Safe drinking water

Guidelines for private water supplies

Selwyn District Council

December 2019

selwyn.govt.nz

Private water supplies: Is your water safe?

Safe drinking-water is a necessity for good health and all property owners have a legislative responsibility to ensure that their water supply to be used for human consumption, food preparation and personal hygiene are safe. The legislation, as applicable and relevant to each situation, includes the Health Act 1956, Building Act 2004 and Building Code.

If water supplies are not suitably managed, they risk becoming contaminated, which can result in illness or even death in extreme cases. It is imperative that property owners are aware of the risks and manage their water supplies accordingly. The risks associated with a water supply include: insufficiently sealed well (bore) heads and tanks, broken pipework, lack of backflow prevention and contaminated sources that are not effectively treated.

Contamination can be microbiological, organic or inorganic;

- Microbiological
  - *E. coli* or Faecal Coliforms – these are bacteria from the gastro-intestinal track of animals and humans and can be disease forming. If any *E. coli* is found in drinking-water, it is deemed not potable (not suitable for drinking).
  - Protozoa – Cryptosporidium and Giardia
- Organic
  - Chemicals such as pesticides and herbicides
  - Cyanotoxins (algae blooms in rivers, streams and lakes)
- Inorganic
  - Nitrates
  - Heavy metals
  - Arsenic

Click on the link to find out what risks may be found in your area in the Environment Canterbury 2018 report which can be found at:
https://ecan.govt.nz/get-involved/news-and-events/2019/groundwater-quality-survey-released/

The Drinking-Water Standards for New Zealand 2005 (revised 2018) lists the Maximum Acceptable Values (MAVs) for potentially harmful contaminants and those of aesthetic value that can be found in drinking water.

Tests to determine water potability (suitability for drinking) include; *E. coli,* Total Coliforms, Turbidity and more increasingly, Nitrates.

FAQs about Nitrates can be found here:
https://www.cph.co.nz/wp-content/uploads/drinkwaterfaqnitrates.pdf

Drinking-water testing suites are available to test for harmful and aesthetic contaminants. These suites provide an overall picture of your drinking-water and are required for building consent purposes.

Testing:
All drinking water supplies should be monitored to ensure that the water remains safe for drinking, food preparation and personal hygiene, such as oral health and washing. The type and frequency of water sampling and testing should be determined following an assessment of the supply to see what the hazards and risks are likely to be.

Testing can determine whether treatment is necessary and if so, what types of treatments are most appropriate. Water sampling should cover periods of heavy rainfall, as this would capture any potential surface run-off entering the source of water.

Options for getting your water tested:

- There are many service providers that can test your water from aseptic sample collection to reporting of results. A simple google search will provide a list of services.

- Food and Health Standards monitors all Selwyn District Council's drinking-water supplies and travels the District daily.

- The following laboratories can send you a sampling kit and complete the testing:
  - **Hill Laboratories:** https://www.hill-laboratories.com/
  - **Eurofins:** https://www.eurofins.co.nz/

  Note: Aseptic sampling procedures must be carried out if *E. coli* and Total Coliforms are being tested for.

What elements constitute a water supply?

The main elements of a typical water supply include: the **SOURCE** (where the water comes from), **TREATMENT** (i.e. Filtration, UV, Chlorination), **STORAGE** (tanks) and **NETWORK** (pipes to the property, stock troughs, irrigation etc.)

SOURCE

There are three main sources of water:

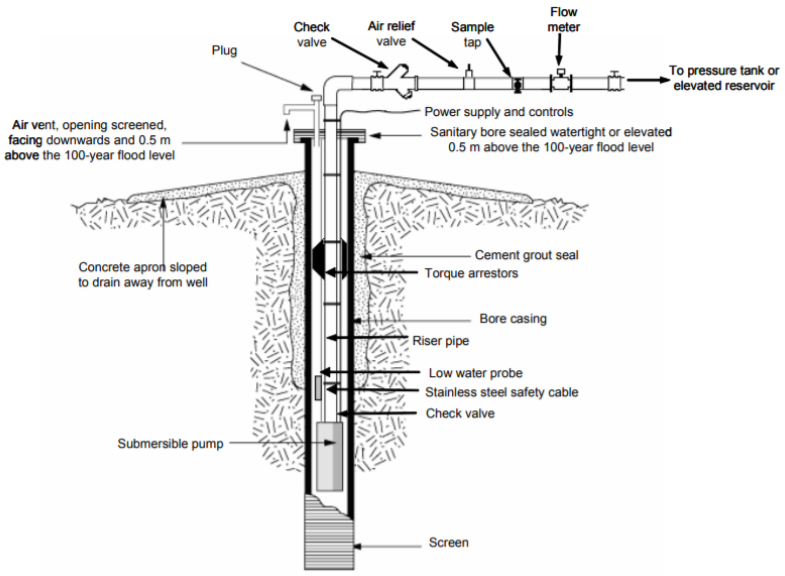
- **Ground Water**
- **Surface Water**
- **Roof Water**

Ground water comes from a bore or well. Wells and bores need to be properly constructed (sealed and protected) with adequate backflow prevention in place. Ground water can be subject to contamination, such as; nitrates, *E. coli*, heavy metals and agri-chemicals.

Shallow wells are more susceptible to contamination.

The following link details useful information on wells and bores:
https://www.health.govt.nz/system/files/documents/publications/design-operation-bores-small-drinking-water-supplies-2010_0.pdf

Figure 1: A typical bore



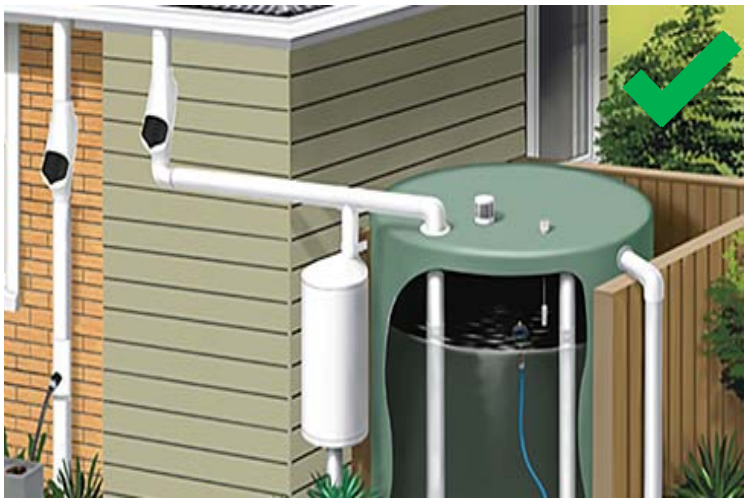
Further information on household groundwater supplies can be found here: https://www.healthed.govt.nz/resource/secure-groundwater-bores-and-wells-safe-household-water

If you are unsure of your well depth or would like to know more about it, enter your well number here: https://ecan.govt.nz/data/well-search/

Surface water sources are from rivers, lakes, streams and water-races. These sources are at a higher risk of contamination and require effective filtration, treatment and regular monitoring, as well as maintenance of the treatment system.
Regular maintenance of the treatment equipment is particularly important during prolonged wet weather, e.g. when rivers and streams become flooded, which in turn can clog up filters in a short space of time. (See below – Treatment).

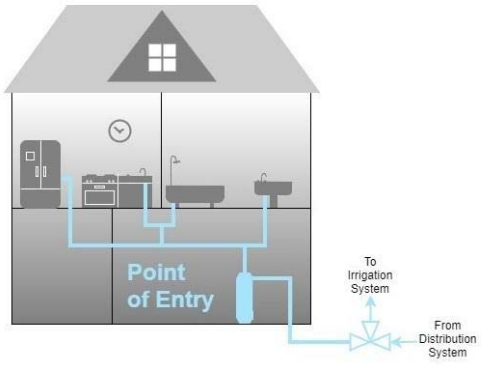
Roof water supplies come from a rain catchment system, typically located on the roof of a house. These sources are also at a high-risk of contamination and should have adequate treatment systems in place.

An important part of effective treatment for a roof water supply is having a first flush diverter in place, this ensures the initial and dirtiest rainwater is flushed away, as well as having a gutter screen and backflow prevention within the storage tank. Equally important is cleaning your gutters regularly and keeping your tank clean. This article details useful information about roof water supplies: https://www.marley.co.nz/wp-content/uploads/dlm_uploads/2016/04/Rainwater-Accessories-Catalogue.pdf

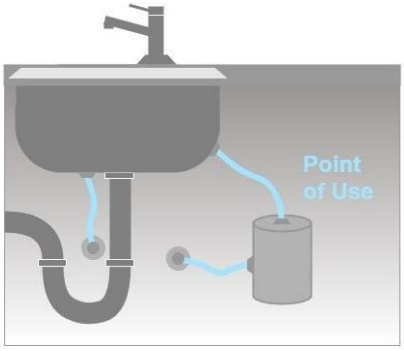


TREATMENT

Whether your source of water comes from the ground, from the stream or from a rain catchment, it is a good idea to treat your water. There are many forms of treatment available, such as: Filtration, UV Treatment and Chlorination. Treatment for self-supplies can differ from Point of Use (POU), which treats the water coming out of a designated point/tap, to Point of Entry (POE), which treats all the water going to the house.



Point of Entry (POE) Treatment



Point of Use (POU) Treatment

Filtration:

Filtration can be used to remove particles and is frequently used before disinfection e.g. UV treatment. There are various types of filtration, including cartridges, ion exchange, sand and reverse osmosis. The level of particles removed is dependent on the type and size of the filters. Some filters can remove or reduce certain chemicals as well, including metals, chlorine and nitrate levels. Filters require regular checking and maintenance to ensure they remain effective. Poorly maintained filters can create a risk of a build-up of bacteria and increase the contamination risk.

Consider filtration types as per:
https://www.health.govt.nz/system/files/documents/publications/treatment-options-small-drinking-water-supplies-jan14.pdf

UV Treatment:

Cartridge filtration and ultraviolet (UV) disinfection may be effective against protozoa, bacteria and some viruses. It is important to check your UV unit regularly to ensure it is working effectively, as they do require ongoing maintenance. The UV sleeves can become soiled and stained and the UV light tubes lose their intensity and the ability to inactive micro-organisms. UV units vary greatly, so it is important you are familiar with the manufacturer's instructions of your model.

For further information:
https://www.health.govt.nz/system/files/documents/publications/uv-disinfection-and-cartridge-filtration_0.pdf

Chlorination:

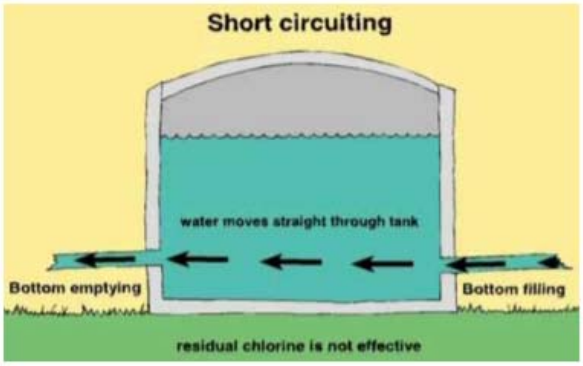
Bacteria are usually killed by dosing with chlorine. This has the advantage of remaining in the water as protection against recontamination in the network. The Drinking-Water Standards for NZ (2005/18) lists the required residual amount at 0.20 mg/L for effective water treatment. After the chlorine is added, the water should be stored for a period in a tank to allow the chlorine to contact and act with the water. Safe limits must be applied, as well as suitable chlorine.

The following link details household water supplies, treatment, maintenance and safe chlorine dosing levels: https://www.healthed.govt.nz/resource/household-water-supplies.

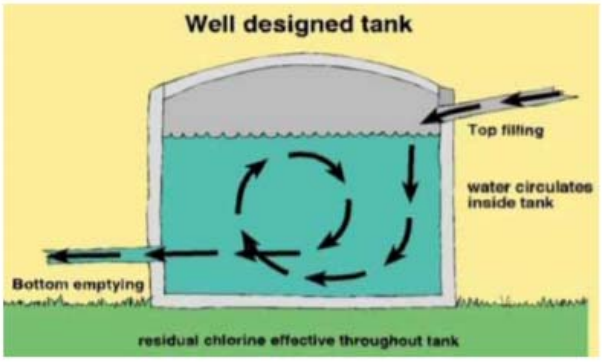
There are many providers of water treatment products, so it is best to research your options thoroughly, gather quotes and gain information from others with treatment systems already installed.

STORAGE

Most networks need storage in order to be able to function effectively. Storage is particularly important where the supply is treated before distribution to the network, because it means the treatment plant does not need to be sized to treat the peak flow that consumers require. Storage can be used to provide chlorine contact time for the inactivation of micro-organisms and as a reserve of treated water in the event of a power cut or treatment plant malfunction. Ideally, water entering the storage tanks should mix with the water already in the tank rather than taking a short cut through the tank, which can lead to variability in chlorine residual.



a) Short circuit situation



b) Mixed flow situation

Most tanks will have a drain line, this allows the tank to be drained for cleaning and other maintenance. If the outlet for draining the tanks discharges to a sewer or storm water system, an air gap or other backflow prevention system must be provided to stop water being sucked back into the tank. Storage tanks also need some form of level control so that they don't overflow when they are full, this may be either a stopcock valve or electrical level switch. An overflow pipe should always be provided in case the level control mechanism fails.

Access covers (tank lids) should be designed with a raised lip to prevent water running off the roof and into the tank. The roof should also be sloped to prevent the ponding of water. Small animals, insects and birds need to be prevented from entering the storage tanks and contaminating the water. Openings such as the air vent and overflow pipe should be covered with a fine screen. Tanks should be cleaned and maintained regularly. This document provides information on cleaning and disinfecting your storage tanks:
https://www.cph.co.nz/wp-content/uploads/drinkwaterfaqdisinfectingstoragetanks.pdf

Further information on storage tanks can be found here: https://www.health.govt.nz/system/files/documents/publications/pumps-pipes-and-storage2010_0.pdf

NETWORK

Network systems vary. Some have new pipework and fittings, some have older pipework and others have a mixture. Properties with older pipework are more at risk of breakages and entry of contamination. The most important aspect of protecting the distribution system is having adequate Backflow Prevention in place. Backflow prevention ensures that no contamination is able to backflow into the water source or the network. These are especially important with stock troughs, irrigation lines, storage tanks, pools and fish ponds.

Backflow prevention devices vary and suitably is dependent on the water pressure, purpose and level of risk. Your local registered plumber will be able to assist you with your backflow prevention device requirements. You can find your local suppliers and installers here: https://www.pgdb.co.nz/trade/registration.html

Further information on pipes, backflow prevention and network maintenance can be found here: https://www.health.govt.nz/system/files/documents/publications/pumps-pipes-and-storage2010_0.pdf

Where to go for more advice

- **Selwyn District Council, Environmental Health officers – contact 03 347 2800**