

Tasmanian Water and Sewerage Corporation

Boundary Backflow Containment Selection Requirements

Issue Number: DRAFT-03

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1. BUSINESS RULE STATEMENT

The Tasmanian Water & Sewerage Corporation (TW) is committed to supply potable water to customer's properties that is free from contamination or pollution.

This will be achieved by the installation, maintenance and testing of appropriately rated boundary backflow containment devices compliant with AS/NZS 2845.1:2010 Water Supply – Backflow prevention devices – Materials, design and performance requirements.

2. INTRODUCTION

2.1 Background

Part of the process for ensuring that safe drinking water is provided is by analysing the various hazards of each property connected to the potable water supply system and then ensuring that there are barriers to control or eliminate those hazards on each property.

A serious risk that exists in water supply systems is that of the possibility of backflow of contaminated water from hazardous sites into the potable water mains. Backflow is the unwanted reverse flow of water from a customer's premises to TW's potable water supply system. The reason that backflow prevention is important is because backflow events in Australia and overseas are known to have resulted in cases of poisoning and fatalities.

Prevention of backflow is achieved by the use of backflow prevention devices located at strategic points within hazardous sites as part of a barrier approach to minimise the risk of contamination to the water supply. To protect the potable water supply system from backflow contamination and to ensure it is safe to drink, TW requires backflow prevention devices to be installed at the property boundary. This is called boundary backflow containment protection.

This document specifies TW's requirements for the installation, maintenance and testing of water supply boundary backflow containment protection to be installed immediately downstream of the water meter.

2.1 What is Boundary Backflow?

Boundary Backflow is defined in AS/NZS 3500.1:2003 Plumbing and drainage – Water services, as the flow of liquids in a direction contrary to the normal or intended direction of flow or the unintended flow of water from a potentially polluted source into TW's potable water supply system.

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Boundary Backflow can typically occur in two ways:

1. Back Siphonage – A condition where the water or other contaminated/polluted liquid enters the potable water supply system by siphonage caused by a negative pressure (vacuum or partial vacuum) in the reticulation potable water supply system. Back siphonage may occur as a consequence of fire-fighting, repairs or breaks; and
2. Back Pressure – A condition where the pressure downstream of a cross connection becomes greater than the pressure upstream of the cross connection, thus allowing water or other contaminated/polluted liquid to reverse its normal flow and enter the potable water supply system.

3. LEVELS OF HAZARD

Every property connected to the potable water supply system has a hazard rating based on the classification of the activity undertaken at the property.

The level of hazard will determine what boundary backflow containment protection device must be installed to protect the integrity of the potable water supply system.

The Australian Standard AS/NZS 3500.1:2003 Plumbing and drainage – Water services has a hazard rating system that is used to ensure the correct backflow prevention devices are installed as follows:

HIGH Hazard: *Any condition, device or practice which in connection with the potable water supply system, has the potential to cause death*

MEDIUM Hazard: *Any condition, device or practice which in connection with the potable water supply system, has the potential to endanger health*

LOW Hazard: *Any condition, device or practice which in connection with the potable water supply system, constitutes a nuisance but does not endanger health*

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The levels of hazard protection required are defined according to whether a backflow prevention device is needed at a fixture, at a connection of specific sections/areas within the property or at the property boundary where the water connection enters the property as follows:

- Individual Protection** Backflow prevention at individual fixtures; and/or
- Zone Protection** Backflow prevention provided at the connection to specific sections of the potable water supply system within a property; and/or
- Boundary Backflow Containment Protection** Backflow prevention provided at the property boundary to protect TW’s potable water supply system from contamination.

Under current Tasmanian legislation the responsibility for the selection of devices depends upon it’s location as specified in Table 1.

Location of Backflow Protection Device	Assess Backflow Device Requirement	Permit Required If A Testable Device
Individual device	Relevant Council	Special Plumbing Permit issued by Council
Zone device	Relevant Council	Special Plumbing Permit issued by Council
Boundary backflow containment device	TW	TW Certificate for Certifiable Works (Plumbing) incorporated into a Special Plumbing Permit issued by Council

Table 1

All properties within TW’s operating area connected to the potable water supply system require a boundary backflow containment device at the property boundary. The device required will be identified by the hazard rating of the processes conducted onsite as defined by AS/NZS 3500.1:2003 Plumbing and drainage – Water services Section 4, Table 4.1 and Table F3 as amended and included in Section 9 of this document or as specified below:

- A boundary backflow containment device is required regardless of zone or individual protection. As TW cannot guarantee the integrity of zone or individual protection on a customer’s site, we cannot guarantee the protection of the drinking water supply from backflow unless the site is contained at the property boundary. If the hazard rating varies due to multiple businesses on the one property, the highest boundary backflow containment hazard rating on the property per Section 9 of this document shall be adopted at the property boundary;
- Where the hazards are unknown for new commercial and/or industrial development at the time of subdivision/building approval/connection application, the hazard rating will default to HIGH;

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4. OWNERSHIP OF BOUNDARY BACKFLOW CONTAINMENT DEVICES

Ownership of all boundary backflow containment devices resides with the property owner together with all costs associated with the supply, installation, commissioning, testing and ongoing maintenance and testing.

The exception to this is that for properties only requiring LOW boundary backflow containment with a DN20 or DN25 water meter which incorporates integrated dual check valves. These integral dual check valve are owned and maintained by TW.

5. SELECTION OF THE CORRECT DEVICE

The level of hazard as specified in Table F3 of AS/NZS 3500.1:2003 Plumbing and drainage – Water services as amended within this guideline (See Section 9) shall be used in conjunction with Table 4.1 of AS/NZS 3500.1:2003 Plumbing and drainage – Water services to determine the correct type of boundary backflow containment device to be installed.

TW must be satisfied that the device selected is appropriate for the level of boundary backflow containment hazard identified for that property.

6. INSTALLATION REQUIREMENTS

6.1 General

The installation of boundary backflow containment devices must be installed by a licensed plumber and the installation must comply with the requirements of AS/NZS 3500.1:2003 Plumbing and drainage – Water services Section 4.6.

If the device is a testable device then in accordance with Clause 77 of the (Tasmanian) Building Act 2000 the plumber must first obtain a special plumbing permit issued by the relevant council noting that both single and double detector check assemblies are also testable devices.

Following installation, the boundary backflow containment device must be commissioned and tested by a person holding a Tasmania (Plumbing Practitioner (Certifier) Water Plumbing – Endorsed ‘Backflow Prevention’ Licence.

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Where installation is required as part of the development works, a Backflow Testing and Commissioning Certificate (see Section 10) is required to be supplied to TW by email to development@taswater.com.au prior to the issue of a Certificate of Compliance (Building and/or Plumbing) by TW.

Generally the boundary backflow containment device must be installed immediately after the isolating valve on the downstream (outlet) side of the TW meter to ensure boundary backflow containment. The water meter and the boundary backflow containment device must be separated by the appropriate distance specified by the water meter supplier to ensure water metering accuracy is maintained. The installation of the boundary backflow containment device must comply with the TW Standard Drawings for water meter installations.

With the exception of dedicated fire services, in line strainers complying with Table 4.3 of AS/NZS 3500.1:2003 Plumbing and drainage – Water services and resilient seated isolation valves must be installed upstream of all boundary backflow containment devices along with a downstream isolation point to enable testing to be undertaken as per Section 7.

The installation shall be in accordance with TW's standard drawings TW-SD-W-20 SH1-SH9 available from the TasWater website www.taswater.com.au

All boundary backflow containment devices shall be installed with connections that allow for simple removal and replacement of the device.

All testable boundary backflow containment devices must be installed above ground with 300mm minimum clearance to finished surface level in an area not subject to freezing or ponding.

Unprotected bypasses shall not be installed around boundary backflow containment devices and all bypasses shall have the same level of boundary backflow containment protection as the main line.

6.2 Commercial and Industrial

A boundary backflow containment device is required regardless of zone or individual backflow protection.

Where the hazards are unknown either no connection should be installed (tee and isolation valve on water main only) or for new commercial and/or industrial development at the time of subdivision/building approval/connection application where the development activity is unknown, the boundary backflow containment hazard rating shall default to HIGH unless otherwise approved by TW. Refer to Section 7 of this document for fire service boundary

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backflow containment requirements.

If the boundary backflow containment hazard rating varies due to multiple businesses on the one property, the highest boundary backflow containment hazard rating on the property shall be adopted at the boundary unless otherwise approved by TW.

6.3 Residential Properties

Where a residential property has a potable water supply system connection and is considered a LOW hazard site, TW will supply and install a DN20 or DN25 water meter that incorporates an integrated dual check valve assembly acceptable for LOW hazard boundary backflow containment protection.

Residential properties with water meter sizes greater than DN25 should be assessed for backflow requirements. As a minimum every boundary installation greater than DN25 will require an external non-testable dual check device installed immediately after the water meter acceptable for LOW hazard boundary backflow containment protection. Refer to Section 6.5 of this document for fire service requirements.

6.3.1 Residential Properties with a Restricted Supply Agreement

Where a residential property has a restricted TW potable water supply system connection which precludes the use of a water meter with an integral dual check valve due to low pressure (also commonly known as a ‘trickle feed’ supply) then the following will apply:

- A break tank is to be installed with an approved “registered” air gap in accordance with Section 8 of AS/NZS 3500.1:2003 Plumbing and drainage – Water services;
- Provided there are no direct connections to the pipework between the water meter assembly and the break tank, an additional boundary backflow containment device will not be required at the water meter installation; and
- The pipe work between the water meter and the break tank must be visually inspected each year in conjunction with an audit of the registered air gap to confirm that no tappings have been made between the connection point and the “registered” air gap.

6.4 Properties with Sewage Pump Stations and/or On-Site Waste Water Management System

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For properties with a sewage pumping station installation the following will apply:

- If the sewage pumping station is locked, owned, operated and maintained by TW and any potable water supply used to maintain the installation is sourced from off-site, (i.e. the risk is managed by TW), then the boundary backflow containment hazard rating shall be the same as the hazard rating for the property without the sewage pump station; or
- If the sewage pumping station is not owned, operated and maintained by TW then the boundary backflow containment hazard rating shall default to 'HIGH'.

For properties with an On-Site Waste Water Management System the following will apply:

- In accordance with AS3550.1:1992 ruling RUL PL.26-2002 Rulings to plumbing and piping systems Standards - Local authority water supply to properties with treatment plants, for properties with either septic or on-site treatment systems then the boundary backflow hazard rating shall be the same as the hazard rating from the property without a septic or on-site treatment system.

6.5 Fire Services

For fire service installations TW has determined that the following will apply:

- If a break tank is installed with an approved "registered" air gap, this installation will comply with TW's boundary backflow containment requirements;
- Provided there are no direct connections to the pipework between the water meter assembly and the break tank, an additional backflow prevention device will not be required at the water meter installation;
- The pipe work between the water meter and the break tank must be visually inspected each year in conjunction with an audit of the registered air gap to confirm that no tappings have been made upstream of the break tank; and
- Where a separate dedicated fire service is installed, only automatic fire sprinkler systems and fixed fire hydrants shall be connected to the dedicated fire service.

If the boundary backflow containment hazard rating is HIGH or MEDIUM the boundary backflow containment devices on the fire services at the property boundary must be a testable double detector check assembly with water metered low flow bypass; OR

If the boundary backflow containment hazard rating is LOW a testable single detector check assembly with a 50kPa rated spring is required with a water metered low flow bypass (with LOW hazard backflow device fitted).

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For the water metered low flow bypasses TW requires the installation of a water meter of the size specified in the table on TW's standard drawing TW-W-20 SH9 noting that the bypass it to have the same level of boundary backflow containment protection as the main line.

6.6 Stand Pipes

Where TW approves the use of potable water supply system metered standpipes these shall have a Non Testable Double Check Valve. The device must be integrated into the design of the standpipe

Note: All fill stations must have a registered air gap (RAG) or reduced pressure backflow boundary containment device (RPZD) at the fill point.

6.7 Existing Installations

Generally existing buildings are exempt from the requirements of TW Boundary Backflow Containment Selection Requirements until one or more of the following conditions applies:

- A building upgrade or redevelopment requires a Planning Permit Application to be submitted; and/or
- The property is re-zoned under the Council Planning Scheme at the property owner's request; and/or
- The property is subdivided or combined with one or more other lots; and/or
- A change of activity on the property that requires a change to the boundary backflow containment hazard rating, where the change does not require a Planning Application; and/or
- The service connection is relocated, modified and/or upgraded.

Where however, in the opinion of TW, a potential or physical cross-connection is found in the water service and/or fire service at any property boundary, the property owner shall upon written advice by TW, ensure that such a cross connection is immediately disconnected or altered to comply with TW's requirements or otherwise removed within the period nominated in the written advice.

Failure to comply within the period nominated by TW, may at the TW's discretion, result in the immediate restriction or disconnection of the property from TW's water supply network.

Unless specified otherwise and depending on the case the time to undertake the installation of the boundary backflow containment device/s shall be up to one (1) calendar year.

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7. INSPECTION, TESTING & MAINTENANCE

In accordance with AS/NZS 3500.1:2003 Plumbing and drainage – Water services and AS2845.3:2010 Water supply - Backflow prevention devices - Field testing and maintenance of testable devices, all testable boundary backflow containment devices must be tested as follows:

- Immediately after installation;
- Annually (at intervals not exceeding 12 months);
- On completion of maintenance work;
- After a backflow or suspected backflow incident; and
- At the request of TW.

It is the property owner's responsibility to ensure that testable boundary backflow containment devices are tested as above and that all records are kept.

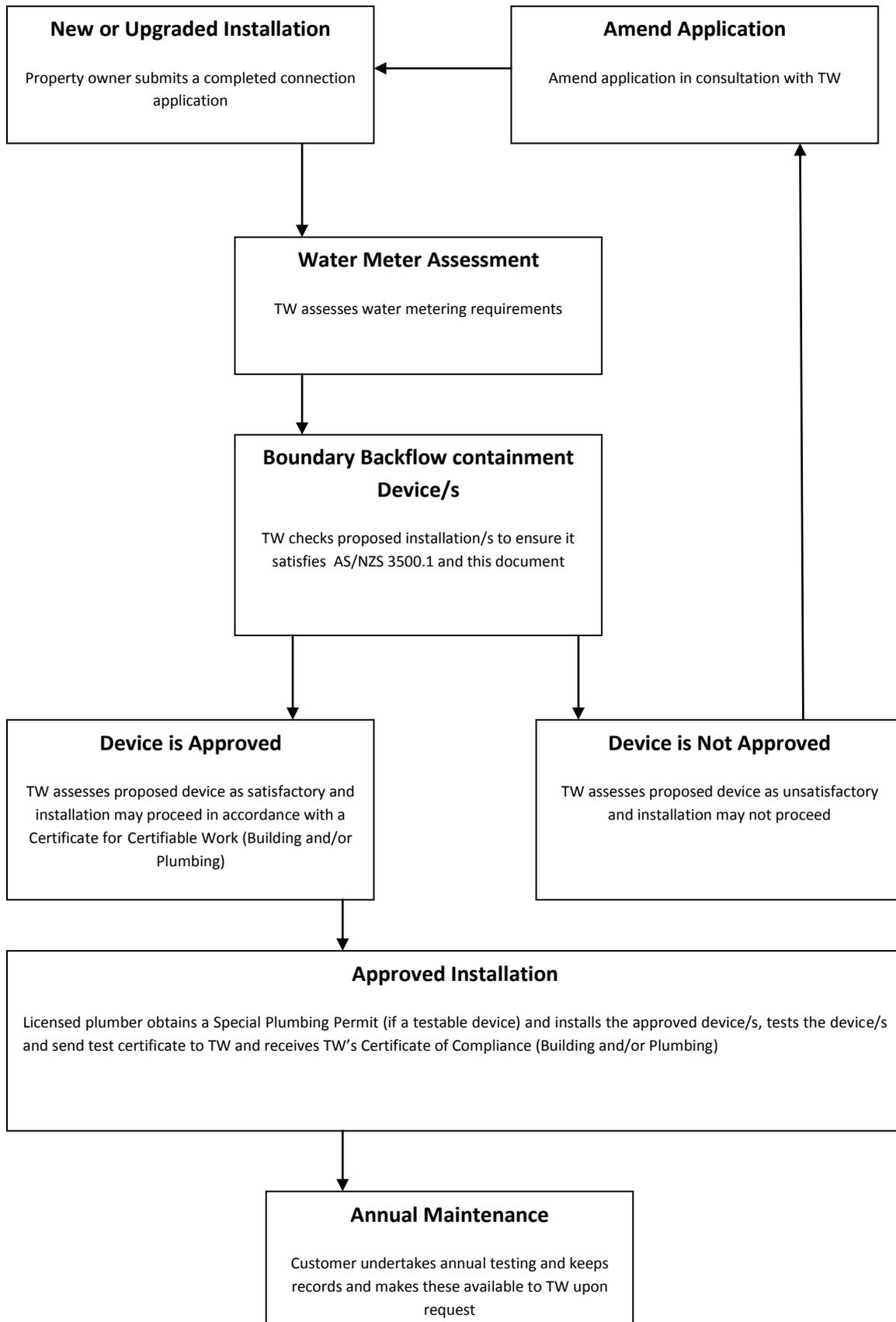
Inspections must be undertaken by a person holding a Tasmania (Plumbing Practitioner (Certifier) Water Plumbing – Endorsed 'Backflow Prevention' Licence and in the case of the commissioning of a new installation they must supply TW with a copy of the test results within 1 month of installation and thereafter when requested by TW forward a copy of the annual test certificate.

Testing of testable boundary backflow containment devices shall be undertaken in accordance with requirements of AS2845.3:2010 Water supply - Backflow prevention devices - Field testing and maintenance of testable devices and this document.

All test kits used by licensed plumbers for testing must be calibrated annually in accordance with AS2845.3:2010 Water supply - Backflow prevention devices - Field testing and maintenance of testable devices .

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8. INSTALLATION FLOW CHART FOR BOUNDARY BACKFLOW CONTAINMENT DEVICES



9. BOUNDARY BACKFLOW CONTAINMENT SITE HAZARD RATINGS

Type of Premises	Hazard Rating	Backflow Prevention Device
Agricultural, Horticultural & Irrigation Systems (Type C & D – refer Section 7 of AS/NZS 3500:1)	High	RBT or RPZD
Premises with an alternative water supply excluding rainwater tanks	High	RBT or RPZD
Premises where inspection is restricted	High	RBT or RPZD
Hospitals, medical clinics mortuaries, clinics and the like	High	RBT or RPZD
Piers, docks and other commercial waterfront facilities	High	RBT or RPZD
Sewage treatment plants and sewage pump stations	High	RBT or RPZD
Private residential sewage pump stations not owned, operated and maintained by TW discharging into TW infrastructure	High	RBT or RPZD
Chemical plants	High	RBT or RPZD
Metal finishing plants	High	RBT or RPZD
Petroleum processing, storage plants and service stations	High	RBT or RPZD
Radioactive material processing plants or nuclear reactors	High	RBT or RPZD
Car and plant washing facilities	High	RBT or RPZD
Abattoirs	High	RBT or RPZD
Factories using processing or manufacturing toxic chemicals	High	RBT or RPZD
Chemical laboratories	High	RBT or RPZD
Pathology laboratories	High	RBT or RPZD
Sanitary depots	High	RBT or RPZD
Universities	High	RBT or RPZD
Motor Home Dump Points	High	RBT or RPZD
Food and beverage processing plants	Medium	Testable Device
Caravan parks	Medium	Testable Device
Marinas	Medium	Testable Device
Premises with grey water re-use systems	Medium	Testable Device
Public swimming pools	Medium	Testable Device
Premises with reticulated and disinfected reclaimed water systems	Medium	Testable Device
Dental Surgery	Low	Non-Testable Device
Private sewage treatment plants (AWTS)	Low	Non-Testable Device
Residential sewage pump stations owned, operated and maintained by TW	Low	Non-Testable Device
Premises with rainwater tanks (refer Table 14.1 of AS3500.1)	Low	Non-Testable Device
Fire Service with a boundary backflow containment hazard rating of HIGH or MEDIUM – refer Note 7	Medium	Testable Double detector check assembly (DDCA) with 50kPa spring and testable water metered low flow bypass
Fire Service with a boundary backflow containment hazard rating of LOW - refer Note 7	Low	Testable Single detector check assembly (SDCA)with 50kPa spring and water metered low flow bypass

1. This table is based upon Table F3 of AS/NZS 3500.1:2003
2. RBT = Registered Break Tank & RPZD = Reduced Pressure Zone Device
3. Where a land use activity or similar activity cannot be identified consult with TW noting that a non-testable dual check valve is required as a minimum at all boundary connections
4. For properties with an alternative water supply refer to Clause 4.2.5 of AS/NZS3500.1:2003
5. Bypasses shall have boundary backflow containment devices with the same boundary backflow containment hazard ratings as the main line.
6. Air gaps should not be used in toxic environments
7. Where tanks, reservoirs, connections to other water supplies, antifreeze or other additives or auxiliary supply such as a pond or lake are within 180m of a fire brigade booster connection then a testable double detector check assembly with 50kPa spring and testable water metered low flow bypass is required.

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10. BOUNDARY BACKFLOW CONTAINMENT CERTIFICATES

10.1 Notice Of Boundary Backflow Containment Device Installation

OCCUPIER OR PROPERTY OWNER DETAILS:

Name of Property Owner (Block Letters)	
Company Name	
Company Address	
Business Phone No:	Mobile Phone No:

LOCATION OF DEVICE:

Street Name & Number	Lot Number
Suburb	Town or City
Water Meter & MIU Serial Numbers	Water Meter Size

HAZARD DETAILS:

Hazards Identified and Details of Hazards	Boundary Hazard Rating
Site Hazard 1	High / Medium / Low
Site Hazard 2	High / Medium / Low
Site Hazard 3	High / Medium / Low

BACKFLOW DEVICE DETAILS:

Boundary Protection	Domestic Supply	Fire Service
Type of Device Installed	Manufacturer	
Model Number	Size	Strainer Installed Yes / No
Serial Number	Date Installed	

INSTALLER DETAILS:

Name (Block Letters)
Business Name
Plumbing Registration (Certifier) Number

INSTALLERS CERTIFICATION:

I certify that I have installed this boundary backflow prevention device at the property specified on this "Notice Of Boundary Backflow Containment Device Installation" the device is correct for the hazard identified.	
Signature of Installer	Date

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10.2 Boundary Backflow Containment Device Test Certification Report

OCCUPIER OR PROPERTY OWNER DETAILS

Name of Property Owner (Block Letters)	
Company Address	
Water meter Number	Water meter Size

LOCATION & DETAILS OF DEVICE

Street Name & Number	Lot Number		
Suburb	Town or City		
Device Manufacturer	Last Test Date		
Model Number	Size		
Serial Number	Strainer Installed	Yes	No

SERVICE DETAILS & TEST RESULTS

Boundary backflow containment Protection	Fire Service	Strainer installed and cleaned before performing test			
Reduced Pressure Zone Device RPZD / Double Check					
Valve	Upstream Check Valve	Downstream Check Valve	Downstream Isolation Valve	Relief Valve	
Initial Test Results	Closed Tight _____ kPa Leaked	Closed Tight _____ kPa Leaked	Closed Tight _____ kPa Leaked	Opened At _____ kPa	
Test Results After Repair	Closed Tight _____ kPa	Closed Tight _____ kPa	Closed Tight _____ kPa	Opened At _____ kPa	
Valve	Single / Double Check Valve SCV / DCV			Pressure Type vacuum Breaker	
	Upstream Check Valve	Downstream Check Valve	Downstream Isolation Valve	Check Valve	Air Inlet
	Initial Test Results	Closed Tight _____ kPa Leaked	Closed Tight _____ kPa Leaked	Closed Tight _____ kPa Leaked	Opened At _____ kPa Not Opened
Test Results After Repair	Closed Tight _____ kPa	Closed Tight _____ kPa	Closed Tight _____ kPa	Closed Tight _____ kPa	Opened At _____ kPa
Repairs Made & Material Used:					

CERTIFIER DETAILS and CERTIFICATION

Name (Block Letters)	Plumbing Register (Certifier) Number		
Business Name			
Test Kit Number	Calibration Certification Date		
Property hazard rating has not changed		Property hazard rating has changed	
I certify that the above details are true and correct at the date tested			
Signature of Certifier			Date

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10.3 Boundary Air Gap & Registered Break Tank Test Certification

OCCUPIER OR PROPERTY OWNER DETAILS:

Name of Property Owner(Block Letters)	
Company Address	
Water meter Number	Water meter Size

LOCATION & DETAILS OF DEVICE:

Street Name & Number	Lot Number
Suburb	Town or City
Device Installed	Last Test Date

WATER SUPPLY LINE INSPECTED:

Line Inspected for Illegal Connections;	Line Found to be Clear	Yes	No
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AIR GAP DETAILS:

Size of Inlet Orifice	Size of Air Gap	
Air Gap Bridged or Bypassed?	Yes	No

ADDITIONAL DETAILS FOR BREAK TANK:

Overflow Details		
Overflow Free of Obstruction?	Yes	No
Float Control Valve Free of Mechanical Damage & Corrosion	Yes	No
Control Valve Operational	Yes	No
Installation Passed Inspection	Yes	No

CERTIFIER DETAILS and CERTIFICATION:

Name (Block Letters)
Business Name
Plumbing Registration (Certifier) Number

I certify that the above details are true and correct at the date tested		
Signature of Certifier		Date

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