

Backflow Prevention

For

Drinking Water Suppliers

Code of Practice

Revised November 2006

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FOREWORD

A definition for backflow is the unwanted reversal of flow in a water distribution system due to changes in the hydraulic pressure in a water distribution system or a piping system. The polluting substance, usually a liquid, tends to enter the potable water supply if the net force acting upon the liquid acts in the direction of the water supply. Therefore, two factors are essential for backflow to occur.

First, the normal direction of flow in the distribution system is interrupted. Second, there must be a link or connection, between the potable system and the source of contamination.

Backflow becomes a serious problem when there are cross connections within the water distributions system.

The Ministry of Health's Drinking Water Standards for New Zealand: 2005, sets out the monitoring required demonstrating compliance with the standards. While the document provides good tools for water managers, the detection of contaminants in the water only occurs after something has gone wrong. By this time the contaminated water will have been unwittingly consumed by customers, who may be by this time suffering adverse reactions with their personal health.

Accordingly the necessity for a Code of Practice to look at effective ways of ensuring that contaminants do not get into the water supply was discussed. The adoption of such a Code offers the public greater certainty that the water they are consuming will be uncontaminated. This Code is intended to reduce adverse public consequences caused by individuals consuming contaminated water resulting from backflows from individual premises into common or public water mains. Water suppliers by adoption and compliance with this Code will reduce that risk.

The 1961 Water Supply Protection Regulations will be superseded by a change to the Health Act. Therefore the Backflow Code of Practice is needed to help Water Suppliers meet the Ministry Of Health document PUBLIC HEALTH RISK MANAGEMENT PLAN [PHRMP] GUIDE—DISTRIBUTION SYSTEM BACKFLOW PREVENTION version 1 Ref D2.4 June 2001.

The Backflow Code of Practice is the outcome of discussions, reviews and funding by the Water Supply Managers' Group of the New Zealand Water and Wastes Association, and produced by Rob Lorden Consulting and the Backflow Prevention Special Interest Group of NZWWA.

The code addresses *Boundary Protection Only* with internal protection at the source of possible contamination controlled by the Building Regulations 1992. The Code is a practical document, to be used by Water Engineers, Designers, Water supply staff, Plumbers and Architects.

It covers both public and private water supplies.

It is intended that this Code will be formally adopted by all Water Suppliers as the method of compliance to Ministry of Health PHRMP offering some uniformity throughout New Zealand. Its contents include Water Supplier and Customer Responsibilities, Product and Design Standards, and Testers and Surveyors Qualifications.

Particular attention is paid to Fire Lines with the NZ Fire Insurance Council being consulted as to their requirements.

NZWWA will set up a National Database on their website listing qualified backflow prevention testers and surveyors.

Kevin Healy – Chair
NZWWA Backflow Special Interest Group

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1. STATEMENT OF PURPOSE AND BACKGROUND

Most New Zealanders are supplied with water from a public or private water supplier. The primary responsibility of the water supplier is to protect the health of those who consume its water by providing water that it is safe to drink at all times.

Under some circumstances contaminated water can be drawn back into the water supplier's main and cause the water in it to be contaminated resulting in major public health issues for those that drink or otherwise use the water.

The standard of backflow protection varies throughout the country and there is a need for consistency amongst the water industry. Backflow prevention is currently subject to the Water Supplies Protection Regulations 1961.

The Ministry of Health's Drinking Water Standards for New Zealand: 2005, sets out the monitoring required demonstrating compliance with the standards. While the document provides good tools for the water managers, the detection of contaminants in the water only occurs after something has gone wrong. By this time customers, who may be suffering adverse reactions with their personal health, will have unwittingly consumed the contaminated water.

Accordingly, a code of practice is needed to look at effective ways of ensuring that contaminants do not get into the water supply in the first place. By adoption of such a code the public will have greater certainty that the water they are consuming will be uncontaminated.

This code is intended to reduce adverse public consequences caused by individuals consuming contaminated water resulting from backflows from individual premises into common or public water mains. Water suppliers by adoption and compliance with this code will reduce that risk.

The Ministry of Health produced a document, *Public Health Risk Management Plan (PHRMP) Guide – Distribution System - Backflow Prevention version 1 Ref D2.4 June 2001*. This code reflects the philosophy of that document and refers to sections of it.

This document requires all connections supplied with drinking water to have appropriate backflow protection. This includes residential properties.

It is intended that public and private water suppliers should formally adopt this code of practice.

Comments have been included in the code to assist in understanding some of the reasons behind the statements in the code. They are not considered to be a formal part of the code. A typical comment follows.

Comment

There have been many serious **backflow** incidents recorded in New Zealand although they are not often widely publicised. Many of these incidents, such as beer from a brewery back-siphoning into a public main, fortunately did not result in any known significant public health consequences but had circumstances been different there could have been dire public health consequences for the brewery's neighbours.

More serious incidents sometimes get reported as headline news such as in May 1994 when it was reported that caustic soda from a dairy factory back-siphoned into a common water main resulting in at least six people receiving burns, some of them serious.

The incident was caused by a maintenance worker's mistake. Had a proper **containment device** been installed, the incident would have been contained within the factory.

Preventing incidents like these are the prime reason for producing this code.

2. OBJECTIVE

The objective of this code is to prescribe industry “good practice” for the protection of water supplies from contamination.

It is intended that the code will be able to be used by all those with an interest or duty of care in the prevention of **backflows** into mains water supplies. It is intended that the code will be voluntarily adopted across New Zealand by organisations that supply water to their **customers**, including private **water suppliers**.

The contents of the code shall be generally contributed to and agreed with the water and **backflow** industries. This includes the Ministry of Health whose **PHRMP guidelines** will be used in this process.

Procedures to monitor and update the code shall be covered in the code.

3. PRINCIPLES

The protection of public health through the installation and the monitoring of **containment devices** is a primary responsibility of all **water suppliers** who supply water to **customers**.

The **water supplier** is responsible for ensuring that the actions, deliberate or accidental, of any one **customer** do not have the potential to have an adverse effect on other **customers** through the contamination of water supply mains.

The **water supplier** shall be proactive in determining what **customers** pose significant risks to the integrity of the mains water supply.

The **water supplier** shall ensure those involved in the specifying; installation and monitoring of **backflow** devices are appropriately trained to carry out their work.

The **water supplier** shall have clear policies on **backflow** prevention, which are easily understood by its **customers**.

Backflow prevention within buildings is required by the New Zealand Building Code **clause G12 Water Supplies** (specifically G12.3.5) of the Building Regulations 1992, and is outside the present scope of this code. This code is written so that parts of it can be applied to private **backflow** prevention within buildings. The **backflow** prevention principles of both codes are very similar.

Customer's complaints will be handled promptly, fully and fairly.

The Code is not a Standard. Reference to relevant standards is contained in the document. Some parts of relevant standards are reproduced in the code to assist understanding.

The contents of the code do not take precedence over any legislative requirements.

Current legislation may include but is not limited to:

- Water Supplies Protection Regulations 1961
- Building Act-2004 and amendments and Building Regulations 1992
- Local Government Act 2002 and subsequent amendments
- Health and Safety in Employment Act 1992
- Health Act 1956
- Food Act 1981
- Resource Management Act 1991
- Employment Relations Act 2000
- Consumer Guarantees Act 1993
- Fair Trading Act 1986 (including the Commerce Commission the enforcement agency under the Act)
- Plumbing, Gasfitters and Drainlayers Act 1978

4. IMPLEMENTATION AND ADMINISTRATION

In order to achieve the objectives of the code, it will be necessary for **water suppliers** to formally adopt the code. This would be done through incorporating it in individual Water Supply Bylaws where the supplier is a regional, district or local council. Other suppliers would incorporate the code in their **customer** agreements or contracts.

This code will be maintained by **NZWWA** to ensure that it is readily available to all **water suppliers** and those who supply **backflow** equipment and services to **water suppliers**. It will be reviewed at periodic intervals as deemed appropriate by the Backflow Prevention Special Interest Group of NZWWA.

5. DEFINITIONS

ABT means approved backflow technician (i.e. not a company) having met the requirements contained within this code. A person can be certified as an **ABT** for testing (testing **backflow prevention devices**) and/or surveying (surveying for potential **backflow** risks).

Backflow means a flow that is contrary to the normal intended direction of flow. In this code it refers to flow from the **customers** premises back into the common or public supply.

Backflow prevention device means a device to prevent **backflow**. Usually these include reduced pressure backflow devices, double check valves - testable and nontestable, dual check valves, vacuum breakers and air gap separation.

Back pressure refers to a situation where the pressure in the downstream (**customer's**) plumbing is greater than the pressure in the **water supplier's** mains resulting in a reversal of normal flow direction and thereby possible contamination of the mains water.

Back-Siphonage refers to a situation where the pressure in the **water supplier's** main is less than the pressure in the downstream (**customer's**) plumbing resulting in a reversal of normal flow direction and potential contamination of the mains water by water being sucked back into the **water supplier's** main.

Common or public water supply means any water supply system that serves individual **customers** from a common system. Often such systems will be public water supplies owned and directly or indirectly, operated by public organisations such as city councils. Private organisations also operate similar water supply systems.

Containment device means any **backflow prevention device**, usually located close to the street boundary, intended to protect a **common or public water supply** system from being contaminated by water from an individual connection through **back-siphonage** or/and **back pressure**.

Customer refers to the owner or occupier of the property who is responsible for the purchasing and use of water supplied.

NZBC clause G12 Water Supplies of the New Zealand Building Code which is contained in the First Schedule of the Building Regulation 1992.

NZWWA is the New Zealand Water and Wastes Association

PHRMP guide means the Public Health Risk Management Plan Guide – Distribution System - Backflow Prevention version 1 Ref D2.4 June 2001.

Water supplier means any organisation that supplies water to another organisation or individual **customers**.

Working days refers to the ordinary days of work for the general community and excludes weekends and public holidays.

6 SCOPE

The scope of this Code of Practice is to document the methods to be used by all **water suppliers** to ensure that risk of **customers** receiving contaminated water from any community's water supply from the activities of individual residential, commercial and industrial **customers** is reduced to an acceptable level and compatible with the requirements of the document ***Public Health Risk Management Plan Guide – Distribution System - Backflow Prevention version 1 Ref D2.4 June 2001*** (the **PHRMP guide**).

This code will refer to, but generally not repeat, information contained in the **PHRMP guide**.

Backflow issues arising from **clause G12 Water Supplies** are not covered in detail by this code. NZBC **clause G12** refers to **backflow** prevention within buildings and is the responsibility of the building owner. It is, however, intended that the principles contained within this code could be applied to **backflow** issues under NZBC **clause G12** Water Supplies where appropriate.

Comment

*The primary responsibility of **water suppliers** is to protect their systems from contamination to ensure that water supplied is safe to drink. The **backflow** containment device is intended to protect the **water suppliers** supply main from being contaminated from an individual property. It does not protect people working or living within that property from being affected by the contamination, which is the responsibility of the property owner under **the Building Act-2004 and subsequent amendments**.*

7 WATER SUPPLIER RESPONSIBILITIES

7.1 Determination of risk

The **water supplier** shall have a risk management programme including a backflow prevention programme, in accordance with the principles contained in the **PHRMP guide** and NZBC clause G12 Water Supplies, to identify potential risks and to ensure that the correct **backflow prevention devices** are installed at all properties/premises.

Comment

The NZBC clause G12 Water Supplies has the following definitions. A list of examples is also included. The definitions are similar to those contained in AS/NZS 3500 1.2.

3.3.1 High hazard

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

High Hazard may include but not necessarily be limited to:

- a) Autoclaves and sterilizers*
- b) Systems containing chemicals such as anti-freeze, anti-corrosion, biocides or fungicides*
- c) Beauty salon and hairdresser's sinks*
- d) Boiler, chiller and cooling tower make-up water*
- e) Car and factory washing facilities*
- f) Chemical dispensers*
- g) Chemical injectors*
- h) Chlorinators*
- i) Dental equipment*
- j) Direct heat exchangers*
- k) Fire sprinkler systems and fire hydrant systems that use toxic or hazardous water*
- l) Hose taps associated with High hazard situations like mixing of pesticides*
- m) Irrigation systems with chemicals*
- n) Laboratories*
- o) Mortuaries*
- p) Pest control equipment*
- r) Piers and docks*
- s) Sewage pumps and sump ejectors*
- t) Sluice sinks and bed pan washers*
- u) Livestock water supply with added chemicals*
- v) Veterinary equipment*

Note: the examples given are not an exhaustive list. Where there is doubt comparison must be made to the hazard definitions.

3.3.2 Medium hazard

Any condition, device or practice which, in connection with the potable water supply system, has the potential to injure or endanger health.

Medium hazard may include but not necessarily be limited to:

- a) Appliances, vehicles or equipment*
- b) Auxiliary water supplies such as pumped and nonpumped fire sprinkler secondary water*
- c) Deionised water, reverse osmosis units and equipment cooling without chemicals*
- d) Fire sprinkler systems and building hydrant systems*
- e) Hose taps and fire hose reels associated with Medium hazard*
- f) Irrigation systems with underground controllers*
- g) Irrigation without chemicals*
- h) Livestock water supply without added chemicals*
- i) Untreated water storage tanks*
- j) Water and steam cleaning*
- k) Water for equipment cooling*
- l) Drink dispensers with carbonates*
- m) Swimming pools, spas and fountains*

Note: The examples given are not an exhaustive list. Where there is doubt comparison must be made to the hazard definitions.

3.3.3 Low hazard

Any condition, device or practice which, in connection with the potable water supply system, would constitute a nuisance, by colour, odour or taste, but not injure or endanger health.

Low hazard may include but not necessarily be limited to:

- a) Drink dispensers (except carbonators)*

Note: The example given is not an exhaustive list. Where there is doubt comparison must be made to the hazard definitions.

There is no very low hazard category.

*The high, medium and low hazard definition is considered to be equivalent to the high, medium and low risk categories of the PHRMP which are not otherwise defined. The definitions should be used to assist in determining the appropriate level of risk where the event is not specifically contained in the Risk Assessment Table of the **PHRMP**.*

When assessing the risk of backflow to the drinking water the water supplier should consider all elements of their supply and distribution systems. Including areas of low pressure and/or higher breakage rates, upstream rural connections, industrial customers and sewage pumping stations.

This programme should amongst other matters:

- Identify potential risks to the water supply
- Eliminate the potential risk where possible
- Result in the installation of **containment devices** where there are potential risks
- Ensure an accurate database is kept of all **containment devices** irrespective of whether or not they are owned by the **water supplier**
- Have a system in place to ensure that all **containment devices** are tested in accordance with the **water supplier's** requirements and the New Zealand Building Code

This programme shall be proactive in seeking out new premises or changes of use within existing premises where **backflow prevention devices** do not exist or the standard of existing **backflow** protection needs to be changed.

The person surveying properties for potential backflow problems shall be an ABT-Surveying.

Where there is an unprotected hazard, the surveyor shall advise the owner and water supplier immediately. The water supplier shall inform the Territorial Authority (usually a council).

Where an industrial or commercial property is inspected and found to require a **containment device**, the **water supplier** shall give the property owner an appropriate amount of time to install the required device depending on prevailing circumstances and the immediate risk posed. This period of time should not exceed three months.

The **water supplier** should endeavour to enter into agreements with those organisations that are responsible for the approval of construction of new buildings, usually councils and building certifiers, or be aware of the change of use within existing premises, to minimise the risk of new or changed activities placing additional contamination risks on the water supply network.

Comment

Water suppliers are often local councils. There is considerable benefit to be gained by having service level agreements or similar arrangements with other parts of council that are aware of new industry establishing, or changes in existing use. This could include dangerous goods, liquid and hazardous wastes, trade wastes, building consent sections and others.

*Similarly the above sections could benefit from information shared by the **water supplier**.*

***Water suppliers** need to know for a number of reasons when a change of use is proposed within an existing building. This includes changes to the flow patterns which may require a meter replacement, changing the standard of **backflow** prevention as a result of the new activity, generating wastes that may require trade wastes consents etc.*

*The **water supplier** also needs to carry out regular surveys of individual premises to determine where changes in the **backflow** protection standards are required. This can be done in conjunction with a number of other inspection activities such as for trade wastes, liquid and hazardous wastes, dangerous goods, etc.*

*All building consents processed by councils are examined in respect to their **backflow** need to comply with NZBC clause G12 Water Supplies.*

Once all existing properties have been surveyed random surveying programmes to determine the extent of change of use should be carried out at a frequency **not greater than** five yearly. This does not apply to very low risk properties such as residential dwellings, where it is unlikely that the risk classification has changed.

Public education should be part of the risk management programme.

All properties, including residential properties, are required to have **containment devices**. The **PHRMP guide** gives minimum levels of protection for high, medium, low and very low risks. These are modified from information contained within table 3 of AS/NZS 3500.1.2 (1999).

The event creating the greatest risk shall be the one determining the device to be installed.

7.2 Installation of containment devices

The **water supplier** shall be responsible for approving the selection, design, and installation of the **containment device**. The **water supplier** may choose to own the device.

Comment

There are mixed views on who should own and be responsible for containment devices.

*Territorial Authorities are encouraged to identify the “**point of supply**” in their water bylaws.*

***Containment devices** are installed primarily to protect **water supplier’s customers** from a **backflow** contamination incident. Irrespective of any ownership arrangements, the **water supplier** has a primary responsibility **if they are connected to the water supplier’s network** under existing legislation to ensure that **backflow** hazards are identified and appropriate **containment devices** are installed and tested.*

*The **water supplier** should recognise that owners and their advisors can be significantly less qualified in **backflow** prevention than their own staff and also may have a lesser appreciation of the consequences of failing to adequately prevent a **backflow** from occurring.*

*This code stops short of requiring that **containment devices** are owned and maintained by the **water supplier**. This matter should be reconsidered in subsequent reviews of the code and following the amendment to the Health Act when it is enacted.*

The Health (Drinking Water) Amendment Bill enables water suppliers to install backflow prevention systems on the side of the point of supply for which the supplier is responsible for maintaining, in certain circumstances. The owner of the land in respect of which the backflow prevention systems operates may be required to reimburse the supplier for the cost of installation, testing and maintenance of the system.

*Where the installation of the **containment device** is a private installation, the **customer** is required to obtain approval from the Territorial Authority prior to the installation being carried out.*

*Note the requirements of section 8.4 and 8.7 in respect to customer ownership of **containment devices**.*

The **water supplier** shall consult with the **customer** before deciding or approving the location of the **containment device**. Where possible the device should be just

inside the **customer's** property boundary and just downstream of the water meter (where installed). The installation geometry shall comply with the appropriate standards and requirements and manufacturer's recommendations.

Comment

The Plumbers, Gasfitters and Drainlayers Act requires that any sanitary plumbing work that involves fixing or unfixing water supply pipes, carried out within private property is carried out by, or under the supervision of a licensed plumber.

*The **customer** would normally pay for the cost of an installation. **Water suppliers** should have an annually published list of standard fees for smaller sized installations where they own the device.*

7.3 Asset management and record keeping

The **water supplier** shall maintain a register of all **containment devices** including air gaps. Where the devices are required to be tested, this information shall be included in the register together with test records. This includes devices installed under NZBC clause G12 Water Supplies.

This register can be used for both **containment devices** and **backflow prevention devices** as required under the Building Regulations 1992.

The **containment devices** owned by the **water supplier** shall be included on a **water supplier's** asset register and given a unique identification number. It shall also be subject to an asset management/maintenance/ replacement/testing programme. Devices should have their identification number permanently attached to, or stamped on them. This does not apply to the valves/stopcocks either side of the device which are expected to be separately accounted for in the **water supplier's** asset register.

Non-testable devices serving single residential dwellings shall be replaced at appropriate intervals as determined by the asset management programme or, where appropriate, when the water meter is replaced.

The **water supplier** shall have a clear policy on upgrading non complying devices to meet the requirements of the **PHRMP guide**. (See Section 19 Transition plan)

7.4 Testing of backflow prevention devices

The **water supplier** shall have a testing programme to ensure that all **containment devices** irrespective of ownership are tested at least annually or a lesser frequency as otherwise specified by the **water supplier**. This shall not apply to very low risk devices which shall be subject to a random sampling program.

The **water supplier** shall formally remind owners of private **containment devices** of their responsibility to have an **ABT** test their devices and their obligation to supply the **water supplier** with test results by the appropriate date. This should be done by letter or similar means.

Where the test results are not received by the due date, the **water supplier** shall contact the owner responsible and arrange for the test to be carried out within ten **working days** where practicable.

The **water supplier** shall have robust systems in place to highlight and act upon tests results not received by the due date.

The **water supplier** shall ensure that all **containment devices** requiring testing are tested within the required time frames by **ABTs- Testing** using certified equipment with the test results held for at least two years.

Securely fastened test tags shall be attached to the device after testing showing as a minimum

- the serial number of the device
- the due date of the next test
- the **ABT** number, name of the tester and a contact phone number
- any water supplier backflow registration number where appropriate.

Where a device fails to test, the **ABT** shall attempt to repair the device while on site and retest.

Comment

It is important that only devices that can be readily serviced in line shall be installed.

Where it is not possible to repair the device on site the device shall be repaired as soon as is practically possible, with an equivalent substitute device installed (and tested) until repairs are completed.

Where it becomes apparent that repairs are not able to be completed on site and the site will be unprotected because a substitute device cannot be found, the **water supplier** shall be advised immediately.

7.5 Backflow policy and procedures

The **water supplier** shall have a clear and easily obtainable policy covering **backflow** prevention. **Customers** shall be clear as to their responsibilities under the policy.

The policy shall clearly and simply address the issues of ownership and responsibilities for approval, installation, ongoing maintenance, annual testing and other matters associated with **containment devices**.

7.6 Contingency plans

The **water supplier** shall have an incident response plan to deal with any contamination incident. It shall be formally reviewed on an annual basis. The plan could be part of an overall emergency response plan.

The plan shall be based on the **PHRMP guide** section - Contingency Plans.

Mechanisms shall be incorporated into the plan to update contact details on a regular basis.

The **water supplier** should have emergency exercises from time to time to familiarise staff with the plans and their content.

7.7 Staff training

The **water supplier** shall ensure that all persons approving **containment devices** are **ABT – Survey** qualified.

Comment

*This person does not necessarily have to be a member of the **water supplier's** staff. They could be from another **water supplier's** organisation or a contractor to the **water supplier**. It is essential that they are appropriately qualified.*

The **water supplier** should ensure that at least one staff member is a qualified **ABT - Testing**.

Staff members who are **ABT-Testing** shall test at least five devices of each testable category on an annual basis. This may be done by arrangement with other **ABTs** engaged in the testing of **backflow prevention devices**.

7.8 Taking water from public or common mains

Any operators or contractors taking water from common or public mains shall first obtain the permission of the **water supplier**. Before granting permission to take water, the **water supplier** shall examine the potential **backflow** risks posed by the proposed drawing of water.

The **water supplier** may place conditions on the taking of water from its mains such as by requiring the contractor to use a hydrant standpipe with a double check valve. Where the **water supplier** requires a testable device, the **ABT's** test certificate shall be kept with the device or in the vehicle used to carry the device at all times.

Where mobile plant and/or tankers are involved they should be subject to the requirements of Section-14.

This clause does not apply to the New Zealand Fire Service going about their normal business of fire fighting and hydrant testing.

7.9 Auditing of ABT reports

The **water supplier** shall ensure that the quality and content of **ABT** reports are in accordance with this code. This applies to both "in-house" reports as well as those provided by external **ABTs**.

Ten percent of reports received from **ABTs** shall be checked to ensure that quality is maintained. This shall involve field audits.

7.10 Disconnection initiated by water supplier

Where, in the opinion of the **water supplier**, a potentially serious hazard to the water supply is not removed within a reasonable period of time or an appropriate **containment device** installed, the **water supplier** shall disconnect the water supply to the **customer** in order to manage the potential public health risk posed by the hazard.

The **water supplier** shall make every effort to assist the **customer** to understand and meet the requirements of the **water supplier** in respect to this code.

The supply shall not be reconnected until the **water supplier** is satisfied that the hazard has been eliminated or that an appropriate **containment device** has been installed and satisfactorily tested.

8 CUSTOMER RESPONSIBILITIES

8.1 Accessibility

Customers shall ensure that the boundary protection device is accessible at all times for maintenance purposes. The **water supplier** and/or any **ABT** employed to test the device, reserves the right to charge **customers** for time spent making a device accessible.

The **customer** shall not interfere with the device in any way. This particularly includes raising the ground levels around the device that would compromise minimum air gaps or the ability for the device to be tested.

There shall be no bypassing of the **containment device** other than with another similar device in parallel to ensure continuity of supply.

8.2 Reporting

The **customer** shall report leaks or any other problems in the **water supplier's** system including the device as soon as is practical.

8.3 Change of use

The **customer** shall report any significant change or proposed change in the use to which the water is to be put.

The **customer** shall also report any significant change or proposed change that will substantially change the volume or flow pattern of water consumed.

The **customer** or the **water supplier** shall change the boundary protection device before the new activity commences or where appropriate, within a timeframe stipulated by the **water supplier**.

The customer must not alter or change the device without the permission of the water supplier.

Comment

***Containment** devices may need to be resized and/or changed to a different type as a result of changes.*

*Similar responsibilities also apply to **customers** in respect to their water meter.*

Some Water Suppliers require customers to identify how the water is to be used if the use is greater than normal domestic consumption. Change of use is notifiable under the Building Act.

*Under Section 46 of the Building Act 2004, property owners are required to notify the **water supplier** in writing of any change in use of the water supplied.*

8.4 Building Act responsibilities

The **customer** shall ensure that the requirements of the Building Act are complied with. This includes;

- Obtaining a building consent for plumbing work that includes the installation or removal of a backflow prevention device,
 - Maintaining backflow prevention devices in accordance with the compliance schedule,
- and
- Ensuring the building is safe and sanitary.

8.5 Internal plumbing alterations

The **customer** shall not alter the plumbing arrangements within the premises without first obtaining the necessary building consents. Any alterations shall comply with the requirements of the NZBC including **clause G12 Water Supplies**.

8.6 Payments

The **customer** shall be responsible for payment of all annual fees, installations, disconnections, testing, consent and permit costs as decided by the **water supplier**.

8.7 Customer ownership of containment devices

Where a **customer** owns and is responsible for the **containment device**, the **customer** shall be responsible for ensuring that it remains fully operational at all times and is tested annually or, where appropriate, more frequently in accordance with the requirements of the compliance schedule.

All containment devices should be managed by the Territorial Authority. Installation will be the responsibility of the property owner but the device should be managed and maintained by the TA. All testing is to be the responsibility of the TA who should recover any testing and maintenance costs from the owner.

Comment

This requirement is additional to section 7.4 and is designed to cover the situation where, for various reasons, the owner does not receive formal notification that it is time to retest the backflow device.

*Not receiving a notice from the **water supplier** is not an acceptable reason for not testing the device.*

The results of all tests shall be sent to the **water supplier** within five **working days** of the test.

8.8 Customer initiated disconnections

Where a property owner considers that a **containment device** is no longer necessary, they may make a request to the **water supplier** that the device be removed and another device installed in its place, in accordance with this code. Where the request is granted, the removal and replacement procedures shall be approved by the **water supplier**. Any costs shall be borne by the property owner.

Full and appropriate records of the change shall be supplied to the **water supplier**.

9 STANDARDS AND PROCEDURES

9.1 Backflow devices manufacturing standards

All **backflow prevention devices** shall be manufactured in accordance with AS 2845.1 1998, (as required by the Building Code).

Unless specifically approved by the **water supplier** all devices installed shall be able to be readily serviced in line.

Where a double check valve device is installed in a pit, it must be of a design that can be serviced by top entry.

If requested, the **water supplier** shall be supplied with appropriate documentation to certify that **backflow** devices are manufactured and tested in accordance with the standards contained in or referred to in either AS 2845.3 (1993) or Chapter 5 of the United States Environmental Protection Agency Cross-Connection Control Manual 2003.

The containment device supplier shall keep manufacturer's data for all models supplied, including servicing/maintenance data and compliance certification for ten years from the time of supply.

All detector check assemblies must be supplied with a manufacturer "product statement" confirming that the main line first check spring has been installed to the manufacturer's standard.

9.2 Installation requirements

The installation details shall be approved by the **water supplier** after consultation with the **customer**. The **water supplier** in giving approval shall consider:

- The level of risk
- The metering arrangement (if any)
- The size of the connection to meet anticipated flow rates
- Head losses through the device
- Manufacturer's recommendations
- The use of strainers
- Protection against frost
- The nature of the hazard and the likelihood of future changes of use
- The need for continuous supply to the premises
- Access for checking the device – Health and Safety considerations
- Drainage requirements including size of drains
- Protection from traffic, underlying hazards, vandalism, etc
- Where private responsibility begins

The device shall be sited immediately upstream of the "point of supply".

Comment

Where continuous supply is needed, two devices in parallel should be required to enable testing to be carried out without interruption of flow.

On completion of the work, the **water supplier** shall be provided with signed as-built drawings clearly detailing the installation and the details of the protection device. The as-built records should also record the risks identified.

Where the **water supplier** is not the owner of the device, the details of the owner and, where appropriate, their agent(s) shall be included with the as-built information supplied. This could include details of the maintenance and testing schedules and an indication that the owner is aware of their responsibilities under this code. This shall include the first test results.

Where high hazard **backflow prevention devices** are required to be installed outside they shall be installed above ground (minimum 300mm) and be protected from vehicular traffic, inclement weather and vandalism. They shall be installed in a securely fenced or caged area with a lockable access gate.

All testable devices shall be fitted with a downstream, resilient seated valve.

9.3 Health and Safety

The installation shall be sited so that it can be easily tested and maintained without compromising the health or safety of the individuals involved. Installations shall be able to be accessed without the need to climb ladders or scaffolding.

9.4 Design standards

The **water supplier** shall be responsible for approving the location, geometry and size of all boundary containment installations.

Backflow prevention devices shall be sited in a position where;

- they can be safely and easily checked and tested by **ABTs**
- where the **backflow installation** is unlikely to be obstructed or subject to heavy vehicular traffic or other loads
- where they can be isolated

Backflow prevention devices shall be installed with isolating valves and a strainer upstream, and isolating valves downstream of the device with the exception of:

- Fire lines
- Very low risk situations

Isolating valves shall be ball valves or resilient seated gate valves for all installations.

10 CONTAINMENT DEVICE TESTING

Containment devices, unless specifically described as non-testable by this code and references contained within it, shall be tested annually by an **ABT** or more frequently under special circumstances as determined by the **water supplier**.

Testing shall be carried out as per AS 2845.3 (1993) or by methods specified by the United States Environmental Protection Agency.

Testing shall be carried out by an individual who is an **ABT**. The **ABT** MUST have no financial interest in the business being carried out at the site other than as a backflow device tester.

Testing shall also be carried out after installation and/or commissioning of the **backflow prevention device** and after each time maintenance has been carried out on the assembly.

In the event of a suspected **backflow** incident, the **water supplier** can request that a test be carried out.

The **ABT** shall provide the **water supplier** with a test certificate containing as a minimum, all the criteria contained on the sample test certificate – Attachment 1 of this code. The owner of the device shall also be supplied with a copy of the certificate.

ABTs, water suppliers and owners shall keep test records for a minimum of two years.

Test procedures shall be the correct type for the device being tested as required by AS/NZS 2845 or equivalent. The test kit shall have a maximum working pressure of 1200 kPa and have colour hoses to minimise mistakes during use.

The test kit used shall be certified/recertified every twelve months by a Telarc registered laboratory.

A copy of the test kit certification shall be kept with the kit.

The certification procedures shall be based on those contained in Appendix 1 of AS/NZS 2845. (1993).

Comment

Testing only covers the performance of the containment device. It does not address whether the device is the appropriate device for the current risk. This is the responsibility of an ABT-Surveyor.

*Water suppliers may elect to carry out testing and surveying at the same time. This could be done by using a person with **both** ABT qualifications.*

Persons involved in backflow testing shall be fully aware of their responsibilities and actions required of them under the Health and Safety in Employment Act should they find that there are hazards to people using water on the site.

11 APPROVED BACKFLOW TECHNICIAN (ABT)

11.1 ABT qualifications

To become an approved **ABT**, it is required that all **ABTs** shall have a thorough knowledge of **backflow** prevention and cross connection control. This shall include knowledge of all relevant Acts and Regulations. They shall also be capable of recognising potential hazards while testing **backflow** devices.

In addition they shall have attended and passed an approved **Backflow course** of not less than 40 hours based on the course requirements contained in Attachment 2.

ABTs are also required to attend and pass refresher courses at least every three years following the initial forty hour course, in order to maintain their **ABT** status.

ABTs shall have public liability and professional liability insurance, both to the minimum value of \$1m covering the areas in which they are working.

Comment

*It is import to attend refresher courses as there is constant change within the industry and it is imperative that **ABTs** keep up with those trends.*

11.2 ABT database

NZWWA will create and maintain a database of all approved **ABTs** it is advised of.

12 BACKFLOW PROTECTION ON FIRE LINES

This section is subject to ongoing discussions and is being considered for inclusion in the code.

Fire sprinkler systems are required by the Approved Document G12 Water Supplies to contain backflow protection in accordance with the Cross Connection Hazard.

Systems containing hazardous compounds such as anti freeze and corrosion inhibitor shall have reduced pressure zone devices installed.

Fire sprinkler systems fed solely from the water supply potable supply **without auxiliary water supplies** shall have a double check valve assembly installed.

Backflow protection devices are to be installed in the valve house.

Metering at the boundary will detect any unprotected connections.

Where, at the request of the water supplier, an additional containment device is required to be installed near the boundary then attention needs to be paid to the security of the containment device.

Line strainers are not required to be installed upstream of backflow prevention devices installed on fire sprinkler and hydrant systems.

Backflow prevention devices installed in fire systems without a line strainer shall be tested annually and immediately after a fire and each full flow test.

Containment devices shall be installed on fire mains with inground hydrants. These devices may be in the sprinkler valve house.

ABTs testing **containment devices** on fire lines shall be specifically approved for this type of work in addition to having attained the **ABT-Testing** qualification.

Subject to ongoing discussions, an ABT qualification allowing persons only to work on fire lines is to be developed.

Comment

It is a New Zealand insurance requirement that only fittings and backflow devices listed on the Verifire Web Site are allowed to be installed on fire lines. These are found under Equipment Listings at verifire.co.nz

*Amendments to G12 Water Supplies now include backflow prevention on fire systems. This code does not require additional **containment devices** but consideration needs to be given to the following issues.*

The following comments are intended to assist with reiterating some of the key points in the document above.

Location of devices

Backflow devices should be installed in a secure environment, such as sprinkler valve houses or pump rooms as part of the building consent process. Where a containment backflow device is required, such as when the fire protection system includes inground hydrants, the valves shall be protected against vandalism as below.

Protection of valves

In accordance with fire protection standards, all valves on a connection serving a sprinkler system, other than the underground sluice valve at the public main connection, will be alarmed/ monitored for unauthorised operation. The use of chains or cages is not recommended on fire lines.

Strainers

Generally, strainers are not required to protect backflow prevention devices supplying sprinkler and hydrant systems. A strainer that will protect these devices will unnecessarily compromise the reliability of the fire protection system. Any strainer that is required (by means of the requirements of the sprinkler codes, or record of debris in the public reticulation system) must comply with the provisions of the sprinkler standard.

Testing of devices

ABTs testing backflow prevention devices serving fire protection systems must understand the protocols of isolating systems, with respect to insurance, life and property protection issues. These procedures also address the notification of the Fire Service, Building Owners, Insurers and the like, before a system is isolated for service. Failure to follow these protocols will expose the contractor to significant liability.

Backflow prevention on Ancillary supplies

Backflow prevention is required by the building code for ancillary water supplies, such as tank top ups, pump cooling circuits, fire hose reels, water enhance special hazard systems and the like.

Metering

No mechanical meters shall be installed on fire systems. Bypass meters with detector check systems do not provide backflow protection unless specifically manufactured with backflow devices in parallel.

*For water supplying fire systems it is vital to ensure that the installation of backflow prevention and metering equipment does not compromise the reliability of fire protection systems. Also that **ABTs** are trained in fire system isolation procedures to ensure that that fire system alarms are not activated during testing and that valves are not left closed after testing.*

Similarly it is equally vital that fire systems do not compromise the quality of the water in the water supplier's mains and the health of those who consume it.

13 BORE WATER

Any backflow programme should give consideration to ensuring that bores are drilled, constructed and maintained in a manner which avoids any contamination of, or cross-connection to, groundwater aquifers and does not allow any seepage or backflow of contaminants into groundwater.

This should include ensuring that well-head construction on all bores provides for the installation of a **containment device** and, where required outside of this code, a water measuring device.

14 MOBILE PLANT

Operators filling mobile or any other plant directly from the **water supplier's** main shall ensure that they obtain formal permission prior to obtaining the water.

Water suppliers in giving permission shall ensure that appropriate protection against **backflow** exists.

Where it is intended to fill a tank with mains water, a permanently mounted air gap of no less than 25 mm or twice the nominal diameter of the delivery pipe, shall be installed between the pipe outlet and the filling tank. In addition the tanker discharge shut off valve and any other valve and/or connections on the tank shall

be designed so that they can not be accidentally connected to a street hydrant by any fire hose with a male or female coupling.

This also applies to operators filling from specifically designed filling stations irrespective of what **backflow prevention devices** are installed unless specifically agreed with the **water supplier**.

Any other situations not clearly covered in the above shall be approved at the discretion of the **water supplier** having regard for the principles and requirements of this policy.

15 DAMAGE AND TAMPERING

The only persons authorised to carry out work on a containment **device** owned by the **water supplier** are the **water supplier's** staff and those persons specifically authorised by the **water supplier**.

Customers shall not touch or tamper with a **containment device** owned by the **water supplier**.

Private **containment devices** shall be maintained by a licensed plumber who is an **ABT**, as part of a testing procedure.

16 PUBLIC INFORMATION

Water suppliers shall be proactive in informing property owners of their obligations under their Public Health Risk Management Plans. This should include informing the community on the risks of cross connections and **backflow** and how they can comply with the **water supplier's** policies and relevant legislation.

The **water supplier** shall have a list of standard risks with appropriate protection methods and/or devices. This can be based on the list contained in the **PHRMP guide** as a minimum requirement.

Water suppliers shall provide **backflow** information as public handouts available from their office(s) and other suitable facilities.

They should include but not be limited to the following advice;

- Information for plumbers
- Information on annual testing
- **Backflow** policies, codes of practice, etc.
- How to comply with the **water supplier's** policy guide for **customers**
- What services **customers** have to pay for and what services are provided free by the water provider
- Reference to further information

17 DISPUTES RESOLUTION

Each **water supplier** shall have a published and readily available disputes resolution process for disputes of any nature between the **customer** and the **water supplier**.

Customers should be encouraged to put their complaints in writing and have the letter/email acknowledged with an interim reply typically within **3-5 working days** and a full response within **10-20 working days** or in accordance with the organisation's stated policies.

The **water supplier** should have a senior position within their organisation specifically tasked with the receiving and resolution of **customer** complaints.

Comment

A generic example of a dispute resolution procedure is;

*Where a **customer** wishes to dispute an issue with the **water supplier**, the **customer** may formally take the issue to a specifically nominated senior position within the **water supplier's** organisation especially tasked to resolve such disputes. That person shall, individually or with the assistance of others, attempt to resolve the issue to the **customer's** satisfaction.*

*Should the **customer** not accept the outcome, they can resubmit the dispute to the **water supplier's** nominated person for further consideration or an independent mediator to hear the dispute and recommend a solution.*

*If the mediator fails to resolve the dispute, the **customer** can take the dispute to arbitration where the decision will be binding on both parties or to the court system.*

The Disputes Tribunal can be used to resolve issues where the disputed amount is below the Tribunal's limits.

A local Ministry of Health representative could be used as part of a dispute resolution team where that was appropriate.

18 ADMINISTRATION

18.1 Maintenance of the code

NZWWA shall develop and maintain a national database of **ABTs**.

This code of practice will be administered by the **NZWWA** who, through the Association's Backflow Prevention Special Interest Group, will be responsible for ensuring that the code is reviewed and updated at appropriate intervals.

18.2 Compliance with the Code of Practice

Both the **water supplier** and the **customer** are responsible for complying with this code of practice. The supply of water to a **customer** is dependent on the **customer** agreeing to abide by this code and other terms and conditions contained within a water supply agreement.

Comment

Reference to the code would be included in water supply bylaws, customer agreements, charters, contracts, etc

19 TRANSITION

Water suppliers in adopting this code shall produce a transition plan to ensure that all **backflow** procedures are in compliance with the code by nominated future dates. All new installations shall be in compliance with this code once adopted.

This plan shall include but not be limited to:

- Transitional plans for identifying and upgrading existing high, medium, low and very low risk properties to this code and the PHRMP guide
- Development of a database of **ABTs** – Survey and Testing by **NZWWA**
- Development of an incident register

Comment

Transition issues will be discussed by the project team once the contents of the code are generally agreed.

Company logo and contact details

**Containment Device
TEST CERTIFICATE**

Owner of Property: _____

Address: _____

Contact Person: _____

The **backflow prevention device** detailed hereon has been tested and maintained as required under Water Supplies Protection Regulations 1961 and the Building Regulations 1992.

Make of Device: _____ Model Number: _____ New device Yes No

Serial Number: _____ Size: _____ Strainer fitted Yes No

Exact Device location: _____

Is the installation correct? (Please circle) Yes No

Reduced Pressure Devices		Relief Valve	Pressure Vacuum Breaker		Down Stream Shut Off
Double Check Devices			Air Inlet	Check Valve	
1st Check	2nd Check				
Closed tight <input type="checkbox"/> RP- _____ kPa	Closed tight <input type="checkbox"/> _____ kPa	Opened at _____ kPa	Opened at _____ kPa	_____ kPa	Closed tight <input type="checkbox"/>
Leaked <input type="checkbox"/>	Leaked <input type="checkbox"/>		Did not open <input type="checkbox"/>	Leaked <input type="checkbox"/>	Leaked <input type="checkbox"/>

Test kit serial number: _____ Calibration date: _____

Result: (Please circle) **Passed.** **Failed**
Registered ABT Name: _____ ABT No: _____

Mailing Address: _____

Certificate No. _____ Date: ___ / ___ / ___

Comments:

Signature: _____ Date ___ / ___ / ___

Comment - Some testers may find that individual forms covering specific types of devices, including air gaps, may be easier to use and better able to be understood by the tester's clients.

The test certificate does not address whether the device is the appropriate device for the current activity being carried out at the site. This is an ABT's (Survey) responsibility.

RULES GOVERNING THE CERTIFICATION OF APPROVED BACKFLOW TECHNICIAN (ABT) - TESTER

SUITABLY QUALIFIED: To become suitably qualified, an applicant must undertake & pass the appropriate NZQA Unit Standards:

- **DURATION** – Programme shall consist of a notional 40 hours of face-to-face tuition.
- **PROGRAMME CONTENT** – Any course of study leading to certification in the field of **backflow** prevention assembly testing, shall consist of 2 parts:
 1. A course of theoretical study which culminates in a summative assessment.
 2. Blind field testing of a range of appliances.

The theoretical programme shall cover the following:

- Local case histories of **backflow** incidents
- Definitions used within the industry
- Acts, Codes & Regulations
- Hydraulic principles
- **Backflow** hazards
- Operation of **backflow prevention devices**
- Installation of **backflow prevention devices**
- Testing of **backflow prevention devices**
- Repairs & maintenance of **backflow prevention devices**

The practical field tests shall cover the following devices:

- Pressure type vacuum breaker
- Double check valve assembly
- Spill – resistant vacuum breaker assembly
- Reduced pressure principle **backflow** prevention assembly.

CERTIFICATION: Upon successful completion of the practical & theoretical examinations & payment of all fees, a certificate shall be issued. The certificate shall be in the form of a photo identification card & shall state the type of certification, full name of the tester, certificate number, a date of issuance & a renewal date.

RE – CERTIFICATION: Currency of certification shall be for a 3 year period. Proof of application for re–certification shall be accepted as an extension to an expired certificate subject to Clause 11.1 of this code. This shall require attendance at a course of not less than six hours in duration.

RULES GOVERNING THE CERTIFICATION OF APPROVED BACKFLOW TECHNICIAN (ABT) – Survey

SUITABLY QUALIFIED: To become suitably qualified, an applicant must undertake & pass an assessed programme of study encompassing the following criteria:

PRE QUALIFICATION – The applicant should be an **ABT–testing**.

DURATION – Programme shall consist of a notional 24 hours of face-to-face tuition.

PROGRAMME CONTENT

Any course of study leading to certification in the field of cross connection control survey shall consist of 2 parts:

1. A course of theoretical study which culminates in a summative assessment.
2. Completion of a field survey

The theoretical programme shall cover the following:

- Common definitions
- Relevant legislation
- Approved documents
- Backflow prevention devices
- Common installations
- Site facilities
- Protection
- Surveying

The practical field survey shall involve:

- A moderately complex establishment that contains a range of hazards

CERTIFICATION: Upon successful completion of the practical & theoretical examinations & payment of all fees a certificate shall be issued. The certificate shall be in the form of a photo identification card & shall state the type of certification, full name of the tester, certificate number, a date of issuance & a renewal date.

RE–CERTIFICATION: Currency of certification shall be for a 3 year period. Proof of application for re – certification shall be accepted as an extension to an expired certificate subject to Clause 11.1 of this code. This shall require attendance at a course of not less than six hours in duration.