

TARIFF STRUCTURES, PRICING AND WATER DEMAND MANAGEMENT

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ABSTRACT

Following its corporatisation, Manukau Water Limited commenced providing retail water and wastewater services to the Manukau community in July 2006. One of the most important decisions that it had to implement in its first year of operations was the new wastewater tariff structures. In replacing land-value based wastewater rates, Manukau City Council, as its shareholder, required the company to retain fixed annual wastewater charges for domestic customers. Customers, other than domestic, that had until then made for their wastewater services as rates based on land value, were to pay for wastewater services on a volumetric basis.

In this paper, I outline the issues that arose for Manukau Water Limited after a strong public reaction to the wastewater tariff structures, I summarize the approach and findings of a comprehensive review of the wastewater tariff structures that took place a year later. The discussion is unique as it highlights how water demand was affected by changing wastewater, rather than water, tariff structures. I further explain why customers may change their water use behaviour based on perceived, rather than real, price increases.

I conclude by summarising key points for the design of tariff structures, the implementation of water tariffs, their impacts on demand management, the implications on organisation's revenue stream and the reactions by customers on water use.

KEYWORDS

water, demand, tariff, price, management, customers, Manukau

1 INTRODUCTION

The most important decision that a water utility needs to make is the tariff structure and the tariffs that it uses to collect revenues from its customers. Water tariff structures need to accomplish their principal objectives. Water utilities must generate sufficient revenues to recover the costs of sustainably running their business. Tariff structures should be designed to send the desired economic signals to the consumers. Even in New Zealand, a land with relatively high rainfall, good quality water resource is scarce and it must be valued. Water tariff structures and pricing tend to be controversial. Is it fair? Is it equitable? Is the organization under-collecting its revenues or over-collecting? Is it simple for customers to understand? Does it send any behavioural signals to the customers?

Designing a tariff structure is an art and involves much more than the science of recovering revenues alone. Boland defines "...water utility tariff is the set of prices, charges and taxes used to generate revenue, together with the rules of governing their application" (Boland, 1993). He argues that the generation of the required revenue should not be the sole consideration and that the tariff structure, when correctly formulated, has the ability to contribute to the overall performance of the organization.

The purpose of this paper is to document and share the challenges faced by Manukau Water Limited when it changed its wastewater tariff structure and tariffs for non-residential customers following its corporatisation in 2006.

Manukau Water Limited is a council controlled organization, 100% owned by Manukau City Council. On 3 July 2006, it took ownership of approximately one billion dollars of water and wastewater assets and became

responsible for the provision of water and wastewater services to an urban population of over 330,000 and New Zealand's largest industrial customer base.

Prior to 3 July 2006, the revenue for the water services was collected via targeted water rates by Manukau Water, a business unit of the Council. There were no fixed annual water charges. Consumers paid for their water service based on the volumes of water recorded at the boundary meter. There was a minimum six-monthly charge of \$25. There was no distinction made between residential (domestic) and non-residential (other than domestic) customers – they all had the same volumetric unit water price.

The wastewater rates were part of Council's land assessment and based on land value. In 2003, three years before Manukau Water Limited took over water and wastewater assets, Manukau City Council removed all residential land-value based rates, replacing them with an annual rate per dwelling unit. Non-residential customers continued to pay the fixed annual wastewater rate plus a land-value based rate.

The prevailing water and wastewater charges for the four years commencing 2005/06 are summarised in Tables 2 to 4.

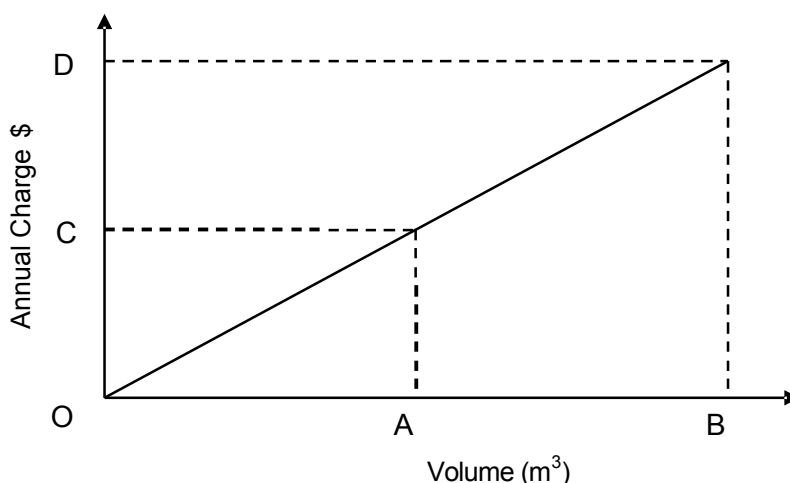
2 MANUKAU WATER LIMITED – FIRST YEAR TARIFFS

2.1 WATER

The water service charge was completely volumetric prior to 3 July 2006. This tariff structure was retained by Manukau Water Limited and the only change that took place was that it was no longer a target rate set by Council. It was now a service charge levied by Manukau Water Limited under its customer contract. There was a 3.3% increase in the unit price of water from the prior year. As shown in Figure 1, a totally volumetric tariff structure meant that customers only paid for what they used. They could avoid costs by reducing water demand.

Manukau Water, as a business unit of Council, had been sending six-monthly water bills separately from the Council's land rate. Manukau Water Limited increased the frequency to quarterly water meter reading and billing. This was an important change as almost half of its revenue requirements were to pay for bulk water services, payments for which were made monthly. The management of cash flow was the company's most important financial objective.

Figure 1: Volumetric consumption charge



2.2 WASTEWATER

2.2.1 GENERAL

Unlike the water tariff structure, the wastewater tariffs had to be changed from 3 July 2006. As a company, Manukau Water Limited could not levy land rates. Therefore, wastewater revenues had to be collected as service charges. Manukau Water Limited retained the fixed annual wastewater tariff structure for residential customers. Manukau City Council did not wish to introduce a volumetric wastewater charge for its domestic households. The purpose of creating a company to undertake its water and wastewater business was not conditional on it introducing volumetric wastewater charges for all customers. However, volumetric wastewater tariffs were introduced for non-residential customers.

Manukau Water Limited inherited different categories of wastewater customers. Unlike the tariff structure for drinking water supply, where there was a single tariff that applied to all customers regardless of whether they were domestic or industrial, the wastewater customers were classified into residential, community and business.

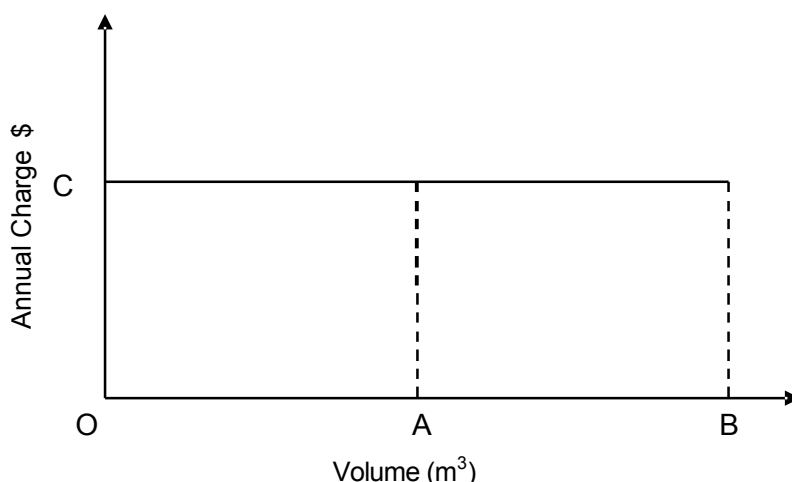
However, to retain the fixed annual wastewater charge for residential customers, the revenue from each customer category had to be ring-fenced to provide Manukau Water limited with its annual wastewater income.

2.2.2 RESIDENTIAL CUSTOMERS

Residential (domestic) customers were charged a fixed annual wastewater fee for each dwelling. This was consistent with the tariff structure prior to 3 July 2006, except that it was no longer a land rate but a wastewater charge. By retaining the same tariff structure for residential customers, the total revenue from this customer segment was fundamentally unchanged. As shown in Table 2, the annual wastewater charge was \$320 per dwelling unit in 2006/07, an increase of 2.2% from the prior year.

As shown in Figure 3, a fixed annual wastewater charge meant that the residential customer paid the same sum of money regardless of the volumes of wastewater it discharged in the sewers.

Figure 2: Fixed annual charge



2.2.3 NON-RESIDENTIAL CUSTOMERS

To not have a short-fall in wastewater incomes, Manukau Water Limited had to obtain from its non-residential customers the difference between its annual wastewater revenue requirement and the total revenue it would derive from its residential customers. Non-residential customers included all customers other than domestic homes.

A change in tariff structure from land rates to volumetric wastewater charges was to result in large incidence among some of the business customers. Warehouse complexes on sizeable parcels of land that had been paying relatively higher wastewater rates based on land value were the major beneficiaries. On the other side, food

processing industries located on a small footprint of land, and paying relatively lower wastewater rates, were facing large increases in charges based on discharge volumes.

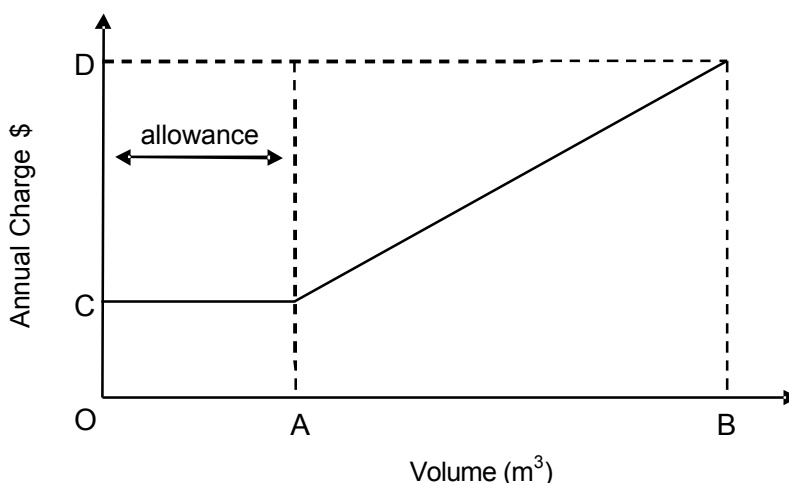
The analyses by Council staff showed that the level of incidence among small businesses would be minimised by implementing a fixed annual charge, accompanied by a volumetric charge. The fixed annual wastewater charge would entitle non-residential customers to a maximum discharge of 400 m³ per annum.

For volumes over 400 m³, a volumetric charge would be made based on each cubic metre of drinking water measured at the boundary meter. A factor would be applied to reflect the reduced wastewater discharge for those industries that demonstrated that they used water in their products or lost it in their processing.

A few large water using customers were facing substantial increases in wastewater charges. It was agreed that Manukau Water Limited would negotiate with these businesses and phase the new tariff structure over three years.

As shown in Figure 3, the fixed annual wastewater charge with a 400 m³ allowance meant that those that used low volumes of water, and discharged low volumes of wastewater, still paid the same annual charge until they reached the threshold volume, after which those that used more paid more.

Figure 3: Fixed plus volumetric charge with allowance



2.2.4 NON-RESIDENTIAL CUSTOMERS - OTHERS

Apart from businesses, the non-residential customer category included community facilities. These were churches, schools, halls, sports clubs and fitness centres. These customers had the same tariff structure as businesses except that the annual and the volumetric charges were much lower.

There were special rebates provided to schools and volumetric tariffs were lower for those businesses that were trade waste customers of Watercare Services Limited who collected the bulk transport and treatment costs directly.

2.3 IMPACTS ON WATER DEMAND

2.3.1 WATER REVENUE

Total water demand for Manukau Water Limited dropped by 0.5% between the 2005/06 and 2006/07 year, during a period when population grew by over 2% and corresponding commercial and industrial growth was high. As water revenue was based 100% on the volumes sold, a reduction against budget of about 3% was substantial. Further, as the company had just been established, its statement of intent obligations were to keep its annual price increases to below the consumer price index. While the impact was large, the one saving point was that almost half of its expenditure was for bulk water purchase and this was mostly volumetric. Therefore, a reduced water demand by consumers meant a reduced bulk water costs.

2.3.2 WASTEWATER REVENUES

When the wastewater tariff structures were being designed for non-residential customers, an assumption was made that on aggregate 80% of the drinking water sold would be discharged as wastewater. This was used to generate the volumetric wastewater consumption charge. During the first year of operation, this assumption was found to be overstated by 15%, seriously and adversely affecting wastewater revenue.

Further, the top 35 non-residential customers contribute to 16% of the company's water demand. Due to the introduction of the volumetric wastewater charges, these companies had a strong signal to review its water usage. The increase in the annual wastewater charges for all of these businesses meant that the likes of the factory or site manager had to seek additional budgets from their managing directors. As would be expected, most were advised of seeking to reduce wastage at their sites. Water demand among this group of customers was reduced by 11%, having an adverse impact on both the water and wastewater revenues.

Wastewater revenue was below budget by 10% in the first year. Unlike bulk water, bulk wastewater services are provided at a fixed cost and are not influenced by volumes of discharge. Therefore, the company had to fully recover this short-fall. The following year's wastewater tariffs were increased by approximately 9% for all customer categories.

2.4 IMPACTS ON COMPANY BRAND

A change in non-residential wastewater tariff structure was expected to create issues among the customers. However, Manukau Water Limited had not expected any issues with residential customers. They were already paying a fixed annual wastewater rate. The charge for 2006/07 had been increased by only \$7 for the whole year for each and every residential customer.

The residential customers did not see this in the same context as was assumed. Most customers only read the total bill and either do not understand, or do not wish to understand, the make-up of their charges. The deliberate intention of Manukau Water Limited to create transparency about its costs and revenues was being met by *shoot the messenger* syndrome. Customers, now having an additional \$320 added to their otherwise low water bill, assumed that water prices had increased. Increasing the frequency of water billing was intended to reduce this impact. However, it also led to households reducing their water demand.

An educational campaign of *Did You Know* was initiated – samples attached in the Appendix. As this was not identified as a risk during the establishment of Manukau Water Limited, the scale of the negative response from the customers was overwhelming for the staff, management and directors of the board of the company.

3 REVIEW OF WASTEWATER TARIFF STRUCTURE

3.1 PURPOSE OF REVIEW

Manukau Water Limited took ownership of the assets, operations and responsibilities for providing water and wastewater services in Manukau City in 2006. After governing the business for 12 months, the board of directors of the company took the opportunity to review the wastewater tariff structures that were ceded to the company when it commenced operations.

The following reasons were instrumental in the review being undertaken by Manukau Water Limited:

- The numerous complaints and submissions received by the company in its first year of operation from persons living alone who had expressed concern that a fixed annual wastewater charge was unfair to them because they used less of the service compared to their neighbours who had large families. These customers were seeking a volumetric wastewater tariff structure;
- the submission and delegations from small business associations and customers that they discharged less wastewater than a residential home and, therefore, the fixed allowance of 400 m³ per annum and the associated fixed annual charge were unfair. They requested that the allowance, if retained, should be reduced to reflect the actual small business wastewater discharge volume and that the charges be more

comparable to that paid by residential customers; and

- the difficulties that company staff had in applying the tariff structures and in explaining to customers the rationale for the wastewater charges.

Manukau Water Limited stated in its statement of intent that it would undertake a comprehensive review of the wastewater tariff structures and make recommendations to Council by December 2007.

3.2 OBJECTIVE OF WASTEWATER TARIFFS

There are many factors that could be considered when selecting tariff structures for wastewater. The relative importance of each of these factors is viewed differently by different customers. There is no single *correct* tariff structure that will satisfy the various objectives, wants and expectations of the different groups of customers, the shareholders and meet the needs of Manukau Water Limited. Therefore, while the company consulted with its stakeholders while undertaking the tariff review, it was important for it to exercise its own judgement in understanding the issues, objectives and constraints while setting the wastewater tariff structures.

Manukau Water Limited approached the design of the tariff structures guided by the following criteria:

- conservation and sustainability;
- equity amongst its customers;
- correct cost recovery for the company;
- cash flow to the company; and
- ease of implementation and collection.

Manukau water Limited needed to recover sufficient revenue to pay for the costs of providing wastewater services. As a council controlled organisation, it has not been set up for the purposes of being a profit-making company. The costs of operating a wastewater system are a mixture of fixed and variable costs. For Manukau Water Limited, most of its costs were fixed.

3.3 RESIDENTIAL CUSTOMERS

The wastewater review revealed that 69% (or about 21 million m³) of the total water was supplied to residential customers. As shown in Figure 4, 25% of the households in Manukau City had two usually-resident persons. Approximately 20% of the households had three persons, and a similar proportion had four persons. Fourteen percent of total households had only one person usually resident in them. A similar proportion of houses had more than six persons resident in them.

About 35% of the private occupied households, or about 32,000 homes, were tenanted. Approximately ten percent of residential households in Manukau City are owned by Housing New Zealand. Different households use different quantities of water. This is generally dependent on the number of persons living in the house. It may also depend on the behaviour of water use or on whether the occupiers pay for their water use or receive it as an unlimited resource via the house rental charge.

On average, a person in Manukau City used 185 litres of water per day (68 m³ per year). Similarly, on average, there were 3.3 persons living in a home. It followed, therefore, that an average household used about 220,000 litres (220 m³) of water a year. Figure 5 shows that 15%, or about 14,000 accounts, of the residential customers used less than 100 m³ of water per year. This is very similar to the percentage of households with only one occupant (14%). At an aggregated level, there is a close overlap between the number of residents in a home and the water demand band.

3.4 NON-RESIDENTIAL CUSTOMERS

Non-residential customers – business are those that use their premises on a commercial-zoned land, and/or use their property for the purposes of operating a business. It excludes schools and community facilities. According to Census 2006 results, there were approximately 22,000 businesses located in Manukau City. However, Manukau Water Limited provided services to these businesses via approximately 6,000 accounts.

These ranged from the very large single customers, such as the Auckland International Airport Limited, to the local panel beater's shop.

The business group consumed about 8.5 million m³ of water annually, or about 29% of the total. As shown in Figure 6, around 2,700 (45%) of these business customers used less than 100 m³ of water a year. In contrast, about four percent of the business customers used 75% of the water.

Figure 4: Pie chart showing proportional distribution of households in Manukau City by the number of usually resident persons they have

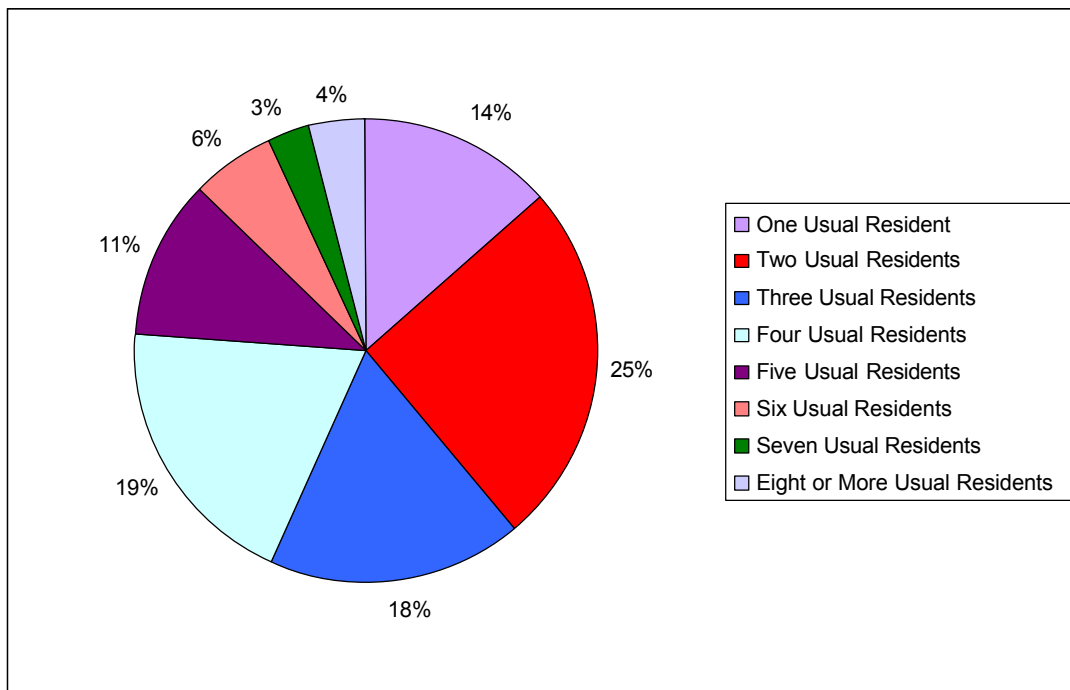
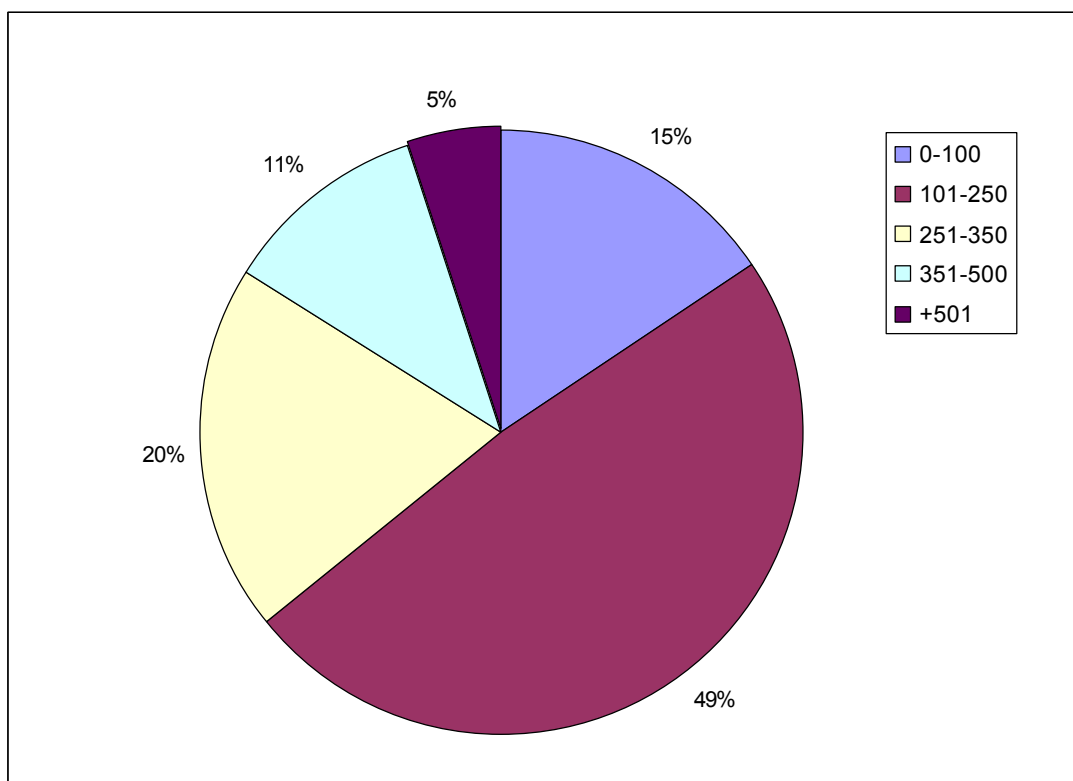


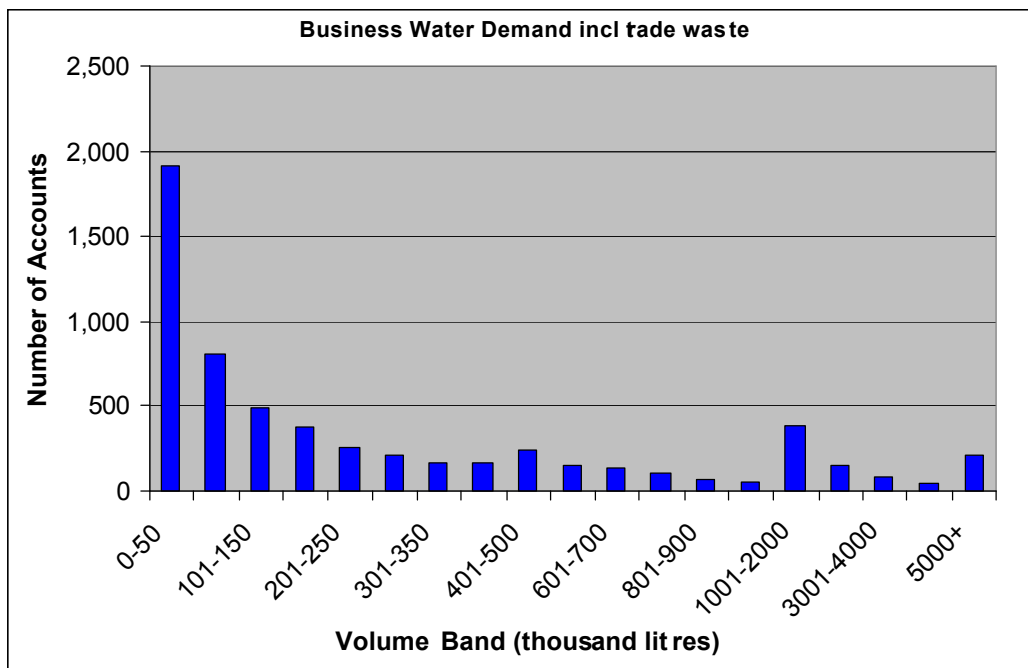
Figure 5: Percentage of household in Manukau City with annual water consumption in bands of 100 m³



3.5 OTHER CUSTOMERS

Manukau Water Limited provided services to 224 schools, various churches, sports and recreational centres. This group contributed towards the remaining 2% of the total water demand.

Figure 6: Profile of annual water consumption by business customers of Manukau Water Limited



4 DESIGNING A NEW TARIFF STRUCTURE

4.1 REVENUE RISKS

With fixed annual wastewater charges for residential customers, Manukau Water Limited had stability and certainty for about two-thirds of its wastewater revenue requirement. Its water revenue was totally dependent on the volumes of water sold. With the introduction on 3 July 2006 of a volumetric wastewater tariff for non-residential customers, the demand management and water conservation initiatives taken by businesses, and supported by Manukau water Limited, adversely affected the company's revenue for the first year.

Hence, it was necessary to balance and manage the risks associated with variable tariff structures based on volumes of water sold with the company's desire to promote water conservation to reduce water demand.

4.2 SYSTEM COSTS

The costs associated with connecting residential and business customers via sewers and pumping stations to a wastewater treatment plant are fixed system costs. These costs depend on distances between the customers' properties and the treatment plant, topography and geology, the nature of neighbouring properties and their anticipated land-use zoning, and the size of infrastructure constructed based on assumptions of growth and development.

The wastewater infrastructure is designed and constructed for peak flows. While there is a relationship between the volumes of drinking water consumed and the volumes of wastewater discharged, peak flows are generally created during rainstorms and attributed mostly to storm water entering the sewerage system either directly (inflows) or indirectly (infiltration). Put simply, infiltration is a function of lengths of pipes while

inflows are influenced by the type and number of connections and chambers on the pipeline. As there are more residential properties, there are longer lengths of private drainage pipes and there are more connections.

To allocate fixed system costs is difficult and, despite the theory, impractical to apply. Hence, most utilities do not set geographically-based tariff structures, instead opting for *postage stamp* pricing.

4.3 VOLUMETRIC TARIFFS

Equitable revenue allocation is based on the assumption that each customer group is allocated a share of the system costs based on the costs that they impose on the system. There are no simple methods that allow this to be done with the accuracy required. Manukau Water Limited, therefore, approached the allocation of the wastewater revenue requirement by basing them on the volumes of wastewater discharged by each customer group. The volumes of wastewater discharged were estimated, based on industry data and from site audits undertaken by Manukau Water Limited.

For residential customers, it has been assumed that as a group, 75% of the drinking water sold was discharged as wastewater. For non-residential business customers, the factors were derived from customer audits, known industry statistics and available records. Some customers discharge all the drinking water they purchase, others discharge only a fraction (such as ice-making companies, soft drink, juice and beer manufacturers) while a few discharge more than 100% because they have their own bore water source.

The percentage of wastewater discharged by and the percentage of revenue required from each customer group are shown in table 1. When comparing the revenues collected for each group based on the prevailing tariffs in 2006/07 to the volumetric-based tariffs shown in Table 1, business customers were subsidising residential customers. This was particularly true for businesses using less than 100 m³ of water a year.

Table 1: Volumes and cost share among customer categories

Customer group	Percentage of total discharge volume	Percentage of revenue of total
Residential	75	74
Non-residential (communities)	2	2
Non-residential (business, trade waste and other)	23	22
Rural (no water service)		2

4.4 PROPOSED TARIFF STRUCTURES

4.4.1 GENERAL

It became apparent very quickly that the only simple, and fair allocation of volume-based cost allocation, was obviously to have a fully volumetric wastewater tariff structure. This would be much like the water tariff structure. It was simple, easily understood, and would heighten the signal to conserve water.

However, it failed to meet some of the other criteria. It would create greater risks to the company in terms of revenue and would place the financial aspirations in conflict with environmental objectives. Further, while it would be accepted by low water using customers, it was not equitable amongst the larger family households.

Selecting an appropriate tariff structure requires striking a balance amongst conflicting social, environmental, cultural and financial drivers. It was decided to recommend to the Council a fixed plus volumetric wastewater tariff structure. However, as it was not a totally volumetric tariff structure, the equity issues around different customers would have to be met by adopting different tariffs for residential customers and non-residential customers.

4.4.2 RESIDENTIAL CUSTOMERS

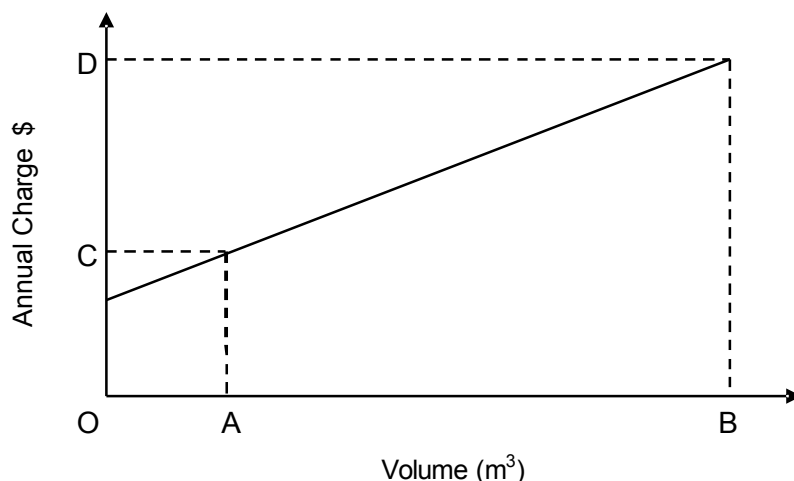
The review concluded that the most appropriate residential wastewater tariff structure for Manukau Water Limited would be one with a fixed annual charge and a volumetric charge. The approach taken was to recover all of Manukau Water Limited's costs, excluding what it paid for bulk wastewater, as fixed costs. The volumetric component for residential customers was then taken as the bulk wastewater costs, divided by the volume of water sold to the residential customers after it had been factored down by 75%.

With such an arrangement, future cost increases due to costs within Manukau Water Limited, which was required to be within consumer price index in the company's statement of intent, will be reflected in the fixed component of the wastewater tariff structure. The volumetric charge would increase at the same rate as the increases in the bulk wastewater charges to Manukau Water Limited.

4.4.3 NON-RESIDENTIAL CUSTOMERS

The fixed plus volumetric wastewater tariff structure for non-residential customers would be retained. However, the fixed annual charge would be the same as the fixed residential charge and there would be no annual allowance (refer Figure 7). All non-residential customers would have the same tariffs. The rebates provided to schools would cease. Not all of the Manukau Water Limited costs would be fully recovered from the smaller number of non-residential customers. Hence, the balance had to be recovered via the volumetric wastewater component with the bulk costs. However, while this ensured a consistent fixed annual charge for all customer groups, it would result in a different volumetric charge from that for residential customers.

Figure 7: Fixed plus volumetric charge



4.4.4 PHASE-IN TO REDUCE INCIDENCE

The proposed change would have a large, and unexpected, impact on the high water users among the residential customers. Further, by removing the ring-fencing, an average 24% increase in residential wastewater charges will result, with corresponding reduction amongst businesses using low volumes of water. Similarly, residential customers that used low volumes of water would pay less than what they did under the fixed wastewater tariff structure. However, residential customers that used between 300m³ and 600 m³ of water per year would face increases of between 40% and 120% a year.

Given the extent of the adverse impact on some customers, it was proposed to remove the subsidies over a four year period.

4.5 AFFORDABILITY

With almost 100% universal metering, drinking water in Manukau City has been sold on a volumetric basis for over a decade. However, Manukau Water Limited, and Manukau City prior to it, has had difficulty in collecting revenues from a small segment of its customers. This group includes those who cannot pay as well those that will not pay.

With an increasing volumetric component to the total water and wastewater charges, the vulnerable group will be the larger families on lower household incomes. Their inability to pay will result in increasing aged debtors, increased costs of recovery, and increased bad debts. Generally, the burden created by those who do not, or cannot, pay is met by those who do pay.

As shown in Figures 8, 10% of the households have an annual income of less than \$20,000. Approximately 50% of the households have an income in excess of \$50,000 per annum. Without the ability to match customers to income levels, averages have been used to reflect affordability consequences.

About 10% of the residential homes serviced by Manukau Water Limited belong to Housing New Zealand. It is probable that 10% of the low income (less than \$20,000 annual income) overlap with the 10% of Housing New Zealand tenants. What is relevant, however, is that Housing New Zealand tenants do not pay for water and / or wastewater charges. Therefore, the affordability test moves away from the tenant to the government agency.

In its report (2004), the Department for Environment, Food and Rural Affairs (defra) in London, found that the average water cost burden on the lowest income quintile across England and Wales was forecast to be around 2.6% in 2009. For the highest income quintile, the water cost burden was expected to be about 0.5% of disposable income.

The select committees recommendations on water affordability included the following comments:

Recommendation 9: Fixing bills at the level that the poorest in society can afford to pay would jeopardise the improvements in services and quality that have undoubtedly been made and would fail to emphasise that water is valuable resource ...

Recommendation 10: People suffering from serious difficulty in paying their bills should be helped through the benefits and tax systems. The Government should review the way in which poorer households are helped with their water and sewerage charges. It should ensure that mechanism to help people pay their water bills take account of the regional variation in those bills.

Recommendation 20: Water prices are going to continue to rise for the foreseeable future. As a result there will be an increasingly large proportion of the population on lower incomes that will find it difficult to pay water bills ... People suffering from serious difficulty in paying their bills should be helped through the benefits and tax system.

Recommendation 21: It is unacceptable that paying customers subsidise bad debts by an average of £10 per year, an amount which is likely to increase as water prices rise unless the issue of affordability is addressed ...

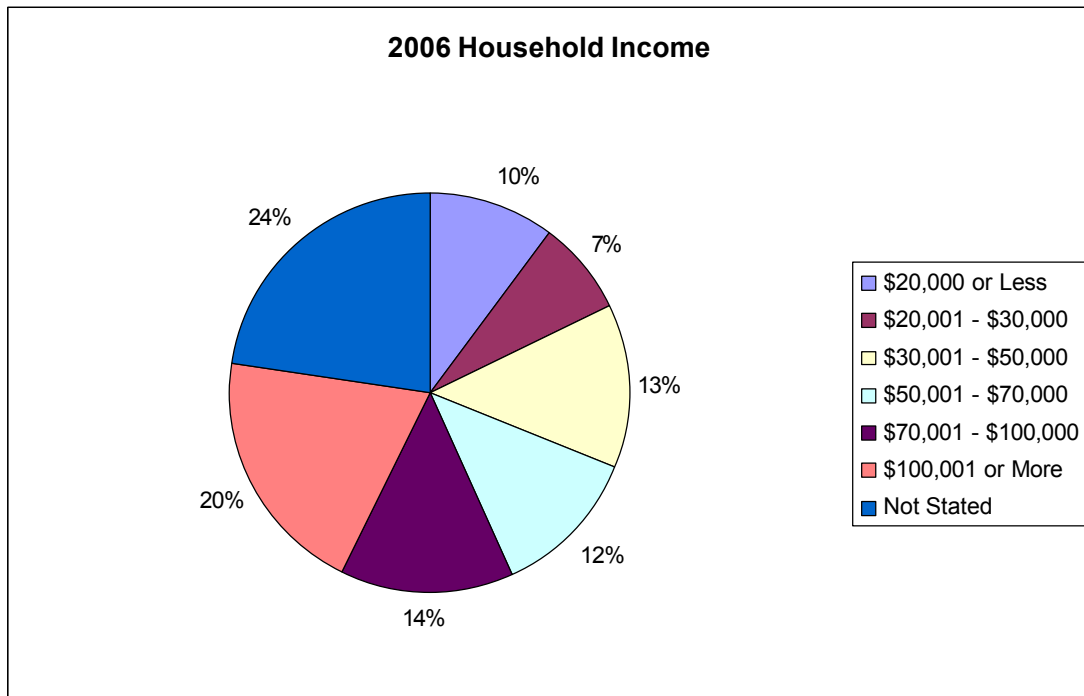
While the comments above were for England and Wales, and for a community that still has a charging system for water services based on rateable value, they had relevance in the Manukau context.

The defra report (2204) used a three percent of household income as a threshold indicator of water affordability. It used water affordability as one of its sustainability indicators, tracking the number of households in Great Britain that had spend more than three percent of its household income on water charges. It found that the number of households that paid more than three percent of its income was nine percent.

In the United States of America, the Environment Protection Agency (EPA) has set a general guideline of two percent of median household income for each of the two services, water and wastewater. This equates to four percent of median household income as being the maximum that should be spent on water and wastewater services.

According to the 2006 census from statistics New Zealand, the median household income in Manukau City for 2006 was \$62,300. A defra three percent household income threshold would equate to \$1,860 – applicable to both water and wastewater services. Using the EPA criterion, the wastewater affordability index of 2% would begin to apply for households paying over \$1,245 a year.

Figure 8: Household income in Manukau City



4.6 COUNCIL'S DECISION

The Council received the report from Manukau Water Limited and deliberated and debated the proposals at council forum and committee meetings. The proposal was included in the Manukau City Council annual planning process in early 2008. Written and verbal submissions were received.

Following the process, the Council resolved to retain the fixed annual wastewater charges for residential customers. The concerns raised around large households having to pay substantially more were possibly a key deciding factor. However, it did resolve to remove subsidies from small businesses to residential customers over four years.

As can be expected, the retention of the fixed wastewater tariff structure for residential customers was not well received by customers that have a very low water use. Unfortunately, when comparing with a totally volumetric water tariff structure, a totally fixed wastewater tariff looks very *unfair* to this group of customers. Manukau Water Limited did, at the request of the Council, consider a fixed and variable tariff structure for its drinking water services. A combined water and wastewater fixed and volumetric tariff structure would, quite by coincidence, have arrived at the fixed component being about the fixed wastewater charge and the volumetric component being the prevailing water charge.

Therefore, it was found that the residential customers were actually being asked to pay for their water and wastewater services in a fair and equitable manner. Unfortunately, the transparency of separating water and wastewater services but retaining a completely volumetric tariff structure for one and a totally fixed tariff structure for the other, has created a perception of unfairness.

5 CONCLUSIONS

5.1 WATER SERVICES ARE NOT FREE

Water services are provided to customers at a cost. Even with raw water being obtained at no resource cost, there are costs in abstracting, treating, storing and transporting this to the customer. The notion that public water supply was a basic human right and needed to be provided for free, can only be achieved by obtaining financial resources from elsewhere. It is not possible for everyone to avoid paying for water services; someone will pay the financial and environmental costs.

This is true for water as well as wastewater services.

5.2 SEND CUSTOMERS A SEPARATE BILL FOR WATER SERVICES

Customers reach the conclusion that their water service is free when they do not have transparency in their charges from councils. The lack of a separate bill for water services results in the majority of ratepayers reaching the conclusion that their water service is provided for free. A separate water and wastewater invoice/rates assessment sent to customers at appropriate intervals will reinforce to them that these services cost money.

5.3 TARIFF STRUCTURES MUST COLLECT SUFFICIENT REVENUES

The main purpose of the tariffs is to collect sufficient revenues from the users of water and wastewater services to pay the operations and maintenance costs, repay loans, create and replace assets and the like. If the cost recovery and economic efficiency objectives were not able to be met, the service quality will decline.

5.4 YOU CANNOT MANAGE WHAT YOU CANNOT MEASURE

It is an old management adage and is applicable to water management. It is fundamental to have appropriate metering to measure the volumes of water abstracted, treated and sold to customers. Monitoring of the abstraction volumes is necessary for environmental and water resource management. Measuring the volumes sold to customers is important for recovering sufficient revenue from customers. Analysis of the volumes abstracted, treated and sold provides opportunity to measure the financial and system efficiency of the water supplier's operation and management of the infrastructure.

5.5 CUSTOMERS MUST RECEIVE INCENTIVE SIGNALS

An appropriately designed tariff structure should send a signal to the customer that water is a valuable resource and that it should be used efficiently. Customers will change their behaviour to use public water efficiently and only for high value activities when they know that they can avoid costs. A tariff structure that requires customers to pay more for water if they use more, sends the signal that they can save costs by reducing wastage. A tariff structure that has the same charge regardless of consumption does not provide the customer with any incentive to reduce wastage.

5.6 WATER TARIFFS SHOULD NOT BE USED FOR SOCIAL POLICY

To ensure improvements in service and quality are not compromised, sufficient revenue needs to be collected via the water tariffs. It is not fair to charge lower water prices to low-income customers. It is also not fair to provide residential customers services at lower prices by placing a greater obligation on business customers. The cost of the water service is the same, and the price need to be the same for equity reasons. The affordability question should be addressed by local and central government agencies by providing assistance schemes to low-income households. The assistance should not be sought via the price of public water service.

5.7 WATER TARIFF STRUCTURES WILL BE CONTROVERSIAL

The pricing of water services is always going to be controversial. It is difficult exercise to reach agreement on the objectives of the tariff structure. The tariff structure affects social, environmental, cultural and financial

objectives and the achievement of one outcome is generally in conflict with the other. A balance has to be struck to achieve the purpose. It is, therefore, extremely important to debate, understand and define what the strategic purpose of the organisation is and how the tariff structure aligns itself to that vision.

5.8 IMPLEMENT NEW TARIFF STRUCTURES WITH CARE

While arriving at the most suitable tariff structure is difficult, the manner in which the new tariffs are implemented can create even greater difficulties. One of the major issues to be aware of is the extent of the incidence; that is the degree of change that customers will face from what they used to pay, to what they will be expected to pay. Early engagement of all customers is important. However, most customers tend to fully appreciate the implications of the new tariff structure when they receive their first bill. By this stage, it is too late for them to influence any changes. The planning of the implementation must take careful consideration of the potential for “shock” and the ease of implementation (Boland, 1993).

5.9 DON'T CHANGE TARIFF STRUCTURES FREQUENTLY

Every time the tariff structure is changed, it will adversely impact on some customers while benefiting others. It is important to ensure that the tariff structures are relevant over time. However, rushing into the establishment and introduction of tariff structures with poor understanding of the consequences will require a subsequent revision.

5.10 THERE IS NO ONE UNIVERSAL TARIFF STRUCTURE

A tariff structure that is effectively working for one water supplier is not as likely to work for another. While core principles can be applied across different water entities, the goal of each organisation is very different. For example, organisations facing severe water scarcity would place higher emphasis on the objective to reduce water demand. On the other hand, it would be quite inappropriate for an organisation with plentiful supply of water for most of the year with a seasonal peak demand issue to adopt an increasing block tariff structure.

5.11 TARIFF STRUCTURES SHOULD ASSIST DEMAND MANAGEMENT

While it is accepted that water prices tend to be fairly inelastic, numerous examples can be cited where customers have reduced their water demand in response to what they perceived was a substantial increase in price. Volumetric water tariff structures send a clear signal to customers that they have the ability to avoid costs by reducing water demand. They have the ability to choose what use they make of the public water supply and how they may choose to meet their other lower value needs.

The introduction of wastewater charges in the water bill/invoice has been received by customers as a “doubling” of water charges, with a noticeable reduction in water use. The introduction of volumetric wastewater charges has had the similar impact to that of introducing a volumetric water charge.

While it is difficult to agree on exactly what may happen to water demand with the introduction of different water tariff structures, there is little disagreement on the effectiveness of volumetric water, and wastewater, tariff structures on demand management.

5.12 SHORT TERM PAIN FOR LONG TERM GAIN

Volumetric water tariff structures have been shown to be effective for demand management. Similarly, wastewater volumetric charges and increasing block tariffs for water are known to further heighten the success of reducing water demand. However, much of a water suppliers costs are fixed. While demand management will successfully defer capital investments, it is more than likely that the longer term savings will not be able to offset the immediate increases in water prices that are required to sustain the organisation's revenue requirements.

If the costs remain about the same and fewer units of water are sold, the unit cost of water will increase. The contradiction of rewarding customers for reducing their demand by increasing the unit price of water is too complex for most people to understand.

Table 2: Retail water prices 2005/06 to 2009/10

Financial Year	Water Price (m ³)	% increase
2005/06	\$1.107	
2006/07	\$1.143	3.3
2007/08	\$1.199	4.9
2008/09	\$1.280	6.8
2009/10	\$1.280	nil

Table 3: Fixed annual wastewater charges for residential customers

Financial Year	Wastewater Fixed annual charge	% increase
2005/06	\$313	
2006/07	\$320	2.2
2007/08	\$350	9.4
2008/09	\$399	14.0*
2009/10	\$399	nil

* includes an increase due to partial removal of subsidies by non-residential business customers

Table 4: Volumetric and fixed annual wastewater charges for business customers

Financial Year	Wastewater Volumetric charge	Wastewater Fixed annual charge	% change
2006/07	2.38	\$950*	
2007/08	2.60	\$1040*	+ 9.5
2008/09	2.68	\$600	- 42.3**
2009/10	2.71	\$482	- 19.7

* tariff provided an initial allowance of 400 m³ of discharge per annum before volumetric charges were applied

** includes a decrease due to partial removal of subsidies to residential customers

Table 5: Water serviced population

Financial Year	Serviced Population	% change
2005/06	334,270	
2006/07	341,680	+ 2.2
2007/08	348,590	+ 2.0
2008/09	354,970	+ 1.8

Table 6: Annual and per capita demand for Manukau Water Limited

Financial Year	Annual water demand (million m³)	Gross per capita demand* (l/p/d)	% change (per capita demand)
2005/06	36.55	300	
2006/07	36.36	292	- 2.7
2007/08	36.54	286	- 2.1
2008/09	35.03	270	- 5.6

* Gross per capita demand is the annual water demand, inclusive of non-revenue water, divided by the serviced population.

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Did you know...

...that in the past year the residential wastewater service charge - which was previously part of your council rates bill - has increased by less than 2 cents a day?

That's \$7 a year - or two flat whites (as long as you don't want soy milk with that).



www.manukauwater.co.nz

Did you know...



...that your annual residential wastewater charge is equivalent to just 88 cents a day?

That's less than \$1 a day to take away and clean all wastewater from your house - including water from sinks, showers, bathtubs, toilets, washing machines and dishwashers. You can't buy a newspaper or even a litre of petrol for that.

www.manukauwater.co.nz