MINISTRY OF BUSINESS, INNOVATION & EMPLOYMENT
HĪKINA WHAKATUTUKI

Please find enclosed Amendment 9, effective 5 November 2020, to Acceptable Solutions G13/AS1, G13/AS2 and G13/AS3 and Verification Methods G13/VM1, G13/VM2 and G13/VM4 for Clause G13 Foul Water of the New Zealand Building Code. The previous amendment to the G13 Acceptable Solutions and Verification Methods (Amendment 8) was in June 2019.

Section	**Previous amendment**	**November 2020 Amendment 9**
Title page	Remove title page and document status and history pages 1–2B	Replace with new title page and document status and history pages 1–2B
Contents	Remove page 5/6	Replace with new page 5/6
References	Remove page 7/8	Replace with new page 7/8
Definitions	Remove page 9/10	Replace with new page 9/10
G13/AS1	Remove pages 13/14, 31–34	Replace with new pages 13/14, 31–34
G13/AS2	Remove pages 39/40, 45/46, 49–52	Replace with new pages 39/40, 45/46, 49–52
Index	Remove pages 53/54	Replace with new pages 53/54

MINISTRY OF BUSINESS,
INNOVATION & EMPLOYMENT
HĪKINA WHAKATUTUKI

Acceptable Solutions and Verification Methods

For New Zealand Building Code Clause
G13 Foul Water

G13
BUILDING CODE

Status of Verification Methods and Acceptable Solutions

Verification Methods and Acceptable Solutions are prepared by the Ministry of Business, Innovation and Employment in accordance with section 22 of the Building Act 2004. Verification Methods and Acceptable Solutions are for use in establishing compliance with the New Zealand Building Code.

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Defined words (italicised in the text) and classified uses are explained in Clauses A1 and A2 of the Building Code and in the Definitions at the start of this document.

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Verification Methods and Acceptable Solutions are available from www.building.govt.nz

New Zealand Government

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Document Status

The most recent version of this document (Amendment 9), as detailed in the Document History, is approved by the Chief Executive of the Ministry of Business, Innovation and Employment. It is effective from 5 November 2020 and supersedes all previous versions of this document.

The previous version of this document (Amendment 8) will cease to have effect on 3 November 2021.

People using this document should check for amendments on a regular basis. The Ministry of Business, Innovation and Employment may amend any part of any Verification Method or Acceptable Solution at any time. Up-to-date versions of Verification Methods and Acceptable Solutions are available from www.building.govt.nz

G13: Document History			
	Date	**Alterations**	
First published	July 1992		
Amendment 1	September 1993	pp. vii–viii, References p. xi, Definitions	p.25, Figure 3 p. 31, Figure 7
Reprinted incorporating Amendment 1		October 1994	
Amendment 2	1 December 1995	p. viii, References	
Amendment 3	28 February 1998	p. ii, Document History p. viii, References	p. 1, 1.0.1 p. 21, 1.0.1
Second edition	Effective from 1 October 2001	Document revised – second edition issued	
Amendment 1	Published March 2007 Effective from 23 June 2007	p. 2, Document History, Status p. 6, Contents pp. 7–8, References	pp. 9–10, Definitions p. 52A, AS3 1.0, 1.0.1, 1.0.2 p. 55, Index
Erratum 1	Effective from 23 June 2007	pp. 5–6, Contents pp. 33–34, AS1 8.0, 8.1	pp. 50–51, AS2 7.0, 7.1
Amendment 2	Effective from 21 June 2007	p. 2, Document History, Status pp. 3, 4, 4A, Building Code Clause p. 6, Contents	p. 8, References p. 52A, VM4 p. 54, Index
Amendment 3	Published 30 June 2010 Effective from 30 September 2010	p. 2, Document History, Status pp. 7–8, References p. 11, G13/VM1 1.0.1 p. 13, G13/AS1 Table 1 p. 32, G13/AS1 6.1.1 p. 33, G13/AS1 6.2.2, 6.3.1, 6.3.2, 7.1.2, Table 7	p. 37, G13/AS2 Table 1 p. 42, G13/AS2 5.1.2 p. 50, G13/AS2 6.1.2 p. 51, G13/AS3 1.0.1 pp. 54–55, Index
Amendment 4	Effective from 10 October 2011 until 14 August 2014	p. 2, Document History, Status p. 8, References	p. 10, Definitions p. 37, G13/AS2 Table 1
Amendment 5	14 February 2014 until 30 May 2017	p. 2A, Document History, Status pp. 7–8, References p. 9, Definitions p. 35, G13/VM2 1.0.1	p. 44, G13/AS2 5.6.1 p. 51, G13/SA2 1.03 p. 52A, 1.1.2
Amendment 6	Effective 1 January 2017 until 31 March 2019	p. 8, References p. 31 G13/AS1 5.8.2, 5.8.3 p. 33 G13/AS1 6.4.1	p. 37 G13/AS2 Table 1 p. 51 G13/AS3 2.0.1, 2.0.2
Amendment 7	Effective from 30 November 2018 until 31 October 2019	p. 8 References p . 33 G13/AS1 7.1.3	p. 50 G13/AS2 6.1.3 p. 51 G13/AS3 2.0.1

G13: **Document History** *(continued)*			
	Date	**Alterations**	
Amendment 7	Effective from 30 November 2018 until 31 October 2019	p. 8 References p . 33 G13/AS1 7.1.3	p. 50 G13/AS2 6.1.3 p. 51 G13/AS3 2.0.1
Amendment 8	Effective 27 June 2019 until 3 November 2021	p. 8 References	p 33 G13/AS1 6.4.1
Amendment 9	Effective 5 November 2020	p 6 Contents p. 8 References p. 10 Definitions p. 13 G13/AS1 Table 1 p. 31 G/13/AS1 5.8.2 p. 33 G13/AS1 6.2.2	p. 40 G13/AS2 3.3.1, 3.3.2, 3.4.2 p. 45 G13/AS2 Figure 7 p. 50 G13/AS2 6.1.2 pp. 51–52 G13 AS3 1.0 pp. 53-54 Index
Note: Page numbers relate to the document at the time of Amendment and may not match page numbers in current document.			

Contents

Erratum 1
Jun 2007

References

For the purposes of New Zealand Building Code (NZBC) compliance, the Standards and documents referenced in these Verification Methods and Acceptable Solutions (primary reference documents) must be the editions, along with their specific amendments, listed below. Where these primary reference documents refer to other Standards or documents (secondary reference documents), which in turn may also refer to other Standards or documents, and so on (lower-order reference documents), then the version in effect at the date of publication of these Verification Methods and Acceptable Solutions must be used.

Amend 5 Feb 2014

Amend 4 Oct 2011

Amend 5 Feb 2014

			Where quoted
	Standards New Zealand		
Amend 3 Sep 2010			
	NZS 3501: 1976	Specification for copper tubes for water, gas, and sanitation *Amends: 1, 2, 3*	AS1 Table 1, AS2 Table 1
Amend 5 Feb 2014	NZS 3604: 2011	Timber framed buildings	AS2 5.6.1
Amend 5 Feb 2014	NZS 4229: 2013	Concrete masonry buildings not requiring specific engineering design	AS2 5.6.1
	NZS 4442: 1988	Welded steel pipes and fittings for water, sewage and medium pressure gas	AS2 Table 1
Amend 3 Sep 2010			
	British Standards Institution		
	BS 437: 2008	Specification for cast iron drain pipes, fittings and their joints for socketed and socketless systems	AS2 Table 1
Amend 3 Sep 2010	BS EN 12056:- Part 2: 2000	Gravity drainage systems inside buildings. Sanitary pipework, layout and calculation	VM1 1.0.1
	Standards Australia		
Amend 3 Sep 2010	AS 1579: 2001	Arc welded steel pipes and fittings for water and waste water	AS2 Table 1
	AS 1589: 2001	Copper and copper alloy waste fittings	AS1 Table 1
Amend 3 Sep 2010	AS 1646: 2007	Elastomeric seals for waterworks purposes	AS2 Table 1
Amend 3 Sep 2010	AS 2887: 1993	Plastic waste fittings	AS1 Table 1
Amend 3 Sep 2010			
	AS 3571: 2009	Plastic piping systems – Glass reinforced thermoplastics (GRP) systems based on unsaturated polyester (UP) resin – pressure and non-pressure drainage and sewerage (ISO 10467: 2004 MOD)	AS2 Table 1
Amend 4 Oct 2011			
Amend 3 Sep 2010	AS 4139: 2003	Fibre reinforced concrete pipes and fittings	AS2 Table 1

		Where quoted	
	Australian/New Zealand Standards		
Amends 3, 4, 9 / Amends 5, 6, 9	AS/NZS 1260: 2017 PVC-U pipes and fittings for drain, waste and vent applications	AS1 Table 1, AS2 Table 1	
Amends 2 and 5	AS/NZS 1547: 2012 On-site domestic wastewater management	VM4 1.1.2	
Amend 3 Sep 2010	AS/NZS 2032: 2006 Installation of PVC pipe systems *Amend: 1*	AS1 6.1.1, 6.2.2, 6.3.1, 7.1.2 AS2 5.1.2, 6.1.2, Table 1	Amend 9 Nov 2020
Amend 4 Oct 2011 / Amends 5, 6, 9	AS/NZS 2033: 2008 Installation of polyethylene pipe systems *Amend: 1, 2*	AS1 Table 1	
Amends 5, 6, 9	AS/NZS 2280: 2014 Ductile iron pipes and fittings *Amend: 1, 2*	AS2 Table 1	
Amend 4 Oct 2011 / Amends 6 and 9	AS/NZS 2566:- Part 2: 2002 Buried flexible pipelines Installation *Amend: 1, 2, 3*	AS2 Table 1	
Amend 1 Jun 2007 / Amends 5, 6, 7, 8	AS/NZS 3500:- Part 2: 2018 Plumbing and drainage Sanitary plumbing and drainage	AS1 7.1.3, VM2 1.0.1 Comment, AS2 6.1.3, AS3 1.0, 1.0.1, 1.0.2	Amend 7 Nov 2018 / Amends 8 and 9
Amends 6 and 9	AS/NZS 3518:2013 Acrylonitrile butadiene styrene (ABS) compounds, pipes and fittings for pressure applications *Amend: 1*	AS2 Table 1	Amend 1 Jun 2007
	AS/NZS 4058: 2007 Pre cast concrete pipes (pressure and non pressure)	AS2 Table 1	
Amend 9 Nov 2020	AS/NZS 4130: 2018 Polyethylene (PE) pipe for pressure applications	AS2 Table 1	
Amend 3 Sep 2010	AS/NZS 4401: 2006 High density polyethylene (PE-HD) pipes and fittings for soil and waste discharge (low and high temperature) systems inside buildings	AS1 Table 1	
Amend 3 Sep 2010	AS/NZS 4936: 2002 Air Admittance valves for use in sanitary plumbing and drainage systems.	AS1 5.8.2, Table 1	Amend 6 Oct 2016
Amends 4 and 9	AS/NZS 5065: 2005 Polyethylene and polypropylene pipe and fittings for drainage and sewerage applications *Amend: 1, 2*	AS2 Table 1	
	European Standards		
Amend 9 Nov 2020	BS EN 12380: 2002 Air admittance valves for drainage systems. Requirements, test methods and evaluation of conformity	AS1 5.8.2, Table 1	
	American Society of Sanitary Engineers		
	ASSE 1050: 2009 Performance requirements for stack air admittance valves for sanitary drainage systems	AS1 5.8.2, Table 1	
	ASSE 1051: 2009 Performance requirements for individual and branch type air admittance valves for sanitary drainage systems	AS1 5.8.2, Table 1	

Definitions

Amend 1 Jun 2007

This is an abbreviated list of definitions for the words or terms particularly relevant to these Verification Methods and Acceptable Solutions. The definitions for any other italicised words may be found in the New Zealand Building Code Handbook.

Amend 5 Feb 2014

Access chamber A chamber with working space at *drain* level through which the *drain* passes either as an open channel or as a pipe incorporating an *inspection point.*

Access point A place where access may be made to a *drain* or *discharge pipe* for inspection, cleaning or maintenance; and may include a *cleaning eye, inspection point, rodding point, inspection chamber* or *access chamber.*

Adequate *Adequate* to achieve the objectives of the *building code.*

Air admittance valve A valve that allows air to enter but not to escape in order to limit pressure fluctuations within the sanitary plumbing or drainage system.

Branch discharge pipe A *discharge pipe* that serves one or more *fixture discharge pipes* for any one floor.

Branch vent pipe A *vent pipe* that serves two or more *fixture vent pipes.*

Amend 1 Jun 2007

Building has the meaning ascribed to it by Sections 8 and 9 of the Building Act 2004.

Cleaning eye A small *diameter access point* usually formed as part of a fitting or trap.

Combined waste pipe A *discharge pipe* which serves two or more *waste pipes.*

Developed length The total length along the centre line of a pipe including fittings and bends.

Diameter (or bore) The nominal internal *diameter.*

Discharge pipe Any pipe that is intended to convey discharge from *sanitary fixtures* or *sanitary appliances.*

Discharge stack A *discharge pipe* that has one or more *discharge pipe* connections, and which is vented at one end via a *discharge stack vent.*

Discharge stack vent A *vent pipe* connected to the top of the *discharge stack.*

Discharge unit The unit of measure for the discharge (hydraulic load) in the *plumbing system,* and is based on the rate, duration and frequency of discharge from a *sanitary fixture* or *sanitary appliance.*

Drain A pipe normally laid below ground level including fittings and equipment and intended to convey *foul water* or *surface water* to an *outfall.*

Drain vent pipe Any pipe which is intended to permit the movement of air into and out of the *drain* and *sewer.*

Fixture An article intended to remain permanently attached to and form part of a *building.*

Fixture discharge pipe A *discharge pipe* that is used to convey waste from a single *sanitary fixture* or *sanitary appliance* to a *branch discharge pipe*, a *discharge stack*, or directly to a *drain.* It does not include any pipes forming part of a *sanitary appliance.*

Fixture vent pipe (trap vent) A *vent pipe* that is connected to a *fixture discharge pipe* or the sanitary *fixture* itself.

Floor waste An outlet located at the low point of a graded floor or in a level floor designed to receive accidental or intentional discharges.

Floor waste pipe A pipe that receives the discharge from a *floor waste* and that discharges outside the *building* or to the *foul water* drainage or sanitary *plumbing system.*

Foul water The discharge from any *sanitary fixture* or *sanitary appliance.*

Foul water drainage system *Drains*, joints and fittings normally laid underground and used specifically for the conveyance of water from the *plumbing system* to an *outfall.*

Grease trap A device designed to intercept grease in a *foul water* discharge.

Gully trap A fitting designed to prevent foul air escaping from the drainage system and used to receive the discharge from *waste pipes.*

Inspection chamber A chamber with working space at ground level through which the *drain* passes either as an open channel or as a pipe incorporating an *inspection point*.

Inspection point A removable cap at *drain* level through which access may be made for cleaning and inspecting the drainage system.

Network utility operator means a person who—

a) undertakes or proposes to undertake the distribution or transmission by pipeline of natural or manufactured gas, petroleum, biofuel, or geothermal energy; or

b) operates or proposes to operate a network for the purpose of—

i) telecommunication as defined in section 5 of the Telecommunications Act 2001; or

ii) radiocommunications as defined in section 2(1) of the Radiocommunications Act 1989; or

c) is an electricity operator or electricity distributor as defined in section 2 of the Electricity Act 1992 for the purpose of line function services as defined in that section; or

d) undertakes or proposes to undertake the distribution of water for supply (including irrigation); or

e) undertakes or proposes to undertake a drainage or sewerage system.

Amend 4 Oct 2011

Outfall That part of the disposal system receiving *surface water* or *foul water* from the drainage system. For *foul water*, the *outfall* may include a *sewer* or a septic tank. For *surface water*, the *outfall* may include a natural water course, kerb and channel, or soakage system.

Plumbing system Pipes, joints and fittings, laid above ground and used for the conveyance of *foul water* to the *foul water drain* and includes *vent pipes*.

Relief vent A *vent pipe* which is connected to a *discharge stack* below the lowest branch connection and which connects at its upper end to the *discharge stack vent* or terminates as an open vent.

Rodding point A removable cap at ground level through which access may be made for cleaning and inspecting the drainage system.

Sanitary appliance An appliance which is intended to be used for *sanitation* and which is not a *sanitary fixture*. Included are machines for washing dishes and clothes.

Sanitary fixture Any *fixture* which is intended to be used for *sanitation*.

COMMENT:
Toilets, urinals, bidets, baths, showers, basins, sinks and tubs are examples of common *sanitary fixtures*.

Amend 9 Nov 2020

Sanitation The term used to describe the activities of washing and/or excretion carried out in a manner or condition, such that the effect on health is minimised, with regard to dirt, contamination and infection.

Sewer A *drain* that is under the control of, or maintained by, a *network utility operator*.

Soil fixture A *sanitary fixture* constructed to receive solid and/or liquid excreted human waste. It includes bedpan disposal units, slop sinks, urinals, water closet pans, and water-flushed sanitary towel disposal units.

Surface water All naturally occurring water, other than sub-surface water, which results from rainfall on the site or water flowing onto the site, including that flowing from a ***drain***, stream, river, lake or sea.

Vent pipe A pipe for the purpose of protecting *water seals* that at its upper end is either open to the atmosphere or fitted with an *air admittance valve* and that at its lower end is connected to a *discharge pipe*.

Waste pipe A *discharge pipe* that conveys the discharge from *waste water fixtures* to a *gully trap*.

Waste water fixture A *sanitary fixture* or *sanitary appliance* used to receive wastes, and which is not a *soil fixture*.

Water seal The depth of water that can be retained in a *water trap*.

Water trap A fitting designed to retain a depth of water that prevents foul air and gases escaping from the *plumbing system* or *foul water drainage system* and entering a *building*.

Acceptable Solution G13/AS1 Sanitary Plumbing

1.0 Scope

1.0.1 This Acceptable Solution applies to above-ground non-pressure (gravity flow) sanitary plumbing for *buildings* having 3 levels or less and includes all pipework for *foul water* within, or on the *building*, including any basements.

1.0.2 The solution does not include:

a) Specialised types of *sanitary fixtures* or *sanitary appliances* used within *buildings* such as hospitals, laboratories and factories, or

b) The conveyance of industrial liquid wastes, chemical or toxic wastes and other wastes which cannot be discharged to a *sewer* without pretreatment.

1.0.3 Protection of water seals

Water seals shall be protected from pressure fluctuations within the sanitary pipework so as to prevent foul air and gases from entering the *building*. The method described in this Acceptable Solution for protecting *water seals* is based on a fully vented *plumbing system* and generally requires each *fixture discharge pipe* to be vented.

COMMENT:
Individually venting each *fixture discharge pipe* provides the greatest flexibility in the arrangement and lengths of *discharge pipes*.

2.0 Materials

2.1 Pipes, traps and fittings

2.1.1 Materials for sanitary *plumbing systems* using gravity flow shall comply with Table 1.

3.0 Water Traps

3.1 Water trap requirements

3.1.1 Discharge points from *sanitary fixtures* and *sanitary appliances* shall have a *water trap* to prevent foul air from the *plumbing system* entering the *building*.

3.1.2 *Water traps* shall be:

a) Removable,

b) Able to be dismantled, or

c) Fitted with a *cleaning eye*.

COMMENT:
Removable panels are not required for access to bath traps.

Table 1: Pipes, traps and fittings
Paragraph 2.1.1

Material	Standard
Pipes and fittings	
Air admittance valves (Amends 3 and 9)	ASSE 1050 or ASSE 1051, BS EN 12380, AS/NZS 4936
Copper pipe	NZS 3501
Copper fittings	AS 1589
PVC pipe and fittings	AS/NZS 1260
Plastic fittings	AS 2887
PE pipe and fittings (Amend 3 Sep 2010)	AS/NZS 4401
Elastomeric rings	AS/NZS 4130 or AS 1646
Traps	
Plastic	AS 2887
Copper	AS 1589

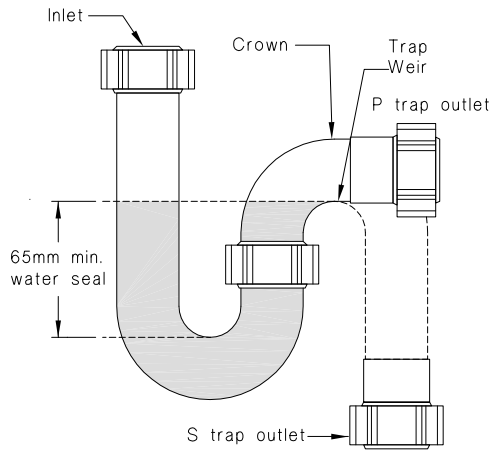
3.2 Water trap dimensions

3.2.1 Under normal operating conditions, *fixture* traps shall retain a *water seal* depth of not less than 25 mm (see Figure 1).

COMMENT:

1. The nominal depth of *water seal* is 75 ± 10 mm for *waste water fixture* traps.
2. The nominal depth of *water seal* is 50 ± 5 mm for *soil fixture* traps.
3. The system should be tested under load conditions to ensure that a 25 mm minimum *water seal* depth is not compromised.

Figure 1: Depth of water seal
Paragraph 3.2.1



3.2.2 The *diameter* of the *water trap* shall be not less than that given in Table 2.

3.3 Water trap location

3.3.1 A *water trap* shall:

a) Be located as close as possible to the *sanitary fixture* or *sanitary appliance* it serves,

b) Have a *discharge pipe* with a *developed length* not exceeding 1.2 m measured between the *water seal* and either the *sanitary fixture* outlet or the *sanitary appliance* discharge point, and

c) Not be located in a different room to the *sanitary fixture* or *sanitary appliance* it serves.

COMMENT:

1. Waste material may build up on the walls of *discharge pipes* and may cause offensive odours to enter the *building* through the *fixture* outlet. A short *discharge pipe* reduces the likelihood of this happening.
2. Traps may be located under the floor or in ceiling spaces of the floor below.

3.3.2 Multiple outlets

A single *water trap* may serve any one of the following outlet combinations located within the same space (see Figure 2):

a) One or two adjacent domestic kitchen sinks together with a dishwashing machine.

b) One or two adjacent domestic kitchen sinks together with a waste disposal unit.

c) One or two adjacent laundry tubs together with a clothes washing machine.

d) Two adjacent basins, domestic kitchen sinks or laundry tubs.

e) One or two adjacent domestic kitchen sinks, together with a waste disposal unit and a dishwashing machine when fitted with a 50 mm trap and *discharge pipe*.

COMMENT:

Commercial sinks – one *water trap* is not permitted to serve two adjacent commercial sinks, as a sink containing *foul water* may contaminate an adjacent sink being used for food preparation.

5.6 Discharge stack and relief vents

5.6.1 The *discharge stack vent*, if also acting as a *drain vent pipe* shall have a *diameter* of not less than 80 mm. Where not acting as a *drain* vent the *discharge stack vent pipe* shall have a *diameter* of not less than that required in Table 6.

5.6.2 Every *discharge stack* serving *sanitary fixtures* or *sanitary appliances* from 3 floors within a *building* shall include a *relief vent* pipe as shown in Figure 7.

5.6.3 *Relief vent* pipes shall:

a) Connect to the bottom of the *discharge stack* at no less than 300 mm below the lowest *discharge pipe* served, and at an angle of 45°, as shown in Figure 7,

b) Be extended upwards at a gradient of no less than 1:80 to connect to the *discharge stack vent*, as shown in Figure 7, or extend separately to the atmosphere as an open vent, and

c) Have a *diameter* of no less than that given in Table 6.

5.7 Termination of open vent pipes

5.7.1 Open *vent pipes* shall terminate outside the *building* in accordance with Paragraphs 5.7.2 and 5.7.3 or 5.7.4.

5.7.2 *Vent pipes* shall terminate outside the *building* and:

a) Be at a height of not less than 50 mm above the overflow level of the highest *sanitary fixture* they serve, and

COMMENT:
The height of 50 mm above the overflow level is to ensure that the *vent pipe* does not convey *foul water* in the event of the *discharge pipe* becoming blocked.

b) Incorporate a means to prevent the entry of birds and vermin and shall have an open area not less than 80% of the cross-sectional area of the *vent pipe* they serve.

5.7.3 Open *vent pipes* serving *discharge pipes* directly connected to the *foul water drainage system* shall terminate no closer to *building elements* than (see Figure 12):

a) Ground level – 3.0 m above,

b) Windows and other openings – 600 mm above, and 3.0 m below and horizontally,

c) Roofs – 150 mm above,

d) Decking having pedestrian access – 3.0 m above, below and horizontally,

e) Eaves or parapets – 600 mm above, below and horizontally, and

f) Air intakes – 5.0 m in any direction.

COMMENT:
These requirements reduce the likelihood of foul air from the *foul water drainage system* entering the *building*.

5.7.4 *Fixture vent pipes* serving *waste pipes* discharging to a *gully trap* shall:

a) Terminate outside the *building* and be not less than 900 mm from any opening to the *building*, and

b) Be vented to the atmosphere independently of any *vent pipe* system connected directly to the *foul water drainage system.*

COMMENT:
1. The location of the outlet of the *vent pipe* serving a *waste pipe* is less restrictive than the requirements for *vent pipes* serving *discharge pipes* connected directly to the *drain*. This is permitted because a *waste pipe* is not connected directly to the *foul water drainage system,* and hence a source of foul air.
2. An independent vent pipe system for *waste pipes* is needed to avoid the risk of *sewer* gases escaping through a *waste pipe* to a *gully trap.*

5.8 Air admittance valves

5.8.1 General

Air admittance valves may be used as venting where specified in accordance with Table 5.

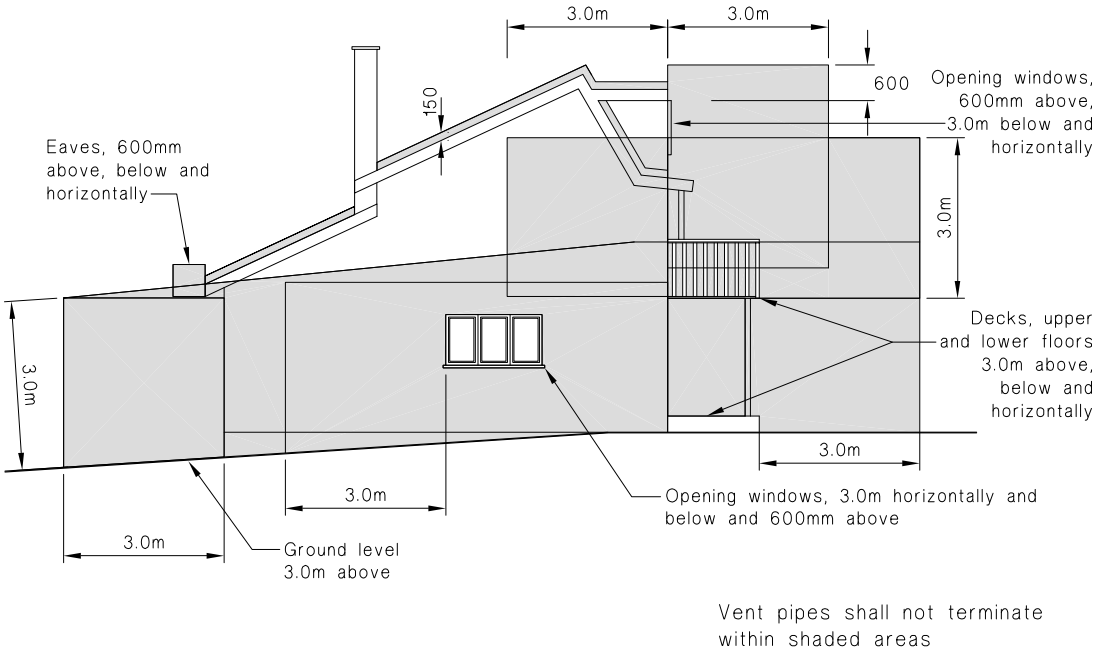
5.8.2 *Air admittance valves* shall be manufactured to ASSE 1050, ASSE 1051, BS EN 12380 or AS/NZS 4936. Amends 6 and 9

5.8.3 Size of air admittance valves

The *air admittance valve* shall have a *diameter* no less than that given in Table 6, and be no smaller in *diameter* than the *vent pipe* that it serves. Amend 6 Jan 2017

Air admittance valves that form an integral part of a *fixture trap* shall only be used as a *trap* vent.

Figure 12: **Restricted location for the termination of vent pipes**
Paragraph 5.7.3



5.8.4 Location

Air admittance valves shall be installed in an upright (vertical) position at least 100 mm above the weir of the *fixture* trap and in a location (see Figure 10 (c)):

a) Accessible for maintenance and inspection,

b) Where the valve is unlikely to become frozen,

c) Protected from likely damage, and

d) Where *adequate* air can enter the valve.

Ventilated openings shall be provided for *air admittance valves* installed within a wall space. The free area of the openings shall be not less than 1.5 times that of the *vent pipe*.

COMMENT:
A significant amount of ventilating pipework and roof penetrations may be avoided with the use of *air admittance valves*. However the pipework sizing, whether for individual *fixture* vents or branch vents, should follow the requirements of this Acceptable Solution. *Air admittance valves* are intended for anti-siphon situations and may not protect the ***water seals*** of traps in positive pressure situations.

6.0 Installation

6.1 Jointing methods

6.1.1 Jointing methods for PVC-U pipe shall comply with AS/NZS 2032.

Amend 3
Sep 2010

6.2 Pipe supports

6.2.1 Pipes shall be supported at centres not exceeding those in Table 7.

Amend 3 Sep 2010

6.2.2 For PVC-U pipes carrying discharges of greater than 60°C, support for the pipe shall be in accordance with Paragraph 6.3.2 of AS/NZS 2032.

Amend 3 Sep 2010

COMMENT:

Supports are required to ensure that the pipe gradient does not fall below minimum values given in Table 4.

Amend 9 Nov 2020

6.3 Thermal movement

6.3.1 The *plumbing system* shall accommodate without failure the expected longitudinal movement in pipes resulting from temperature changes. All copper and PVC-U pipes shall incorporate expansion joints. The provisions described in Section 6.4 of AS/NZS 2032 shall be used for PVC-U pipes.

Amend 3 Sep 2010

Amend 3 Sep 2010

6.3.2 At supports, and at wall and floor penetrations not incorporating expansion joints, movement shall be accommodated using pipe sleeves or a durable and flexible lagging material.

COMMENT:

Amend 3 Sep 2010

1. Thermal expansion will cause a 10 m length of PVC-U to extend 0.8 mm for each 1°C rise of pipe temperature.
2. Provision for thermal movement by correctly locating expansion joints, with fixed and sliding supports, prevents damage to pipes and *fixtures*.

6.4 Fire separation

6.4.1 Fire stopping shall be fitted to pipes passing through fire separations in accordance with C/AS2 Paragraph 4.4.

Amends 6 and 8

7.0 Watertightness

7.1 Test methods

7.1.1 All above ground sanitary plumbing pipework shall be tested by water test or air test to verify that the system is watertight.

7.1.2 Water test: The method described in AS/NZS 2032 may be used for ensuring watertightness of above ground sanitary plumbing pipework.

Amend 3 Sep 2010

7.1.3 Air tests may be carried out in accordance with either clause 15.3 of AS/NZS 3500.2 or paragraph 8.3 of E1/VM1.

Amend 7 Nov 2018

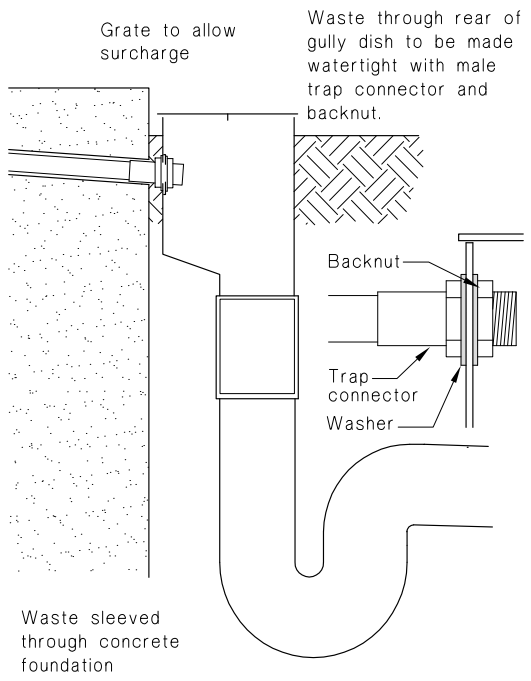
Erratum 1 Jun 2007

Table 7: Distances Between Supports
Paragraph 6.2.1

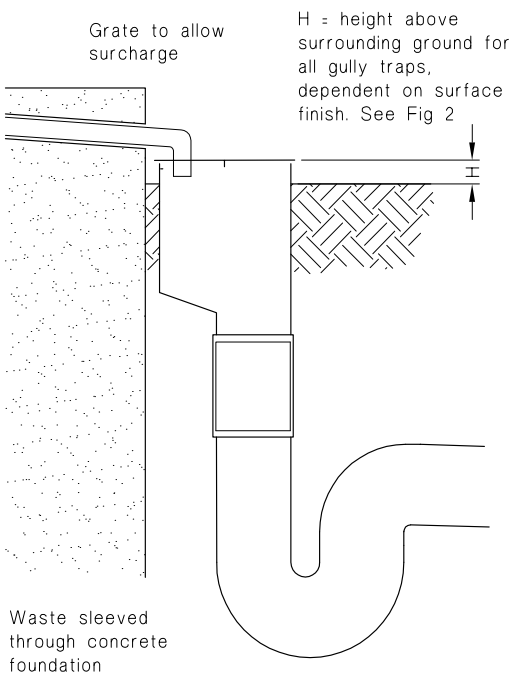
Amend 3 Sep 2010

Material	Pipe diameter (mm)	Maximum distance between supports (m) Vertical pipe	Graded pipe
Copper pipes	32 to 50	3.0	2.5
	greater than 50	3.5	3.0
PVC-U pipes	32 to 50	1.0	0.5
	65 to 100	1.2	1.0
	greater than 100	1.8	1.2

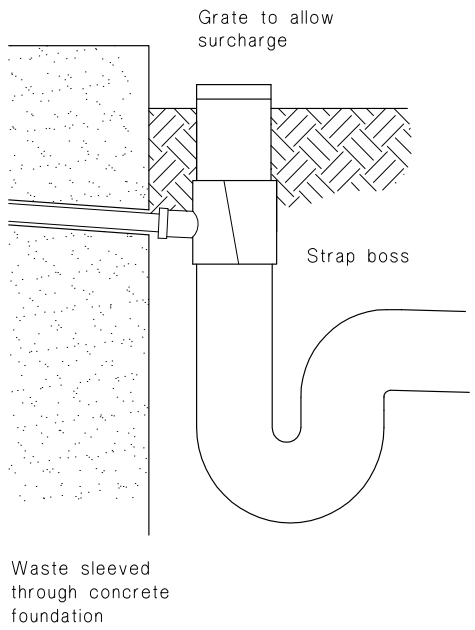
Figure 3: **Methods of connecting to gully traps**
Paragraph 3.3.1



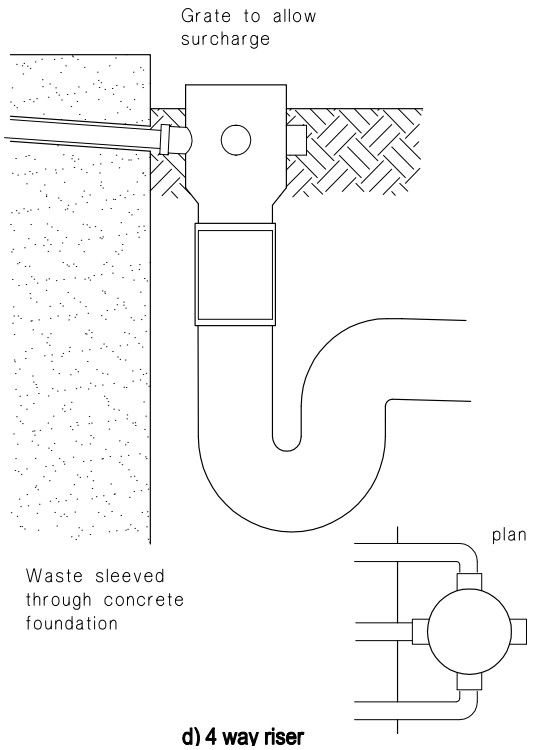
a) Waste discharging to rear of gully dish



b) Waste bend discharging over gully dish



c) Strap boss to riser



d) 4 way riser

h) The top of the *water seal* no more than 600 mm below the top of the gully dish, and

COMMENT:
To permit the *gully trap* to be easily cleaned by hand.

i) *Adequate* support from bedding and backfilling with:

i) concrete no less than 75 mm thick surrounding the entire gully dish and which is separated from the *building* foundation, where the *gully trap* is likely to be damaged, or

Amend 9 Nov 2020

ii) compacted bedding material complying with Paragraph 2.1.1, in other areas, and

j) A minimum of 600 mm clear access space above the gully dish.

3.3.2 In order to provide overflow relief for the drainage system, every *building* used for Housing shall be provided with at least one *gully trap* which shall:

a) Be positioned so that the top of the gully dish is no less than 150 mm below the overflow level of the lowest *sanitary fixture* served by the drainage system,

b) Have a grating that will allow surcharge,

c) Be located in a visible position, and

d) Be installed so that surcharge cannot enter into or under *buildings*.

COMMENT:
Housing is a classified use defined in Clause A1 of the *Building Code*.

Amend 9 Nov 2020

3.4 Grease traps

3.4.1 *Grease traps* shall be provided for any *discharge pipe* serving a sink(s) where the *foul water* discharges to a soak pit.

3.4.2 In *buildings* other than *Housing*, *grease traps* shall be provided where waste water is likely to convey grease.

COMMENT:
Housing is a classified use defined in Clause A1 of the *Building Code*.

Amend 9 Nov 2020

3.4.3 The capacity of a *grease trap* shall be at least twice the capacity of all *sanitary fixtures* and *sanitary appliances* discharging to it, and in no case less than 100 litres as shown in Figure 4.

3.4.4 For restaurants and cafés, the capacity of the *grease trap* shall be at least 5 litres for each person for whom seating is provided, and in no case less than that required by Paragraph 3.4.3.

3.4.5 *Grease traps* located outside a *building* shall be configured as shown in Figure 4.

3.4.6 The top of the outlet junction shall be extended to finished ground level and fitted with a watertight *rodding point* access cover as shown in Figures 4 and 10.

3.4.7 Other types of *grease trap* such as those that separate or digest grease must be approved by the *network utility operator* as required by G14/VM1 1.2.

3.5 Gradient of drains

3.5.1 *Drains* shall:

a) Be laid at an even grade, and

b) Have no obstructions to flow.

3.5.2 *Drains* shall be installed at the maximum practicable gradient.

3.5.3 The gradient of drainage pipes shall be not less than that required in Table 2 for the relevant *discharge unit* loading.

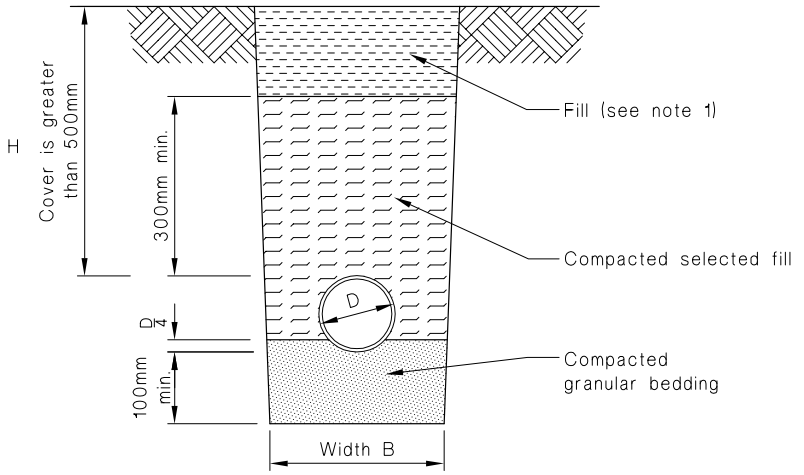
Table 2: Drain discharge unit loading and minimum gradients
Paragraphs 3.5.3, 3.6.3 and 5.2.1

Diameter (mm)	Minimum gradient									
	1:20	1:40	1:60	1:80	1:100	1:120	1:140	1:160	1:180	1:200
80	215	100	61	44	34	–	–	–	–	–
100	515	255	205	149	122	104	–	–	–	–
150	2920	1790	1310	1040	855	760	677	611	558	515

See Paragraph 5.2.2 for *drains* laid at gradients within shaded area.

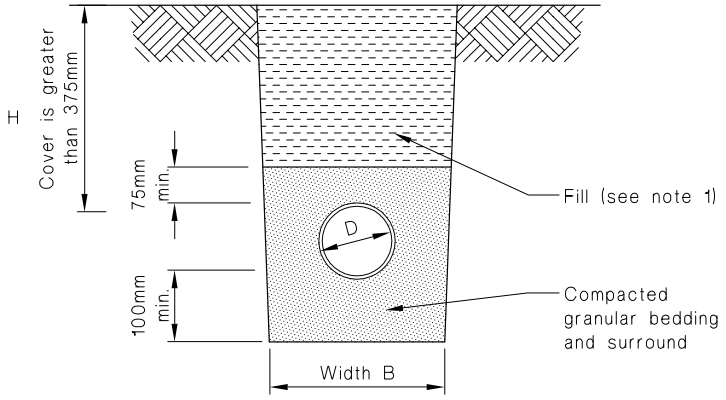
Figure 7: **Bedding and backfilling**
Paragraphs 2.1.1, 5.2.1, 5.3.1 and 5.4.1

Amend 9 Nov 2020



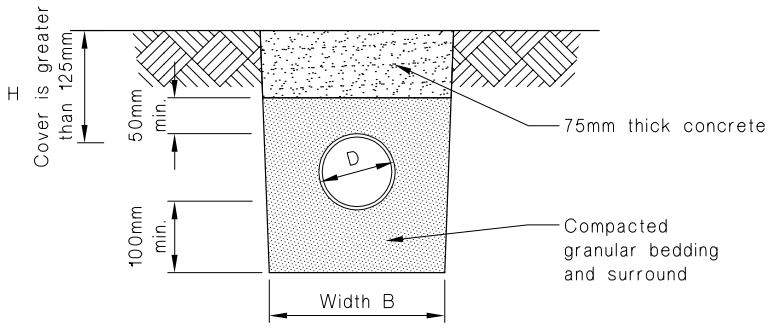
(a) Cover greater than 500 mm

Amend 9 Nov 2020



(b) Cover greater than 375 mm

Amend 9 Nov 2020



(c) Cover greater than 125 mm

Amend 9 Nov 2020

NOTE:
1. Fill shall be:
-Ordinary fill where drains are located below gardens and open country.
-Compacted selected fill where the drains are located below residential driveways and similar areas subject to light traffic.

Figure 8: **Relationship of pipe trench to building foundation**
Paragraph 5.6.1

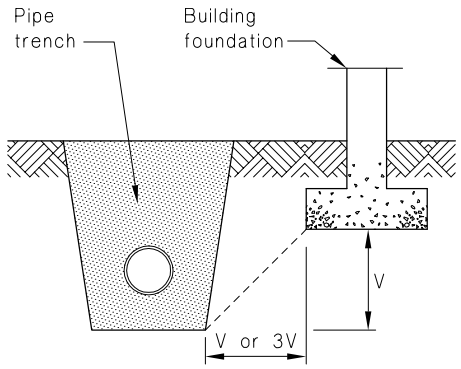
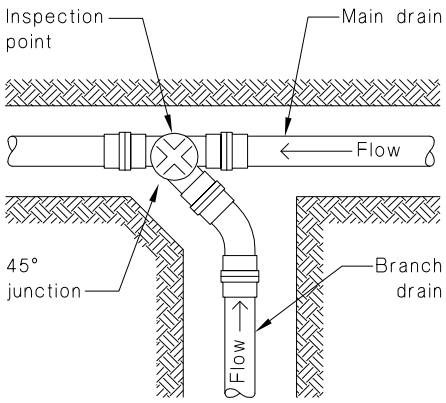


Figure 9: **Inspection points**
Paragraph 5.7.3



5.7.4 *Access points* shall be provided at the following locations:

a) Immediately prior to *drain outfalls*,

b) Immediately inside the boundary of the property served,

c) At the junction of every *drain* with another *drain* except that no *access point* is required where the branch *drain* is less than 2.0 m long and only serves a *gully trap*,

d) Every change in horizontal direction of greater than 45°,

e) Every change in gradient greater than 45°,

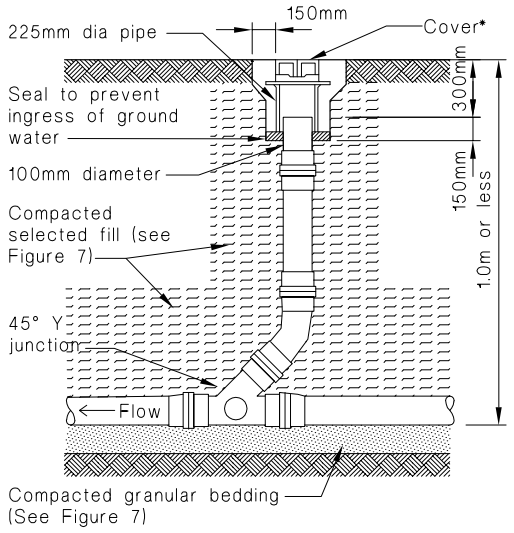
f) At intervals (on straight lines) of no less than:

   i) 50 m where *rodding points* are used, or

   ii) 100 m where *access chambers*, *inspection chambers* or *inspection points* are used, and

g) Within 2.0 m outside the *building* where a *drain* enters or exits from under a *building*.

Figure 10: **Rodding points**
Paragraphs 3.4.6, 5.7.3 and 5.9.1



*Where the rodding point is located inside a building the cover shall be sealed at floor level

5.8 Additional requirements for drains installed under buildings

5.8.1 *Drains* installed under *buildings* shall be:

a) Straight and of even gradient,

b) Separated from the *building* foundation by at least 25 mm, and

c) When passing through concrete, sleeved or wrapped in a durable and flexible material to allow for expansion and contraction.

5.8.2 *Drains* passing beneath *buildings* with a concrete slab on the ground floor shall have in addition to Paragraph 5.8.1:

a) 50 mm clearance from the top of the pipe to the underside of the slab, and

b) Junctions beneath the *building* joining at an angle of not more than 45^{O} (see Figure 13).

COMMENT:

Drains located under *buildings* must meet the Durability Performance requirement of B2.3.1 (a), that is the life of the *building* being not less than 50 years.

5.9 Access to drains under buildings

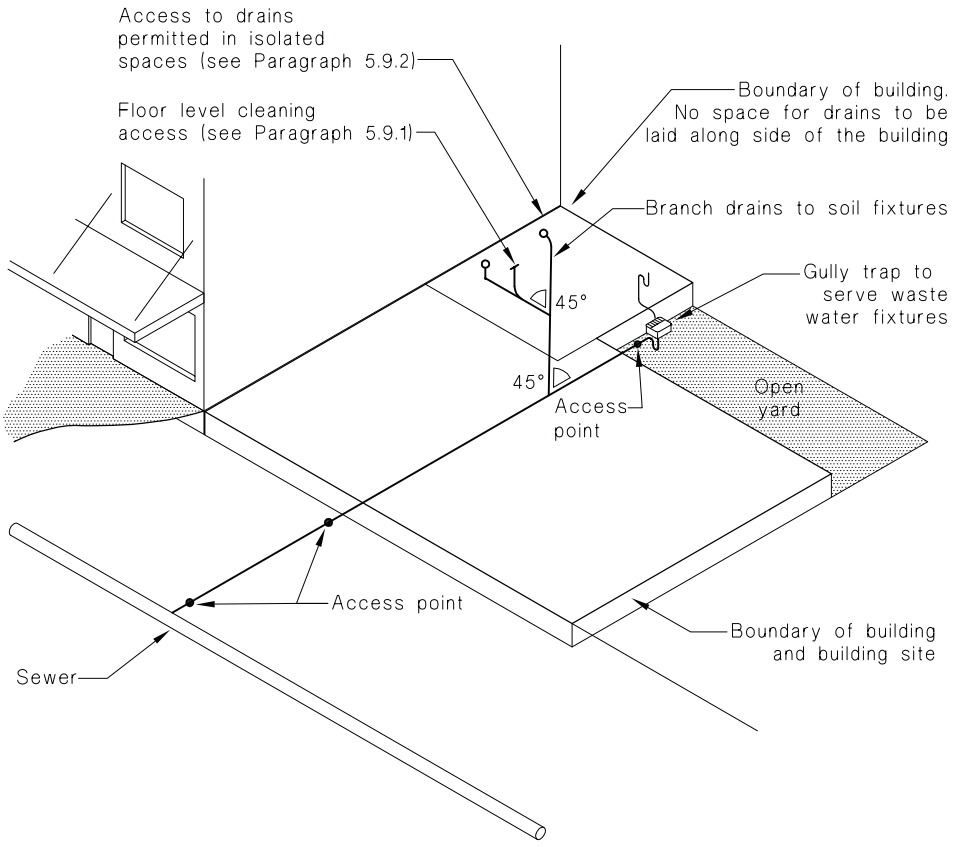
5.9.1 Where two or more *soil fixtures* are connected to a branch *drain* beneath the *building*, access for cleaning shall be provided by a sealed floor level *rodding point* located downstream of the highest *fixture* connection to the branch *drain* (see Figures 10 and 13).

5.9.2 *Access points* located within a *building* shall be in an area that complies with the isolation and ventilation requirements for spaces in which *soil fixtures* are located.

COMMENT:

Refer to G1/AS1 "Personal Hygiene" and G4/AS1 "Ventilation".

Figure 13: **Drains under buildings**
Paragraphs 5.8.2 and 5.9.1



5.9.3 *Access points* may be located in a space containing a *soil fixture*.

5.10 Disused drains

5.10.1 Where a *drain* or part of a *drain* is no longer required, it shall be disconnected from the *foul water drainage system* at the junction with the live *drain* or at the property boundary.

5.10.2 The live *drain* shall be sealed by either of the following *methods*:

a) Purpose made junctions sealed with a tight-fitting plug that is fixed securely in place and does not protrude into the live *drain*, or

b) In in-situ formed junctions, where disused branch *drains* which have been inserted into an existing length of pipe, these shall be cut off as close as practicable to the junction and sealed with a purpose made cap, plug or stopper. Alternatively, the length of pipe into which the branch *drain* was inserted may be replaced.

COMMENT:
The unsatisfactory disconnection of old branch *drains* from live *drains* can lead to a source of major infiltration of ground water into the drainage system.

6.0 Watertightness

6.1 Testing

6.1.1 All sections of the drainage system shall be tested by water test or air test to ensure watertightness.

COMMENT:
Testing should be undertaken before backfilling for the easy identification of any leaks.

6.1.2 Water test

Amends 3 , 7, 9 | AS/NZS 2032 Section 7 gives an acceptable method for ensuring watertightness of below ground PVC-U drainage pipework.

Amend 3 Sep 2010 |

6.1.3 Air tests may be carried out in accordance with either clause 15.3 of AS/NZS 3500.2 or paragraph 8.3 of E1/VM1.

Amend 7 Nov 2018 |

6.1.4 Where a disused *drain* is being reinstated, the disused *drain* shall be tested to verify that the *drain* is sound.

6.1.5 Where a *building* is proposed to be built over an existing *drain*, the *drain* shall be verified as being sound both before and after construction.

Erratum 1 Jun 2007 |

Acceptable Solution G13/AS3 Sanitary plumbing and drainage

Amend 9 Nov 2020

1.0 AS/NZS 3500.2

1.0.1 AS/NZS 3500.2, as modified by Paragraph 1.0.2, is an Acceptable Solution for the design and installation of sanitary plumbing and drainage systems.

Amend 3 Sep 2010

Amends 6 and 7

Amend 6 Jan 2017

1.0.2 Modifications to AS/NZS 3500.2

Clause 2.2 Delete and replace with "Materials and products shall comply with NZBC Clause B2 Durability and G13/AS1 Paragraph 2.0 Materials".

Clause 3.19 Delete Clause.

Clause 4.4 Replace "inspection shafts" with "access point" in this Clause.

Clause 4.6.6 This applies only to *Housing*.

COMMENT:
Housing is a classified use defined in Clause A1 of the Building Code

Clause 4.9.1 Delete and replace with

"**4.9.1 Drains installed at grade**

4.9.1.1 General

The connection of any drain to a graded drain shall be by means of a junction with an upstream angle not greater than 45° and shall conform to the following:

(a) Double 45° junctions shall not be used.

(b) Where unequal junctions are used, the invert of the branch drain shall be at least 10 mm higher than the soffit of the drain to which it connects.

4.9.1.2 New installations

Where a junction is used to make the connection of a DN 100 branch drain to a main drain of the same size, the entry level of the branch drain shall be elevated at an incline of not less than 15° above the horizontal.

NOTE 1: See Figure 4.9.1(a) for a typical example.

NOTE 2: Positioning the junction a minimum of 15° above horizontal removes the probability of the partial backwash of a discharge into the branch causing stranding that can lead to blockages in the drain.

4.9.1.3 Other installations

For repairs or extensions to existing installations or where the main and branch drains are not DN 100 the entry level of the branch drain may be on grade.

NOTE 1: Where sufficient height is available in existing installations, the provisions of Clause 4.9.1.2 should be followed to avoid the potential for blockages."

Amend 9 Nov 2020

Clause 5.6 Delete and replace with "Drains in other than stable ground shall be subject to specific design."

Amends 1 and 6

Clause 6.6.2.4 Delete and replace with

"6.6.2.4 Junctions installed at grade

6.6.2.4.1 General

Discharge pipes shall be joined to each other by means of a 45° junction. Where unequal size junctions are used, the invert of the branch pipe shall be 10 mm higher than the soffit of the pipe to which it connects.

6.6.2.4.2 New installations

Where a junction is used to make the connection of a DN 100 branch pipe to a common discharge pipe of the same size, the entry level of the branch pipe shall be elevated at an incline of not less than 15° above the horizontal.

NOTE 1: See Figure 4.9.1(a) for a typical example.

NOTE 2: Positioning the junction a minimum of 15° above horizontal removes the probability of the partial backwash of a discharge into the branch causing stranding that can lead to blockages in the drain.

6.6.2.4.3 Other installations

For repairs or extensions to existing installations the entry level of the branch pipe may be on grade.

NOTE 1: Where sufficient height is available in existing installations, the provisions of Clause 6.6.2.4.1 should be followed to avoid the potential for blockages."

Amend 9 Nov 2020

Clause 6.6.2.6 Delete and replace with

"**6.6.2.6 Junctions for stacks connected to a graded pipe**

Junctions installed on grade for the connection of a stack to a graded pipe shall be in accordance with Clause 6.8.3."

Clause 6.8.3 (a) Delete and replace with

"(a) a 45° junction installed on grade in accordance with Clause 6.6.2.4 and a bend at the base of the stack in accordance with Clause 6.8.4; or"

Clause 10.7 Delete and replace with "PVC-U piping systems shall be installed in accordance with AS/NZS 2032 and the requirements of this Standard."

Amend 9 Nov 2020

Section 14 Delete section.

Amends 1, 5, 6

Amend 9 Nov 2020

Index G13/VM1/VM2 & AS1/AS2/AS3

All references to Verification Methods and Acceptable Solutions are preceded by **VM** or **AS** respectively.