Affinity Water
Civil CESWI Amendments

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Purpose

This Specification details the standard Affinity Water (AW) amendments to the Civil Engineering Specification for the Water Industry 7th Edition (CESWI 7) published by the WRc on behalf of Water UK in March 2011.

Scope

The specification contained in CESWI 7 combined with the amendments contained here together comprise the standard civil engineering specification to be applied by all AW staff and Contractors to all construction works carried out for and on behalf of Affinity Water.

Construction works means the carrying out of any building, civil engineering or engineering construction works as defined in Clause 1.1.

Terminology

Whereas CESWI 7 uses the term 'Client', these amendments use the terms 'Employer' and 'Project Manager' to describe the roles attributed to them under NEC3, the New Engineering and Construction Contract, which is the basis for most of AW's contracts.

Additional Specifications or Particular Requirements will be included within the Contract Documentation as required.

Precedence

Insofar as any legislative requirements, contract clauses, special or particular requirements and CESWI amendments or supplementary clauses may conflict, or be inconsistent within contract documents, the prevailing requirements shall be as follows-

Legislative requirements shall take precedence over any other stated requirements.

The precedence of all other requirements, in order, shall be Contract core clauses, Contract additional clauses, Works Information (Contract drawings, site information, particular requirements, CESWI supplementary or amended requirements) and finally CESWI 7.

Clause Numbering

Where clauses in CESWI have been altered, extended or enlarged upon, the additional special clause paragraphs have been numbered in sequence with the clause and paragraph numbering in that document. Additional Special Clauses relevant to each section of the specification have been numbered to follow the last clause of that section.

Contents

SECTION 1

GENERAL

Specification - Supplementary Clauses

1.1 Definitions

7. "RFQ" means Request for Quotation.

8. "Construction Work" means the carrying out of any building, civil engineering or engineering construction work and includes;

   a) The construction, alteration, conversion, fitting out, commissioning, renovation, repair, upkeep, redecoration or other maintenance (including cleaning which involves the use of water or an abrasive at high pressure or the use of corrosive or toxic substances), decommissioning, demolition or dismantling of a structure;

   b) The preparation of an intended structure, including site clearance, exploration, investigation (but not site survey) and excavation (but not pre0construction archaeological investigations), and the clearance or preparation of the site or structure for use or occupation at its conclusion;

   c) The assembly on site of prefabricated elements to form a structure or the disassembly on site of the prefabricated element which immediately before such disassembly, formed a structure;

   d) The removal of a structure, or of any product or waste resulting from demolition or dismantling of a structure, or form disassembly or prefabricated elements which immediately before such disassembly formed a structure;

   e) The installation, commissioning, maintenance, repair or removal of mechanical, electrical, gas, compressed air, hydraulic, telecommunications, computer or similar services which are normally fixed within or to a structure.

1.5 Tidiness of the Site

5. The Contractor shall ensure that spoil or imported material does not accumulate to an unreasonable level on the work area during the work particularly on highways or in pedestrian areas where access is restricted. As soon as possible but within the NRSWA noticing periods after completion of the whole or an appropriate section of the work the work area shall be cleared of all materials and equipment and left in a clean condition.

6. This Clause replaces Clause 1.5.2.

   All pipelaying equipment and materials shall be stored in positions agreed with the Project Manager, Street Authority or Landowner and stacked or stockpiled safely,

neatly and securely. Pipelaying materials shall be stored to prevent any contamination prior to their use.

7. The Contractor shall be responsible for obtaining any necessary licences required for the storage of pipelaying materials or equipment.

1.7 Survey of Highways, Properties and Lands

5. The Contractor shall ensure that adequate consultation takes place with all interested parties including where necessary, Developers, Highway Authorities, Transport and Local Authorities, Archaeological Depts. of County Councils, Canal and River Trust, Environment Agency, Heritage England and Natural England. Consultation and any necessary site meetings shall begin before work commences on site.

6. In private land or where there is potential for dispute, photographic and written records shall be made by the Contractor of the condition of the work area before work is commenced. Situations may arise on cross country pipelines where the Employer wishes that such pre-entry records are prepared and agreed with the interested parties by the Employer's land agent. In such circumstances this will be stated in the RFQ.

7. For works in the highway the Contractor shall, prior to the project commencement, make a video recording of the proposed route and include an audio commentary of the conditions found and any risks/issues identified.

   The Contractor shall keep the recording for a period of two years from the completion of the Works and make available to the Employer or Project Manager upon demand.

8. For works in the highway the Contractor shall immediately prior to closing highway notices obtain a photographic record of the site covered by the notice to demonstrate that conditions required for closure of the notices are met.

   The Contractor shall keep the recording for a period of two years from the completion of the Works and make available to the Employer or Project Manager upon demand.

1.8 Levels and Reference Points

2. Levels and positions given are based on levels and positions shown on existing drawings. The Contractor shall check that these are compatible with the new works and inform the Project Manager of any discrepancies.

3. Levels shown on drawings shall be in metres above Ordnance Datum (Newlyn).

4. In the case of trunk water main schemes, the Contractor will be required to carry out a ground survey to ascertain existing topographical levels and details required for the purposes of his design.

5. The Contractor shall provide all the labour and equipment required for accurately setting out and measuring up of the works and to obtain records and check accuracy during progress.

6. Design flood levels shall take account the asset life and not only the relevant climate change scenario for fluvial events but also localised pluvial effects and historical artesian conditions. In all cases design flood levels shall be, as a minimum, 300 mm above the level associated with a 1:100 year plus 20% flow event.

1.9 Site Fencing and Gates

2. Clause 1.9.2 is deleted.

5. In private land the Contractor, or Employers land agent if appointed, shall agree with the landowner / occupier's appropriate temporary fencing and gates to the work areas. Such fencing and gates shall be erected before commencing any other work in that portion of the site (not including surveying or ground investigation works).

6. Fencing shall be erected as soon as possible and shall be inspected and maintained without delay throughout the duration of the work. Access through temporary fencing shall be provided for the reasonable requirements of those having an existing right to pass over the work area.

7. Notwithstanding the requirements of Safety at Street Works and Road Works a Code of Practice, the Contractor shall provide and maintain temporary fencing for the work areas. It shall be sufficient to offer suitable protection for health and safety purposes.

   It is anticipated that extensive use of mobile security fencing will be required in urban areas and the Contractor must include for this in his rates and prices.

8. Temporary fencing shall be removed as soon as it is no longer required and this shall, where necessary, be undertaken in stages as the work progresses.

9. Where required to replace or erect permanent fencing it shall comply with the relevant provisions of the appropriate Part of BS 1722. All timber shall be given preservative treatment in accordance with the provisions of the relevant standard to meet the approval of the landowner / occupier.

1.10 Interference with Land Interests

4. Caravans or other accommodation for residential use will only be permitted with the agreement of the Employer.

5. All design and installation of works in private land shall comply with the requirements set out in the Employer's Code of Practice for excise of powers under Sections 159 and 161(2) of the Water Industry Act 1991 and LRLG0001 AWC Main Laying on Private Land Policy.

6. Negotiations shall not take place between the Contractor and landowners that may affect the interests of the Employer without the prior agreement of the Project Manager.

7. Any repair or replacement of Land Drainage shall be undertaken in accordance with Clause 3.12 and the Technical Note on the design of field drainage system (MAFF/ADAS) Booklet 345 and the Land Drainage Contractors Association publication, pipeline reinstatement drainage.

8. Material that must be removed from the work area in order to execute the works or other finds such as coins or articles of antiquity may have a residual value that remains the property of the Landowner. The Contractor shall not remove any material from the work area without the agreement of the Project Manager.

9. The Contractor shall not allow his employees or any sub-contractor or their employees to shoot, trap, fish or to disturb game or livestock within or adjacent to the work area.

10. The Contractor shall not allow his employees or any sub-Contractor or their employees to bring any animal on to the work area, excepting guard dogs subject to the provisions of the Guard Dogs Act 1975 and with the express agreement of the Project Manager.

1.13 Protection Against Damage

4. The Contractor shall ensure that no fuel oil, lubricating or hydraulic fluid or other potentially dangerous substances spill on to the work area. Any material contaminated by fluids shall be removed from the site and disposed of in a responsible manner at the Contractor's expense.

5. Where land, including grass, shrubs and trees, and fencing including gates, have been damaged or removed in pursuance of the works, they shall be replaced with new to a similar or better standard and in the case of fencing, of sufficient overlap to retain the integrity of the barrier.

1.15 Works Affecting Watercourses

6. The Employer is responsible for the discharges to controlled waters and sewers from its activities. Discharges that cause damage to controlled waters or sewers can lead to the company being prosecuted and damage its reputation. The contractor is therefore required to work in a way that will minimise this risk.

7. The Contractor shall not undertake work that affects a watercourse without the prior agreement of the Environment Agency or other supervising authority.

8. Unless otherwise agreed by the Environment Agency all watercourses within the work area of the works shall be maintained to accommodate their maximum flow capacity during the works.

9. No discharges shall be made into any watercourse, drain or sewer without the written permission of the Environment Agency or drainage authority.

10. Before commencing work affecting any watercourse, drain or sewer the Contractor shall ascertain the effect of any diversion or stoppage of the watercourse on land or property upstream or downstream and notify Environment Agency or other supervising authority.

11. Any water discharged into a watercourse drain, or sewer shall not contain significant quantities of suspended matter or be polluted chemically (even with chlorine) or bacteriologically. If necessary, measures will be taken to eliminate or reduce to an acceptable level such pollution before discharge all subject to the appropriate consent from the Environment Agency or drainage authority.

12. The Contractor shall take all possible precautions to prevent any substance, excepting uncontaminated, dechlorinated water to enter a watercourse drain, or sewer. Should such an incident occur it shall be reported immediately to the Project Manager and Environment Agency.

13. The Contractor shall be responsible for obtaining all consents for works affecting watercourses, canals, lakes, reservoirs, boreholes, aquifer, designated flood catchments and land or road drainage and sewers.

1.17 Apparatus of Statutory Undertakers, Highway or Roads Authority and Others

5. The Employer, within its service area, holds records for clean water, customer locations and Ordnance Survey background and topological mapping within their geographical information system (GIS). The Employer can also obtain from other Undertakers gas, electricity, wastewater and cable records as requested. The Contractor may use these records and print paper copies as required. The Employer does not accept any liability for the accuracy or completeness of these records.

6. The Contractor shall satisfy himself, if necessary, by further investigation, that all reasonable efforts have been made to determine the existence and position of any plant or apparatus which may affect or be affected by the works.

7. If it is found necessary, the Contractor will arrange, after notifying the Project Manager of his intention, to divert, replace, support or protect any plant apparatus or structure affected by the works. Any such activity shall be carried out in accordance with the requirements of the owners or operators of the plant apparatus or structures affected by the works.

8. Proposed works affecting fire hydrants should meet the approval of the Fire and Rescue Authority. The Contractor should obtain written approval of all agreed changes to existing fire hydrants in design of mains renewals or diversions and all new hydrants in design of new mains installations. A schedule of such agreement will

be maintained by the Contractor and provided to the Project Manager at monthly intervals.

1.18 Traffic Requirements

12. Turning space for vehicles must always be available within the site for all vehicles during construction.

13. In addition to that set out in Clause 1.18.1, the Contractor shall comply with the code of practice, "safety at street works and road works" (www.gov.uk/government/uploads/system/uploads/attachment_data/file/321056/safety-at-streetworks.pdf) and the relevant provisions of 'An Introduction to the use of Portable Vehicular Signals' published by the Department for Transport (www.gov.uk/government/publications/introduction-to-the-use-of-portable-vehicular-signals) In all instances the Contractor shall hold sufficient stocks of cones, lamps, barriers, signs etc to ensure availability to cover loss, damage etc.

14. For the avoidance of doubt the Contractor is deemed to have included in his rates and prices for work in connection with signing, lighting, guarding and traffic management in general as detailed in Safety at Street Works and Road Works, A Code of Practice, which extends to the use of multiple traffic control signal heads. Where such work is outside the scope of this Code it will be valued based on the Schedule of Cost Components.

15. A closure of a road, footway or other way may be necessary to undertake the work and the Contractor shall advise the Project Manager if he believes such a closure may be necessary. In the event of such a closure being necessary the work cannot be commenced until the expiration of the statutory notice period required under the provisions of the New Roads and Street Works Act 1991, and the Traffic Management Act 2004, this will in practice take at least six weeks from when the closure is requested of the Street Authority. The Contractor shall design, provide, erect and remove the signing required by the Street Authority to affect the closure. If a way must be closed by the Contractor due to unforeseen emergency the Contractor shall notify the Project Manager, the Street Authority, the Emergency Services and Public Transport Operators without delay after such a closure. Because of the variable nature of closures items have not been included in the work schedules. The Schedule of Cost Components will be used to value the implementation of signing for closures.

16. When working in a highway the Contractor shall organise and control his activities to minimise any disruption to traffic and pedestrians. If the Contractor occupies part of the highway in order to undertake the work, he shall always maintain free passage to vehicles and pedestrians on the remaining part of the highway.

17. Care shall be taken to avoid excavation close to trees but if this is unavoidable then the Contractor shall comply with NJUG publication Volume 4 Guidelines for the Planning, Installation and maintenance of Utility Services in Proximity to Trees. http://www.njug.org.uk/publication/51

1.19 Emergency Arrangements

3. The emergency service for dealing with issues arising from the works shall be maintained continuously, 24 hours/day, 7 days /week.

4. The Contractor shall provide the Employer and Project Manager with a roster of managers and supervisors, (with telephone numbers) sufficient to enable the out of hours work to be adequately managed and response times to be achieved.

5. The Contractor shall have available sufficient resources to attend to issues, particularly those relating to safety and to working in the highway.

6. If the Contractor fails to meet the requirements, the Employer may deploy other resources to undertake the necessary remedial works and the cost of such undertaking will be deducted from any payment otherwise due to the Contractor.

1.21 Environment and Sustainability

4. For the purpose of the Control of Pollution Act 1974 and any statutory modification or re-enactment thereof or any regulations made thereunder, and with particular reference to Part II (Pollution of water) and Part III (Noise), the Environmental Protection Act 1990, the Water Act 1989 (as amended) and the Control of Pollution (oil storage) Regulations 2001, the Contractor shall be deemed to be the person responsible for and having control over the carrying out of the Works. The Contractor shall indemnify the Employer against the consequence of any notice served on, or any complaint laid, or proceedings taken against, the Employer under the Act. Provided that the Contractor's liability to indemnify the Employer shall be reduced proportionately to the extent that such notice, complaint or proceedings may be the result of an act or neglect of the Employer his agents, servants or other contractors (not being employed by the Contractor).

5. The Contractor shall, in carrying out works, conform to the Noise at Work Regulations 2005, take all practicable precautions to prevent or reduce any noise or inconvenience to the owners, tenants or occupiers of adjacent properties and to the public generally, and shall use all reasonable means to keep noise and vibration to a minimum. He shall use such plant and employ such methods as are necessary to keep within the noise limits laid down by the local Authority. He shall also comply with the recommendations set out in BS 5228 – Code of Practice for Noise and Vibration Control on Construction and Open Sites. Special measures, where appropriate or when required by the Project Manager, shall be taken in the vicinity of hospitals, schools and similar institutions.

6. The provision of traffic light units employing diesel powered generator by day, that charge batteries for night-time operation, shall not be considered as special measures. Whenever practicable traffic lights should be powered by mains electricity and not a diesel-powered generator.

7. Without limiting his obligations and responsibilities, as stated above, the Contractor shall be deemed to have included in his tender for the compliance with all the relevant requirements and recommendations of BS 5228.

8. The Employer has not applied to the local authority for consent under Section 61 of the aforesaid Act, and the Contractor shall be responsible for applying for any such consent he may consider to be advisable.

9. The Contractor shall, in carrying out works, prepare a Site Waste Management Plan in accordance with CR503 (Site Waste Management Plans). The SWMP shall be prepared by the Contractor in consultation with the Project Manager and Employer and will contain a declaration that the Employer and Contractor will take all reasonable steps to ensure that all waste from the site is dealt with in accordance with the Waste (England and Wales) Regulations 2011 and that materials will be handled efficiently and waste managed appropriately.

   During the works the SWMP shall be made available on site and updated by the Contractor to satisfy the requirements of the Regulations.
   The Contractor shall retain the SWMP for a period of two years after completion of the Project.

1.25 Protection of Water Quality

1. General

   Water Companies have a statutory duty to provide 'wholesome', as defined in The Water Supply (Water Quality) Regulations 2010 and the Water Industry Act 1991. The Contractor must be aware of the need to demonstrate measures to protect, and not to prejudice the wholesomeness of any water supply. This section of the specification sets out the requirements necessary to minimise risks to water quality.

   For all materials that are to come into contact with potable water reference shall be made to the current list of approved substances prepared by the Drinking Water Inspectorate and to the current issue of the 'Water Fittings and Materials Directory' published by WRc.

   The Contractor shall comply with the Employer's policies, procedures, work instructions and operational practices.

2. Storage and installation of materials

   Materials should be transported, stored and installed in such a way that prevents contamination affecting them. It is therefore essential that they are stored in a manner that prevents ingress of soil, waters or contact with any other contaminants that may render them unfit for use. For example, pipe ends must be capped during delivery, storage, transportation and laying and whenever work stops for an extended period e.g. overnight.

Pipes and fittings must be laid hygienically, and all steps shall be taken to prevent the ingress of any foreign matter to the internal bore of the pipeline and jointing area during installation.

3. Ground contamination

The Contractor shall comply with the Employer's procedure NW053.

If at any stage during installation, it is apparent or suspected that the ground is contaminated or has been contaminated, installation work must stop immediately, and the Project Manager must be informed. Work shall not be resumed until permission is granted by the Project Manager after consultation with the Employer.

Where ground contamination or a risk of such has been identified at the design stage of any works, the Project Manager will consult the Employer's Operations Scientists. The Project Manager may then require designs to include the use of pipe systems with appropriate protection of water quality and the use of imported stone pipe surround if not already specified. Contamination can often occur where 'brown-field sites' are being re-developed.

4. Cleaning and disinfection

All new pipework with a nominal bore greater than 26 mm (32 mm outside diameter in the case of polyethylene) must be flushed, swabbed and disinfected. Smaller pipework i.e. for service pipes must be flushed and the water subjected to odour sampling as SSO-101 AW Water Quality Sampling Procedure.

Pipework repaired by the Contractor shall be subjected to spray chlorination and flushed immediately after the repair is completed. NW033 AW Network disinfection must be fully complied with. No valves will be subsequently operated without authorisation from the Employer as per NW103 Authorisation to access the network.

Any water used in swabbing, flushing, cleaning, pressure testing, disinfection and commissioning of the works shall be potable water from the Employer's distribution network and be accounted for. The volume of such process water will be recorded by the Contractor and reported to the Project Manager at monthly intervals.

The Contractor shall comply with NW010 Discharge to watercourses.

Where normal flushing cannot be carried out, or where there are particular difficulties, e.g. where a divisional valve has to be operated then the Contractor shall submit a method statement (AW0282 Method Statement Guidance Note) for agreement by the Project Manager prior to the flushing being undertaken.

The Contractor shall be given reasonable notice of when flushing/swabbing will take place so that the process can be audited.

The Contractor shall provide a programme of planned work including in advance of when disinfection of mains is being carried out in order that the process may be audited

Any emptying arrangements for mains shall be provided with back siphonage protection

5. Water Sampling and testing

Sampling requirements are documented in NW033. Sampling shall be in accordance with the Employer's document SSO-101 AW Water Quality Sampling Procedure.

Contractor's staff identified to carry out water quality sampling must be trained and authorised by the Employer. Authorised Contractor's staff must be fully and properly equipped to carry out their sampling duties. Particular attention is drawn to the need for electronic chlorine and turbidity meters, sampling box and insulated cool box.

Insulated boxes and sampling kits must be subjected to frequent and regular disinfection and a record must be kept for inspection as per SSO-101 AW Water Quality Sampling Procedure.

Contractor's staff without Sampling Authorisation shall not take samples.

The Employer will provide sample bottles.

A Sample Record shall be completed for all water quality samples taken. All samples shall be labelled.

Samples must be kept in an insulated box and delivered to the Employer's laboratory with the appropriate paperwork within 6 hours of sampling for planned work or 24 hours for unplanned work if kept in a dedicated refrigerator and transported in an insulated box.

Samples requiring analysis out of normal laboratory working hours shall be by appointment only.

If water quality sample results or records from work carried out on the distribution network do not meet the Employer's standards, the Contractor shall take immediate action as the Project Manager requests to be necessary to remedy the situation and protect customers from receiving a water supply that is unwholesome or unfit for human consumption. The Contractor will be required to meet any additional costs.

6. Connecting to existing network

The Contractor shall not connect any new main to the Employer's distribution network without prior consent by the Employer and the Project Manager.

Water quality sampling must be carried out following any mains connection to the network.

On-line renewals by trenchless methods such as pipe bursting and lining of mains are exempt from the above Clause, but specific procedures apply and are detailed in Section 15 Trenchless Techniques.

The Contractor shall not connect any pipe, fitting or any apparatus to the Employer's distribution network, which may cause contamination of the water, which it contains. All temporary connections, which extract water from the distribution network, shall be fitted with a double check valve.

7. The Contractor shall comply with the requirements of the all Guidance notes, policies, procedures and standards referenced under the Related Documents section at the end of this document:

1.26 Communication Requirements

1. The Contractor shall provide suitable equipment to ensure that all staff employed on the contract shall be readily contactable by the Project Manager. The Contractor shall provide a schedule of how staff may be contacted, including any telephone numbers. Field staff who may be required to contact the Employer's staff to confirm their identity shall be provided with a suitable mechanism to do so.

1.27 Employer's Working Time

1. The Contractor should note that the normal working hours of the Employer's operational staff available to provide routine support, is at variance with the Normal Working Hours as defined elsewhere in the Contract. The Contractor is required to programme his activities to accommodate this.

Operational support	08.00 –16.00 Monday – Thursday 08.00 – 15.30 Friday
Call centre	24 hrs – 7 days

1.28 Pipe Samples

1. The Employer wishes to take available opportunities to collect samples of existing mains and service pipes for condition assessment. Specific requirements will be instructed from time to time or identified in the RFQ. Sections of pipe removed in the normal course of the works, including connections to the network, or service pipe

reconnection, are to be offered to the Project Manager prior to disposal. If the Project Manager decides that the sections of pipe are of use in condition assessment they shall be returned to the Contractor's depot and the Project Manager informed so that collection can be arranged.

2. Where expressly required the Contractor shall recover a 500 mm length of pipe and as quickly of possible place it in the plastic bag provided by the Employer. If it is not possible to take a 500 mm length, smaller samples may be acceptable. Where instructed the Contractor shall also take a soil sample, representative of the material that was in contact with the pipe and place that in the container provided. The samples should be labelled stating the location and date when the sample was taken. The sample should be returned to the Contractor's depot and the Project Manager informed so that collection can be arranged.

1.29 Materials Purchased by the Contractor from the Employer / Joint Framework

1. The Framework Information refers to the requirements regarding materials purchased under a jointly negotiated framework agreement.

   The existence of such an agreement or its contents shall not limit the Contractor in seeking to provide the best value or innovation in terms of material selection. The Contractor is encouraged to amend and improve supply arrangements where there is benefit.

2. If a supplier under a framework agreement defaults putting the delivery of the works at risk, then the Contractor shall advise the Project Manager and seek an alternative source of supply.

3. All materials supplied by the Contractor shall comply with the relevant British Standard (BS), or European Standard (EN) or International Standard (ISO) and Water Industry Standards (WIS).

1.30 Material Provided by the Employer.

1. No materials will be provided by the Employer, except in the event of an emergency or other special circumstance as instructed by the Project Manager.

1.31 Storage Handling and Use of Materials

1. All materials supplied by the Contractor and processes using them shall comply with the latest and relevant British Standard (BS), or European Standard (EN) or International Standard (ISO), and Civil Contract Engineering Specification for the Water Industry and their Codes of Practice.

2. The Contractor shall ensure that all pipework and fittings are stored to the manufacturer's recommendations. Valves and rubber jointing rings shall be stored such that they cannot be damaged by ingress of water and subsequent frost, nor subject to hot sun for long periods.

3. All Reinstatement and Backfill Materials shall comply with the Specification for the Reinstatement of Openings in Highways. (issued by HAUC).

SECTION 2

MATERIALS

Specification - Supplementary Clauses

2.16 Cement

4. Cement shall be stored in dry, weatherproof buildings with adequate ventilation. Bags of cement shall be stored on wooden slats raised above ground level to allow effective circulation of air.

2.20 Concrete – General

6. Typical use for designed mixes:

Class	Cube Strength N/mm^2	Typical Use
C8/10	10.0	Trench backfill, pipe surround, fence post anchors
C12/15	15.0	Un-reinforced thrust blocks
C20/25	25.0	Reinforced weight or thrust blocks, reservoir upstands and similar

7. Aggregate shall be to BS EN 12620 maximum size 20 mm

8. Exposure class shall be XC2

9. Chloride content class shall be Cl 0,20

2.24 Concrete – Air Entrained

2. This clause replaces Clause 2.24.1

Concrete mixes shall not include any air-entraining agents, cement replacement materials or admixtures without the approval of the Project Manager.

2.32 Doors Frames and Linings

4. Except where specified otherwise, new internal doors shall be good quality 44 mm thick veneered flush doors with solid core, solid frame and lipping. 1/2-hour fire rating shall apply.

2.36 Ductile Iron, Cast Iron and Steel Pipes, Flanges and Fittings

10. The Contractor shall ensure that all pipework and fittings are stored in compliance with the manufacturer's recommendations. Valves and rubber jointing rings shall be stored such that they cannot be damaged by ingress of water and subsequent frost, nor subject to hot sun for long periods.

11. All new pipes shall be stored with protective end caps in place to prevent access by foreign matter. End caps shall only be removed immediately prior to installation of the pipe.

12. The normal working pressure will be stated in the RFQ for Design. The pressure rating of the pipe shall be selected by the Contractor during design considering the proposed operational regime and the requirements of Clause 7.9.

2.46 Foamed Concrete

2 Foamed concrete containing Incinerator Bottom Ash (IBA) shall not be used. Only foamed concrete containing exclusively inert materials will be permitted.

2.52 Glass Reinforced Plastics (Grp) Pipes and Fittings

2. The normal working pressure will be stated in the RFQ for Design. The pressure rating of the pipe shall be selected by the Contractor during design considering the proposed loading, operational regime and the requirements of Clause 7.9.

2.66 Joint Filler Board

6. Preformed filler for joints in concrete shall be Hydrocell as manufactured by Expandite Ltd. 1-9 Chase Road, London, NW10 6PS.

2.67 Joint Sealing Compounds and Sealants

7. Joint sealing compound for potable water retaining structures and pre-cast concrete duct covers shall be Nitoseal MS600 - Fosroc Ltd, Drayton Manor Business Park, Coleshill Rd, Tamworth B78 3XN.

8. All jointing materials shall be stored and used strictly in accordance with the Manufacturer's instructions.

2.78 Mechanical Couplings for Pipelines and Fittings

6. The normal working pressure will be stated in the RFQ for Design. The pressure rating of the pipe shall be selected by the Contractor during design taking into account the proposed loading, operational regime and the requirements of Clause 7.9.

2.82 Mortar

5. Mortar for brickwork above DPC shall be Class M3, 1:1:5. Mortar for engineering brickwork shall be Class M1.

2.86 Nuts, Screws, Washers and Bolts

7. All nuts, bolts, screws and washers shall be galvanised unless specifically stated otherwise.

2.97 Polyethylene Pipes and Fittings

6. Polyethylene piping systems for cold potable water supply exceeding 90 mm diameter shall be PE100.

7. The normal working pressure will be stated in the RFQ for Design. The pressure rating shall be selected by the Contractor during design taking into account the proposed operational regime and the requirements of Clause 7.9.

2.124 Surface Boxes and Guards

11. Telescopic valve spindle extensions are preferred by the Employer. Kettler, or similar approved by the Project Manager, are acceptable and shall be installed in accordance with Drawing AW4834-2015-01.

2.129 Unplasticised PVC Pipes and Fittings

8. uPVC pipes shall be of molecular orientated PVC. The normal working pressure will be stated in the RFQ for Design. The pressure rating of the pipe shall be selected by the Contractor during design taking into account the proposed loading, operational regime and the requirements of Clause 7.9.

2.143 Roof Waterproof Membrane

1. The materials to be used for the waterproof membranes for the sealing of reservoir roofs shall be agreed in each case and are identified in the schedule of rates.

2. The roof membrane shall be watertight and tested for leaks as detailed in clause 14.8 ‘Testing for Water Tightness’.

SECTION 3

EXCAVATION, BACKFILLING AND RESTORATION

Specification - Supplementary Clauses

3.1 Excavation

9. No excavation shall be kept open longer than is necessary to carry out the works.

10. The excavation sides shall be even and vertical or battered with no significant undercutting of the original surface. If any undercutting occurs, measures shall be taken to fill any voids as soon as possible.

11. Where works are to be undertaken close to existing structures the Contractor shall take any precautions necessary to support the structure whilst the works are in progress and shall use appropriate methods of excavation which minimise any likelihood of damage to the structure.

12. This Clause replaces Clause 3.1.8

    Trenches for pipes carrying water under pressure shall be excavated to a sufficient depth to ensure a minimum cover of 800 mm to the top of the pipes in the case of network distribution mains and 900 mm to the top of the pipe in the case of trunk mains or mains over 300 mm nominal diameter. Wherever practical pipes should be laid as close as possible to minimum cover, whilst maintaining a minimum gradient of 1:500 to avoid trapping of air within the main.

13. The Contractor shall make every effort to avoid damage or deterioration to the formations or final exposed surface of the excavation.

14. If ground in the final exposed surface of the excavation is encountered which is considered unsuitable to support the pipework or thrust blocks or to give adequate bearing to the reinstatement of the excavation, the Project Manager shall be promptly informed.

15. The Contractor shall, where topsoil exists, keep it separate from other excavated material. Excavated material suitable for reuse shall be retained at the work area and protected from excessive drying or wetting, Material shall also be stored and handled to avoid contamination or the loss of fines or growth of weeds.

3.2 Relaying Turf

3. If reinstatement is to be carried out using turf cut at commencement of the works then Turf shall be cut to 1000 mm. x 300 mm. x 40 mm. depth. It shall be green when cut and shall be stored in stacks and kept moist. It shall be laid within 1 week of cutting if the cutting occurred between 1st. April - 31st. Aug. or 2 weeks if cut at any other time

of year. Turf not re-laid within these periods shall be regarded as topsoil. Turf shall be laid level, be compacted and watered at the time of laying.

3.6 Backfilling

6. Backfilling shall ensure that the backfill material is evenly dispersed and compacted around any pipes or apparatus laid within the excavation.

7. Where marker tapes are required, they shall be placed in the backfill material above the crown of the pipe at a depth of 450 mm. from the surface.

3.7 Reinstatement of Maintainable Highways

5. For the purposes of implementing the Specification where reference is made in Specification for Reinstatement of Openings in the Highway to the Undertaker then the same responsibilities and liabilities shall apply to the Contractor.

6. At design stage, the Contractor shall check and verify with the Street Authority that the type and category of the reinstatement that the Contractor proposes is appropriate.

7. The Contractor shall carry out all reinstatements in accordance with this Specification and shall guarantee the performance of the permanent reinstatement for 2 years or in the case of deep openings 3 years of the final reinstatement having been registered with the Highway Authority. If, at any time during the interim reinstatement or maintenance periods, the reinstatement fails the performance requirements of this Specification, the Contractor shall be held responsible and carry out remedial action to restore the reinstatement to the standard set out in this Specification.

8. The Contractor should normally use Method A, All Permanent Reinstatement, (known as first hit reinstatement) as set out in Specification for the Reinstatement of Openings in the Highway. If the Contractor wishes to use Methods B or C (second hit reinstatement) this must be done with the express permission of the Project Manager.

   If methods B or C are adopted permanent reinstatement must be completed within 30 days of the site clear notice being issued.

3.9 Reinstatement of Unpaved Land

6. Preparation of the surfaces prior to top soiling shall include elimination or removal of all weed growth, rubbish and demolition rubble within the area to be topsoiled.

7. A suitable fertiliser as detailed in Clause 2.39 shall be applied at the rate of 40 grams/sq. metre.

8. Grass shall be sown at the rate of at least 30 grams/sq. metre with a mixture chosen from Mixtures 2, 3 or 4 of Clause 2.55 appropriate to the soil type.

3.17 Reinstatement of Miscellaneous Structures.

1 Any wall, fence, gate and other structure disturbed by the works shall be reinstated to a condition as close as is reasonably practicable to its original condition or to an alternative condition specified by the Project Manager.

3.18 Modular Pavements.

1. Modular pavement units shall be reused wherever possible. Prior to opening pavements of modular construction, the Contractor is to agree with the Highway Authority the extent of existing damage/potential re-use of modules. The Contractor will then be reimbursed by the Highway Authority for the provision of replacement modules to the extent of the agreed existing damage level. Failure to reach such an agreement will render the Contractor liable for replacement of all damaged modules.

3.19 Reinstatement Other Than Streets.

1. Private grounds, including fences trees and shrubs, and paved areas shall be reinstated to match or exceed the existing construction in agreement with the landowner. Every care shall be taken to match the colour, texture and levels of the reinstatement as closely as reasonably possible with the existing finishes.

SECTION 4

CONCRETE AND FORMWORK

Specification - Supplementary Clauses

4.15 Fixing of Reinforcement

4. The Contractor shall provide details of the location, spacing and type of support to reinforcement for the approval of the Project Manager.

SECTION 5

CONSTRUCTION OF PIPELINES, TUNNELS AND ANCILLARY WORKS

Specification - Supplementary Clauses

5.1 Pipelaying Generally

9. This Clause replaces Clause 5.1.4

Any protective cap, disk or other appliance on the end of a pipe or fitting shall only be removed permanently when the pipe or fitting which it protects is about to be jointed. Any exposed pipe ends shall be capped and sealed when pipelaying is not actively being carried out to prevent the ingress of water and other foreign matter entering the pipework. Pipes and fittings, including any lining or sheathing, shall be examined for damage and the joint surfaces and components shall be cleaned immediately before laying.

10. This Clause replaces Clause 5.1.6

Where required, marker tape in accordance with Cl2.27 shall be laid in the backfill at 450 mm. beneath the finished surface. Tape incorporating a corrosion resistant tracing system shall be used above nonferrous pipes and shall be continuous. The tape shall terminate in valve, washout and hydrant chambers, and shall be adequately secured to allow future temporary connection of cable locating equipment that may be used to trace the pipe.

11. The Contractor shall check (if necessary, using trial excavations) and verify as attainable the proposed route for the installation of the pipe and other apparatus. Any reason for not being able to maintain the proposed route shall be reported to the Project Manager.

12. Mains and Services on new developments shall be laid in accordance NJUG publication Volume 2, Positioning and Colour Coding. However, the cover to mains shall be a minimum of 800 mm.

13. Pipe shall be laid and jointed in accordance with the manufacturer's instructions or where these do not exist to other approved standards acceptable to the Project Manager.

14. Any corrosion prevention system that requires on-site application shall be fitted or applied in accordance with the manufacturer's instructions.

15. Pipe and fittings shall be handled and laid in a manner that ensures that no damage occurs to the pipe or fitting or to any coating that may have been applied to them.

16. Polyethylene pipe shall be designed and installed in accordance with the manufacturer’s recommendations.

16. PVC pipe shall be designed and installed in accordance with the manufacturer's recommendations.

17. Ductile Iron mains shall be installed in accordance with manufacturers' recommendations. Attention is drawn to the fact that the current dominant supplier of this pipe in the UK, St Gobain Pipelines, has changed the type of gasket and push fit socket and spigot on pipes supplied by them.

18. Any other agreed pipe material shall be installed in accordance with manufacturers' recommendations. This requirement is of particular relevance where a polyethylene barrier pipe system is being used in land that is contaminated.

19. Marker posts and plates shall be installed at operational fittings and field boundaries in accordance with NW 107, Marker plating and posting of mains valves.

Where location of operational equipment in agricultural land is unavoidable and it is not economic to place the equipment at field boundaries a slalom post shall be installed within the concrete surround to the cover and frame. Such post will be mounted on a spring mechanism that will enable agricultural machinery to pass over the assembly and shall be to the approval of the landowner and Project Manager.

5.6 Thrust Blocks

9. All thrust restraints shall be designed and constructed by the Contractor.

The Contractor shall take full responsibility for all thrust restraints and in the eventuality of a failure shall bear the cost of all remedial works, consequential damage and any third-party claims.

When requested by the Project Manager, the Contractor shall supply details of his designs with supporting calculations.

5.7 Pipe Jointing Generally

7. This Clause replaces Clause 5.7.3

Where PE pipes are used, a fully welded system shall be used, and the number of joints minimised. Butt fusion joints are preferred, and the use of electrofusion couplings shall be limited to that which is essential for the cost-effective construction of the works.

8. Where PE service pipes are used, joints shall be made with proprietary compression fittings.

5.8 Welded Joints in Polyethylene Pipes

4. Hand scraping for preparation of electrofusion joints shall not be permitted. Preparation must be carried out with a proprietary rotary peeler.

5.26 Tolerances

2. All apparatus within the Contractor scope and area of work shall be recorded to a minimum accuracy of +/-100 mm to the centre of the apparatus using a GPS unit capable of obtaining the required accuracy. In locations where poor satellite or mobile signal does not allow recording to the required +/-100 mm accuracy other technology must be employed to maintain the required standard; this shall include the use of a 'Total Station'.

3. If manual observations are recorded they need to be incorporated into the electronic survey and flagged accordingly; these measurements must also be taken to a minimum accuracy of +/-100 mm using at least two fixed positions that will ultimately appear on large scale Ordnance Survey digital maps e.g. building corners, boundary wall corners, kerbs, fence lines etc.

5.34 Service Pipes

1. Service pipe shall be laid where practicable at right angles to the main from which it is connected and in a line between the point of connection to the main to the Undertakers stop valve that will normally be sited adjacent to the boundary of the highway.

2. Service pipes shall not be connected to mains pipe until the following criteria are met:

- The mains pipe has been connected to the Undertaker's distribution network.
- At the point of tapping, water in the mains pipe has been fully replaced within the last 14 days. This may be as a result of natural flow through the main or from flushing.

5.35 Operation of Valves

1. The Contractor shall not operate any existing valves, or other equipment nor shall he operate any valve or fitting installed under the contract without the Employers consent.

5.36 Pipeline Works Documentation Requirements

1. In private land or where there is the potential for dispute, photographic and written records shall be made by the Contractor of the condition of the service area before work is commenced.

2. The Contractor shall ensure that before any work or materials are covered up, the correct dimensions of any such work or materials have been taken and recorded and he has satisfied himself that the works are in compliance with the Contract requirements and that all records necessary to satisfy certification or verification of the quality of the Works have been taken.

3. The position of existing and newly installed mains, apparatus and services shall be recorded especially where there is a change in size, material type, mains laying method, depth or direction, and at minimum intervals of not less than every 25 m.

4. Every junction shall also be measured and recorded together with all inline or associated apparatus including, fittings, valves, hydrants, air valves etc.

5. Depth measurements shall be recorded, where practicable, at 50 m intervals or where a change occurs of more than 10% in depth or direction of the main.

6. Where existing asbestos cement pipes have been replaced as part of a Mains Renewal project; the method of replacement must be clearly recorded, i.e.:

   - On-line by pipe bursting
   - On-line by retaining as a host pipe and lining with a smaller pipe.
   - On-line by retaining as a host pipe and lining with an in-situ spray.
   - Off-line and left abandoned in situ by trenching or directional drilling

7. The survey shall record the position of service connection details, both mains tapping points and boundary stop taps which have been installed or located as part of the Supplier's works. The recorded information will be fed back to the Employer's GIS system to aid future knowledge of network operability.

8. Photographs shall be located using GPS technology and will be made available via a web-based portal into the Contractor's image management system or via regular updates to the Employer's image management system.

9. Photographs shall be digital and shall remain the property of the Employer. They shall be stored by the Contractor in an agreed format and in a manner that can be easily linked to the relevant job and readily accessed by the Employer on request at any time of the day.

10. At the expiry of the Period of Maintenance the photographs shall be supplied to the Employer in jpeg format.

11. The Contractor shall take site progress and quality verification photographs of all works before covering up and provide the Employer with colour images annotated with date, location and description of the work portrayed.

12. In the case of all electro-fusion joints the photograph and welding data should be kept within the same web-based system and all joints should be independently verified to the acceptance of the EFM.

13 As-laid records and drawings submitted by the Contractor shall use the English language and SI units and shall be in two forms: electronic 'As-laid' drawings, and, electronic 'GIS files' outputted directly from the GPS survey data in compatible formats that enable direct upload into the Employer's GIS system.

14. As-laid GIS file submissions shall consist of separate shapefiles for each apparatus (feature) type e.g. main, valve, hydrant, fittings etc. Each feature shall contain the attributes exactly as requested by the Employer's FCL and outputted to the British National Grid (in metres) coordinate system. Within each submission the GIS files will be 'zipped' up along with an Excel (or similar compatible) spread sheet detailing: Employer project and scheme numbers, scheme name, project manager, submission length in metres, survey date, approving agent and Contractor track-sheet references.

15. As-laid drawings shall be produced at a scale between 1:500 and 1:1250; the drawings shall be legible when printed on either A4 or A3 paper and shall not exceed A0 in size. Where the area of survey is extensive, multiple drawings shall be produced. The background Ordnance Survey geography must also be shown; this data will be provided in electronic format to the Contractor by the Employer upon request.

16. All drawings submitted shall carry the Contractors name and a title block with the contract title, drawing title, Employers name, Employers Project number and a reference number forming part of a sequential numbering system for all the Supplier's drawings.

17. Drawings for acceptance shall have a blank space 90 mm x 60 mm provided as an extension of the title block for the Employer's representatives acceptance stamp. Where drawings are revised, the revision letter or number shall be incorporated in the title block and the revision shall be clearly indicated on the drawing with the revision letter or number shown in an adjacent triangle.

18. Drawings submitted for acceptance shall be supported by complementary drawings calculations and information listed in the Schedules and other standard literature and drawings of minor items of plant; small scale detail layouts of plant sub-assemblies which due to scale are unclear on the general layout drawings; and Sub-Contractors' detail drawings which give further information to enable the Employer to satisfy himself that the design and apparatus depicted on the drawings for acceptance complies with the specification.

19. Accepted and Final drawings shall be copied onto computer disc in the latest version of AutoCAD.

20. Calculations shall be submitted in sufficient detail to enable the Employer to check that the size, rating and design of the various items of plant comply with the specification. No acceptance of a drawing will be given until sufficient complementary drawings and other relevant information is provided.

21. As-laid drawings shall be produced from geospatial survey data contained within a GIS or CAD system and saved in PDF or a similar acceptable format as agreed with the Employer.

22. As-laid records produced or supplied by the Contractor must accurately depict the scope of works and any associated apparatus installed at the time of taking over. The Contractor shall also record the size and position of any thrust blocks, obstructions or other utilities installed or found during the works.

23. As-laid drawings shall show, as a minimum, individual mains that have been put into service, together with details of any associated service pipes (if applicable) and any other apparatus such as, mains tapings, boundary boxes, valves, hydrants, air valves etc.

24. Newly installed apparatus shall be marked clearly on the drawings to distinguish it from existing apparatus. Newly installed mains shall be shown colour-coded by installation technique. Any abandoned or decommissioned infrastructure shall also be identified and shown on the as-laid records.

25. Record drawings shall have a title block which includes the Service Order number and which of the work streams, project or programme it relates to, date of issue (Version Control), a legend clearly showing which features are displayed on the drawing, an arrow indicating North and a bar or numeric drawing scale.

26. The record drawing shall be clear and easy to read at all times; where areas are ‘busy’ or complex e.g. at pipe junctions with multiple fittings, detail ‘cut out’ boxes at a scale large enough to adequately see and read the detail and any associated annotations is required to be added within the drawing. Where necessary a cover sheet to be attached providing attribute details e.g. size, make etc. of valves.

SECTION 6

BUILDING WORKS

Specification - Supplementary Clauses

6.2 Brickwork and Blockwork, Jointing and Pointing

3. Except where specified otherwise, the brickwork bond shall be consistent with that of adjacent structures.

4. Except where specified otherwise, external facing brickwork shall be finished with weathered joints 3 mm deep formed before the mortar has set.

5. Brickwork or blockwork for internal surfaces which are not to be rendered or plastered shall be finished with a flush joint as work proceeds.

6. Except where specified otherwise, engineering brickwork shall be built in Class M1 mortar. Other brickwork shall be in Class M3 mortar.

7. Where blockwork is used to fill existing window and door openings as a security measure, it shall be tied to the existing structure using 'Firfix' or similar. It shall be fair faced internally and finished with three coats of emulsion paint. Externally the joints shall be raked out to form a key. Sand/cement render shall be applied and finished with two full coats of external quality masonry paint to the manufacturer's specification.

6.14 Concrete Floor Finishes

5. Except where specified otherwise, concrete floor finishes shall be fair.

6. Floors in buildings and plant areas shall be laid to falls with sufficient drainage to ensure that condensation, leaks, weeps etc. do not result in the formation of puddles. Drainage channels and/or sumps shall be provided as necessary.

6.38 Built-In Articles

1. Articles to be fixed in brickwork, blockwork and masonry shall be built-in as work proceeds. Where this is impracticable the Contractor shall use preformed profiles to form pockets of the required size and shape to allow the articles to be subsequently built in.

SECTION 7

TESTING AND DISINFECTION

Specification - Supplementary Clauses

7.1 Cleaning and Swabbing of Pipelines

4. This Clause replaces Clause 7.1.2

On completion of the hydraulic test on water mains, a foam swap shall be passed through the main a sufficient number of times to achieve clear wash water. Clear wash water shall be defined as having a turbidity of less than 1 NTU (Nephelometric Turbidity Units).

5. Swabs shall have a density of 20 - 25 kg/m^3, minimum tensile strength 95 kN/m^2 and a hardness (at 50% deflection to BS4443 Parts 1, 2 and 4) of 19 to 23 kg.

The diameter of the swab shall be as follows:

- Hard swabs: nominal bore of main
- Soft swabs for mains up to and including 300 mm: nominal bore + 25%
- Soft swabs for mains greater than 300 mm: nominal bore + 75 mm

The length of the swab shall be 1.5 times its diameter.

7.3 Testing Method Programme and Notification

1. This Clause replaces Clause 7.3.1
The proposed programme and method of testing and swabbing shall be determined by the Contractor during the design stage and submitted to the Project Manager at Design Review for acceptance.

4. The normal working pressure will be stated in the RFQ for Design.

5. Unless expressly agreed by the Project Manager the pressure testing of pipe shall be hydraulic. All new Mains of 80 mm dia. and above shall be hydraulically pressure tested. (See also sub-clause 11).

6. Pipes which form a repair or a connection to the existing distribution system (which is done in isolation from new pipework) shall be subject to visual inspection for water tightness when subjected to the pressure in the adjacent distribution system. All such pipes and connections should be free of visually identifiable leakage.

7. All new service pipes less than 80 mm dia. and greater than 50 m in length shall be hydraulically pressure tested.

8. All service pipes less than 50m in length and repairs or replacements of service pipes shall be subject to visual inspection for water tightness when subjected to the pressure in the adjacent distribution system. All such pipes and connections should be free of visually identifiable leakage.

9. The length of pipe to be tested shall, subject always to the individual circumstances of the work area, not exceed 1000 m.

10. Unless expressly approved by the Project Manager, the Contractor shall plan his work activities such that pipe laid does not exceed that successfully pressure tested by more than 2000 m per package order.

11. If pipes are laid by a lining technique requiring a pressure reversion then under normal circumstances the reversion process exceeding the test pressure will deemed to have met the requirements of the prescribed pressure test.

12. If pipes are installed by an on line replacement method (e.g. pipe bursting), using pipe from a continuous coil without joints, and it is intended that customers are to be reconnected to the newly installed main within the same working day, then a pressure test will not be required. A visual inspection to meet the requirements of Cl 7.3.5 shall be carried out.

13. The test pressure shall be as stated in the RFQ.

14. The Contractor shall provide all the equipment for the pressure test including a pressure transducer with data processing and logging facilities to record the pressure test.

15. The Project Manager shall be given an opportunity to witness the test. At least 24 hours prior notice shall be given to the Project Manager of when a test is to take place. All test results and interpretation shall be made available to the Project Manager as soon as possible after completion of the test.

16. A pressure test certificate shall be completed for all new mains installations. The certificate should comprise:

- A plan showing the extent of the test
- The pressure trace for the test period
- Valid calibration certificate, within 6 months, for the pressure transducer used.
- In the case of polyethylene pipes, the calculated values of n1 and n2
- In the case other materials, the volume of water lost during the test
- If the test is satisfactory
- Reasons for failure if the test is unsatisfactory

The responsible person undertaking the test will sign this certificate.

17. Any emptying arrangements for mains shall be provided with back siphonage protection.

7.4 Testing Non-Pressure Pipelines

4. Gravity pipelines shall be tested by an air test before backfilling is commenced and with an air test after completion of all Contract work immediately prior to the works being handed over.

5. Any defects shall be located, made good and re-tested.

7.7 CCTV Inspection of Pipelines

2. This Clause replaces Clause 7.7.1

   CCTV inspections for works not associated with potable water shall comply with the Model Contract Document for Sewer Condition Inspection 1994, published by The Foundation for Water Research.

3. CCTV inspections for works associated with potable water shall comply with the following documents published by Water UK and available on their website (www.water.org.uk/)

   WIS 4-02-01 v2.1 Operational Requirements: In-situ resin lining of water mains

   IGN 4-02-02 v2 Code of Practice: In-situ resin lining of water mains

4. The Contractor shall not use CCTV equipment on works associated with potable water that have previously been used in sewer or non-potable applications.

7.9 Testing of Ductile Iron, PVC, GRP and Steel Pressure Pipelines

6. Unless specified otherwise, the test pressure for ductile iron pipework shall be equivalent to the nominal pressure rating. The Contractor is to provide for all matters in connection with the testing including additional pipework, blank flanges, pipework modifications, thrust blocks etc. which may be necessary.

7. This Clause replaces Clause 7.9.1

   Pipelines shall be pressure tested in accordance with EN 805, Water Supply – Requirements for systems and components outside buildings, Section 11 Testing of pipelines, and the details provided in ‘Pressure Testing of Water Supply Pipelines and Sewer Rising Mains WRc.

8. After filling of lined pipe, prior to testing, the pipeline shall be left full for 24 hours at 50% of the test pressure.

9. During pressure testing, air valves shall be isolated and valve gland packings tightened down. Air valves shall be re-adjusted and opened upon completion of the successful test.

7.10 Testing of Polyethylene Pressure Pipelines

3. This Clause replaces Clause 7.10.2

Clauses 7.9.2, 7.9.5, 7.9.6 and 7.9.8 shall apply.

7.11 Disinfection of Water Mains

5. All new pipework must be flushed, swabbed and disinfected in accordance with NW033 Network Disinfection - Procedure. Pipework repaired by the Contractor shall be flushed immediately after the repair is completed. See NW010 Discharge to watercourses.

6. Where normal flushing cannot be carried out, or where there are difficulties, the Contractor shall submit a method statement (OP011 Method Statement Guidance Note and Method Statement Template) for agreement by the Project Manager prior to the flushing being undertaken. This should be considered and addressed during the Design stage.

7. The Contractor shall give reasonable notice of when flushing/swabbing will take place so that the process can be audited by the Project Manager.

8. The Contractor shall provide a programme of planned work at least 2 working days in advance of disinfection of mains in order that the process may be audited by the Project Manager.

9. The Contractor is required to undertake Water Quality Sampling and delivery of samples to a designated laboratory in accordance with the Employer's procedures NW033. The designated laboratory is The Employers laboratory, Staines, North Surrey. Sampling shall be in accordance with NW080 Water Quality Sampling Following Network Activities – Procedure.

10. All staff undertaking sampling must have received full and appropriate training and certification by the Employer's Scientific Services Department. The Contractor must ensure that appropriate and regular training is given to all employees and that this is properly recorded.

11. Sampling shall be in accordance with the Employer's documents SSO-159 Microbiological Sampling and SSO-160 Chemical Sampling.

12. The Employer will provide sample bottles.

13. A Disinfection Record shall be completed for all water quality samples taken.

14. Samples must be kept in an insulated box and delivered to the Employer laboratory with the appropriate paperwork within 6 hours of sampling for planned work or 24

hours for unplanned work if kept in a dedicated refrigerator and transported in an insulated box.

15. Samples requiring analysis out of normal laboratory hours shall be by appointment only.

16. The Contractor must fully co-operate with the requirements of the Employer's Scientific Services Department to ensure a supply of wholesome water fit for human consumption.

17. Acceptance criteria for water quality tests are set out in the Employer's document NW080. The Employer shall advise the Contractor of the test results and acceptability to permit potable supply.

If water quality sample results or records from work carried out by the Contractor do not meet the Employers standards, the Contractor shall take immediate action as the Project Manager or Employer may instruct to remedy the situation and protect customers from receiving a contaminated water supply. Any failure to meet the defined performance requirements is deemed to be at the Contractor's Risk and will result in the Contractor being liable for the Employer's costs. Such costs will comprise of compensation payments, investigation and administration costs.

7.16 Water for Testing, Swabbing and Disinfection

2. Potable water will normally be supplied free of charge to the Contractor, from mains or from existing hydrants by standpipes or other suitable means. The Contractor will be responsible for the collection and distribution of the water to suit his own requirements.

3. The Contractor shall consult with the Employer to determine the pressure, flow rate and location of available water during the Design process and take into account any constraints imposed.

4. The Contractor shall take every precaution to prevent contamination, waste and misuse of the water supplied by the Employer, who reserves the right to make a charge for such water if, in the opinion of the Project Manager, it is being used carelessly or wastefully.

5. Potable water run to waste shall be measured and reported by the Contractor at monthly intervals.

7.19 Operation of Valves and Hydrants

1. The Contractor shall not operate any equipment belonging to the Company unless under Supervision by the Employer's operational staff as part of a controlled outage procedure or unless duly authorised by the Employer in accordance with the Employers Operation of valves procedure, NW 022 and Valve Operation Policy, OP 344 and AW Access to the Network Procedure, OP 345.

2. The Contractor shall identify all valve operations necessary to carry out the Works during Design and seek the Employer's approval in accordance with the Employer's "Outage Policy and Procedure - OP204".

3. All Contractors staff and operatives undertaking valve operations must have received full and appropriate training and attained a certificate of competence by attending a "Valve Operation Refresher Training Course" provided by the Employer. Once certified the staff and operatives are required to attend the course on a two-yearly basis. The Contractor must ensure that appropriate and regular training is given to all employees and that this is properly recorded.

4. When undertaking valve operations, the Contractor shall do so with regard to its effect on the water supply to customers connected to the surrounding distribution network and shall maintain an operational log to satisfy the requirements of the Employer.

5. The valve operation log shall be presented to the Employers operations representative within 24 hours of any valve operations in a format meeting the approval of the Project Manager.

6. Valves and hydrants shall be opened and closed slowly to avoid surges developing in the pipework.

7. The Contractor is advised that the Employer cannot guarantee drop tight shut-off before, during or after maintenance or connection works, and the Contractor must anticipate the effects of this on his planned works and ensure contingency plans are available.

7.20 Connections to Existing Water Mains

1. The Contractor will be required to make connections to existing live water mains in close liaison with the Employer's operational staff.

2. The Contractor shall prepare all required outage plans and method statements for the acceptance of the Employer's operational staff.

3. Under certain circumstances the Contractor will be required to make connections to the existing trunk main network out of normal working hours, during periods of low demand. In this case the Employer will advise the Contractor during Design stage liaison and the Contractor will take into account such constraints in his design.

4. Consideration and priority shall be given to use of non-disruptive forms of connection during evolution of the Design, such as under pressure tees, line stopping, etc. where viable.

5. The Employer cannot guarantee timeslots for outages and having gained "Outage Consent" and booked preliminary time slots for the outages required the Contractor

shall continue to liaise with the Employer's Operations Centre Representative during the works. It may be necessary to adjust the outage timeslot due to Employers operational emergencies and suitable float should be allowed for in the contractor's programme.

6. The Contractor shall not connect any new trunk main to the Employer's network without prior consent of the Project Manager, Employers Operations Centre and Scientific Services representatives.

7. The Contractor shall not connect any pipe, fitting or apparatus to the Employer's network, which may cause contamination of the water, which it contains.

8. All temporary connections to existing mains shall be installed with suitable non-return valves, stop valves and meters to measure water usage. Non-return valves, calibrated meters and other associated pipework are to be provided by the Contractor.

7.21 Abandoning of Existing Mains and Services

1. Abandonment of existing mains and services shall be in accordance with the Employer's documents NW023 Procedure for abandoning mains.

2. Where an abandoned main or service is not entirely removed the end of any pipes or ducts remaining in the ground shall be sealed to prevent transfer of groundwater.

SECTION 8

ROADWORKS

No Supplementary clauses

SECTION 9

SEWER RENOVATION

No Supplementary clauses

SECTION 10

WATER MAINS RENOVATION

No Supplementary clauses

SECTION 11

TUNNELLING AND SHAFT SINKING WORKS

No Supplementary clauses

SECTION 12

CONCRETE REPAIRS

Specification - Supplementary Clauses

12.1 Cleaning and Inspection

1. The Contractor shall clean the external surface and produce a fine surface texture to ensure an adequate key suitable for receiving the repair to the structure by an approved method to remove dirt, loose paint and other deleterious matter. A trial area shall be cleaned and inspected by the Project Manager before approval is given for the cleaning method employed. Wire brushing is not an approved method unless necessary in difficult to access areas such as behind telecommunication equipment brackets.

2. The Contractor, in conjunction with the Project Manager, shall make a close and thorough inspection of the external surface of the structure, to agree and mark out the areas of defective concrete.

12.2 Records of Work Undertaken

1. The Contractor shall keep records of the defects and remedial work on the structure relating to position, dimensions and nature of defect, results of tests, additional reinforcement, and the nature of the repair.

2. Additionally, colour photographs shall be taken of each defect prior to breaking out, following breaking out, and the finished repair.

3. Final measurement of relevant items shall be based on these records. All such records shall be agreed daily with the Project Manager.

12.3 Tests for Carbonation of Concrete

1. When breaking out reinforced concrete, tests for carbonation shall be performed to determine the point to which carbonation has penetrated and breaking out of old concrete need not proceed further. Tests shall be carried out at a frequency of one per four square metres or as directed by the Project Manager.

2. The Contractor shall test the extent of carbonation of the old concrete using a phenolphthalein indicator, in accordance with the procedures described in the BS EN 14630:2006 Products and systems for the protection and repair of concrete structures – test methods – determination of carbonation depth in hardened concrete by the phenolphthalein method. The test shall be applied to freshly exposed concrete to determine if all defective concrete has been removed.

12.4 Tests for Chloride Content of Concrete

1. When directed by the Project Manager the Contractor shall perform tests for chloride content of the old concrete in accordance with the procedures described in the BS 1881-124:2015 Testing concrete – Part 124: Method for analysis of hardened concrete. Samples of concrete may be obtained from the breaking up of defective concrete removed from the structure or alternatively from drilling dust from test holes. Care must be exercised when drilling to avoid reinforcing bars.

12.5 Removal of Defective Concrete

1. All loose material shall be removed from the affected area.

2. A plain regular shape shall be cut around the defective concrete, using a power-driven disc cutter, to define the extent of the breaking out. The depth of cut shall not be less than 10 mm nor should it exceed the local depth of concrete cover to the steel reinforcement.

3. Concrete shall be removed using power-driven breakers, or another method approved by the Project Manager, from the area defined within the cut lines. If, as the result of excessive force or weak concrete, further damage occurs outside the cut lines, the area shall be incorporated into the regular shape and broken out to expose solid concrete.

4. Where the reinforcing bar is exposed, the breaking out shall continue to expose the full circumference of the bar and to give a minimum of 20 mm clearance all around the bar. Great care should be taken to ensure that the reinforcement is not cut or damaged during the breaking out process.

5. Damaged reinforcement shall be repaired to the satisfaction of the Project Manager.

6. The final repair zone shall have disc cut edges and have a plain regular shape.

12.6 Preparation of Reinforcement

1. Rust scale, corrosion products and other deposits shall be removed from reinforcement exposed within the area of repair by grit blasting or other approved method in accordance with BS EN ISO 8501-1: supplement:2001, BS 7079- A1: supplement 1:1996. If corrosion has advanced such that more than 10% of the cross-sectional area is lost, supplementation or replacement shall be considered, and instruction sought from the Project Manager.

2. Grit blasting shall be carried out in such a way as to include the hidden faces at the backs of bars and at intersections of bars.

3. Where deemed necessary the exposed reinforcement shall be thoroughly degreased with an approved solvent using clean cotton or paper cloths as part of the preparation operation.

4. All reinforcement shall be adequately fixed and tied in position such that it will not be displaced during reinstatement.

12.7 Protection of Reinforcement

1. After cleaning the reinforcement, the steel shall be coated with 2 coats of an approved primer, mixed and applied in accordance with the manufacturer's instructions.

2. The exposed reinforcement shall be completely coated with the primer within 3 hours of cleaning. Any reinforcement remaining uncoated at the end of a 3-hour period shall be re-cleaned in accordance with the specification.

3. The primer shall be applied to the steel with a stiff brush using a stippling action ensuring that the whole of the exposed reinforcing bars are thoroughly coated.

12.8 Conditions for Application of Repair Materials

1. Pre-batched bagged repair mortars shall be stored in a dry environment protected from rain and temperatures below 5°C, all in accordance with the manufacturer's recommendations. Bagged mortars shall be kept off the ground on pallets and shall not be removed from the store for use in the works until immediately prior to mixing. Material from damaged bags or buckets shall be discarded.

2. Before the application of repair materials proceeds the condition of the surface to be repaired and the weather shall be suitable to allow the work to proceed. Repairs shall not proceed if the air temperature or concrete substrate temperature is 5°C on a falling thermometer, unless specific planned procedures for cold weather working are implemented and agreed with the Project Manager. In warm weather work shall be protected from premature drying out.

12.9 Concrete Priming and Bonding

1. Immediately before reinstatement all dust, debris and lose material must be removed from the repair area by appropriate means such as air jetting, water jetting or brushing.

2. The concrete substrate shall be completely and thoroughly washed with water to remove as much chloride residue as possible. Any surplus water is to be removed before reinstatement commences.

3. Concrete surfaces with the repair area shall be treated with an approved bond coat to the manufacturer's instructions.

4. The bonding material shall be mixed in accordance with the manufacturer's recommendations brushed onto the previously coated steel reinforcement and

thoroughly worked into all hollows and crevices in the prepared concrete surface to ensure good adhesion.

12.10 Concrete Repair Mortar

1. The approved repair mortar shall be applied in layers not exceeding 20 mm while the bond coat is still tacky and shall be compacted by trowel or gloved hand. Care shall be taken to ensure full compaction around any steel reinforcement. The repair mortars are finished by striking off with a straight-edge and closing with a wooden or plastic float to obtain a 'fair finish'.

2. If at any time the mortar completely dries out on the concrete substrate before over-laying the repair surface shall be re-prepared by complete removal of the dried key coat, followed by application of fresh key coat onto dampened substrate.

3. If the thickness is too great for one application, i.e., the material slumps, the surface shall be scratched and successive layers of repair mortar shall be applied as soon as the preceding layer has become sufficiently stiff to support the weight of the additional layer. Each new layer shall be applied to a fresh slurry bond coat.

4. Each layer shall be thoroughly worked and compacted in the repair zone and around or between reinforcing bars. The technique employed shall ensure that no air is entrapped and that full contact with the primed substrate is achieved. Where the repair is accessible and the depth of repair makes formwork a feasible option, the mortar may be packed in one application rather than repeated render applications. The formwork shall be erected as necessary to the repair area but allow sufficient access for the bonding coat to be applied to the existing concrete surface. If this is not possible, formwork shall be prefabricated so it can be placed into position within a half hour of the bonding coat being applied. Application of a release agent to the form face is required.

5. The final surface shall be trowelled off to a level with a wood or plastic float to a fair finish. Curing shall be implemented immediately on completion of the repair. The repair shall be moist cured for a minimum period of 72 hours by application of polythene sheeting sealed with damp tolerant adhesive tape. During this period the temperature of the material shall not drop below 5°C and the repair shall be shaded from direct sunlight. Curing membranes shall not be used.

6. The finished repair shall have an equivalent concrete anti-carbonation depth of 40 mm to all reinforcing bars.

12.11 Protective Coatings

1. Fairing coats/pore filling coats shall be used for filling blow holes and similar imperfections (0 – 3 mm) prior to subsequent surface coatings. The material shall be applied by steel trowel using a scrape on scrape off technique. Blow holes and other

imperfections shall be filled flush to the surrounding surface. The finish shall be by steel trowel or sponge float to blend with adjacent areas.

2. Where the overall surface or isolated areas require additional levelling to produce a smooth regular surface this shall be deemed a levelling coat and shall be a separate application to a maximum thickness of 20 mm.

3. Two coats (unless otherwise specified) of the approved anti-carbonation coating shall be applied to the prepared surfaces to the manufacturer's specification. Where primer is required this is to be included as a system and applied according to the manufacturers' requirements. The coatings may be applied by brush or roller. An even thickness of coating shall be applied free of pin holes and imperfections.

12.12 Repair Using Cast Concrete with Formwork

1. The repair of more extensive zones may, if agreed with or instructed by the Project Manager, be affected using cast concrete with conventional formwork constructed to form the correct profile required for the section concerned.

2. Two types of repair concrete will be acceptable, depending upon the thickness and complexity of the section being repaired:

   1.1 Conventional concrete in accordance with Section 4 of the Standard Specification and the general requirements for prescribed mixes in Section 2 of BS 8500.

   The Concrete shall be Grade C25/30 using Ordinary Portland Cement with a minimum cement content of 275 kg/m³, a maximum water to cement ratio of 0.50 and maximum aggregate size of 10 mm; neither the fine nor the coarse aggregates shall be of marine origin, and they shall be non-reactive in respect of alkali-silica reaction; the mix should be of high workability and may contain an approved air entraining agent based on neutralised Vinsol resin equivalent, with a maximum air content of 5% at the point of placing.

   1.2 Free-flowing proprietary cementitious repair mortar used in accordance with the manufacturer's recommendations.

2. Preparation of the repair zone and the reinforcement shall be in accordance with the requirements of Section 12.

3. The formwork finish shall be "Fair Finish", constructed to leave a finish on the concrete to match as closely as possible the original surface of the section of the structure concerned.

4. The formwork shall be supported by approved non-corrodible fixings attached to the structure by drilled anchor bolts or other approved means, with careful filling of any holes on completion of the work. It must be strong enough to withstand the full weight and pressure of the concrete or mortar and shall be entirely leak-tight even under

load and vibration. Formwork, panel joints and the joints of formwork against the existing concrete shall be sealed using a proprietary sealant and the formwork shall be tested for leaks using clean potable grade water before concreting in the presence of the Project Manager.

5. The formwork shall be provided wherever necessary with means of entry for the concrete, a pouch or pouring chute for conventional concrete or suitable piped system for the pourable mortar. All residual protrusions shall be removed as soon as practicable and finished smooth.

6. The whole shape and nature of the repair area and the formwork provided shall be so regulated to facilitate the concreting operations, to allow for the use of immersion (poker) type vibrators for concrete compaction (in the case of conventional concrete) and to permit the free and complete removal of air bubbles, pockets, etc.

7. After placing, the concrete shall be cured by leaving the formwork in place for at least 60 hours after casting, and by covering with plastic sheeting, or wet hessian sheeting, etc for a period of at least 7 days after casting. The cost of curing shall be included in the rates for the concrete in the items in the Schedule of Prices.

12.13 Sprayed Concrete

1. If the Contractor wishes to employ spray methods for the application of concrete or mortar, he shall submit details of his proposals at the time of tender. The materials, process and application shall be in accordance with the "Specification for Sprayed Concrete" and the "Code of Practice for Sprayed Concrete", published by the Concrete Society.

2. The requirements of Section 12 for concrete repairs shall apply unless specifically superseded in this Section.

3. Prior to commencement of spraying, the Contractor shall certify to the Project Manager that the foreman, nozzle man and delivery equipment operatives have completed satisfactory work in similar capacities elsewhere. Where required by the Project Manager the operatives shall spray pre-constructed panels which shall be approved by the Project Manager before the operatives can proceed with the repair work.

4. Reinforcement shall be firmly fixed to give the cover, clearances and laps described in the Contract or specified by the Project Manager. Where stainless steel tie wire is specified, other fixings or spacing devices shall be corrosion resistant.

5. Guides shall be set up to establish finished surfaces if required in the Contract. These guides shall be approved by the Project Manager prior to spraying. When required arises shall be formed true to the details shown in the Contract.

6. Surfaces which are not to receive sprayed concrete shall be protected.

7. No concrete shall be sprayed in air temperatures less than 5ºC. Freshly sprayed concrete shall be protected from rain or water until the surface is of sufficient hardness to prevent damage.

8. Sprayed concrete shall be applied so that it neither sags nor slumps

9. The thickness of each layer of sprayed concrete shall not exceed the maximum stated in the Contract.

10. All reinforcement shall be surrounded by sprayed concrete.

11. Rebound shall not be worked into the construction or re-used in the works.

12. Cover to reinforcement shall be not less than 40 mm unless otherwise stated in the Contract.

13. Unless otherwise stated in the Contract, sprayed concrete shall be left as sprayed. All surface finishes shall be reasonably uniform in texture and free from blemishes. Where a surface is required on layers of thickness less than 50 mm, the finish shall be formed in or on a subsequent layer.

14. Freshly sprayed concrete shall be thoroughly protected from freezing or rapid drying out for a period of at least three days. Membrane curing shall not be used when a further layer of sprayed concrete or other bonded finish is to be applied.

15. Areas of the work which exhibit a lack of compaction or bond, dry patches, voids sand pockets or sagged or slumped material shall be removed and re-sprayed immediately. Areas of re-spraying shall not be less than 300 mm x 300 mm and shall be to the approval of the Project Manager.

16. When starting or stopping the spraying operation or whenever spraying is irregular, the nozzle shall be directed away from the Works.

17. A minimum lighting intensity of 200 lux shall be maintained in the spraying area.

18. Full records of all materials delivered to the spray concrete mixer shall be kept and made available to the Project Manager.

12.14 Testing of Repairs

1. Where directed by the Project Manager the Contractor shall repair trial areas which shall be approved by the Project Manager before commencing the Work.

2. All repair concrete and mortar shall be tested in accordance with Section 4 of the Standard Specification.

3. The bond strength of all overlaid mortars shall be tested as stated in Section 4 of the Standard Specification. All such tested sites shall be repaired to the satisfaction of the Project Manager.

4. Where directed by the Project Manager the cover depth to reinforcement shall be monitored with a cover meter or other approved equipment. Any area where the cover depth falls below the minimum specified (after applying any tolerance) shall be broken out and replaced to the satisfaction of the Project Manager

6. Cores with a maximum diameter of 50 mm shall be taken at positions selected by the Project Manager to determine the quality of the repair. All such cored sites shall be repaired to the satisfaction of the Project Manager.

SECTION 13

COATINGS AND LININGS

Specification - Supplementary Clauses

13.1 Painting and Coating

1. Where not included as an integral part of the concrete repair system, in Section 12, painting and coating shall be carried out in accordance with the manufacture's specification and as directed by the Project Manager. Where necessary, the wet film thickness shall be monitored with a set film thickness gauge as directed by the Project Manager.

2. The minimum paint thickness of the topcoat shall be 1 mm.

13.2 Cast Iron Pipework and Exposed Non-Galvanised Metal Work

1. All existing coatings, loose material, organic growth etc shall be removed by blast cleaning or equivalent mechanical means to SA 2½ in accordance with BS EN ISO 8501.

2. All painting work shall be protected from rain and frost until dry. Materials shall not be applied at temperatures below 5°C.

13.3 Internal Linings (Removal)

1. Existing linings shall be carefully stripped from concrete using sharp electric chisels without excessive force being used to avoid unnecessary damage to the concrete structure. Alternatively, hydro-demolition may be employed. All lining material shall be removed from chases, keys etc., in the concrete.

2. All existing coatings, loose materials etc shall be removed by water jetting or grit blasting. A trial area shall be cleaned and inspected by the Project Manager before approval is given for the cleaning method.

3. When the cleaning is complete the Contractor in conjunction with the Project Manager shall make a close and thorough inspection of the surface to agree and mark out areas of defective concrete, cracks and other defects which shall be repaired in accordance with the Specification before application of the lining material.

13.4 Internal Linings (Performance Requirements)

1. The lining shall be watertight. The lining will be tested initially with the structure full to overflow level for two days. Any drop in level or any visible leaks shall constitute a failure.

SECTION 14

RESERVOIR ROOF WATERPROOFING

Specification - Supplementary Clauses

14.1 Roof Loading

1. The Contractor shall make himself aware and make enquiries in order to determine whether specific weight restrictions exist in relation to any of the structures on Site that may be affected by any aspect of the refurbishment works.

14.2 Earth Works

1. Unless otherwise instructed material on reservoir roofs shall be stripped and stockpiled on site for re-use

2. Where top soiling shall be carried out using imported topsoil, it shall give a compacted finished 225 mm depth of topsoil.

3. The Contractor shall prepare a method by which the earthworks shall be carried out and which shall include but not limited to;

   a) area to be taken up with stockpiles.
   b) method of stripping the overburden and its disposal/re-use.
   c) sketches showing access around stockpiles and to reservoir.
   d) working areas and sequence of working on the roof (including perimeter drain system).
   e) method of providing cut off between working areas so that surface water does not flow across the boundary.
   f) topsoil storage areas shall be kept clear of any existing manholes or other equipment.

4. At no time shall vehicles involved in the earthwork operation be allowed to traverse across prepared or completed surfaces.

14.3 Preparation, Inspection and Testing of the Roof

1. Immediately after the topsoil is removed, the exposed roof surface shall be cleaned by water jetting. The Project Manager/Inspecting Engineer shall be informed as soon as the roof is perfectly clean and ready for inspection.

2. The Contractor shall provide attendance and support for the Project Manager to make his inspection.

3. After testing of the reservoir roof for watertightness in accordance with the Affinity Water inundation test standard, all active leaks shall be sealed and treated with a

suitably approved proprietary over-banding system, or as directed by the Project Manager.

4. Where surfaces are to receive a membrane or other system to ensure watertightness, any protuberances shall be ground off flush and rough areas levelled using materials deemed suitable by the Project Manager. The edge of the roof shall be ground off to provide a smooth rounded edge to accommodate the sealant

14.4 Installation of Waterproof Membranes

1. For any reservoir or cell which cannot be removed from service for membrane installation, the following additional precautions shall be taken to prevent contamination of the cell in service.

   a) Plant shall be kept off the roof area whenever possible.
   b) Travelling plant must travel over a temporary impermeable sheet (i.e. temporary membrane)
   c) Semi-stationary plan (excavators etc.) shall be maintained in an impermeable bund.

14.5 Installation of the Composite Drainage Layer

1. Sheets of drainage composite shall be laid immediately after the membrane and weighted down at the edge with sandbags.

2. Sheets shall be rolled out in the same direction as the membrane. No joints shall be permitted at right angles to the slope.

3. The sheets shall be mechanically fixed at the joints using the nodules of the plastic base sheet. There shall also be an overlap of the top geotextile fabric the two layers being taped together.

4. Adjacent sheets shall be fixed with the core butt jointed. The geotextile flap on the edge of the drainage sheet shall be extended across the joint shiplap style and taped into position.

5. On vertical faces, the drainage sheet shall be fixed to the membrane with self-adhesive stick pins at 2 per square metre.

6. The drainage composite shall be continuous where it is bent over the edge of the reservoir with the edges reinforced without loss of waterway capacity.

7. The drainage composite on the reservoir shall bend over the edge of the reservoir and extend as far as the membrane into the drainage trench. It shall be reinforced as necessary at the edge of the roof so that the drainage path is unrestricted.

8. Temporary access across the drainage layer will only be permitted if the sheets are protected by 25 mm plywood sheets or 200 mm of topsoil.

14.6 Sealing of Roof Membranes at Access Openings, and Valve Box Upstands

1. Manholes, valve boxes and associated structures shall be prepared by erecting a smooth transition from the horizontal to the vertical (e.g. by casting fillets at the base) and casting concrete around circular objects to give a rectangular form to receive the membrane.

14.7 Replacement of Topsoil on Reservoir Roof

1. As topsoiling proceeds all consolidated wheel tracks will be carefully forked over. Final grading of the top 100 mm shall be carried out to ensure a true specified level and slope, and to avoid dishing or other depressions. Any area that becomes unduly compacted during the grading operation shall be loosened by careful forking or harrowing.

14.8 Testing for Water Tightness

1. Once topsoiling is complete a water test shall be carried out to establish the effectiveness of the waterproof membrane system and to locate any defects caused during the installation process.

2. The Contractor shall carry out a flood test on the whole roof area in accordance with the Affinity Water inundation test standard.

3. The water may be obtained from hydrants on the site, but it may be necessary for the Contractor to provide a sump and pump the water onto the roof. No hydrants shall be operated without approval from AW. If in exceptional circumstances, water must be obtained by pumping out of a live cell of a reservoir, extreme precautions shall be taken to prevent contamination. The method and precautions shall be agreed in advance with the Project Manager and Employer.

4. The underside of the roof shall be examined for leaks over a three-day period following the commencement of the test. All leaks shall be located and repaired, and the test repeated if necessary, until no noticeable leakage is observed.

5. The perimeter drainage system may be used for discharging the test water providing it is linked to an adequate drainage system and silt traps are provided.

14.9 Seeding

1. When the earthworks are completed and the membrane has been satisfactorily tested, the roof shall be seeded with a grass seed mix (either Mixtures 2, 3 or 4) appropriate to the soil type.

2. Prior to seeding, topsoil areas shall be brought to a medium tilth and all stones over 50 mm and other deleterious matter shall be removed. All reasonable precautions shall be taken to ensure that pedestrian and other traffic does not cross treated areas during cultivation, seeding and until the grass is established.

3. The Contractor shall allow for any seasonal delay between topsoiling and seeding. Any weeds grown in the interim period shall be removed.

4. The Contractor shall water and maintain the grass during the Defects Period and shall ensure that the seed germinates and does not die due to lack of moisture. Water shall be provided for watering at intervals no more frequent than weekly as deemed necessary by the Contractor.

5. Dependent on the time of seeding and as directed by the Project Manager, the Contractor shall undertake an initial cut of the established sward in late June to 30 – 70 mm, followed by 3 No. cuts between July and September to 100 mm. All cuttings shall be removed from site.

6. Grassed areas shall be only accepted when germination has proved satisfactory and all weeds have been removed.

7. During the Defects Period, grass areas shall be cut using an approved mowing machine when conditions are not excessively wet or damp. Root pulling shall be avoided.

8. Grassed areas shall be maintained by watering, weeding, repair of all erosion and settlement and re-seeding as necessary to establish a uniform and healthy sward of grass, free from pernicious weeds.

SECTION 15

TRENCHLESS PIPE INSTALLATION METHODS

Specification - Supplementary Clauses

15.1 General Methodology

1. The Employer is interested in promoting cost effective use of available trenchless methods of installation of pipework, as an alternative to more traditional open cut trenched methods.

2. The RFQ will identify the required nominal bore of the mains to be installed or renewed, together with the extent of service pipe renewal and the normal maximum operation pressure.

3. As part of the design process the Contractor shall demonstrate to the satisfaction of the Project Manager that the proposed methods provide best value to the Employer in terms of cost and customer disruption.

4. During the design stage, the Contractor will be responsible for checking the operability of any of the Employer's equipment and identifying any necessary remedial work for inclusion in the Work Package.

5. The Contractor shall ensure that before and during the work:

   - It does not pose a threat to water quality both during installation and when in operation.
   - The trenchless method is acceptable to the pipe manufacturer.
   - The main is not damaged by the installation method particularly by being over stressed or scored.
   - The main operates satisfactorily without leakage and can satisfy pressure tests if required.

6. Before using a trenchless method in a particular location, the Project Manager shall have approved a method statement prepared by the Contractor during the design stage. The method statement shall include at least the following information:

   - The preparatory work, including work to clean existing pipes and to ensure that lining can take place without undue risk to the lining.
   - Steps taken to protect the customer's water supplies.
   - Details of communications with customers.
   - Steps taken to provide alternative water supplies to the customers during the work.
   - Details of the operation of any of the company's equipment e.g. sluice valves, hydrants stop cocks.

- Details of the trenchless techniques including steps taken to ensure compliance with this specification and the recommendations of the material manufacturers and or the patent holders of the techniques being used.
- Steps taken to avoid long term damage to the installation of the main or in any reversion process.
- Measures taken to ensure compliance with Health and Safety legislation
- Details of how the main is to be recommissioned and supplies restored, including disinfection and pressure testing.
- Contingency measures.

7. If the contractor plans to carry out on-line pipe replacement on Fridays, arrangements must be in place to take any actions necessary when bacteriological sample results have been confirmed. These arrangements shall be notified to the Employer's Water Quality Department and have the approval of the Project Manager.

15.2 Preparatory Work

1. In cases where an existing pipe is used as a conduit for installing a new pipe (e.g. slip lining and close fit linings) the Contractor shall be responsible for ensuring that the existing pipe has been prepared to ensure that the new pipe can be installed without undue damage.

2. If cleaning work is required to existing pipes for the installation of a new pipe, any supply connected to the pipe to be cleaned must be adequately protected from the entry of the cleaning water. During the design stage, the Contractor will be responsible for checking the operability of any of the Employer's equipment required to be used during the operation and for carrying out the necessary remedial work prior to commencement of cleaning.

3. Cleaning should be carried out in accordance with the following documents recently published by Water UK and available on their website (www.water.org.uk/):

   - WIS 4-02-01 Operational Requirements: In situ resin lining of water mains

   - IGN 4-02-02 Code of Practice: In situ resin lining of water mains

   The method of cleaning utilised shall remove all tuberculation, deposits, and loose or deteriorated remains of any original coating and other foreign materials from inside the pipe. The cleaning method chosen shall not remove areas of graphitisation.

4. Under no circumstances shall a main cleaned and prepared for lining or pipe installation be restored to service prior to the lining or installation.

5. Prior to a close fit or slip lining being undertaken a full colour CCTV survey and inspection shall be carried out prior to installation of the lining to examine the success of cleaning and locate ferrules that must be removed prior to lining. The Contractor shall make a video recording of each length of main immediately prior to lining. The

recording shall be labelled with location, date and time of survey and shall be available for inspection by the Project Manager.

15.3. Trenchless Installation

1. Most trenchless techniques use Polyethylene Pipe. If used, this type of pipe shall be installed in accordance with the manufacturers' recommendations**.**

2. If the technique requires the pipe to be winched or pulled into position, the winch shall be fitted with a tension limiting and load measuring devices. The tension limiting device shall be set to trip when the maximum permitted load is reached as defined by the pipe manufacturer's information.

3. The method of installation shall be such that the installed pipe is not damaged to an extent that will reduce the installed pipes life or performance. Any such damage is considered a Defect if not removed from the works. Such Defects shall be rectified at the Contractor's expense.

4. In the case of polyethylene pipe, any scoring to a depth greater than 10% of the wall thickness of the pipe will be considered a Defect and may involve total removal of the installed pipe. The length to be replaced and the method will be determined by further examination of the pipeline. This may involve searching by way of further excavations or the use of existing excavations at ferrules to identify the extent of the Defect. Such searching will be carried out at the Contractor's expense.

5. Any compressed air introduced or exhausted from equipment into the pipe lining shall be filtered at source to remove oil or other contaminants. The filters shall be maintained in a good operational condition.

6. Where there is the possibility of hydraulic fluid, lubricant or de-icer coming into contact with the pipe or sleeve material during pipe installation operations the relevant fluids must have approval from:

   - Water Regulations 1999
   - The Department of the Environment Committee on Chemicals and Materials for Use in Public Water Supply and Swimming Pools (DOE/CCM)

   Where pipes are contaminated by fluids not carrying these approvals or by any other means they shall be replaced at the Contractor's expense.

7. Grouting of pipe linings will not normally be required other than annular gaps immediately adjacent to access openings made for whatever reason. Grouting shall be carried out using polyurethane foam or 2: 1 sand cement mortar.

15.4 Special Requirements for Pipe Bursting

1. During design stage the Contractor must satisfy himself that ground conditions, surface construction and the presence of buried apparatus will not prevent pipe bursting from being carried out successfully.

2. The Contractor shall identify and make provision on the working drawings for the removal of all recorded burst repairs that may prevent progression of the bursting operations during this investigation.

3. The Contractor shall satisfy the requirements of “Damage Control Procedure for Pipeline Construction Involving Pipe Splitting” published by British Gas plc and WRc Swindon (ERS M45 February 1990).

4. The Contractor shall liaise with all utilities prior to carrying out bursting work to ensure that all pipes or services that may be at risk from bursting operations are suitably identified. The Contractor will be responsible for preventing any damage caused to adjacent utility apparatus and pay for any remedial works required.

5. The Contractor shall be liable for damage caused to the road surface or to any adjacent services or property attributable to the use of the bursting technique.

15.5 Special Requirements for Slip Lining

1. For welded pipe the external weld bead shall be removed prior to installation.

15.6 Special Requirements for Close Fit Lining

1. Close fit lining shall only be used where accepted by the Project Manager.

2. The Contractor shall select the diameter of the close fit lining pipe with due regard to the diameter of the existing mains, as ascertained during design.

3. Couplings or adaptors to be used to connect close fit linings with existing or new pipelines shall be of a type to provide a seal against the parent pipe and the lining as well as providing shear resistance and full end loading – Liner grip or similar will be an acceptable form of connection.

15.7. Special Requirements for Guided / Directional Drilling

1. The Contractor must satisfy himself that ground conditions, surface construction and the presence of buried apparatus will not prevent Guided/Directional Drilling from being carried out successfully.

2. The Contractor must, as part of the design process, assess the depth at which a drilled main will be installed. Any proposed installation at a depth of cover in excess of 1.2m must have the agreement of the Project Manager.

3. Checks on-line and level to necessitate steering corrections shall be carried out at appropriate intervals but no more than 3m horizontal intervals. A continuous record of these results shall be made and retained for submission to the Project Manager to accompany the Quality Control records.

4. Drilling of the pilot bore shall be carried out to achieve a final tolerance of ± 100 mm on-line and level.

5. In the event of an obstruction being encountered which requires a major route correction the Contractor must stop and inform the Project Manager. The Project Manager will agree and approve any remedial actions before they are carried out. In extreme cases corrective action may require withdrawal of the drill string and recommencement of the bore on a differing line and / or level.

6. All amendments to route of the bore shall be effected, to allow installation of the pipe within the recommended curvature limits for pipe of the specified diameter and pressure rating.

15.8. Special Requirements for Semi Structural Lining

1. Where a semi structural polyurethane resin pipe lining has been agreed as a Mains Renewal solution it shall be installed in accordance with the following documents published by Water UK and available on their website (www.water.org.uk/)

   - WIS 4-02-01 Operational Requirements: In situ resin lining of water mains
   - (WIS 4-02-01 replaces the DWI publication Operational requirements: In-situ resin lining of water mains version 2.4 8 January 2007).
   - IGN 4-02-02 Code of Practice: In situ resin lining of water mains
   - (IGN 4-02-02 replaces the DWI publication Code of Practice: In situ resin lining of water mains Version 2.2 30th October 2006).

15.9 Service Connections

1. Where an existing pipe is to be lined or pipe burst, the Contractor shall expose all ferrule connections. Where the main is to be lined with polyethylene pipe the Contractor and shall cut suitable windows in the wall of the host pipe to allow new service connections to be made. This should be carried out in advance of the lining installation and all sharp edges on the cut face shall be chamfered so as not to impart damage to the installed pipe.

2. Windows cut in a host pipe for reconnection of ferrules to the installed pipe shall be grouted to form a pressure seal around the perimeter of the opening if a gap exists between the host pipe and the installed pipe.

3. In the case of other approved close fit lining methods, a proprietary ferrule specially designed for close fit lined mains, which can be installed by direct drilling and tapping of the host main and lining pipe may be considered as an alternative option.

4. Service pipes shall not be connected to mains pipes until the main has gone through the specified disinfection process and, other than where a pipe has been installed by pipe bursting or lining, satisfactory results from bacteriological tests have been confirmed.

15.10 Return to Service

1. In order to minimise customers' inconvenience, mains installed by trenchless methods may be returned to service after the specified disinfection process has been undertaken but before the results from the bacteriological tests have been received. In this case the Contractor must deliver a notice to all the customers affected immediately before supplies are restored. This notice will advise the customer to boil water that is used for drinking and cooking. The Contractor is also responsible for delivering another notice to customers when a satisfactory result from bacteriological tests have been confirmed.

Responsibilities

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Related Documents

- Other documents in the Civil Standards suite, particularly AM681 Civils CESWI
- Other Company Standards. (e.g. Process, Electrical Control and Automation)
- Other company procedures for operations network and scientific services
- Legislation, Approved Codes of Practice and Industry Guidance Notes etc. referred to in this document.

Document Reference	Document Title	Document Type
AM307	Design of Distribution Mains and Services	Guidance Note
AM309	RESERVOIRS AND WATER TOWERS INSPECTION AND REPORTING	Guidance Note
AM600	Mechanical Standards	Standard
AM604	Mechanical Clauses	Guidance Note
AM605	Commissioning, Testing and Takeover	Standard
AM607	Pumping System Design Guidelines	Standard
AM609	WIMES 1.14 Pump Unit Overhaul and Repair	Standard
AM611	WIMES 1.05 Submersible Borehole Pumpsets	Standard
AM613	WIMES 4.01 Paints and Polymeric Coatings	Standard
AM614	WIMES 8.03 Mechanical Installations	Standard
AM620	Electrical Standards	Standard
AM625	Low Voltage Switchgear	Standard
AM626	WIMES 3.02 Low Voltage Electrical Installations	Standard
AM627	WIMES 3.03 Low Voltage AC TEFC Motors	Standard
AM628	WIMES 3.04 Low Voltage Electrical Package Plant	Standard
AM629	WIMES 3.05 Electrical Components	Standard
AM630	WIMES 3.07 UNINTERRUPTIBLE POWER SUPPLIES	Standard
AM631	WIMES 3.08 Valve Actuators	Standard
AM632	WIMES 3.09 Ring Main Units	Standard
AM633	WIMES 3.10 HV DISTRIBUTION SWITCHGEAR	Standard
AM634	WIMES 3.11 Distribution and Power Transformers	Standard
AM635	WIMES 3.12 HV Motor Starter Assemblies	Standard
AM636	WIMES 3.13 HV Electrical Installations	Standard

Document Reference	Document Title	Document Type
AM638	WIMES 3.02(B) Optical Fibre Networks	Standard
AM639	WIMES 3.02(C) Lightning Protection	Standard
AM650	UV Disinfection Plants	Standard
AM652	GAC Regeneration and Replacement Strategy	Procedure
AM653	Membrane Modules Selection and Replacement Strategy	Policy
AM681	CESWI 7th Edition	Standard
AM685	Civil Standards Kiosks	Standard
AM693	Installation of Wall Mounted Domestic Meter Boxes	Guidance Note
AM717	WIMES 1.15 End Suction Pump Unit	Standard
AM718	WIMES 1.16 Vertically Suspended Bowl Pumps	Standard
AM785	CDM 2015 - Guidance on the Requirements for Pre-Construction Information	Guidance Note
AM786	CDM Site Safety Survey	Procedure
AM787	Pre-Construction Information CDM 2015	Guidance Note
AM794	Traffic Management Plan	Form Template
AM821	Electrical Safety Standard for Low Voltage System	Standard
AM824	Safety Guidance Handbook for Low-Voltage Systems	Guidance Note
AM834	The health and safety file	Guidance Note
AM-EFT-0010	Pest Control Policy	Policy
AW0004	Asset Management Policy	Policy
AW0005	Strategic Asset Management Plan	Plan
AW0027	Environment Agency Notification	Guidance Note
AW0030	Work at Height Corporate Standard	Standard
AW0031	Asbestos Corporate Standard	Standard
AW0032	Confined Space Corporate Standard	Standard
AW0033	Occupational Health Corporate Standard	Standard
AW0034	Working with Electricity Corporate Standard	Standard
AW0044	Management of Equipment Corporate Standard	Standard
AW0111	Common Standard - Safety when working with electricity	Standard
AW0112	Common Standard - Safety when working at height	Standard
AW0113	Common Standard - Safety when carrying out excavation works	Standard
AW0114	Common Standard - Safety when working adjacent to buried services	Standard
AW0115	Common Standard - Safety in lifting operations	Standard
AW0116	Common Standard - Safety when working alone	Standard
AW0117	Common Standard - Safety when driving on Affinity Water business	Standard
AW0118	Common Standard - Safety when working in an office	Guidance Note
AW0119	Common Standard - Safety when working in the highway	Standard

Document Reference	Document Title	Document Type
AW0120	Common Standard - Safety when working in Confined Spaces	Standard
AW0121	Common Standard - Safety when working with fixed plant and equipment	Standard
AW0122	Common Standard - Safety when working with mobile plant	Standard
AW0123	Common Standard - Safety when working with hazardous substances	Standard
AW0124	Common Standard - Safety when working with asbestos	Standard
AW0126	Common Standard - Manual handling	Standard
AW0127	Common Standard - Avoiding slips trips and falls	Standard
AW0128	Common Standard - Safety when working with vibrating equipment	Standard
AW0129	Common Standard – Construction and Demolition Works	Standard
AW0130	Common Standard - Reporting incidents	Standard
AW0131	Common Standard - Safety when managing contractors and suppliers	Standard
AW0132	Common Standard - Permits to Work	Standard
AW0133	Common Standard - Site induction Visitors and New Starters	Standard
AW0233	Alcohol and Drugs Policy	Policy
AW0290	Site Specific Risk Assessment	Form Template
AW0291	Safe System of Work Template	Form Template
AW0294	Handling and Transferring Asbestos Cement Pipe Waste	Procedure
AW0301	Common Safety Standard - PPE	Standard
AW0302	Guidance Note for the installation of overland networks	Guidance Note
AW4800	Maximum Trench Width, Bedding and Sidefill Material	Drawing
AW4801	Pipe Protection under Ditches and Streams	Drawing
AW4803	Mains Connections Arrangements	Drawing
AW4810	Replacement of BS 750 Type 1 Hydrant	Drawing
AW4811	Trunk Main Hydrant Chamber Detail	Drawing
AW4814	Trunk Main Single Washout Detail	Drawing
AW4816	Headwall Details (1 of 2)	Drawing
AW4818	Temporary Swabbing Detail for Butterfly Valve Double Washout	Drawing
AW4830	Trunk Main Gate Valve up to 300 mm Diameter	Drawing
AW4831	Trunk Main Gate Valve Installation 300 mm and Over	Drawing
AW4832	Trunk Main Butterfly Valve Installation	Drawing
AW4833	Trunk Main Riser Pot Detail - With Discharge Consent	Drawing
AW4834	Telescopic Valve Spindle Details	Drawing
AW4835	Trunk Main Valve Spindle Details	Drawing

Document Reference	Document Title	Document Type
AW4836	Chamber Installation in Soft Ground and Highways	Drawing
AW4837	Marker Plate and Post Details	Drawing
AW4838	Trunk Main Air Valve Details	Drawing
AW4839	Single and Double Air Valve Installation	Drawing
AW4840	Stop Tap or Sluice Valve Chambers	Drawing
AW4841	Typical Trunk Main Gate Valve Thrust Restraint	Drawing
AW4842	Internal Manifold Layout	Drawing
AW4843	25 mm and 32 mm Single New and Existing Service Connection with Boundary Box	Drawing
AW4850	Leakage Step testing OXO Arrangement	Drawing
AW4850	Leakage Step Testing OXO Arrangement	Drawing
AW4860	50 mm Single Service Connection with Meter Chamber	Drawing
AW4862	Service Connections	Drawing
AW4863	Service Connections - Barrier Pipe	Drawing
AW4870	Contaminated Ground - Barrier Pipe Service Connection	Drawing
AW4871	Sluice Valve Installation	Drawing
AW4901	Pressure Reducing Valve and DMA Meter Installation on Main	Drawing
AW4902	Pressure Reducing Valve and DMA Meter Installation on Bypass to Main	Drawing
AW4904	Typical Rural Land Drain Reinstatement	Drawing
AW4905	Temporary Demarcation Fencing	Drawing
AW4906	Temporary Post and Rail Fencing	Drawing
AW4907	Temporary Stock Proof Fencing	Drawing
AW4908	Temporary Cleft Chestnut Pale Fencing	Drawing
AW4909	Temporary Cattle Proof Fencing	Drawing
AW4910	Temporary Post and Wire Fencing	Drawing
AW4911	Temporary Gated Crossings	Drawing
AW4912	Temporary Hedge Reinstatement	Drawing
AW4913	Typical Fence Reinstatement	Drawing
AW-STD-117	Reservoir Refurbishment Standard Details 1	Drawing
AW-STD-120	Reservoir Refurbishment Standard Details 2 Ventilation	Drawing
AW-STD-121	Reservoir Refurbishment Standard Details 3 Access Covers	Drawing
CR503	Site Waste Management Plans	Guidance Note
HS041	Asbestos Cement Pipes Guidance Note 1.8	Drawing
HS095	Management of Confined Spaces Entry Procedure	Procedure
HS099	Working on Metal Water Services	Guidance Note
HS142	COSHH Assessment	Guidance Note
HS144	Work at Height Procedure	Procedure

Document Reference	Document Title	Document Type
NW010	Discharge to Water Courses	Procedure
NW023	Abandoning Mains Procedure	Procedure
NW033	Network Disinfection	Procedure
NW039	Repair of Broken Mains and Service Pipes	Procedure
NW053	Contaminated Land Guidance Note	Guidance Note
NW080	Water Quality Sampling Following Network Activities	Procedure
NW103	Authorisation to Access the Network	Procedure
NW105	Network Sample Record and Shutdown Form	Form Template
NW106	Contractor Sample Record	Form Template
NW107	Marker Plating and Posting of Mains Valves	Procedure
NW127	Working on Environmentally Sensitive Sites	Guidance Note
NW132	Access to the Network	Guidance Note
NW133	Permit to Access the Drinking Water Distribution System	Form Template
OP026	OP026 Restricted Operations Procedure	Procedure
OP033	Access to Network Permission and Permit	Form Template
OP204	Outage Policy and Procedure	Procedure
OP660	Reservoir & Tower Level Monitoring Standard	Guidance Note
PD027	MAINTENANCE OF SERVICE RESERVOIRS	Procedure
PD059	Planned and Unplanned Works on Production Sites	Procedure
PD121	Rapid Gravity Filtration	Guidance Note
PD123	Submerged Membrane Plants	Guidance Note
PD125	Clarification	Guidance Note
PD130	PD130 Chemical or Oil Spills on Production Sites 2.0	Procedure
PD209	RESERVOIR INSPECTION	Guidance Note
PD214	Reservoir Act	Guidance Note
PD216	Improvement of Circulation and Turnover in Drinking Water Storage	Guidance Note
PD300	Water Retaining Structure Isolation, Drain Down and Cleaning Guidance Note	Procedure
PD508	CERT OF CLEANINGDISINFECTION	Form Template
PD532	Lifting Equipment Inspections	Procedure
PD535	Production Asset Incident Note	Form Template
PD536	Personal Safety Inspection	Form Template
PD543	Safe Isolation of Plant and Equipment	Procedure
QA019	Control of Non-Conforming Product	Procedure
QAE001	Environmental Permitting	Guidance Note
QAE002	Identification and Management of Badgers	Guidance Note
QAE003	Identification and Management of Bats	Guidance Note
QAE004	Identification and Management of Bees and Wasps	Guidance Note

Document Reference	Document Title	Document Type
QAE005	Identification and Management of Great Crested Newts	Guidance Note
QAE006	Identification and Management of Nesting Birds	Guidance Note
QAE007	Identification and Management of Reptiles and Amphibians	Guidance Note
QAE008	Injurious and Invasive Plants Giant Hogweed	Guidance Note
QAE009	Injurious Plants Common Ragwort	Guidance Note
QAE010	Invasive Plants Himalayan Balsam	Guidance Note
QAE011	Invasive Plants Japanese Knotweed	Guidance Note
QAE012	Invertebrates and insects	Guidance Note
QAE013	ISO14001 Environmental Management system	Guidance Note
QAE014	Macrophytes	Guidance Note
QAE015	Management of Nuisance	Guidance Note
QAE016	Management of Trees and Hedgerows	Guidance Note
QAE017	Waste and Waste Management	Guidance Note
QAE018	River Restoration	Guidance Note
QAE019	Biodiversity	Guidance Note
QAE022	Discharge to water courses	Guidance Note
QAE023	Traffic disruption	Guidance Note
QAE025	Fish	Guidance Note
QAE027	Emissions to air	Guidance Note
QAE028	Oil and Chemical Spillages	Guidance Note
QAE030	Archaeology and Built Heritage	Guidance Note
QAE031	Oak Processionary Moth Toolbox Talk	Guidance Note
QAE032	Asian Hornet Awareness - Toolbox Talk	Guidance Note
QAE033	Environmental Incidents Toolbox Talk	Guidance Note
SE2.1.2	Issue of Identity Cards and Access Fobs	Procedure
SE2.2.2	Security Procedure for Protecting Plant on Sites	Procedure
SE2.5.1	General Vehicle Security	Guidance Note
SE2.5.2	Vehicle Identification at Company Sites	Guidance Note
SE2.5.3	Unauthorised Vehicles at Company Sites	Guidance Note
SE2.5.4	Vehicle Parking at Office Sites	Guidance Note
SE2.6.1	CCTV Policy	Policy
SE2.6.2	CCTV Monitoring Requirements	Standard
SE2.7.1	AW contractors on AW sites	Guidance Note
SE2.7.2	Contractors on Office Sites	Guidance Note
SE2.7.3	AW Contractors on Designated Sites	Guidance Note
SE2.7.4	Log of Contractors Sub Contractors on Site	Form Template
SE3.1.4	Control of Sensitive Water Company Security Information	Standard
SE3.2.4	Security Incident Reporting	Guidance Note

Document Reference	Document Title	Document Type
SE3.2.5	Security Incident Report Form	Form Template
SE4.1.1	Occasional Third-Party Access to Operational Sites	Guidance Note
SE4.1.2	Security Visits and Controls at Operational Sites	Guidance Note
SE4.1.3	AW Visitors to Designated Company Sites	Procedure
SE4.2.1	DESIGNATED SITE DESCRIPTION	Guidance Note
SE4.4.2	Reservoir Key Safes	Guidance Note
SE5.1.4	SECURITY RISK ASSESSMENT FORM	Form Template
SE5.2.1	Perimeter Protection Policy	Policy
SE5.2.2	Perimeter Protection Standards	Standard
SE5.2.3	Perimeter Access (Gates) Protection	Standard
SE5.2.4	Installation of Temporary Fencing Standard	Standard
SE5.3.1	Enclosure Protection Standard	Standard
SE5.4	AW Electronic Security Standards	Standard
SE5.5.1	Enclosure Access Point Protection	Standard
SE5.6.1	ACCESS CONTROL INTO SECURE AREAS	Standard
SE5.7.1	SECURITY RISK ASSESSMENT PROCESS FOR RESERVOIRS	Procedure
SE5.7.2	Reservoir Security Requirements	Standard
SE5.7.3	Open Water Security Requirements	Standard
SE5.7.4	Chemical dosing Security Standard	Standard
SE5.8.1	Borehole Security Requirements	Standard
SE5.8.2	Non-Abstraction Borehole Construction Standard	Standard
SE5.8.3	Intruder Detection System Site Acceptance Test	Form Template
SHEQ-ENV-5000	Waste Management Guidance	Guidance Note
SP304	Reservoir Turnover Policy	Policy
SSO-101	AW Water Quality Sampling Procedure	Procedure
SSO-185	Fittings Inspection Procedure	Procedure
SSO-187	Fittings Inspection Water Audit Procedure	Procedure
SSO-188	Hydrant Use Standpipe Hire Procedure	Procedure
SSO-189	Unauthorised Hydrant Use Procedure	Procedure
SSO-190	Network Regulations Re-inspection Procedure	Procedure
SSO-191	Systematic Flushing Guidance	Guidance Note
SSO-192	Hygienic Storage of Pipes and Fittings	Procedure
SSO-511	Carcass Discovery Response Procedure	Guidance Note
WI-MET-700	Meter Installation	Procedure
WI-NET-404	Lifting Covers	Procedure
WI-NET-520	Planning Applications	Procedure
WI-NET-521	Out of Hours Work in the Highway	Procedure

Document Reference	Document Title	Document Type
WI-OHS-920	Pipe Cutting	Procedure
WI-OHS-924	Use of Compressed Air Equipment	Procedure
WI-OHS-940	Use of Earth Leads	Guidance Note
WI-OHS-941	Avoidance of Danger from Gas Pipes and Electricity Cables	Procedure
WI-OHS-944	Entry into Covered Reservoirs	Guidance Note
WI-OHS-950	Hand Arm Vibration (HAV)	Procedure
WI-OHS-953	Working in the vicinity of Overhead Power Lines	Procedure