B1P1 Cold water supply

A cold water service must be connected to a *drinking water* supply.

Applications

(1) B1P1 applies to cold water supplied for human consumption, food preparation, food utensil washing or personal hygiene.

(2) B1P1 applies to automatic fire sprinkler systems when installed in accordance with FPAA101D Automatic Fire Sprinkler System Design and Installation - Drinking Water Supply.

Explanatory Information: Unintentional heating of cold water services

- Where installed in a location subjected to extreme summer temperatures (such as the roof space of a building), cold water services have the potential to become unintentionally heated. This can pose a hazard as the cold water supply may reach temperatures in excess of 45° Celsius, increasing the potential for scalding.
- To reduce the likelihood of unintentional heating of cold water services, consideration should be given to—
  - (i) avoiding long runs of pipework in locations exposed to solar heat gain; or
  - (ii) applying insulation, either directly to the pipework, or by using additional ceiling insulation material between the pipework and the solar heat source.
- Avoidance of unintentional heating of cold water services in known areas of extreme summer temperatures may also assist in reducing water usage through drawing off of water which has become excessively heated.

B1P2 Velocity

(1) Water velocity within ~~C~~cold water service pipework must ~~ensure that the pipework water velocity does~~ not exceed 3 metres per second for 99% ~~more than 1%~~ of the time that water is required during the annual peak hour.

(2) Water velocity within cold water valves and devices must ensure the correct functioning of fixtures and appliances.

Explanatory Information

The velocity limit contained in B1P2 is an upper limit value and does not necessarily represent a suitable velocity for water service components, equipment and pipework materials. Confirmation should be sought on suitable velocities for products and any specific design and installation criteria.

It is recognised that not all water service components are selected based on the 99th percentile flowrate.

~~During the hour of heaviest usage expected to occur in a year, cold water service velocity of 3 metres per second must not be exceeded for 99% of the time downstream fixtures are in use.~~

B1P3 Access and isolation

(1) ~~A cold water service must ensure access for maintenance of mechanical components and operational controls~~.Access must be provided to components of a cold water service that require maintenance, regular repair or replacement including mechanical devices and controls.

(2) ~~A cold water service must ensure the system, appliances and devices can be isolated for testing and maintenance.~~Isolation must be provided to a cold water service and components that require testing, maintenance, regular repair or replacement including mechanical devices, appliances and controls.

Explanatory Information

Access to mechanical components may require the use of a ladder, removal of an access panel, cover, door or similar. obstruction.

(iii) a dual flush cistern or flushing valve that is connected to a water closet pan to a flush volume of not more than—

(A) 6 and 3 litres; or

(B) 4.5 and 3 litres; or

(b) water saving measures *equivalent* to or greater than those described in (a).

Applications

The flush volumes of B1P4 may be within a tolerance of—

(a) ±0.5 litres for the full flush of a 6/3 litre cistern; or

(b) +0.5 litres for the reduced flush of a 6/3 litre cistern; or

(c) ±0.2 litres for a 4.5/3 litre cistern.

Exemptions

The requirements of B1P4 do not apply to a vacuum *drainage* system.

TAS B1P5

B1P5 Pressure

The points of discharge for a cold water service must—

(a) have—

(i) a working pressure of not less than 50 kPa; and

(ii) a static pressure within the building of not more than 500 kPa; or

(b) have water pressures suitable for the correct functioning of the fixture or appliance where water pressures outside of (a)(i) and (a)(ii) are required.

B1P6 Uncontrolled discharge

~~A cold water service must avoid failure or *uncontrolled discharge*.~~Any failure or *uncontrolled discharge* from a cold water service must be avoided.

Verification Methods

B1V1 Determination of velocity

(1) Compliance with *Performance Requirement* B1P2 is verified for a cold-water service when the pipework diameter of that service is greater than or equal to the minimum diameter (D_{min}) determined in accordance with the following equation:

$$D_{min} = \sqrt{\frac{4Q_{99} \, X \, 10^3}{\pi v}} \quad \text{when: } v = 3\ m/s,\ D_{min} \approx \sqrt{425Q_{99}}$$

where—

(a) D_{min} represents the minimum pipe diameter (mm); and

(b) Q_{99} represents the 99th percentile flow rate (L/s); and

(c) v represents the maximum velocity (m/s).

(2) The flow rate must be calculated by determining the greater of—

(a) probable simultaneous flow rate in accordance with (3); or

(b) flow rate of a single fixture with the largest flow rate downstream of the pipework section.

(3) For a specific pipe section, the probable simultaneous flow rate must be calculated in accordance with the following equation:

$$Q_{99} = \frac{1}{1 - P_0}\left[\sum_{k=1}^{K} n_k p_k q_k + (1 + P_0) z_{0.99} \sqrt{(1 - P_0)\sum_{k=1}^{K} n_k p_k (1 - p_k) q_k \ ^2 - P_0 \left(\sum_{k=1}^{K} n_k p_k q_k\right)^2}\right]$$

where—

(a) Q_{99} represents the 99th percentile flow rate (i.e. the designed probable simultaneous flow rate); and

(b) P_0 represents the probability of stagnation during peak usage (zero demand) determined in accordance with (4); and

(c) K represents the total number of fixture groups; and

(d) k represents the index of individual fixture groups; and

(e) n_k is the number of fixtures for a specific fixture group downstream of a pipework section; and

(f) q_k is the specific fixture flow rate; and

(g) p_k is the probability of fixture use (probability that a fixture group is running water during the peak period of water consumption) determined in accordance with (5); and

(h) Z_{99} represents the 99th percentile of the standard normal distribution and is equal to 2.362.

(4) The probability of stagnation during peak usage must be determined in accordance with the following equation:

$$P_0 = \prod_{k=1}^{K} (1 - p_k)^{n_k}$$

where—

(a) P_0 represents the probability of stagnation during peak usage (zero demand); and

(b) K represents the total number of fixture groups; and

(c) k represents the index of individual fixture groups; and

(d) n_k is the number of fixtures for a specific fixture group downstream of the pipework section; and

(e) p_k is the probability of fixture use (probability that a fixture group is running water during the peak period of water consumption) determined in accordance with (5).

(5) The probability of fixture use must be calculated in accordance with the following equation:

$$p_k = p_{k,B} + F_{o,B}$$

where—

(a) p_k represents the probability of fixture use; and

(b) $p_{k,B}$ is the baseline probability of fixture use determined in accordance with (6); and

(c) $F_{o,B}$ represents the probability adjustment factor according to occupancy calculated in accordance with (7).

(6) The baseline probability of fixture use must be determined in accordance with the following:

$p_{k,B} = P_{k,1}$ when: B = 1

$p_{k,B} = c_1 p_{k1} B^{-c_2}$ when: $2 \leq B \leq 20$

$p_{k,B} = c_1 p_{k1} 20^{-c_2}$ when: $B > 20$

where—

(a) $p_{k,B}$ is the baseline probability of fixture use; and

(b) B represents the number of apartments drawing water downstream of the pipe section; and

(c) $p_{k,1}, c_1, c_2$ are coefficients from Table B1V1.

(7) The probability adjustment factor must be determined in accordance with the following:

$$F_{o,B} = m_{k,B}(o - B)$$

where—

(a) $F_{o,B}$ represents the probability adjustment factor according to occupancy; and

(b) B represents the number of apartments drawing water downstream of the pipe section; and

(c) o represents the estimated total number of building occupants drawing water downstream of the pipe section; and

(d) $m_{k,B}$ represents the increased probability of fixture use per additional building occupant over B calculated in accordance with (8).

(8) The increased probability of fixture use per additional building occupant over B must be determined in accordance with the following:

$$m_{k,B} = c_3 B^{-c_4} \text{ when } B > 1$$

where—

(a) $m_{k,B}$ represents the increased probability of fixture use per additional building occupant over B; and

(b) B represents the number of apartments drawing water downstream of the pipe section; and

(c) c_3, c_4 are coefficients from Table B1V1.

Table B1V1: Fixture probability coefficients

Fixture	$P_{k,1}$	c_1	c_2	c_3	c_4
Shower	0.061	0.908	-0.475	0.020	-1.343
Tap	0.009	1	0	0.004	-0.880
Toilet	0.002	1	0	0.002	-0.880
Washing machine	0.031	0.976	-0.515	0.005	-1.349
Dishwasher	0.001	1	0	0.0005	-0.880
Bath	0.006	1.460	-0.411	0.008	-1.768

Table Notes

The probability coefficient (P_k) for taps is for all locations (e.g. kitchen, laundry and bathroom).

Explanatory Information: Fixture flow rates

The velocity limit defined by B1P2 is an upper limit value and does not necessarily represent a suitable velocity for water service components, equipment, and pipework materials. Confirmation should be sought on suitable velocities for the products and any specific design and installation criteria.

It is recognised that not all water service component is selected based on the 99th percentile flowrate. The practitioner must ensure appropriate use of B1V1(3) when selecting components using the 99th percentile flowrate.

Fixture flowrates can be determined based on the type selected for a particular project.

Recommended fixture flowrates (q_k) for water efficiency fixtures and appliances are as follows:

- Shower: 0.15 L/s.
- Tap (basin): 0.08 L/s.
- Tap (kitchen): 0.12 L/s
- Tap (laundry): 0.12 L/s.
- Toilet (3/4.5L): 0.19 L/s.
- Washing machine: 0.22 L/s.
- Dishwasher: 0.08 L/s.
- Bath: 0.3 L/s.

Explanatory Information: Building size and occupancy

Research has shown the probability of fixture use is dependent of building size and occupancy. The following parameters are built into probability of fixture use equations:

- Building size (number of apartments).
- Building occupancy (estimated number of occupants) drawing water downstream from the subject pipe section.

Consideration should be given to the anticipated occupancy for each apartment building. Where building occupancy is not known the number of bedrooms for each dwelling can be used an an indicator of the anticipated building occupancy. Statistics on average building occupancy may be utilised to make informed assumptions.

Values in Table B1V1 are derived from fixture use characteristics considering the results presented in several relevant Australian residential end-use studies that have monitored fixture usage in detached residential dwellings.

Deemed-to-Satisfy Provisions

B1D1 Deemed-to-Satisfy Provisions

(1) *Performance Requirement* B1P1 is satisfied if the cold water service is connected to—

(a) the *Network Utility Operator's drinking water* supply; or

(b) an alternative *drinking water* supply.

(2) Where a *Deemed-to-Satisfy Solution* is proposed, *Performance Requirements* B1P2 to B1P6 are satisfied by complying with B1D2 to B1D6.

(3) Where a *Performance Solution* is proposed, the relevant *Performance Requirements* must be determined in accordance with A2G2(3) and A2G4(3) as applicable.

(i) a low greenhouse gas intensity energy source; or

(ii) an on-site *renewable energy* source; or

(iii) another process as reclaimed energy.

Explanatory Information

The greenhouse gas intensity of energy sources vary. For example, natural gas has a low greenhouse gas intensity compared with electricity generated from coal.

For the purposes of B2F3(b), the *renewable energy* source must be on-site (not GreenPower) and includes, but is not limited to solar, wind, hydroelectric, wave action and geothermal.

Performance Requirements

B2P1 Heated water supply

A *heated water* service must be connected to a *drinking water* supply.

Applications

B2P1 applies to a *heated water* service used for human consumption, food preparation, food utensil washing or personal hygiene.

B2P2 Scald prevention

Heated water supplied by a *heated water* service must be delivered from the point of discharge of fixtures and appliances at a temperature which is unlikely to scald.

Applications

B2P2 applies to fixtures and appliances used primarily for personal hygiene.

B2P3 Velocity

VIC B2P3(1)

The water velocity in *heated water* service pipework up to 65 °C must not exceed—

(a) 3.0 m/s for more than 1% of the time that water is required during the peak hour in reticulated *heated water* systems; and

(b) 1.2 m/s for the flow and 1.0 m/s for the return of a copper circulatory *heated water* service for more than 1% of the time that water is required during the peak hour; and

(c) ~~1~~2.0 m/s for the flow and 1.0 m/s for the return of a circulatory *heated water* service using other materials for more than 1% of the time that the water is required during the peak hour.

Explanatory Information

High velocities in *heated water* services can be a contributing factor to the erosion/corrosion of pipework. Consideration should be given to the appropriate velocities for the building based on water temperature, water chemistry and materials used.

B2P4 Access and isolation

VIC B2P4(1)

(1) ~~Access must be available to *heated water* service pipework for maintenance of mechanical components and operational controls.~~Access must be provided to components of a *heated water* service that require maintenance, regular repair or replacement including mechanical devices and controls.

(2) ~~*Heated water* service pipework, appliances and devices must be capable of being isolated for testing and maintenance.~~Isolation must be provided to a *heated water* service and components that require testing, maintenance, regular repair or replacement including mechanical devices, appliances and controls.

Explanatory Information

Access to mechanical components may require the use of a ladder, removal of an access panel, cover, door, or similar obstruction.

B2P5 Pressure relief and temperature limitation

Containers used for producing and/or storing *heated water* are to relieve excessive pressure and avoid flash steam production by—

(a) relieving pressure so that the maximum rated working pressure, or 1400 kPa, whichever is the lesser, is not exceeded; and

(b) limiting water temperatures to a maximum of 99 °C; or

(c) other suitable means providing an *equivalent* level of safety to (a) and (b).

Applications

B2P5(a) has a tolerance of +5% or 14 kPa whichever is the greater.

B2P6 Legionella control

Heated water must be stored and delivered under conditions which avoid the likelihood of the growth of a Legionella bacteria count greater than or equal to 10 Legionella colony forming units (cfu) per millilitre.

Explanatory Information

A risk assessment should be undertaken for the control and management of Legionella in *heated water* systems in *aged care*, *health-care* and other similar facilities ~~with high risk~~which likely contain immunocompromised occupants.

QLD B2P7

VIC B2P7

B2P7 Energy use and source

(1) A *heated water* service, including any associated distribution system and components, must ensure the efficient use of energy and water.

(2) Features in B2P7(1) must be appropriate to the following:

(a) The *heated water* service and its usage.

(b) The geographic location of the building.

To improve the efficiency of *heated water* systems, the design should consider factors such as the number of outlets, their purpose and expected typical usage, and the distance between the water heater and each of the outlets. The water heater should be positioned nearest to the most used outlets, or installed to provide consistent coverage of the building. Where this is not viable, the use of multiple water heaters or a flow and return pipe loop may need to be considered.

B2P7(2) permits the energy source of the *heated water* service to be considered. This means that the net energy obtained from *renewable energy* sources such as solar, geothermal, wind, and biofuels may be considered as 'free' energy in calculating the energy consumption. Similarly, heat reclaimed from another 'free' source such as a by-product from co-generation type processes as well as other industrial processes, which could otherwise be rejected from the building, could be considered as 'free' energy in calculating the energy consumption.

B2P8 Temperature

A *heated water* service must ensure that *heated water* is provided at appropriate temperatures for the correct functioning of the fixture or appliance.

TAS B2P9

B2P9 Pressure

The points of discharge for a *heated water* service must—

(a) have—

(i) a working pressure of not less than 50 kPa; and

(ii) a static pressure within the building of not more than 500 kPa; or

(b) have water pressures suitable for the correct functioning of the fixture or appliance where water pressures are outside of (a)(i) and (a)(ii) are required.

B2P10 Uncontrolled discharge

~~A *heated water* service must avoid failure or *uncontrolled discharge*.~~Any failure or *uncontrolled discharge* from a *heated water* service must be avoided.

B2P11 Water efficiency

A *heated water* service must ensure the efficient use of *drinking water* by limiting water use from a tap or outlet for a shower, basin, kitchen sink or laundry trough to a flow rate of not more than 9 l/m.

Verification Methods

B2V1 Heated water storage temperature

Compliance with B2P6 is verified for each *heated water* storage system when the water heater is designed such that all water is subjected to a temperature-dependent minimum exposure period as specified in Table B2V1 within 7 days before passing through the water-heating appliance's *heated water* outlet.

B2D4 Water efficiency

A tap or outlet used for a shower, basin, kitchen sink, or laundry trough must be a minimum of 3 Star WELS rated and discharge not more than 9 litres per minute.

Exemptions

The requirements of B2D4 do not apply to a shower intended to provide rapid drenching of a person for emergency purposes, such as chemical removal.

Applications

A *heated water* outlet includes an outlet which delivers any combination of *heated water* and cold water.

Explanatory Information

AS/NZS 6400 Water Efficient Products - Rating and labelling, provides the basis for the rating and labelling of a range of products under the mandatory Water Efficiency Labelling and Standards (WELS) Scheme.

B2D4 outlines the minimum level of water efficiency for certain *plumbing products* and fixtures, however the adoption of *products* and technologies of greater efficiency should be considered.

NSW B2D5

SA B2D5

VIC B2D5

B2D5 Maximum delivery temperature

The delivery temperature of *heated water* at the outlet of each sanitary fixture must be—

(a) not more than 45 °C in any—

(i) residential part of an *aged care building*; or

(ii) *patient care area* in a *health-care building*; or

(iii) part of an *early childhood centre*, or primary or secondary *school*, that is used by children; or

(iv) designated *accessible* facility in a common area of a Class 2 building, or in any part of a Class 3~~,~~ or Class 5~~, Class 6, Class 7, Class 8, Class 9a, Class 9b, Class 9c or Class~~ to 10 building; or

(b) not more than 50 °C in all other cases.

Applications

B2D5 applies to all *heated water* installations intended for personal hygiene.

Explanatory Information

Scenarios covered in B2D5 may include where—

- a *heated water* service is installed on the premises for the first time; or
- the water heater forming part of an existing heated water service is—
  - replaced with a like-for-like water heater; or
  - replaced with a different type of water heater; or
  - relocated, and is reconnected to, some or all of the sanitary fixtures to which it was previously connected; or
- more than one existing sanitary fixture is replaced with new similar fixtures; or
- an existing heated water service on the premises is altered or extended to serve additional sanitary fixtures.

SA B2D9

B2D9 General requirements

A *heated water* service must be in accordance with AS/NZS 3500.4.

B2D10 Bushfire prone areas

A *heated water* service in a *designated bushfire prone area* must be in accordance with AS 3959.

B2D11 Solar heated water

A solar *heated water* supply system for food preparation and sanitary purposes, where installed in a new building in *climate zones* 1, 2 or 3, is not *required* to comply with Section 8 of AS/NZS 3500.4.

Explanatory Information: Cross-volume considerations

NCC Volumes One and Two deal with a number of areas of on-site construction which are relevant to a *heated water* service. They include, but may not be limited to, those listed in Table B2.

Table B2: Cross-volume considerations

Item	NCC Volume One Class 2 to 9 buildings	NCC Volume Two Class 1 and 10 buildings
Excavations for pipework adjacent to a building and footings	B1 Structural provisions	H1 Structure
Termite management for attachments to buildings and penetrations through a slab	B1 Structural provisions	H1 Structure
Penetrations for pipework through a vapour barrier	B1 Structural provisions	H1 Structure
Pipework in timber bearers and joists of solid timber or engineered wood products	B1 Structural provisions	H1 Structure
Fittings, fixtures and pipework installations in steel framed construction	B1 Structural provisions	H1 Structure
Penetrations through a fire-resisting wall or floor	C1 Fire resistance Performance Requirements and C4 Protection of openings	H3 Fire safety
Fixtures and fittings in a wet area	F2 Wet areas and overflow protection	H4 Health and amenity
Service pipework external to the building and penetrations through roof cladding in a bushfire prone area	G5 Construction in bushfire prone areas	H7 Ancillary provisions and additional construction requirements
Pipework sound insulation	F7 Sound transmission and insulation	H4 Health and amenity
Flues, chimneys, pipes, gas storage, domestic fuel tanks, cooling or heating appliances or other services	C4 Protection of openings	H3 Fire safety

Item	NCC Volume One Class 2 to 9 buildings	NCC Volume Two Class 1 and 10 buildings
Central heating pipework	J6 Air-conditioning and ventilation systems	H6 Energy efficiency
Heated water supply and ~~P~~pool and spa heating and pumping - energy efficiency	J8 Heated water supply and swimming pool and spa pool plant	H6 Energy efficiency
Energy consumption monitoring for water heaters	J9 Facilities for energy monitoring	Not applicable
Whole of home energy efficiency, including heated water supply	J3D14, J3D15	H6 Energy efficiency

B3P2 Identification

(1) Pipes, ~~pipe~~ outlets, fittings, storage and holding tanks that are part of a *non-drinking water* service must be clearly identified.

(2) A *non-drinking water* service must only be connected to outlets clearly identified for non-drinking use.

B3P3 Velocity

VIC B3P3(1)

Non-drinking water service pipework must ensure that pipework water velocity does not exceed 3 m/s for more than 1% of the time that the water is required during the annual peak hour.

Explanatory Information

During the hour of heaviest usage in reticulated non-drinking services, a water velocity of 3 m/s must not be exceeded for 99% of the time that any downstream fixtures are in use.

B3P4 Access and isolation

(1) ~~A *non-drinking water* service must ensure access for maintenance of mechanical components and operational controls.~~Access must be provided to components of a *non-drinking water* service that require maintenance, regular repair or replacement including mechanical devices and controls.

(2) ~~A *non-drinking water* service must ensure the system, appliances and devices can be isolated for testing and maintenance.~~Isolation must be provided to a *non-drinking water* service and components that require testing, maintenance, regular repair or replacement including mechanical devices, appliances and controls.

Explanatory Information

Access to mechanical components may require the use of a ladder, removal of an access panel, cover, door, or similar obstruction.

B3P5 Pressure

The points of discharge for a *non-drinking water* service must—

(a) have—

(i) a working pressure of not less than 50 kPa; and

(ii) a static pressure within the building of not more than 500 kPa: or

(b) have water pressures suitable for the correct functioning of the fixture or appliance where water pressures outside of (a)(i) and (a)(ii) are required.

B3P6 Uncontrolled discharge

~~A *non-drinking water* service must avoid failure or *uncontrolled discharge*.~~Any failure or *uncontrolled discharge* from a *non-drinking water* service must be avoided.

Part B4 Fire-fighting water services

NSW Part B4

QLD Part B4

Introduction to this Part

This Part sets out requirements for any part of a fire-fighting water service from the *point of connection* or other acceptable source(s) of supply to the fire-fighting equipment, including hydrants, hose reels, sprinkler services, *automatic* fire suppression systems and wall drencher systems.

Objectives

B4O1 Objective

The Objective of this Part is to—

(a) safeguard people from illness, injury or *loss* (including *loss* of *amenity*) due to the failure of a fire-fighting water installation; and

(b) ensure that a fire-fighting water installation is suitable; and

(c) conserve water and energy; and

(d) safeguard the environment; and

(e) safeguard public and private infrastructure; and

(f) ensure that a fire-fighting water installation is designed and is capable of being maintained so that throughout its serviceable life it will continue to satisfy Objectives (a) to (e).

Functional Statements

B4F1 Fire-fighting water supply

Fire-fighting equipment must be provided with adequate water for its intended purpose.

Performance Requirements

B4P1 Flow-rate and pressure

~~A fire-fighting water service must ensure that the water supply flow and pressures to fire-fighting equipment are to be based on a minimum 95th percentile system performance for the correct functioning of the fire-fighting equipment.~~Flowrates and pressures to fire-fighting equipment and services must be based on a minimum 95th percentile system performance for the correct functioning of the fire-fighting equipment or service.

B4P2 Access and isolation

(1) ~~A fire-fighting water service must ensure access for maintenance of mechanical components and operational controls.~~Access must be provided to components of a fire-fighting water service that require maintenance, regular

repair or replacement including mechanical devices and controls.

VIC B4P2(2)

(2) ~~A fire-fighting water service must ensure the system can be isolated for testing and maintenance.~~Isolation must be provided to a fire-fighting water service and components that require testing, maintenance, regular repair or replacement including mechanical devices, appliances and controls and must have adequate provision for flow testing (drainage).

Explanatory Information

Access to mechanical components may require the use of a ladder, removal of an access panel, cover, door, or similar obstruction.

B4P3 Fire-fighting water storage

Water storage supplying fire-fighting systems must be sized suitably for the level of risk and supply arrangements.

B4P4 Uncontrolled discharge

~~A fire-fighting water service must avoid failure or *uncontrolled discharge*.~~Any failure or *uncontrolled discharge* from a fire-fighting water service must be avoided.

Deemed-to-Satisfy Provisions

B4D1 Deemed-to-Satisfy Provisions

(1) Where a *Deemed-to-Satisfy Solution* is proposed, *Performance Requirements* B4P1 to B4P4 are satisfied by complying with B4D2 to B4D6.

(2) Where a *Performance Solution* is proposed, the relevant *Performance Requirements* must be determined in accordance with A2G2(3) and A2G4(3) as applicable.

VIC B4D2

B4D2 General requirements

Fire-fighting water services for Class 2 to Class 9 buildings and structures must comply with the requirements of Part E1 of Volume One of the NCC.

Explanatory Information

NCC Volume One requires the installation of fire-fighting equipment including fire hose reels, fire hydrants and *automatic* fire suppression systems in certain types of buildings.

The installation of fire-fighting water services in Class 1 buildings is not required by NCC Volume Two, however, where these services are installed voluntarily, they must be in accordance with Part B4.

B5V1 Determination of individual and zone hazard ratings

(1) Compliance with *Performance Requirement* B5P1 for *individual protection* and *zone protection* is verified by compliance with B5V1.

(2) A hazard exists wherever it is possible for water or *contaminants* to enter any water ~~*non-drinking water*~~ service or supply via any potential or actual *cross-connection* between itself and any ~~an~~other separate water ~~*non-drinking water*~~ service on the same *site*.

(3) Each hazard must be—

(a) assigned a *Hazard Rating* in accordance with (4); and

(b) isolated from the *drinking water* service by an appropriate *backflow prevention device* which is selected and installed for the appropriate *Hazard Rating* in accordance with Section 4 of AS/NZS 3500.1.

(4) To determine the *Hazard Rating*—

(a) an assessment of the property or proposed installation must be undertaken using Tables B5V1a, B5V1b, B5V1c, B5V1d and B5V1e; and

(b) the scores allocated from each table are calculated; and

(c) the *Hazard Rating* is determined by the sum of the scores in accordance with B5V1(5).

(5) A total score of—

(a) 0 to 3 presents no Hazard; and

(b) 4 to 7 presents a *Low Hazard*; and

(c) 8 to 10 presents a *Medium Hazard*; and

(d) 11 or greater presents a *High Hazard*.

(6) Notwithstanding the *Hazard Rating* determined in (4), where access to the *site* is restricted in a way that could limit or prevent future testing or maintenance of a *backflow prevention device*, the *site* must be protected with a *containment* device suitable for a *High Hazard*.

Explanatory Information

- The intent of this *Verification Method* is to provide a consistent means of determining *Hazard Ratings* for determining appropriate *backflow prevention devices*. ~~situations not listed in Specification 41.~~
- This *Verification Method* is not intended to enable the lowering of any *Hazard Ratings* already prescribed in B5D7. ~~Specification 41.~~
- No hazard exists where there is no potential or actual *cross-connection* with the *drinking water*.

Table B5V1a: Building class

Site condition	Common examples	Notes	Score
The property to which the water service is installed contains a Class 1, 2, 7a, or 10 building where not more than 12 people reside.	Domestic residences and *carparks* with no associated activities.	Building may use small amounts of cleaning products, etc.	1
The property to which the water service is installed contains a Class 3, 4, 5, 6 or 7b building where chemical products are not stored.	Hostel, hotel and multi-level office.	Building is likely to have greater than 12 residents and/or occupants, and may contain moderate amounts of cleaning or commercial chemicals.	2
The property to which the water service is installed contains a Class 7b, 8 or 9 building where chemical products are stored.	Mechanical workshop, metal finisher, cleaning product wholesaler.	May contain large amounts of hazardous or toxic commercial chemicals.	3

Site condition	Common examples	Notes	Score
The *product* or installation presents a *cross-connection* that will affect a large property or could allow *contaminants* to enter other properties.	Tenancies within a shopping complex, connected via water meters without *Containment protection*.	*Cross-connection* will affect *drinking water* to 100 people or greater. Consideration is needed as to whether water meters may not have suitable backflow protection or may not be adequate to mitigate the risk.	3

Deemed-to-Satisfy Provisions

B5D1 Deemed-to-Satisfy Provisions

(1) Where a *Deemed-to-Satisfy Solution* is proposed, *Performance Requirement* B5P1 is satisfied by complying with B5D2 to B5D7~~6~~.

(2) Where a *Performance Solution* is proposed, the relevant *Performance Requirements* must be determined in accordance with A2G2(3) and A2G4(3) as applicable.

B5D2 Drinking water service

(1) A hazard exists wherever it is possible for water or *contaminants* to enter a *drinking water* service or supply via any potential or actual *cross-connection* between—

(a) the *drinking water* service; and

(b) any of the following:

(i) A *non-drinking water* service.

(ii) A *rainwater service*.

(iii) An alternative water supply.

(iv) A *swimming pool*.

(v) Pipes, fixtures or specialist equipment (including *boilers* and pumps) containing chemicals, liquids, gases or other substances which may be harmful to health or safety.

(2) Each hazard must—

(a) be assigned an *Individual protection Hazard Rating* or *Zone protection Hazard Rating* in accordance with B5D7(2) ~~S41C4 and S41C5~~; and

(b) be isolated from the *drinking water* service by an appropriate *backflow prevention device* which is selected and installed in accordance with Section 4 of AS/NZS 3500.1.

(3) Where a *site* is served by a *Network Utility Operator's drinking water* supply, appropriate *containment protection* must be selected and installed in accordance with Section 4 of AS/NZS 3500.1.

Explanatory Information: Integral backflow protection

No additional backflow prevention protection is *required* where *cross-connection* mitigation is provided in accordance with AS/NZS 3500.1 as an integral part of a fixture, appliance or apparatus and is suitable for the *Hazard Rating* specified in B5D7.

B5D3 Non-drinking water service

(1) A ~~hazard exists wherever it is possible for water or *contaminants* to enter a~~ *non-drinking water* service or supply

must not havevia any potential *cross-connection* tobetween itself and another separate *non-drinking water* service on the same *site*.

(2) Each hazard must—

(a) be assigned a *Containment protection Hazard Rating* in accordance with S41C6B5D7(101), B5D7(112) or B5D7(123); and

(b) be isolated from the *non-drinking water* service by appropriate protection*containment protection* which is selected and installed in accordance with Section 4 of AS/NZS 3500.1.

Exemptions

B5D3 does not apply to water used for agricultural purposes only.

Explanatory Information

For the purposes of B5D3, a 'separate' *non-drinking water* service exists where multiple *non-drinking water* services are on the same *site* and each is supplied by water from different sources.

For example, on a *site* connected to both recycled water and bore water, both may be considered *non-drinking water* services and are supplied by different sources. Therefore, each is a 'separate' *non-drinking water* service.

~~Explanatory Information~~

~~A 'separate *non-drinking water* service' means one which draws water from a different source. For example, on a *site* connected to both recycled water and bore water, both may be considered *non-drinking water* services, but are drawn from different sources. Therefore, each would be a 'separate *non-drinking water* service'.~~

B5D4 Fire-fighting water service

Each fire-fighting water service must—

(a) be assigned a *Hazard Rating* in accordance with ~~S41C6~~B5D7(134) and B5D7(154); and

(b) be isolated from the *drinking water* service by an appropriate *backflow prevention device* which is selected and installed in accordance with Section 4 of AS/NZS 3500.1.

B5D5 Unprotected water service

Water downstream of a *backflow prevention device* protected by *individual protection* or *zone protection* is considered to be an *unprotected water service*.

NSW B5D6

SA B5D6

B5D6 Rainwater

~~Protection of *drinking water* services from rainwater must be in accordance with AS/NZS 3500.1 (2018) Clause 16.4 and Table 16.4.~~

When *drinking water* is connected to a supply pipe before the rainwater tank for provision of a changeover device or a top-up mechanism, the installation must include backflow protection in accordance with AS/NZS 3500.1 as follows:

(a) *Buried rainwater tanks* constitute a *Medium Hazard* or *High Hazard* for the purposes of backflow protection.

(b) *Partially buried rainwater tanks* constitute a *Low Hazard* for the purposes of backflow protection.

(c) *Above ground rainwater tanks* constitute a *Low Hazard* for the purposes of backflow protection.

~~Applications~~

~~B5D6 applies to scenarios not covered by S41C6(1)(b).~~

Explanatory Information

- When *drinking water* is not connected to *rainwater storage* or a *rainwater service*, backflow protection is not required.
- The water supply used to top up a rainwater tank may be from a *Network Utility Operator* drinking water supply or an alternative water supply.
- In some jurisdictions, regulations issued under water supply legislation and/or rules set by a *Network Utility Operator* may prescribe backflow prevention requirements that exceed those contained in B5D6. In these circumstances those regulations and/or rules should be followed.

NSW B5D7

B5D7 Cross-connection hazards

(1) The *Hazard Ratings* prescribed for the *cross-connection* hazards described in (4) to (14) must be used for selecting the required backflow protection for the purposes of compliance with B5D2, B5D3, B5D4, B5D5 and B5D6.

(2) *Cross-connection* hazards within the *site* must be rated in accordance with—

(a) (4), (5) and (6) for *individual protection* at the point of each individual hazard; or

(b) (7), (8) and (9) for *zone protection* at the point where a group of hazards can be isolated.

(3) The hazard posed by the *site* to the *Network Utility Operator's drinking water* supply must be rated for *containment protection* in accordance with (10), (11) and (12).

(4) The following are *Low Hazard* for the purpose of *individual protection*:

(a) Carbonated drink dispensing machines.

(b) Drinking fountains and bottle fillers.

(c) Coils and jackets in heat exchangers, in sealed and non-toxic environments only.

(d) Drink dispensing equipment including vending machines and coffee machines.

(e) External hose taps, with no hazards within 18 m.

(f) Fixtures used for ablutions including baths, basins, showers and bidettes with a minimum 25 mm air gap.

(g) Toilet douche seats where the outlet in all positions is at least 25 mm above the overflow level of the pan.

(h) Fixtures used for food preparation, including sinks.

(i) Flexible hoses used over domestic waste fixtures.

(j) Haemodialysis machines in Class 1, Class 2 and Class 10 buildings.

(k) Hair salon basins or troughs.

(l) In-line water softeners and filters.

(m) Photographic processing machines without developer mixing.

(n) Emergency eye wash and shower stations for use with *drinking water*.

(o) Food preparation or food storage tanks, vats or vessels (without clean-in-place systems).

(5) The following are *Medium Hazard* for the purpose of *individual protection*;

(a) Chemical dispensers (low toxicity).

(b) Dental consoles.

(6) The following are *High Hazard* for the purpose of *individual protection*:

(a) Chlorinators.

(b) Coils and jackets in heat exchangers, in unsealed and toxic environments.

(c) Steam calorifiers.

(d) Steam *boilers*.

(e) Antibiotic injectors (agricultural).

(f) Bidets and toilet douche seats where the outlet in any position is not 25 mm above the overflow level of the pan.

(g) Bidettes installed without a minimum 25 mm air gap.

(h) Handheld bidet hoses and trigger sprays.

(i) Chemical dispensers (high toxicity).

(j) Cooling towers.

(k) Demineralising equipment using ion-exchange resins with acid and alkali regeneration.

(l) Equipment used for handling, mixing, measuring and processing chemical and microbiological substances.

(m) Fogging and cleaning sprays with chemical injection or additives.

(n) Mixing of chemicals.

(o) Pan washing apparatus.

(p) Photographic developers with *drinking water* supply rinse tanks or mixing facilities.

(q) Plants with auxiliary *non-drinking water* supplies.

(r) Type D *irrigation system* injected with fertilisers, herbicides, nematicides, insecticides or weedicides.

(s) Weed and pest spraying and water cartage tasks.

(t) Portable and mobile tankers.

(u) Placenta/surgical waste disposal units.

(v) Food preparation or food storage tanks, vats or vessels (with clean-in-place systems).

(7) The following are *Low Hazard* for the purpose of *zone protection*:

(a) Fire-fighting water storage tanks without chemical additives.

(b) Food storage tanks, vats or vessels.

(c) Hair salon basins or troughs.

(d) Type B *irrigation systems*.

(e) Water filtration equipment.

(8) The following are *Medium Hazard* for the purpose of *zone protection*:

(a) Type C *irrigation systems*.

(b) Beauty spas and foot salons.

(9) The following are *High Hazard* for the purpose of *zone protection*:

(a) Photographic laboratories.

(b) Aircraft facilities.

(c) Secondary *school* laboratories, including fume cupboards.

(d) Dental and medical procedure rooms and equipment using *drinking water*.

(e) Clean-in-place systems.

(f) Commercial laundries.

(g) Cooling or heating systems with recirculating water.

(h) Dockside facilities.

(i) Drinking nipples and troughs (agricultural).

(j) Food preparation or food storage tanks, vats or vessels.

(k) Vats and vessels (clean-in-place systems).

(l) In a Class 9 building—

(i) dissecting rooms; and

(ii) utility rooms which contain fixtures other than hand basins; and

(iii) operating theatres.

(m) Industrial and teaching laboratories.

(n) Industrial process water that has been recirculated.

(o) Mortuary equipment used in funeral parlours, mortuaries and autopsy areas.

(p) Sanitary dump points.

(q) Tanks, vats or vessels associated with electroplating, degreasing, descaling, stripping, pickling, dipping or the like.

(r) Type D *irrigation systems* injected with fertilisers, herbicides, nematicides, insecticides or weedicides.

(10) The following are *Low Hazard* for the purpose of *containment protection*:

(a) A water service provided to a Class 1, Class 2, Class 7a or Class 10 building where—

(i) not more than 12 persons reside; and

(ii) the building may only use non-commercial amounts of cleaning products.

(b) A water service where there are no *non-drinking water* services within the property.

(11)The following are *Medium Hazard* for the purpose of *containment protection*:

(a) A water service provided to a Class 3, Class 4, Class 5, Class 6 or Class 7b building where chemicals are not stored.

(b) A water service provided to a property that has—

(i) other *non-drinking water* services; or

(ii) a separate fire-fighting water service.

(12)The following are *High Hazard* for the purpose of *containment protection*:

(a) A water service provided to a Class 7b building where chemicals may be stored.

(b) A water service provided to a Class 8 or Class 9 building.

(c) A water service provided to a property used for commercial agriculture, farming, turf irrigation, industrial, processing or chemical industries.

(d) A water service provided to a property that has *non-drinking water* services from multiple sources with potential for health related contamination.

(13)The following fire-fighting water services are *Low Hazard*:

(a) A fire-fighting water service which has—

(i) a direct connection to a *Network Utility Operator's* water supply; and

(ii) does not contain a tank, resorvoir, connection to another water supply, antifreeze or other additives, or fire brigade booster connection from an auxiliary water supply.

(b) Domestic fire sprinkler systems installed in Class 1 buildings.

(c) FPAA101D fire sprinkler systems.

(14)Any fire-fighting water services not referred to in (13) are *Medium Hazard*.

Notes

For B5D7(13) and B5D7(14), fire hose reels located within an area where a *cross-connection* hazard exists have a *Hazard Rating* the same as the areas within reach of the hose.

Exemptions

(1) B5D7(10)(b) does not apply to a *non-drinking water* service provided to the property by a *Network Utility Operator* as part of a dual water supply.

(2) B5D7(11)(b)(i) does not apply to a *non-drinking water* service provided to the property by a *Network Utility Operator*.

Applications

(a) For B5D7(11), *Medium Hazard* properties for the purposes of *containment protection* include the following:

(i) Caravan parks.

(ii) Food and beverage processing plants.

(iii) Marinas.

(iv) Premises that are connected to a grey water re-use system or a reticulated and disinfected reclaimed water system.

(v) Public *swimming pools*.

(b) For B5D7(12), *High Hazard* properties for the purpose of *containment protection* include the following:

(i) Abattoirs.

(ii) Car and plant washing facilities.

(iii) Chemical laboratories.

(iv) Chemical plants.

(v) Factories using, processing or manufacturing toxic chemicals.

(vi) Hospitals, mortuaries, dental surgeries, clinics or day surgeries and the like containing patient care areas such as an operating theatre, minor procedures consultation room, resuscitation, intensive care and coronary care.

(vii) Metal finishing plants.

(viii) Pathology laboratories.

(ix) Petroleum processing and storage plants and facilities.

(x) Piers, docks and other waterfront facilities.

(xi) Premises where access to conduct inspections is restricted.

(xii) Sanitary depots.

(xiii) Sewerage treatment plants and sewerage lift stations.

(xiv) Universities.

(xv) Premises containing wastewater dump points.

(xvi) Industrial processing.

(xvii) Chemical industries.

Explanatory Information: Hazard Ratings

B5D7 only prescribes *Hazard Ratings* for a limited list of known hazards. It does not cover every potential *cross-connection* that may arise.

Where a situation arises which is not listed in the clause, the appropriate *Hazard Rating* may be determined through a *Performance Solution*. A *Performance Solution* can be developed using *Verification Method* B5V1.

Explanatory Information: Clean-in-place systems

For the purposes of B5D7(4)(o) in *individual protection*, clean-in-place is a method of cleaning the internal surfaces of pipes, vessels, process equipment, filters and associated fittings, without disassembly.

Explanatory Information: Toilet douche seats

For the purposes of B5D7(6)(f), the *high hazard backflow prevention device* can be part of the toilet douche seat or installed separately.

Explanatory Information: Containment protection

- For B5D7(11)(a); Class 3, 5, 6 and 7b buildings are likely to have greater than 12 occupants (residents and/or workers) and may contain moderate amounts of cleaning or commercial chemicals, or a separate fire-fighting water service.
- For B5D7(12)(b) and B5D7(12)(c); a property presents a risk from wastewater effluent *irrigation system*, process water and/or bore water. The property has an increased potential for *cross-connection* between *drinking water* and *non-drinking water* with high consequences such as chemicals, recycled sewerage, medical, biological, toxic or hazardous substances.
- For B5D7(10), B5D7(11) and B5D7(12); in some jurisdictions, regulations issued under water supply legislation, and/or rules set by a *Network Utility Operator*, may prescribe *containment protection* which differs from these clauses. In these circumstances, a solution that meets the NCC as well as applicable legislation/rules is to be implemented.

of (a)(i) and (a)(ii) are required.

B6P2 Velocity

A The velocity of rainwater within the *rainwater service* must ensure pipework must water velocity does not exceed 3 m/s for more than 1% of the time that the water is required during the normal peak flow.

Explanatory Information

During the hour of heaviest usage in reticulated *rainwater service* pipework, a velocity of 3 m/s must not be exceeded for 99% of the time that any downstream fixture is in use.

B6P3 Water efficiency

A *rainwater service* must ensure the efficient use of water by Where rainwater is used for flushing of toilets or urinals, efficient use of rainwater must be achieved by—

(a) limiting water usage from incorporation of—

(i) a cistern or flushing device for a urinal, to a flush volume of not more than 2.5 litres for each—

(A) single urinal stall; or

(B) 600 mm length of a continuous urinal wall; and

(ii) a dual flush cistern or flushing valve that is connected to a water closet pan, to a flush volume of not more than—

(A) 6 and 3 litres; or

(B) 4.5 and 3 litres; and or

(iii) other rainwater using fixtures and appliances, to an efficient level; or

(b) other water saving measures which achieve *equivalent* or greater efficiency than (a).

Applications

The flush volumes of B6P3 may be within a tolerance of—

(a) ±0.5 litres for the full flush of a 6/3 litre cistern; or

(b) +0.5 litres for the reduced flush of a 6/3 litre cistern; or

(c) ±0.2 litres for a 4.5/3 litre cistern.

Exemptions

The requirements of B6P3(a)(ii) do not apply to a vacuum *drainage* system.

B6P4 Access and isolation

(a) A rainwater service must ensure access for maintenance of mechanical components and operational controls. Access must be provided to components of a *rainwater service* that require maintenance, regular repair or replacement including mechanical devices and controls.

(b) A *rainwater service* must ensure the system, appliances and devices can be isolated for testing and maintenance.

Explanatory Information

Access to mechanical components may require the use of a ladder, removal of an access panel, cover, door, or similar obstruction.

B6P5 Isolation

Isolation must be provided to a *rainwater service* and components that require testing, maintenance, regular repair or replacement including mechanical devices, appliances and controls.

B6P6~~5~~ Identification

Pipes and pipe outlets that form part of a *rainwater service* must be clearly identified.

B6P7~~6~~ Uncontrolled discharge

~~A *rainwater service* must avoid the likelihood of failure and *uncontrolled discharge*.~~Any failure or *uncontrolled discharge* from a *rainwater service* must be avoided.

VIC B6P7

B6P8 Contamination

[New Clause]

Where installed, a *rainwater service* must be installed in a manner that—

(a) avoids the likelihood of contamination of water within the *rainwater service*, the cold water service, or the *Network Utility Operator's drinking water* supply (if connected); and

(b) not pose a hazard to public health; and

(c) not have an unprotected cross-connection with any *Network Utility Operator's* drinking water service.

Deemed-to-Satisfy Provisions

B6D1 Deemed-to-Satisfy Provisions

VIC B6D1(1)

(1) Where a *Deemed-to-Satisfy Solution* is proposed, *Performance Requirements* B6P1 to B6P~~6~~8 are satisfied by complying with B6D2 to B6D~~6~~7.

(2) Where a *Performance Solution* is proposed, the relevant *Performance Requirements* must be determined in accordance with A2G2(3) and A2G4(3) as applicable.

SA B6D2

VIC B6D2

B6D2 General requirements

A *rainwater service* must comply with Section 15 of AS/NZS 3500.1.

B6D3 Identification

(1) ~~Identification of r~~Rainwater pipework ~~and outlets~~ must be marked in accordance with Section 15 of AS/NZS 3500.1.

(2) Rainwater outlet fittings must be marked in accordance with Section 15 of AS/NZS 3500.1.

B6D4 Water efficiency

(1) Cisterns or flushing devices for water closet pans must—

(a) be a minimum of 3 Star WELS rating, discharging not more than 6 litres or 4.5 litres for a full flush; and

(b) have a dual flushing mechanism.

Exemptions

(1) The requirements of B6D4 do not apply to a vacuum *drainage* system.

(2) The requirements of B6D4(2)(c) do not apply to a programmed solenoid operated flushing system if programmed to shut down during extended periods of non-occupancy of a building.

Explanatory Information

- Prior to installing a programmed solenoid operated flushing system, further advice should be sought from the authority having jurisdiction.
- Where sensor control is used for urinal flushing, sensors should be located to avoid unnecessary 'nuisance' flushing triggered by pedestrian traffic.
- AS/NZS 6400 Water Efficient Products - Rating and Labelling, provides the basis for the rating and labelling of a range of *products* under the mandatory Water Efficiency Labelling and Standards (WELS) scheme.
- B6D4 Water efficiency outlines the minimum level of water efficiency for certain *plumbing products* and fixtures, however the adoption of greater efficiency *products* and technologies should be considered.

B6D5 Access ~~and isolation~~

~~(1)~~ Access for maintenance of mechanical components and operational controls must be provided in accordance with AS/NZS 3500.1.

~~(2) Isolation of appliances and *backflow prevention devices* for testing and maintenance must be provided in accordance with AS/NZS 3500.1.~~

B6D6 Isolation

A means of isolation for the *rainwater service*, appliances and devices for testing and maintenance must be provided in accordance with AS/NZS 3500.1.

B6D~~6~~7 Bushfire prone areas

A rainwater service in a *designated bushfire prone area* must be in accordance with AS 3959.

Performance Requirements

B7P1 Contamination ~~control~~

VIC B7P1(1)

(1) ~~Stored rainwater must reduce the likelihood of contamination.~~Chemical, physical or microbial contamination of stored rainwater must be avoided.

VIC B7P1(2)

(2) Stored rainwater must not pose a hazard to public health.

Explanatory Information

Some examples of potential contaminants of stored rainwater include leaves, debris, insects, and small animals. Other forms of potential contamination include algae and lead from flashings.

See the Australian Drinking Water Guidelines for more information on the use of roof-harvested rainwater for drinking purposes. See also Environmental Health Standing Committee (enHealth) ~~g~~Guidance on the use of rainwater tanks for more information.

B7P2 Uncontrolled discharge

~~*Rainwater storage* must avoid the likelihood of failure or *uncontrolled discharge*.~~Any failure or *uncontrolled discharge* from a *rainwater storage* must be avoided.

B7P3 Access ~~and isolation~~

~~(1) Rainwater storage must allow access for cleaning and maintenance.~~Access must be provided to components of a *rainwater storage* that require maintenance, regular repair or replacement including mechanical devices and controls.

~~(2) *Rainwater storage* must allow for the system to be isolated.~~

Explanatory Information

Access to mechanical components may require the use of a ladder, removal of an access panel, cover, door, or similar obstruction.

B7P4 Isolation

Isolation must be provided to a *rainwater storage* and components that require testing, maintenance, regular repair or replacement including mechanical devices, appliances and controls.

VIC B7P4

B7P~~4~~5 Identification

Rainwater storage and holding tanks used only for non-drinking purposes must be clearly identified.

Exemptions

~~Where *rainwater storage* is intended to supply water for drinking and personal hygiene, identification of the storage and holding tanks is not *required*.~~Identification is not *required* where *rainwater storage* is intended to supply water for drinking and personal hygiene purposes.

Deemed-to-Satisfy Provisions

B7D1 Deemed-to-Satisfy Provisions

VIC B7D1(1)

(1) Where a *Deemed-to-Satisfy Solution* is proposed, *Performance Requirements* B7P1 and B7P~~4~~5 are satisfied by complying with B7D2 and B7D~~3~~7.

(2) Where a *Performance Solution* is proposed, the relevant *Performance Requirements* must be determined in accordance with A2G2(3) and A2G4(3) as applicable.

~~Notes~~

~~There are no *Deemed-to-Satisfy Solutions* for B7P2 and B7P3.~~

TAS B7D2

B7D2 Collection of rainwater

Rainwater storage must only ~~collect~~contain roof captured rainwater.

Exemptions

Rainwater storage may be supplemented with *drinking water* where necessary.

Explanatory Information

The Environmental Health Standing Committee (enHealth) has produced a document, Guidance on the use of rainwater tanks. This guidance document includes information on design and installation as well as the potential contribution of rainwater tanks to improved water conservation.

Any cold water service from a *Network Utility Operator's drinking water* supply to a *rainwater storage* system top up or switching device must comply with Part B1.

VIC B7D3

B7D3 Identification

The *rainwater storage* must be identified as rainwater in accordance with AS/NZS 3500.1.

Exemptions

Where *rainwater storage* is intended to supply water for drinking and personal hygiene, identification of the storage and holding tanks is not required.

VIC B7D4

B7D4 Uncontrolled discharge

Rainwater storage must have provision for overflow in accordance with AS/NZS 3500.1.

B7D5 Access

Rainwater storage must be provided with access in accordance with AS/NZS 3500.1.

B7D6 Isolation

Rainwater storage connection to water services must be provided with means of isolation in accordance with AS/NZS 3500.1.

B7D7 Contamination

Contamination control for *rainwater storage* must be in accordance with—

(a) B5D6; and

(b) AS/NZS 3500.1.

Specification 41 Cross-connection hazards

S41C1 Scope

This Specification sets out *cross-connection* hazards and corresponding *Hazard Ratings*.

Explanatory Information

This Specification only prescribes *Hazard Ratings* for a limited list of known hazards. It does not cover every potential *cross-connection* that may arise from time to time.

Where a situation arises which is not listed in this Specification, the appropriate *Hazard Rating* may be determined as a *Performance Solution*, such as a *Performance Solution* developed using *Verification Method* B5V1.

S41C2 Application

The *Hazard Ratings* prescribed in this Specification must be used for selecting the required *backflow prevention device*, for the purposes of compliance with the *Deemed-to-Satisfy Provisions*.

S41C3 Protection types and hazard ratings

(1) *Cross-connection* hazards within the *site* must be rated in accordance with—

(a) S41C4 for *individual protection* at the point of each individual hazard; or

(b) S41C5 for *zone protection* at the point where a group of hazards can be isolated.

(2) The hazard posed by the *site* to the *Network Utility Operator's drinking water* supply must be rated for *containment protection* in accordance with S41C6.

VIC S41C3(3)

(3) Pipework and outlets supplied by a *drinking water* source downstream of an *individual protection backflow prevention device* are considered to convey *drinking water* from an *unprotected water service*.

S41C4 Individual protection

(1) The following are *Low Hazard* for the purpose of *individual protection*:

(a) Carbonated drink dispensing machines.

(b) Drinking fountains and bottle fillers.

(c) Coils and jackets in heat exchangers, in sealed and non-toxic environments only.

(d) Drink dispensing equipment including vending machines and coffee machines.

(e) External hose taps, with no hazards within 18 m.

(f) Fixtures used for ablutions including baths, basins, showers and bidettes with a minimum 25 mm air gap.

(g) Toilet douche seats where the outlet in all positions is at least 25 mm above the overflow level of the pan.

(h) Fixtures used for food preparation, including sinks.

(i) Flexible connections over domestic fixtures.

(j) Haemodialysis machines in Class 1, Class 2 and Class 10 buildings.

(k) Hair salon basins or troughs.

(l) In-line water softeners and filters.

(m) Photographic processing machines without developer mixing.

(n) Emergency eye wash and shower stations for use with *drinking water*.

(o) Food preparation or food storage tanks, vats or vessels (without clean-in-place systems).

(2) The following are *Medium Hazard* for the purpose of *individual protection*:

(a) Chemical dispensers (low toxicity).

(b) Dental consoles.

VIC S41C4(3)

(3) The following are *High Hazard* for the purpose of *individual protection*:

(a) Chlorinators.

(b) Coils and jackets in heat exchangers, in unsealed and toxic environments.

(c) Steam calorifiers.

(d) Steam *boilers*.

(e) Antibiotic injectors (agricultural).

(f) Bidets and toilet douche seats where the outlet in any position is not 25 mm above the overflow level of the pan.

(g) Bidettes installed without a minimum 25 mm air gap.

(h) Handheld bidet hoses and trigger sprays.

(i) Chemical dispensers (high toxicity).

(j) Cooling towers.

(k) Demineralising equipment using ion-exchange resins with acid and alkali regeneration.

(l) Equipment used for handling, mixing, measuring and processing chemical and microbiological substances.

(m) Fogging and cleaning sprays with chemical injection or additives.

(n) Mixing of chemicals.

(o) Pan washing apparatus.

(p) Photographic developers with *drinking water* supply rinse tanks or mixing facilities.

(q) Plants with auxiliary *non-drinking water* supplies.

(r) Type D *irrigation system* injected with fertilisers, herbicides, nematicides, insecticides or weedicides.

(s) Weed and pest spraying and water cartage tanks.

(t) Portable and mobile tankers.

(u) Placenta / surgical waste disposal units.

(v) Food preparation or food storage tanks, vats or vessels (with clean-in-place systems).

Explanatory Information: Clean-in-place systems

For the purposes of S41C4(1)(o) in *individual protection*, clean-in-place is a method of cleaning the internal surfaces of pipes, vessels, process equipment, filters and associated fittings, without disassembly.

Explanatory Information

For the purposes of S41C4(3)(f), the *high hazard backflow prevention device* can be part of the toilet douche seat or installed separately.

S41C5 Zone protection

(1) The following are *Low Hazard* for the purpose of *zone protection*:

(a) Fire-fighting water storage tanks without chemical additives.

(b) Food storage tanks, vats or vessels.

(c) Hair salon basins or troughs.

(d) Type B *irrigation systems*.

(e) Water filtration equipment.

(2) The following are *Medium Hazard* for the purpose of *zone protection*:

(a) Type C *irrigation systems*.

(b) Beauty spas and foot salons.

(3) The following are *High Hazard* for the purpose of *zone protection*:

(a) Photographic laboratories.

(b) Aircraft facilities.

(c) Secondary *school* laboratories, including fume cupboards.

(d) Dental and medical procedure rooms and equipment using *drinking water*.

(e) Clean-in-place systems.

(f) Commercial laundries.

(g) Cooling or heating systems with recirculating water.

(h) Dockside facilities.

(i) Drinking nipples and troughs (agricultural).

(j) Food preparation or food storage tanks, vats or vessels.

(k) Vats and vessels (clean-in-place systems).

(l) In a Class 9 building —

(i) dissecting rooms; and

(ii) utility rooms which contain fixtures other than hand basins; and

(iii) operating theatres.

(m) Industrial and teaching laboratories.

(n) Industrial process water that has been recirculated.

(o) Mortuary equipment used in funeral parlours, mortuaries and autopsy areas.

(p) Sanitary dump points.

(q) Tanks, vats or vessels associated with electroplating, degreasing, descaling, stripping, pickling, dipping or the like.

(r) Type D *irrigation systems* injected with fertilisers, herbicides, nematicides, insecticides or weedicides.

VIC S41C6

S41C6 Containment protection

(1) The following are *Low Hazard* for the purpose of *containment protection*:

(a) A water service provided to a Class 1, Class 2, Class 7a or Class 10 building where —

(i) not more than 12 persons reside; and

(ii) the building may only use non-commercial amounts of cleaning products.

(b) Premises served by a rainwater harvesting system, not including any rainwater storage tanks that are *buried tanks*.

(c) A water service where there are no *non-drinking water* services within the property.

(2) The following are *Medium Hazard* for the purpose of *containment protection*:

(a) A water service provided to a Class 3, Class 4, Class 5, Class 6 or Class 7b building where chemicals are not stored.

(b) A water service provided to a property that has—

(i) other *non-drinking water* services; or

(ii) a separate fire water service.

(3) The following are *High Hazard* for the purpose of *containment protection*:

(a) A water service provided to a Class 7b building where chemicals may be stored.

(b) A water service provided to a Class 8 or Class 9 building.

(c) A water service provided to a property used for commercial agriculture, farming, turf irrigation, industrial, processing or chemical industries.

(d) A water service provided to a property that has *non-drinking water* services from multiple sources with potential for health related contamination.

Applications

(a) *Medium Hazard* properties for the purpose of *containment protection* include the following—

(i) Caravan parks.

(ii) Food and beverage processing plants.

(iii) Marinas.

(iv) Premises that are connected to a grey water re-use system or a reticulated and disinfected reclaimed water system.

(v) Public *swimming pools*.

(b) *High Hazard* properties for the purpose of *containment protection* include the following—

(i) Abattoirs.

(ii) Car and plant washing facilities.

(iii) Chemical laboratories.

(iv) Chemical plants.

(v) Factories using, processing or manufacturing toxic chemicals.

(vi) Hospitals, mortuaries, dental surgeries, clinics or day surgeries and the like containing patient care areas such as an operating theatre, minor procedures consultation room, resuscitation, intensive care and coronary care.

(vii) Metal finishing plants.

(viii) Pathology laboratories.

(ix) Petroleum processing and storage plants and facilities.

(x) Piers, docks and other waterfront facilities.

(xi) Premises where access to conduct inspections is restricted.

(xii) Sanitary depots.

(xiii) Sewerage treatment plants and sewerage lift stations.

(xiv) Universities.

(xv) Premises containing wastewater dump points.

(xvi) Industrial processing.

(xvii) Chemical industries.

Exemptions

(1) Clause (1)(b) does not apply to a *non-drinking water* service provided to the property by a *Network Utility Operator* as part of a dual water supply.

(2) Clause (2)(b)(i) does not apply to a *non-drinking water* service provided to the property by a *Network Utility Operator*.

Explanatory Information

- Clause (2)(a); building Classes 3, 4, 5, 6, and 7b are likely to have greater than 12 occupants (residents and/or workers) and may contain moderate amounts of cleaning or commercial chemicals, or a separate fire-fighting water service.
- Clause (3)(b) and (3)(c); a property presents a risk from wastewater effluent *irrigation system*, process water and/or bore water. The property has an increased potential for *cross-connection* between *drinking water* and *non-drinking water* with high consequences such as chemicals, recycled sewerage, medical, biological, toxic or hazardous substances.
- In some jurisdictions, regulations issued under water supply legislation, and/or rules set by a *Network Utility Operator*, may prescribe *containment protection* which differs from this Specification. If this occurs then those regulations and/or rules should be followed in place of this Specification. This Specification only applies for the purposes of compliance with Volume Three of the NCC. It is not intended to limit or extend the application of other regulations.

S41C7 Fire-fighting water services

(1) The following fire-fighting water services are *Low Hazard*:

(a) A fire-fighting water service which has—

(i) a direct connection to a *Network Utility Operator's* water supply; and

(ii) does not contain a tank, reservoir, connection to another water supply, antifreeze or other additives, or fire brigade booster connection from an auxiliary water supply,

(b) Domestic fire sprinkler systems installed in Class 1 buildings.

(c) FPAA101D fire sprinkler systems.

(d) Fire-fighting water storage tanks.

(2) Any fire-fighting water services not referred to in (1) are *Medium Hazard*.

Notes

Fire hose reels located within an area where a *cross-connection* hazard exists have a *Hazard Rating* the same as the areas within reach of the hose.

Part C1 Sanitary plumbing systems

Introduction to this Part

This Part sets out the requirements for any part of a sanitary *plumbing* system of a property including from sanitary fixtures and appliances from the *point of connection* to a sanitary *drainage* system.

Objectives

C1O1 Objective

The Objective of this Part is to—

(a) safeguard people from illness, injury or *loss* (including *loss* of *amenity*) due to the failure of a sanitary *plumbing* installation; and

(b) ensure that a sanitary *plumbing* installation is suitable; and

(c) conserve water and energy; and

(d) safeguard the environment; and

(e) safeguard public and private infrastructure; and

(f) ensure that a sanitary *plumbing* installation is designed and is capable of being maintained so that throughout its serviceable life it will continue to satisfy Objectives (a) to (e).

Functional Statements

C1F1 Disposal system

Sanitary fixtures and sanitary appliances must be provided with an adequate disposal system that does not impact adversely on the occupants of the premises, property, the environment or the *Network Utility Operator's* infrastructure.

Performance Requirements

C1P1 Disposal

~~A sanitary *plumbing* system must ensure sewage or sullage is transferred to a sanitary *drainage* system or an *approved disposal system*.~~Sewage and sullage must be transferred through a sanitary *plumbing* system to—

(a) a sanitary *drainage system*; or

(b) an *approved disposal system* authorised by an authority having jurisdiction.

~~Explanatory Information: Non-flushing (waterless) urinals~~

~~Where a non-flushing (waterless) urinal is to be installed to a sanitary *plumbing* system comprising copper, copper alloy or other metallic piping, undiluted discharge transported through such pipework may increase the likelihood of corrosion.~~

~~Practitioners should also be aware that undiluted discharge, transported through pipework of any material, can cause a build-up of struvite (ammonium magnesium phosphate) inside the pipework, potentially causing *blockage* within the sanitary *plumbing* system.~~

Explanatory Information

An *approved disposal system* may be—

(1) an *on-site wastewater management system*; or

(2) a connection to a *Network Utility Operator's* sewerage system.

C1P2 Access

~~A sanitary *plumbing* system must ensure access for maintenance of mechanical components, operational controls and for clearing *blockages*.~~Access must be provided to components of a sanitary *plumbing* system that require maintenance, regular repair or replacement including mechanical devices, controls and for clearing *blockages*.

Explanatory Information

Access to mechanical components may require the use of a ladder, removal of an access panel, cover, door, or similar obstruction.

C1P3 Water efficiency

A sanitary *plumbing* system must ensure efficient use of *drinking water* by—

(a) limiting water usage from—

(i) a cistern or flushing device for a urinal, to a flush volume of not more than 2.5 litres for each—

(A) single urinal stall; or

(B) 600 mm length of a continuous urinal wall; and

(ii) a dual flush cistern or flushing valve that is connected to a water closet pan to a flush volume of not more than—

(A) 6 and 3 litres; or

(B) 4.5 and 3 litres; or

(b) water saving measures *equivalent* to or greater than those described in (a).

Applications

The flush volume of C1P3 may be within a tolerance of—

(a) ±0.5 litres for the full flush of a 6/3 litre cistern; or

(b) +0.5 litres for the reduced flush of a 6/3 litre cistern; or

(c) ±0.2 litres for a 4.5/3 litre cistern.

Exemptions

The requirements of C1P3 do not apply to a vacuum *drainage* system.

C1P4 Uncontrolled discharge

~~A sanitary *plumbing* system must avoid *blockage* or *uncontrolled discharge*.~~Any failure or *uncontrolled discharge* from a sanitary *plumbing* system must be avoided.

C1P6 Contamination

~~A sanitary *plumbing* system must avoid—~~

(1) The entry of water, sewerage and sullage from a sanitary *plumbing* ~~the~~ system into buildings must be avoided.~~; and~~

(2) The entry of foul gases from a sanitary *plumbing* ~~the~~ system into buildings must be avoided, such that—

(a) at pressures of up to ±375 Pa, water trap seals will not be reduced to depths less than—

(i) ~~-~~70 mm for trap seals in pressurised rooms; and

~~(a)~~(ii) ~~-~~25 mm for all other applications; or

(b) an equivalent level of safety to human health is achieved as a system complying to (~~i~~a).~~; and~~

(3) The entry of *surface water*~~, subsurface water~~ and stormwater into a sanitary *plumbing* ~~the~~ system must be avoided.

C1P7 Damage

~~A sanitary *plumbing* system must avoid damage from superimposed loads, ground movement or root penetration.~~Damage to a sanitary plumbing system from superimposed loads, ground movement or root penetration must be avoided.

Explanatory Information

Superimposed loads that a sanitary *plumbing* system is susceptible to damage from, include building loads and loads arising from building movement or ground movement.

Verification Methods

C1V1 Determination of sanitary plumbing wastewater flowrates

(1) Compliance with C1P3 for pipe sizing is verified for each sanitary *plumbing* pipework section when the discharge flowrate is not less than the greater of—

(a) the probable simultaneous wastewater flowrate calculated in accordance with (2); or

(b) the Discharge Unit (DU) value of the highest fixture connected upstream of the pipework section as given in Table C1V1b, in litres per second, whichever is greater.

(2) For the purposes of (1)(a), for each pipework section, the design probable simultaneous wastewater flowrate must be calculated in accordance with the following:

$$Q_{Total} = K\sqrt{\sum DU} + Q_{Other}$$

(3) In the equation shown at (2)—

(a) Q_{Total} = the probable simultaneous wastewater flowrate for that pipework section (l/s); and

(b) Q_{Other} = the sum of any other wastewater flowrates such as pumped discharges (l/s); and

(c) K = the frequency factor given in Table C1V1a (dimensionless); and

(d) $\sum DU$ = the sum of the discharge units as given in Table C1V1b, connected upstream of that pipework section (dimensionless).

Table C1V1a: Frequency factors

Fixture usage	NCC building classes	Frequency factor (K)
Intermittent use e.g. dwelling, guesthouse or office	Classes 1, 2, 3 or 4	0.5
Frequent use e.g. hospital, restaurant or hotel	Classes 5, 6, 7, 8, 9a or 9c	0.7
Congested use e.g. open to general public, *school*	Class 9b	1.0
Special use e.g. laboratory	Not applicable	1.2

NCC building class	NCC building class example	Frequency factor (K)	Time interval between fixture use averaged over peak period (s)
Class 1	Residential dwelling, duplexes, or townhouses	0.5	1200
Class 2	Apartment or unit	0.5-0.8	450-1200
Class 3	Hotel, hostel, dormitory	0.6-0.8	450-800
Class 4	Sole dwelling within a Class 5-9 building	0.5	1200
Class 5	Office	0.6-0.8	450-800
Class 6	Retail, shop, restaurant, café	0.6-0.8	450-800
Class 7	Carpark, warehouse, storage building	0.6-0.8	450-800
Class 8	Factory, workshop, laboratory	0.6-0.8	450-800
Class 9a	Healthcare building, hospital, and GP clinics	0.6-0.8	450-800
Class 9b	Public event buildings, stadiums, theatres, schools, universities, and churches	1.0-1.2	200-300
Class 9c	Aged care facilities	0.6-0.8	450-800

Table C1V1b: Discharge units

Fixture	~~System 1~~	~~System 2~~Discharge Units (DU)	~~System 3~~
Basin	~~0.5~~	0.3	~~0.3~~
Bath (with shower)		0.5	
Bath (without shower)		0.6	
Bidet		0.3	
Shower (single)	~~0.6~~	0.4	~~0.4~~
Urinal (wall-hung)	~~0.8~~	0.5	~~0.4~~
Urinal (stall for each 600 mm length of slab)		0.2	
~~Bath~~	~~0.8~~	~~0.6~~	~~1.3~~
Kitchen sink	~~0.8~~	0.6	~~1.3~~
Water closet (6L cistern)	~~2.0~~	1.8	~~1.2~~
Water closet (4L cistern)		1.8	
Washing machine - up to 6 kg	~~0.8~~	0.6	~~0.6~~
Domestic dishwasher	~~0.8~~	0.6	~~0.2~~
Floor waste gully		Sum of DU from connected fixtures	

~~**Explanatory Information**~~

~~System types referred to in Table C1V1b are as follows:~~

- ~~System 1 - A sanitary *plumbing* system where branch discharge pipes are designed with a filling degree of 50%.~~
- ~~System 2 - A sanitary *plumbing* system where branch discharge pipes are designed with a filling degree of 70%.~~
- ~~System 3 - A sanitary *plumbing* system where branch discharge pipes are designed with a filing degree of 100%.~~
- ~~Systems 1 and 2 are similar to the fully vented modified system and System 3 is similar to the single stack system detailed in AS/NZS 3500.2.~~
- ~~Filling degree is defined as the ratio between the height of fluid in a pipe (h) and the diameter of the pipe (D), or h/D.~~

Explanatory Information: Table C1V1a

When using Table C1V1a, t~~T~~he hydraulic practitioner ~~shall~~should use their own judgement to select the frequency factor

most appropriate to their design based on the estimated average time between fixture usage during peak periods of use.

Explanatory Information: Table C1V1b

Considerations when using Table C1V1b are as follows:

- The Discharge Unit (DU) values in Table C1V1b are based on the BS EN 12056.2 System II fixture values where branch discharge pipes are designed with a filling degree of 70%. The use of these fixture values is up to the discretion of the practitioner.
- Filling degree is defined as the ratio between the height of fluid in a pipe (h) and the internal diameter of the pipe (D), or h/D.
- Where a washing machine is connected to a sink trap, only the sink discharge unit is considered.
- The practitioner may introduce their own fixture values where a desired fixture type is not listed, or the provided DU value is considered to be outdated. Evidence of engineering best practice, careful consideration and experimentation demonstrating the real-life performance of the fixture(s) compared with the proposed DU values shall be provided.

~~C1V2 System 1 - Common discharge design~~

~~(1) Compliance with C1P5 for pipe sizing is verified for each common discharge branch when—~~

~~(a) pipework is in accordance with (2); and~~

~~(b) ventilation is in accordance with (3).~~

~~(2) Each unvented common discharge pipe within the system must have—~~

~~(a) a pipe length from trap weir to stack less than 4 m; and~~

~~(b) no more than three 90º bends, excluding the first bend after the trap outlet; and~~

~~(c) no vertical drops of greater than 45º inclination between the trap weir and the stack greater than 1 m; and~~

~~(d) a gradient greater than 1.00%; and~~

~~(e) a pipe size in accordance with Table C1V2.~~

~~(3) Each vented common discharge pipe within the system must have—~~

~~(a) a pipe length from trap weir to the stack of less than 10 m; and~~

~~(b) no vertical drops of greater than 45º inclination, between the trap weir and the stack greater than 3 m; and~~

~~(c) a gradient greater than 0.50%; and~~

~~(d) a pipe size in accordance with Table C1V2; and~~

~~(e) a group vent sized in accordance with Table C1V2; and~~

~~(f) each group vent either—~~

~~(i) terminates to atmosphere or interconnects with another vent in accordance with AS/NZS 3500.2; or~~

~~(ii) terminates at an air admittance valve with a minimum airflow rate equal to the wastewater design flowrate.~~

Limitations

Water closets must only be connected to a DN 80 or DN 100 discharge pipe.

Table C1V2: Common discharge pipe capacity

Common discharge pipe size - Nominal diameter (DN)	Unvented capacity Q_{Total} - Litres per second (l/s)	Vented capacity Q_{Total} - Litres per second (l/s)	Group vent - Nominal diameter (DN)
40	0.50	N/A	N/A
50	0.80	0.75	40
65	1.00	1.50	40
80	2.00	3.00	50
100	2.50	3.75	65

C1V2 System design using wastewater flow-rates

(1) Compliance with C1P5 for pipe sizing is verified for the *plumbing* design when—

(a) fully vented systems and fully vented modified systems are designed in accordance with Section 8 of AZ/NZS 3500.2; and

(b) single stack systems and single stack modified systems are designed in accordance with Section 9 of AZ/NZS 3500.2; and

(c) consideration by the designer is given to expanding the exclusion zones referenced in AS/NZS 3500.2 (1 m exclusion zone at the base of the stack) for high rise buildings.

(2) For the purposes of (1), for each pipework section, the probable simultaneous wastewater flowrate determined through C1V1 may be converted to an equivalent AS/NZS 3500.2 Fixture Unit (FU) in accordance with the following:

$$FU_{Total} = 6.75Q_{Total}^2$$

(3) In the equation shown at (2):

(a) $\boldsymbol{Q}$ = the wastewater flowrate (L/s); and

(b) $\boldsymbol{F}$U = the equivalent fixture units converted from a flowrate (dimensionless) where the result is rounded up to the next integer.

(4) For the purposes of (1), all relevant sizing tables and design guidance referencing FU in AS/NZS 3500.2 may alternatively be converted to an equivalent flow-rate using the following:

$$Q = \sqrt{\frac{\sum FU}{6.75}}$$

(5) In the equation shown at (4), Σ$\boldsymbol{F}$U = the sum of fixture units to be converted (dimensionless).

Explanatory Information

The conversion of the probable simultaneous wastewater flowrate into fixture units (FU) using the formula in (2) allows the resultant FU value to be used when applying the relevant sizing tables and design guidance in the applicable sections of AS/NZS 3500.2 in accordance with (1).

C1V3 System 2 – Common discharge design

(1) Compliance with C1P5 relating to pipe sizing is verified for each common discharge branch when—

(a) pipework is in accordance with (2); and

(b) ventilation is provided in accordance with (3).

(2) Each unvented common discharge pipe within the system must have—

(a) a pipe length from trap weir to stack less than 10 m; and

(b) no more than one 90º bend, excluding the first bend after the trap outlet; and

(c) no vertical drops of greater than 45º inclination between the trap weir and the stack, greater than—

(i) 1 m, where a water closet is connected to the branch; or

(ii) 3 m, where no water closets are connected to the branch; and

(d) a gradient greater than 1.50%; and

(e) a pipe size in accordance with Table C1V3.

(3) Each vented common discharge pipe within the system has—

(a) no vertical drops of greater than 45º inclination between the trap weir and the stack greater than 3 m; and

(b) a gradient greater than 1.50%; and

(c) a pipe size in accordance with Table C1V3; and

(d) a group vent sized in accordance with Table C1V3; and

(e) each group vent either terminates to—

(i) atmosphere or interconnects with another vent in accordance with AS/NZS 3500.2; or

(ii) an air admittance valve with a minimum airflow rate equal to 2 times the wastewater design flowrate.

Limitations

(1) Water closets must only be connected to a DN 80 or DN 100 discharge pipe.

(2) No more than one water closet can be connected to a DN 80 discharge pipe.

Table C1V3: System 2 - Common discharge pipe capacity

Common discharge pipe – Nominal diameter (DN)	Unvented capacity Q_{Total} – Litres per second (l/s)	Vented capacity Q_{Total} – Litres per second (l/s)	Group vent – Nominal diameter (DN)
40	0.50	0.75	32
50	1.00	1.50	32

Common discharge pipe – Nominal diameter (DN)	Unvented capacity Q_{Total} – Litres per second (l/s)	Vented capacity Q_{Total} – Litres per second (l/s)	Group vent – Nominal diameter (DN)
65	1.50	2.25	40
80	2.25	3.40	40
100	2.50	3.75	50

C1V4 System 3 - Branch design

(1) Compliance with C1P5 relating to pipe sizing is verified for each discharge branch when –

(a) each unvented fixture, or combination of fixtures, connects independently to the stack in accordance with Table C1V4a; and

(b) each vented fixture, or combination of fixtures, connects to the stack in accordance with Table C1V4b.

(2) Ventilation requirements must be in accordance with the following:

(a) Each trap vent must be –

(i) not less than DN 50, where the connection of the vent to the branch is liable to *blockage* due to splashing or submergence; or

(ii) DN 32, where the connection of the vent to the branch is not liable to *blockage* due to splashing or submergence.

(b) Each trap vent connects within 750 mm of the fixture it serves.

(c) Each trap vent must –

(i) terminate at atmosphere or interconnect with another vent in accordance with AS/NZS 3500.2; or

(ii) connect to a common trap vent at least 40 mm in diameter; or

(iii) connect to the stack above the flood level of the highest fixture; or

(iv) terminate to an air admittance valve with a minimum airflow rate equal to 2 times the wastewater design flowrate.

(3) Each branch connection must use a sweep or 45° junction where the branch is –

(a) an equal diameter to the stack; and

(b) the stack is DN 80 or larger.

Table C1V4a: System 3 - Unvented fixture connections

Fixture	Waste Nominal Diameter (DN)	Maximum length, in metres (m)	Minimum gradient (%)	Maximum gradient (%)	Maximum number of bends	Maximum vertical drop, in metres (m)
Basin	32	1.7	2.2	2.2	0	0
Basin	32	1.1	4.4	4.4	0	0
Basin	32	0.7	8.7	8.7	0	0
Basin	40	3	1.8	4.4	2	0
Basin group ≤4 basins	50	4	1.8	4.4	0	0
Bidet	32	1.7	2.2	2.2	0	0
Bidet	32	1.1	4.4	4.4	0	0
Bidet	32	0.7	8.7	8.7	0	0
Bidet	40	3	1.8	4.4	2	0
Shower	40	No limit	1.8	9	No limit	1.5

Fixture	Waste Nominal Diameter (DN)	Maximum length, in metres (m)	Minimum gradient (%)	Maximum gradient (%)	Maximum number of bends	Maximum vertical drop, in metres (m)
Bath	40	No limit	1.8	9	No limit	1.5
Single urinal	40	3	1.8	9	No limit	1.5
Slab urinal	65	3	1.8	9	No limit	1.5
Sink - kitchen	40	No limit	1.8	9	No limit	1.5
Trough – laundry	40	3	1.8	9	No limit	1.5
Domestic dishwasher	40	3	1.8	4.4	No limit	1.5
Domestic clothes washing machine - up to 6 kg	40	3	1.8	4.4	No limit	1.5
Water closet	80	No limit	1.8	No limit	No limit	1.5
Water closet	100	No limit	1.8	No limit	No limit	1.5
Water closet group ≤8 water closets	100	15	0.9	9	2	1.5
Food waste disposal unit	40	3	13.5	No limit	No limit	1.5
Sanitary napkin disposal unit	40	3	5.4	No limit	No limit	1.5
Floor waste gully	50	No limit	1.8	No limit	No limit	1.5
Floor waste gully	80	No limit	1.8	No limit	No limit	1.5
Floor waste gully	100	No limit	1.8	No limit	No limit	1.5

Table C1V4b: System 3 - Vented fixture connections

Fixture	Waste Nominal Diameter (DN)	Maximum length, in metres (m)	Minimum gradient (%)	Maximum gradient (%)	Maximum number of bends	Maximum vertical drop, in metres (m)
Basin	32	3	1.8	No limit	2	3
Basin	40	3	1.8	No limit	No limit	3
Basin group ≤5 basins	50	7	1.8	4.4	No limit	No limit
Basin group ≤10 basins	50	10	1.8	4.4	No limit	No limit
Bidet	32	3	1.8	No limit	2	3
Bidet	40	3	1.8	No limit	No limit	3
Shower	40	No limit	1.8	No limit	No limit	No limit
Bath	40	No limit	1.8	No limit	No limit	No limit
Single urinal	40	3	1.8	No limit	No limit	3
>1 Single urinal	50	No limit	1.8	No limit	No limit	No limit

Fixture	Waste Nominal Diameter (DN)	Maximum length, in metres (m)	Minimum gradient (%)	Maximum gradient (%)	Maximum number of bends	Maximum vertical drop, in metres (m)
Trough urinal	50	3	1.8	No limit	No limit	3
Slab urinal	65	3	1.8	No limit	No limit	3
Sink - kitchen	40	No limit	1.8	No limit	No limit	No limit
Trough – laundry	40	3	1.8	No limit	No limit	No limit
Domestic dishwasher	40	No limit	1.8	No limit	No limit	No limit
Domestic clothes washing machine (up to 6 kg)	40	No limit	1.8	No limit	No limit	No limit
Water closet	80	No limit	1.8	No limit	No limit	No limit
Water closet	100	No limit	1.8	No limit	No limit	No limit
Water closet group ≤8	100	15	0.9	No limit	No limit	No limit
Food waste disposal unit	40	3	13.5	No limit	No limit	3
Sanitary napkin disposal unit	40	3	5.4	No limit	No limit	3
Floor waste gully	50	No limit	1.8	No limit	No limit	No limit
Floor waste gully	80	No limit	1.8	No limit	No limit	No limit
Floor waste gully	100	No limit	1.8	No limit	No limit	No limit
Small potato peeler	40	3	13.5	No limit	No limit	3

Limitations

(1) The maximum number of bends permitted is measured from the fixture trap weir to the connection to the stack, excluding the first bend after the trap weir.

(2) The maximum pipe length is measured from the fixture trap weir to the connection to the stack.

(3) A slab urinal must not cater for more than 7 people. Additional waste outlets may be required for longer urinals.

(4) Where a water closet is connected, sweep or 45º junctions must be used to connect to the stack.

(5) Bottle and resealing traps are not permitted for food waste disposal units or sanitary napkin disposal units.

C1V5 Stack design

(1) Compliance with C1P5 relating to pipe sizing is verified for the stack system when—

(a) each stack has a pipe size in accordance with (2); and

(b) ventilation is provided in accordance with (3).

(2) Each stack must have a pipe size in accordance with—

(a) Table C1V5a, where a separate relief vent is not provided; or

(b) Table C1V5b, where a separate relief vent is provided.

(3) Ventilation must comply with the following:

(a) Each stack vent must terminate either to—

(i) the atmosphere or interconnect with another vent in accordance with AS/NZS 3500.2; or

(ii) an air admittance valve with a minimum airflow rate equal to 8 times the wastewater design flowrate.

(b) Each stack vent must be sized in accordance with—

(i) Clause 8.5.4 of AS/NZS 3500.2 for stack vents; or

(ii) Clause 8.5.3 of AS/NZS 3500.2 for relief vents.

(c) Each relief vent must interconnect with the stack vent at each floor.

Applications

(1) Water closets must be connected to a DN 80 or DN 100 discharge pipe.

(2) Water closets must not be connected to DN 80 where a C1V2 System 1 or C1V4 System 3 is used.

Table C1V5a: Stack capacity without a relief vent

Stack Nominal Diameter (DN)	Capacity with square or 88° junction, in litres per second (l/s)	Capacity with sweep or 45° junction, in litres per second (l/s)
65	0.5	0.7
80	2.0	2.5
100	4.0	5.2
150	9.5	12.4

Table C1V5b: Stack capacity with a relief vent

Stack Nominal Diameter (DN)	Capacity with square or 88° junction, in litres per second (l/s)	Capacity with sweep or 45° junction, in litres per second (l/s)
65	0.7	0.9
80	2.6	3.4
100	5.6	7.3
150	12.4	18.3

Deemed-to-Satisfy Provisions

C1D1 Deemed-to-Satisfy Provisions

(1) Where a *Deemed-to-Satisfy Solution* is proposed, *Performance Requirement* C1P1 to C1P7 is satisfied by complying with C1D2 ~~and~~to C1D5.

(2) Where a *Performance Solution* is proposed, the relevant *Performance Requirements* must be determined in accordance with A2G2(3) and A2G4(3) as applicable.

C1D2 Invert levels

The invert level of a trap or gully weir must be a minimum of 10 mm higher than the soffit of the pipe to which it connects.

Part C2 Sanitary drainage systems

Introduction to this Part

This Part sets out the requirements for any part of a sanitary *drainage* system of a property including from sanitary fixtures, appliances and sanitary *plumbing* systems from the *point of connection* to an *approved disposal system*.

Objectives

C2O1 Objective

The Objective of this Part is to—

(a) safeguard people from illness, injury or *loss* (including *loss* of *amenity*) due to the failure of a sanitary *drainage* installation; and

(b) ensure that a sanitary *drainage* installation is suitable; and

(c) conserve water and energy; and

(d) safeguard the environment; and

(e) safeguard public and private infrastructure; and

(f) safeguard people from illness caused by the discharge of *swimming pool* waste water; and

(g) protect *other property* from damage caused by the discharge of *swimming pool* waste water; and

(h) ensure that a sanitary *drainage* installation is designed and is capable of being maintained so that throughout its serviceable life it will continue to satisfy Objectives (a) to (g).

Functional Statements

C2F1 Disposal system

Sanitary fixtures and sanitary appliances must be provided with an adequate disposal system that does not impact adversely on occupants of the premises, property, the environment or the *Network Utility Operator's* infrastructure.

C2F2 Swimming pool wastewater disposal

Adequate means for the disposal of *swimming pool* water and *drainage* is to be provided for each *swimming pool*.

Performance Requirements

C2P1 Disposal

~~A sanitary *drainage* system must ensure sewage is transferred from a sanitary *plumbing* system to an *approved disposal system*.~~Sewage must be transferred through a sanitary *drainage system* to an *approved disposal system* authorised by an authority having jurisdiction.

Explanatory Information

An *approved disposal system* may be—

(1) an *on-site wastewater management system*; or

(2) a connection to a *Network Utility Operator's* sewerage system.

NT C2P2

C2P2 Swimming pool drainage

~~A *swimming pool* must have adequate means of draining the pool in a manner that will not—~~

~~(a) cause illness to people; or~~

~~(b) affect *other property*.~~

(1) An adequate means of draining a *swimming pool* must be designed and installed in a manner that will not cause illness to people.

(2) An adequate means of draining a *swimming pool* must be designed and installed in a manner that will not affect any *other property*.

C2P3 Access

~~A sanitary *drainage* system must ensure there is access for maintenance and clearing a *blockage*.~~Access must be provided to components of a sanitary *drainage* system that require maintenance, regular repair or replacement including mechanical devices, controls and for clearing *blockages*.

Explanatory Information

Access to mechanical components may require the use of a ladder, removal of an access panel, cover, door, or similar obstruction.

C2P4 Ventilation

(1) A sanitary *drainage* system must ensure there is adequate ventilation to avoid foul air and gases accumulating in the sanitary *drainage* and sewerage system.

(2) A sanitary *drainage* system must ensure that ventilation is provided to avoid hydraulic load imbalance such that—

(a) there is less than a 1% likelihood during the annual peak hour that when any fixture discharges, air pressure at any trap seal exceeds ±375 Pa difference from atmospheric pressure; or

(b) an *equivalent* level of safety to human health is achieved as a system complying to (a).

C2P5 Contamination

~~(1) A sanitary *drainage* system must ensure protection against internal contamination.~~

~~(2) A sanitary *drainage* system must avoid the entry of water, foul air and gases from the system into buildings.~~

~~(3) A sanitary *drainage* system must avoid the entry of *surface water*, sub-surface water and stormwater into the system.~~

(1) The entry of water, sewerage and sullage from a sanitary *drainage system* into buildings must be avoided.

(2) A sanitary *drainage system* must be protected against internal contamination.

(3) The entry of foul gases from a sanitary *drainage system* into buildings must be avoided, such that—

(a) at pressures of up to ±375 Pa, water trap seals will not be reduced to depths less than—

(i) 70 mm for trap seals in pressuris~~z~~ed rooms; and

(ii) 25 mm for all other applications; or

(b) an equivalent level of safety to human health is achieved as a system complying to (a).

(4) The entry of *surface water*, *sub-surface water* and stormwater into a sanitary *drainage system* must be avoided.

Explanatory Information

Consideration should be given to the type, quality and quantity of waste being discharged to a sanitary *drainage system* and the suitability and compatibility of the materials used.

C2P6 Uncontrolled discharge

~~A sanitary *drainage* system must avoid *blockage* and *uncontrolled discharge*.~~Any failure or *uncontrolled discharge* from a sanitary *drainage system* must be avoided.

C2P7 Damage

~~(1) A sanitary *drainage* system must avoid damage from root penetration, superimposed loads or ground movement.~~

~~(2) A sanitary *drainage* system must avoid damage to existing buildings or *siteworks*.~~

~~(3) A sanitary *drainage* system must avoid damage to the *Network Utility Operator's* sewerage system or other *approved disposal system*.~~

(1) Damage to sanitary *drainage systems* from superimposed loads must be avoided.

(2) Damage to sanitary *drainage systems* from ground movement must be avoided.

(3) Damage to sanitary *drainage systems* from root penetration must be avoided.

(4) Damage to the *Network Utility Operator's* sewerage system or any *approved disposal system* must be avoided.

(5) Damage to *siteworks* or existing buildings from a sanitary *drainage system* must be avoided.

Notes

There are no *Deemed-to-Satisfy Provisions* for sanitary *drainage* systems to address ground movement.

Explanatory Information

- For C2P7(1), superimposed loads that a sanitary *drainage system* is susceptible to damage from, include building loads and loads arising from building movement or ground movement.
- For C2P7(2), the soil classification of a *site* should provide an indication of the likelihood for ground movement.
- For C2P7(3), consideration should be given to the location of sanitary *drainage systems* in respect to the existing or proposed surrounding landscape features and implementing appropriate strategies to minimise the likelihood of root penetration.
- For C2P7(5), consideration should be given to factors such as the anticipated type, quality and quantity of waste intended to be discharged. Suitable pre-treatment may be necessary to prevent any potential for damage.

VIC C2P8

Verification Methods

C2V1 Velocity and liquid-to-air ratio

Compliance with C2P1 is achieved if the sanitary *drainage* system is designed to operate with—

(a) a liquid-to-air ratio of between 1 to 1 and 0.65 to 0.35; and

(b) a minimum velocity of 0.8 m/s; and

(c) a maximum velocity of—

(i) 2 m/s under normal operating conditions; and

(ii) 3.5 m/s under surge conditions.

Explanatory Information

- The purpose of the minimum velocity is to minimise the likelihood of *blockage* in the sanitary *drainage* system.
- The maximum velocity is intended to minimise the likelihood of damage to the system.

VIC C2V2

C2V2 Pressure testing

Compliance with C2P1 is achieved if the sanitary *drainage* system passes one or more of the pressure tests set out in Section 15 of AS/NZS 3500.2.

C2V3 Determination of sanitary drainage wastewater flowrates

(1) Compliance with C2P1 for pipe sizing is verified for each sanitary *drainage* pipework section when the design flow rate is not less than—

(a) the probable simultaneous wastewater flow rate calculated in accordance with (2); or

(b) the Discharge Unit (DU) value of the highest fixture connected upstream of the pipework section as given by Table C2V3b, in litres per second, whichever is greater.

(2) For the purposes of (1)(a), for each pipework section, the design probable simultaneous wastewater flow rate must be calculated in accordance with the following:

$$Q_{Total} = K\sqrt{\sum DU} + Q_{Other}$$

(3) In the equation shown at (2):

(a) Q_{Total} = the probable simultaneous wastewater flowrate for that pipework section (l/s).

(b) Q_{Other} = the sum of any other wastewater flowrates such as pumped discharges (l/s).

(c) K = the frequency factor given in Table C2V3a (dimensionless)~~.~~, or C2V3(2).

(d) $\sum DU$ = the sum of the discharge units as given in Table C2V3b connected upstream of that pipework section (dimensionless).

~~**Explanatory Information**~~

~~System types referred to in Table C2V3b are as follows:~~

- ~~System 1 - A sanitary *drainage* system where branch discharge pipes are designed with a filling degree of 50%.~~

- System 2 - A sanitary *drainage* system where branch discharge pipes are designed with a filling degree of 70%.
- System 3 - A sanitary *drainage* system where branch discharge pipes are designed with a filling degree of 100%.
- Systems 1 and 2 are similar to the fully vented modified system and System 3 is similar to the single stack system, as detailed in AS/NZS 3500.2.
- Filling degree is defined as the ratio between the height of fluid in a pipe (h) and the diameter of the pipe (D), or h/D.

Table C2V3a: Frequency factors

Fixture usage	NCC building class	Frequency factor (K)
Intermittent use e.g. dwelling, guesthouse or office	Classes 1, 2, 3 or 4	0.5
Frequent use e.g. hospital, restaurant or hotel	Classes 5, 6, 7, 8, 9a or 9c	0.7
Congested use e.g. open to the general public, *school*	Class 9b	1.0
Special use e.g. laboratory	Not applicable	1.2

NCC Bbuilding Cclass	NCC Bbuilding Cclass Eexample	Frequency Ffactor (K)	Time interval between fixture use averaged over peak period (s)
Class 1	Residential dwelling, duplexes, or townhouses	0.5	1200
Class 2	Apartment or unit	0.5 – 0.8	450 – 1200
Class 3	Hotel, hostel, dormitory	0.6 – 0.8	450 – 800
Class 4	Sole dwelling within a Class 5-9 building	0.5	1200
Class 5	Office	0.6 – 0.8	450 – 800
Class 6	Retail, shop, restaurant, café	0.6 – 0.8	450 – 800
Class 7	Carpark, warehouse, storage building	0.6 – 0.8	450 – 800
Class 8	Factory, workshop, laboratory	0.6 – 0.8	450 – 800
Class 9a	Healthcare building, hospital, and GP clinics	0.6 – 0.8	450 – 800
Class 9b	Public event buildings, stadiums, theatres, schools, universities, and churches	1.0 – 1.2	200 – 300
Class 9c	Aged care facilities	0.6 – 0.8	450 - 800

Table C2V3b: Discharge units

Fixture	~~System 1~~	~~System 2~~Discharge Units (DU)	~~System 3~~
Basin	~~0.5~~	0.3	~~0.3~~
Bath (with shower)		0.5	
Bath (without shower)		0.6	
Bidet		0.3	
Shower (single)	~~0.6~~	0.4	~~0.4~~
Urinal (wall-hung)	~~0.8~~	0.5	~~0.4~~
Urinal (stall for each 600 mm length of slab)		0.2	
~~Bath~~	~~0.8~~	~~0.6~~	~~1.3~~
Kitchen sink	~~0.8~~	0.6	~~1.3~~
Water closet (6L cistern)	~~2.0~~	1.8	~~1.2~~
Water closet (4L cistern)		1.8	
Washing machine - up to 6- kg	~~0.8~~	0.6	~~0.6~~
Domestic dishwasher	~~0.8~~	0.6	~~0.2~~
Floor waster gully		Sum of DU from connected fixtures	

Explanatory Information: Table C2V3a

When using Table C2V3a, the hydraulic practitioner should use their own judgement to select the frequency factor most appropriate to their design based on the estimated average time between fixture usage during peak periods of use.

Explanatory Information: Table C2V3b

Considerations when using Table C2V3b are as follows:

- The Discharge Unit (DU) values in Table C2V3b are based on the BS EN 12056.2 System II fixture values where branch discharge pipes are designed with a filling degree of 70%. The use of these fixture values is up to the discretion of the practitioner.
- Filling degree is defined as the ratio between the height of fluid in a pipe (h) and the internal diameter of the pipe (D), or h/D.
- Where a washing machine is connected to a sink trap, only the sink discharge unit is considered.
- The practitioner may introduce their own fixture values where a desired fixture type is not listed, or the provided DU value is considered to be outdated. Evidence of engineering best practice, careful consideration and experimentation demonstrating the real-life performance of the fixture(s) compared with the proposed DU values shall be provided.

C2V4 Sanitary drainage design

(1) Compliance with C2P1 for main drains and branch drains is verified if (2) to (4) are complied with.

(2) Sanitary *drainage* pipework shall be sized in accordance with AS 2200 and C2V1.

(3) The following limitations shall be applied:

(a) The size of the drain shall be of nominal size as specified in Table 3.4.1 of AS/NZS 3500.2.

(b) The minimum size of a main drain shall be as per Clause 3.3.2 of AS/NZS 3500.2.

(c) The minimum size of a branch drain shall be as per Clause 3.3.3 of AS/NZS 3500.2.

(d) Not more than 2 water closet pans shall be connected to a vented DN 80 branch drain.

(4) When using the Colebrook-White equation provided in AS 2200—

(a) minimum and maximum pipe grades shall be designed such that (2) is satisfied; and

(b) the filling degree shall be designed such that (2) is satisfied; and

(c) the flowrate of the designed drain must be greater than or equal to that determined in accordance with C2V3; and

(d) unless alternative values are appropriate, the design values must be—

(i) 1.5 mm for pipe roughness; and

(ii) 1.01 x 10^{-6} m^2s^{-1} for kinematic viscosity.

Deemed-to-Satisfy Provisions

C2D1 Deemed-to-Satisfy Provisions

(1) Where a *Deemed-to-Satisfy Solution* is proposed, *Performance Requirements* C2P1 to C2P7 are satisfied by complying with C2D2 to C2D5.

(2) Where a *Performance Solution* is proposed, the relevant *Performance Requirements* must be determined in accordance with A2G2(3) and A2G4(3) as applicable.

C2D2 Invert levels

The invert level of a trap or gully weir must be a minimum of 10 mm higher than the soffit of the pipe to which it connects.

C2D3 Swimming pool drainage

Where ~~P~~pumped discharge from a *swimming pool* discharges into a ~~must connect to the~~ sanitary *drainage system* it must be in accordance with AS/NZS 3500.2.

NSW C2D4

SA C2D4

VIC C2D4

C2D4 General requirements

(1) A sanitary *drainage* system must be in accordance with AS/NZS 3500.2.

(2) Notwithstanding (1), the maximum length of a waste pipe for an untrapped bath discharging to a *floor waste* gully may be 2.5 m.

TAS C2D4(2)

C2D5 Bushfire prone areas

A sanitary *drainage* system in a *designated bushfire prone area* must be in accordance with AS 3959.

TAS C2D6

Explanatory Information: Cross-volume considerations

NCC Volumes One and Two deal with a number of areas of on-site construction which are relevant to a sanitary *drainage* system. These include, but are not limited to, those listed in Table C2.

Table C2: Cross-volume considerations

Item	NCC Volume One Class 2 to 9 buildings	NCC Volume Two Class 1 and 10 buildings
Excavations for pipework adjacent to a building and footings	B1 Structural provisions	H1 Structure
Termite management for attachments to buildings and penetrations through a slab	B1 Structural provisions	H1 Structure
Penetrations for pipework through a vapour barrier	B1 Structural provisions	H1 Structure
Pipework in timber bearers and joists of solid timber or engineered wood products	B1 Structural provisions	H1 Structure
Fittings, fixtures and pipework installations in steel framed construction	B1 Structural provisions	H1 Structure
Penetrations through a fire-resisting wall or floor	C1 Fire resistance Performance Requirements and C4 Protection of openings	H3 Fire safety

Explanatory Information

Wastewater contains a range of pathogens that can cause illness in humans. A well designed, maintained, and operated wastewater system improves sanitation and reduces the risk to public and environmental health. Poorly designed and maintained wastewater systems can result in, contamination of drinking water and recreational water sources, including those used for food production, as well as increased risks of direct wastewater contact by the public.

C3P2 Environmental impacts

On-site wastewater management systems must protect the environment by ensuring that—

(a) *surface water* and ground water are not polluted: and

(b) soil productivity is maintained or enhanced; and

(c) the likelihood of contamination of soils, ground water and waterways is avoided.

C3P3 Community systems

On-site wastewater management systems must minimise the impacts on and maintain and enhance community *amenity*. ~~They must ensure that the *on-site wastewater management system* design and its implementation contribute to improving and sustaining aesthetic values within individual properties and groups of properties.~~

Explanatory Information

The *on-site wastewater management system* design and its implementation contribute to improving and sustaining aesthetic values within individual properties and groups of properties.

C3P4 Discharge to a Network Utility Operator sewer

Where an *on-site wastewater management system* discharges to the *point of connection* of a *Network Utility Operator's* sewer system, the connection must comply with the *Network Utility Operator* requirements.

TAS C3P5

VIC C3P5

C3P5 General requirements

On-site wastewater management systems that facilitate on-site storage, treatment, disposal or re-use of wastewater must be designed and constructed—

(a) with *required* treatment and storage capacity for the volume and make up of waste and frequency of discharge for disposal; and

(b) with *required* size, strength and rigidity for the nature, flow rates, volume of wastes and/or waste products which must be processed; and

(c) using materials which are impervious both to the waste for which disposal is required and to water; and

(d) to avoid the likelihood of *surface water* and stormwater entering the system.

VIC C3P6

C3P6 Land application systems

(1) *On-site wastewater management systems* and associated land application systems must—

(a) complete the treatment, uptake and absorption of the final effluent within the boundaries of the approved area; and

(b) protect against internal contamination; and

(c) provide ventilation to avoid the likelihood of foul air and gases from accumulating in the system.

(2) *On-site wastewater management systems* and associated land application systems must avoid the likelihood of—

(a) ~~avoid the likelihood of~~ the creation of unpleasant odours or the accumulation of offensive matter; and

(b) ~~avoid the likelihood of~~ stormwater run-off entering the system; and

(c) ~~avoid the likelihood of~~ root penetration or ingress of ground water entering the system; and

(d) ~~avoid the likelihood of~~ unintended or *uncontrolled discharge*; and

(e) ~~avoid the likelihood of~~ *blockage* and leakage; and

(f) ~~avoid the likelihood of~~ damage from superimposed loads or ground movement.

VIC C3P7

C3P7 Access for maintenance

(1) *On-site wastewater management systems* that facilitate on-site storage, treatment, disposal or re-use of wastewater must—

(a) provide vehicle access for collection, if necessary; and

(b) avoid the likelihood of unauthorised access by people; and

(c) permit cleaning, maintenance, measurement and performance sampling.

(2) Land application systems must—

(a) provide access, as required, for maintenance; and

(b) incorporate provisions, as required, for effective cleaning.

C3P8 Uncontrolled discharge

On-site wastewater management systems that facilitate on-site storage, treatment, disposal or re-use of wastewater must avoid *blockage* or *uncontrolled discharge*.

C3P9 Identification

On-site wastewater management systems that facilitate on-site storage, treatment, disposal or re-use of wastewater must permit the manufacturer model, serial number and designed capacity to be easily accessed and identifiable after installation.

Deemed-to-Satisfy Provisions

C3D1 Deemed-to-Satisfy Provisions

(1) *Performance Requirements* C3P1 to C3P9 are satisfied by complying with C3D2 to C3D7.

(2) Where a *Performance Solution* is proposed, the relevant *Performance Requirements* must be determined in accordance with A2G2(3) and A2G4(3) as applicable.