

Title	Describe drinking-water supply reticulation systems		
Level	5	Credits	8

Purpose	People credited with this unit standard are able to describe: the reticulated services found on public and private property; the components of a drinking-water supply reticulation network; the operating parameters of the reticulation system; pumps and their performance; the hydraulics of the reticulation system, and the role of pumps, valves, and pressure reservoirs in water reticulation; and the techniques for locating underground water services, and recording.
----------------	--

Classification	Water Industry > Water Reticulation
-----------------------	-------------------------------------

Available grade	Achieved
------------------------	----------

Guidance Information

- Legislation and references relevant to this unit standard include:
 Health Act 1956, Local Government Act 2002, and subsequent amendments;
Drinking-Water Standards for New Zealand, 2005 (Revised 2008). Ministry of Health, Wellington;
 NZS 9201.7:2007 *Model General Bylaws – Water Supply*.
- Definition
Drinking-water supply – the supply catchment, treatment plant, and distribution including tankers. The drinking-water supplier has responsibility for managing the public health risks of the drinking-water supply.

Outcomes and performance criteria

Outcome 1

Describe the reticulated services found on public and private property.

Performance criteria

- Reticulated services are described in terms of their general characteristics, ownership, access and occurrence.

Range	includes but is not limited to – water supply, foul sewage, stormwater, electricity supply, telecommunication systems, gas systems, traffic systems, easement.
-------	--

Outcome 2

Describe the components of a drinking-water supply reticulation network.

Performance criteria

- 2.1 Drinking-water distribution network reticulation systems are described in terms of supply security and peak flow management.
- Range includes but is not limited to – reservoir detention, elevation considerations, costs of pumping and hour of day, control valves, monitoring and control systems, service reservoirs, network configuration.
- 2.2 Service reservoirs are described in terms of their types, functions, construction, operation, security features, and sampling access.
- Range types of reservoirs include but are not limited to – surface reservoirs, underground reservoirs; functions – diurnal peak storage and attenuation, fire reserves, elevation control, supply loss storage, inlet and outlet arrangements, drain/overflow lines, valving; construction – materials, shape, inlet/outlet arrangements.
- 2.3 Drinking-water supply mains are described in terms of their functions, fittings, location, and sampling access.
- Range service connections include but are not limited to – trunk mains, pumping mains, high pressure mains, reticulation mains, ring mains, rider mains; location – plans, records; fittings include but are not limited to – valves, fire hydrants.
- 2.4 Pipe materials and fittings used in reticulation systems are described in terms of their features.
- Range life span, durability, potential effects on water quality, methods of testing, pressure rating, operational and installation problems.

Outcome 3

Describe the operating parameters of the reticulation system.

Performance criteria

- 3.1 The causes, impacts, and control of leaks are described in terms of system operation.
- Range may include but is not limited to – sources of leaks, water losses, night flow tests.

3.2 The use of property meters is described in terms of data and income collection and water conservation.

3.3 Supervisory Control and Data Acquisition (SCADA) systems and process control in drinking-water reticulation systems are described in terms of the information collected to facilitate operations.

Range includes but is not limited to – reservoir pressure and flow status.

Outcome 4

Describe pumps and their performance.

Performance criteria

4.1 Pumps are described in terms of their performance and method of operation, the types of use for which they are suitable, and precautions to be taken against adverse effects of pumping practice.

4.2 The performance curves of pumps are described in terms of the head produced versus discharge.

4.3 The impacts of pump operating speeds are described in terms of their performance curve.

Outcome 5

Describe the hydraulics of the reticulation system, and the role of pumps, valves, and pressure reservoirs in water reticulation.

Performance criteria

5.1 Hydraulic gradient is described in terms of friction losses and fall.

5.2 The concept of pressure is described in terms of static pressure and friction losses.

Range may include but is not limited to – elevation differences, conversion of static energy to friction and dynamic pressure.

5.3 The sources of friction are described in terms of the components of a reticulation network.

Range may include but is not limited to – pipeline losses, fittings losses, valves and tap losses.

5.4 The variation of friction loss is described in terms of flow rate changes.

Range may include but is not limited to – hydraulic grade line concepts, pressure fluctuations, relationship with velocity, impact of diameter on velocity.

- 5.5 The role of pumps and valves is described in terms of the impact on hydraulic gradients.
- Range may include but is not limited to – hydraulic lifts, rising mains.
- 5.6 The role of service reservoirs is described in terms of maintaining and smoothing pressure and flow.
- 5.7 The application of water supply computer network models is described in terms of pressure and flow utilising a hydraulic model.
- 5.8 Methods of determining flow measurement are described in terms of physical means.

Outcome 6

Describe the techniques for locating underground water services, and recording.

Performance criteria

- 6.1 Identification of the location of the line of an underground service is described in relation to the use of surface covers and trench line indicators.
- 6.2 The line of an underground service set out in the field is described in terms of the application of measurements scaled from a records plan.
- 6.3 A services locating device is described in terms of its use in locating and marking the line of an underground service in the field.
- 6.4 The recording of information obtained from as-built measurements is described in terms of the reasons, and process.

Replacement information	This unit standard and unit standard 22102 were replaced by unit standard 31520.
--------------------------------	--

This unit standard is expiring. Assessment against the standard must take place by the last date for assessment set out below.

Status information and last date for assessment for superseded versions

Process	Version	Date	Last Date for Assessment
Registration	1	27 August 2001	31 December 2018
Revision	2	12 February 2003	31 December 2018
Review	3	19 September 2008	31 December 2018
Review	4	16 March 2017	31 December 2021
Review	5	29 November 2018	31 December 2021

Consent and Moderation Requirements (CMR) reference	0101
--	------

This CMR can be accessed at <http://www.nzqa.govt.nz/framework/search/index.do>.

This unit standard is Expiring