ERA SUBMISSION

December 2004

AQWEST ERA SUBMISSION

Introduction

This submission details the pricing proposals of AQWEST – The Bunbury Water Board for the five year period from 2003/04 to 2008/09. The pricing proposals are to provide information to the Economic Regulation Authority (ERA) for a five year planning period to assist it in advising the Minister for the Environment in her annual approval of AQWEST's prices for the period.

Introduction to AQWEST

AQWEST is a statutory authority created in accordance with the provisions of the *Water Boards Act 1904* (The Act). The Board Members are appointed by the Minister for the Environment and must be customers of AQWEST.

The Board is responsible for the exercise of the powers and authorities conferred by the Act in the construction, maintenance and management of works for the storage and distribution of water within AQWEST's licensed water area. The water area at present is the local government area of the City of Bunbury (excluding Pelican Point) and the development area of the Preston Industrial Area in the Shire of Dardanup. AQWEST's current licence operates until 2022.

At present AQWEST is responsible for the provision of potable water to 12,352 residential and 2,169 non-residential customers. It operates six treatment plants with a daily output capacity of 38,500KL, four storage reservoirs with a capacity of 115 ML and distribution through 330 km of water mains.

As part of managing the water supply system the Board meets on a monthly basis and the meetings are open to the public and customers to attend. The Board's activities are audited on a regular basis by a number of agencies, principally the Office of the Auditor General for its financial performance and the Economic Regulation Authority (ERA) for Operational and Asset Management performance. In all aspects AQWEST has achieved an unqualified audit for the eight years since the COAG reforms were implemented. Customer Surveys conducted annually show a high level of approval of AQWEST performance by its customers. These customer surveys are appended at Appendix One, to provide further evidence of service levels provided by AQWEST.

Context of Review

A number of key issues have influenced this pricing determination circumscribing, in some cases, the level of detail which can be provided and in others, the types of solutions which are applicable. As these issues affect the submission in its entirety, they are discussed below.

Submission Timeframe

In the electricity and gas industry, under the *National Third Party Access Code for Natural Gas Pipeline Systems*, operators of covered pipelines are given 90 days to submit access arrangement proposals, which contain much the same information requirements as this submission. AQWEST, along with other water service providers, was given half that time at the outset of the process, to provide the same information.

It is understood by AQWEST that there are time constraints on the conduct of this inquiry that are set by Government. However, from the outset AQWEST has expressed concern about the amount of time it is being given to respond to the ERA requirements for information or submissions.

Whilst every effort has been made to provide accurate and detailed information within the timeframe required by the ERA, given the limited resources available to a relatively small organisation like AQWEST, the level of detail which has been provided in the report is less than would have been possible, had more time been available. In particular, the ERA requires projections on demand and supply with a time horizon of 30 years, which is very difficult to do robustly in the time provided. Whilst AQWEST regularly undertakes planning exercises as part of its prudent asset management, the most recent planning cycle has not coincided with the timing requirements of the ERA. The ramifications of this are discussed as a separate issue below, under the heading of Forward Planning. Where issues exist in this regard, AQWEST will happily discuss these with the Minister in order that she can make an appropriate finding in respect to the level of AQWEST's prices.

Staffing Requirements and Specialist Expertise

Given its small size, AQWEST does not employ any economic specialists, whose sole role it would be to ensure regulatory compliance. Thus, it was necessary for AQWEST to engage the assistance of external specialist consultants to assist in the preparation of this document, at a cost of approximately $25,000 to the organisation, which has been borne by AQWEST's customers and shareholders, the people of the City of Bunbury.

In addition to employing the service of external consultants, AQWEST has been forced to divert staff from their regular tasks, in order to provide the information necessary to prepare this submission, resulting in staffing costs of approximately $20,000. The total estimated cost of $45,000 over a customer base of 14,521 is a cost of $3.10 per customer. In a domestic sense this represents 1.1% of the average domestic bill.

The short timeframe has meant that this has impacted significantly on staff ability to undertake their regular tasks. AQWEST's prime role is to provide water services to the people of Bunbury and, as such, has endeavoured to limit the amount of time these key staff devote to this submission, to avoid a potential degradation in service levels which might otherwise have occurred.

Corporate Model

The ERA methodology speaks of 'shareholders' and 'rates of return', implicitly assuming that the relevant model for a water service provider is that of a publicly limited company. However, the purpose of economic regulation is to mimic, as closely as possible, the pressures of a competitive marketplace. In a competitive marketplace, publicly limited companies are by no means the only corporate structure employed. For example, many companies remain family-owned, despite being substantially larger than AQWEST. Others, like law and accounting firms, are partnerships, owned by a subset of their employees. Still others, such as HBF in Western Australia, are cooperatives, owned by their members. There is nothing in economic theory which suggests that the only relevant proxy of a competitive market

is a publicly limited company. In fact, where actual competition is occurring in the water industry, in the UK, a number of corporate structures are emerging. In particular, Dwr Cymr, in Wales, has become a community-owned cooperative, and many other UK utilities have examined a similar approach. AQWEST believes that its current corporate structure, restricted in no small part by the historical influence of its governing Act, is best proxied by the type of community-owned cooperative which has developed in Wales. That is, the shareholders of AQWEST are its customers in the City of Bunbury.[1] This has an influence on the setting of prices and the relevance of rates of return.

The Water Boards Act 1904 and AQWEST's Potential as a Competitive Business

The basic principle of economic regulation is an endeavour to proxy the operations of a competitive market and, more particularly, its pressures on firms. In the case of AQWEST, however, its governing legislation, the *Water Boards Act 1904* needs to be considered. In particular, the Act specifically prevents AQWEST from engaging in a number of activities which a firm not covered by the Act would have pursued, such as:[2]

- Public-private partnerships.
- Providing services outside its gazetted area, including new developments near Bunbury, such as Kemerton and Dalyellup.
- Undertaking synergistic services, such as sewerage and drainage, water reuse and consulting, in conjunction with water services, which most water service providers in Australia do.
- Making a profit for the benefit of its shareholders in Bunbury.
- Undertaking works without Ministerial oversight.
- Receiving CSO payments in a manner similar to other water service providers in the State.
- Acquiring land, where necessary, with powers consistent to those enjoyed by other water service providers in the State.
- Accessing financing with the flexibility of a commercial organisation.
- Accessing and managing assets which AQWEST does not own.

As discussed in the context of operating expenditures, this has had an impact of some $3 million per annum on AQWEST's business and, by extension, to the water costs of its customers. More importantly, perhaps, the restrictive requirements of the Act have an overall influence on the way in which AQWEST is able to efficiently conduct its business. This is difficult to quantify, as it has been a component of AQWEST's business since its inception 100 years ago, but all of the benchmarking comparisons in

[1] In the past, arguments have been made that the WA State Government is a (or even the only) 'shareholder' in AQWEST, by virtue of the fact that it would be required to assume ownership of AQWEST's assets should it become bankrupt. However, such a role does not make it a shareholder, but rather a liquidator. By definition, a shareholder contributes equity to a firm. Since its inception in 1905, the State Government has contributed no equity to AQWEST. For the purposes of economic regulation, it seems counterintuitive to consider the State Government as an equity holder in AQWEST.

[2] These issues will be familiar to the ERA, as they were highlighted by its predecessor, the Office of Water Regulation, in its review under National Competition Policy of the *Water Boards Act 1904*. Recommendations to amend the Act to address these issues went before Cabinet in 2000, following the review, but these amendments have yet to occur. As both the current and above-mentioned reviews form part of National Competition Policy, it is frustrating that the application of the Policy seems to be selective and patchy.

this submission need to be considered within the context that AQWEST, and none of the firms with which it is compared, is impaired by the restrictions inherent in its governing Act.

AQWEST realises that consideration of its governing legislation is beyond the scope of this review, which narrowly considers the appropriateness of pricing. However, the overarching concern of reform in the water sector is the efficient provision of water services to the public. From this perspective, AQWEST would urge consideration of the appropriateness of its Act, as it has done consistently for the past nine years.

Forward Planning

AQWEST regularly undertakes a process of planning to ensure future provision of services is maintained at an appropriate level. Although the planning cycle has not coincided with the requirements of this submission, AQWEST has been able to access data from past planning exercises to inform this submission. There is, however, an issue with this approach as, in this instance, history may not be an accurate forecast of future requirements.

The reason for this is simple; water pipelines last approximately 100 years and AQWEST will be 100 years old next year, meaning that pipeline replacement may begin within the next five years. The first pipelines to be replaced may be those in the centre of Bunbury which is likely to be costly because of the need to avoid existing services and to reinstate footpaths, roads, gardens etc. AQWEST has been gathering background data to inform its planning decisions for a number of years, and has been preparing for funding this asset replacement through augmentations to its asset replacement reserve However, it had scheduled the detailed planning phase of this asset replacement process to begin towards the end of this year, and into next year. As such, it does not have detailed information on the costs and optimal timeframe for such asset replacement. This exercise, of course, will take much longer than the six weeks provided by the ERA for this submission. Whilst every effort has been made to provide accurate information, the timing of the ERA review has not coincided particularly well with the separate planning process AQWEST is undertaking to ensure prudent asset replacement. Whilst AQWEST appreciates that a regulatory process designed to service the whole state cannot wait upon the conveniences of one service provider, it would like to point out that the prices developed in this document should be considered to be of a preliminary nature only and it may be necessary to change estimates in the near future, as its planning process provides more information.[3] As more information comes to hand, AQWEST will discuss any relevant changes in prices with the Minister.

Service Levels

Are the proposed levels of service provision consistent with the required standards and customers' expectations?

The level of service provided by AQWEST accords very well with both the requirements of the various regulators and the expectations of its customers and

[3] Note that the methodology need not change, but the actual values determined may do so.

shareholders, the people of Bunbury. Further details are provided below, and copies of relevant reports are appended at Appendix One.

AQWEST's levels of service are regulated by the Economic Regulation Authority and Department of Health. Regulatory instruments are the operating licence granted under the Water Services Coordination Act 1995 and the Memorandum of Understanding with the Department of Health.

The Operating licence stipulates standards in relation to the following matters:

- Customer complaints
- Processes for the investigation, conciliation and arbitration of customer complaints.
- The requirement to develop and implement a customer charter
- Community consultation
- The availability and connection of services
- Drinking water quality
- Pressure and flow
- Continuity of supply
- Drought Response

In addition the licence requires AQWEST to develop an asset management system that ensures that it is in compliance with the operating licence in the long term. AQWEST's SCADA and Mainpac Asset Management systems of asset management form key components of this compliance procedure.

Quarterly, six monthly and annual reports are prepared against the standards stipulated in the licence, indicating compliance with the operating licence over the long term. Copies of these reports since 1999 are attached at Appendix Two.

In June 2004 AQWEST entered into a Memorandum of Understanding with the Department of Health that specified the standard for drinking water quality and drinking water quality management. In particular the document set standards in relation to following issues:

- Drinking water quality (1996 Australian Drinking Water Guidelines)
- Water sampling
- Protocols for handling water quality incidents
- Source protection
- Catchment Management
- Use of pesticides
- Public education and information

This agreement significantly increased AQWEST's water sampling program. The results of the sampling program indicate that AQWEST is generally in compliance with the Australian Drinking Water Guidelines, although pH, Fe and Mn are occasional outside these guidelines. As such, AQWEST is meeting its regulatory requirements in this regard and not exceeding them, meaning customer willingness to pay for service levels higher than those required by regulation is not an issue.

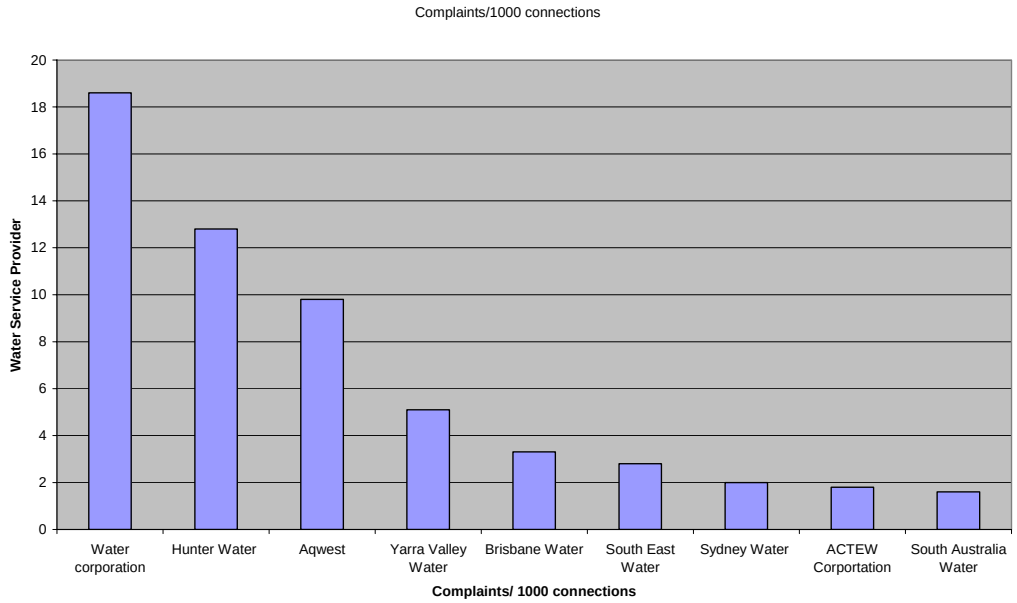
Complaints associated with Iron (Fe) and Manganese (Mn) are the most common water quality related compliant received by AQWEST. These complaints are caused by soluble Fe and Mn being delivered in the water of customers, causing water to become brown as the Fe and Mn is oxidised upon being released from taps or through contact with washing detergent. Over the last 3 years AQWEST has received an average of 134 Iron and Manganese related complaints. Table One summarise Iron and Manganese related complaints over the past 3 years.

Table One: Manganese and Iron Complaints

Year	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	*Total*
2001/02	9	9	10	50	21	5	10	20	8	5	6	15	***168***
2002/03	15	6	8	15	5	3	4	4	2	4	6	10	***82***
2003/04	7	11	20	42	14	20	8	6	6	11	1	6	***152***
Average	***10***	***9***	***13***	***36***	***13***	***9***	***7***	***10***	***5***	***7***	***4***	***10***	***134***

Figure One indicates AQWEST's performance in comparison to other Australian water service providers. The data have been taken from the *Inquiry on Urban Water and Waste Water Pricing* (ERA 2004). AQWEST receives approximately 9.8 complaints per 1000 connections, which is still much higher than the other providers. Most providers generally achieve less than 4 complaints per 1000 connections. AQWEST believes that this is an appropriate target. The Board has recently made a commitment to reducing the number of dirty water complaints to this level. It is expected that significant investment may be required, however the amount of work hasn't been fully scoped out at this stage and is not reflected in the current five year capital works program, but some of its ramifications are discussed following Figure One.

Figure One: Complaints Per Thousand Connections, Australian Water Providers

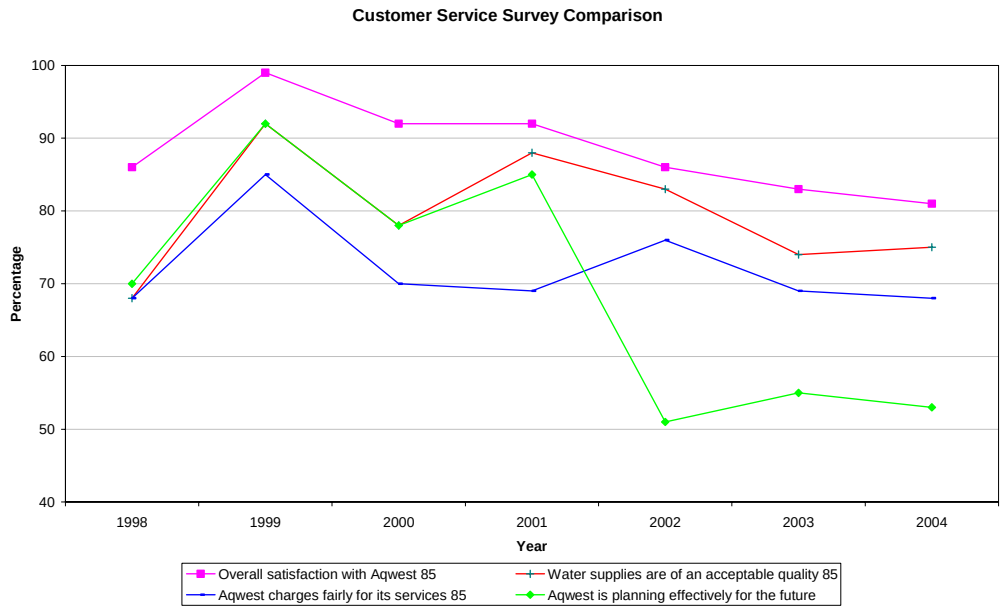


A significant body of research exists (Majerowski, 2004), (Raveendran et.al, 2002) which indicates that the current Australian Drinking Water Guideline limits for Fe and Mn of 0.3 and 0.1 respectively are too high to prevent the accumulation of these elements in the reticulation system and associated "Dirty Water Complaints". A number of Water Service Providers have adopted 0.1 and 0.02 mg/l as targets for these parameters including major providers such as Hunter Water Australia, demonstrating a willingness for customers to pay for this higher level of service. It is AQWEST's intention to adopt 0.1 and 0.02 mg/l as target for these parameters.

Preliminary work has been conducted to determine viable options for reducing dirty water complaints and to reduce Fe and Mn to 0.1 and 0.02 mg/l respectively. However, cost estimates have not been prepared at this stage. Work is expected to include some rationalisation of treatment facilities, process investigation and optimisation, installation of improved monitoring and control equipment, and more targeted flushing programs. It is expected that these items will increase the 5 year capital works program to some extent.

AQWEST conducts customer satisfaction surveys on an annual basis in accordance with its operating licence. The data series shows a decline in customer satisfaction in a number of areas particularly overall satisfaction with AQWEST services, overall drinking water quality and planning for the future. The surveys indicate that AQWEST's customers are becoming more demanding and are expecting a higher level of service than in the past. AQWEST believes that it's customers would be willing to pay the cost associated with the higher level of service that is being demanded. Figure Two contains a summary of the customer satisfaction data since 1998.

Figure Two: Customer Survey Issues (1998-2004)



All major investment decisions are approved by the Board of AQWEST and the Minister for the Environment with full knowledge of the impact their investment decisions are likely to have on prices. All AQWEST Board members are AQWEST

customers and are prominent members of the Bunbury community. The Board members are selected by the Minister for the skills and knowledge they bring to the organisation and it is felt that they are in tune with the Bunbury community and in a good position to understand the willingness to pay.

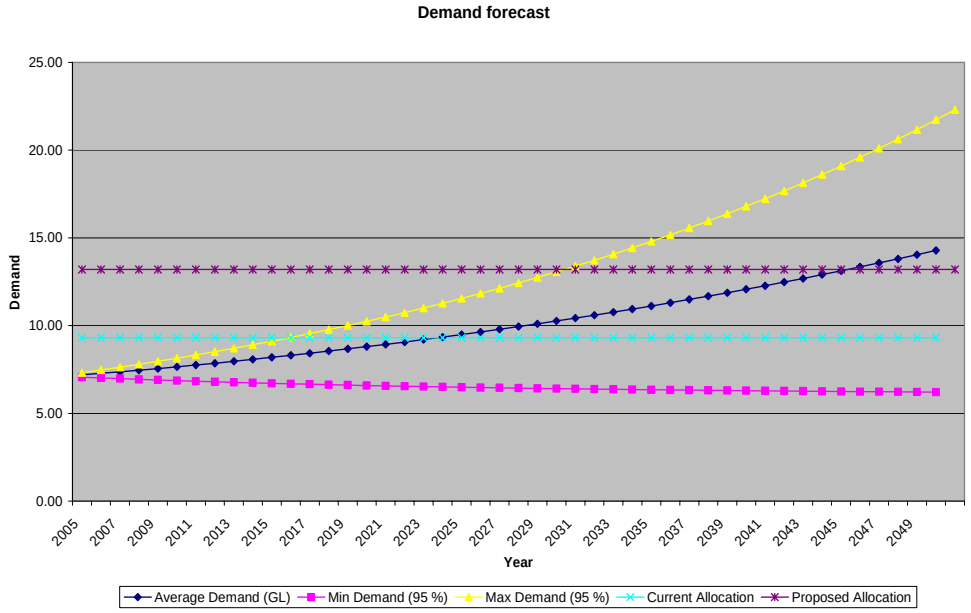
Provision for the Future

Is the strategy to balance supply and demand for the next twenty to thirty years appropriate?

AQWEST believes that, whilst appreciating the difficulties of planning over such a long-term planning horizon, it has secured sufficient water reserves, and relevant infrastructure, to maintain service levels over a time horizon of 20-30 years. Details are provided below.

AQWEST has secured an annual allocation of 9.2 GL of groundwater out of the Yarragadee Formation and has applied to the Waters and Rivers commission to secure a further 4 GL taking AQWEST's total annual allocation to 13.2 GL. It is expected that this will be sufficient to meet demand for potable water until at least 2030. Figure Three indicates forecasts maximum, minimum and expected demand out to 2050.

Figure Three: Demand Forecasts to 2050



In keeping with a minimisation of long-run marginal costs, AQWEST intends to defer investment in treatment system capacity and trunk distribution as long as possible. It does this through prudent demand management, which has seen reductions in demand per household of one third over the past twenty years, allowing it to delay capacity expansion over the past decade until 2004, and to decommission three treatment plants. AQWEST believes that demand management plays a crucial role in the minimisation of long run marginal cost and in maintaining prudent investment levels. Moreover, it has a proven record in this regard. This is shown in Figure Four, which

clearly shows an increasing number of services and fairly static overall demand over the past 30 years.

Current treatment capacity is 38.5 ML/d with peak day demand at 36 ML. Leaving a small security buffer of 2.5 ML to ensure that no customers are left without water during peak periods.[4] It is envisaged that investment in treatment plant augmentation will be required between 2007 and 2010 depending on increases in demand. In the circumstances in which AQWEST operates, augmentation of supply is not overly problematic. Estimates for this work have not yet been completed and have not been included in the five year capital works programme. As discussed in the introduction, this is part of AQWEST's ongoing planning; the timing of which has not coincided perfectly with the timing of this review.

Demand

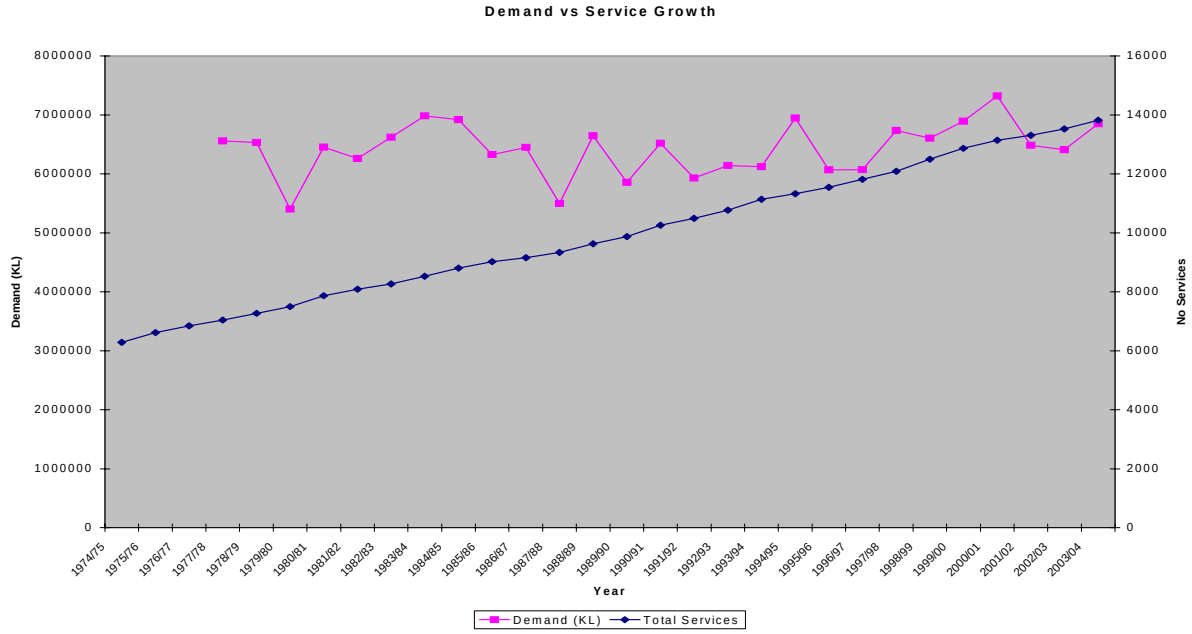
This section summarises relevant demand, and security of supply issues.

Demand Projections

Are the demand projections robust?

Historically the number of services has grown at a relatively constant rate averaging approximately 2.7% with a standard deviation of 0.82 %. However, demand has increased at a much slower rate since the late 1970's at between 5.5 GL per year and 7 GL per year as shown in Figure 2.1.

Figure Four: Demand Versus Service Growth (1974/75 – 2003/04)



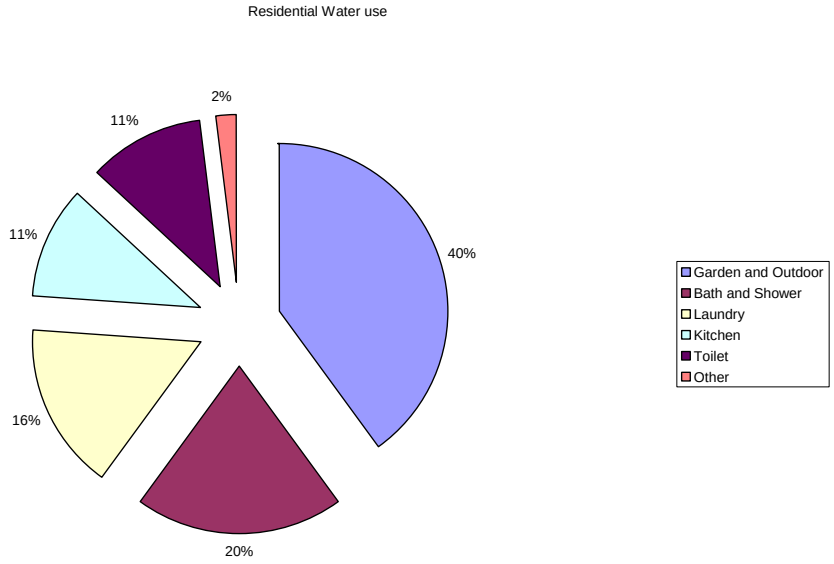
[4] Unlike other utilities such as electricity, gas and telephones, water is essential for the sustenance of human life, and it is simply not acceptable to consumers to have 'blackouts' in their water supply. For this reason, AQWEST maintains a security buffer.

This implies that the demand per service has been continually declining. Key demand drivers contributing to this decline in demand have been:

- The introduction of user pays pricing structures.
- The effectiveness of the sliding block tariff pricing regime which includes increasing rates as customers increase their water usages.
- AQWEST's demand management programs.
- Greater customer awareness of the need to conserve water.
- The introduction of water efficient appliances and fittings.
- The development of alternative water sources.
- Increasing housing density.
- The aging of the population.

Figure Five shows the drivers for residential demand. It is expected that over time Gardening and outdoor use would reduce as a percentage of overall water demand. However, overall demand is expected to continue to increase with population increases.

Figure Five: Key Drivers of Residential Demand



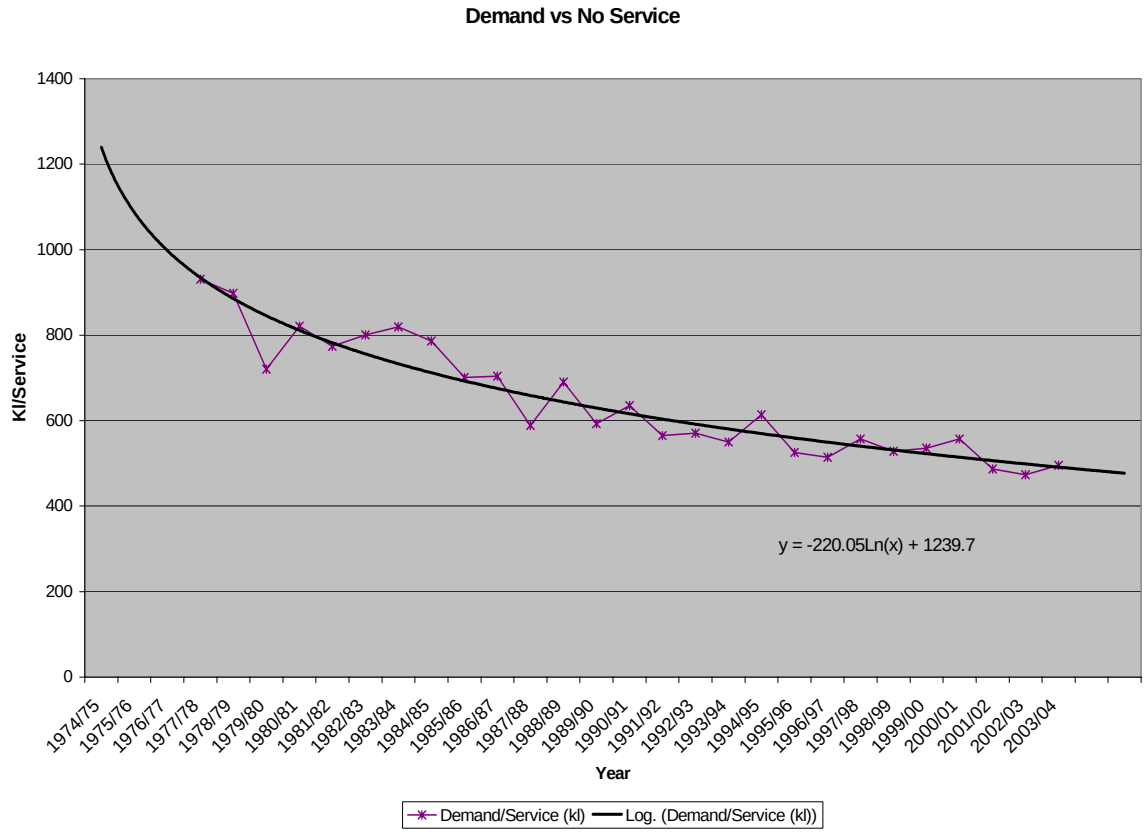
Currently, industrial and commercial customers are charged rates on the basis of Gross Rental Value (GRV). AQWEST intends to introduce a user pays based charging mechanism over the next 5 year period. It is expected that this pricing regime will significantly reduce the industrial and commercial demand. This is discussed further in the section addressing base prices.

This declining trend in demand is expected to continue particularly with the introduction of a user pays system for commercial properties, greater acceptance of alternative water sources eg effluent and grey water reuse and increasing housing density. However, the rate of this decrease in demand per service is expected to

decrease. Figure Six shows the historical demand per service, and projects future demand.

Regression analysis has been used to forecast demand, fitting an exponential decay curve to these data. This curve has then been used to determine the demand per service into the future.[5]

Figure Six: Historical and Projected Future Demand



An estimate for the minimum, average and maximum number of services to the year 2050 has been determined by extrapolation. The average assumes that the historical average growth rate will continue, the minimum assumes that growth will continue at the rate of two standard deviations lower than the historical average and the maximum assumes that growth will continue at two standard deviations above the historical average.

[5] This analysis does not include projections for different classes of demand. Given the short timeframe required by the ERA, AQWEST was unable to undertake new demand analysis, but had rather to rely upon existing work. The purpose of this existing analysis was to determine the amount of treatment capacity and ground water allocation that is necessary to meet future water demand. For this purpose it how the water is used was immaterial. AQWEST is currently in the process of forecasting demand by customer class, as part of its move towards a more consumption charge base for non-residential customers. However, this forecasting is not yet complete, and it would be premature to include it in this report.

The minimum, average and maximum annual demand to the year 2050 have been estimated by combining the estimates for service numbers and the model for demand per service. The forecast of the number of Services and annual water demand is shown in Appendix Three.

The assumptions underlying the regression model are as follows:

- Per capita residential demand will continue to decrease
- Customers will continue to adopt water efficient appliances
- Use of alternative water sources and grey water reuse will continue to increase

These assumptions are justified by a greater community awareness of water scarcity, programs such as the state water strategy and the continued use of pricing policies to control residential demand.

Table Two indicates the ratio of peak to average day demand. The average ratio is approximately 1.8. This ratio has been used to estimate the peak day demand to the year 2050. For the purpose of this exercise it has been assumed that this ratio will not change significantly. Peak day demand forecasts are shown in Appendix Four.

Table Two: Peak vs Average Daily Demand (1997/98-2003/04)

Year	Peak Day Demand (kL)	Average Day Demand (kL)	PDD/ADD
1997/98	35824	18448	1.94
1998/99	33265	18098	1.83
1999/00	34277	18884	1.81
2000/01	32200	20051	1.60
2001/02	29271	17760	1.64
2002/03	35049	17555	1.99
2003/04	35731	18758	1.90

Security of Supply

Is the security buffer justified?

The matter of a security buffer in the circumstances in which AQWEST operates is dealt with through a combination of adequate extraction and treatment capacity with service reservoir storage capacity. This combination allows the peak instantaneous demand and the variation in peak daily demand to be managed effectively. In off-peak (non summer) periods it also allows AQWEST to maximise the use of off-peak power. The value of this is demonstrated by comparing 1991's power costs of $823,800 and those from 2004 of $299,500 (both in 2004 dollars) representing a real decline of 64 percent.

AQWEST has access to water resources that will allow for the maximum projected increase in demand over the next 25 years and mean projected demand for the 40 years. The next source of supply can be relatively easily and quickly bought on line. Don't understand the previous sentence. Thus, only a minimal security buffer is required, and is available at essentially no cost to consumers.

The key issue in managing security of supply is in having the correct balance of supply and storage. This requirement was is modelled using AQWEST's computer

based network model. Augmentation of supply on the basis of the technology used by AQWEST to extract and treat water can be undertaken in small increments. These small increments are set out in the AQWEST 5-year capital works plan and will be achieved by increasing output of existing facilities. No major new treatment facilities are envisaged in the current 5 year planning period.

The history of AQWEST supply and storage capacity is such that the present supply capacity matches demand closely and has in fact decreased since 1984. AQWEST's storage capacity has not increased since 1988 and there are no plans to increase that capacity within the 5 Year Capital Works planning period.

In essence AQWEST's existing security buffers are considered to be adequate. For daily peak demand, the previously mentioned 2.5 ML buffer in treatment plant capacity has been adequate historically, and is considered most likely to continue to be so into the future.

Meeting Demand

The following discussion highlights AQWEST's methods to meet demand.

Source Development

Is the source development or wastewater-plant timetable justified?

AQWEST has a single, licensed access to source water that more than covers its 30 year median demand projections. The assessment of different options is therefore not considered necessary and it has not been considered appropriate to fund such analysis.

Demand Management

Is an economic level of demand management demonstrated?

AQWEST has long had a very pro-active demand management programme in operation, and can demonstrate a high level of success with its demand management strategies. Table Three shows that average domestic consumption has been decreased from 536kL in 1984 to 341kL in 1992 and that level of consumption has been maintained over the last 12 years. Total system demand has been kept at levels last seen in 1984 and during this period three outdated treatment plants have been decommissioned, this represents a capital cost saving of roughly $9 million. At an interest rate of nine percent per annum, this represents an opportunity cost of capital saving of approximately $800,000 per annum.[6]

[6] This does not include operating and maintenance cost savings. Interest rates are the average 10-year Commonwealth Treasury Bond rates since 1985, when decommissioning began.

Table Three: Water Production and Consumption (1982 – 2003)

Year	Water Production (kL)	Average Domestic Consumption (kL)
1982	6,290,000	508
1983	6,620,000	525
1984	6,981,214	536
1985	6,919,235	478
1986	6,324,555	460
1987	6,448,025	417
1988	5,495,870	375
1989	6,644,143	347
1990	5,856,502	368
1991	6,517,253	376
1992	5,928,870	341
1993	6,142,456	342
1994	6,122,312	340
1995	6,947,610	375
1996	6,066,883	331
1997	6,071,013	329
1998	6,557,926	322
1999 (9 months)	5,671,949	295
2000	6,893,000	317
2001	7,318,000	350
2002	6,482,580	300
2003	6,407,652	302
2004	6,846,786	341

The total range of Demand Management Strategies except for retro fitting household water saving devices has been employed by AQWEST. The key elements of this program have been:

- Pricing structure
- Water loss program
- Meter replacement program
- Public relations program

The most effective strategy is considered to be the pricing structure. AQWEST set a target average domestic consumption level of 350kL and based its pricing strategy around providing the 350kL at full cost recovery and applying increasing charges for increasing bands of consumption. The upper band levels involve a penalty for excessive usage. It is important to reiterate that differential charges are a demand management measure, not a tool for cross subsidisation and not an indication of price discrimination. Price discrimination (itself often the most efficient response to differing elasticity of demand amongst users, even if it does involve some cross subsidy, see Baumol & Bradford, 1970) implies that the most elastic portions of the demand curve are charged the lowest prices. In the case of AQWEST's charging regime, a higher rate is charged for increased consumption, where demand is more elastic. Thus, it is difficult to ascertain how AQWEST's penalty rates could be perceived as price discrimination.

It is interesting to note that a key element of the State Water Strategy (WA Government, 2002) was to increase the price of domestic water in the upper usage bands. As the strategy notes (Ibid, p23):

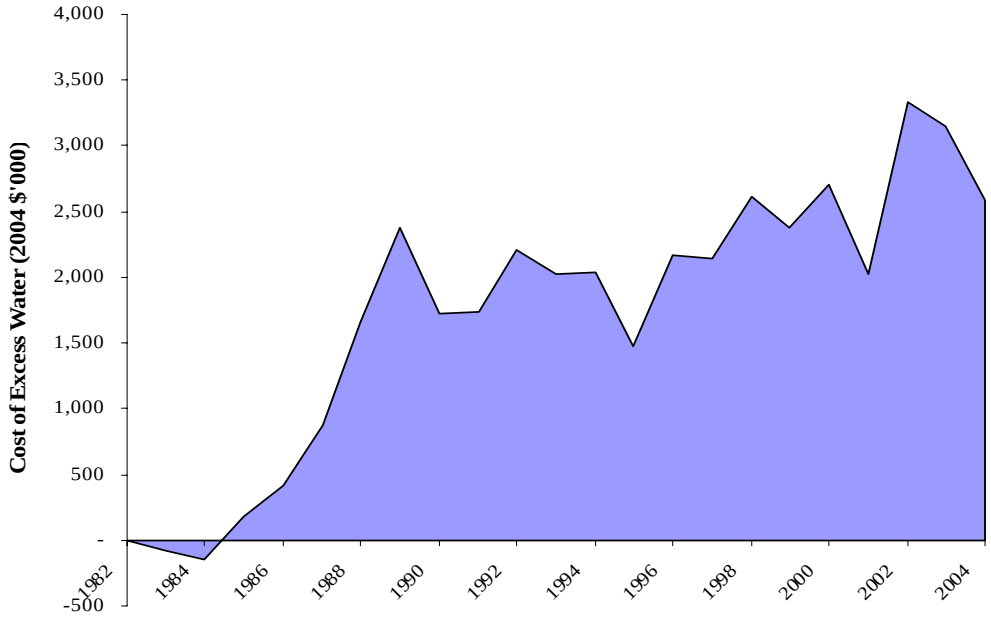
"The Government will substantially increase the price paid by Water Corporation domestic customers who consume more than 550kL in excess of general price movements to encourage the adoption of waterwise practices. For metropolitan consumers the price for water consumed between 550- 950kL will increase by up to 20 per cent to $1.20 per kilolitre. For water consumed above 950kL the price will increase to $1.50 per kilolitre."

As the Strategy recognises, price is a very effective demand management tool, particularly for marginal consumption. It is for these reasons that AQWEST has historically used price to manage demand, and it underpins its success in doing so. It would seem counter-intuitive to now cease to use this effective tool, given past success and the broader Government policy framework in respect to water policy.

The effect of the pricing strategy is that the impact of price increases does not wear off. If a consumer increases their consumption above their normal pattern they will incur a cost penalty which acts as a reminder. It also allows consumers to have control to some degree over what they spend on water. The other benefit is that AQWEST has been able to maintain revenue levels while reducing demand without increasing the cost of water to responsible users.

Annual expenditure of $25,000 on water conservation publicity is the only cost that can be attributed to demand management as meter replacement and the water loss program are seen as normal operation and maintenance expenses. This $25,000 represents about 0.3% of revenue and is seen as minimal but as history shows, highly effective. The benefits are shown in Figure Seven, which shows how much extra it would have cost AQWEST, in 2004, to service demand, on an annual basis, had average domestic consumption stayed at the same level as it was in 1982.

Figure Seven: Additional Water Costs Incurred Had Consumers Maintained 1982 Water Consumption Levels.



As may be seen, real savings reached more than $2.5 million per annum by 2004. Whilst it is recognised that diminishing returns in terms of the efficiency gains possible in water use by consumers means that future water savings may be smaller than they have been in the past, it is intended to maintain existing water conservation strategies at present levels.

Leakage and Losses

Is an economic level of leakages and losses documented?

AQWEST has taken a careful and pro-active stance on leakage detection and prevention. Details are provided below.

Water industry data for distribution system losses indicates levels as low as 5 per cent and up to 25 per cent in OECD countries (according to the UK Environmental Agency). The lowest figure reported is from Singapore, which employs a pro-active leakage detection and pressure reduction programs, and reports a UFW figure of 4.9 per cent.

Bench marking data indicate the best practice for unaccounted for water is 8 % with 10 % being generally recognised as an economic level of unaccounted for water (Lambert, 2002) given the costs of leakage detection and prevention. A review of key performance indicators revealed that AQWEST's unaccounted for water figure for the 1999- 2000 financial year was 19.6 % it is now 13.5 %. Analysis indicated that the high unaccounted for water figure was due to inaccurate metering, unauthorised consumption and real system losses. A further indicator is the International Leakage Index (Lambert, 2002) which determines an economical level of system leakage, based on the costs associated with leakages and the costs associated with detecting and fixing leaks. The index indicates that the economic level is <1.5 meaning that marginal returns from leak detection work exist at below this level. AQWEST's index has gone from 2.35 to 1.6 over the last 3 years meaning that according to the index it is still economical to conduct some leakage detection work.[7]

The 19.6 per cent figure based on AQWEST's total delivery represented a loss of 1350 ML a year. This was the equivalent to the average annual consumption of 4265 residential properties and had a commercial value of nearly $1,000,000.

Actions taken to rectify the problem include:

- Active meter replacement program – research, bench top testing and AQWEST's experience indicates that it is cost effective to maintain an average meter age of 7 years. The meter replacement program replaces meters on an annual basis to bring the overall age of the network fleet down to 7 years. AQWEST's figures indicated that the programme saved approximately $150,000 last financial year.
- Metering of fire services to reduce the amount of unauthorised usage.
- Night flow analysis followed by leak detection and repair.

[7] Whilst the Index is useful, it can for technical reasons lead to unreliable results. For this reason, it is not a central part of AQWEST's planning processes.

AQWEST target for unaccounted for water is 10 % which is in line with industry estimates of the economic level of unaccounted for water. It is envisaged that this target could be met by 2007 depending on the success of the loss management programme.

The cost of this program is approximately $150,000 per year. Return on investment is considered very good when all cost savings are taken into account, eg the volume of water saved, additional revenue and deferment of capital expenditure. Payback generally occurs within the first year of leakage reduction programmes being implemented.

Revenue Requirement

Is the level of required revenue for each year justified?

The discussion below provides a justification for the required revenue and highlights how revenue levels are appropriate given projected costs and demand.

Initial Value of the Regulatory Asset Base

Is the initial value of the regulatory asset base appropriate?

N/A: As the methodology paper notes, the ERA is not requiring AQWEST to provide estimates of its regulatory asset base.

Capital Expenditure

Is the capital expenditure programme appropriate?

Over the course of the next five years, capital expenditure will total approximately $11,067,900 or approximately $2.214 million per annum. AQWEST believes that this expenditure is both appropriate and necessary to maintain system integrity and water quality, as is discussed below. It also compares well with other similarly sized water utilities around Australia. However, it should be made clear that Bunbury is one of the fastest growing cities in Australia, with substantial developments planned in areas like the Outer Harbour, as well as increasing urban density. AQWEST is undertaking ongoing dialogue with the City of Bunbury to ascertain how this will impact on ongoing capital expenditure requirements, and this may influence the capital expenditure projections below. Where this has the potential to influence prices, it will be discussed with the Minister as part of her annual pricing review. Table Four provides some details of the major expenditure items. Further detail on capital expenditure is provided in Appendix Five.

Table Four: Capital Expenditure Projections (2003/04-2008/09)

	2003-2004 Budget	2004-2005 Projection	2005-2006 Projection	2006-2007 Projection	2007-2008 Projection	2008-2009 Projection
Investment on Sites	$2,054,000	$2,209,000	$1,115,000	$1,585,000	$840,000	$1,005,000
Investment in Mains	$597,900	$235,500	$240,800	$250,800	$280,800	$311,000
Investment in Equipment	$507,495	$379,500	$233,500	$250,000	$520,000	$265,000
Other Investment	$277,000	$213,000	$259,000	$183,000	$509,000	$183,000
Total Investment	***$3,436,395***	***$3,037,000***	***$1,848,300***	***$2,268,800***	***$2,149,800***	***$1,764,000***

The major expenditure items driving capital expenditure are as follows:

- Installation of a 500mm trunk main from the Tech Water Treatment Plant to Robert's Reservoir ($2.6 million over five years).
- Plant purchases totalling $1 million over the next five years.
- A mains subdivision costing $920,000 over five years (as per Water Supply Planning Report – Gugich and Associates Pty Ltd, see Appendix Six).
- A meter replacement programme, costing $850,000 over the next five years.
- An upgrade of treatment capacity to increase production capacity at Tech School to 14 ML/day ($750,000 in 2003/04).
- An ongoing mains replacement programme based on modern asset management practices, costing $600,000 over five years.

The trunk main is necessary because computer based network analysis carried out by an independent consultant highlights a difficulty in maintaining the required standard of pressure and flow in the rapidly redeveloping northern end of the city.

The plant purchases are necessary because historical experience has shown that a two-year plant replacement cycle is the most economical to provide AQWEST with a reliable vehicle fleet to ensure operations and maintenance activities are delivered to the required standards.

The mains subdivision expenditure is demand driven by the land development industry. It is an estimate only based on historical activity and can vary significantly with the cycles of the land development demand and supply. Subdivision mains expenditure is matched by income from the land development properties and largely has no impact on customer charges.

The impact of taxes on headworks, however, is a different matter. In accordance with the National Tax Equivalent Regime developed by Treasury, gifted assets and cash contributions made by developers for the provision of infrastructure or Headworks is considered revenue and thereby contributes to the organisations bottom line. In effect what that means is that all income from developers is subject to 30% tax. This requires AQWEST to increase revenue to offset the tax and maintain the headworks revenue for the purpose for which it is raised i.e. - the provision of infrastructure or headworks. This is a volatile source of revenue that is not controlled by AQWEST and does not result from any investment or business activity conducted by AQWEST. Although strictly speaking not part of this review process, the volatile effect of this

regime, together with its questionable benefits, merits further review as to its appropriateness.

The meter replacement program is necessary as effectively these meters directly impact on customer revenue. Research conducted by AQWEST (see Appendix Seven) has shown that there are considerable revenue losses incurred by aging meters that record slower as they get older. A trial conducted in 2002/2003 has indicated a one year pay back period is achieved with an accelerated meter replacement program.

The production capacity upgrade is necessary because growth and consumption have caught up with existing production capacity. The proposal is for a limited augmentation of an existing plant that will meet growth based demand increases to the end of the 5 year planning period.

The mains replacement program is based on an analysis of the age profile of the water mains database, a review of the performance levels (eg bursts and leaks) of the mains and as necessary a site inspection. With an industry standard 80 year life expectancy and a history of nearly 100 years there is ongoing need for mains replacement. The cost of the program is exacerbated by the fact that mains to be replaced are in well developed areas and will incur considerable reinstatement cost. It is expected that the mains replacement program will increase over time in line with the rapid development of the water reticulation system.

AQWEST has been proactive for a number of years in benchmarking itself against other similarly sized water authorities in order to assess and improve its relative performance. It has now been included in the Victorian Water Industry Association's annual review (VicWater, 2003). In an industry such as water services, with high fixed and sunk costs, it is critical to ensure that comparisons be made between organisations with similar characteristics. For example, the vast disparity in size between Watercorp and AQWEST renders simple comparisons between the two organisations largely meaningless.[8] Table Five compares capital expenditure on a per connection basis between AQWEST and the various Victorian water utilities as an average over the past five years.[9] It also includes summary figures of total operating costs and total revenues for 2002-03 to provide a rough guide as to the relative scale of operations involved at each utility.

[8] Watercorp apparently shares this view. It benchmarks itself against Sydney Water and a collection of UK water utilities of a similar size. See OfWat (2000) for details. Also, unlike Bunbury, prices in most WA regional towns are supported by CSO payments, resulting in difficulties in making like-with-like comparisons.

[9] As with most infrastructure industries, investment in the water industry is lumpy. Thus, capital expenditure over a five year period provides a more realistic picture than investment in a single year.

Table Five: Average Annual Capital Expenditure Benchmarks (1998/99 – 2002/03)

	Average Capex 1998/99 - 2002/03 ($'000)	Number of Connections 2002/03	Average Capex Per Connection	Total Revenue 2002/03 ($'000)	Total Costs 2002/03 ($'000)
Barwon	$38,130	117658	$324	$99,851	$77,821
Central Highlands	$12,526	53281	$235	$47,684	$42,878
Coliban	$33,711	60331	$559	$45,594	$47,636
Gippsland	$18,539	57450	$323	$47,444	$48,848
Golburn Valley	$26,724	49035	$545	$51,658	$36,658
North East	$13,846	39797	$348	$28,551	$30,803
Western	$12,896	47449	$272	$50,078	$26,810
East Gippsland	$6,292	18614	$338	$13,895	$13,295
Glenelg	$2,838	8284	$343	$5,240	$5,549
Grampians	$15,100	30037	$503	$26,634	$26,567
Lower Murray	$8,775	28269	$310	$22,538	$20,692
Portland Coast	$2,412	7572	$318	$6,082	$6,064
South Gippsland	$3,657	15710	$233	$13,413	$12,305
South West	$11,862	20565	$577	$15,690	$17,922
Westernport	$3,553	12575	$283	$12,597	$8,642
City West	$40,389	285849	$141	$260,992	$156,192
South East	$64,943	572466	$113	$388,249	$262,831
Yarra Valley	$59,708	614000	$ 97	$371,003	$291,193
Melbourne Water	$92,911	1,472,315	$63	$510,730	$342,070
AQWEST	$1,758	14,216	$124	$7,217	$4,516

Source: VicWater 2003 p83

Compared with its Victorian peers, AQWEST has undertaken a relatively small amount of capital expenditure over the past five years. This is due to change over the next two years, as capital expenditure increases to $261 per connection in 2003/04 and $214 in 2004/05, before falling again in future years. There are many reasons for these differences in capital expenditure, based mostly in AQWEST's history and that of the Victorian water providers against which it is benchmarked. In the mid Eighties, AQWEST underwent a major investment programme, upgrading all major treatment plants. The Victorian water providers are only now going through a similar process of major investments. Major treatment plants, properly maintained, have 30 year operational lives, and this has meant that necessary capital expenditure after that date has been reduced substantially. Another contributing factor has been AQWEST's demand management programme. Whilst the number of connections has increased by more than two thirds since 1982, annual water production has increased by only 16 percent. This has resulted in substantial spare capacity for AQWEST over the period (three treatment plants had to be decommissioned), and it only recently became necessary to expand capacity. A third factor is the nature of AQWEST's treatment business, with multiple small treatment plants instead of centralised treatment.[10] This has meant smaller trunk lines, requiring less capital expenditure. A final reason concerns the pipe assets. Pipes commonly last in excess of 100 years. As discussed in the introduction, AQWEST is 100 years old next year, meaning that pipe

[10] Note, the efficiency of this approach is something AQWEST is reviewing at present.

replacement programmes will begin in the next 10 years, which may increase capital expenditure substantially.

Depreciation

Is the level of depreciation appropriate?

AQWEST believes that the level of depreciation used currently is appropriate and, moreover, that depreciation methodologies are reasonable. It also believes that its method of funding asset replacement from current earnings is both appropriate, and presents the best solution from the perspective of intergenerational equity. All of these issues are discussed in detail below.

AQWEST sets aside an amount, each year, for asset replacement; that is, it takes each of its assets, establishes its useful life, and depreciates the asset over this useful life, to ensure that the asset can be relaced at the end of its useful life. This is equivalent to an economic rate of depreciation, and is typically slightly higher than an accounting rate of depreciation, which only takes the book value of assets. The rail industry in Western Australia is regulated in a similar manner, whereby at the beginning of each regulatory period, a proxy asset base of brand new assets is assumed, and then these are depreciated over the asset life of a brand new asset, regardless of what is in the ground. The approach is taken because, like water infrastructure assets, it is deemed important that rail infrastructure assets be able to support services in perpetuity. The approach is different to that taken in gas and electricity whereby, rather than take the optimised replacement cost and depreciate over the entire useful asset life, the depreciated optimised replacement cost, and the remaining asset lives are used. The two approaches result in differences in the annual amount of depreciation calculated, and in the profile of depreciation schedules, and some differences in the net present value of assets, depending upon the age of assets, but these are not substantial issues (see ORAR, 2002 for more details).

For AQWEST, the optimised replacement costs of most of its asset classes have been reviewed recently (OPUS, 2003), and these have been used in calculating the economic depreciation to apply, each year, during the five year regulatory period. The figures derived are slightly larger than those generated using the previous methodology, which was more ad-hoc. The optimised replacement costs will be updated ahead of future reviews (as occurs on a regular basis in any case, to ensure changes in technology and cost are incorporated), and then new figures will be used for subsequent reviews. Table Six summarises the annual depreciation amounts for each major asset class

Table Six: Annual Economic Depreciation by Asset Class

	Annual Depreciation Amount
Mains	$462,914
Meters	$152,848
Bores and Pumps	$313,254
Reservoirs	$503,041
Buildings	$44,641
Treatment Plants	$560,030
Plant & Equipment	$31,364
Motor Vehicles	$71,741

Office Equipment	$58,934
Tools	$11,273
Total Annual Depreciation	***$2,210,043***

The depreciation rates in Table Six are based on straight line depreciation, over asset lives as described in IMEA (1994).

Asset Replacement Methodology

AQWEST's Asset Replacement reserve is a financial instrument, whereby monies are set aside from current revenues to fund future asset replacement. It is distinct from the balance sheet item of depreciation, which determines current asset values. The amount set aside from revenues each year to fund asset replacement is roughly the same as the accounting line item of depreciation, but there is no double counting; the funds for asset replacement are only taken once from revenues.

There has been some debate about AQWEST's choice to fund future asset replacement from retained earnings, rather than through an increase in debt. An argument has been made that, as infrastructure built now will service future generations, it is they who should fund the infrastructure (through debt repayments) rather than the current generation of customers. It is contended that the issue is one of inter-generational equity.

However, the issue is more complex than this. Consider a car rental company, which establishes itself via a bank loan to buy the first 'generation' of cars to lease, and has to replace the cars every five years due to wear and tear. Its first generation of car renters will pay lease costs equal to the consumables in the car (fuel, batteries, oil, water, tyres etc) and the interest and principal costs associated with the car. At the end of the five year period, the rental company will have no assets left, and will thus be required to go to the bank again, to borrow again for the next generation. Thus, each generation pays for its own use of the vehicles (ie – the depreciation), by paying off the bank loan. No issues exist in respect to intergenerational equity.

Consider now a second situation, whereby the car rental company borrows money to purchase the first generation of cars, but here it also increases the rental rate for cars to cover not only consumables and the costs of the bank loan, but also to cover the future replacement of the cars, when they become worn-out in five years time. What has happened to intergenerational equity in this scenario? The first generation of car owners is certainly treated badly; not only do they have to pay off the bank loan incurred to purchase the cars they rent, but they also have to pay an amount sufficient to buy the next generation of cars. However, each future generation of car owners need only pay the amount sufficient to purchase the next generation of cars, as the bank loan has been repaid. Moreover, as each new generation of cars needs to be bought only because they have used the cars,[11] this is not inequitable. Thus, intergenerational equity is an issue only for generation one, the generation which coincides with the change in funding mechanism.

[11] A car might be subject to natural degradation, like rust, over a long period of time, but it depreciates much faster when actually used, as do all assets.

Consider now a third scenario, the converse of the above. Consider a car company that has been in operation for many periods of time, and has operated under an asset replacement philosophy, whereby each generation of car renters pays, as part of the overall rental fee, an amount to purchase the next generation of cars, which are needed due to the current generation of car renters using and hence degrading the assets. Now consider what might occur if a new manager of this car rental firm is appointed, and this manager decides that, in future, all cars will be purchased by bank loans, rather than through some replacement reserve. What happens now to intergenerational equity? As previously, the effect lasts for only one generation. The difference in this case is that the generation which coincides with the change enjoys a benefit, rather than suffering a cost. This is because, once the decision is made to fund future asset purchases via bank loans, not reserves, the price of car rentals can decrease for a single generation; not only does it not have to pay a fee for asset replacement, but also, it is the next generation (and all thereafter) which will have to pay the bank loan to fund the purchase of future cars. All future generations, of course, will simply pay back the bank loan used to purchase the assets used by their generation, as in the original scenario.

In an environment with no changes in interest rates and no changes in the cost of infrastructure (in terms of the service it can deliver), the issue of intergenerational equity, then, is not based on whether the mechanism used to fund asset purchases is backward-looking (as in bank loans), or forward-looking (as in asset replacement reserves), but rather on a decision to change the mechanism of funding. **The decision to change the method of funding, not the method of funding itself, results in an intergenerational inequity, which lasts precisely one generation.** If multiple changes are made (and provided nothing else in the model changes), then an even number of changes, over the longer term, will result in no intergenerational inequity, whilst an odd number of changes will result in inequity.

Of course, there may be many reasons for one to change the method of funding, which are not incorporated into the simplistic model above. For example, if there is an expectation of a substantial increase in interest rates in the future and/or the cost of the relevant asset is decreasing over time, then it may be optimal to consider switching from funding via bank loans to funding via asset replacement reserves as, in the longer term, the benefits enjoyed by future generations who need contribute less to fund the next generation of the asset than the previous one cost and/or who do not need to face increasing finance costs for the asset might outweigh the disbenefit suffered by the present generation which needs to pay both the bank interest and principal and the asset replacement reserve. Conversely, if bank interest rates are in a period of historical decrease over time, and/or the cost of the asset is increasing then, even though the present generation receives a benefit from switching from an asset replacement regime to bank funding, future generations benefit too, because the cost of replacing the asset they have used is on an increasing trend.

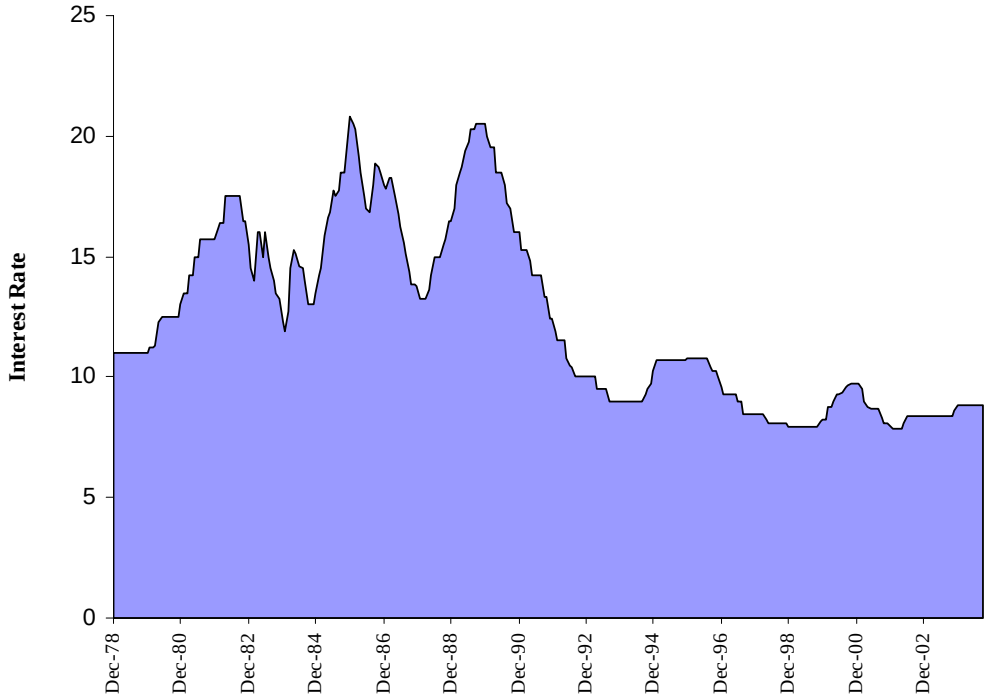
AQWEST is not, at present, in a situation of change, in terms of the funding of its infrastructure. That period of change has effectively occurred, affecting the generation of customers prior to 2000. It has zero debt at present. Thus, if the move was made to begin funding future assets from debt, rather than reserves, the current generation of customers would receive a benefit (and all future generations, as discussed above, would be on an equal footing with respect to each other, but not with

respect to the current generation. As such, the issue of whether to change the method of funding must consider two issues:

- The movement of bank interest rates, with decreasing interest rates being a rationale for a move to debt financing.[12]
- The change in infrastructure costs, with increasing costs being a reason to move to debt financing.[13]

As Figure Eight shows, interest rates are at historically low levels and it likely that these will increase over time rather than decrease, certainly in the immediate future. In the longer term, they may return to current levels, but there is not really much room for them to be much lower, as nominal interest rates are bounded from below by zero.

Figure Eight: Reserve Bank of Australia Large Business Indicator Interest Rates (1978-2004)



Source: Reserve Bank of Australia

On the issue of infrastructure, the issue is somewhat more complex. One key component of infrastructure, land, is increasing in value, and is likely to do so in the future. However, AQWEST does not depreciate its land, and hence maintains no reserves for future land purchases.[14] Also, as noted in the introduction, AQWEST may soon need to begin replacing pipe laid at its inception, in 1905, which will

[12] As the cost of financing the purchase of infrastructure will decrease over time, as interest payments decrease.

[13] As increasing costs mean that the current generation would need to pay more to replace the infrastructure than it cost to provide them with it.

[14] These are funded from headworks reserves (which are separate from asset replacement reserves and funded by developer contributions) as land purchases are generally associated with new treatment facilities.

increase capital expenditure costs above those which have been the case in recent historical times. Whilst AQWEST believes it has reserves sufficient to replace this infrastructure in a staged manner, there is some uncertainty. However, over the longer term, with the progress of technological change, the provision of water infrastructure is at least a constant cost, and more likely a decreasing cost industry, particularly once product quality is considered.

As such, it is difficult to ascertain the benefits which would occur from changing the funding methodology, and inducing a period of intergenerational inequality, as the longer term environment would appear to favour remaining with funding from reserves, rather than moving towards debt funding. AQWEST will monitor the situation in the future, but would urge that a move to debt funding, whilst it may appear to be beneficial in the short term (to current consumers), the longer term environment does not favour such a move, particularly given the long-lived nature of AQWEST's assets.

SCARM (1997, pp13-22) discusses asset replacement reserves as the appropriate way of funding new infrastructure in its draft guidelines on the determination of full cost recovery, rather than debt financing. In part, this reflects recognition by the National Competition Council that, in a relatively low-risk environment such as water service provision, the unpredictability associated with debt and variable interest rates is likely to be much greater than the unpredictability associated with the technical parameters of future infrastructure.

Rolling Forward the Regulatory Asset Base

Is the value of the regulatory asset base for each of the next five years appropriate?

N/A: The ERA is not requiring AQWEST to provide estimates of its regulatory asset base, and hence there is no rolling forward which can be meaningfully undertaken.

Rate of Return

Is the requested rate of return appropriate?

N/A: The ERA is not requiring AQWEST to provide estimates of its regulatory asset base, and hence there is no rate of return to be calculated.

The methodology paper envisages the calculation, by the ERA, of some 'notional' rate of return to endeavour to ascertain if customers of AQWEST obtain some 'discount' by virtue of their not having a rate of return included in their prices. This exercise, however, is based upon an implicit assumption that the relevant proxy of a competitive firm is a publicly listed company, with shareholders. It is difficult to see why this should necessarily be the correct proxy to use.

The fallacy of the concept of Bunbury residents receiving some form of 'discount' through no requirement on rates of return is clear with some examination of the issue. The shareholders of AQWEST, like those of a cooperative, are its customers. If the relationship were formalised, and each of these 'shareholders' were explicitly given some form of share certificate, entitling them to dividends, what would occur? AQWEST would price its water, incorporating a rate of return to its shareholders

(resulting, of course, in higher prices), and then would remit this increase in profits back to its shareholders at the end of the year. As the set of shareholders and the set of customers are one in the same, the net result to this set would be identical to the current situation. In other words, the fact that the people of Bunbury, AQWEST's customers, are also its owners, is capitalised into the prices they are charged. The notion that they are somehow receiving a discount is thus incorrect.

Under its governing legislation, AQWEST is not permitted to operate outside its legislated boundaries. Were it able to do so, then it is very likely that its owners, the people of Bunbury, would expect to receive some benefits, by virtue of their ownership of AQWEST, through a rate of return earned in business ventures outside Bunbury. They may require this through a reduction in their own prices, or through some form of rebate, analogous to a dividend. However, whilst the set of customers and the set of 'shareholders' is one in the same, the notion of any kind of discount, or transfer payment between groups is simply incorrect.

Operating and Maintenance Expenditure

To what extent is operating and maintenance expenditure at an efficient level and what scope is there for efficiency gain over the next five years?

AQWEST believes that its operational and maintenance expenditures are, broadly speaking, at an appropriate level for an organisation of its size. This is discussed further below.

Table Seven provides a summary of operational and maintenance expenditure over the next five years. A more detailed presentation is provided in Appendix Eight.

Table Seven: Operation and Maintenance Expenditure (2003/04 – 2008/09)

	2003-2004 Budget	**2004-2005 Projection**	**2005-2006 Projection**	**2006-2007 Projection**	**2007-2008 Projection**	**2008-2009 Projection**
Ongoing works maintenance	$1,514,753	$1,654,400	$1,669,800	$1,703,900	$1,738,600	$1,774,100
Electricity	$358,000	$310,400	$307,300	$304,300	$301,300	$298,300
Other service expenses	$27,000	$59,500	$49,100	$52,500	$41,300	$55,500
Bad debts	$2,000	$2,000	$2,000	$2,000	$2,000	$2,000
Computer maintenance	$114,400	$229,750	$167,200	$170,600	$174,200	$177,800
Insurances	$151,982	$132,500	$135,300	$ 138,300	$141,300	$144,300
Loan interest	$ -	$ -	$ -	$ -	$ -	
Legal expenses	$60,000	$60,000	$25,000	$25,000	$25,000	$25,000
Rent	$69,300	$71,500	$73,700	$67,100	$41,900	$43,200
Salaries & wages	$760,475	$805,300	$811,800	$844,300	$878,100	$913,300
Superannuation	$111,448	$118,000	$122,700	$127,700	$132,800	$138,100
Other office expenses	$455,304	$612,100	$489,300	$490,700	$ 615,100	$534,600
Total O & M expenditure	***$3,624,662***	***$4,055,450***	***$3,853,200***	***$3,926,400***	***$4,091,600***	***$4,106,200***

Apart from the salaries and wages of staff, the main drivers of operational and maintenance expenditure over the period are:

- Service maintenance ($2 million over five years).
- Filter operations ($1.5 million over five years)
- Mains maintenance ($1.3 million over five years)
- Filter maintenance ($1.2 million over five years)
- Chemical treatment ($980,000 over five years)

All of these expenses are key maintenance expenses, to ensure that the system is able to operate effectively and safely. Maintenance is a key driver of operational expenditure for this reason. In terms of service quality, AQWEST is governed by a number of different requirements, including the operating licence issued by the ERA, *Australian Drinking Water Guidelines 1996*, and the customer service charter

Staffing costs are a major component of AQWEST's costs. AQWEST has been conducting its own benchmarking studies comparing labour cost with a sample of its Victorian water/wastewater counterparts, and its initial findings suggest the average cost per employee for AQWEST of approximately $53,151 compares favourably with the Victorian average of $67,467. These results, however, are preliminary, and should be taken as being indicative, rather than definitive.

AQWEST maintains a watching brief over operational and maintenance expenditure and, during this year, has conducted a review of its main expenditure items and has adopted the following measures to reduce operational expenditure items which it has identified as being high:

- Optimising energy costs by using off-peak power.
- Installation of SCADA systems.
- Increasing the level of automation in treatment plants.
- Optimising use of treatment chemicals

In respect to how AQWEST compares to the rest of the industry (see Figure Nine), there are no specific outliers within its operations and maintenance expenditure that differentiate it substantially from other water service providers, save the requirements of its governing legislation, which are addressed as a separate issue below.

There are a number of important operational expenditure items which AQWEST incurs and which it would not incur if it were operating as a firm in a competitive market, and not subject to regulation. These costs do not relate to meeting its licence standards and conditions. As mentioned in the introduction, perhaps the most important operational expenditure items relate to the governing legislation, the *Water Boards Act 1904*, which has a pervasive influence over the efficiency with which AQWEST is able to conduct its business. This Act effectively prevents AQWEST from operating in a commercial manner, and substantial effort and expense has been made by AQWEST in order that this Act be changed. As it is precisely this Act which prevents AQWEST from operating in a commercial manner, it believes that such expenses should be highlighted in this review. Some examples of business opportunities which AQWEST wished to pursue and could not, because of the governing Act include:

- Dalyellup water supply (estimated loss to AQWEST $200,000 per annum).
- Kemerton joint venture in water supply (estimated loss to AQWEST $1.8 million per annum).
- Inability to participate in Private Public Partnerships and gaining the efficiencies thereof.
- Undertaking works without Ministerial oversight.
- Acquiring land, where necessary, with powers consistent to those enjoyed by other water service providers in the State.
- Accessing financing with the flexibility of a commercial organisation.
- Accessing and managing assets which AQWEST does not own.

Initial and conservative estimates of the cost to AQWEST of this legislation, incorporating the above factors, suggest a loss of roughly $3 million per annum, which is borne by AQWEST's stakeholders in Bunbury, who would otherwise benefit from prices being roughly one third lower than they are at present.

A second key cost area is that incurred as a result of the information requirements of Treasury. AQWEST is included in the State Financial Reports and, as such, is required to report information to Treasury on numerous occasions during the year. The information is required pursuant to the Financial Administration and Audit Act (FAAA) and the Government Financial Responsibility Act 2000. The information required is very similar to that reported in AQWEST's other reports to its stakeholders, such as the Annual Report, but, rather than simply take published information, Treasury requires information to be prepared in a certain format, transferring its administrative burden in data collection to AQWEST. The information reporting requirements include: actuals data (quarterly); budget information (annually); capital works (annually); mid year review (annually); review of fees and charges (annually) and other reports as requested by Treasury. Preparing reports for Treasury requires approximately 200 man-hours of work per year, resulting in an annual wages and overheads cost of approximately $10,000.

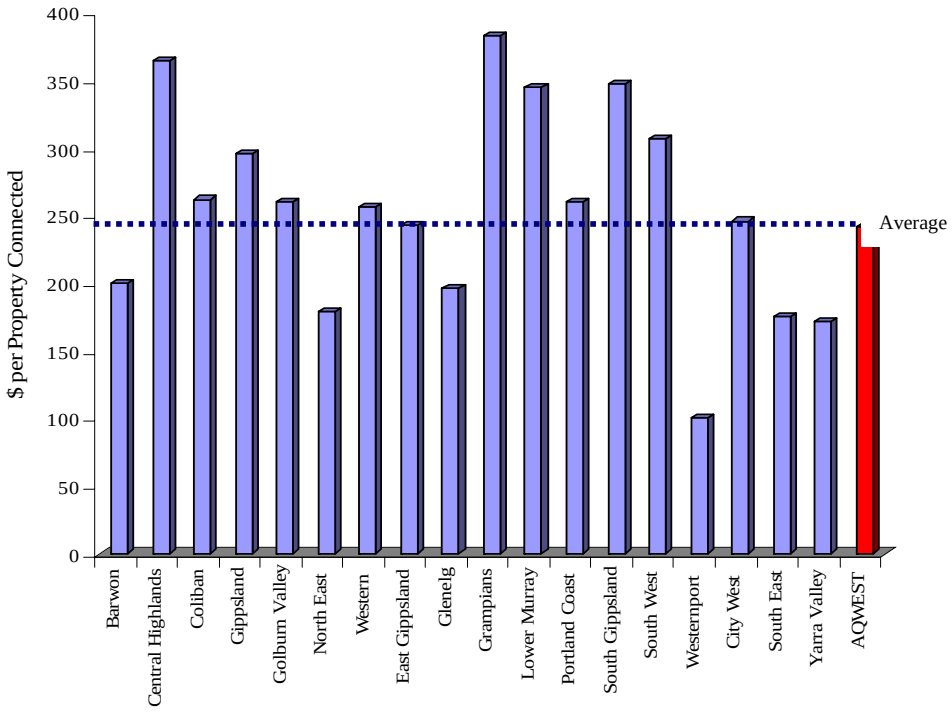
A third key cost has been the operational expenses associated with complying with the requirements of the ERA, which themselves have evolved over time. These costs would not be incurred by a firm operating in a competitive market. Whilst AQWEST believes in the need for regulation of monopoly service providers to prevent potential abuses of market power, the regulatory regime in water imposes substantial costs on AQWEST, and AQWEST considers this relevant to be raised as part of this review. These costs include:

- **Specialist assistance to prepare the pricing submission:** The ERA required a very short timeframe for water service providers to respond to its methodology paper and prepare pricing submissions and this required the employment of specialist consultants, at a cost of $25,000.
- **Diversion of staff resources:** In order to provide the information required in this report, substantial staff resources were required, over a short period of time. This cost approximately $20,000.

The total estimated cost of $45,000 over a customer base of 14,521 is a cost of $3.10 per customer. In a domestic sense this represents 1.1% of the average domestic bill.

In assessing the appropriateness of AQWEST's operational and maintenance expenditure, one key comparator is how AQWEST compares against its peers. Figure Nine provides such a comparison. As previously, figures are presented on a per connection basis to account for the differences in size of the firms (see Table Five for this comparison of size).[15]

Figure Nine: AQWEST and Victorian Utility Operations and Maintenance Expenditure (2002/03)[16]



Source: VicWater, 2003, p79

AQWEST's costs are slightly below the average for Victoria. Moreover, AQWEST customers use more water than the Victorian average, meaning that its operating costs on a per kilolitre basis are actually slightly better than indicated above, relative to the other utilities. Finally, whilst the other utilities are wastewater and water suppliers and can hence apportion operating costs over both services, AQWEST provides only water services.

[15] On a per megalitre of water supplied basis, the relative figures are roughly the same, so there are no issues with respect to AQWEST customers having unusually large demand.

[16] The report (VicWater, 2003, p79) from which these figures are drawn contain an error, whereby the figures for Operational Expenditure include depreciation for AQWEST, but not for other service providers. This is clear from examining the comparative expenditure figures, which are only provided for the single year (2002/03), and reduce the AQWEST figure from the reported $342 to $242. AQWEST's operational expenditure has not changed markedly over the previous five years, so it would appear that a similar reduction would be likely for these years as well. However, in the absence of more detailed financial information from all providers in the survey, it has not been possible to make this comparison.

Revenue Requirements

What are the implications of the above decisions on the amount of required revenue for each of the next five years?

AQWEST's required revenue requirements are summarised in Table Eight below. New capital expenditure refers to gross capital expenditure minus the expenditure required to replace existing assets, which forms part of the depreciation line item (albeit in different years to the current year). Thus, capital expenditures here are different from Table Four, and the difference is transfers from asset replacement reserves to fund asset replacement. This is not included in revenue requirements as it represents revenue which has already been collected from consumers in previous years.

Table Eight: AQWEST Required Revenue (2003/04 – 2008/09)

	2003-2004 Budget	**2004-2005 Projection**	**2005-2006 Projection**	**2006-2007 Projection**	**2007-2008 Projection**	**2008-2009 Projection**
New capital expenditure	$1,988,895	$1,288,410	$1,348,300	$943,800	$1,649,800	$1,449,000
Operation & maintenance expenditure	$3,624,662	$4,055,450	$3,853,200	$3,926,400	$4,091,600	$4,106,200
Depreciation	$2,210,043	$2,210,043	$2,210,043	$2,210,043	$2,210,043	$2,210,043
Total Expenditure	*$7,823,600*	*$7,553,903*	*$7,411,543*	*$7,080,243*	*$7,951,443*	*$7,765,243*

AQWEST's actual projected revenue over the same period, based upon the current pricing model, is summarised in Table Nine.

Table Nine: AQWEST Actual Projected Revenue (2003/04 – 2008/09)

	2003-2004 Budget	**2004-2005 Projection**	**2005-2006 Projection**	**2006-2007 Projection**	**2007-2008 Projection**	**2008-2009 Projection**
Water Sales	$2,924,312	$3,021,700	$3,110,885	$3,353,470	$3,532,627	$3,712,784
Rates & Supply Fees	$2,880,607	$3,015,300	$2,794,958	$2,665,538	$2,536,618	$2,408,098
less: Rebates	-$265,100	-$273,600	-$278,400	-$283,300	-$288,300	-$293,500
Total Water Sales	*$5,539,819*	*$5,763,400*	*$5,627,443*	*$5,735,708*	*$5,780,945*	*$5,827,382*
Other Income						
Interest Received	$629,150	$851,400	$946,000	$1,024,000	$1,112,000	$1,232,000
Developers Contributions	$550,000	$550,000	$555,000	$555,000	$555,000	$555,000
Profit(Loss) On Asset Disposal	-$147,218	-$5,000	-$5,000	-$5,000	-$5,000	-$5,000
All Other Revenue	$339,055	$339,605	$342,605	$337,255	$314,605	$317,105
Total Revenue	**$6,910,806**	**$7,499,405**	**$7,466,048**	**$7,646,963**	**$7,757,550**	**$7,926,487**

As may be seen, AQWEST's actual projected revenue is less than its required revenue at the start of the period, but greater than required revenue by the end. This is because AQWEST is undergoing some capital expansion at present, and this pricing review has coincided with the early stages of it, when AQWEST is running down some of the asset reserves it has in place to fund new infrastructure and replace existing

infrastructure. Prices, which are smoothed to cover lumpy infrastructure investment, are still 'catching up' during this period. The use of asset replacement reserves to fund asset replacement reduces the disparity between projected revenues and costs in each year.

Commercial Viability

What level of financial performance is implied by the requested level of required revenue?

AQWEST has been a commercially sustainable, stand-alone entity for almost 100 years, never requiring State Government support for its activities. It will remain so into the foreseeable future, as the summary of information in this report shows. AQWEST has no debt, and pays no explicit dividends to its shareholders in the community of Bunbury (rather capitalising these into the prices charged). As suggested by the ERA, the relevant financial indicator is the Internal Financing Ratio (as the ratio is not debt-dependent). Table Ten provides the results for this indicator over the next five years.

Table Ten: Internal Financing Ratio (2003/04 – 2008/09)

	2003-04 Budget	2004-05 Projection	2005-06 Projection	2006-07 Projection	2007-08 Projection	2008-09 Projection
Ratio	1.85	2.29	3.74	3.13	3.35	4.18

On average, through the planning period, the ratio is 2.94, meaning AQWEST is able to fund its new capital purchases approximately three times over, using its earnings through the period.

AQWEST does not have access to detailed information from other service providers to calculate the same index for all of its peers. This will be a task for the ERA when all submissions are received.

Identifying Base Prices

Are the prices that each service provider would set before taking into account social considerations and externalities appropriate?

AQWEST believes that its base prices are appropriate and, moreover, that the current prices require very little adjustment, except for some consideration of the charges to non-residential customers, which is already occurring as part of an overall shift in the way in which these customers are charged, moving from a fixed rate based on gross rental value to fee incorporating a higher volumetric component.

In an ideal world, marginal costs are calculated either by developing a production function and taking its derivative or by undertaking a detailed engineering analysis of incremental costs. The former often requires some heroic assumptions (particularly in the case of a networked good such as water) and the latter is extremely expensive and time consuming. However, under certain circumstances, short run average variable cost will be the same as short run marginal cost (SRMC), and average cost will be the same as long run marginal cost (LRMC). These circumstances are (see Johnson, 1960):

- Efficient operation of fixed plant.
- Absence of economies of scale and scope.
- System operating at appropriate capacity.

In the case of AQWEST, Tables Three and Five and Figure Nine suggest that it is operating efficiently. The former is an historical record showing how it has reduced demand to sustainable levels, and the latter two benchmark AQWEST's capital, operational and maintenance expenditure against its peers, where AQWEST performs relatively well. By virtue of its governing legislation, AQWEST is only able to supply water services (and then within a prescribed area), and hence it is unable to reap economies of scope.[17] Table Three and Figure Nine suggest that economies of scale may also be limited in the water industry; there is no clear relationship between the size of a utility and its average costs and it appears that cost driving factors are more complex than a simple scale effect. Finally, as the historical record of demand management and the discussion on demand projections and security buffers suggests, AQWEST is operating at its most appropriate capacity level.

For these reasons, AQWEST has used short run average variable costs as a proxy for SRMC and average costs as a proxy for LRMC. This is not to say that the measures are necessarily exactly equal in the case of AQWEST, but rather that the errors associated with deviations from the above three assumptions are likely to be smaller than errors associated with misspecification of a more complex production function or engineering incremental cost approach.

The ERA's methodology suggests that prices should not deviate from marginal cost or that, where they do, the variance should be transparent. However, if one is to follow the National Competition Policy Guidelines National Competition Policy (NCC, 1998, p104) which commits urban water suppliers to:

> *"the adoption by no later than 1998 of charging arrangements for water services comprising an access or connection component together with an additional component or components to reflect usage where this is cost-effective"*

then the question of what constitutes marginal cost and what constitutes fixed costs depends on the time horizon chosen. In the very short run, almost all costs are fixed. In the very long run, all costs are marginal. Over a medium time horizon, some costs will be fixed and some costs will be marginal. The choice of the time horizon is critical to what the marginal costs will actually be. The ERA has provided no indication of the time horizon over which marginal costs should be calculated, beyond some very vague references to ensuring demand and supply are balanced in the longer term. In fact, so long as the volumetric price for a kilolitre of water for residential customers lies between 57 and 94 cents, and that for non-residential customers lies between 45 and 81 cents (see Table Eleven), then it is true to say that prices do not deviate from marginal cost. The marginal cost price is not a single figure. Rather, one has a series of fixed-price/variable price pairs, which differ according to the timeframe chosen. All of these prices are 'correct'. The key issue is over what time horizon one plans pricing. This has not been stipulated.

[17] This is not to say that it would not like to do so. Indeed, the ability to reap economies of scope is precisely the reason why AQWEST has been pushing for legislative change

Given the lack of guidance provided by the ERA as to what timeframe it considers appropriate as the 'short term' (and hence which cost items should be considered fixed and which should be considered marginal), AQWEST has considered a time period of approximately one year.[18] Over this timeframe, all of the operational and maintenance expenditures can be considered variable, as well as a small portion of capital expenditure. More than ninety percent of capital expenditure, and all of depreciation make up the fixed costs. If this timeframe is too short, then more cost items will become variable, and marginal costs will increase. If it is too long, then more costs will become fixed and marginal costs will decrease. Table Eleven has been prepared on this basis, and the apportionment of individual cost items is shown in Appendix Nine.

Table Eleven: Prices and Marginal Costs (2003/04 – 2008/09)

	2003-04 Budget	2004-05 Projection	2005-06 Projection	2006-07 Projection	2007-08 Projection	2008-09 Projection
All Consumers						
Fixed Costs	$192.77	$110.00	$104.86	$71.75	$117.31	$82.84
SRMC	$0.53	$0.55	$0.52	$0.52	$0.54	$0.53
LRMC	$0.91	$0.77	$0.73	$0.66	$0.78	$0.70
Residential Customers						
Fixed Costs	$169.02	$95.57	$92.76	$64.78	$103.26	$73.79
SRMC	$0.57	$0.59	$0.55	$0.54	$0.57	$0.56
LRMC	$0.94	$0.81	$0.76	$0.69	$0.82	$0.73
Total Fee to Consumer of 350kL	$275.00	$275.00	$275.00	$275.00	$275.00	$275.00
Fixed Fee	$88.00	$88.00	$88.00	$88.00	$88.00	$88.00
Variable Fee	$0.53	$0.53	$0.53	$0.53	$0.53	$0.53
Average Total Fee	$0.79	$0.79	$0.79	$0.79	$0.79	$0.79
Non Residential Customers						
Fixed Costs	$366.56	$179.11	$198.56	$139.30	$221.71	$155.29
SRMC	$0.45	$0.48	$0.45	$0.44	$0.47	$0.46
LRMC	$0.81	$0.66	$0.66	$0.60	$0.71	$0.63
Total Fee to Consumer of 1000kL	$1,182.01	$1,133.75	$1,008.07	$987.71	$937.92	$890.12
Fixed Fee	$856.48	$831.47	$694.03	$590.41	$491.81	$398.10
Variable Fee	$ -	$ -	$0.04	$0.13	$0.22	$0.31
Average Total Fee	$1.12	$1.10	$0.99	$0.99	$0.95	$0.92

Not all costs are recovered directly from consumers. Headworks costs, for example, are recovered from developers (and later capitalised into the value of new properties). Whilst some of the monies received from consumers are retained in the asset replacement reserve, equally, some asset replacement is funded from the reserve, not from consumer charges, so transfers from the reserve are considered as an adjustment to fixed costs. Also, some types of property are neither residential nor non-residential, but are rather vacant land. Finally, AQWEST has some, relatively small,

[18] AQWEST's prices are approved by its Board and the Minister on an annual basis, and hence this price-planning horizon was adopted. A horizon of five years would not change the results markedly, as most capital costs are still fixed over this horizon.

sources of income other than its customers. These are mostly the interest it receives on asset replacement reserves, and from the sale of some assets. All of these items are fixed in nature, so have been subtracted from capital costs to give the amount of fixed costs (together with depreciation) which are to be recovered from residential and non-residential customers.

Table Eleven is divided into three parts. The first part shows fixed costs, SRMC and LRMC for all customers. This provides a very rough guide of the short and long term costs of the organisation as a whole. However, AQWEST's customers are highly heterogeneous. For this reason, we have made the basic split between the two most different groups, residential and non-residential customers, and considered the fixed costs, SRMC and LRMC of each group. The methodology by which costs were split between residential and non-residential customers is summarised in Appendix Ten. In both the residential and non-residential cases, the actual charges made to a representative consumer (consuming 350kL in the case of the residential consumer and 1000kL in the case of the industrial consumer – the average annual consumption in each case) are shown. The fixed fee is the fee levied by AQWEST (the average in the case of non-residential customers, who are rated according to land values) and the variable fee is the average cost per kL of consumption of 350 kL or 1000 kL, depending on consumer type. Non-residential customers receive free water up to the point where their consumption (valued at the non-residential tariff of 72 cents per kilolitre) equals the rating charge. In the first few years, the average non-residential customer pays rates which entitle it to more than 1000kL of free water, and hence the variable fee is zero. The reason for the wide variance in fixed and variable fees for non-residential customers is that AQWEST is currently in transition between charging these customers by rates and charging them volumetrically. In the next pricing determination, this process will be complete, and there will not be as much variation.

What can be ascertained from the information in Table Eleven? Firstly, the SRMC of residential consumers is higher than that for non-residential consumers, but the fixed costs are lower. This is to be expected; non-residential customers require substantial additional capital, such as fire systems, larger mains and so on, which all incur a higher fixed cost. As such, one would expect them to incur much higher fixed costs. However, volumes of water are also much higher, allowing for some economies of scale. As such, one would expect marginal costs to be much lower. This should thus be reflected in the fee schedule and, to a certain extent, it is (see below).

The variable fee charged to residential consumers matches very closely the SRMC of supply to them. Contrary to some expectations, residential consumers of large amounts of water do not seem to be overly subsidising consumers of smaller amounts of residential water. For non-residential consumers, the variable fee does not match the SRMC of supply, but it becomes closer during the period. This is because AQWEST is currently in the process of changing its charging regime for non-residential customers, to reflect a higher volumetric and a lower fixed cost component. Thus, one would expect a mis-match at the start of the period, growing closer towards the end of the period.

The fixed fees to non-residential consumers are much higher than the fixed costs incurred by these consumers, and remain so throughout the period. This is largely because the shift from a rates-based system of charging to a consumption based

system of charging is in progress during the period. For residential consumers, the fixed charge is much lower than the fixed costs at the beginning of the period, but the two figures accord almost exactly by the end. This is because much of the capital expenditure at the commencement of the period is for residential customer infrastructure, and represents just a smoothing of charges over time. The LRMC for residential consumers reflects the same phenomenon, whilst that for non-residential customers reflects the fact that the charging schedule is still being altered.

However, there does not appear to be a substantial cross-subsidisation from non-residential to residential customers by the end of the period; the fixed costs, SRMC and LRMC of servicing residential customers is being covered by these customers.

Adjusting Base Prices

Base tariffs are adjusted by charging a different price according to consumption levels. AQWEST operates a number of different steps in its tariffs for residential water use, as follows:

- 0-150 kL: 37 cents per kL.
- 151-350 kL: 65 cents per kL.
- 351-500 kL: 95 cents per kL.
- 501-700 kL: 123 cents per kL.
- 701-1000 kL: 146 cents per kL.
- Over 1000 kL: 212 cents per kL.

AQWEST has led the industry in the adoption of stepped variable charges for water consumption, which has recently been endorsed by the State Government for the rest of the State. This is not intended to be a cross subsidy, but acts rather as a demand management tool. Moreover, AQWEST's historical record of the use of stepped prices shows that it is an effective tool for demand management. As such, this adjustment in the base prices of Table Eleven is not considered to have ramifications for economic efficiency, in the manner of, say, a uniform tariff policy.

The Office of Water Policy's (OWP, 2004) submission to the ERA's *Inquiry of Urban Water and Wastewater Pricing Issues Paper* cites CSIRO research suggesting that the elasticity of demand for water inside the house is -0.04 and outside the house is -0.31. Both of these figures suggest water is highly inelastic, which would mean that demand management by price would be ineffective. However, the marginal utility for water is not only not constant, but it varies hugely over a small volume of water; a man dying of thirst will value the first glass of water he receives close to the value of his own life, but after a few litres, when his thirst is slaked, subsequent glasses are almost valueless. This means that the elasticity of demand for water, over relatively small volumes, is also like to vary widely, and single numbers do not reflect this. Whilst fixed costs (such as the investments made in the plants for a garden) may mean that, over the short term, the elasticity of demand for water may be very low, over the longer term, and for large amounts of water (above those required for daily ablutions and the maintenance of a small garden, say), elasticities are likely to be much higher. Based on historical data on the consumption of AQWEST's customers, the real price per kL of water has increased by approximately 38.5% between 1982 and 2004. However, consumption per household has decreased by almost 50 percent. Although there may be many factors influencing this other than price, it does suggest a much

higher elasticity of demand may be feasible. Indeed, examining the annual real price increases and reductions in demand each year from 1982 suggests that the elasticity of demand may be twice the upper limit of the figures the OWP provide. Given that the elasticity of demand for essential purposes (drinking, washing, toilets etc) is likely to be very low, this suggests a rather high elasticity of demand for less essential purposes, such as gardens, particularly over the longer term.[19] This suggests that AQWEST's stepped programme of prices is both effective as a demand management tool, and protects customers who conserve water from high water prices. Moreover, it is only a small deviation from marginal cost pricing; only consumers consuming almost 200kL more per annum than the average would be paying greater than the LRMC for 2003/04 in Table Eleven. Table Twelve provides a comparison with the Victorian water providers.

Table Twelve: Fees and Charges Comparison

	Fixed Access Charge	Variable Charge (c/kL)	Notes	Variable Charge for 250 kL usage	Total bill for 250 kL Usage
Barwon	$103.00	70.7		$176.75	$279.35
Central Highlands	$56.21	32-76	Different for different towns served by the utility	$189.79	$246.00
Coliban	$92.70	32.6-62.4	Different for different towns served by the utility	$136.25	$228.95
Gippsland	$69.90	32.8 or 54.7	Different for treated and untreated	$136.75	$206.65
Golburn Valley	$85.30	34.85 or 43.18	Different for different towns served by the utility	$97.54	$182.84
North East	$87.68	39.21		$107.75	$195.43
Western	$110.00	70		$ 175.00	$285.00
East Gippsland	$127.00	62		$148.00	$275.00
Glenelg	$128.00	70.7		$176.75	$304.75
Grampians	$198.74	87.4	lesser charges apply for towns receiving lower quality water	$218.50	$417.24
Lower Murray	$92.56	21.82 or 38.19	Different tariffs above and below 400 kL	$54.55	$147.11
Portland Coast	$165.93	21.84 or 54	Different tariffs above and below 360 kL	$54.60	$220.53
South Gippsland	$160.00	56.5		$141.00	$301.00
South West	$146.02	54.07 or 81.12	Different tariffs above or below 301 kL	$135.18	$218.20
Westernport	$175.50	62 or 105	Different tariffs July-Oct & Nov-June	$234.55	$410.05
City West	$81.92	77.41		$193.53	$275.45
South East	$34.80	78.5		$196.25	$231.05
Yarra Valley	$57.36	75.23		$188.08	$245.44
AQWEST	$84.00	37-212	See text for tariff steps	$120.50	$204.50

Source: VicWater, 2003, p48

AQWEST's charges are amongst the lowest in the comparative field, suggesting that AQWEST customers are not unduly disadvantaged compared to their peers in

[19] This very simple comparison of percentage changes in demand and real price captures very little of the likely real interactions between the two variables, and should be taken only as providing a very broad indication of the fact that the elasticity of demand for water over some ranges of consumption may be much higher than the OWP figures indicate.

Victoria. Moreover, AQWEST is not the only utility to adopt differential tariffs, although it has more steps than other utilities, who have only two, at differing levels. Other utilities, reflecting their service of different towns, have different prices for different towns, and still others have seasonal charges. Clearly, different utilities have adopted different approaches to managing their variable costs.

Meeting Social Objectives

How should base prices be adjusted to take into account social considerations?

AQWEST currently provides discounts to holders of Pensioners and Seniors Cards as follows:[20]

- Supply Fee: Pensioners – 50 percent rebate, Seniors – 25 percent rebate.
- Water Consumption: Pensioners – 50 percent rebate up to 350 kL, Seniors – 50 percent rebate up to 150 kL.

These discounts comprise less than five percent of AQWEST's total revenues. The decision to provide these discounts was made by the Board, as it reflects an expectation in the community that senior citizens will receive preferential treatment on their water bills. The expectation has been formed largely due to other water service providers traditionally providing such a discount.

AQWEST also has a procedure whereby customers who have experienced unexpected water losses on their properties can be refunded half the water charges incurred (providing certain requirements are met). This procedure is also fairly standard across the water industry in Western Australia, and costs AQWEST approximately $30,000 per annum in lost water charges.

AQWEST provides no other discounts intended to meet social objectives. Moreover, it receives no CSO payments from Government and hence has made no comments on their reduction.

AQWEST believes that the adjustment of prices to reflect social objectives is the task of the regulator, as it forms part of the regulatory environment, the devising of which is more properly the role of the regulator, not of the regulated firms. As a regulated firm, AQWEST will endeavour to operate as efficiently as possible within the regulatory framework designed by Government. For this reason, AQWEST has not sought to advise the ERA on the adjustment of prices to reflect social objectives. However, AQWEST would like to note that economic theory is very clear on the point that the most efficient way in which to meet social objectives is not to alter prices for certain groups of customers, but rather to provide cash rebates to these disadvantaged consumers, which they may spend in the way they see fit. In this manner, correct demand signals from relative prices are maintained; if Government is serious about ensuring the sustainability of the water resources of WA, the current CSO framework, does not seem optimal.

Adjusting for Externalities

How should prices be adjusted to take into account externalities?

[20] Approximately three percent of these rebates are recovered from the State Government.

AQWEST does not currently internalise any externalities and hence does not make any adjustment to prices. As with social costs, AQWEST believes that it is the role of the regulator to stipulate the 'rules of the game' in respect to externalities, within which water utilities are required to operate, and the role of firms to optimise within the constraints implied by those rules. When such rules are presented, AQWEST will happily provide comment on their implementability. However, beyond the commentary below, AQWEST does not have any suggestions as to how the ERA should frame the regulatory environment to account for externalities at the current time.

If the Water and Rivers Commission were to introduce a charge to reflect water resources management, AQWEST's view is that this should be passed on to consumers in full. The reason is that the intent of a resources charge is to reflect the value the community places on a resource, and through this, to send a signal to consumers of the impacts of their use of the resource on the wider community. Thus, if the charge is not paid in full, consumers do not receive this crucial demand management signal, and would therefore not reduce their consumption when the real costs to the community of consumption rise. Were AQWEST to absorb any part of this cost, this would be counter productive in providing a clear signal of the total cost to managing the resource. Perhaps the clearest example of the fallacy of not passing on real resource costs occurred in California, with its power crisis a few years ago. The reform process in California allowed wholesale power prices to increase, but capped retail prices. This meant that, as demand increased, placing a strain on generators and increasing costs in the system, consumers received no signals about these increasing costs, and hence did not temper their demand. The entire cost of adjustment was borne by the electricity wholesalers, and many of them became bankrupt. If water utilities in WA do not pass on costs, the same situation may occur here.

Although this review does not seek to ascertain the appropriateness of a resource charge, AQWEST would suggest that a figure designed to cover the costs of resource management is not appropriate. Royalties for minerals in Western Australia, for example, do not reflect the cost of operating the bureaucracies charged with administering the resources sector and land administration. A resource charge is supposed to reflect the value the community places on the resource in-situ. In this manner, only uses more valuable than this can make use of the resource. The value of water to the alternative user (such as farmers or the environment) is unlikely to be the same as the cost of managing water resources and, indeed, the two may not even be remotely correlated. AQWEST suggests substantially more thought needs to be applied to resource charges, particularly as cost increases will need to be justified to the shareholders.

Comparison with Current Prices

Should the gap between the resultant prices and current prices be closed?

For residential consumers, the gaps between SRMC and variable price are very small, and the gap between fixed costs and fixed charges also narrows over the period. By the end of five years the LRMC for residential consumers matches the average fee per kL. Moreover, as LRMC and SRMC are being met, there does not appear to be any

significant cross subsidy from non-residential to residential consumers. As such, there does not seem to be a substantial need to close a gap between current prices and those from the model as the gap is very small.

For non-residential customers, however, charges are still higher than costs, although differences are narrowing. This is because the current five year period is one of change, from rate based to more volumetric charges for these customers. The detailed review of how this change is to take place has yet to be undertaken. The findings presented in this report will be incorporated into the review of the non residential price to be undertaken by AQWEST in the near future. This review needs to consider in substantial detail the highly heterogeneous nature of non-residential customers to ensure changes in the pricing regime are equitable. This review of pricing will occur during the next 12 months, and be presented to the Minister in the 2005/06 pricing submission.

Price Recommendations

For residential consumers, no adjustment in price is recommended. For non-residential customers, it is recommended that the pricing system change, to reflect more accurately the split between fixed and marginal costs. However, given the heterogeneity of these customers, it is not recommended that prices be changed in an ad-hoc manner, using solely the findings of this review as a basis. Rather, it is recommended that AQWEST undertake a more detailed examination of the true costs of serving each of its non-residential customers (or at least, an examination grouping like consumers together). This examination could then form the basis for future annual ministerial pricing approvals.

Conclusions and Recommendations

AQWEST has not undertaken economic examination of pricing in the manner required by this report in the past, as such examination have not been considered necessary in the day to day context of the business. Moreover, the short timeframe and other issues associated with this review have constrained the details of the findings. However, as the review shows, the existing pricing mechanisms of AQWEST (with the exception of prices to non-residential customers, which are in any case under review) perform adequately in ensuring full cost recovery as per the requirements of National Competition Policy and ensuring that appropriate signals concerning sustainable demand are sent to its consumers.

In summary, the major non-price findings are as follows:

- AQWEST meets its customers' expectations in terms of service levels, and AQWEST is proactive in ensuring this remains the case.
- AQWEST has made adequate provision for future water resource needs, with sufficient allocations within its current (25 year) licence to meet demand for potable water past 2030.
- AQWEST has a well developed demand management system (which leads other utilities in WA, and saves the people of Bunbury around $2.5 million a year in water charges) to ensure conservation of its key resource, and adequate security buffers.
- AQWEST's system of asset management is second to none, and it is close to industry best practice in leakage detection.

The major price and revenue findings are as follows:

- The volumetric charge levied by AQWEST on residential consumers matches its variable costs, in accordance with economic theory, as does the fixed charge.
- Charges levied on industrial consumers are moving towards cost reflectiveness, and the charging regime is currently under review.
- There does not appear to be substantial cross-subsidy between residential and non-residential users; customers pay for what they get.
- The stepped charging regime does not constitute cross subsidisation, but rather has been a very effective demand management tool, resulting in substantial reductions in water wastage over time.
- There is no need to adjust the current method of pricing for residential consumers and, whilst some concerns exist in relation to the division between fixed and variable charges for non-residential users, these are being addressed. Moreover, it is expected that non-residential charges may in fact fall, as there is no cross subsidy with residential users and a more volumetric base to charges may encourage water saving by non-residential users.
- AQWEST's fees and charges compare well with its peers.
- AQWEST's planned capital expenditure is amongst the lowest of its peers, and its operational expenditure is below the average levels of its peers, indicating it is operated in a highly efficient manner.
- Current asset replacement reserve contributions are slightly below those required for appropriate economic depreciation, but are roughly correct.
- The asset replacement reserve method of funding future asset purchases is both prudent and in accordance with the precepts of inter-generational equity. There appears no a-priori advantage in shifting to debt financing of asset replacement, as this risks a return to AQWEST's days of near insolvency in the Eighties.
- Revenue projections are slightly below cost projections over the next five years, due to the fact that substantial capital expenditure this year and next is being funded from asset replacement reserves, not from current revenues.

Recommendations from the review are as follows:

- There is no need to alter current residential prices or their structures.
- Prices for non-residential customers require review, as per AQWEST's existing planned review process.
- Capital expenditure and economic depreciation forecasts appear adequate for the moment, but a watching brief should be maintained to ensure the future capital expansion, particularly of mains assets remains cost reflective.
- There should be no shift to debt financing of future asset purchases.

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