WATER CONSTRUCTION STANDARDS

Water Supply Code of Australia

(WSA 03-2011 Version 3.1)

WSAA Code – Supplement Document – Specifications

Document Control

This document is an electronically controlled document available on Council's website. Maintenance of this document will be the responsibility of Goulburn Mulwaree Council.

Prior to being updated, any proposed amendments to this document shall be approved by Goulburn Mulwaree Council, following consultation with other key stakeholders. Following consultation and approval, amendments made to this document shall be updated on Council's website.

The following table outlines the amendments that have been made to this document since it was initially issued.

RECORD OF AMENDMENTS

Rev	Review Date	Issue Date	Reviewer	Comment
1		01/05/2018		N/A
2.1	12/7/2019		TS	Updated
2.2			TS	Reviewed and amended
2.3	17/01/2020	17/01/2020	TS	Update Section 9, Section 24
2.4	21/02/2020	24/02/2020	TS	Update Section 5.11.3
2.5	26/02/2020	26/02/2020	TS	Update Section 5.11.3
2.6	22/07/2020	22/07/2020	TS	Update title page Formatting Section 2.6.3 Amend Section 4.5 Amend Section 5.1.1 Amend Section 5.4.4 Formatting Section 5.4.15 Amend Table 5.4 Section 5.11.2 Amend Section 5.11.3 Amend Section 7.6.1 Amend Section 8.8.9 Add Section 11.2 Amend Section 11.5.1 Amend Section 15.8 Amend Section 15.18 Amend Section 20.1 Amend Section 23.2 Amend Section 23.3 Amend Section 23.8 Amend Appendix A Amend Appendix B

Table of Contents

1. GOULBURN MULWAREE COUNCIL'S WATER CONSTRUCTION STANDARDS

The WSAA Water Code of Australia (WSA03-2011) (the *Code*), together with this Supplement (the *Supplement*), comprises the Goulburn Mulwaree Council's Water Code for water supply systems up to and including 750mm diameter.

1.1 National Codes Initiative

The Water Services Association of Australia (WSAA) has developed a series of national codes of practice covering the design and construction of water and wastewater infrastructure. The benefits of these national codes are:

- to facilitate consistent national reform and regulation of the water industry;
- to provide a transitional mechanism for sharing water-industry specialist expertise as internal Water Authority resources diminish;
- to provide a common technical reference for the development of industry training and skills accreditation programs for private sector suppliers;
- to enhance the mobility of suppliers eg. designers and constructors by reducing parochial technical impediments to trade; and
- improve the Australian water industry's interface with international companies

1.2 Document Improvement

The *Supplement* is a live document that will be continually reviewed and periodically updated to ensure it reflects authorities desire to be at the forefront of Water Industry Best Practice Procedures, and to reflect changes in Council's Policy.

Stakeholders are invited to comment on the Supplement at any time by using the Document Improvement Request Form on the following page. This form may be photocopied.

2. WATER SUPPLY CODE OF AUSTRALIA

Part 1 of this document is Goulburn Mulwaree Council's Supplement to the Water Services Association of Australia Part 1 – Water Supply Code of Australia (WSA 03-2011 Version 3.1)

A. VARIATIONS TO CODE PART 0: GLOSSARY OF TERMS, ABBREVIATIONS AND REFERENCES

WSA 03 Part 0 Page Ref.	Amendment and/or Addition
Page 15	**Concept Plan** A package of information that is to be provided as required by Goulburn Mulwaree Council to enable the appropriate planning/design of major water system components to be performed. The authority may not provide a "concept plan" for the localised water supply system. This is at the responsibility of the "designer", particularly so if the development is to be staged. The authority will however provide details of items (a - h) as specified in section 1.2.5 of WSA-03 where available.
N/A	**Equivalent Tenement (ET)** The equivalent hypothetical residential 1 lot tenement that would produce the same peak dry weather flow as that contributed by the area under consideration i.e. all zonings including residential, commercial and industrial. 1ET is taken to be equivalent to 3.5EP (Equivalent Person).
N/A	**Water Authority** Goulburn Mulwaree Council Utilities – Water and Sewer Services

B. VARIATIONS TO THE CODE – WSA 03 (2011) PART 1: PLANNING AND DESIGN

<table>
<tr><th>Section Ref.
Page Ref.</th><th>Amendment and/or Addition</th></tr>
<tr><td colspan="2">Chapter 1 – General (Design)</td></tr>
<tr><td>Section 1.2.6
Page 53</td><td>Design Life

All water supply distribution systems shall be designed for a nominal asset life of at least 80 years without rehabilitation. Some components such as pumps, valves, metering and control equipment may require earlier renovation or replacement. Typical asset design lives for water supply distribution items are shown in Table GMC1.2.

TABLE GMC1.2
<table><tr><th>ITEM</th><th>Water Mains</th><th>Reservoirs</th><th>Pumps</th><th>Valves</th><th>SCADA</th></tr><tr><td>Expected design life, years</td><td>80</td><td>80</td><td>20</td><td>30</td><td>15</td></tr></table></td></tr>
<tr><td colspan="2">Chapter 2 – System Planning</td></tr>
<tr><td>Section 2.2
Page 55</td><td>General (System Planning Process)

All new water mains are to have a minimum diameter of 150mm.</td></tr>
<tr><td>Section 2.3.1
Page 56</td><td>General

Goulburn Mulwaree Council minimum design level of service is 30m head (300kPa) @ a minimum of 15L/s under peak instantaneous demand to residential properties in green field developments measured at the nearest hydrant.

Goulburn Mulwaree Council’s minimum level of service is 15m head (150kPa) to existing developments.</td></tr>
</table>

Section 2.4
Page 61

System Configuration

The Water Authority will require a concept plan or indicative layout plan with functional design requirements for the project.

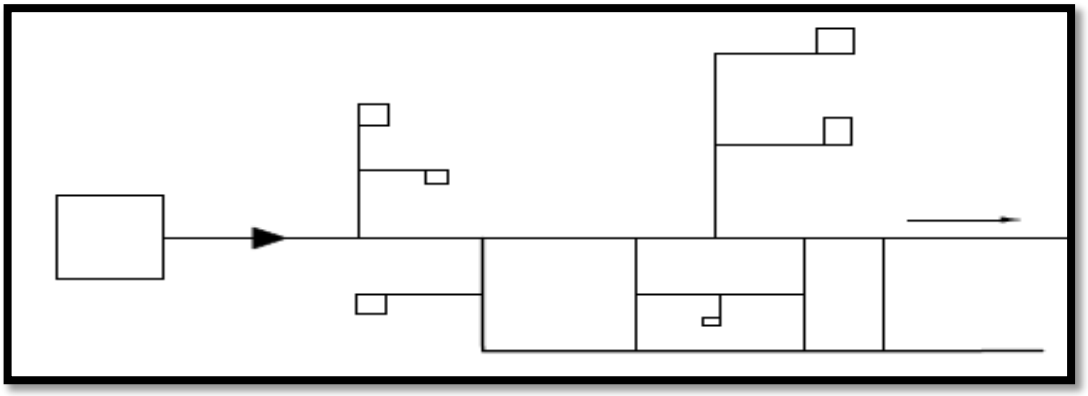


FIGURE GMC2.1 (b) - SINGLE TRANSFER / DISTRIBUTION MAIN, NETWORK WITH MULTIPLE DISTRIBUTION MAINS (reduced diameter dead-end mains are not permitted for use, dead ends are to be linked or looped)

Section 2.5.3.3
Page 64

Minimum Service Pressure

Table GMC2.3

Pressure	Residential	Industrial / Commercial
Maximum Allowable Service Pressure	900 kPa (90 m h)	900 kPa (90 m h)
Desirable Maximum Service Pressure	600 kPa (60 m h)	600 kPa (60 m h)
Minimum Allowable Service Pressure	150kPa (15 m h)	150kPa (15 m h)
Desirable Minimum Service Pressure[1]	300 kPa (30 m h)	300 kPa (30 m h)
Desirable Minimum Static Pressure[2]	350 kPa (35 m h)	350 kPa (35 m h)

NOTES:

(1) Water Authority written approval shall be obtained for service pressures less than the "desirable minimum".

<table>
<tr><td></td><td>(2) AS/NZS 3500.1 requires that the maximum static pressure at any outlet, other than fire service outlet, within a building does not exceed 500 kPa. Pressure reduction devices may be required to achieve this.</td></tr>
<tr><td>Section 2.6.3
Page 67</td><td>Water Age

Looped Mains are required in all cul-de-sacs. Reduced mains are not permitted for use by Goulburn Mulwaree Council.</td></tr>
<tr><td colspan="2">Chapter 3 – Hydraulic Design</td></tr>
<tr><td>Section 3.1.2
Page 75</td><td>Minimum Pipe Sizes

Reduced sized mains are not permitted for use by Goulburn Mulwaree Council. Minimum allowed pipe size for water mains shall comply with Table GMC3.1

Table GMC3.1
<table>
<tr><td rowspan="2">Zoning/Development</td><td colspan="2">Minimum pipe Size (DN)</td></tr>
<tr><td>Cast Iron outside diameter series</td><td>ISO series</td></tr>
<tr><td>Low & Medium Density Residential</td><td>150</td><td>180</td></tr>
<tr><td>High Density Residential (>3 storeys)</td><td>150</td><td>180</td></tr>
<tr><td>Multiple Developments of High Density Residential (>7 storeys)</td><td>200 or 225(1)</td><td>250 or 280(1)</td></tr>
<tr><td>Industrial and Commercial</td><td>150</td><td>180</td></tr>
</table>
Notes:
(1) Goulburn Mulwaree Council to nominate the preferred size</td></tr>
<tr><td>Section 3.3.1
Page 79</td><td>Gravity Systems

For gravity systems, the minimum PN of pipes and fittings shall not be less than PN16 except for road crossings, where the minimum PN for pipes and fittings shall not be less than PN20.</td></tr>
<tr><td>Section 3.3.2
Page 79</td><td>Systems subjected to Dynamic Pressures

For gravity systems, the minimum PN of pipes and fittings shall not be less than PN16 except for road crossings, where the minimum PN for pipes and fittings shall not be less than PN20.</td></tr>
<tr><td>Section 3.5
Page 79</td><td>System Test Pressure

The system test pressure applied to each section of a water mains network shall be such that:</td></tr>
</table>

	(a) At the highest point in the test section the pressure shall be not less than the system design pressure, and (b) At the lowest point in the test section, the test pressure shall be the greater of: (i) 1.25 times the system design pressure; (ii) 125 m head.
Section 3.8 Page 82	**Pipeline Components Minimum Pressure Class** The minimum pressure class (PN) of pipeline components shall be: • PN20 for road crossings; • PN16 for all other cases; Unless otherwise specified in writing by Goulburn Mulwaree Council.

Chapter 4 – Products and Materials

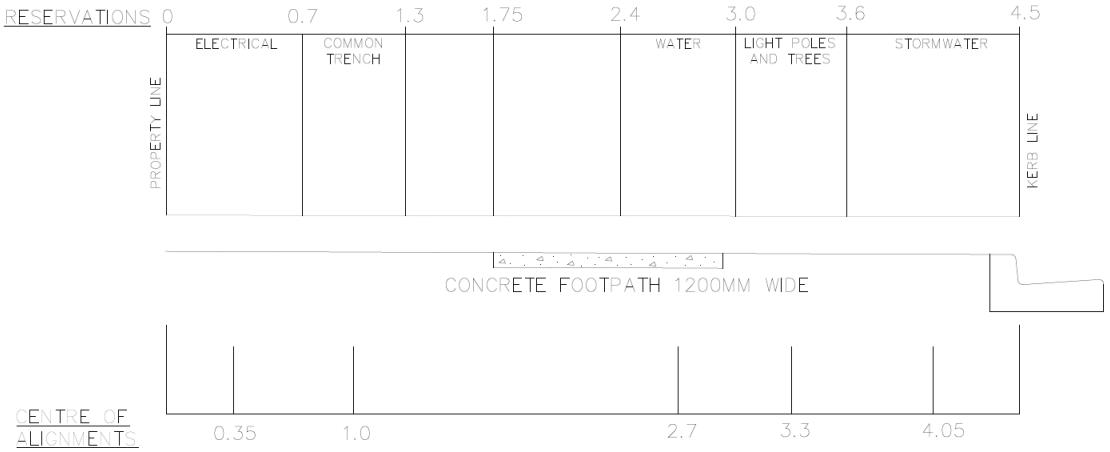
Section 4.2
Page 83

Differentiation of Drinking and Non-Drinking Pipe Systems

TABLE GMC4.1

COMPONENT	DRINKING WATER SYSTEM	NON-DRINKING WATER SYSTEM
RETICULATION MAINS		
PVC pipe	Plain blue	Plain purple
PE pipe	Plain Black OR black + blue stripes(1)	Plain purple OR black + purple stripes(1)
Ductile Iron pipe	Blue PE sleeving OR blue coating	Purple PE sleeving OR purple coating(2)
Fittings (bends, couplings, flanges, etc.)	Colour not required(3,4)	Colour not required(3,4)
Valve (spindle cap)	Blue coating	Purple coating
Valve (body)	Colour not required(3,4)	Colour not required(3,4)
Hydrant (claw)	Blue coating OR blue shroud	Purple coating OR purple shroud
Hydrant (body)	Colour not required(3,4)	Colour not required(3,4)
Standpipe hydrants	Blue coating	Purple coating
Scours (outlets)	Blue coating	Purple coating
Marking tapes	Blue	Purple
Surface fittings and surrounds	(5)	(5)
Signage (marker posts, plates etc.)	(5)	(5)

	<table><tr><th colspan="3">PROPERTY SERVICES</th></tr><tr><td>PE Pipe</td><td>Plain black OR black + blue stripes(1) 32mm or larger</td><td>Plain purple OR black + purple stripes(1)</td></tr><tr><td>Pre-tapped connector (plug)</td><td>Blue coating</td><td>Purple coating</td></tr><tr><td>Pre-tapped connector (body)</td><td>Colour not required(3,4)</td><td>Colour not required(3,4)</td></tr><tr><td>Tapping band or saddle</td><td>Blue band or saddle</td><td>Plain purple plastics (plastics moulding) or purple coating (metallic)</td></tr><tr><td>Fittings e.g. ball valve</td><td>Blue handle</td><td>Plain purple handle (plastics moulding) or purple coating (metallic)</td></tr><tr><td>Meters</td><td>Blue or blue coating</td><td>Plain purple plastics (plastics moulding) or purple coating (metallic)</td></tr><tr><td>Meter boxes (lids)</td><td>(5)</td><td>(5)</td></tr></table> NOTES: *(1) It is recommended that a combination of plain and striped pipes be used in dual water reticulation systems rather than all plain or all striped pipes.* *(2) Factory applied coating where permitted by the Product Specification.* *(3) Unless otherwise specified by Goulburn Mulwaree Council.* *(4) For any system, do not apply purple sleeve over a pipe, fitting, valve or other appurtenance that is coloured blue and vice versa.* *(5) To be coloured in accordance with Goulburn Mulwaree Council requirements*
Section 4.2.6 Page 86	**Marking Tapes** Relevant Product Specifications include: • WSA PS–318 Marking Tape, Detectable Non-Detectable marking tape is not permitted for use by Goulburn Mulwaree Council. Marking Tapes for drinking and non-drinking water mains and property services shall comply with relevant Product Specifications.
Section 4.4 Page 87	**PVC Pipeline Systems** PVC-U pressure is not permitted for use by Goulburn Mulwaree Council. Pipe Series 1 is not permitted for use by Goulburn Mulwaree Council.

Section 4.5 Page 88	**PE Pipeline Systems** PE pipes are not to be used unless approved in writing by Goulburn Mulwaree Council. Material Class (PE100) only is to be used where permitted.
Chapter 5 – General Design	
Section 5.1.1 Page 97	**Design Tolerances** (c) Water mains shall be minimum 2.4m and maximum 3.0m from property boundaries, generally laid at 2.7m or as specified by Goulburn Mulwaree Council. Water mains are to be placed in road reserves where possible; water mains are not to be placed in Council-owned land unless given specific written permission by Goulburn Mulwaree Council. Water Mains are not to be installed in private property under any circumstances. **Figure GMC5.1 – Alignment of Services** 
Section 5.2.1 Page 99	**Layout of Water Mains** Reduced sized mains are not permitted for use by Goulburn Mulwaree Council.
Section 5.2.3 Page 99	**Link mains** Link mains are not to be used unless approved by Goulburn Mulwaree Council in writing. If approved, link mains cannot pass through private property or property not owned by Goulburn Mulwaree Council.

Section 5.2.4 Page 100	**Reduced Sized Mains** Reduced sized mains are not permitted for use by Goulburn Mulwaree Council.
Section 5.3 Page 102	**Water Main Access** Access into water mains shall be provided for water mains ≥ DN 750. The access facility shall be 600 mm diameter clear openings located at 500m maximum spacing. The locations of person-access facilities shall be shown on Design Drawings and on Work As Constructed drawings.
Section 5.4.1 Page 102	**General (Location of Water Mains)** Water Mains shall be located in road reserves. Water mains shall not be located in private property under any circumstances. Water mains shall not pass through Council-owned property unless approved by Goulburn Mulwaree Council in writing.
Section 5.4.2.4 Page 103	**Location in Roundabouts and Bus Bays** (this also applies to road widening and any vehicular bays) Where practicable, a water main shall not be laid under a roundabout. Where no other option is available water mains may be approved in a straight line through roundabout intersections, road widenings, vehicle bays and bus bays, as a prolongation of the line of the main leading to the intersection. If there is limited access for maintenance, a maintenance-free installation shall be used (Refer Clause 7.6).
Section 5.4.4 Page 104	**Water Mains in Easements** Water mains shall not be located in private property under any circumstances.
Section 5.4.14 Page 111	**Water Mains on Curved Alignments** Curved alignments for water mains are not permitted for use in Goulburn Mulwaree Council.
Section 5.4.15 Page 111	**Location Markers** Provide location marker posts, plates and other markings for the location, valves, scours, flushing points and other fittings at the locations and in the manner as required on the Design Drawings and Specification. Hydrants & stop valves shall be marked as per below –

	Urban • 'H', 'W', or WCS/SDISK, 40mm in diameter, fixed to the kerb; • 'SC' & 'SV' to be impressed in the kerb 100 mm high by 80 mm wide, at the time of laying of the kerb and gutter or cut in later with an angle grinder; • Blue 'catseye' reflective marker to be fixed centrally in the roadway, 100mm from the road centre on the side of the hydrant; • Green 'catseye' reflective marker to be fixed centrally in the roadway, 100mm from the road centre on the side of the hydrant. *Rural* • Standard 'H', 'SC' & 'SV' plates are to be fixed to an adjacent fence or recycled plastic post approved by Goulburn Mulwaree Council; • On sealed roads the blue 'catseye' reflective marker to be fixed centrally in the roadway, 100mm from the road centre on the side of the hydrant; • On sealed roads, green 'catseye' reflective marker to be fixed centrally in the roadway, 100mm from the road centre on the side of the hydrant.
Section 5.4.16 Page 112	**Marking Tape** Non-detectable marking tape is not permitted for use in Goulburn Mulwaree Council
Section 5.6 Page 114	**Shared Trenching** Shared trenching with water mains is not permitted in Goulburn Mulwaree Council.
Section 5.10 Page 119	**Termination Points** Water mains are to be looped where termination points may exist (such as cul-de-sacs).
Section 5.11.1 Page 120	**General** (Property Services) Split services are not permitted for use by Goulburn Mulwaree Council.
Section 5.11.2 Page 121	**Connections to Water Mains** (Property Services) Split Services are not permitted for use by Goulburn Mulwaree Council.

Where the water service connects to the water main under footpaths, driveways or any concrete structure, a lid structure is to be installed into the concrete footpath directly above the tapping band to allow for easy access.

100mm PVC pipe is to be installed over all tapping bands to allow access when uncovered, with a cap placed on top to avoid dirt infiltration.

Connections for corner lots and lots shall be located on the corner having more than one access point shall be located on the primary street frontage.

Minimum pipe and connection sizes shall be in accordance with Table GMC5.4.

TABLE GMC5.4

Development Type	Nominal Service Line & Meter Size	Comments
Single Lot/ Dwelling	20mm	In low pressure areas, property services may be upsized to 25mm subject to approval by Goulburn Mulwaree Council.
Single Lot/Dwelling w/ Granny Flat	Individual 20mm service for each dwelling	Granny flats approved under state planning policies, etc.
Dual Occupancy (attached or detached)	Individual 20mm service for each dwelling	Refer to Goulburn Mulwaree Council's Water Metering and Connection Policy.
Medium Density	Individual 20mm services for each dwelling, or a master meter.	20mm meter per dwelling/unit/premise. Master meters can be installed as per Water Metering and Connection Policy.
High Rise/Complex Development	As per Hydraulic calculations	20mm meter per dwelling / unit. Master meters can be installed as per Water Metering and Connection Policy.
Commercial	As per Hydraulic calculations	Master meter with written approval from GMC

	Industrial	As per Hydraulic calculations	

Notes:
Refer to Goulburn Mulwaree Council's "Water Metering and Connection Policy"

Section 5.11.3
Page 121

Services, Outlets and Meters

Water Services are to be installed by a plumber holding an endorsed license or supervisor certificate in force under the Home Building Act 1989 (as per S634 of the Local Government Act 1993). All water services installed as part of a development must have the water services placed in a 100mm PVC conduit.

Property service outlets for drinking water 20mm or 25mm and non-drinking water (if available) servicing new developments shall be specified for installation using A grade copper pipe. (Refer to Section 4.2 and Table GMC4.1). Property services for existing lots (water service renewals) 20mm or 25mm shall be "A" grade copper. Copper reductions are not permitted for use in Goulburn Mulwaree Council.

Water services shall be laid at the bottom of the trench and backfilled with appropriate material (refer to Chapter 17). The bottom of the trench shall be at the same level, or lower, than the water main.

Property meters shall be positioned no further than one meter from the primary street alignment and within one metre of a side boundary. For corner lots the meter is to be located on the corner splay. Water services are to be placed in 100mm PVC conduits for road crossings, with detectable marking tape to be placed on top of the conduit. Conduits are to have a minimum horizontal clearance of 300mm from other services and vertical clearance of 150mm from other services.

Where water services for a 20mm water meter are required to pass under a roadway, the section of the water service from the water main to the meter is to be 25mm in diameter.

A second 100mm PVC conduit is to be installed at the opposite corner of the block requiring road crossings for possible future subdivision of the property, with detectable water main marking tape to be placed on top of the conduit. Conduits are to have a minimum horizontal clearance of 300mm from other services and vertical clearance of 150mm from other services. The conduit is to have a 90 degree bend on each end, and brought up to 300mm below ground level.

In cases where there is a conflict with proposed or existing driveways and/or other services and no other solution exists, each affected lot shall be provided with a single service located in an appropriate alignment.

Property services within footways shall be positioned at 90±5/-5 degrees to the water main or kerb. Where required to cross the road carriageway, property services shall be positioned at 90±5/-5 degrees to the road carriageway and extending no further than one metre inside the property boundary.

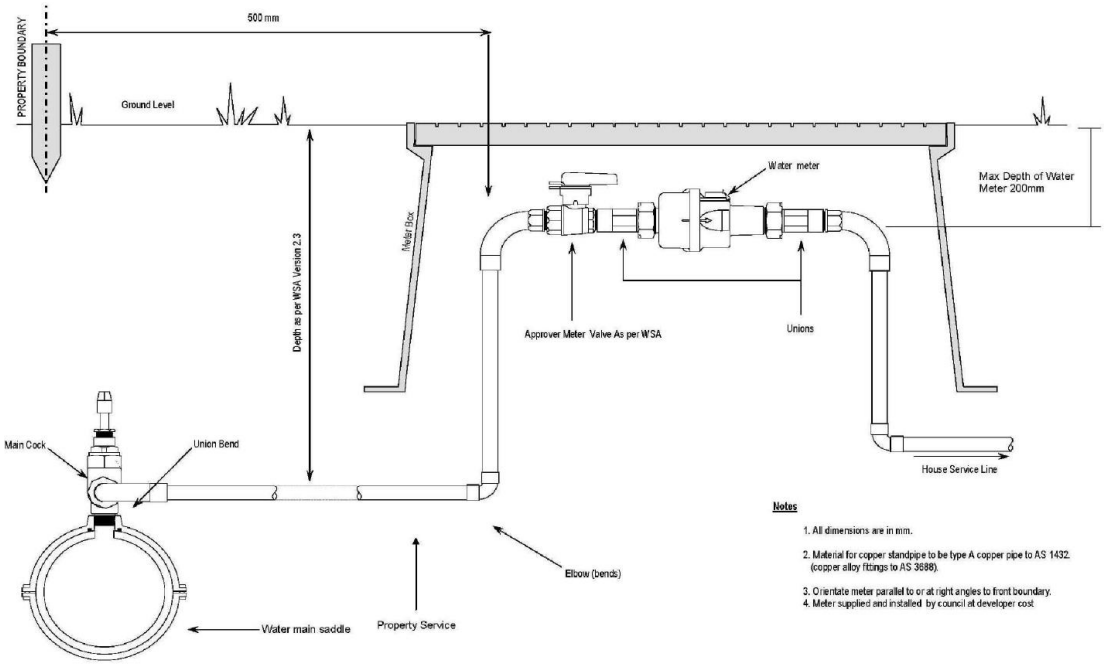
Kerb markers shall be provided to assist with locating property service connections. Service duct markers shall also be provided on the kerb to show the location of the main cock.

Appropriately sized quarter-turn meter marked ball valves shall be provided on property services at locations as required by Goulburn Mulwaree Council. The ball valve fittings must be a separate fitting from the 90 degree bend fitting.

Separate property service outlets (connection points for on-property water services) for drinking water and non-drinking water (if available) shall be provided for each identified lot in the development to service the planned number of customers occupying the lot.

Meters for drinking water and non-drinking water shall be placed together (spacing as required by Goulburn Mulwaree Council) near a common boundary, or at the side of an access way in the case of battle-axe lots. All water meters are to be installed below ground level, with a meter box placed over the water meter for ease of access.

Figure GMC5.2 – Water Meter Configuration



Section 5.11.4 Additional to WSA 03	**Fire Services** Fire services may be made available to developments with a water entitlement when specified by a hydraulic consultant. A meter must be installed adjacent to the fire service, but connected so as to indirectly register water use. Fire services shall be designed and installed with backflow prevention in accordance with Council's Cross Connection and Backflow Prevention Policy, including detector check meter.
Section 5.11.5 Additional to WSA 03	**Responsibility and Ownership** Goulburn Mulwaree Council undertakes the installation, modification and maintenance of all metered or unmetered services which are connected directly to the mains within the Goulburn Mulwaree Local Government area. Unless approved in writing by Goulburn Mulwaree Council it is an offence under Section 636 of the *Local Government Act 1993* to tamper with any metered service or fittings owned and operated by Goulburn Mulwaree Council, and carries a fine of $2 200. All works shall be carried out in accordance with the Goulburn Mulwaree Council requirements, NSW Code of Practice for Plumbing & Drainage and AS3500 Plumbing & Drainage Standard. If private water meters are installed they will not be read, maintained or serviced by Goulburn Mulwaree Council. Pipework downstream of the meter is the responsibility/ownership of the lot owner (or Body Corporate).
Section 5.11.6 Additional to WSA 03	**Backflow Prevention Devices** Backflow prevention and cross connection control shall be evaluated, and installed, in accordance with Council's Cross Connection and Backflow Prevention Policy, and Australian Standards (AS2845). The property owner, or body corporate, is responsible for the installation, maintenance and testing of backflow prevention devices.

Section 5.12.5.2
Page 126

Clearance Requirements

TABLE GMC5.5 CLEARANCES BETWEEN WATER MAINS AND UNDERGROUND SERVICES

Utility (Existing Service)	Minimum Horizontal Distance		Minimum Vertical Clearance [1] mm
	≤ DN300[2]	> DN300[2]	
Water mains >DN375[2]	600	600	*500*
Water Mains ≤ DN375[2]	*300*	600	*150*
Gas mains	*300*	600	*150*
Telecommunication conduit & cables	*300*	600	*150*
Electricity conduit & cable[7]	*500*	1000	*225*
Drains	*300*	*1200*	*150*
Sewers	1000[5]/600	1000[5]/600	500[4]
Kerbs	*300[6]*	600	600

NOTES:

1. Vertical clearances apply where water mains cross one another and other utility services, except in the case of sewers where a vertical separation shall always be maintained, even when the main and sewer are parallel. The main should always be located above the sewer to minimise the possibility of backflow contamination in the event of a main break.

2. Water mains include mains supplying drinking water and non-drinking water.

3. Clearances can be as specified in the above table subject to the structure not being destabilised. The clearance from timber poles shall be measured from the outside face. The minimum distance shall be for a distance of up to 2m past the pole and/or pit unless it causes destabilisation of the structure.

4. Water mains should always cross over sewers and stormwater drains. For cases where there is no alternative and the main must cross under the sewer, the design shall nominate an appropriate trenchless construction technique in accordance with Section 5.5 or other water main construction and protection treatment, effectively joint-free in the vicinity of the sewer.

5. Where a parallel sewer is at the minimum vertical clearance lower than the water main (500 mm), maintain a minimum horizontal clearance of 1000 mm.

	This minimum horizontal clearance can be progressively reduced to 600 mm as the vertical clearance is increased to 750 mm. *6. Clearance from kerbs shall be measured from the nearest point of the kerb. For water mains ≤DN 300 clearances from kerbs can be progressively reduced until the minimum of 150 mm is reached.* *7. An additional clearance from high voltage electrical installations should be maintained above the conduits or cables to allow for a protective barrier and marking to be provided as approved/required by the electricity utility authority.*
Section 5.12.6.3 Page 129	**Vertical Deviation of Water Mains** Vertical deviations shall be graded out on at least one side of the obstruction so as not to create a sediment trap.

Chapter 6 – System Pressure Management

Chapter 7 – Structural Design

Section 7.4.2
Page 159

Pipe Cover

Table GMC7.2

LOCATION	MINIMUM COVER mm
Non-trafficable areas	
- General (parks, footways, easements etc.)	600
- Driveways in residential areas	600
- Footways in local road reserves	600
- Footways in major road and motorway reserves	600
- Footways in industrial/commercial areas	600
Trafficable areas	
- Driveways in industrial/commercial areas	600
- Carriageways and verges of sealed local roads	600
- Carriageways and verges of major roads	600 – or RMS spec
- Carriageways and verges of motorways	1200 – or RMS spec
- Carriageways and verges of unsealed roads	750
- Embankments	750

	NOTE: RMS spec to be used on RMS designated roads or where specification is greater than 600mm.
Section 7.6.1 Page 166	**General** (Concrete Encasement) Concrete encasement of water mains is not permitted without written permission from Goulburn Mulwaree Council. Where permission is given, a design is to be submitted to Council from a suitably qualified structural engineer for the encasement of the water main. Concrete encasement of water mains of material other than Ductile Iron Concrete Encased (DICL) is not permitted by Goulburn Mulwaree Council.
Section 7.6.2 Page 167	**Requirements** (Concrete Encasement) In the case of PVC, HDPE and GRP pipes the method is as follows: The pipes are to be fully wrapped with a compressible material, minimum thickness 10 mm or 5% of the nominal pipe diameter, whichever is greater. The concrete must be at least 20 MPa. The thickness of the concrete encasement shall be 150 mm minimum around the pipe. Reinforcement must be placed in the concrete encasement, with a minimum cover of 50mm. The concrete encasement of the pipe shall be from flexible joint to flexible joint.
Section 7.9.2.2 Page 172	**Concrete Thrust Blocks** The bearing area of thrust blocks shall be pro-rated to allow for a maximum test pressure of 1600kPA (160m head), but shall not be less than the nominal thrust area, N.

TABLE GMC7.3 - MINIMUM THRUST AREA FOR CONCRETE BLOCKS AT 1250 kPa SYSTEM TEST PRESSURE

FOR HORIZONTAL THRUST ON TRENCH WALLS WHERE THE COVER OVER THE PIPES IS 450 OR GREATER	HORIZONTAL BENDS												TEES & DEAD ENDS		
	STIFF CLAY MEDIUM DENSE CLEAN SAND	VERY STIFF CLAY MEDIUM DENSE CLEAN SAND	HARD CLAY SOUND ROCK	STIFF CLAY MEDIUM DENSE CLEAN SAND	VERY STIFF CLAY MEDIUM DENSE CLEAN SAND	HARD CLAY SOUND ROCK	STIFF CLAY MEDIUM DENSE CLEAN SAND	VERY STIFF CLAY MEDIUM DENSE CLEAN SAND	HARD CLAY SOUND ROCK	STIFF CLAY MEDIUM DENSE CLEAN SAND	VERY STIFF CLAY MEDIUM DENSE CLEAN SAND	HARD CLAY SOUND ROCK	STIFF CLAY MEDIUM DENSE CLEAN SAND	VERY STIFF CLAY MEDIUM DENSE CLEAN SAND	HARD CLAY SOUND ROCK
Angle (Deg)	**90**	**90**	**90**	**45**	**45**	**45**	**22.5**	**22.5**	**22.5**	**11.25**	**11.25**	**11.25**	-	-	-
Dia (mm)	**50**	**100**	**200**	**50**	**100**	**200**	**50**	**100**	**200**	**50**	**100**	**200**	**50**	**100**	**200**
100	0.348	0.174	0.087	0.189	0.094	0.047	0.096	0.048	0.024	0.048	0.024	0.012	0.246	0.123	0.062
150	0.784	0.392	0.196	0.424	0.212	0.106	0.216	0.108	0.054	0.109	0.054	0.027	0.554	0.277	0.139
200	1.394	0.697	0.348	0.754	0.377	0.189	0.385	0.192	0.096	0.193	0.097	0.048	0.986	0.493	0.246
225	1.764	0.882	0.441	0.955	0.477	0.239	0.487	0.243	0.122	0.245	0.122	0.061	1.247	0.624	0.312
250	2.178	1.089	0.544	1.179	0.589	0.295	0.601	0.300	0.150	0.302	0.151	0.075	1.540	0.770	0.385
300	3.136	1.568	0.784	1.697	0.849	0.424	0.865	0.433	0.216	0.435	0.217	0.109	2.218	1.109	0.554
375	4.900	2.450	1.225	2.652	1.326	0.663	1.352	0.676	0.338	0.679	0.340	0.170	3.465	1.733	0.866
450	7.056	3.528	1.764	3.819	1.909	0.955	1.947	0.973	0.487	0.978	0.489	0.245	4.990	2.495	1.247
500	8.712	4.356	2.178	4.715	2.357	1.179	2.404	1.202	0.601	1.208	0.604	0.302	6.160	3.080	1.540
600	12.545	6.272	3.136	6.789	3.395	1.697	3.461	1.731	0.865	1.739	0.869	0.435	8.870	4.435	2.218
750	19.601	9.800	4.900	10.608	5.304	2.652	5.408	2.704	1.352	2.717	1.359	0.679	13.860	6.930	3.465

	a) AHBP = Allowable Horizontal Bearing Pressure b) NOTES: add/change; c) Soil classifications used in this Table are explained in Appendix G. d) Do not use standard thrust blocks in: a. very soft, soft or firm clay b. loose clean sand c. uncompacted fill or refuse A geotechnical assessment and individual design is required for these soils. e) The nominal thrust area 'N' to be achieved by pouring concrete the full length of the fitting and extending from the floor of the trench to above the fitting (see Note 5). f) The above noted table is for test pressure up to 1250 kPa. For system test pressures other than 1250 kPa, reduce or increase the minimum thrust area by the ratio of the applicable pressures, except where: a. thrust area is <0.18m2; and b. 'N' appears in the table; and the applicable pressure is above 1250 kPa. g) Finish thrust blocks approximately 100 mm above the top of the fitting or bearing pad and extend to the floor of the trench or deeper if necessary to achieve the required thrust area. Maximum encasement to be 180°. h) The minimum thrust area for taper thrust blocks to be equal to the difference between the thrust areas for dead-ends of equivalent diameter to those each side of taper. i) For downward vertical thrust, the allowable bearing pressures for various soils may be taken as twice that for horizontal thrust shown. j) Thrust block design calculations are based on 1600kPA . This variation was to allow for variation in site conditions. Test pressure to be as noted above.
Chapter 8 - Appurtenances	
Section 8.2.2.2 Page 189	**Gate Valves** All sluice valves shall be minimum Class 16, Non Rising Spindle, Resilient Seated, Anticlockwise Closing – (ACC), manufactured to AS 2638 and Nylon or Fusion Bonded Epoxy (FBE) coated to AS 4158.
Section 8.6.3 Page 214	**Scour Application** Scours shall be provided on distribution and transfer mains ≥ DN 300. For mains ≥ DN 375 and < DN 750, a single scour valve shall be provided on the scour branch. For all mains ≥ DN 750, two gate valves, closely spaced in series, shall be installed on each scour branch, with the upstream valve left open and the downstream valve closed.
Section 8.8.4 Page 217	**Hydrant Types** All Hydrants shall be Nylon or Fusion Bonded Epoxy (FBE) coated to AS 4158, 80 mm nominal bore to AS 3952, CI to AS 1830, Flanges to AS 4087 with

	Stainless Steel wire springs. Fasteners are to be Stainless Steel Marine Grade or Hot Dipped Galvanised (HDG) 316 to AS 1110, AS 1111, AS 1112, and AS 2837. Hydrant risers shall be used where pipe cover exceeds 250 mm. All hydrant risers shall be Nylon or Fusion Bonded Epoxy (FBE) coated to AS 4158. Details of all proposed hydrants and hydrant risers shall be submitted to Goulburn Mulwaree Council for inspection and approval, prior to use. Spring hydrants are to be used within Goulburn Mulwaree Council.
Section 8.8.6 Page 218	**Hydrant Outlet Connections** Hydrant outlet connections shall be the standard claw type that is suitable for the attachment of a hydrant standpipe.
Section 8.8.8 Page 218	**Hydrant Spacing** Urban a) Maximum sixty (60) metre spacing along the main, and b) Maximum forty (40) metres from a property boundary. Properties must be serviced by fire hydrants as per Fire & Rescue NSW requirements. Rural a) Maximum of 80 metre spacing along the main or b) Minimum one (1) hydrant per lot.
Section 8.8.9 Page 219	**Hydrant Location** Urban In urban areas, hydrants are to be generally aligned with lot boundaries. Locations may require adjustment on site with Goulburn Mulwaree Council's Inspector. Rural In rural areas hydrants should be located at the access point for each lot, if known, or otherwise, centrally located. Hydrants on reticulation mains shall be located below-ground in a non-trafficable location i.e. within the nature strip, footway or road verge and clear of driveways.

<table>
<tr><td></td><td>Screw hydrants are not permitted for use in Goulburn Mulwaree Council.</td></tr>
<tr><td>Section 8.10.2
Page 222</td><td>General (Surface Fittings)

All buried appurtenances shall be provided with surface fittings for operation, maintenance and fire fighting purposes. The Hydrant and Valve Covers/Surrounds are to be Recycled Plastic and installed as per the WSAA Standard Drawing.

Details of all proposed Hydrant and Valve Cover/Surrounds shall be submitted to Goulburn Mulwaree Council for inspection and approval, prior to use.</td></tr>
<tr><td>Section 8.10.3
Page 222</td><td>Marking of Surface Fittings

Surface Fittings shall be coloured as per Table GMC8.10.3

Table GMC8.10.3<table><tr><td>Fitting</td><td>Colour</td></tr><tr><td>Stop valve</td><td>White</td></tr><tr><td>Zone Valve</td><td>Red</td></tr><tr><td>Recycled water valve</td><td>N/A</td></tr><tr><td>Left hand valve</td><td>N/A</td></tr><tr><td>Hydrant</td><td>Yellow</td></tr><tr><td>Recycled water hydrant</td><td>N/A</td></tr><tr><td>Air Valve</td><td>White</td></tr><tr><td>Recycled water air valve</td><td>N/A</td></tr><tr><td>Scour Valve</td><td>White</td></tr></table></td></tr>
<tr><td>Section 8.11.3
Page 227</td><td>Pavement Markers

Arrows are to be painted on to the pavement behind (in the direction of the traffic flow) pointing to the side of the road that the appurtenance (hydrant, stop valve, etc.) is located. The colour of the arrow is to be coloured as per Table GMC8.10.3.</td></tr>
</table>

Chapter 9 – Design Review and Drawings	
Section 9.4 Page 231	**Recording of Work As Constructed Information** WAE drawings shall be in accordance with Goulburn Mulwaree Council's standards for engineering Works As Executed (WAE) drawing points 9 and 10. Electronic data file requirement refer attachments. Refer to attachment A & B. WAE drawings are to be submitted to Council in pdf and dwg format, or as hard copies (in A1 size and A3 size). Survey points for Work As Constructed Drawings are to be taken by a Registered Surveyor, and certified by the Registered Surveyor that the Work As Constructed drawings are a full and accurate representation of the constructed works. Certification may be achieved by the Registered Surveyor stamping and signing each plan. Engineering design plans are to be prepared to Council's standards by a person, either holding qualification acceptable for Corporate membership of the Institute of Engineers Australia, or a person of proven experience in the field.

C. VARIATIONS TO THE CODE – WSA 03 (2011) PART 2: CONSTRUCTION

Chapter 10 – General	
Section 10.2 Page 239	**Interpretation** "Product Specification" means the Goulburn Mulwaree Council Specification detailing the requirements for the supply of a product or material. Note; If no GMC requirement is given, refer to WSAA product specification. All materials must have the Standards Mark or Water Mark or the Plumbing Safety Type Test Mark.
Chapter 11 – General Construction	
Section 11.2 Page 241	**Order of Construction, Testing and Commissioning** New water mains are not to be connected to Council's existing water network until new water mains have been tested and disinfected.
Section 11.5.1 Page 242	**Protection of Other Services** For the location of water, sewer and stormwater assets, contact Council for the approximate location of these assets via a diagram from Council's GIS system. For more accurate locations of assets Council can be engaged to accurately locate the existence/location of Council's assets, upon application at the applicant's expense. Contractors and/or Developers are to accurately locate underground assets before completing work that may affect these assets.
Chapter 12 – Products and Materials	
Section 12.6 Page 252	**Supply of Water to the Works** Contractors and/or developers shall not use Council's water supply via hydrants unless given specific written instruction to do so. Any standpipes used for this purpose are to be metered, with readings at the start of use and the end of use to be provided to Council.
Section 12.8.8 Additional to WSA	**Corrosion Protection of Metal Surfaces** Corrosion protection to any other exposed metal Surfaces shall be protected from corrosion using the Denso Petrolatum System (or equivalent)

	Component 1 – Seashield Primer P Component 2 – 402 or 400 Mastic Component 3 – 600 Tape Component 4 – 931 Overwrap Tape Alternative systems may be suitable; however, details shall be submitted to and approved by Goulburn Mulwaree Council prior to use.
Chapter 13 - Excavation	
Chapter 14 – Bedding for Pipes	
Section 14.2 Page 261	**Bedding and Pipe Support** Pipe bedding is the zone between the ground foundation and the bottom of the pipe and a minimum 100mm all-round the pipe. 7mm Blue Metal Aggregate is to be used around newly laid main (including bedding). Refer to **Section 16.2** for more information.
Chapter 15 – Pipe Laying, Jointing and Connecting	
Section 15.3 Page 264	**Horizontal and Vertical Separation of Crossing Pipelines** Maintain minimum vertical separation of crossing pipelines as specified in Table GMC5.5. Fill the separation with embedment material and compact.
Section 15.8 Page 267	**Tapping of Mains, Property Services and Water Meters** All connections to Council's existing water mains must be completed by Council, upon application at the applicant's expense. The work will be scheduled into Council's works program once the quotation is paid in full. Properties with new water connections must have a metered water supply, with meters installed by Council once an application has been submitted to Council and work to be completed is paid for.
Section 15.12.1 Page 269	**Non-Detectable marking Tape** Non-detectable marking tape is not permitted for use by Goulburn Mulwaree Council.
Section 15.16 Page 270	**Aqueducts** Aqueducts are not permitted for use by Goulburn Mulwaree Council.

Section 15.18 Page 270	**Appurtenance Location Marking** Provide location marker posts, plates and/or kerb markings for the location of valves, scours, flushing points, water service conduits, road crossings and other fittings at the locations and in the manner as required on the Design Drawings and Specification. Hydrants shall be marked as per below – Urban a) 'H' to be impressed in the kerb 100 mm high by 80 mm wide at the time of laying of the kerb and gutter or cut in later with an angle grinder. b) Blue reflective marker to be fixed in the roadway 100mm from the road centerline on the side of the appurtenance, with coloured triangle indicating direction of hydrant. Rural a) A standard 'H' plate to be fixed to an adjacent fence or recycled plastic post approved by Goulburn Mulwaree Council. b) On sealed roads, blue reflective marker to be fixed in the roadway 100mm from the road centerline on the side of the appurtenance, with coloured triangle indicating direction of hydrant.
Section 15.22 Additional to WSA 03	**Connectors** Connection types approved for use to make connections on water mains are: Gibault Type Joints and Gunmetal/ABS (Acrylonitrite Butadiene Styrene) Joiners and thrust connectors (for flange/ spigot connections in HDPE to PVC).
Section 15.22.1 Additional to WSA 03	**Gibault Joints** All Gibault Joints to be long sleeved type either stainless steel or coated to AS 4158.
Section 15.23 Additional to WSA 03	**Air Release Valves** Air release valves shall be placed on all trunk/feeder water mains and any large reticulated mains as directed by Goulburn Mulwaree Council. Air valves shall be located at all high points and shall be double orifice with a working pressure of maximum 16 Bar. Air release valves shall include a stop valve to allow for maintenance and repair without shutting down the main.

Chapter 16 – Pipe Embedment and Support

Section 16.2
Page 275

Embedment Materials

7mm Blue Metal Aggregate is to be used around newly laid mains. The following table (Table 4.2, AS/NZS 2566.2:2002) specifies the embedment depth and trench width, with the following figure (Figure 1.2, AS/NZS 2566.2:2002) providing detail of the embedment dimensions.

TABLE 4.2

MINIMUM EMBEDMENT ZONE DIMENSIONS

millimetres

D_e	Minimum dimension			
	l_b	l_c (see Note 2)	l_o	$B = D_e - 2l_c$
≥75, ≤150	75	100	100	275 – 350
>150, ≤300	100	150	150	450 – 600
>300, ≤450	100	200	150	700 – 850
>450, ≤900	150	300	150	1050 – 1500
>900, ≤1500	150	350	200	1600 – 2200
>1500, ≤4000	150	$0.25D_e$	300	2250 – 6000

NOTES:

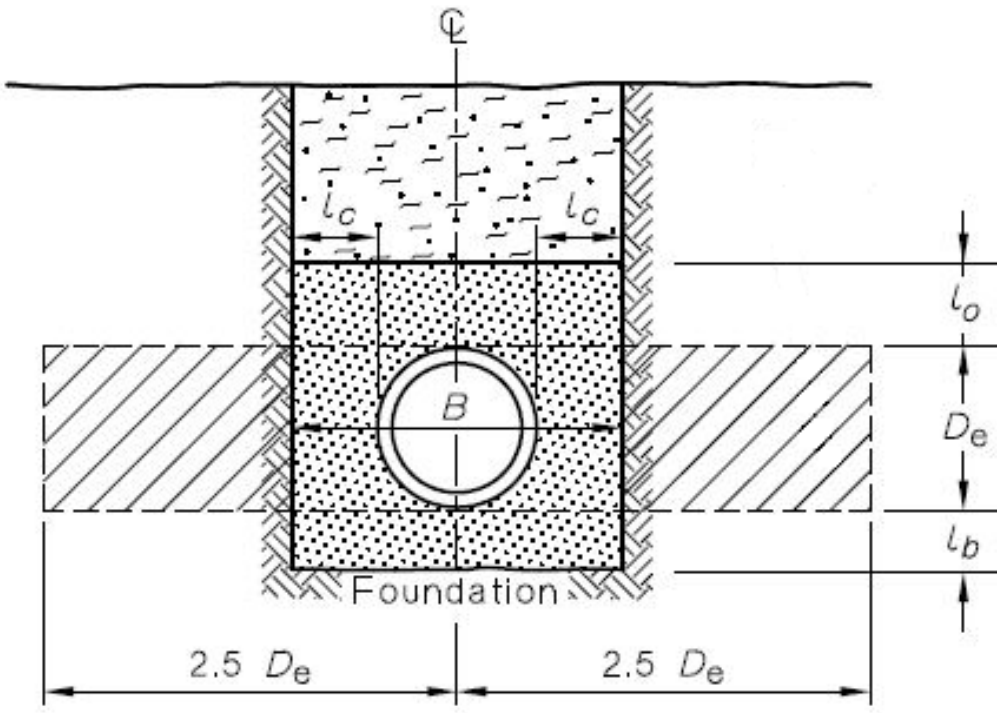
1 The objective is to achieve uniform compaction of the embedment material.

2 The tabulated values may provide insufficient clearances for installation purposes in certain circumstances.

3 The minimum spacing between adjacent parallel pipelines shall be determined from Clause 5.2.6.

4 Refer to Figure 1.2 for definitions of l_b, l_c, l_o.

Figure 1.2



<table>
<tr><td>Section 16.3.1
Page 275</td><td>Methods (Compaction of Embedment)

Embedment material to be compacted must be compacted in 150mm (maximum) layers.</td></tr>
<tr><td colspan="2">Chapter 17 - Fill</td></tr>
<tr><td>Section 17.1.1.1
Page 277</td><td>Trafficable Areas (Material Requirements)

Where the water main is to be placed beneath a road or road shoulder, backfill material shall be a mixture of sand and cement in the ratio of 27 parts sand to 1 part cement. The sand shall meet the requirements specified in Table GMC17.1 below and be mixed with the cement before being placed in the trench.
Table GMC17.1
<table><tr><th>Sieve Size Aperture Width (AS 1152)</th><th>Equivalent BS Sieve Size (BS 410)</th><th>Percentage Passing</th></tr><tr><td>9.5 mm</td><td>3/8 inch</td><td>100</td></tr><tr><td>6.7 mm</td><td>1/4 inch</td><td>90-100</td></tr><tr><td>425 µm</td><td>No. 36</td><td>40-90</td></tr><tr><td>150 µm</td><td>No. 100</td><td>0-40</td></tr></table>
The sand cement material shall be supplied and compacted in 150mm layers to the full depth of the trench. For existing roads, the final road finish shall be either 2 Coat or Hot-Mix, depending on the material of the existing road.</td></tr>
<tr><td>Section 17.1.1.2
Page 277</td><td>Non-Trafficable Areas (Material Requirements)

Any trenches dug in non-trafficable areas shall be backfilled with soil/clay mix and compacted in 150mm layers.

If the new water main is to be placed beneath a footpath, backfill material is to be DGB20 compacted in 150mm layers.</td></tr>
<tr><td colspan="2">Chapter 18 - Swabbing</td></tr>
<tr><td colspan="2">Chapter 19 – Acceptance Testing</td></tr>
<tr><td>Section 19.4.2
Page 284</td><td>Mains (Hydrostatic Pressure testing)

All hydrostatic pressure testing of new mains is to be completed by a third party that is NATA accredited. The results of the testing is to be supplied to Council.</td></tr>
</table>

	Adopt a maximum test length of 500m for water mains.
Section 19.4.3 Page 284	**Property Services** (Hydrostatic Pressure testing) Hydrostatic pressure testing of property services are to be completed in conjunction with the pressure testing of the water mains.
Chapter 20 - Disinfection	
Section 20.1 Page 286	**Application** (Disinfection) All new water mains are to be disinfected before they are connected to Council's water supply network, provided they meet the requirements of the hydrostatic pressure testing. Council is to complete the disinfection at the applicant's expense. Where Council is not able to complete this work, the applicant is to organize for the completion of the disinfection at their expense. Test results are to be supplied to Council once the disinfection is complete.
Chapter 21 – Tolerances on As-Constructed Work	
Chapter 22 – Connections to Existing Water Mains	
Section 22.1 Page 290	**General** (Connections to Existing mains) All connections to existing water mains are to be completed by Goulburn Mulwaree Council, unless Council specifically permits a third party to do so in writing.
Chapter 23 - Restoration	
Section 23.2 Page 293	**Pavements** 50mm of cold mix is to be placed over the trench and compacted. Permanent footpath restoration is to be completed as soon as practicable.
Section 23.3 Page 293	**Lawns** Grassed areas that have been trenched are to be seeded. Lawn area is to be restored to an equivalent or better condition.
Section 23.8 Additional to WSA 03	**Road and Shoulder Restoration** 50mm of cold mix is to be placed over the trench and compacted. Permanent road and/or shoulder restoration is to be completed as soon as practicable.

Chapter 24 – Work As Constructed Details	
Section 24 Page 295	**Work As Constructed Drawings** Work As Constructed drawings are to be submitted to Council before the issue of the s307 Certificate of Compliance. Work As Constructed drawings with the amendments to the original design plan to represent the 'as constructed' information must be completed for presentation to, and approval by Goulburn Mulwaree Council, prior to Pressure Testing and the issue of the Certificate of Practical Completion/Certificate of Compliance. Refer to attachment B. Survey points for Work As Constructed Drawings are to be taken by a Registered Surveyor, and certified by the Registered Surveyor that the Work As Constructed drawings are a full and accurate representation of the constructed works. Certification may be achieved by the Registered Surveyor stamping and signing each plan.

APPENDIX A – ELECTRONIC DATA FILE

Survey Type Real Time Kinematic (RTK)

Data Required Co-ordinates, AHD height, point codes and code legend, and 3D quality data on ach point. All levels to be given in MGA (AHD).

Projection GDA94 (MGA55) projection.

Position Quality Readings within: 2cm horizontal and 3cm vertical.

File Format Co-ordinates to be provided in Excel*.xls spreadsheet or comma delimited*.txt file or .csv file.

Points Required

Sewer

- Sewer manholes at centre of manhole lid
- Sewer junction locations at the intersection point with the main at the surface and at the end of the junction at the surface.
- Sewer vents, immediately adjacent to the sewer vent.

Water mains

- Water mains at the intersection point between two mains
- Water mains at bends and tee sections
- Water main hydrants at the centre of the hydrant cover.
- Water main stop valves at the centre of the stop valve cover.
- Water main air valves and scour valves at the centre of the air valve/scour valve cover.
- Water main tapers at the midpoint of the taper.
- Water Main creek/river crossings, at each end of the creek/river crossing
- Water main puddle flange and thrust blocks.
- Meter boxes at the centre of the meter box.

Stormwater

- Stormwater pits and headwalls at the centre of the pit lid or headwall.
- Stormwater junction locations at the intersection point with the pipe at the surface, and at the end of the junction at the surface.
- Culverts should have points taken on the centre of the headwall either side of the road.

Property

- Lot boundary points

Road

- Footpaths on both outside edges to clearly show line, length and any deviations.
- Kerb and gutter at invert of the kerb to clearly show line, length and any deviations. Points also to be taken at all tangents points.
- Traffic island point locations around the outside edge to clearly show size and shape of the feature.

Other

- Points of any other relevant features such as water quality devices ie swales, bio-detention basins etc.

3. APPENDIX B – WORKS AS EXECUTED DRAWINGS

This Standard Technical Specification was developed by Goulburn Mulwaree Council to be used for compilation of WAE plans for Water Supply and Sewerage works for Developer constructed and Capital projects. It is intended that this Specification be used in conjunction with various Goulburn Mulwaree Council's Sewer and Water Supplements to the WSA codes (Water Supply and Sewer Code) and specific drawings and design requirements as defined by Goulburn Mulwaree Council for each particular project.

Goulburn Mulwaree Council does not consider this Standard Technical Specification suitable for use for any other purpose or in any other manner. Use of this Standard Technical Specification for any other purpose or in any other manner is wholly at the user's risk.

Goulburn Mulwaree Council makes no representations or warranty that this Standard Technical Specification has been prepared with reasonable care and does not assume a duty of care to any person using this document for any purpose other than stated.

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This document is current at the date of downloading. Goulburn Mulwaree Council may update this document at any time.

GENERAL

1.1 Scope

This Specification details requirements for the preparation of Work As Executed (WAE) plans for water supply and sewerage works constructed where works are to be accepted/owned by Goulburn Mulwaree Council.

These specifications are available online at

https://www.goulburn.nsw.gov.au/Services/Water-Sewer/Water-and-Sewer-Construction-Standards

https://www.goulburn.nsw.gov.au/Development/Plans-Strategies#section-5

1.2 Interpretation

"Construction Drawings" are all drawings defining the physical characteristics of the works to be constructed.

"Work As Executed Drawings" (WAE) are all drawings defining the physical characteristics of the works constructed.

SURVEY

To determine any location co-ordinates required by this specification use:

- A registered surveyor; or
- A surveyor accredited with AS9001 or AS9002.

State co-ordinates in Map Grid of Australia (GDA94 Zone 56) and levels in Australian Height Datum (AHD).

Table GMC B1

Feature	Level Accuracy	Co-ordinate Accuracy
Buried work (located by prodding or electronic detector	± 0.05m/m depth	± 0.05m/m depth
Fencing		± 0.10m
All other features	± 0.005m	± 0.05m

DRAWING REQUIREMENTS

General

Revise the electronic version of all Construction Drawings in accordance with Preparation of Civil and Structural Engineering Drawings Document and Goulburn Mulwaree Council's Sewer and Water Supplements to WSAA Code to accurately depict the work as constructed. Check and revise all dimensions, co-ordinates, levels, materials, boundary ties and other drawing notations.

Provide a table of co-ordinates for all constructed surface fitting on the General Arrangement drawing. Below is an example of the information required:

Table GMC B2

CHAINAGE	EASTING	NORTHING	R.L
547.15	345448.54	6383845.98	
548.98 - Hyd	345448.55	6383847.81	
549.58 - SV	345448.56	6383848.41	
551.97 – Hyd	345448.58	6383850.80	
578.50	345449.59	6383860.60	
600.36	345443.53	6383880.20	
670.95	3454438.80	6383830.32	
722.04	345443.98	6383850.42	
731.00 - Tee	345465.97	6383851.62	

SV	345433.58	6383850.41	
Scour Pit	345423.18	6383853.64	
1339.71 - Hyd	345445.38	6383850.23	
1342.37 - SV	345446.95	6383857.10	
1345.44 - Tee	345442.91	6383859.12	

Indicate the accuracy of the measurement of the GPS co-ordinates (i.e. GPS, Measured, Survey quality, etc.).

Amend the notation to indicate actual details of features noted on the Construction Drawing to be located, sized or determined during construction. For example:

- A drawing note indicates pipe work as being either M or O PVC, HDPE or DICL. Amend the note to show what was actually used.
- A drawing note indicating concrete encasement of pipe work is required where cover is less than 700mm. Indicate the actual extent of encasement installed with start and finish chainages.
- When the dimension or size on a Construction Drawing is nominal (eg. Pipe diameter) only correct the dimension if a different size is used. For cast in-situ concrete work, only correct dimensions when the work constructed is outside the tolerances defined in AS3610 Formwork for Concrete.

State the origin of all levels and co-ordinates on each drawing as well as any additional survey control marks.

When specified, modify contours to depict the work as constructed.

On each drawing state the month and year by which all field work on the drawing was completed.

Add a “WAE” notation in the Revision table located on each drawing to indicate that it is Work-As–Executed even if no other changes have been made to the Construction Drawing.

Supply completed WAE drawings on CD/DVD in AutoCAD.dwg and Adobe.pdf file format in the latest release of AutoCAD or previous two versions. Provide signed A3 + A1 hardcopy prints of the drawings.

Water/Recycled water fittings Co-ordinates and / or Boundary Ties

Record the easting and northing co-ordinates if not already provided under Clause 4.1 of each of the water fittings on the WAE drawing.

- Air valve
- Double air/control valve
- Pressure reducing valve
- Auto inlet valve
- Hydrant
- Pressure sustaining valve
- Ball Valve
- Hydrant bend
- Reflux valve

- Blank hydrant
- Hydrant control valve
- Scour
- Booster control valve
- Manhole
- Strainer
- Borewell
- Meter
- Stop valve
- Butterfly valve
- Pitot cock valve
- Water pump
- Cluster box
- Chlorine Dosing Unit
- Flushing trap
- Built-in Bypass valves

Measured Location of Fittings in Water/Recycled Water and Sewer Rising Mains

Record the following information on the Construction drawing as the work progresses. Transfer the information to the WAE drawing.

- Fitting type
- Pipe sizes and materials
- Chainage from the start of the water, recycled water or rising main
- Distances to any convenient prominent features such as boundary fences

Provide a copy of the original marked up Construction drawing showing all field measurements with the WAE AutoCAD drawing.

- Bend
- End of thrust bore or directional drill
- Tapping
- Blank flange
- Gibault joint
- Tee
- Cap
- Start of concrete encasement
- Cross
- Start of thrust bore or directional drill
- End of concrete encasement
- Taper

SUBMISSION OF WAE INFORMATION

Complete and submit all WAE information with a completed Appendix C WAE checklist.

TECHNICAL DATA

Complete and supply copies of the supplied schedules of technical data.

4. APPENDIX C – WAE CHECKLIST

Requirements	Yes	No	Comments
Work-As-Executed (WAE) location co-ordinates determined by registered surveyor or surveyor accredited with AS9001 or AS9002.			
Co-ordinates stated in Map Grid Australia (GDA94 zone 56)			
Levels in Australian Height Datum (PM or SSM)			
Electronic version of Construction Drawing revised depicting work as executed			
Dimensions, co-ordinates, levels, materials and other drawing notations checked and revised			
Constructed surface fittings table of co-ordinates provided on General Arrangement Drawing.			
Measurement accuracy indicated (eg. GPS, Measured, Survey quality)			
Amended notation supplied indicating actual details of features noted on the Construction Drawing located, sized or determined during construction			
Origin of all levels, co-ordinates and additional survey control marks stated on each plan.			
Contours modified to depict work as executed.			
Month and year by which all field work was completed stated on each drawing			
“WAE” notation added in Revision table even if no other changes have been made to the Construction Drawing			

Completed WAE drawings supplied on CD/DVD in AutoCAD.DWG and Adobe.PDF format in the latest release of AutoCAD or previous two versions				
Signed A3 hardcopy prints of drawings provided				
Sewer fittings	Sewer fitting co-ordinates recorded on WAE drawing			
Gravity sewer mains	Completed junction sheets supplied in hard copy and PDF format with AutoCAD drawing			
	Junction sheets scanned at 300 dpi			
Sewer vents	Completed table presented on WAE drawing			
Sewer Flow Relief/Emergency Detention Structures and pipe work	Completed table of all relief or detention structure components and pipe work presented on WAE drawing			
Requirement		Yes	No	Comments
Water/Recycled water fitting co-ordinates	Easting and northing co-ordinates of each water fitting recorded on WAE drawing			
Measured location of fittings in Water/Recycled water and sewer mains	Information recorded on Construction drawing and transferred to WAE drawing			
	Copy of original marked up Constructed drawing showing all field measurements provided with WAE AutoCAD drawing			
Supplied Schedules A, B and C completed				

WAE submission complies with the requirements of Work-As-Executed (WAE) Information

Contractor Name.....

Contractor Signature / Date.....

Surveyor’s Name.....

Surveyor’s Signature / Date.....

5. APPENDIX D – DATA SCHEDULES

SCHEDULE A – WATER/RECYCLED WATER AND SEWER PIPES

Contractor				Contract No.			Date Works Completed		
Ref / Drawing Note 1	Pipe Material Note 2	Pipe Lining Note 3	Structured Wall Note 4	Series (if applicable)	Pressure Class (PN)	Stiffness Class (SN) Note 5	Joint System Note 6	Manufacturer	Supplier

Note 1	Drawing number or other reference if applicable					
Note 2	DI (Ductile Iron) CI (Cast Iron) S (Steel) PVC-U PVC-M PVC-O HDPE (Polyethylene) PP (Polypropylene) GRP ABS Cu RC VC MSCL					
Note 3	If applicable – CL (Cement Lined) FBPE (Fusion Bonded Polyethylene) PL (Plastic lined – eg: plastiliner for concrete pipes)					
Note 4	If applicable – Profile, sandwich					
Note 5	Required for PVC non-pressure pipe (eg: SN6, SN8) and all GRP (eg: SN5000 or SN10000)					
Note 6	RRJ (rubber ring joint) W (Welded) RRJL (Rubber ring joint with locking segments eg: “Tyton-Lok” MC (Mechanical coupling) EF (Electrofusion welded) LJ (Lead joint) SCJ (Solvent cement joint)					
GMC USE ONLY	GMC Rep		Project/Task No.		SWIMS Reference	

SCHEDULE B – WATER AND SEWER PIPE REHABILITATION

Contractor			Contract No.			Date Works Completed	
Ref/Drawing/MHs Note 1	Host Pipe Material Note 2	Replacement Pipe System Note 3	Material Class Note 4	Pressure Class (PN)	Technology Note 5	Junction/Lateral Sealing Method Note 6	Liner Trade Name

Note 1	Drawing number, upstream and downstream MH or MS numbers or other reference if applicable
Note 2	DI (Ductile Iron) CI (Cast Iron) S (Steel) PVC-U PVC-M PVC-O HDPE (Polyethylene) PP (Polypropylene) GRP ABS Cu RC VC MSCL
Note 3	PE (Polyethylene) ERIF (Epoxy Resin Impregnated Felt) PRIF (Polyester Resin Impregnated Felt) EP (Epoxy – sprayed or spread)
Note 4	If applicable – generally for PE only eg: 80B
Note 5	PC (Pipe Cracking) SL (Slip Lining) CIPL (Cured-in-Place Liner) CF (Close Fit Liner) SW (Spiral Wound) SWL (Swage Lining) PJ (Pipe Jacking) PEAT (Pipe Eating)
Note 6	None PU (Polyurethane Grout) CF (Cementitous Fully grouted annulus) EP (Epoxy) THJL (Top Hat Junction Lining) FJL (Full Junction Liner)

GMC USE ONLY	GMC Rep		Project/Task No.		SWIMS Reference	

SCHEDULE C – PIPE FITTINGS AND MISCELLANEOUS

Contractor			Contract Number		Date Works Complete	
Item	Ref / Drawing	Materials	Pressure Class (PN)	Supplier	Manufacturer	
Stop valves						
Hydrants & Riser						
Gibault Joints						
Bends						
Tapping Bands						
Services Valves						
SV Box						
Hydrant Box						
Junctions						
Reflux Valves						
Sluice Valves						
Gate Valves						
Air Valves						
Concrete						

Cement							
Stainless Steel Ladders							
Pre-cast Manholes							
Vent shafts							
GMC USE ONLY	GMC Rep			Project/Task No.		SWIMS Reference	

6. APPENDIX E – DESIGN DRAWINGS REQUIRENMENTS

GOULBURN MULWAREE COUNCIL REQUIREMENTS FOR SEWER DESIGN DRAWINGS

PLANS

- Plans are to be prepared on sheets sizes no greater than A1 and no smaller than A3,
- and shall have sheet borders.
- Plans are to be drawn at a scale of 1:500 unless greater detail needs to be shown in which case a scale of 1:250 may be used.
- Generally plans are to clearly elaborate the extent of works to be undertaken and are to be free of any superfluous information.
- Lots proposed to be serviced are to be shown in their entirety.
- Boundaries of lots to be serviced in the plan are to be highlighted by bold lines and numbering.
- All lots shown on the plan are to be properly numbered.
- Adjoining lot information (Lot and DP No.s) is to be shown on the plan in stippled lettering.
- Contours at a minimum 0.5m interval are to show over the entire area of the lots to be serviced and major contour values clearly shown.
- In general the plan is to clearly show the works to be undertaken with all other information in thinner, smaller or fainter line types to avoid confusion.(Internal sewer drainage lines are not to be shown or to be identified as not part of approval)
- Contours and levels shown are to be on Australian Height Datum (AHD).
- Bench Marks showing levels on AHD are to be shown on the plan – minimum spacing for benchmarks is to be 200m.
- North point to be shown on plans – should be to the top of page or to the right of the page.
- Proposed roads showing kerb lines (or if applicable edge of bitumen) and existing/proposed stormwater drainage systems (including interallotment drainage lines) are to be shown on the plan. Thin or light lines are to be used for this additional information.
- Existing and proposed (if known) street names are to be shown on the plan
- Proposed sewer lines are generally to be located within property boundaries with consideration given to the possible impact of the sewer lines and structures to future building sites. Where possible zones of influence (as defined in Council's Building GMC Policy) should not extend into building area.
- In cases where sewer lines are to run up the side of properties, these lines shall be concrete encased. Encasing is to be shown commencing a minimum 1.0m outside the building line and extend a minimum 75% of the depth of the building area.
- Proposed sewer lines are to be shown with bearings and distances on each line (distances measured from centre of structures)
- All structures (i.e. Maintenance holes) are to be clearly numbered commencing from the downstream end and numbered progressively to the end of the line. Numbering is to be kept simple e.g. A/1, A/2 etc. and the used of complex manhole number e.g. XAC1/3 avoided.

- All structures are to be clearly dimensioned in relation to existing or proposed boundaries, sufficient to enable proper setting out by survey. Where dimensioning not possible or unworkable MGA co-ordinates may be shown for all sewer structures.
- All sewer junctions are to be clearly shown and noted as to their type i.e. slope junction (SJ), riley junction (RJ), or vertical junction (VJ), with the chainage of the junction shown from the centre downstream manhole/structure. NB –Lots where sewer mains are located outside lot to be served, shall be serviced by riley junction and lots with sewer located inside lot shall be serviced by slope junction (excludes VJ, MHJ & junction extending from terminal maintenance shafts).
- A table is to be included on the plan which details the fall at the centre of the maintenance holes and corresponding minimum required fall across the maintenance hole giving consideration to grade.
- All new sewer mains are to drawn as thick unbroken lines and maintenance holes, terminal maintenance shafts etc. drawn as shown on the attached plan.

LONGITUDINAL SECTIONS

- Longitudinal sections are to be prepared at a standard scale of 1:500 horizontal and 1:100 vertical unless greater detail needs to be shown in which case a horizontal scale of 1:250 may be used.
- Sections are to commence with the downstream maintenance hole on the left hand side of the page.
- Sections are to show lengths of lines, natural surface (and design surface where applicable), invert levels (inlet and outlet) at centre of proposed and existing maintenance holes or structures and depth of line at structures from natural and design surface to inverts and any storm water or water main crossings.
- Sections are to show a datum line (in bold) with level clearly denoted.
- Levels are to be shown to an accuracy of no greater than 0.005.
- Structures are to be clearly numbered with numbering coinciding with that shown on the plan.
- Grades of sewer lines are to be clearly shown both in percentage and ratio ie. 1:XX (to a maximum of 2 decimal places)
- Grades of proposed lines are to be no flatter than the minimum grades as defined in WSA Codes. Where possible absolute minimum grades are to be avoided, but if design constraints dictate the use of minimum grades, a note is to be added to the long section indicating this and stating the requirement for lines to be checked by survey prior to backfilling to ensure design requirements have been met.
- Size and type of sewer pipe to be shown.
- The concrete encasing of sewer lines is to be clearly shown on the long section together with start and finish chainages.
- Details of vertical junctions showing height of junction riser above the main is to be shown on the long section.
- The general description of property type in which the sewer line is to run should be shown along the top of the section i.e. private, public reserve, road, etc.

GOULBURN MULWAREE COUNCIL REQUIREMENTS FOR WATER DESIGN DRAWINGS

All plans are to be prepared in accordance with these guidelines and in accordance with Goulburn Mulwaree Council's technical Specification for the Preparation of Civil & Structural Drawing

- Plans are to be prepared on sheets sizes no greater than A1 and no smaller than A3.
- Plans are to be drawn at a scale of 1:500 unless greater detail needs to be shown in which case a scale of 1:250 may be used. Scale bar to be provided on plans along with scaling references at A1 & A3.
- Generally plans are to clearly elaborate the extent of works to be undertaken and are to be free of any superfluous information.
- Lots proposed to be serviced are to be shown in their entirety.
- Boundaries of lots to be serviced in the plan are to be highlighted by bold lines and numbering.
- Electronic plans.
- All lots shown on the plan are to be properly numbered.
- Adjoining lot information (Lot and DP No.s) is to be shown on the plan in stippled lettering.
- Contours at a minimum 0.5m interval are to be shown over the entire area of the lots to be serviced and major contour values clearly shown.
- In general the plan is to clearly show the works to be undertaken with all other information in thinner, smaller or fainter line types to avoid confusion.
- Contours and levels shown are to be on Australian Height Datum (AHD)
- Bench Marks showing levels at AHD are to be shown on the plan – minimum spacing for benchmarks is to be 200m.
- North point to be shown on plans – north shall be to top of page or to the right of the page.
- Proposed roads showing kerb lines (or if applicable edge of bitumen) and existing/proposed stormwater drainage systems (including interallotment drainage lines) are to be shown on the plan.
- Existing and proposed (if known) street names are to be shown on the plan.
- All existing services (sewer, stormwater etc.) and if necessary their proximity to the new water main are to be clearly shown on the plan
- All proposed electrical/telecommunication services are to be located on opposite side of the lot to water services.
- Proposed water mains are to be located in the footpath area at a minimum 2.4m and maximum 3.0m from property boundaries. They should generally be laid at 2.7m from property boundaries.
- Long section to be included where required vertical alignment of all other services crossing under/over pipeline.
- Proposed water mains are to be shown with boundary offset distances on each line and connections to boundaries sufficient to enable proposed fittings ie. Hydrants, stop valves etc; to be set out by survey.
- The type and size of every new pipeline is to be clearly shown on the plan.
- All fittings including connections and flanges are to be clearly marked and tied to property boundaries/MGA co-ordinates. Enlarged sections are to be shown where multiple fittings are required and greater detail is required for design/construction planning.
- New water mains are to be shown as a thick unbroken line. Valves, hydrants etc. are to be drawn in accordance with the standard.

- Where possible, in the first instance hydrants are to be positioned on the line of property boundaries. This requirement is set to avoid having hydrants located in future driveways.
- Design plans to show the location and type of any required trench stops or bulkheads.
- Design plans to show location, size and bearing area of all thrust blocks.

WATER CONSTRUCTION NOTES:

The contractor shall comply with the requirements of the Work Health and Safety Act 2011, which requires employers to ensure the health, safety and welfare of employees.

The contractor shall at all-time exercise all necessary precautions appropriate to ensure the safety of all persons on the work site or in the vicinity of the work site.

Prior to commencing work on site the Contractor shall give all necessary notifications as required and shall provide to the Superintendent satisfactory evidence to such effect.

Prior to commencing work on site the Contractor shall provide to the Superintendent evidence that the contractor has current Public Risk (liability) and Workers Compensation Insurance Policies.

The Contractor shall give not less than 4 days' notice to the Superintendent and Goulburn Mulwaree Council prior to the commencement of work on the site.

Notwithstanding any other provisions the Contractor shall arrange for the work to be inspected by the Goulburn Mulwaree Council Inspector at the following stages:

a) After laying of pipes on 100mm suitable bedding and haunching prior to completion of 100mm of backfill.
b) After backfill to 100mm over pipes and prior to completion of backfill.
c) Prior to pouring of thrust blocks.
d) After installation of under-road conduits prior to backfilling.
e) Following installation of property water services and prior to backfilling.
f) During the disinfection and pressure testing of water mains.
g) At practical completion, after supply of work-as-executed plans.
h) At the end of the maintenance period.
i) At any other specified stage of the works as required by Council's inspector.
j) Water mains to be K9 Ductile Iron Cement Lined (DICL) Class 16/PN16, Series II, RRJ PVC "M" to AS/NZS 4765 or HDPE PN16 unless otherwise specified on plan. Pipes to be light blue in colour or black with blue stripe for HDPE.
k) Water mains located within easements across private allotments or under roads to be Class K9 Ductile Iron Cement Lined (DICL) RRJ pipes. PVC "M" minimum cl20 or HDPE cl20.
l) Water mains are to be located in road reserves between 2.4m and 3.0m from the property boundary. They're generally laid at 2.7m from the property boundary.
m) Water main is to have a minimum cover compliant with table 7.2.
n) Where the water main is to be constructed in areas of fill, the contractor is to ensure that the area is compacted prior to construction of the main.
o) Detectable tracer tape to be provided on top of the pipe embedment material or 1.0 metre below the finished surface level, whichever is the higher. Detectable tape is to be green in colour with the inscription "CAUTION - WATER MAIN BURIED BELOW", 100mm wide polythene tape with 316 stainless steel wire insert.
p) All Ductile Iron valves, fittings and bends shall be Nylon or Fusion Bonded Epoxy (FBE) coated to AS/NZS 4158.

q) All valves are to be Class 16, non-rising spindle, anti-clockwise (ACC) closing resilient seated and manufactured to AS 2638.
r) All spring hydrants to be at a depth of no greater than 250mm below finished ground surface.
s) All hydrant and stop valve covers are to be left protruding 50mm (minimum) above the finished ground surface level. This is to allow for grass growth around the hydrant and stop valve covers.
t) All flanged fittings are to be fastened with Marine Grade (316) Stainless Steel nuts or hot dipped galvanized (HDG), bolts and washers.
u) Concrete thrust blocks are to be provided at all bends, tees, tapers and end caps. construction shall be performed in accordance with the drawings, with Water Services Association of Australia – Water Supply Code of Australia – WSA 03-2011 V3.1 and Goulburn Mulwaree Council's Supplement to the Water Services Association of Australia – Water Supply Code of Australia (WSA 03-2011) Version 3.1, these notes and any other requirements of Goulburn Mulwaree Council and the Superintendent.
v) Sediment and erosion control measures are to be implemented prior to construction work commencing and maintained during the construction phase. Sediment and erosion control measures are to incorporate those as detailed on the approved sediment and erosion control plan included in the road and drainage plans.
w) Interconnections and `cut-ins' into Council's existing water mains are to be undertaken by Goulburn Mulwaree Council at the contractor's expense.
x) Appropriate backfill materials compacted in 150mm layers (maximum to the top of the trench (underside of road base) is to be provided for the proposed road crossings. This is to extend a minimum of 1.0 metre past the back of the kerb and gutter.
y) Hydrant covers are to be installed in an orientation where the nearest oncoming traffic will strike the covers closed, or as directed by Goulburn Mulwaree Council's inspector.
z) Blue 'cats-eye' reflective markers to be fixed in the centre of roadways with triangle indication pointing to the hydrant location or as directed by Goulburn Mulwaree Council.
aa) The contractor is to gain approval under Section 138 of the Roads Act 1993 prior to commencing construction within all road reserves.
bb) The Contractor shall work only within the hours from 7:00am-5:00pm Monday to Friday excluding Public Holidays. Any work outside these hours by arrangement with Goulburn Mulwaree Council.
cc) The contractor shall ensure that the residents adjacent to the construction zone are not affected by dust or undue noise during construction and are not deprived of all-weather access nor are subjected to additional stormwater runoff.
dd) The contractor shall not disturb any survey control marks. Should any survey control mark be disturbed or obliterated, the contractor shall notify the superintendent immediately. The contractor shall have the marks replaced at their own expense.
ee) The contractor is to ensure that mPVC pipes are not deflected by more than the recommended bending radius specified by the product manufacture.
ff) The Contractor is to locate and level all services prior to proceeding. If a conflict arises the Contractor is to immediately notify the Superintendent. Records of service location are to be submitted to the Superintendent at the completion of the works.
gg) The Contractor shall provide all labour, materials and equipment necessary for the accurate setting out of the entire works. The Contractor shall ensure the pipes are laid to correct invert levels.
hh) All filling that takes place over the site is to be in accordance with Goulburn Mulwaree Council 'Engineer Design Specifications, DCP 100 Section D6'. The compaction test results shall be forwarded to Goulburn Mulwaree Council upon completion.

POLYETHYLENE WATERMAIN CONSTRUCTION NOTES.

a) All polyethylene (PE) water mains shall be designed and installed in accordance with the Water Services Association of Australia Polyethylene Pipeline Code (WSA01-2004 V3.1).
b) PE pipe shall comply with AS/NZS 4130.
c) Fittings used on PE pipe shall comply with AS 2129.
d) The PE compound shall be PE100 and shall comply with AS/NZS 4131.
e) PE may be cold bent to a radius as specified by the supplier.
f) Allowance shall be made during construction for expansion and contraction of PE pipe due to temperature changes.
g) The pressure rating of PE pipes and fittings have been determined in accordance with Section 2.10 of WSA01-2001 and AS/NZS 4130.
h) PE pipe shall be black pipe with blue stripes.
i) PE pipe and fittings shall be stored on site in accordance with manufacturer/supplier recommendations.
j) Installation of PE pipe shall be in accordance with AS/NZS 2566.2.
k) Detectable tracer tape shall be provided on top of the pipe embedment material or 1.0 metre below the finished surface level, whichever is higher. Detectable tape shall be green in colour with the inscription “CAUTION - WATER MAIN BELOW”, 100mm wide PE tape with 316 stainless steel wire insert.
l) Jointing shall be by butt-fusion welding method unless noted otherwise.
m) Butt-fusion welding shall be certified and accredited in accordance with Section 6 of WSA01-2001.
n) Pre-qualification of the butt-fusion welding technique shall be obtained from Goulburn Mulwaree Council prior to commencement of works. Refer to Section 2.12.2 of WSA01-2004.
o) All flange backing plates, nuts & bolts are to be 316 stainless steel or hot dipped galvanised (HDG).
p) All PE connections to have 316 stainless steel or hot dipped galvanised backing plate and PE stub flange welded to the main.

CHECKLIST FOR WATER RETICULATION DESIGN PLANS

SITE…… FILE NO……..……..

- Check that all lots to be serviced are shown on the plan
- Long section
- Contours and/or spot heights shown
- Current or proposed lot numbers shown
- Adjoining lot information shown (lot and DP)
- Street names shown
- Bench Marks and reference to Datum shown
- North Point shown
- Existing water main details to be shown (size & type of pipe, hydrants, stop valves)
- Check overall layout – best configuration?
- Water Main located 2.7m offset from boundaries (check offset of fittings at bends)
- Type and diameter of pipe specified on plan
- Hydrants spaced at no more than 60m intervals (lineal)
- Hydrants located at the highest point in the line to allow for venting of air
- Temporary hydrants denoted at the end of lines to be extended in the future allow for venting of air
- Sizing and layout of the main in keeping with the strategy for the area.
- Stop valves in appropriate locations to enable isolation of the sections of the main
- Main running through private property and or close to building lines denoted as being DICL pipe
- Dead ends in the design (these are to be deleted)
- HDPE pipe been used in head of cul-de-sacs – check that correct OD specified and notes about joining to MPVC
- Curved lines are to be in accordance with pipe manufactures specifications.
- Standard construction notes included on the plan (including HDPE if used)
- Conflict with other services
- Electrical conduits to be shown and on opposite side of lots to water service conduits.
- Thrust blocks shown with size and bearing area.
- Trench stops/bulkheads.