PRICEWATERHOUSECOOPERS

Essential Services Commission

Urban and Rural Water Price Review 2008: Assessment of Demand Forecasts

Final Report

March 2008

Contents

1 Introduction

PricewaterhouseCoopers (PwC) has been engaged by the Essential Services Commission of Victoria (ESCV) to undertake a review and assessment of the demand forecasts prepared by the Victorian urban and rural water businesses.

The businesses have prepared these forecasts for inclusion in their water plans that set out the revenue and expenditure they propose to undertake over the years 2008-09 to 2012-13. The ESCV is currently undertaking a water price review that will assess the reasonableness of the proposals set out in the businesses' water plans.

The outcome of PwC's review of the businesses' demand forecasts will be an input into the ESCV's consideration of the businesses' water plans.

1.1 Objective of this review

PwC has been asked by the ESCV to provide advice on whether the demand forecasts proposed by the urban and rural businesses:

- have been developed using appropriate forecasting methodologies or approaches, given the materiality of the forecasts for the businesses' revenue and resulting prices
- reflect reasonable assumptions about the key drivers of demand, including the impact of supply restrictions
- use the best available information, including historical data that can support trends in demand, and
- take account of current demand and economic conditions.

In providing this advice, PwC is expected to have regard to:

- any guidance issued by the ESCV with respect to how it will assess the businesses' proposed demand forecasts;
- the information set out in the businesses' Water Plans (and accompanying templates) and any explanations that the businesses provide with respect to the basis used to derive the forecasts including any assumptions used;
- comparisons amongst the businesses of their forecasting methodologies and assumptions and resulting forecasts;
- relevant Victorian Government policies related to the water industry that impact on demand management, pricing, water conservation, metering and recycled water;
- any readily available data and information that PwC has available to assess demand forecasts; and
- PwC's own experience in preparing and assessing the veracity of forecasts of demand for rural and urban water services in Victoria and other Australian states.

If PwC does not believe that the businesses' proposed demand forecasts reflect these requirements, it is required to provide the ESCV with an alternative forecast. PwC has also

been asked to identify any implications of adopting an alternative demand forecast for the relevant businesses' operating or capital expenditure requirements and/or prices.

1.2 Limitations

This report has been prepared consistent with the terms and conditions agreed to between PwC and the ESCV for the provision of services.

It has been prepared by PwC for the ESCV for the sole purposes of providing an indication of whether forecasts of demand for services prepared by the water businesses are reasonable. While PwC understands that the ESCV will make this report publicly available it is not intended to be relied upon by any person other than the ESCV, nor is it to be used for any purpose other than that articulated above.

Accordingly, PwC accepts no responsibility in any way whatsoever for the use of this report by any other persons or for any other purpose.

This report has been prepared using information provided to the ESCV and PwC by the businesses in their Water Plans and information templates. We have also relied on the responses that we have received from the businesses in response to information requests that we have had.

Importantly, PwC has not undertaken any independent verification of the reliability, accuracy or completeness of this information. Therefore, it should not be construed that PwC has carried out any form of audit or other verification of the adequacy, completeness, mathematical accuracy, or reasonableness of the information provided by the businesses and upon which this report is based.

1.3 Structure of this report

The remainder of this report is structured as follows:

- Chapter 2 assesses the key assumptions used by the businesses in developing their demand forecasts
- Appendix A provides our assessment of each of the urban water businesses' demand forecasts, and
- Appendix B provides our assessment of each of the rural water businesses' demand forecasts.

Two of the businesses — GWMWater and Lower Murray Water — provide both rural and urban water services. The urban and rural components of these businesses have been dealt with separately in appendices A and B.

2 Assessment of the key assumptions

In this chapter, we set out the framework that we have used to assess the key assumptions that most businesses have applied to develop their demand forecasts and provide our view on what the value of these assumptions might be over the next regulatory period. Our views on these assumptions are then used to assess each business's forecasts and the methodology and assumptions in developing their forecasts in appendices A and B.

2.1 Urban water businesses

In developing their demand forecasts for the 2008-2013 price review, each of the urban water businesses has made assumptions in regard to:

- future growth in customer numbers;
- the impact of climate change and the likely level of water inflows into their systems over the period;
- the likely level of water consumption restrictions that will apply; and
- the impact of water conservation measures, including the effect of increased prices on water consumption.

While there is a degree of commonality between the businesses, each has assumed a different combination of these scenarios when developing their forecasts. For example, some have factored in a price elasticity impact while others have not. Some businesses have assumed extremely low water inflow conditions will continue while others have assumed that the level of water inflows will improve as the present drought conditions give way to more normal rainfalls.

In this section, we set out our approach to assessing the assumptions used by the urban water businesses and set out some high level findings from our review. An analysis of each urban water business's assumptions is set out in appendix A of this report.

2.1.1 Approach to assessing the assumptions used

To assess the assumptions used by the businesses, we have used the following principles as our starting point:

1. Consumer behaviour and water consumption patterns should not vary significantly between the businesses. The profile of consumption by a resident in Horsham should not vary to any large degree from a consumer in Bright.
2. Consumers across the state will behave in a similar way when confronted with increased water prices. That is, price elasticity should be fairly consistent across Victoria.
3. Weather patterns should be fairly consistent across the businesses given the size of the territory of Victoria. It is unlikely that climate change will affect one business more severely than another neighbouring business or that an easing of drought conditions occurs only in one business's supply area and not others.

4. Water conservation measures will have similar impacts upon consumer consumption patterns regardless of where the consumer is located.

Despite these principles, we recognise that there may be local conditions, demographic patterns or other reasons that may make it reasonable for a business to use different assumptions from other businesses to develop its forecasts. To test whether this is the case, we have engaged with the business concerned to understand why its assumptions differ from the other businesses. We have also requested that the business concerned provide information or analysis that supports the assumptions they have used.

The other consideration that has framed our assessment has been the evidence available from third party or independent sources. Where possible, we have sought to identify independent third party views on:

- likely rainfall patterns over the next regulatory period and the effect of climate change upon water inflows;
- price elasticity impacts and the effectiveness of the various non-price water conservation measures proposed by the businesses; and
- future population trends and changes in demographics.

Where available, we have tested the assumptions used by the businesses against the information and evidence available from these sources.

Again, we recognise that there may be reasons why the conditions being experienced by a particular business may warrant the use of an assumption that deviates from the views of these third party sources. We have engaged with the business concerned to understand why the assumption they have used varies and requested that further information or evidence be provided in support of their approach.

In late January PwC provided the ESCV with a draft report of its assessment. In this draft report, we had adjusted the businesses' forecasts where the information provided had not supported the assumptions they had used or where information had not been forthcoming from the business. In most cases, we adjusted the forecasts to bring them into line with the assumptions used by the other businesses and/or the evidence available from third party sources. In doing so, we gave consideration to local conditions and modified the final assumption used to develop a revised set of forecasts.

We stressed that the forecasts set out in that report were a draft view on the businesses' forecasts and that there remained issues or questions on the forecasts that we wished to resolve before providing our final view on the forecasts. Further communications with the businesses occurred prior to the final report to ensure that we fully understood the businesses' forecasts and we had all the information we needed to formulate a final view on the businesses' demand forecasts.

The majority of businesses provided submitted responses to the draft report. These responses and further communications with businesses form the basis for any further amendments we have made to the forecast demands in this final report.

In some instances the businesses were able to provide further information supporting their original water plan forecasts and we have adjusted our final forecasts accordingly.

Some businesses took the opportunity to materially revise their water plan forecasts.

- GWMWater revised its forecasts to reflect better information regarding the Grampians Wimmer Mallee Pipeline.
- North East Water revised its forecast consumption in response to our draft report
- Westernport Water revised its full demand schedule after discovery of an error in its base year.

Our analysis in this final report is based on the latest demand revisions submitted by the businesses.

2.1.2 Assessment of the urban water businesses' key assumptions

As noted above, the urban water businesses have referred to four key assumptions underlying their demand forecasts — population growth and demographic changes; climate change and likely water inflows; restriction levels applying to water consumption; and price and non-price water conservation measures.

In most cases, it has been extremely difficult to understand the detailed methodology that the businesses have used to develop their demand forecasts. In a number of cases, the impression provided is that the businesses have simply used their 'best guess' at future demand. While more robust methodologies would be preferable, we have some sympathy with this approach given the current severity of the drought in some districts and the large uncertainties over future rainfall patterns.

The Victorian water sector appears at the centre of a confluence of events and uncertainties that make predicting water demand difficult. Much of the State is suffering severe drought conditions and it remains very uncertain whether these conditions will continue or whether normal rainfall patterns will return. Even if normal rainfall levels return, there are water conservation and demand management programs being implemented that may modify future demand patterns from those seen in the past. One of the largest uncertainties confronting this review has been how customer behaviour responds to the lifting of water restrictions and how fast this response will be.

Despite these uncertainties, we have had to formulate a view on the outlook for water supplies and the likely customer response to the lifting of restrictions and implementation of water conservation measures in order to assess the assumptions that the businesses have made. In formulating this view, we have given consideration to the views and analysis provided by the businesses as well as the views and information of third party sources, such as the CSIRO and Bureau of Meteorology.

However, the uncertainties concerning the future have led us to err on the side of caution where we have been confronted with conflicting analysis and information. We believe that this approach is necessary to ensure that we do not recommend a set of forecasts that are overly optimistic and thus which could affect the future revenues that these businesses earn.

In the sections that follow, we set out our views on the likely trend in population and demographic changes, water inflows and resulting restriction levels and the effectiveness of water conservation measures. These views are used to assess the assumptions that have been used by the business when evaluating their forecasts. A business-by-business assessment is provided in appendices A and B of this report.

Population growth and demographic changes

Most businesses have forecast an average per annum growth rate of between 1% and 1.5% for customer connections. The exceptions are:

- Western Water which is forecasting much higher growth due to expected strong population growth as a result of the Melbourne 2030 strategy; and
- GWMWater which is forecasting much lower customer connection growth due to declining fertility rates and its ageing population.

To develop their forecasts, most of the businesses have relied on the Victorian Government's *Victoria in Future* report (VIF 2004). As the population groupings contained in the VIF do not often translate directly to the water businesses' supply areas, the businesses have adjusted the forecasts in the VIF using local council and/or historical information to develop a population forecast for their water supply area.

We agree with the businesses' use of the VIF forecasts as the starting point for developing a set of customer number forecasts.

As a result, the issue that we have focussed on in this review is the methodology that the businesses have used to:

- translate the VIF forecasts into population forecasts for their supply area;
- adjust the population forecasts into a customer number forecast;
- forecast water supply connections for non-residential customers; and
- forecast the number of customers connecting to the wastewater and trade waste system.

Few of the businesses explained in their water plan the detailed methodology that they have used to translate the VIF forecasts into population forecasts for their water supply area. While some noted that they have used local council or historical information to adjust the forecasts, there was no detail on how this additional information had been used or what adjustments were actually made.

Where we have had reservations regarding the forecast growth rate in customer connections we have discussed the methodology used to derive the forecasts with the business.

Most of the businesses have forecast that the growth in residential customer connections will be above the expected population growth rate forecast by VIF. The higher growth rate aims to take account of ageing populations in many of the urban communities that these businesses serve. In their view, an ageing population will result in more single occupancy residences and thus a greater number of connections than suggested by population forecasts.

We believe that increasing the growth in connections above the population growth rate is appropriate as the information presented in VIF indicates that single occupancy residences will increase in number over coming years. The VIF report projects two key expectations about Victoria's population:

1. As the population ages and as increasing numbers of people do not have children, Victoria will see strong increases in lone person or couple without children households.

2. One of the key impacts of population growth that will be visible in the future will be the rapid growth of households compared to total population growth. In almost all areas of the state, household growth will outpace population growth due to declining average household size.[1]

In most instances, we have found no issues with the way that the businesses have made this adjustment to their expected forecasts and thus we believe that most of the residential connection forecasts presented by the businesses are reasonable.

However, we note that there was at least one instance in which the ViF forecasts for last few years under-forecast actual connections growth for one business. For this business, we did not believe that the ViF forecasts were an appropriate basis for assessing the customer connection forecasts of the business concerned.

The businesses have used a variety of methods to forecast non-residential connections. Some have applied the same growth rate that they have used to forecast residential connections because both types of customers have grown at similar rates in the past. Similar relationships have been used to forecast wastewater demand and trade waste demand. For example, one business applied the same forecast growth rate to non-residential customers as it did to residential customers as both types of customer connections have historically grown at similar rates.

Generally, where the growth rates in non-residential connections, wastewater connections and trade waste connections have been forecast using the historical relationships between residential, non-residential, wastewater and trade waste growth, we have tended to accept the forecasts generated as reasonable.

In only a few cases are we of the view that the customer connection forecasts provided by the businesses require adjusting. As a result, we have used the customer connection forecasts as a check of any adjustments we have made to the volume forecasts. Any adjustment to the volumes should not result in unrealistic changes in the average consumption levels that the forecasts produce.

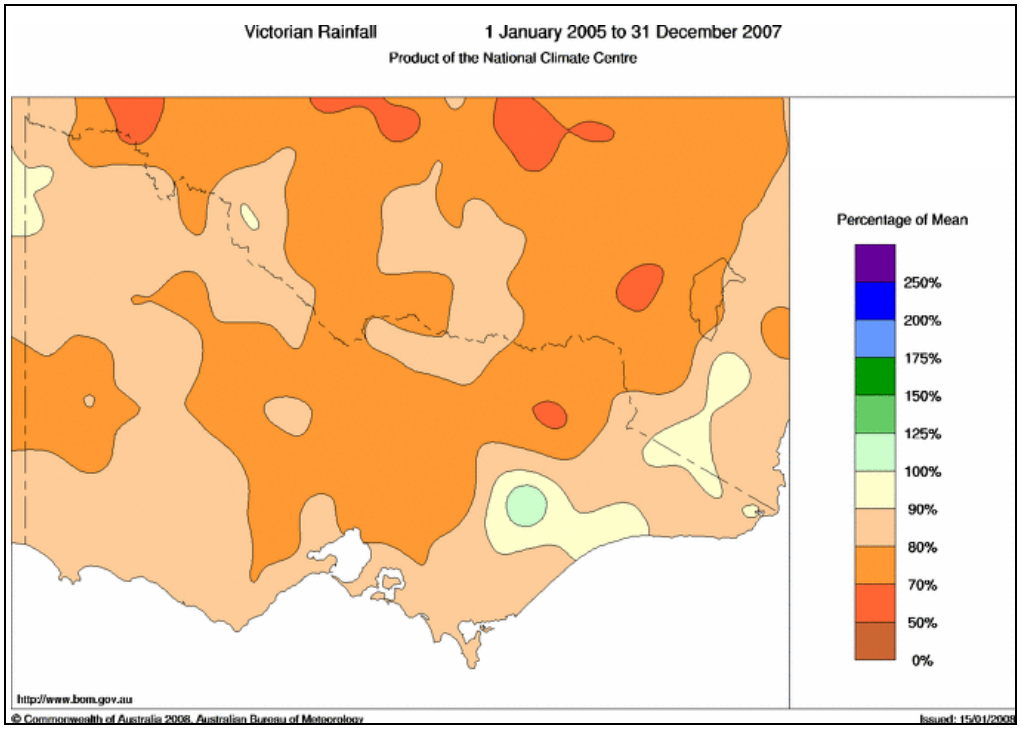
Water inflows, climate change and restriction levels

One of the key factors that the businesses have considered when developing their demand forecasts has been their expectations about the availability of water over the next regulatory period. Most areas of Victoria are currently experiencing some level of drought which has reduced the availability of water supplies and thus forced demand reductions upon customers. In some cases, dam levels are critical, severe restrictions apply and the water authority is investigating alternative sources of supply, including trucking water in from other districts.

Figure 1 shows that rainfall levels have been between 70 and 90% of mean rainfall levels over the last three years, indicating the extent of the drought in some areas.

[1] Victoria in Future 2004 Overview Report, Department of Planning and Community Development, p. 5

Figure 1: Rainfall in Victoria, January 2005 to December 2007, percentage of the mean



One of the key factors that will influence the level of water demand over the next regulatory period is whether there will be an easing of drought conditions and a return to more normal rainfall levels resulting in an increase in consumption as water becomes more readily available.

Consistent with our framework, we have sourced information from third party sources where possible to develop a view on a likely scenario for water inflows over the next regulatory period. In particular, we have sought information from these sources on expected weather patterns and likely rainfall levels and the impact of climate change on weather and rainfall levels.

There is a great deal of uncertainty over what rainfall levels will occur in the future and, in particular, how climate change will affect the pattern and quantity of rainfall. Due to this uncertainty, we believe more cautious assumptions on these matters are preferable to minimise the risk that we recommend demand forecasts that are overly optimistic. However, we are also mindful of excessively pessimistic assumptions that may lead to forecasts that are overly conservative.

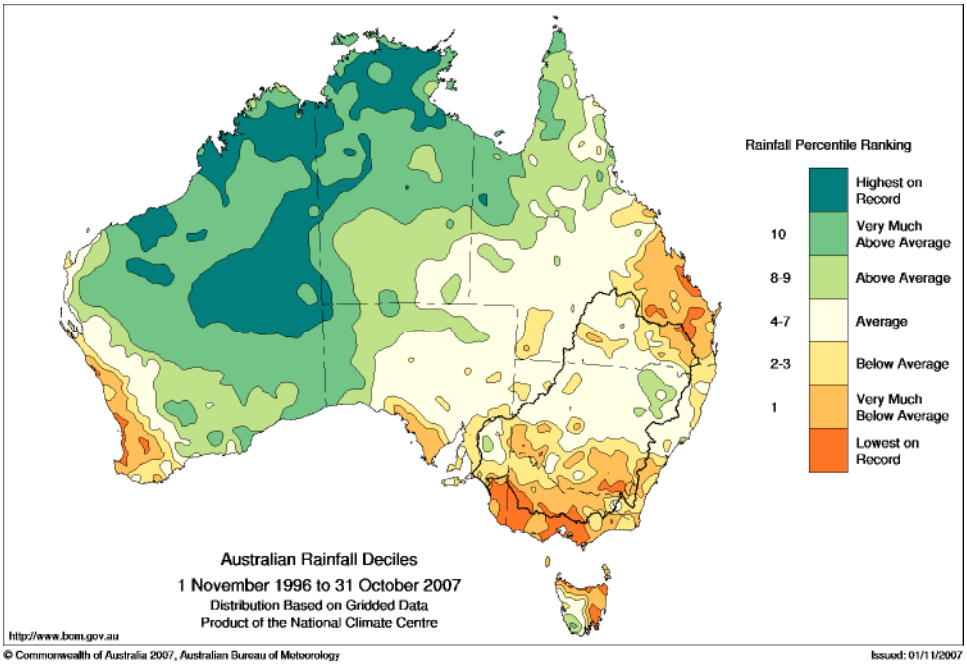
Water inflows and restriction levels

Some of the businesses have developed their forecasts assuming a low water inflow scenario. A low inflow scenario predicts future inflow levels using an average of the last 10 years of inflows.

The majority of these businesses reside in the western districts of the state where drought conditions appear worst.

Given the extended drought period experienced in Victoria, the average inflows used by these businesses would be below long term averages and thus imply that they expect severe drought conditions to continue. Figure 2 sets out the rainfall percentile ranking for the last 11 years, confirming the extremely dry conditions that have prevailed over much of Victoria during this period.

Figure 2: Rainfall percentile ranking, Australia, 1995 to 2007



We have attempted to source information on the most likely rainfall scenario over the next 5 to10 years from the Bureau of Meteorology and other agencies. However, very little is publicly available on the likely rainfall scenario going forward. Available forecasts only extend out over the next twelve months, whereas we require forecasts for the next 6 to 7 years.

While we understand the severity of the drought conditions occurring in some areas, we have assumed that the next regulatory period will see a return to a 'medium climate change rainfall scenario'. This scenario is one of gradual climate change based on the long run average (the past 50 to 100 years) of inflows.

In our view, this scenario provides a reasonable 'middle ground' between the low inflow and high inflow scenarios available and thus provides the right balance of risks over the period. We note that many of businesses have assumed a medium rainfall scenario over the next regulatory period when developing their forecast demand.

We are of the view that the medium inflow scenario should be modified to account for the broad community acceptance of climate change. The CSIRO is predicting that climate change will lead to annual, winter and spring rainfall decreasing whereas changes to summer and autumn rainfalls are less certain. Overall, the CSIRO believe that the effect on Australian rainfall by 2030 will be as follows:

> Best estimates of annual precipitation change represent little change in the far north and decreases of 2% and 5% elsewhere. In summer and autumn decreases are

smaller and there are slight increases in the east. Decreases of around 5% prevail in winter and spring, particularly in the south west where they reach 10%.[2]

Thus, while we have assumed a medium inflow scenario, we expect inflows to be less than the average over the last 50 to 100 years because of the declining rainfalls expected under climate change.

Assuming a medium rainfall scenario (with climate change impact) suggests that water restrictions will ease over the period and consumption will return to levels similar to pre-drought levels. How quickly customers return to consumption patterns and levels that were prevalent prior to restrictions coming into effect will influence the rate of growth in water demand over the period.

We have not been able to source information or research that examines how rapidly customers return to earlier consumption levels and patterns as water restrictions are lifted. However, several water businesses have anticipated that consumption will return to between 70% and 90% of pre-restriction levels over a two year period.

To assess the bounce back in consumption following the easing of restrictions, we have assessed each business's assumption on a case-by-case basis using a return to between 70% and 90% of pre-restriction levels over a two year period as a benchmark. In this assessment, we have given consideration to the reasons the businesses have given for the pattern they have assumed where such information has been provided.

Some of the businesses believe that many of the water conservation measures introduced in recent years, such as water efficient appliances, as well as greater public appreciation of water and the impact of restrictions on their consumption behaviour will lead to permanent declines in water consumption. Thus, even with increased water inflows and the removal of restrictions, these businesses believe that baseline water consumption will be lower than the baseline level that has occurred in the past.

Despite some businesses assuming a low inflow scenario, we have found that few of the volume forecasts that they have submitted require adjusting to reflect a medium inflow scenario. Most of these businesses will be the beneficiaries of alternative water supplies — in particular the Goldfields Pipeline — that will come on line during the period. Thus, even though these businesses have forecast low inflows, their water demand forecasts anticipate the complete removal of restrictions and strong growth in consumption levels as the supplies from these alternative sources become available.

Water conservation measures

The final factor that we have considered in reviewing the businesses' demand forecasts is the effectiveness of the water conservation measures that they intend implementing over the period. Under their Water Strategies, each business has committed to reducing mid 1990s average consumption levels by 25% by 2015.

Water conservation measures are the primary tool that the businesses' intend to use to achieve this target and thus we have examined how their assumptions regarding the effectiveness of these measures have been factored into the forecasts.

[2] CSIRO 2007 Climate Change in Australia — Technical Report, p. 67

Water conservation measures can be price-based or non-price based. In our view, price is a water conservation measure that can be used by a business to encourage more efficient use of water. The measure of price elasticity can thus be considered a measure of how effective price is as a water conservation measure.

Price-based measures (price elasticity)

Only five of the water businesses have taken into account the impact of changing prices on residential demand through assumptions about the price elasticity of demand (see table 1). Where it has been applied, it has often been unclear from the plans what elasticity figures has been used and/or how the measure used has been translated in the businesses' demand forecasts.

Most of the businesses have not incorporated elasticity impacts into their forecasts for non-residential demand. The water plans did not provide any obvious reasoning for why this was the case.

To assist the analysis, where a business has not incorporated price elasticity impacts, we have assumed that they believe price elasticity is zero and thus we have assessed their assumption to apply a zero price elasticity measure.

Table 1: Price elasticities applied by selected businesses in their water plans

Business	Thresholds	Elasticity measure
Barwon Wate	n.a.	-0.6
Lower Murray Water	0-300kL	-0.05
	300-600kL	-0.2
	>600kL	-0.3
North East Water	Indoor consumption	10% price increase will result in a 0.5% reduction in demand
	Outdoor consumption	10% price increase will result in a 1.5% reduction in demand
Western Water	0-53kL	0
	53-106kL	-0.1
	>106kL	-0.1

Consistent with our framework, our starting point for assessing the price elasticities used by the businesses has been third party views. For this purpose, we have sourced price elasticity information from the Water Supply Association of Australia (WSAA) which has published the following price elasticity figures:

- Indoor consumption — for every 10% increase in price there will be a 0.5% reduction in demand; and

- Outdoor consumption — for every 10% increase in price there will be a 1.5% reduction in demand.

In analysing the businesses' demand forecasts, we have assessed the extent to which price impacts can explain any slowing in future water demand growth rates. For example, one business is proposing to introduce large price increases in the next regulatory period and, at the same time, is forecasting a slowing in demand growth compared with recent history. Applying the WSAA elasticity estimates to the anticipated price increases accounts for almost all of the slower growth and thus we have accepted their volume forecasts.

Some businesses have not assumed any price impact on demand in the future because, under the current level of restrictions, they do not believe that price will have a noticeable impact upon customer usage. Customers in these water supply areas are already subject to stage 3 or 4 restrictions while effectively ban all outdoor usage.

We also are of the view that in those areas where stage 3 or 4 restrictions currently apply, customers have already reduced their discretionary consumption to such a point that price will have little impact on usage.

This is borne out by the WSAA elasticity measures that suggest that price elasticity for indoor residential use under normal supply conditions is quite low. Under stage 3 and 4 restrictions, customers have severely curtailed or eliminated altogether their outdoor use of water. As a result, it is unlikely that residential water usage will respond noticeably to price increases.

While considering a low or zero price elasticity may be appropriate under current supply conditions and restriction, the task that we have had to consider is how restriction levels may change in the future. This in turn is dependent on the likely rainfall scenario assumed going forward and/or the coming on line of alternative water supply sources.

We believe that higher rainfall levels in the future will see an easing of restrictions and thus consumers will begin to increase their discretionary use. As a result, we expect them to respond more noticeably to price elasticity impacts, although the absolute price elasticity impacts will remain quite low.

For the draft report and this final report, we have applied a 0.07 price elasticity to the demand forecasts where we have believed this necessary. 0.07 has been derived by taking the weighted average of WSAA's price elasticity estimates with the weights based on 80% indoor use and 20% indoor use.

The elasticity adjustments made to the businesses' forecasts were based on the prices that the businesses had set out in their water plan templates. If the ESCV adjusts the businesses' prices as a result of its price review, then this may affect the price elasticity adjustment made to the businesses' forecasts.

Non-price water conservation measures

Most of the businesses propose implementing non-price water conservation measures over the next regulatory period. The measures include water efficient appliance programs, indoor retrofitting and business efficiency programs.

Most businesses also indicate that they intend to maintain permanent water saving rules. These rules limit the extent of water use for outdoor activities such as odd/even day watering programs and prohibitions on pavement watering.

In most cases, non-price water conservation programs have been introduced to achieve the business's water conservation targets set out in their Water Strategy. In these Strategies, the businesses have committed to achieving 25% reductions in water use by 2015 from mid-1990 levels.

The level of information provided by the businesses in support of the water savings that will be achieved by the proposed water conservation programs and water savings rules varies.

Some businesses have used the results achieved in metropolitan areas such as Melbourne and Sydney to quantity to anticipated benefits of these programs. In most instances, where anticipated water savings have been supported by such information, we have tended to accept the savings proposed.

Other businesses have not provided similar independent support for the savings that they anticipate they will achieve over the period. In some cases, the business has stated that certain programs will be implemented with little justification of the water volume savings they have assumed when developing their forecasts.

In the draft report we queried the assumptions used by a number of businesses and adjusted the forecasts upward to discount the effect of water conservation programs in their forecasts. Most of the affected businesses were able to provide further information in response to the draft report. This information was in most cases sufficient to provide us with confidence in the assumed benefits of the conservation programs.

2.1.3 Conclusions

We have amended several of the water businesses demand forecasts. In most cases, it is the water volume forecasts that have been altered because we believe that they are based on overly conservative assumptions, particularly in regard to the rainfall outlook. In these cases, we have adjusted the forecasts upward to reflect our assumption of a medium rainfall scenario going forward. Price elasticity impacts have also been applied in some cases.

We have also made adjustments to some of the customer number forecasts because they have also appeared overly conservative. These adjustments have had flow effects to the water volume demand forecasts and thus these have also been altered to maintain a realistic average consumption level.

2.2 Rural water businesses

There are five water businesses that provide rural water services — Lower Murray Water; Grampians Wimmera Malley Water; FMIT; Southern Rural Water; and Goulburn Murray Water. Their primary role is to supply irrigation water in line with the water entitlements that govern the allocation of this water. They also supply stock and domestic allocations and some provide drainage services to their irrigation customers.

2.2.1 Approach to assessing the forecasts

The approach we have taken to assessing the rural water businesses' forecasts has been to compare the forecasts against the available history.

Under normal rainfall scenarios, we would expect to see a fairly consistent trend of increased usage and increasing number of customers. However, we have been conscious of the extent of the drought and the extremely low dam levels prevalent in a number of the irrigation

districts. We are also aware that many river and groundwater systems have been capped preventing the water business from issuing any further licences to use these resources.

Hence, while the available history has provided a starting point for our analysis, we have given close consideration to the factors influencing supply in the businesses' supply area and what this will mean for demand over the next regulatory period.

Some of the conclusions on the assumptions that we have made in regard to the urban water businesses are also relevant to the rural water businesses. This is particularly the case regarding our view on the rainfall outlook.

Consistent with the conclusion we have come to for a medium climate change scenario going forward, we have expected the same conditions to apply to the rural water businesses and thus we expect that water demand will increase in rural areas over the regulatory period.

2.2.2 Assessment of the rural water businesses' key assumptions

The key factors that the rural businesses' have given consideration to when developing their demand forecasts include number of irrigation licences; water supply conditions and the availability of alternative water sources; water trading outcomes, and improved irrigation practices.

It should be noted that the businesses have not all assumed the same set of assumptions when developing their forecasts. As a result, we have not set out our analysis of their assumptions in this section and instead address each business individually in section 4 of this report.

As with the urban water businesses, it has often been difficult to gain a detailed understanding of the methodology the rural water businesses have used to forecast demand in their supply areas.

2.2.3 Conclusions

For the final report, we made adjustments to the demand forecasts provided by one rural water business to reflect a medium inflow scenario and adjust for incorrect use of historical data.

A URBAN WATER BUSINESSES

Gippsland Water (GW)

GW has forecast the following over the next regulatory period:

- Water related residential customer connections will grow on average by 1.0% per annum and non-residential water customer connections to grow by 0.4% per annum over the course of the regulatory period. Residential customer numbers are forecast on the basis of both population projections and dwelling density from Victoria in Future. Non residential customer numbers have been forecast using a population based method with the change in future customer numbers assumed to be proportional to the population change.
- Residential consumption will decrease by an average of 2.4% per annum and non-residential consumption to grow by an average of 0.4% per annum over the course of the regulatory period. Residential volumes are based on a five year benchmark demand period from 2000-01 to 2004-05 and take into consideration both population and connection projections. They are calculated using the growth in residential connections adjusted for an occupants-per-dwelling factor.
- Over the course of the regulatory period GW has factored in an anticipated decrease in per household consumption of 15.5% or on an average annual basis a reduction of 3.3%. In effect GW is anticipating it will be able to achieve its stated conservation targets set out in its Water Strategy.
- Residential wastewater related connections are expected to grow over the course of the regulatory period by an average annual rate of 1.2% per annum. Non-residential wastewater connections are predicted to increase by an average of 0.4% per annum.

Customer connections

While the customer forecasts may be consistent with Victoria in Future, in the draft report we noted we were concerned that the manner in which statistics had been translated into connection growth may be underestimating actual growth.

For the three years of historical information available from the ESC's annual performance report the average annual growth rate was 2.4% for both residential water and sewerage connections. This compared with the 1% per annum growth forecast by GW over the regulatory period. Prior to the draft report, GW did not provide any explanation for why the lower growth rate is anticipated in its water plan.

As a result, for the purposes of the Draft Report we amended these forecasts to reflect the recent historical trend. In our view, the sharp decline in connection growth appears at odds with the historical data and a prevailing view of an increasing trend toward single occupancy residences and ageing populations.

Adjusting GW's residential connections forecasts had a flow on effect on GW's residential water consumption forecasts as higher connection numbers means higher consumption levels.

GW based growth in non-residential customer numbers on overall population growth. While the method for deriving the estimates is unclear the low growth in non-residential connections is consistent with the available historical data from the ESC performance report

for the years 2004-05 to 2006-07. This data indicates an average annual growth of approximately 0.2% for non-domestic connections. This compares with GW's forecast of 0.4% per annum over the regulatory period.

Given the consistency in the forecast of non-residential connections compared to history, in the draft report we found that GW's non-residential connection forecasts were reasonable.

In response to the Draft Report, Gippsland Water stated that connections growth estimates should not be amended. Gippsland Water's response provided data for actual connections for the period 1998-99 to 2006-07. These connections are reported in table A.3. The table also reports the average annual compounding growth rate for a number of different time periods all ending in 2006-07. It should be noted that based on this data growth has historically been in excess of 1.6% per annum.

Table A.3: Connections — Gippsland Water

	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07
Connected properties	52,396	53,739	53,989	54,238	54,710	55,856	56,548	58,293	59,338
Annual growth rates									
2 year period	2005-06 to 2006-07	1.8%							
3 year period	2004-05 to 2006-07	2.4%							
5 year period	2002-03 to 2006-07	2.1%							
7 year period	2000-01 to 2006-07	1.6%							

Annual growth rates are estimated based on the average compounding growth rate over that period.

Gippsland Water is proposing a step decrease that effectively halves its growth rate. Such a decrease does not appear to be consistent with general growth expectations for the area. For example, the Baw Baw, Latrobe and Wellington Councils are considering increasing land supply beyond the level currently provided for to account for growth. The step decrease is also not observable in the ViF forecasts.

We have considered the original ViF growth numbers for the local government areas of Baw Baw, Latrobe and Wellington and recognise that these forecasts (while not evidencing step decreases) are consistent with the quantum proposed by GW. However, we also note that the ViF forecasts may not be appropriate indicators for GW connection growth given that historically they have forecast growth rates that were materially less than the growth rate in actual connections of approximately 2.1% per annum (Baw Baw 1.73%, Latrobe 0.78% and Wellington 0.81% for occupied private dwellings). We understand that a direct comparison between ViF and Gippsland Water's historical connections is problematic. However, it is reasonable to expect there to be some correlation between the growth rates.

In its response to the Draft Report Gippsland Water stated that the primary drivers behind the step change in growth were an increase in interest rates and a shortage of land supply around Traralgon. Its worth noting that the recent interest rate increases apply universally

across Victoria and that consequently we should be able to observe similar step decreases in other Victorian water utilities.

The other primary driver of Gippsland Water's step decrease in growth relates to constraints in land supply for Traralgon and Morwell. We note that the consultancy Beca Pty Ltd undertook the Latrobe Residential Land Supply Analysis for Latrobe City Council in 2006. The Latrobe Residential Land Supply Analysis focused on Morwell, Traralgon and the Traralgon-Morwell Corridor.

Beca found that a medium growth scenario is likely to eventuate. It estimated that the five-year average of 218 lots released per annum in Traralgon will increase to 281 lots per annum, and from 29 lots to 68 lots per annum in Morwell. These forecasts represent a step increase in residential development. Beca found that based on 2006 consumption Morwell had 5 years of land supply and Traralgon had 3.5 years of supply.

However, the same study also identified a number of potential parcels of land where development could occur and concluded that Latrobe City could expect to increase land supply to: Morwell 25 years and Traralgon 10.5 years.

After consideration of Gippsland Water's response, the historical growth rates and the land supply forecasts from Beca we remain concerned that the proposed forecast of customer connections is overly conservative. In particular we note that there is no supporting evidence for the significant step decrease in growth in first year of the regulatory period.

We acknowledge that the Draft Demand Report by applying a three year average of 2.4% per annum is high compared to other utilities. Subsequently, for the purposes of the Final Demand Report we have adopted the average compounding growth rate based on the preceding 7 years of connection data as supplied by Gippsland Water 1.6% per annum.

Water demand

In the Draft Report we expressed concern regarding the negative growth forecast for residential water consumption over the period. Audited historical data from the ESC annual performance report shows that average household consumption has been declining by approximately 2.3% per annum over the last three years. GW is forecasting a continuation of this trend over the next regulatory period.

Our concerns with the decline were largely based on pre-existing restrictions. In our view, the decline over recent years reflected the introduction of restrictions which will not be repeated in the future.

We also looked for other reasons for why this decline in growth may occur. One possibility was that GW's water conservation programs will be highly effective in achieving their water targets set out in their Water Strategy. GW has not provided any material indicating that their water conservation measures will be this effective. In response to a request for further information, GW only stated the following:

> *The actions outlined in the Water Plan (p145) are generic in nature and in the main, reflect the provision of advice to customers. Gippsland Water has not determined the impact, expenditure or timing of savings associated with each individual action [conservation programs] outlined.*

We noted that the savings from the conservation measures appear much more significant than what other businesses were forecasting.

GW is not proposing that restrictions will achieve the anticipated decrease in residential usage as GW is not intending to impose restrictions during the forecast period. While the permanent water saving rules that have been in place since 2005 will have some impact, we were not convinced that the impact would be as large as GW anticipated. Given our concerns and apparent uncertainty regarding the benefits from the conservation program, we adjusted GW forecasts to reflect the historic average for residential consumption.

We also noted that the forecasts did not reference estimates of price elasticity of demand. As with other water businesses we have adjusted demand to reflect an industry based estimate of elasticity. We have applied an elasticity value of -0.07 to the forecasted residential consumption.

Non-residential demand forecasts are based on population growth — change in non-residential volumes is assumed to be proportional to population growth. Major industry demand is based on an average for a defined benchmark period or industry provided forecast where available. In the Draft Report we also noted that we would be discussing with GW how anticipated new industry with an estimated demand of 10,000 ML was treated in the demand forecasts.

In response to the Draft Report GW indicated that the restrictions data upon which our assumptions were based was incorrect and that high level restrictions were not currently in place. Gippsland Water noted that stage 4 restrictions had only been in place of a short period in three minor towns during 2006-07. Taking the lack of restrictions into account, the observable downward trend in consumption per connection and noting that the increased connections forecasts have lowered per connection consumption we are satisfied that such demand reductions are reasonable.

In its Water Plan Gippsland Water indicated that there was a possibility that an estimated demand of 10,000 ML from new industry may occur during the regulatory period. In response to the Draft Report Gippsland Water noted that they currently do not have enough entitlement to satisfy such an increase in new industry demand and that it was likely that government would provide these customers with their own entitlement, in which case they would privately divert the water. Taking the response into consideration we are satisfied that this demand not be included in the forecasts.

Wastewater demand

Residential wastewater related connections are expected to grow over the course of the regulatory period by an average annual rate of 1.2% per annum. Non-residential wastewater connections are predicted to increase by an average of 0.4% per annum. As with residential water connections, wastewater connections were amended to reflect historical growth rates of 1.6%.

A Wastewater Volumetric Charge applies to non residential properties which use in excess of 100 kilolitres of water in any four month period. The forecast level of discharge for these customers is proposed to increase over the regulatory period, primarily as a result of the Australian Paper expansion project. We believe that this is a reasonable assumption.

Trade waste demand

GW currently has 504 Minor Trade Waste customers. This number is expected to increase to 1,245 over the regulatory period, representing an average annual increase of approximately 14.8% per annum, This increase is not driven by changes in demand but rather the

identification by Gippsland Water of current wastewater customers as Minor Trade Waste customers. Given this explanation we believe the forecasts are reasonable.

GW did not provide and volume or parameter based forecasts as they do not levy charges on these basis.

Revised forecasts

We have adjusted GW's forecasts of residential demand for water. The revised forecasts are set out in the following table.

Service	Category	Tariff Description	PQR	2008-09	2009-10	2010-11	2011-12	2012-13
Sewerage	Major Clients	Connected	Qty	5.00	5.00	5.00	5.00	5.00
		No Connection	Qty	5.00	5.00	5.00	5.00	5.00
		Volumetric	Qty	523,250.00	523,250.00	523,250.00	523,250.00	523,250.00
	Non Residential	Connected	Qty	4,897.50	4,918.50	4,939.00	4,959.00	4,979.00
		No Connection	Qty	78.00	78.00	78.00	78.00	78.00
		Volumetric	Qty	843,968.83	847,265.85	850,432.58	853,599.32	856,766.06
	Residential	Connected	Qty	46,179.65	46,795.60	47,235.18	47,721.62	48,366.19
			QtyA	**46,303.58**	**47,044.43**	**47,797.15**	**48,561.90**	**49,338.89**
		No Connection	Qty	2,535.00	2,535.00	2,535.00	2,535.00	2,535.00
Trade waste	Non Residential	Annual Fee	Qty	788.00	984.00	1,230.00	1,254.00	1,254.00
Water	Fire Service	100 mm	Qty	212.00	215.00	218.00	221.00	224.00
		150 mm	Qty	13.00	13.00	13.00	13.00	13.00
		20 mm	Qty	159.00	159.00	159.00	159.00	159.00
		25 mm	Qty	78.00	80.00	82.00	84.00	86.00
		32 mm	Qty	56.00	56.00	56.00	56.00	56.00
		40 mm	Qty	41.00	41.00	41.00	41.00	41.00
		50 mm	Qty	396.00	402.00	408.00	414.00	420.00
		75 mm	Qty	12.00	12.00	12.00	12.00	12.00
		80 mm	Qty	517.00	517.00	517.00	517.00	517.00
		No Connection	Qty	-	-	-	-	-
	Major Clients	100 mm	Qty	4.00	4.00	4.00	4.00	4.00
		150 mm	Qty	7.00	7.00	7.00	7.00	7.00
		20 mm	Qty	3.00	3.00	3.00	3.00	3.00
		25 mm	Qty	1.00	1.00	1.00	1.00	1.00
		32 mm	Qty	1.00	1.00	1.00	1.00	1.00
		40 mm	Qty	3.00	3.00	3.00	3.00	3.00
		50 mm	Qty	3.00	3.00	3.00	3.00	3.00
		75 mm	Qty	1.00	1.00	1.00	1.00	1.00
		80 mm	Qty	7.00	7.00	7.00	7.00	7.00
		No Connection	Qty	3.00	3.00	3.00	3.00	3.00
		Volumetric	Qty	2,410,200.00	2,410,200.00	2,410,200.00	2,410,200.00	2,410,200.00
	Major Clients Fire Service	150 mm	Qty	1.00	1.00	1.00	1.00	1.00
		32 mm	Qty	1.00	1.00	1.00	1.00	1.00
	Non Residential	100 mm	Qty	38.00	38.00	38.00	38.00	38.00
		150 mm	Qty	1.00	1.00	1.00	1.00	1.00

Service	Category	Tariff Description	PQR	2008-09	2009-10	2010-11	2011-12	2012-13
		20 mm	Qty	4,600.00	4,624.00	4,647.50	4,670.50	4,693.50
		25 mm	Qty	451.00	451.00	451.00	451.00	451.00
		32 mm	Qty	156.00	156.00	156.00	156.00	156.00
		40 mm	Qty	159.00	159.00	159.00	159.00	159.00
		50 mm	Qty	149.00	149.00	149.00	149.00	149.00
		75 mm	Qty	8.00	8.00	8.00	8.00	8.00
		80 mm	Qty	42.00	42.00	42.00	42.00	42.00
		No Connection	Qty	55.00	55.00	55.00	55.00	55.00
		Volumetric	Qty	2,751,944.68	2,762,695.31	2,773,021.16	2,783,347.00	2,793,672.85
	Residential	100 mm	Qty	1.00	1.00	1.00	1.00	1.00
		150 mm	Qty	-	-	-	-	-
		20 mm	Qty	52,918.41	53,459.38	53,987.36	54,511.04	55,034.23
			QtyA	53,228.61	**54,080.26**	**54,945.55**	**55,824.68**	**56,717.87**
		25 mm	Qty	1,044.00	1,044.00	1,044.00	1,044.00	1,044.00
		32 mm	Qty	44.00	44.00	44.00	44.00	44.00
		40 mm	Qty	14.00	14.00	14.00	14.00	14.00
		50 mm	Qty	14.00	14.00	14.00	14.00	14.00
		75 mm	Qty	1.00	1.00	1.00	1.00	1.00
		80 mm	Qty	2.00	2.00	2.00	2.00	2.00
		No Connection	Qty	3,044.00	3,044.00	3,044.00	3,044.00	3,044.00
		Volumetric	Qty	10,498,384.75	10,244,323.12	9,994,102.26	9,748,967.23	9,509,198.60
			QtyA	10,448,446.57	**10,252,723.94**	**10,061,752.36**	**9,875,019.62**	**9,692,083.90**