

GORE DISTRICT COUNCIL

SUBDIVISION AND LAND DEVELOPMENT BYLAW

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SECTION 7

WATER SUPPLY

7.1 SCOPE

This section covers the installation of water supply reticulation. Standards for more specialised aspects such as raw water supply, treatment facilities and storage reservoirs are not covered. Details may be obtained from Council on request if required. This section, except for Clause 7.23, does not apply to rural water supplies.

This section of the bylaw shall be read with Sections 10 and 11, which set out general requirements for trenching and backfill of underground pipes.

7.2 OBJECTIVE

The practices specified or advised in this section are intended to:

- (a) Result in the supply of a high quality potable water supply within reticulated areas to provide for the needs of people and communities. In particular to:
 - Protect the water supply from contamination,
 - Control and reduce wastage of water; and
 - Ensure plumbing and connections used do not cause damage or wear to the system and are designed for a reasonable service life
- (b) The construction and maintaining of reticulated water supplies is “sustainable” as possible so as to limit any long term adverse effects and help “Future Proof” the subdivision or land development

7.3 RELEVANT LEGISLATION

The Drinking Water Standards for New Zealand detail quality and safety standards for drinking water. Councils seeks to ensure that all potable water reticulation schemes fully comply with the Drinking Water Standards for New Zealand.

The District Plan requires consent for all subdivisions and conditions are able to be imposed on subdivisions which are approved.

The New Zealand Fire Services Firefighting Water Supplies Code of Practice SNZ PAS 4509, sets out requirements for fire fighting water supplies.

Council’s Water Supply Bylaw sets out the process for adding consumers to a rural water supply or modifying the network.

Council has adopted NZS 9201 Model General Bylaw: Chapter 7 as its Water Supply Bylaw.

7.4 RAINWATER

Rainwater provides a good source of water for washing and irrigation. This can reduce the quantity of water required to be supplied and have a good effect on storm surge and stormwater disposal.

Within both urban and rural areas, it is strongly recommended that a system of storing and using rainwater be included at each new dwelling or other land development.

7.5 PERFORMANCE STANDARDS

Water supplies shall be designed and constructed so that:

- (a) The general performance standards of Section 1.4 are met for components to be maintained by Council.
- (b) An adequate, reliable, safe and efficient supply of potable and wholesome water is provided, in accordance with the applicable Drinking Water Standards

Further, for developments required to have a reticulated water supply:

- (c) No building site is further than 135 metres from a fire hydrant.
- (d) For fire fighting purposes a minimum fire fighting supply of 25 litres/sec from two adjacent hydrants and a 30 metre head is available within all residential developments.
- (e) Every commercial and industrial property receives minimum head and flows designed in accordance with specific parameters set out in SNZ PAS 4509 New Zealand Fire Services Firefighting Water Supplies Code of Practice.
- (f) Where proposed and possible future development is to occur only on one side of a road, water mains shall be located within the adjacent berm.
- (g) All mains and connections are constructed to ensure zero leakage of water and easy connection for service connection fittings.
- (h) No more than 12 lots within a cul-de-sac are serviced by a rider main less than 100 mm in diameter. The rider main shall commence no more than 65 metres from the dead end of the cul-de-sac and shall continue on standard alignment from the end of the larger main around the head of the cul-de-sac and up the other side of the street.

Dispensation may only be permitted subject to approval of Council (see Section 15).

7.6 RETICULATION DESIGN

The water reticulation network shall be designed to meet the performance standards and in conformity with this Bylaw and associated Standard Drawings. In addition:

- (a) No main on which a fire hydrant is installed shall be less than 100 mm in diameter.
- (b) Reticulation shall be designed to minimise pipe work passing under road surfaces. Rider mains shall be looped so as to serve the maximum number of lots with the minimum number of road crossings.
- (c) All arterial and collector roads shall be serviced by fire fighting mains in each berm.
- (d) Local roads may be serviced by a fire fighting main on one side of the street and a rider main on the other side.

- (e) Should an unreasonable length of rider main with no service connection be involved, Council may agree to extra road crossings being provided.
- (f) There shall be no dead-end mains.
- (g) The layout shall be designed to minimise head losses and take into consideration future demand from adjacent areas.
- (h) If directed by Council, high points on mains and rider mains shall be provided with a 20 mm service connection and valve mounted vertically and enclosed in a surface box for the purpose of air release.
- (i) Approved scour points shall be provided where directed by Council.

The following pipe material shall be used, as appropriate:

Table 7.1 Permitted Pipe Materials	
Pipe Materials	Standard Applicable
PVC-O	AS/NZS 4441: Oriented PVC (PVC-O) Pipes for Pressure Applications (Series 1 or Series 2 as required)
PVC-U	AS/NZS 1477: PVC Pipes and Fittings for Pressure Applications (Series 1 or Series 2 as required)
PVC-M	AS/NZS 4765: Modified PVC (PVC-M) Pipes for Pressure Applications (Series 1 or Series 2 as required)
PE PE 80B or PE110	AS/NZS 4130: Polyethylene (PE) Pipes for Pressure Applications

Dispensation may only be permitted subject to approval of Council (see Section 15).

7.7 WATER MAINS

New mains and fittings shall be PVC-O, PVC-U, PVC-M or PE pipe complying with the applicable standards advised in the table above.

All gravity reticulation pipes shall conform to a minimum PN12 standard (120 metres working head, 1,200 kPa maximum working pressure) unless approved otherwise.

Pipe joints shall be of an approved type and generally of the pipe manufacturer's proprietary type rubber-ring flexible joint or detachable gibault type joint.

7.8 RIDER MAINS

Rider mains shall be connected to the supply main by means of a tee or tapped saddle in accordance with Standard Drawing W04 (Water Main Connections). Where possible, rider mains shall be fed from both ends by connection to a larger main. The size of rider mains shall be governed by Table 7.2.

Table 7.2 Criteria For Rider Mains		
Maximum Number of Services in a Through Road	Size of Rider Main (mm)	
	Single Feed	Both Ends Feed
Less than 3	50	50
3 -6	63	50
7 -15	Not applicable	63
16 -30 (Only with operating pressure >600kPa)	Not applicable	63
Maximum Number in Cul-de-sacs		
12 max	Size of Rider Main (mm) As above	

The above table is based on the assumption that all service connections will be normal 20 mm internal diameter connections to all lots. All service connections shall receive a minimum supply of 25 L/s at entry to the lot. Where special provision is made for larger supplies then larger rider mains may be required or special connections made to the principal main in the street. Such cases shall be subject to special approval.

When a rider main must be laid on a curve which is too sharp for convenient laying of rigid pipes, e.g. small diameter cul-de-sacs, Council may approve the use of flexible pipe over those lengths where curvature is excessive, or alternatively may require the line to be laid as a series of straights connected with formed bends and couplings. If, for any reason, a rider main is reduced in diameter, the whole of the length of the rider main shall be assessed as if it was fed from one end only.

7.9 SERVICE PIPES AND CONNECTIONS

Service connections will normally be completed by Council upon application and payment of the relevant connection fees at the time of building consent application.

Except for special large connections, all lots shall be provided with a 20 mm service connection connected to the main by means of an approved tapping band (or tee on 20 mm and 25 mm pipes) and an angle ferrule of approved proprietary type. See Standard Drawing W05 (Standard Water Connection Details).

Service connections are required to be located at the road frontage boundary and be fabricated from PE 80B (MDPE) PN12 pipe complying with AS/NZS 4130: Polyethylene (PE) Pipes for Pressure Applications.

The body of rear lots shall be individually serviced by connection to the street frontage with the connection points located offset from the centreline of the right of way so as to be clear of the vehicle crossing with the connection terminating outside of the right of way formation.

All residential service connections shall be an Acuflo CM2000 Composite Manifold, which includes an approved gate valve and check valve. Manifolds shall be enclosed in an Acuflo MIDlinground box and in accordance with Standard Drawing W05 (Standard Water Connection Details).

Commercial and industrial properties are required to be metered and a water meter of an type approved by Council shall be included at the connection and located beyond the gate valve. Meters and valves shall be enclosed in a box in accordance with Standard Drawing W03 (Water Meter Cover Details).

Water services to residential properties are required to be designed to facilitate the installation of a water meter at a future date.

If as a result of activities being undertaken on a site, there is the potential of contaminants entering the water supply and then being drawn back to the main reticulation an approved backflow device shall be installed. For example, where supply is to water troughs, or facilities using hazardous chemicals. All backflow devices shall be designed and installed to meet AS/NZS 2845.1:2010 Water Supply – Backflow prevention devices – Materials, design and performance requirements.

7.10 **DEPTH OF MAINS**

The minimum depth of cover from the finished surface level to the top of the pipe shall be as shown in the table below:

Table 7.3 Depth of Mains	
Location	Minimum depth of cover from the finished surface level to top of the pipe (mm)
Service connection pipes in all cases	450
Mains under grass berms and footpaths	750
Mains under carriageways	900

7.11 **VALVES**

Valves on mains shall be resilient seated cast iron waterworks pattern sluice valves, nylon coated for corrosion protection and conforming to AS/NZS 2638.2: CP Gate Valves for Waterworks Purposes Part 2 - Resilient Seated. All valves shall be anti-clockwise closing unless stipulated otherwise. The use of light pattern valves will not be permitted. All valve joints isolated from other fittings may be plain ended. In all other cases valves shall be flanged.

All valves shall be enclosed in a surface box set flush with the finished ground surface in such a way that the spindle is not more than 400 mm below finished ground level and readily accessible to a standard valve key.

Valves on rider mains shall be either sluice valves as above or gate valves. Gate valves shall be hand wheel operated and enclosed in a surface box set flush with the finished ground surface. Valves shall have the spindle not more than 400 mm below the finished ground level. Gate valves shall conform to BS 5154 Specification for Copper Alloy Globe, Globe Stop and Check, Check and Gate Valves PN12 or higher, with non-rising stems.

Valves shall generally be placed on all branches of each tee or cross and shall be sited adjacent to the flanged tee or cross or at such other location as may be directed. Valves shall be located clear of the carriageway wherever possible. The spacing of line valves on principal mains in any street shall not exceed 500 metres. Where possible, not more than 40 consumers on a main or rider main shall be isolated should the supply be shut down for maintenance purposes. Individual branch mains are to be valved at the tee or cross and all sections of interconnecting mains and riders are to be provided with isolation valves at each end. In no case shall more than three valves be required to isolate any section of the reticulation.

7.12 **HYDRANTS**

All mains (other than rider mains) 100 mm or more in diameter, shall be provided with fire hydrants. These shall be clockwise closing of the screw-down type and shall comply with NZS/BS 750 Specification for Underground Fire Hydrants and Surface Box Frames and Covers.

Hydrants shall generally be located at street intersections and near private accesses.

Hydrants shall be evenly spaced between these points so that the maximum spacing does not exceed 135 metres in residential areas and 90 metres in commercial and industrial areas. In special situations Council may require this spacing to be reduced.

In cul-de-sacs or other terminal streets or right of ways, the last hydrant at the end of the supply main shall be not more than half the maximum approved spacing from the head of the street, and in no case more than 135 metres from the furthestmost building site on any allotment when measured along the route of travel.

Hydrants shall be mounted on approved hydrant tees with risers, if necessary, so that the top of the spindle on the hydrant is between 175 mm and 250 mm below the finished surface level. A loose lid surface box shall be installed to enclose the hydrant in such a way that a standpipe and key can be fitted and the hydrant operated without obstruction.

Hydrant locations shall be marked in accordance with NZS 4501 Code of Practice for the Location Marking of Fire Hydrants.

7.13 PIPE FITTINGS

Pipe fittings such as tees, hydrant tees, tapers, crosses, hydrant risers, caps, plugs and bends shall be of approved manufacture to the general requirements of the relevant Standard. All pipe fittings shall comply with the dimensions of the line on which they are to be used. Flanges shall be drilled to AS/NZS 4087: Metallic Flanges for Waterworks Purposes.

All fittings used with PVC pipe shall comply with AS/NZS 2280: Ductile Iron Pipes and Fittings, AS/NZS 4998: Bolted Unrestrained Mechanical Couplings for Waterworks Purposes, and AS/NZS 4793: Mechanical Tapping Bands for Waterworks Purposes.

Protective coatings on Ductile Iron fittings shall comply with AS/NZS 4158: Thermal-bonded Polymeric Coatings on Valves and Fittings for Water Industry Purposes.

Gibaults and tapping bands shall be constructed to BS EN 545:2010: Ductile Iron Pipes, Fittings, Accessories and their Joints for Water Pipelines. Requirements and Test Methods, BS EN 598 + A1 Ductile Iron Pipes, Fittings, Accessories and their Joints for Sewerage Applications. Requirements and Test Methods, and BS EN 969 Ductile Iron Pipes, Fittings, Accessories and their Joints for Gas Pipelines. Requirements and Test Methods..

All gibault joints shall be denso-tape wrapped.

The following fitting materials shall be used as appropriate:

Fittings Materials	Standard Applicable
PVC-U, PVC-O, PVC-M	AS/NZS 1477:2006: PVC pipes and fittings for pressure applications
PE	AS/NZS 4129: Fittings for Polyethylene (PE) Pipes for Pressure Applications
Access covers and grates	AS 3996: Access Covers and Grates
Ductile iron	AS/NZS 2280: Ductile Iron Pipes and Fittings
Ductile iron unrestrained mechanical couplings	AS/NZS 4998: Bolted Unrestrained Mechanical Couplings for Waterworks Purposes
Plastic or metallic tapping bands	AS/NZS 4793: Mechanical Tapping Bands for Waterworks Purposes
Fire hydrants	NZS/BS 750: Specification for Underground Fire Hydrants and Surface Box Frames and Covers

Table 7.4 Permitted Fitting Materials	
Fittings Materials	Standard Applicable
Resilient seated gate valves	AS 2638 Part 2: Gate Valves for Waterworks Purposes - Resilient Seated

7.14 SURFACE BOXES

Hydrant boxes shall comply with NZS/BS 750: Specification for Underground Fire Hydrants and Surface Box Frames and Covers and shall be Grade A. Hydrant boxes shall be loose lid type, cast iron and mounted on concrete or similar supported on a firm foundation having a CBR ≥ 10 in accordance with Standard Drawing W05 (Standard Water Connection Details) so that no load can transfer to the pipe. Surface boxes shall be set flush with the finished surface level.

Valve boxes and toby boxes shall be surrounded in concrete and mounted over the valve in accordance with Standard Drawing W01 (All Water Valves in Roadways).

7.15 THRUST BLOCKS

Cast in-situ thrust blocks shall be provided at all bends, sluice valves, tees, and crosses to the sizes shown in the Standard Drawings. All thrust blocks shall be poured against trimmed natural ground and placed in such a way that access to and removal of any bolts on adjacent fittings is unimpaired. The concrete is to be separated from the uPVC, HDPE or ABS by a material such as malthoid, approved by Council. This material shall prevent any bond forming between the pipe and the concrete. Concrete shall not encase more than 135 degrees of the pipe diameter.

All sluice valves shall be provided with anchorage in accordance with Standard Drawings. Special requirements apply to the anchoring of uPVC lines and developers should refer to the manufacturer's specifications.

7.16 PIPE LAYING

Pipes shall be laid on straight grades and lines or on smooth curves without exceeding the Manufacturer's recommended deflection of the joints or, in the case of flexible pipe, the recommended curvature of the barrel.

Where greater deflections are needed, formed bends shall be separated by one full pipe length unless flanged joints are used. Flanged joint combinations must be interspersed by flexible couplings to allow ready removal and replacement of individual fittings. A series of flexible joints in close proximity to each without adequate lateral support will not be acceptable.

The method of pipe laying and jointing shall be as recommended by the manufacturers for the type and class of pipe in use. All pipe barrels shall be evenly supported over the entire length by the trench floor on suitable bedding material placed before the pipe is laid. Collars shall be unsupported. The open ends of pipes shall be kept covered to prevent the ingress of foreign matter and all pipes shall be inspected and cleared as laying proceeds.

uPVC, mPVC and oPVC pipes shall be laid in conformity with the requirements of AS/NZS 2032: Installation of PVC Pipe Systems.

7.17 TESTING

Once an installation and backfilling is complete, all new pipe work shall be slowly filled with water to remove all air and allowed to stand for 24 hours under a static head of up to the intended working pressure. Any leaks found by visual inspection shall be repaired and the process repeated before testing commences.

Pipes to be tested shall not include any service lines. When the pipeline is ready for a pressure test Council shall be given not less than 48 hours notice in advance.

All pipes shall be tested using the appropriate methodology for the pipe material and diameter in accordance with AS/NZS 2566.2 The test pressure shall not exceed 1.25 times the rated pressure of the lowest rated component but shall be at least 1.25 times the specified maximum operating pressure.

As a minimum, a 100 mm diameter test pressure gauge manufactured to BS EN 837-1 Pressure Gauges. Bourdon Tube Pressure Gauges. Dimensions, Metrology, Requirements and Testing, is required to monitor the tests. The gauge is required to be in good working order with current test certification (within last 12 months) and having less than 1% error.

7.18 STERILISING AND FLUSHING

All mains shall be fully sterilised using calcium hypochlorite at a minimum concentration of 50 gm/m³ and left for at least 24 hours. At the end of this contact period the chlorinated water shall be tested for minimum residual chlorine, a minimum concentration of 0.25 ppm (0.25 gm/m³) being required for the test to be acceptable. If the minimum amount is not detected, the line shall be flushed and the disinfection process repeated until a satisfactory result is achieved. In all cases the residual test shall be carried out by Council or an approved representative.

When the connection to existing reticulation has been made the new reticulation shall be thoroughly flushed through a standpipe or other suitable tapping to remove all debris and unchlorinated water. Flows through hydrants shall be tested to a minimum flow of 12.5 litres/second to ensure that no obstruction remains in the pipelines. Where such obstruction is considered present, the lines shall be dismantled and cleared through fully open ends.

7.19 CONNECTION TO EXISTING RETICULATION

After the system has passed the pressure test a connection to the existing distribution system will be made. It will be necessary for the Contractor to give at least 48 hours notice to Council that a connection is required. The connection is to be made under Council's supervision and at the expense of the Contractor.

7.20 BACKFILLING

Cover material placed over each pipe for anchorage during testing shall be evenly spread along the trench length and compacted before backfilling commences.

This initial layer shall be laid evenly along and around the pipe to a minimum of 150 mm depth over the pipe and compacted by hand. Backfilling shall proceed in layers not exceeding 300 mm depth with each layer being fully compacted as it is placed. Any unsuitable material removed from the trench shall be removed from the site and not used for backfilling. Any settlement of backfill shall be made good until the end of the defects liability period (minimum 12 months). Backfill in roadways shall conform with the

appropriate requirements for roading.

Refer to AS/NZS 2032 Installation of PVC Pipe Systems for the requirements for backfilling of PVC lines.

7.21 SURFACE MARKING

All hydrants shall be painted with yellow road marking paint complying with the relevant specifications. Refer to Section 13.

Fire hydrants shall be additionally marked with a double sided blue cats eye reflective marker fixed near the centre of the road.

All valve covers shall be painted with blue reflective road marking paint. Where a hydrant or valve is located in a grass berm a concrete surround shall be constructed to enable clear marking.

7.22 WATER FOR FIRE FIGHTING

All developments shall be provided with fire fighting capacity in accordance with the New Zealand Fire Service Fire Fighting Water Supplies Code of Practice SNZ PAS 4509.

Where a development cannot be connected to a high pressure supply the following will apply: Each allotment will require:

- (a) The installation of a dedicated fire fighting water supply of at least 20,000 litres within a 30,000 litre tank within 90 metres of any dwelling. Alternatively, a 7,000 litre fire fighting reserve can be provided for each dwelling in association with a domestic sprinkler system. Storage may be above or below ground.
- (b) Heavy-duty vehicle access a minimum of 4.5 metre wide and 11 metre long to a connection site on a hardstand area suitable for fire service appliance parking. Access shall be maintained at all times to the hardstand areas. The connection site shall be within 6 metres of the water source.
- (c) Connections that are compatible with Fire Service equipment. The fittings are to comply with the following standard, being either:
 - 70 mm instantaneous couplings (female) to SNZ PAS 4505 Specification for Fire Fighting Waterway Equipment, or
 - 100 mm and 140 mm suction coupling (female) to SNZ PAS 4505 Specification for Fire Fighting Waterway Equipment with the hose tail of the same diameter as the threaded coupling, e.g. 140 mm coupling to have 140 mm hose tail.

Alternatively communal water supply tanks servicing a number of properties may be utilised provided that:

- At least two tanks are located within 135 metres of each building.
- Each tank has at least 20,000 litre capacity.
- Permanent couplings for private tanks are installed at each tank.

7.23 RURAL WATER SUPPLIES

Sufficient information shall accompany subdivision applications to ascertain:

- (a) If the property is connected to any rural water supply scheme.
- (b) If the new allotments will be connected to any scheme.

The application process to connect to any scheme is independent of the subdivision process. A connection is not compulsory and if a connection cannot be made this does not negate any subdivision consent.

Any existing internal reticulation crossing a proposed boundary shall be disconnected. The Surveyor shall be required to confirm, when lodging the survey plan of subdivision for seal that this has been completed.

On each proposed lot, there must be a minimum of two days storage of water. Some water schemes are for the purpose of supplying stock only (not for human consumption or irrigation).