

Recent GWRC research has stated that if the recent rate of population growth continues, as from 2007, they would be unable to supply sufficient potable water during 1 in 50-year drought conditions. This has prompted the call for the preparation of a regional Wellington Water Management Plan to identify the possible options to provide solutions.

With regards to asset management planning there is an identified lack of systematic or co-ordinated action to consult with customers at grassroots level. This does not align with the transparency requirement of the LGA 2002. Council needs clearer definitions of community expectations on the levels of service provision and potentially an increase in public consultation.

4.4.2 Non-reticulated communities

At present there is no long term monitoring data on the quality of water collected for domestic purposes from roofs, bores or streams. This means Council is currently unable to assess whether these water supplies meet current MoH guidelines.

The population totals of Meridian village and Glenside are both less than 25 people. These settlements will be treated as communities for the purpose of this Assessment, however are not sufficient in numbers to be registered as community drinking water suppliers with MoH.

It is unlikely that any treatment is carried out as rainwater is generally directed straight into tanks.

4.5 The Present Situation

4.5.1 Reticulated

Water Quality

GWRC has a bottom line quality standard of meeting the requirements of the Drinking Water Standards including aesthetic standards, and a supply reliability standard of supplying enough water to meet demand in a drought with a recurrence of up to 50 years. These standards have been agreed with the four customer cities.

Reticulated water is treated before it is transferred to users. Treatment plants remove actual or potential contaminants and ensure that the water delivered is safe to drink. Te Marua and Wainuiomata plants treat river water from the Hutt and Wainuiomata-Orongorongo catchment areas. This water requires a number of processes - coagulation, flocculation,¹ filtration and disinfection - to achieve a high quality drinking water.

At both treatment plants, the filtered water is then disinfected by adding a very small quantity of chlorine. This kills any existing bacteria or viruses and protects against any contamination that may occur between the treatment plant and the tap. Acidity is again reduced to control corrosion and fluoride is added for dental protection. Dirt and pieces of floc removed during treatment are piped to wastewater recovery plants at Te Marua and Wainuiomata. Here, the solid material is separated out and disposed of at a local landfill. The retrieved water is recycled through the treatment process.

Waterloo and Gear Island plants treat aquifer water that is naturally safe to drink, but requires the acidity to be adjusted to minimise corrosion of pipes and fittings. At Council supply points the bulk water from GWRC is monitored for turbidity, FAC (free available chlorine) and pH for compliance with Drinking Water Standards.

A structured water quality control monitoring programme is in place to ensure compliance with the Drinking Water Standards for New Zealand 2000, approved by the MoH. This involves daily microbiological and chemical testing of the main water supplies into the city and weekly testing within the reticulation system, Environmental Laboratory Services (ELS) carry out the monitoring. The Drinking Water Standards stipulate zero *E-Coli* bacteria exceedance. In the last 5 years there has been no incidents of microbiological or chemical contamination.

Microbiological contaminants should be monitored for in all supplies and hence are known as Priority 1 determinands. Second level, Priority 2 determinands, only need monitoring when supplying populations of 100 or more, and the population must be at least 500 before a Priority 2 determinand is officially assigned and appears in the Register of Community Drinking-Water Supplies in New Zealand.

For Wellington in the 2003-printed Register, three Priority 2 determinands were assigned: one determinand (Fluoride) at 4 treatment plants (Gear Island, Te Marua, Wainuiomata and Waterloo) and two determinands to 2 distribution zones (aggressiveness to be resolved- Wadestown and lead- Eastern Wellington).

Te Marua and Wainuiomata water treatment plants are graded 'A' for risk management and water quality (*Completely satisfactory*).

¹ Coagulation is the process of adding chemicals to water to make dissolved and suspended particles bind together (coagulate) and form larger particles (flocculant) that settle out of the water.

Table 5 shows each identified community and the current public health grading. The public health grading is an evaluation of both the actual water quality and the underlying measures taken to minimise risk.

These measures ensure that the water remains safe and wholesome now and in the future. Table 5 shows that the Source and Plant grading (A to C) which relates to the water as it leaves the treatment plant.

Zone Name	Population	Zone Grading*
Brooklyn	9,765	Bb
Churton	4,446	Aa
Eastern Wellington	16,815	Bd
Johnsonville	18,357	Ba
Karori	13,146	Bb
Kelburn	9,924	Bb
Onslow	11,883	Ba
Southern Wellington	30,024	Bb
Tawa	12,903	Ab
Wadestown	6,789	Ba
Wellington Central	31,074	Ba

Table 5. The MoH public health grading for Wellington supply zones. (Grading explanations in Appendix 2)

Before it enters the reticulation system it only presents a moderate level of risk. The part of the grading for the quality of the water and the systems in place (procedures and reticulation quality) to minimise the risk of unsafe water to the consumer have 'a' or 'b' status - completely satisfactory with negligible level of risk and demonstrably high quality.

The variation is mainly brought about through sediment, corrosion and slime growths in the pipes. The colour, taste and odour of water is affected by pipe condition, by the build up of deposits and biofilms in the pipes, and the age of the water when it reaches the customer. In the 2003/04 financial year Council received 73 taste and smell complaints out of a total 9,121 water related enquiries.

4.5.2 Non-Reticulated

The preparation of this assessment has highlighted the lack of knowledge regarding drinking water collection methods and treatment practices (if any) of non-reticulated communities. To address this issue Council sent questionnaires (appendix 3) regarding water collection and treatment practices to 260 homes and 4 businesses in the non-reticulated communities. The response rate to the questionnaire was only 26%.

Quality

Some supplies that are not connected to the reticulated supply and are accessible to the public are monitored for their water quality and Regional Public Health may take an annual sample at some. Most of these small supplies may have sporadic events where bacteria (i.e. *E-Coli*, *Cryptosporidium*) in the water exceed levels in the Drinking Water Standards for New Zealand. In practice these supplies are allowed no more than 1 positive result in 78-109 samples. The small supply results show a clear difference in water standards compared to the Council supply. An isolated household, or community under 25, does not pose the same public health risk as that of a town. The very small amount of tank water drunk cold does not need to meet the same stringent standards of a town supply, as the public health risk is much lower (Ashworth, 2005).

For domestic water consumption the most common method of potable water collection is channelling water from the roof into large tanks made of various types of material.

Diverting spring and tributary water supply for household use is current practice for water supply in South Karori.

In the Makara many residents tap into and use subsoil water. The public toilets at Makara beach are owned and maintained by Council but are not connected to the reticulated system, their water supply is from a spring.

The Stony Beach Bistro has a holding tank for water which is filled up from a spring. During summer water is occasionally taken from town to keep this tank filled.

Ohariu Golf Club's drinking water was non-compliant with required environmental health annual analysis for *Cryptosporidium*. They now bring in water from the reticulated supply.

At the Meridian village water is collected from a stream, pumped to holdings tanks, filtered (filters are changed every six weeks) chlorinated and then distributed to the houses. This supply is not tested for any microbiological contaminants.

Questionnaires completed by members of these communities indicate satisfaction with their current systems and water quality. However responses to the questions regarding cleaning of guttering, filters and storage tanks demonstrated there could be health risk issues.

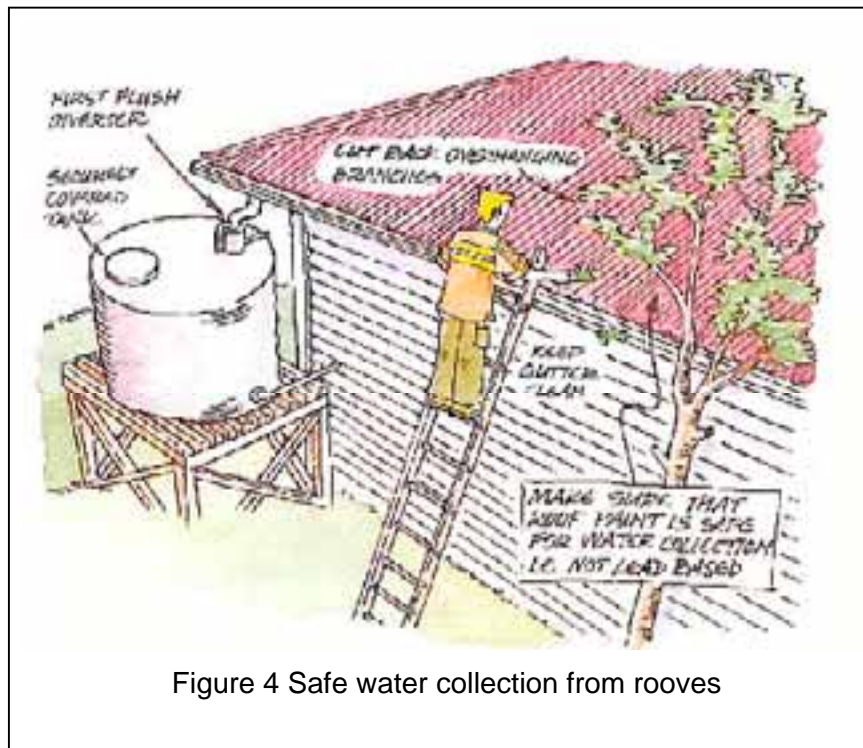


Figure 4 Safe water collection from rooves

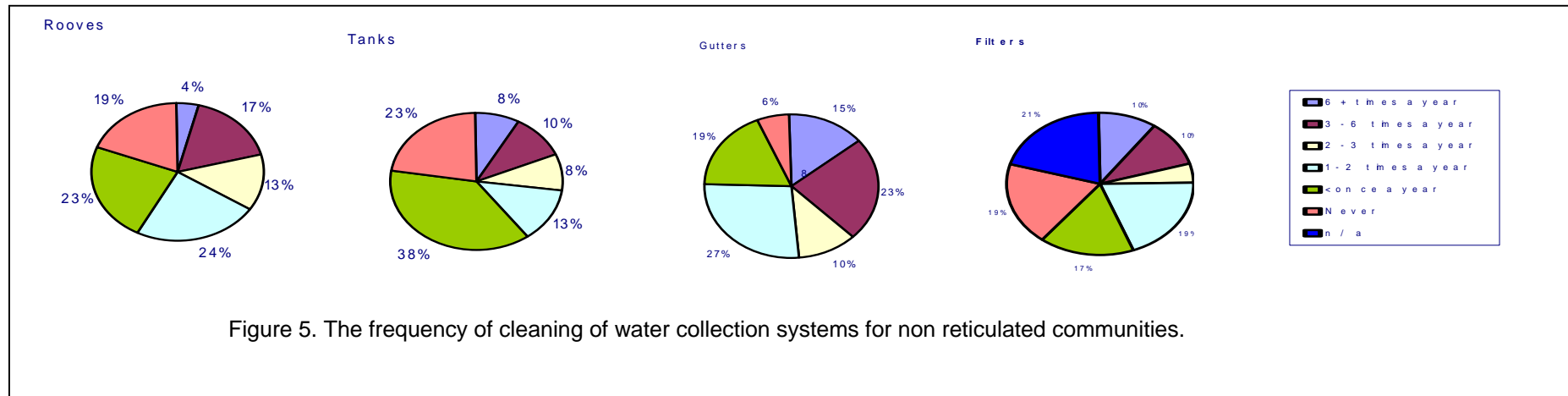
The MoH recommends gutters, tanks, screens, and other components should be inspected/cleaned twice yearly (Figure 4) (MoH publication Water Collection Tanks and Safe Household Water (MOH10148)).

Figure 5 shows the survey responses. Generally one quarter of all respondents cleaned rooves at least twice yearly, though for the cleaning of guttering nearly half of the respondents cleaned guttering twice yearly. Alternatively around half of all respondents clean storage tanks less than twice yearly and one quarter of the respondents do not have filter systems installed.

The MoH advises reticulated drinking water be sampled 10 times a quarter for E-Coli compliance. The Drinking Water Standards 2000 outline E coli requirements for individual household drinking water supplies, though no general sampling recommendations are made. Of the responses 15% annually monitor the biological quality of their drinking water. Only 3% monitor quarterly. This is well below the suggested guidelines. Similarly only 8% annually monitor the chemical quality of water.

The questionnaire asked residents whether they were prepared to let Council sample their drinking water, 80% of respondees agreed they would.

Although there is no direct evidence of problems the questionnaire responses indicate that some tanks would not achieve compliance with NZ Drinking Water Standards 2000; consequently there may be a risk that should be addressed. Greater education of and improved maintenance by dwelling occupants is recommended to improve water quality further also as a sensible safeguard, it is recommended that all new dwellings be required to install first-flush diverters on all roof water feeding to tank(s).



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.