



Quantity

Tank supplies generally have an adequate quantity of water for the residents, except perhaps where the roof area-to-occupants ratio is low, the tank capacity is small and/or there is a drought. Experience shows that, in practice, residents cope with this situation through the application of stringent water conservation practices (e.g. restricting toilet flushes, taking shorter showers, re-use of greywater for outside uses, etc)

4.6 Risks

Council is aware that the buried infrastructure has inherent risks associated with it. However it is not just the buried infrastructure as there are inherent risks associated with anything subject to natural events, such as earthquakes and rainfall. A risk assessment for the water asset is covered in the Risk Management Plan and the Public Health Risk Management Plan (2004). This is a comprehensive guide to all risks expected to affect Council's water supply. There is an Emergency Management Plan in place to deal with the risks of service failure associated with earthquakes, extreme weather and other events. This section is an overview of the predominant risks.

The following risk tables should be read in conjunction with chapter 3 on Risk.

4.6.1 Reticulated

Quantity	Level of Risk
Council can manage likelihood and impact	
Pump failure at pump station	Moderate
Mains pressure failure anywhere, or high instantaneous demand	Low
Burst supply main	Moderate
Unauthorised access/vandalism/ sabotage	Low
Council can manage only impact	
Natural disaster cutting off supply to Wellington	High
Insufficient supply of raw or post treated water	Low

To mitigate these risks;

- There are duplicate pumps at all pump stations
- Three monthly and annual operation and maintenance checks are carried out at all the pump stations
- A standby generator can be transported to site if required
- Implementation of renewal and upgrade programmes will improve the reliability and stability of the system. Assets are considered for maintenance, rehabilitation or renewal based on the history of the pipe, the material of the pipe and water quality
- Only approved materials as per Water Supply Technical Specification 6th Edition 2003 are used in the reticulation system
- Council is developing a programme for reservoir renewals to meet the storage demand

- A network model is being developed to demonstrate the impact development will have on the current situation. It can also be used for the management and prioritising of current issues without major upgrade projects
- Pressure on the system is continuously monitored
- Pressure and demand management plans have been developed which will be more valid when the system model is in place
- Some reservoirs have perimeter fences and all reservoir access points are locked and alarmed
- Auto shut-off valves are installed at reservoirs to stop water leakage following natural disaster
- Investigation for inter-connection of supply zones for emergency purposes
- Water conservation investigations are being carried out with GWRC.

Quality	Level of Risk
Waterborne communicable diseases	Moderate
Backflow	Low
Contaminated groundwater	Moderate
Dissolution, leaching or corrosion from construction materials	Low
Sediment/slime accumulation and release	Low

The risk of supplying inferior quality water is mitigated through;

- Providing safe drinking water and preventing the spread of disease, meeting MoH Guidelines, National Standards and Council obligations
- Treatment and continuous compliance monitoring by GWRC and Council at supply points ensures only high quality water is delivered

- Requiring commercial premises which pose a risk to the reticulated supply, such as dentists and dry cleaners, to install a backflow preventor as stipulated by Local Government regulations and National Standards
- Regular water testing of boreholes supplying drinking water as required under MoH guidelines to give early warning of any sign of contamination
- Compliance with National Standards for pipe material ensures so there are no health risk from inferior quality pipes
- Implementation of upgrade and renewals programmes to improve the reliability, stability and quality of the system
- Dead end flushing, increased water circulation and the efficient management of the system ensure there is no accumulation of sediments or contaminants which has helped increase the water quality significantly
- Low risks from terrorism.

4.6.2 Non-reticulated

Risks of contamination to the supply	Level of Risk
Lack of monitoring	Moderate
Lack of maintenance of collection systems	Moderate
Upstream septic tank failure and/or farming practices	High

Due to the lack of monitoring standards or regulatory requirement there is no current mitigation in place to reduce these risks. Although;

- Common deficiencies by property owners and components of rainwater collection systems include lack of knowledge, lack of maintenance, inadequate disinfection of the water, poorly designed delivery systems and storage tanks, and the failure to adopt physical measures to safeguard the water against contamination

- The individual nature of rainwater collection makes public health control measures extremely difficult. Although a variety of measures are available for improving rainwater quality; a good system design that is properly operated and maintained is the simplest most effective means of ensuring good water quality, while water treatment is mainly appropriate as a remedial action if contamination is suspected. Attempts to introduce water treatment methods, such as on-site chlorination, have met strong resistance, particularly because of taste and concerns of chlorine by-products
- The risk of contamination of roof-collected drinking water with microbiological pathogens can be minimised by modern approaches to water management practices but continues to be a public health concern. Providing the rainwater has little taste or smell and is collected from a well-maintained system it is probably safe and unlikely to cause any illness in most cases. However water which may appear clean and visually free of contamination and from a roof which is free of moss, lichen or other vegetation may be faecally contaminated. Bacterial growth may occur when water in rainwater storage tanks is physically “dirty” and the bacteria have sufficiently nutrients to multiply in the tanks. Sedimentation of small amounts of organic matter entering the tanks could lead to a build up of nutrients at the bottom of storage tanks. Faecal contamination of rainwater can be minimised and even eliminated if a clean impervious roof that is free of any moss, lichen or other vegetation is used for rainwater collection.
- Changing the behaviour of roof-collected rainwater communities will not necessarily be easy. Any expected behavioural changes by the communities will only be effective if it involves very little extra effort and cost to them. It maybe more practical, less time consuming and cheaper to ensure that residents using roof collected rainwater are made aware of and have access to current information on the safe collection and storage of rainwater.
- There are two ways of minimising the risk from upstream contaminants; regular maintenance checks on septic tanks, protecting the catchment and minimising the possibility of pollution. Council will work with GWRC to develop these ideas.