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.

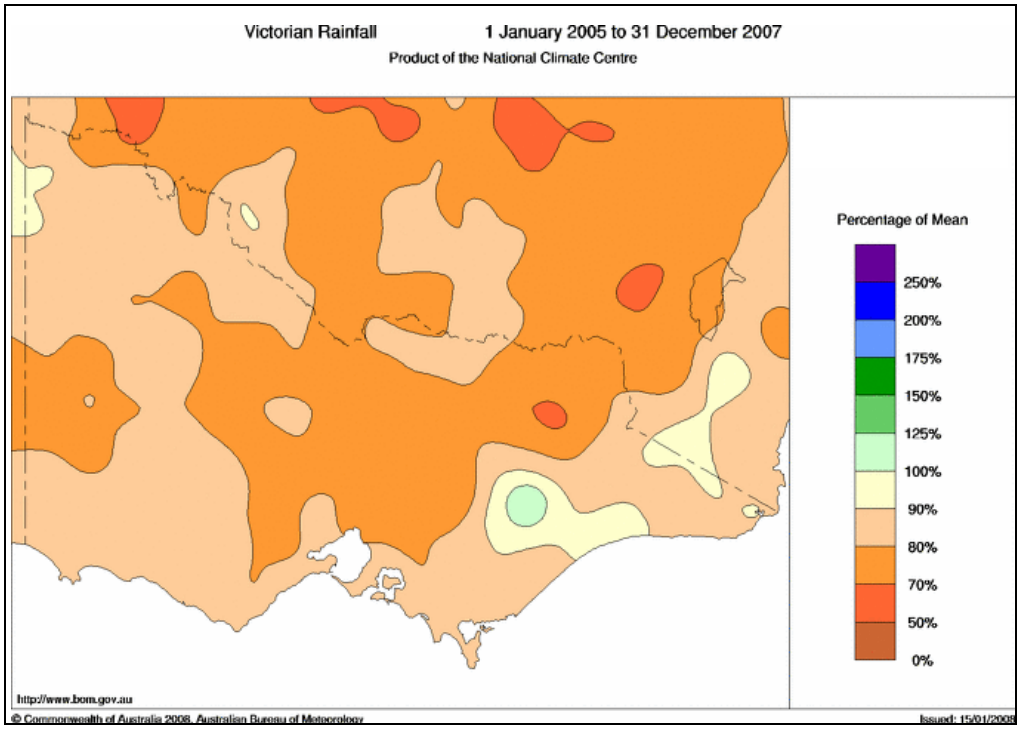
Water inflows, climate change and restriction levels

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.

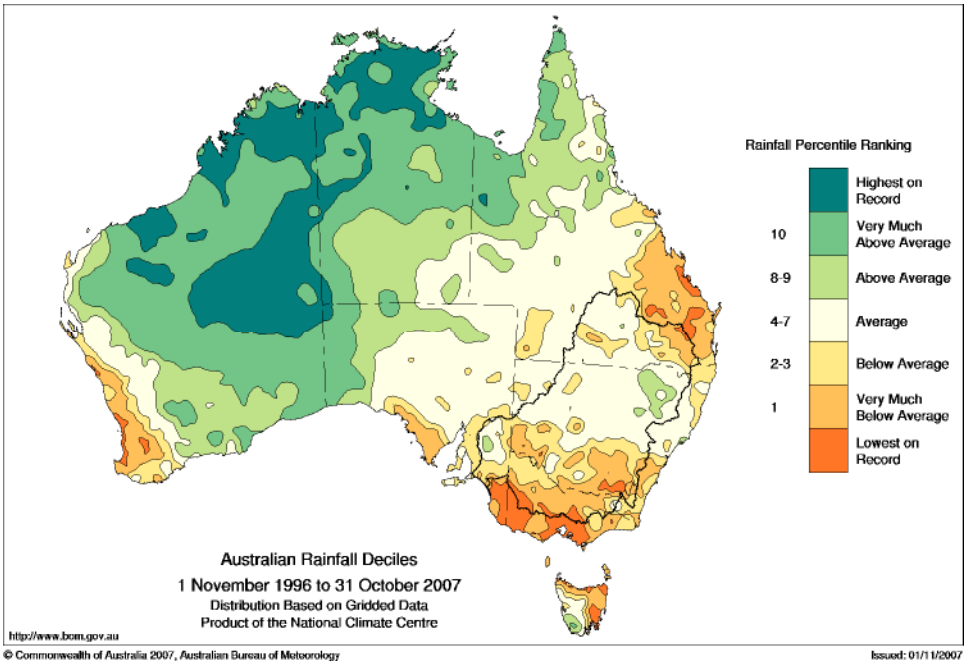
Water inflows and restriction levels

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

Wannon Water (WnW)

Wannon Water (WnW) was formed on 1 July 2005 from the amalgamation of three water authorities in southwest Victoria: Glenelg Water, Portland Coast Water and South West Water. This is its first Water Plan as an integrated business; consequently the price structure in the Water Plan Template changes from 2008/09 onwards. We also note that it can be difficult to reconcile aspects of its Water Plan with the Template, particularly in terms of the Water Plan's discussion and presentation of results for forecasts relating to connections and volumes for different classes of customers (residential, non-residential, major customers and rural customers)

Based on its Template, WnW's demand forecasts for the 2008-09 to 2012-13 period are as follows:

- Residential and non-residential total water demand are forecast to decline by average annual rates of 0.1% and 0.8%, respectively. On a per connection basis (residential + non-residential customers), average annual demand is expected to decline by an average annual rate of -2.1%.
- Total water and wastewater connections are forecast to increase at annual average rates of 1.6% and 1.1%, respectively.

WnW's Water Plan shows the following:

- According to WnW, predicted growth in customer connections is based on VIF household projections for statistical local areas, disaggregated to parts of each area serviced by WnW using historic trends for local household growth from both census data and council records.
- Overall, residential water demand per connection is forecast to fall from 183 kL in 2005/06 to 161 kL in 2012/13 (a fall of about 12%). Over the same period, 'non-residential' water demand per connection is predicted to fall from 483 kL per connection to 445 kL per connection (a decline of about 8%), while demand from rural customers is forecast to decline from 1,285 kL per connection in 2006/07 to 1,202 kL per connection in 2008/09 (a decline of 6.5%) and then remain steady throughout the regulatory period. Per connection demand by major customers is expected to fall from about 232,284 kL in 2005/06 to 182,839 kL in 2012/13 (a reduction of 27%).[3]
- In forecasting restriction levels to 2012-13, WNW assumes a continuation of the low inflow conditions of the past 10 years – ie, a 'step' change in inflows resulting from climate change. WnW's assumptions regarding restriction levels for residential and non-residential customers over the regulatory period are listed in Table A.11 below. This shows that, of the larger systems, Hamilton is expected to remain on Stage 4 restrictions until major supply augmentation (the Hamilton Grampians Inter-Connector Pipeline) is completed in 2010. Permanent Water Savings Measures were introduced across the Otways system in July 2006. WnW reports that, to date, this has resulted in a 4% reduction in annual residential water use across both Warrnambool and Camperdown, which "*exceeds modelling projections as well as notional estimates of a 2% saving at this stage in the demand management program*."

[3] From Table 8-11 on page 107.

Table A.11: Forecast water restriction levels – Wannon Water

Service	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13
Restriction level	2-3-4[1] (4 from Nov 06) PWS[2]	4-3[1] (3 from Nov 07) PWS[2]	3-4[1] (4 from Jan 09) PWS[2]	4-3[1] (3 from Oct 09) PWS[2]	PWS from July 10	PWS	PWS

1. Restrictions apply to Balmoral, Cavendish, Dunkeld, Glenthompson, Hamilton and Tarrington
2. All other towns are on Permanent Water Savings (PWS)

- Even after restrictions are lifted in Hamilton, WnW assumes that residential demand will not return to historic levels. This is due to WnW's demand management initiatives, including the introduction of three tier volumetric charging and price increases. WnW's Water Plan forecasts that per connection residential demand in Hamilton will increase from 155kL in 2009-10 to 170kL in 2010-11, with the easing of restrictions, and will rise to 175kL by 2012-13. However, this is still only about 74% of 2005-06 consumption levels (of 237kL per connection).[4]
- The effect of WnW's demand management strategy is to reduce per connection demand (relative to historic levels) in both restricted and unrestricted systems. WnW assumes its strategy will reduce demand by approximately 2,000 ML per annum by 2015 (or a 30% reduction in per capita water use, based on 1997 levels of consumption), with a large proportion of these savings (1,410ML) being realised between 2005-06 and 2008. The demand management strategy is comprised of a range of measures, including education programs, initiatives targeting major customers, installation of water efficient appliances, and WnW's rising block tariff.
- To estimate reductions in water demand from its rising block tariff, WnW assumes price elasticities of -0.2 for outdoor and -0.05 for indoor use. WnW's *Water Supply Demand Management Strategy* (p. 62) indicates that these elasticities, applied to forecast price changes, result in savings of 85ML per annum by 2015.

Customer numbers

WnW's Template does not distinguish between customer types. Customers are only characterised by meter sizes (20mm to 150mm+). From the Water Plan we know that WnW is forecasting zero growth in rural and major customer connections[5] – hence, it is apparent that these customers are those greater than 20mm. However, the Template does not allow us to distinguish between residential and (other) non-residential customers.

WnW states that:

> *As the proposed tariff price for service charges is the same for residential, non-residential , rural and major (in the same pricing group) there is no need within the Water Plan Template to differentiate between customer classifications….Wannon Water is currently finalising a half yearly report which will enable customer numbers, and recent changes in customer numbers, to be verified. This will allow projections from July 1 to be varied if there are material changes identified. It is proposed to also check consumption for the first six months of 2007/2008 with the corresponding period in 2006/2007. This check will be an additional validation of the*

[4] WnW Water Plan, p 107.

[5] As noted in our Draft Report, we believe that this assumption is reasonable given the freeze on new rural customers and the small number of major customers.

> *projections for 2008/2009 and beyond. The report will be available for the planned discussions with the Essential Services Commission*. [6]

It also makes that point the total number of water services will not equal the total number of customers as many customers have multiple services, particularly rural and major customers (e.g. a consolidated rural property may have 5 different water services – 3 x 20 mm and 2 x 32 mm services, but is counted as a single customer).[7]

WnW advises that forecast growth in both residential and non-residential water connections are based on VIF projections of changes in population for various customer zones. It also notes that forecast growth in residential and non-residential wastewater connections are:

> *... generally assumed to be proportional to changes in residential and non-residential water connections excepting for new wastewater connections associated with the sewering of Peterborough (the Peterborough project will be complete in 2008 but some 200 plus connections will proceed over the following two or three years).*[8]

However, this is something that we have been unable to verify from the Template.

Water demand forecasts

WnW's forecasts of water demand appear overly conservative. Even though WnW are of the view that restrictions will ease over the regulatory, demand will actually decline and remain well below historical levels on a per connection basis.

WnW attributes this decline primarily to the demand management strategies that it proposes to implement over the period, which are detailed on pages 60 to 63 of its 2007 *Water Supply Demand Strategy* and summarised on page 104 of its Water Plan.

In our Draft Report, we noted that about 424ML of the approximate 2,000 ML in total savings from this strategy is earmarked to come from leakage reduction. While this is a measure that should reduce bulk water demand of the system as a whole (and help conserve water and augment supplies), it will not reduce end customer demand. Therefore, we have amended WnW's forecasts to add this 424 ML per annum back into WnW's forecasts. In doing so, we have distributed these volumes across the different districts and tariffs in proportion to overall demand.

Our Draft Report also pointed out that a large proportion of total savings (1,410ML) from the demand management strategy are expected to occur between 2005-06 and 2008 (per page 104 of the Water Plan). To test this assumption, we asked WnW for information on actual progress against these forecast savings. WnW has advised that, while a detailed assessment of water use in the first six months of the 2007/08 year is nearing finalisation, indications are that it is achieving demand reductions across all customer types and zones so that demand to June 30 2008 will be 7% to 10% less than the previous year (which equates to about 760 to 1,100 ML).[9]

In forecasting demand for Major Customers, WnW has factored in three proposals that together would generate savings of 510ML per annum. At the time of writing the Water Plan

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[6] WnW response to the Draft Report, 27 February 2008.

[7] Ibid.

[8] Ibid.

[9] Ibid.

(p. 103), at least two of these projects seemed to be merely under 'consideration' or 'review' for commencement in 2008. WnW has since advised that two of three proposals are expected to commence later in 2008 than originally scheduled (increasing consumption by about 110ML to 120ML in 2008/09). However, it also notes that through a range of other measures (including the WaterMAPs program and EPA driven Environment and Resource Efficiency Plans), major customer consumption overall has declined 11% (approximately 170 ML) in the first six months of 2007/08. Consequently, WnW has provided revised demand figures for major customers for the regulatory period (with demand from these customers decreasing by about 10% to 7% throughout 2008/09 to 2012/13).

However, given that WnW's forecasts already incorporate a significant reduction in major customer demand (as well as a reduction in overall water demand), we have not incorporated these lower demand figures into WnW's forecasts. We also note that some systems are currently under high level restrictions (Table A.7), hence there is a danger of being too conservative if demand figures for the first six months of this year are projected forward.

As noted in our Draft Report, WnW used a 'stepped' climate change scenario in predicting water inflows and future restriction levels. It has since provided a scenario whereby restrictions are lifted earlier than this original forecast, under a medium climate change/water inflow scenario:

> *Given good inflows, of the order of the long term average or better, it is possible that restrictions could be removed as early as the end of 2008*".[10]

According to WnW, this has a small impact on demand forecasts as systems currently exposed to restrictions constitute only 7% of total demand. It also points out that this scenario actually reduces forecast demand in 2008/09 because:

> *WnW will be extremely reluctant to lift restrictions until after the summer of 2008/09 so as to avoid the risk of unleashing opportunities for the restoration of discretionary use of water before it is absolutely sure of the long term maintenance of low/no restrictions. At the same time average to above average rainfall will have diminished demand by residential rural and municipal (non-residential) customers*.[11]

[10] Ibid.

[11] Ibid.

According to WnW, this new scenario has the following net impact in terms of water demand:

Year	New scenario
2008/09	-21 ML
2009/10	+51 ML
2010/11	+ 28 ML
2011/12	+ 1 ML
2012/13	-13 ML
Aggregate change	+46 ML

In any case, we have amended WnW's forecasts to incorporate this scenario. In doing so, we have adjusted water demand forecasts for 'Block 3' in Group 3 (as it is our understanding that Group 3 relates to areas subject to restrictions in the original forecasts).

Revised forecasts

We have not revised any of WnW's connection forecasts. However, as discussed above, the Template does not provide a breakdown of forecast connections by customer type (i.e. residential and non-residential).

Our above-mentioned adjustments to WnW's water volume forecasts, along with WnW's original forecasts, are outlined in the table below. These revisions increase annual demand by between 3% and 4%.

Service	District	Tariff Description	Unit	2008-09	2009-10	2010-11	2011-12	2012-13
Water	Group 1	Block 1 (0-438 litres/day)	kL	759,068	759,598	770,299	775,166	782,817
		Revised		785,126	786,038	797,033	802,344	810,232
		Block 2 (439-822 litres/day)	kL	276,472	274,392	276,217	278,380	280,976
		Revised		285,963	283,943	285,803	288,140	290,816
		Block 3 (822+ litres/day)	kL	153,040	150,576	150,470	151,821	153,243
		Revised		137,294	206,817	183,692	158,144	145,610
		Non residential Potable	kL	1,148,436	1,111,960	1,104,679	1,079,944	1,074,807
		Revised		1,187,861	1,150,666	1,143,018	1,117,808	1,112,448
		Non residential Non-Potable	kL					
		0-20mm	Cust	8,441	8,488	8,534	8,579	8,625
		21-25mm	Cust	368	368	368	368	368
		26-32mm	Cust	47	47	47	47	47
		33-40mm	Cust	47	47	47	47	47
		41-50mm	Cust	47	47	47	47	47
		51-80mm	Cust	17	17	17	17	17
		81-100mm	Cust	34	34	34	34	34
		101-150mm	Cust	7	7	7	7	7
		150+mm	Cust	2	2	2	2	2
	Group 2	Block 1 (0-438 litres/day)	kL	1,987,387	1,981,589	2,002,431	2,004,280	2,016,978
		Revised		2,055,612	2,050,565	2,071,928	2,074,553	2,087,615
		Block 2 (439-822 litres/day)	kL	709,232	691,974	685,080	680,072	667,930
		Revised		733,579	716,061	708,857	703,916	691,322
		Block 3 (822+ litres/day)	kL	384,831	366,831	355,527	342,390	335,480
		Revised		398,042	379,600	367,866	354,395	347,229
		Non residential Potable	kL	3,460,002	3,434,306	3,449,949	3,405,832	3,420,995
		Revised		3,578,780	3,553,849	3,569,684	3,525,246	3,540,802
		Non residential Non-Potable	kL	1,196,000	1,170,685	1,173,575	1,155,880	1,158,135
		Revised		1,237,057	1,211,435	1,214,305	1,196,407	1,198,694
		Darlington Non-Potable	kL	2,100	1,950	1,800	2,040	2,017
		Revised		2,172	2,018	1,862	2,112	2,088
		0-20mm	Cust	23,239	23,848	24,494	25,182	25,918
		Darlington Service Fee	Cust	22	22	22	22	22
		21-25mm	Cust	899	899	899	899	899
		26-32mm	Cust	132	132	132	132	132
		33-40mm	Cust	100	100	100	100	100
		41-50mm	Cust	50	50	50	50	50
		51-80mm	Cust	28	28	28	28	28
		81-100mm	Cust	9	9	9	9	9
		101-150mm	Cust	4	4	4	4	4
		150+mm	Cust	-				
		Service - Un-connected	Cust	734	734	734	734	734
	Group 3	Block 1 (0-438 litres/day)	kL	579,687	578,654	585,338	586,384	590,300
		Revised		599,587	598,796	605,653	606,943	610,973
		Block 2 (439-822 litres/day)	kL	216,259	212,422	211,620	208,962	208,066
		Revised		223,683	219,816	218,965	216,289	215,353
		Block 3 (822+ litres/day)	kL	146,319	141,614	139,180	135,693	133,804

Service	District	Tariff Description	Unit	2008-09	2009-10	2010-11	2011-12	2012-13
		Revised		151,342	146,543	144,010	140,451	138,490
		Non residential Potable	kL	664,895	641,734	634,451	615,860	609,111
		Revised		687,720	664,072	656,470	637,453	630,443
		Non residential Non - Potable	kL					
		0-20mm	Cust	6,449	6,457	6,464	6,471	6,477
		21-25mm	Cust	130	130	130	130	130
		26-32mm	Cust	51	51	51	51	51
		33-40mm	Cust	47	47	47	47	47
		41-50mm	Cust	45	45	45	45	45
		51-80mm	Cust	10	10	10	10	10
		81-100mm	Cust	8	8	8	8	8
		101-150mm	Cust	-				
		150+mm	Cust	-				
	Group 4	Block 1 (0-438 litres/day)	kL	82,693	83,019	84,516	85,128	86,222
		Revised		85,532	85,909	87,449	88,113	89,242
		Block 2 (439-822 litres/day)	kL	22,367	22,553	23,123	23,395	23,918
		Revised		23,135	23,338	23,926	24,215	24,756
		Block 3 (822+ litres/day)	kL	26,790	27,012	27,697	28,023	28,653
		Revised		27,710	27,952	28,658	29,006	29,656
		Non residential Potable	kL	175,344	171,806	172,603	170,205	170,778
		Revised		181,363	177,786	178,593	176,173	176,759
		Non-residential Non-Potable	kL	0	0	0	0	0
		0-20mm	Cust	1,045	1,059	1,072	1,085	1,099
		21-25mm	Cust	94	94	94	94	94
		26-32mm	Cust	7	7	7	7	7
		33-40mm	Cust	11	11	11	11	11
		41-50mm	Cust	2	2	2	2	2
		51-80mm	Cust	3	3	3	3	3
		81-100mm	Cust	2	2	2	2	2
		101-150mm	Cust	-				
		150+mm	Cust	-				
	Group 5	Block 1 (0-438 litres/day)	kL	146,102	146,625	149,911	150,031	150,893
		Revised		151,118	151,729	155,114	155,291	156,177
		Block 2 (439-822 litres/day)	kL	45,367	45,752	47,898	47,428	47,297
		Revised		46,924	47,345	49,560	49,091	48,953
		Block 3 (822+ litres/day)	kL	39,387	39,391	41,694	40,846	40,423
		Revised		40,739	40,762	43,141	42,278	41,839
		Non residential Potable	kL	129,324	126,508	128,742	125,279	124,174
		Revised		133,764	130,912	133,210	129,671	128,523
		0-20mm	Cust	2,314	2,309	2,305	2,300	2,295
		21-25mm	Cust	45	45	45	45	45
		26-32mm	Cust	13	13	13	13	13
		33-40mm	Cust	9	9	9	9	9
		41-50mm	Cust	10	10	10	10	10
		51-80mm	Cust	13	13	13	13	13
		81-100mm	Cust	4	4	4	4	4

Service	District	Tariff Description	Unit	2008-09	2009-10	2010-11	2011-12	2012-13
		101-150mm	Cust	1	1	1	1	1
Sewerage	Group 1	Service charge	Cust	2,195	2,221	2,248	2,274	2,301
		Service - Un-connected	Cust					
	Group 2	Service charge	Cust	17,486	17,778	18,077	18,382	18,697
		Service - Un-connected	Cust	706	706	706	706	706
	Group 3	Service charge - Unconnected Land	Cust	181	181	181	181	181
		Service charge	Cust	6,030	6,040	6,049	6,058	6,065
	Group 4	Service charge - Unconnected Land	Cust	689	689	689	689	689
		Service charge	Cust	5,323	5,345	5,366	5,386	5,406
	Group 5	Service charge - Unconnected Land	Cust	264	264	264	264	264
		Service charge	Cust	2,284	2,306	2,328	2,350	2,373