



Water Softening Benefit/Cost Assessment

Summary Report

14 February 2007

1. Introduction

The Wanganui District Council has substantially completed its assessment of the feasibility and costs of providing softer water to the City whilst also providing a back up bore for Kaiwi which provides the City with the bulk of its water.

The following summarises the assessment undertaken by Montgomery Watson Harza in reviewing and assessing the costs to consumers of a hard water supply in order to quantify the benefits or otherwise of water softening. Ref - MWH "Water Softening Benefit Cost Assessment 2 Feb 2007".

2. What is Hard Water?

Hard water contains significant concentrations of ions such as calcium and magnesium. Typically the water has passed through strata rich in limestone. Wanganui hardness is around 200mg/l. This hardness can be removed by increasing the temperature of water. Wanganui water contains high levels of both calcium and magnesium.

3. Disadvantage of hard Water

Hard water has a number of negative impacts:

- Increased consumption of soaps and detergents
- Scale formation on hot water cylinder elements or heat exchangers leading to premature failure
- Loss of heating efficiency in water heaters
- Increased labour associated with cleaning
- Clogging of fittings with scale

The report focuses on the first three impacts as quantifiable data was not readily available for the other impacts. However, the first three impacts are thought to contain significant consumer costs, hence the results of the study are understated.

4. Assessment of Costs

4.1 Soap and Cleaning Product Consumption

The approach to establishing costs was to source data on accumulated soap and cleaning product sales between Wanganui and other centres using soft water. Although various supermarkets were approached, there was difficulty in assessing market share from any particular store and commercial sensitivity limited any analysis.

Product suppliers were therefore approached (Colgate-Palmolive and Unilever) which feed various markets.

Specifically compared to New Plymouth which has a soft water source

Item	Percentage Increase in Sales in Wanganui (%)	Extra cost to Wanganui Residents
Bars of soap	50	\$13.07
Liquid dishwashing detergent	43	\$19.14
Laundry powder	42	\$44.61
Shampoo / conditioner	26	\$41.68
Total cost per annum		\$118.50

4.2 Cost for water cylinders

The data comes from the main suppliers of electric elements in Wanganui of which approx 2500 elements are replaced per year. This equates to approximately \$25 per annum cost per household. Data indicates that elements on average last four years. It would appear that gas flow heaters would have lower life and higher costs from \$50-\$70 per household per annum.

4.3 Inefficiencies in water heating due to scale formation

Based on a number of studies from overseas and Massey University it is estimated that reduced efficiency for Wanganui is 10%. This would equate to approximately \$63 extra cost per household per annum.

4.4 Other impacts of hard water (difficult to quantify)

- Reduction in lifetime of clothing from scum and precipitate build-up in the fibre which cannot be removed.
- Premature failure of appliances including dishwashers and washing machines and pipe fittings. Some overseas studies indicate that appliances in hard water areas may wear out 30% earlier than in soft water areas, (approximately \$50+ per annum per household).

5. Summary of costs per household

Item	Example Water Heating (Gas)
Water heater repair / maintenance	\$50.00
Soaps / detergents	\$118.50
Additional energy use for water heating	\$62.60
Total	\$231.10
Rounded total	\$230.00

In summary the costs can range up from \$190 up to \$230 for those components listed in the table however, it should be noted that the costs must be more than this in reality because of primarily the issues listed above section 4.4. E.g. an additional estimate of \$50+ per annum can be attributed to shortened appliance life.