Backflow Prevention Management Plan

CASSOWARY COAST REGIONAL COUNCIL

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TITLE	Backflow Prevention Management Plan
ABSTRACT	Supports the Backflow Prevention Policy with additional background and guidelines.
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EXECUTIVE SUMMARY

This Backflow Prevention Management Plan provides additional background and guideline information to assist the public and plumbers understand their obligations to ensure compliance with the adopted Backflow Prevention Policy.

All water supply systems intended for human consumption, food preparation, utensil washing or oral hygiene must be safeguarded from contact with contaminated water.

Backflow prevention aims to reduce the risk of any contamination flowing back through connections to pollute either the water systems within a premises or the water supply systems of the water service provider if the property is connected to the reticulated water supply or a private supply system such as bores or rainwater.

Local Governments are obligated, by Queensland legislation, for establishing and maintaining a program for the registration, maintenance and testing of testable backflow prevention devices installed in their local government area (Plumbing and Drainage Regulations 2019 - section 101) to protect the integrity of water internal to a premises and the regions' water supply.

Local governments have been empowered through Queensland legislation to issue enforcement notices to the owner or occupier of a premise. The enforcement notice may require a person to install, register, inspect, test, repair or replace a backflow prevention device where the local government reasonably believes plumbing on the premises could pollute either the water supply in premises or the water service provider's water service to premises (Plumbing and Drainage Act 2018 - section145).

Council's adoption of the Backflow Prevention Policy ensures that Cassowary Coast Regional Council is complying with its legislative obligations and exercises its duty of care to ensure owners and plumbers are undertaking the prescribed measures to safeguard internal water use from pollution and ensure that premises are not polluting the water supply of the reticulated network.

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1 PURPOSE OF MANAGEMENT PLAN

This document is intended as a guideline to support the intent and application of Council's adopted Backflow Prevention Policy. Details are provided in this document that outline:

- how backflow occurs;
- why the prevention of backflow is important;
- the legislation covering Council's obligations and the responsibilities of property owners/(or their licensee) and the responsibilities of plumbers with backflow accreditation;
- technical information on backflow devices;
- the relationship between the backflow device that should be used and the risk of contamination;
- where to find other information eg Australian Standards.

2 BACKGROUND

2.1 What Is Backflow?

Backflow is defined as the un-intended flow of water from a potentially polluted source into a potable water supply or flow in direction contrary to the normal direction.

2.2 How Does Backflow Occur?

The water supply system is designed to ensure that water flows to the property under pressure. If the supply pressure is less than the pressure at the property, there is a high probability that water could be drawn back into the potable water supply system (backsiphonage). Water pressure can be affected when:

- there is a break in the water main
- water is being pumped from the main water supply during a fire
- a customer is using water at a higher pressure than the pressure supplied
- heavy water use on site reduces water pressure within the water's supply network
- the water outlet on the property is substantially higher than the water main

2.3 Why is Backflow Prevention Important?

All water supply systems intended for human consumption, food preparation, utensil washing or oral hygiene should be safeguarded from contact with contaminated water.

There is a risk to public health if there is a cross connection between the potable water supply and a contaminated source.

2.4 Case Studies of Contaminated Water Supply

Documented cases highlight the potentially serious nature of some backflow contamination issues.

An example of a documented backflow contamination incident in Australia occurred at the Ranger Uranium Mine in 2004. The incident occurred when a hose was connected from the water manifold on the Fine Ore Bin scrubber to a potable water supply and resulted in the potable supply of the mine and local community of Jabiru East being contaminated with process water. At least one shift of workers consumed drinking water or used shower facilities that contained high levels of uranium contamination.

Documented cases are less readily available within Australia, but are well documented in the United States of America where significant investment and resources in establishing standards and training in backflow prevention and cross connection control has occurred.

An examples from drinking water systems in Virginia, USA, highlight the seriousness of cross connections. A pest control company was using a water hose connected to a house to mix a chemical pesticide in a tank truck. At the same time, city workers were draining a distribution line serving the subdivision. The pesticide was drawn into the distribution system by back siphonage. When water service was restored, water contaminated with the pesticide flowed directly into homes.

3 BACKFLOW PREVENTION

3.1 General

The Australian Standard (AS) 3500.1 Plumbing and Drainage Part 1: Water Services prescribes the plumbing requirements to prevent contamination from backflow.

Relevant clauses from AS3500.1 that prescribe the requirement for backflow prevention are outlined below:

- *Clause 4.2.1 Design: . "All water supply systems shall be designed, installed and maintained so as to prevent contaminants from being introduced into the drinking water supply system*".
- Clause 4.2.2 Protection against contaminants: *"No device or system that may cause contamination of a water supply shall be connected directly or indirectly to any part of a water service without appropriate cross-connection or backflow prevention control suitable for the degree of hazard."*

There are different backflow prevention devices which can be installed depending on the hazard(s) within the premises and their hazard rating. Australian Standard AS 3500 defines three degrees of hazard associated with cross-connection and backflow, namely:

- **High Hazard** : “Any condition, device or practice that, in connection with the water supply system, has the potential to cause death.”
- **Medium Hazard**: “Any condition, device or practice that, in connection with the water supply system, has the potential to endanger health.”
- **Low Hazard**: “Any condition, device or practice that, in connection with the water supply system, constitutes a nuisance but does not endanger health or cause injury.”

3.2 Backflow Prevention Requirements

AS 3500.1 Appendix F outlines the hazard rating for individual facilities within a premises and the hazard rating of different uses within a premises or the hazard rating of different types of premises. Based on the type of facility or premises type, the standard prescribes different forms of backflow prevention device.

Backflow prevention devices have one of the following elements to stop water flowing backwards:

- a valve that only lets water go in one direction
- an air gap
- a break tank.

3.3 Examples of Backflow Protection

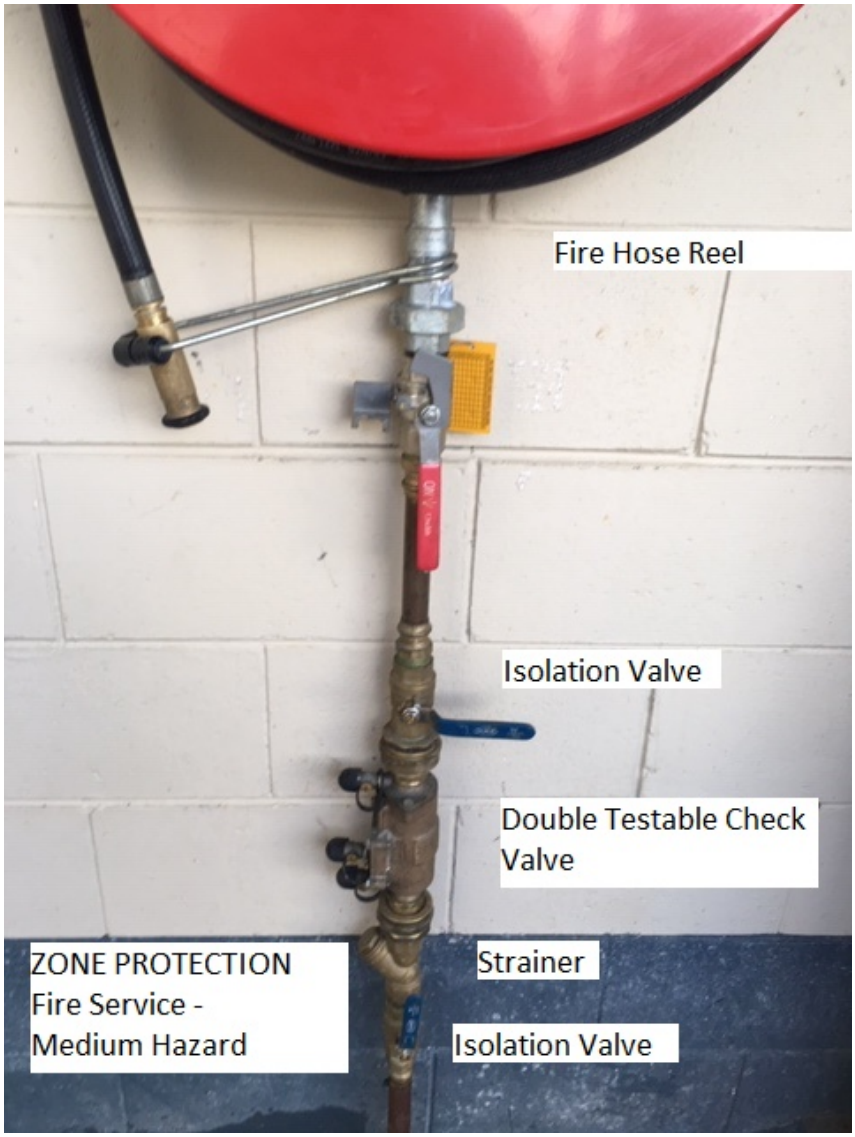
Individual Protection – Hazard Rating and appropriate Backflow Device for Individual Fixtures, Appliances or Apparatus. (From Table F1 AS3500.1)

Form of cross- connection	Hazard rating	Backflow prevention device
In hospitals/medical facilities: Equipment used for handling, mixing, measuring and processing chemical and microbiological substances	High	Registered Air Gap or Reduced Pressure Zone Device
Cafes: Fixtures for food preparation eg sinks	Low	Air Gap
Domestic: External hose taps	Low	Non-testable device

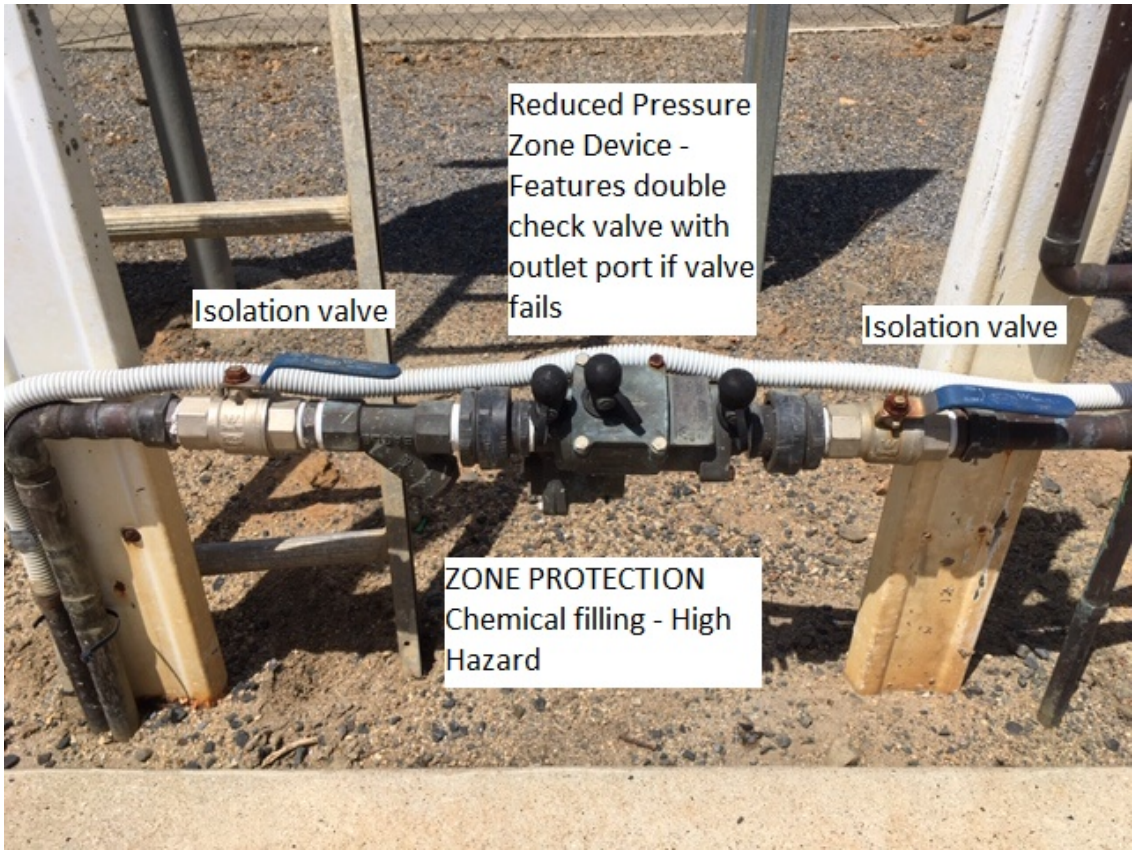
Zone Protection – Hazard Ratings and appropriate backflow devices at connection to specified sections of a water supply system within a building of facility. (Table F2 AS3500.1)

Form of cross- connection	Hazard rating	Backflow prevention device
Agricultural Irrigation systems: **Irrigation system injected with fertilizers, herbicides, nematicides and insecticides**	High	Registered break tank or Reduced Pressure Zone Device
Secondary school laboratories	Medium	Testable device
Fire hose reels (in line with hazard rating of area in reach of hose.)	Medium	Double check valve

Refer AS 3500.1 Appendix F Table F2 for other listed uses and zoning requirements.



Picture 1: Zone Protection- Medium hazard fire hose reel with double check valve.

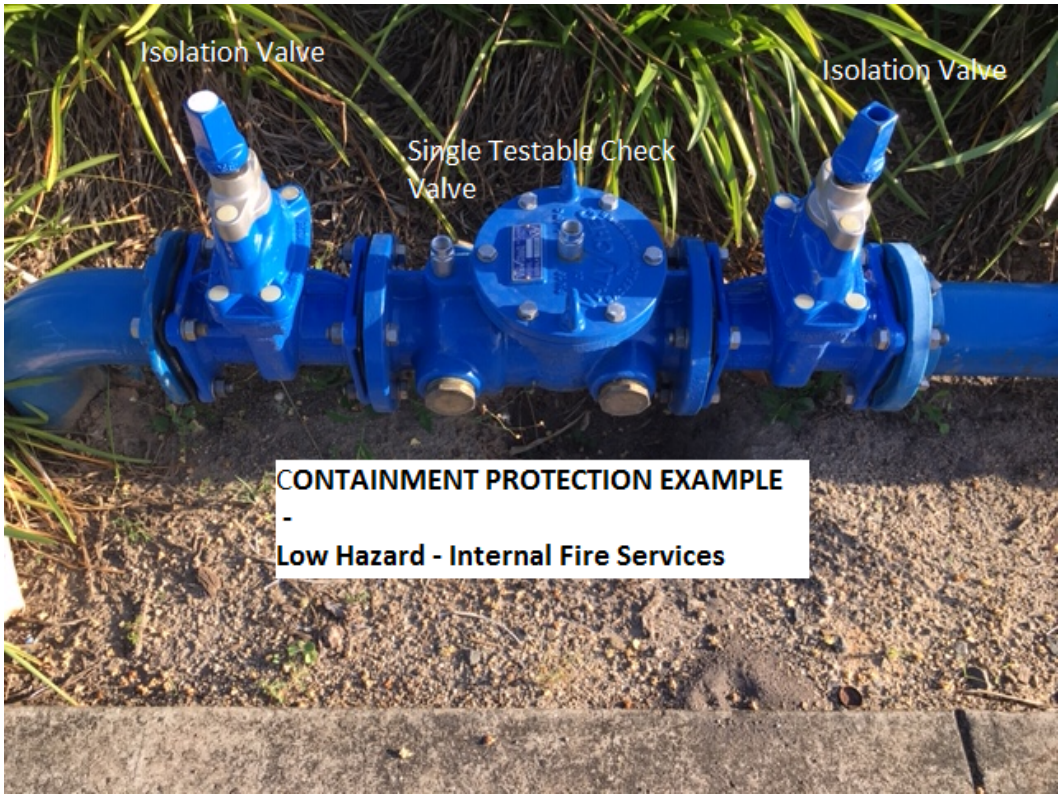


Picture 2 : Zone Protection – Chemical Filling Service Line – High Hazard

Containment Protection – Hazard ratings and appropriate backflow devices provided at the property boundary at connection to supply main. (Table F3 AS3500.1)

Type of Premises	Hazard rating	Backflow prevention device
Hospitals, mortuaries, clinics	High	Registered Break Tank or Reduced Pressure Zone Device
Sewerage Treatment Plants and sewerage pump stations	High	Registered Break Tank or Reduced Pressure Zone Device
Caravan Parks	Medium	Testable device
Public swimming pools	Medium	Testable device
All premises – with fire services	Low/Medium or High (depends on business function)	Varies Eg Council depot supply is Single check valve (testable)- separate protection for hose reels.

Refer AS 3500.1 Appendix F -Table F3 for other listed premises types and hazard rating.



Picture 3 :Low Hazard Containment Protection – Single testable check valve (In this instance internal devices have individual and zone protection.)

The following Table 1 is collated from details provided in Tables F1, F2 and F3 of AS/NZS 3500.1 and provides examples of different business hazard ratings and Council's expectations of backflow prevention device requirements. The list below is not exhaustive.

Within the premises, businesses could have a combination of individual and zonal protection devices but for businesses connected to the Council reticulation network that are medium or high hazard types, a testable containment device will be required at the point of connection to the network. Council should be contacted where customers, building consultants or licensed plumbers are uncertain of the hazard rating of a property or the appropriate boundary containment device. A site assessment may be required to allow the property hazard rating to be correctly determined.

Table 1: Hazard ratings of business types and facilities

Hazard rating	Example
High	Abattoirs and fish processing plants
	Autoclaves, sterilisers, pan washing facilities
	Car and plant washing facilities
	Chemical dispensers or chemical injectors (high toxicity)
	Chemical plants, factories or suppliers
	Commercial laundry and dry cleaning facilities
	Cooling towers (assessment may be required)
	Commercial effluent re-use and water recycling schemes
	Funeral parlours, mortuaries, dissecting rooms and autopsy areas
	High security sites that are not able to be inspected
	Hospitals, community clinics, dialysis centres and the like
	Irrigation systems with chemical injection
	Laboratories including chemical, pathology, industrial and teaching
	Livestock and fish farm water supply with /without chemical addition
	Metal finishing plants
	Pest control facilities
	Petroleum products processing and storage facilities
	Piers, docks and other waterfront facilities
	Photographic and x-ray machines (developer mixing facilities)
	Power generation facilities (assessment may be required)
	Premise with an alternative water supply assessed as non-drinking and a potentially high hazard
	Public effluent discharge points including motor home dump points
	Radioactive material processing plants or similar facilities
	Sewerage pumping and treatment facilities
	Veterinary clinics, taxidermists and equipment facilities
	Water cartage tankers (other than sole purpose drinking water tankers)
Medium	Commercial and public swimming pools, spas and fountains
	Food and beverage processing plant
	Water mains in subdivisions not yet approved for connection
	Caravan parks
Low	Hair salon basins or troughs
	In-line water softeners and water filtration equipment

	Irrigation systems on residential properties
	Irrigation systems for onsite sewerage facility land application areas up to 20ep
	Private bores of known water quality on residential properties
	Rainwater tanks on residential properties
	Photographic processing machines (no developer mixing)

4 LEGISLATION AND STANDARDS

The following are the principal Acts, Regulations and Standards that are relevant to the area of backflow prevention.

4.1 Legislation

Legislation	Application
Plumbing and Drainage Act 2018	s145 PDA. Use of enforcement notice to install a backflow prevention device or register the device or have it inspected, tested and maintained. (1) (d) polluting the water supply in premises or a water service provider's water service
Plumbing and Drainage Regulations 2019	s101-s103 and s113 PDR. Obligations of local government, owner of premises and licensee – Testable backflow devices.
Plumbing and Drainage Regulations 2019	s113 PDR. Registers kept by local governments – Backflow.

The following clauses 101, 102, 103 and 113 are extracts from the Plumbing and Drainage Regulation, 2019.

101 Testable backflow prevention device—obligation of local government

A local government must establish a program for—

(a) registering each testable backflow prevention device installed at premises in its local government area; and

(b) monitoring the maintenance and testing of each device.

102 Testable backflow prevention device—obligations of owner of premises

(1) This section applies if a testable backflow prevention device is installed at premises in a local government area, whether the device is installed for the first time or to replace a device already at the premises.

(2) The owner of the premises must register the testable backflow prevention device, by giving notice, in the approved form, to the local government.

Maximum penalty—20 penalty units.

(3) However, the owner of the premises need not comply with subsection (2) if—

(a) the device has already been registered under subsection (2) after being installed under subsection (1); or

(b) a licensee has installed the device under section 103(1)(a) and given the local government notice of the installation as mentioned in section 103(3); or

(c) a backflow prevention licensee has maintained and tested the device and given the local government notice of the maintenance and testing as mentioned in section 103(3).

(4) The owner of the premises must also arrange for a backflow prevention licensee to maintain and test the device at least once each year after the device is registered.

Maximum penalty—20 penalty units.

103 Testable backflow prevention device—obligation of licensee

(1) This section applies if a licensee carries out the following work (the relevant work)—

(a) installing a testable backflow prevention device at premises, whether for the first time or to replace a device previously installed;

(b) removing a testable backflow prevention device from premises.

(2) This section also applies if the owner of premises where a testable backflow prevention device is installed arranges for a backflow prevention licensee to maintain and test the device (also the relevant work), whether to comply with section 102(4) or an enforcement notice.

(3) The licensee must, within 10 business days after carrying out the relevant work, give notice of the relevant work in the approved form to—

(a) the local government; and

(b) the owner of the premises.

Maximum penalty—20 penalty units.

113 Register of testable backflow prevention devices

(1) A local government must keep a register containing each notice given to the local government under section 102(2) or 103(3).

(2) The local government must keep a notice mentioned in subsection (1) in the register until the premises to which the notice relates are demolished or removed.

4.2 Australian Standards

There are two key Australian Standards which detail the requirements for backflow as noted below:

Standard	Application
AS/NZ 3500 National Plumbing and Drainage Standard	Specifies the requirements and methods for the prevention of potential contamination of drinking water within the water service and the water main and provides for the selection and installation of backflow prevention devices.
AS/2845.3 water supply backflow	Specifies requirements for the design, performance and testing of backflow prevention devices used for the protection of the water supply.

5 ROLES AND RESPONSIBILITIES

5.1 Plumbing Permits and Notifiable Works

The installation of new plumbing (including any backflow devices) for a new building requires a plumbing permit. Plumbing works associated with a permit must be inspected and approved by Local Government Plumbing Inspectors. Other than for new buildings, in many instances plumbing work does not require a permit but any notifiable plumbing work must be registered with the Queensland Building and Construction Commission (QBCC). In relation to backflow, notifiable work includes *"work necessary for installing, replacing or removing a testable backflow prevention or a dual check valve with atmospheric port, if the work is for an existing building…*" The QBCC can audit and enforce "Notifiable Work Compliance" under the Plumbing and Drainage Act 2018. By arrangement with the QBCC, local governments can audit notifiable works and inspect other plumbing works within their particular area.

5.2 Local Government – Backflow Specific Responsibilities

5.2.1 Requirements

As noted in Section 3.1, local governments have been empowered through State Government legislation to enforce the owner of the premises to install, register, inspect, test, repair or replace a backflow prevention device where the local government reasonably believes plumbing on the premises could pollute either the water supply in premises or the water service provider's water service to premises (2018 PDA s.145). Penalties may be applied if owners do not comply with registration or maintenance obligations.

Local Governments are charged with the responsibility, by the Queensland Government, for maintaining a program for the registration, maintenance and testing of all testable backflow prevention devices installed in their local government area (2019 PDR s.113).

5.3 Property Owners – Backflow Specific Responsibilities

5.3.1 Requirements

The property owner is the legal owner of any backflow prevention device installed on the property side of Council's water meter or otherwise within the property. An owner of an installed testable backflow prevention device must:

- Ensure any testable backflow device or registered air gaps or registered break tank are registered with the Local Government. This function could be undertaken by the accredited licenced plumber following the commissioning/testing process.
- Have the device inspected or tested for operational functioning at least once each year by a person who is licensed to carry out the work (2019 PDR s.102).

5.4 Role of Licensed Plumbers

5.4.1 Requirements

Only a licensed plumber with a Backflow Accreditation can install, commission and test a testable backflow prevention device.

When installing a backflow prevention device the accredited plumber must:

- Determine which device should be installed by using the hazard rating of a process (refer to AS/NZS 3500:1) and section 3.3 Examples of Backflow Protection
- If the hazard rating varies due to multiple business processes, the highest hazard rating should be applied.
- Install all backflow prevention device(s) in accordance with the AS/NZS 3500:1, which provides detailed installation guidelines.
- Have all backflow prevention device(s) commissioned and tested by a licensed plumber with backflow prevention accreditation. The accredited licenced plumber who inspects or tests a backflow prevention device must give the local government written results of the inspection or test on the approved form (Form 9) within 10 business days after inspecting or testing the device. (2019 PDR s.103) A copy of the Form 9 is attached in Appendix A.

- Install only backflow prevention device(s) manufactured and quality assured to AS/NZS 2845 on properties within Council's area of operations.

If an accredited plumber replaces or removes a faulty device, it is the responsibility of the licensed plumbing contractor to submit a Form 4 to the QBCC (Notifiable Works) and forward a copy of the completed Form 9 to Council.

An accredited plumber who inspects or tests a testable backflow prevention device must, within 10 business days after inspecting or testing the device, give Council written results of the inspection or test.

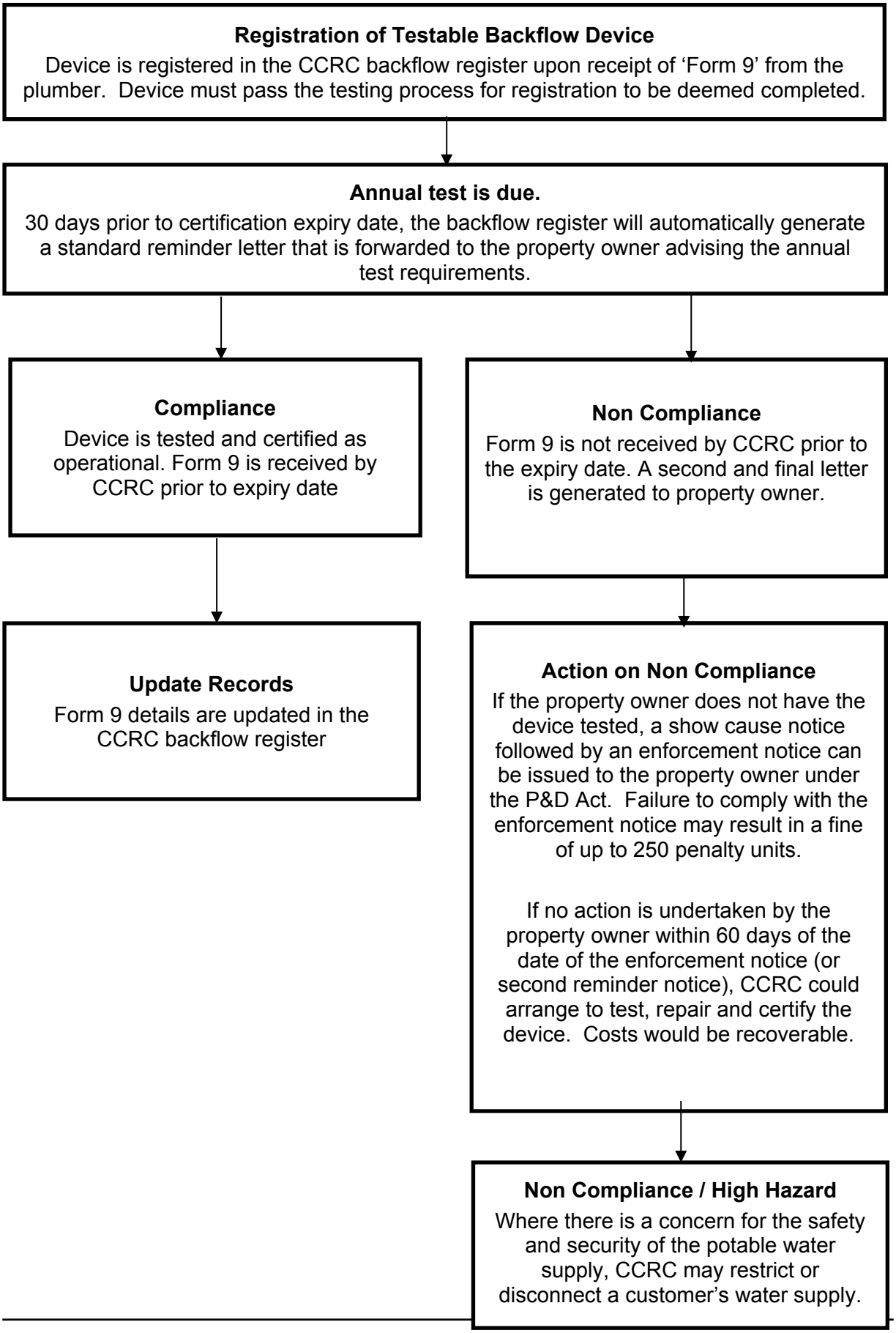
Plumbers undertaking connection to Council's metered service point are obliged to comply with the provisions of AS3500.1 and install at the owners cost the relevant backflow prevention device/s. All backflow installations are on the property owner's side of the meter and are not part of Council's fee for the metered connection.

There are a number of licensed plumbers throughout the region who have a backflow endorsement. It would be up to the property owner to negotiate with the plumber regarding a reasonable charge that reflects the complexity of their connections.

5.5 Administration and Enforcement Agencies

Both the Plumbing and Drainage Act 2018 and the Plumbing and Drainage Regulation 2019 are administered and enforced by the Queensland Government Department of Housing and Public Works. A local government authority may be audited and prosecuted by the administration agency if it fails to comply with it legal obligation under the act.

Figure 1: Workflow of Council Procedure for Registration of Testable Backflow Devices



5.6 Fees and Charges

5.6.1 Annual Fee

Council will introduce an annual fee that will be used to: maintain the register; for any correspondence that is issued in relation to the device; and for a Council Officer to undertake random spot audits. The amount of the annual fee will be prescribed in Council's Fees and Charges Schedule. No annual fee will be charged during the 2 year amnesty period. After the amnesty period, the annual fee to all properties will be imposed concurrently once per year.

For new developments, there will be no pro-rata billing of the annual fee. (The annual fee will only be applied once per year.)

5.6.2 Inspection and Test Fee

Council will introduce an inspection and test fee per testable backflow prevention device. This fee would apply if property owners elected to use Council to undertake the inspection and testing of a device other than in the initial creation of the register. The fee will not cover repairs or maintenance. A notice will be provided to an owner if the device was defective requiring its repair or replacement by a licenced plumber. If after 60 days, the device was not repaired or replaced by the owner, for high risk businesses, Council may undertake the repair works and recover costs.

5.6.3 Application Fee

There will be no application fee for registering new plumbing installations with testable backflow prevention devices.

5.7 Penalties

Failure to comply with any written notice or direction from Council may result in a Show Cause Notice being issued, and then possibly an Enforcement Notice under the Plumbing and Drainage Act. Failure to comply with the enforcement notice may result in a fine of up to 250 penalty units.

5.8 Non-compliance

During the creation of the initial register or afterwards, if any testable backflow installation is found by Council not to comply with the Australian Standard or legislative requirements, Council will issue a notice to repair, maintain, replace or test the device. Council does not have the resources to audit all properties for backflow compliance and ultimately responsibility for ensuring backflow devices meet regulatory requirements is that of the property owner.

If the property owner fails to repair, maintain, replace or test a backflow prevention device as per AS3500 and the Plumbing and Drainage Act, Council may utilise the provisions of the Local Government Act and Regulations to:

- have the defective work repaired;
- apply penalties; or
- restrict or disconnect the water connection.

APPENDIX A – FORM 9

BACKFLOW PREVENTION DEVICE

Inspection and Maintenance TEST Report

Form **9**

Within the local authority area of _____ Council

Local Authority Ref or B/A Number: ☐ INITIAL TEST ☐ STANDARD TEST ☐ RE TEST ☐ AUDIT TEST

DATE OF TEST:

WHITE - Council Copy
BLUE - Owners Copy
PINK - Testers Copy

Owner/Occupier _____
Address _____
Suburb _____ P/Code _____
Contact _____ Phone _____
Assessment No _____ Property No. _____
Installed By _____

Authorised Testers Name _____
Address _____
Suburb _____ P/Code _____
License No _____ Phone _____
Test Kit Serial No _____ Date Last Certified. _____
Place of Certification _____

DEVICE DETAILS AND TEST RESULTS

Make of Device _____ Size(mm) _____ Model No. _____ Serial No. _____
Site Address _____
Exact Device Location _____
Mains Pressure _____ kpa Time of test _____ ☐ Containment Protection ☐ Zone Protection ☐ Individual Protection

☐ REDUCED PRESSURE ZONE DEVICE ☐ SINGLE CHECK ☐ PRESSURE VACUUM BREAKER ☐ DOUBLE CHECK VALVE ☐ DETECTOR (use a second form for bypass)

	UPSTREAM ISOLATION VALVE	CHECK VALVE No.1	CHECK VALVE No.2	RELIEF VALVE DIFFERENTIAL PRESSURE	AIR INLET DIFFERENTIAL PRESSURE	DOWNSTREAM ISOLATION VALVE
INITIAL TEST BEFORE MAINTENANCE	☐ Closed Tight ☐ Leaked ☐ Not Applicable	☐ Closed Tight _____kpa ☐ Leaked	☐ Closed Tight _____kpa ☐ Leaked ☐ Not Applicable	☐ Opened at _____kpa ☐ Not Opened ☐ Not Applicable	☐ Opened at _____kpa ☐ Not Opened ☐ Not Applicable	☐ Closed Tight ☐ Leaked ☐ Not Applicable

Describe maintenance, parts and materials used:-

☐ Not Applicable, passed test first time

LAST TEST IF APPLICABLE	☐ Closed Tight ☐ Leaked ☐ Not Applicable	☐ Closed Tight _____kpa ☐ Leaked	☐ Closed Tight _____kpa ☐ Leaked ☐ Not Applicable	☐ Opened at _____kpa ☐ Not Opened ☐ Not Applicable	☐ Opened at _____kpa ☐ Not Opened ☐ Not Applicable	☐ Closed Tight ☐ Leaked ☐ Not Applicable

Notes:

I have tested the above device, and certified it passes the performance requirements outlined in AS3500.1:20C3 & AS2845.3:2010 Appendix: (to be nominated by the tester) ☐ PASS ☐ FAIL

Authorised Testers Signature _____ **Date** ____ / ____ / ____

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Privacy: The information on this form is collected for purposes related to deciding this application and monitoring compliance under the Plumbing and Drainage Act 2002 (the Act). This information may be stored in the Local Government database and may also be used for statistical research, information provision and evaluation of services. Your personal information may be provided to the financial institution which handles the Local Government's financial transactions and may be disclosed to other Local Government agencies, State government and third parties for purposes related to this application and/or monitoring compliance with the Act. Except in these circumstances, personal information will only be disclosed to third parties with your consent or in accordance with the Queensland Government's Information Privacy Act 2009.
RTI: The information collected on this form will be retained as required by the Public Records Act 2002 and other relevant Acts and regulations, and is subject to the Right to Information regime established by the Right to Information Act 2009.