DISTRICT OF SUMMERLAND

BUILDING BULLETIN

CROSS CONNECTION – BACKFLOW PREVENTION

Bulletin No. 19-02

Purpose

To inform owners, contractors and the general public about Cross Connection: how it occurs, how to control it and guidance on the selection and installation of backflow preventers. This information compliments the provisions of Consolidated Water Utilities Bylaw No. 2014-019 Part 7 – Water Quality Protection Section 7.1 Cross Connection. Building and Plumbing permit applicants who intend to connect a water line on private property to the community's potable water system are responsible for providing backflow prevention appropriate to the circumstances on their property.

In Plain Language

The community's potable water system needs to be protected from potential sources of contamination.

The District has embarked on a Cross Connection Control Project with the intention of ensuring properties are provided with premise isolation where appropriate and an ongoing program is in place to monitor system performance. Premise isolation is the isolation of a property's private water system (water lines) from the District's potable water system. In addition, the potential for contamination within a building to its occupants from fire, sprinklers, irrigation, air conditioning, boiler and other systems is also considered.

Subdivision and Development Services (SDS) Bylaw Regulations

Schedule "C.5" of SDS Bylaw No. 99-004, Section 2 – Design Criteria requires that water distribution systems be designed to deliver water in adequate quantities, at adequate pressures, for both domestic use under peak consumption conditions and fire flows (anticipated volume required to a fight fire in the building that the water line serves). The bylaw defines demand and design standards, including that individual lots be served by separate water services.

Consolidated Water Utilities Bylaw Regulations

Consolidated Water Utilities Bylaw No. 2014-019 addresses the installation of private water services and conditions of water supply. Part 7 - Water Quality Protection addresses cross connection control specifically including the requirements with respect to installation, inspection and testing of approved backflow prevention devices.

The Building Bylaw

The District of Summerland regulates the construction and use of buildings and plumbing systems for the health, safety and protection of persons and property via the Building Bylaw. In accordance with provincial legislation, the Building Bylaw reflects the *British Columbia Building Code and the British Columbia Plumbing Code*.

The Technicalities Explained

The following explanatory information is offered to clarify the terminology used:

What is Cross Connection?

In water supply systems, water is normally maintained at a significant pressure to enable water to flow from the tap, shower, etc. When pressure falls or is reduced, as may happen if a water main bursts or there is unexpectedly high demand on the water system, the reduced pressure in the pipe may allow contaminated water from the ground, from storage or from other sources to be drawn up into the system.

Points at which a potable (drinking water) system connects with a non-potable water system are called cross connections.

There are two types of backflow: **back-pressure** and **back-siphonage**.

Back-pressure occurs when the pressure in a private water system is greater than the pressure in the District's water supply system. Back pressure can force an undesirable contaminant to enter potable water piping. Sources of back pressure may be pumps in the water distribution system, boilers, heat exchanging equipment, or power washing equipment. In these cases, there may be a risk of overcoming the static water pressure in the piping. To reduce the risk of contamination, a backflow preventer must be fitted. A backflow preventer is also important when potentially toxic chemicals are used, for instance for commercial/industrial descaling (boilers) or when bleaches are used for residential power washing.

Back-siphonage is the reversal of normal flow. This is caused by a reduction in the pressure in the local water supply system which can be caused by nearby fire fighting or water main break. Back-siphonage can cause contaminated water to be pulled into the water supply system.

Cross Connection Devices

1. **Air gap:** The least expensive and most effective way to provide backflow prevention is to provide an air gap. A simple example is the space between a wall mounted faucet and the sink rim (this space is the air gap). Water can easily flow from the faucet into the sink, but there is no way that water can flow from the sink into the faucet without modifying the system. This arrangement will prevent any contaminants in the sink from flowing into the potable water system by siphonage.

2. **Vacuum breaker:** A vacuum breaker typically contains a plastic disc that is pressed forward by water supply pressure and covers small vent holes. Should the supply pressure drop, the disc springs back, opening the vent holes which let in outside air, preventing backflow of water.

3. **Double Check Valve Assembly:** A double check valve assembly (DCVA) consists of two check valves assembled in series. This employs two operating principles: firstly, one check valve will still act even if the other is jammed wide open. Secondly, the closure of one valve reduces the pressure differential across the other, allowing a more reliable seal and avoiding even minor leakage. The double check valve assembly is suitable for prevention of back pressure and back siphonage but is not suitable for high hazard applications. It is commonly used on irrigation, fire sprinkler and boiler systems. If the hazard is higher, such as using antifreeze in the fire sprinkler system, then a more reliable check valve such as reduced pressure backflow assembly must be used.

4. **Reduced Pressure Backflow Assembly:** This device consists of two independent check valves, plumbed in series, with a pressure monitored chamber between. The chamber is maintained at a pressure that is lower than the water supply pressure, but high enough to maintain downstream pressure. The reduced pressure is guaranteed by a differential pressure relief valve, which automatically relieves excess pressure in the chamber by discharging to a drain. Because certain combinations of check valve failure and/or system backpressure cause the relief valve to discharge, the device must be mounted in a location where the drain will not become flooded.