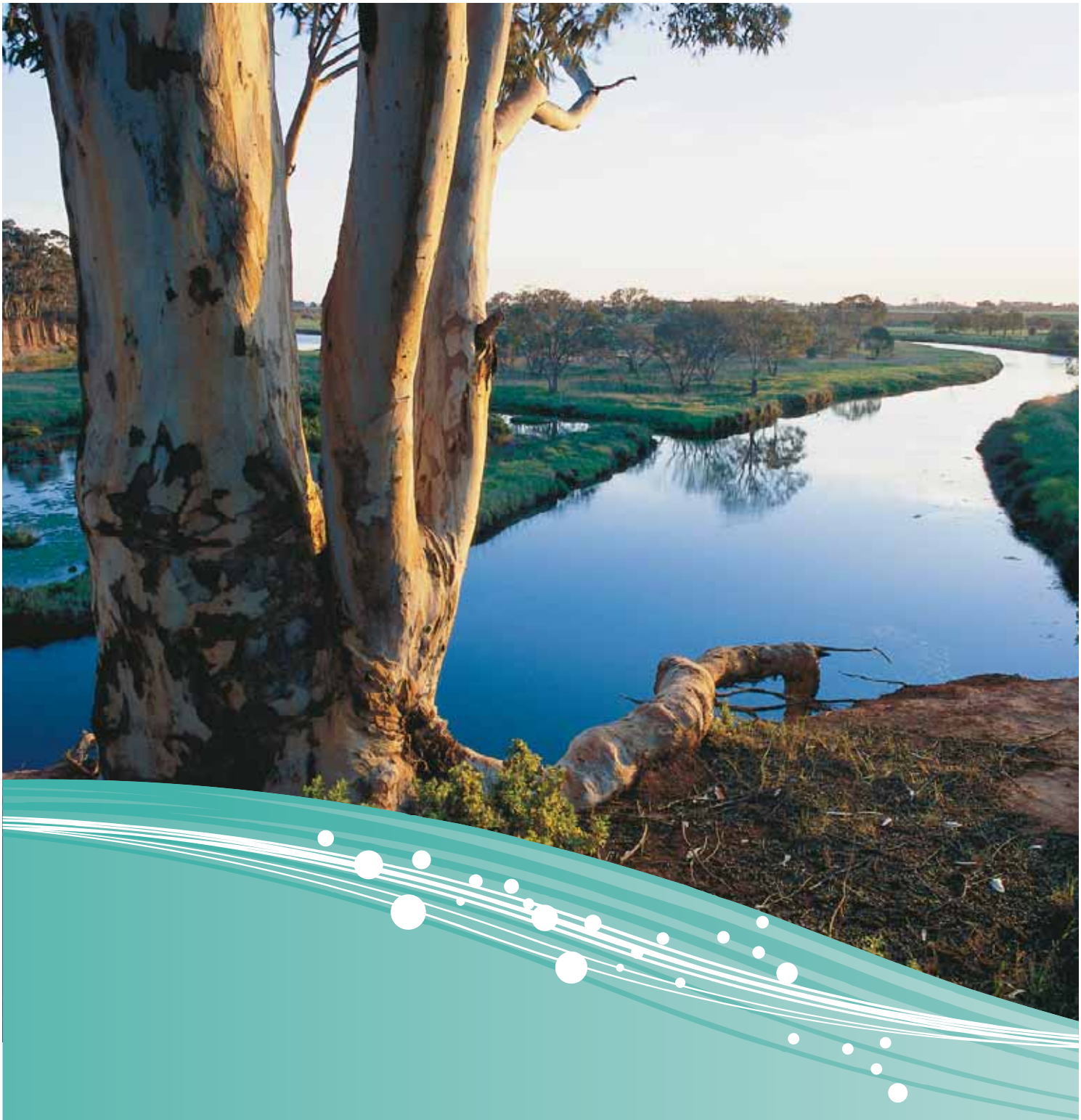

# 2008 Waterways Water Plan

Melbourne Water®

I love living here*

*So please protect our rivers & creeks

Victoria
The Place To Be

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2008 Waterways Water Plan

# Executive Summary

## Overview

Melbourne Water is a water resource manager, providing waterways and drainage services to the greater Melbourne community and wholesale water, sewerage and recycled water services to retail water businesses. In doing so, we are committed to managing our business efficiently to achieve our vision of 'working together to ensure a sustainable water future'.

In providing waterways and drainage services, Melbourne Water works with Government, regulators and the community to deliver programs to improve and protect the health of rivers and creeks and enhance their environmental, economic and social values. Melbourne Water also plans and delivers drainage infrastructure to service urban growth and provide a safe level of flood protection for communities within the Port Phillip and Westernport region.

This Waterways Water Plan summarises the outcomes, actions and expenditures that Melbourne Water proposes to undertake and the prices it proposes to charge over the 2008 regulatory period (2008/09 to 2012/13).[1] Performance over the 2005 regulatory period (2005/06 to 2007/08) is also discussed, as are the factors impacting on performance over the 2005 and 2008 regulatory periods.

Over the past two years, Melbourne Water has made considerable effort to define its role as a regional provider of waterways and drainage services and to set clear goals and targets for its programs. This has included:

- Extensive engagement with local governments and the community in Melbourne Water's extended operating area to establish service levels and charging arrangements[2]
- Revised terms of reference and membership of the Waterways Advisory Committee to strengthen its role in and the participation of regulators in preparing Melbourne Water's Waterways Operating Charter
- Preparing a new Waterways Operating Charter as required by Government via Melbourne Water's Statement of Obligations. The revised Charter provides targets and programs to ensure an appropriate level of flood protection, improve the health, amenity and understanding of our rivers and creeks, manage environmental flows and development, and engage stakeholders and the community
- Preparing major strategies that underpin and support Operating Charter targets and programs and associated expenditures including the:
  - Flood Management and Drainage Strategy which responds to a 2005 performance audit by the Auditory General and Melbourne Water's obligations as floodplain management authority under the Water Act 1989
  - Waterways Water Quality Strategy which provides actions to monitor and improve stormwater quality and its impact on our rivers and creeks given Melbourne Water's obligations as 'caretaker of river health' and a 'Protection Agency' under the Environmental Protection Act 1970
  - Regional River Health Strategy and Addendum which also supports Melbourne Water's role as caretaker of river health and the long term aim of improving Melbourne's rivers and creeks with increasing numbers of native fish, platypus and plant life
  - Development Planning Strategy and program which supports Melbourne Water's obligations as statutory referral authority under the Planning and Environment Act 1987 and floodplain management authority under the Water Act 1989

[1] All expenditures and prices have been expressed in real 2006/07 dollars.

[2] Following the Government's 2004 White Paper, Our Water Our Future, Melbourne Water's waterways and drainage operating area was extended by Order-in-Council in November 2005, to include parts of the Westernport, Werribee and Maribyrnong catchments, for which there was previously no designated regional authority responsible for managing waterways and drainage

  - Community and Stakeholder Engagement Framework which is consistent with the Government's expectations set out in Melbourne Water's Statement of Obligations.

The proposals included in this Waterways Water Plan reflect the outcomes of this work and Melbourne Water's commitment to:

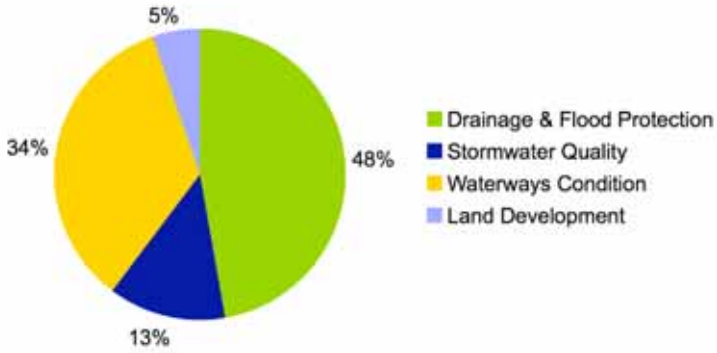
- Consolidate newly introduced services to customers in Melbourne Water's extended waterways operating area
- Improve awareness of flood risks and adopt a more targeted drainage and flood protection capital works program focusing on intolerable flooding risks
- Build on the improvements to river health and stormwater quality achieved over the current regulatory period, to achieve ten year targets set out in the Regional River Health Strategy, the Waterways Operating Charter and Waterways Water Quality Strategy
- Continue to plan appropriately for urban growth and provide efficient and responsive services to the development industry
- Continue to undertake monitoring and research to better understand the effectiveness of management actions in relation to river health, environmental and recreational water quality and flood management and enable an adaptive approach to program delivery
- Continue to engage local government, the private sector and the community to gain a shared understanding of waterway and flooding issues and priorities to develop more inclusive, cost effective outcomes including greater use of at source rather than end of pipe solutions.

The Waterways Water Plan has also been prepared in a changing environment, characterised by climate uncertainty and drought, changes in obligations and industry wide increases in costs. Rainfall has been at historically low levels resulting in less water being available for environmental needs, river diverters and supply to metropolitan Melbourne. Melbourne has also experienced a number of major storms in recent years which have resulted in localised flooding and property damage. Melbourne Water's service obligations have increased since the Essential Services Commission (the Commission) last set prices in 2005. There have also been industry wide increases in some key input costs such as contract and labour rates. These factors have impacted on Melbourne Water's financial and non financial performance over the current regulatory period, and increased the challenges associated with moving to a longer regulatory period, highlighting the need for a regulatory framework that provides for appropriate risk allocation and adaptive service delivery.

Delivering new obligations and services to an expanded service area in an increasing input cost environment will necessitate an increase in capital and operating expenditure despite ongoing initiatives to improve the efficiency and effectiveness of service delivery. The contribution of each major program area to the proposed waterways and drainage required revenue (excluding corporate costs) is provided by Figure 1 below.

# Executive Summary

**Figure 1: Proposed waterways and drainage required revenue by program 2008/09 – 2012/13[3]**




***Drainage and flood protection services make the largest contribution to the proposed required revenue.***

Increasing expenditures will in turn lead to an increase in prices. Melbourne Water's waterway and drainage prices are forecast to increase on average for customers in its existing service area by inflation plus 1% per year over the 2008 regulatory period. Melbourne Water also proposes to commence charging for waterway and drainage services provided to customers in its extended operating area.

In addition to improving the services Melbourne Water provides, the Waterways Water Plan also includes proposals to improve the basis of the prices we use to fund waterways and drainage activities. The proposed prices have been developed in consultation with Government and key stakeholders to ensure that prices:

- Better reflect the extent to which customers impact on, or benefit, from the services provided
- Take into account the interests of customers (including appropriate transitional arrangements)
- Are understandable to customers
- Are consistent with providing a sustainable regulated revenue stream for regulated activities
- Minimise administration costs.

A key determinant of future prices and returns to Government is the weighted average cost of capital (WACC). Melbourne Water and the metropolitan retail water businesses have received independent advice that the WACC should be 6.4% rather than the 5.1%, as currently adopted by the Commission. However, adopting a higher WACC could increase prices by a further 1.7% per year. Melbourne Water has used the lower WACC recommended by the Commission in this Waterways Water Plan.

In preparing this Waterways Water Plan, Melbourne Water has endeavoured to clarify future stakeholder requirements and priorities, recommend appropriate changes to the regulatory framework, continue to refine its forecasting methodologies and adopt the best available information to put forward realistic expenditure estimates.

The proposals included in this Water Plan have been tested with the community via a Consultation Draft released on 10 October 2007. Additional information has been included in this Water Plan to respond to issues raised by submissions where appropriate. Where comments related to government or regulatory policy, Melbourne Water has raised this issue with the relevant party.

[3] Excludes corporate costs.

# Executive Summary

## Background and industry context

### Melbourne Water

Melbourne Water is a statutory corporation, fully owned by the Victorian Government.

Melbourne Water is a water resource manager, providing waterways and drainage services to the greater Melbourne community and wholesale water, sewerage and recycled water services to retail water businesses.

As Victoria's largest urban water business, Melbourne Water provides over 60% of the State's potable water, and 11% of total water supplied in Victoria for urban and rural purposes. Melbourne Water also currently treats around 300 GL[4] of sewage collected by the three metropolitan retail water businesses, of which over 20% is currently recycled.

The Government's White Paper, Our Water Our Future, designated Melbourne Water as the caretaker of river health and authority responsible for waterway, regional drainage and floodplain management across the entire Port Phillip and Westernport region (an area of more than 12,000 km$^2$ with 3.6 million residents). Successful provision of this role involves:

- **Community and stakeholder engagement and involvement** to build trust and strengthen working relationships with key stakeholders and the community
- **Managing waterways** to ensure Melbourne's rivers and creeks are healthy, with increased numbers of native fish, platypus and plant life
- **Managing environmental flows** to ensure sufficient environmental flows to support river health and protect beneficial uses of the waterways
- **Managing water quality** in collaboration with others to achieve objectives for water quality in accordance with State environmental protection policies and targets set out in the Regional River Health Strategy and Waterways Water Quality Strategy
- **Flood and drainage management** to minimise all currently known intolerable flooding risks to public health and safety, property and infrastructure and increase community understanding and preparedness for floods
- **Managing urban growth** to ensure urban development achieves appropriate standards of flood protection, protects waterway health and is sensitive to other environmental and social values, delivers an efficient service and provides accurate, timely and reliable information to the development industry and community
- **Monitoring, investigations and research** to build a comprehensive knowledge base to improve decision making and evaluate progress against performance targets.

A detailed description of Melbourne Water's waterways and drainage services, its goals and targets is provided in the Waterways Operating Charter for 2008/09 to 2012/13.[5]

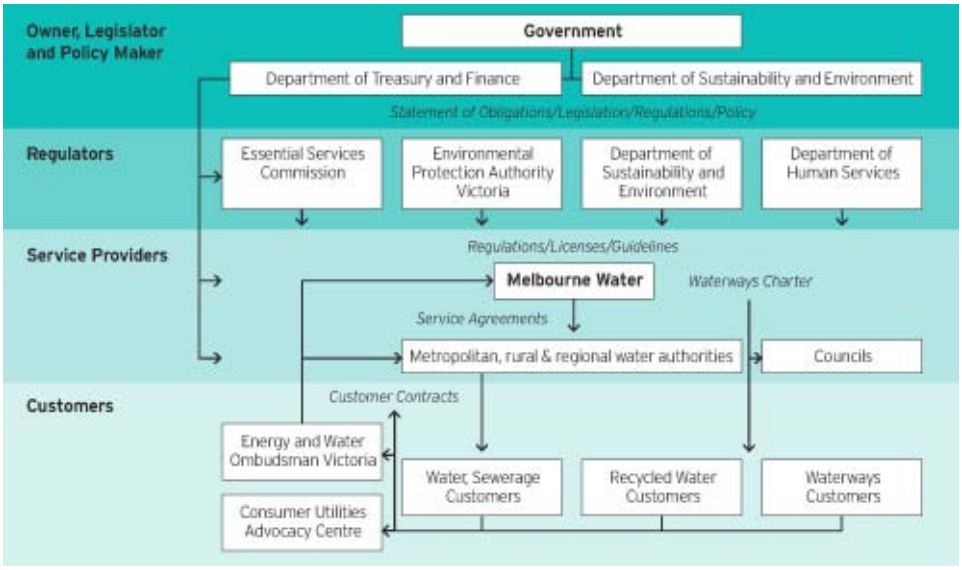
[4] A gigalitre (GL) is equivalent to a billion litres.

[5] A copy of the Waterways Operating Charter is available on Melbourne Water's website www.melbournewater.com.au

## Regulatory framework

The structure of the Melbourne metropolitan water industry is illustrated below in Figure 2.

**Figure 2: Industry structure and regulatory framework**




***The water industry in Melbourne clearly separates the roles of ownership, regulation and service provision.***

The State Government sets the policy and legal framework, specifies water business obligations and monitors water business performance. The Minister for Water, supported by the Department of Sustainability and Environment, sets out specific requirements for each business through Statements of Obligations. The Minister for Water is also responsible for allocating water resources. In the metropolitan sector, the Treasurer, in consultation with the Minister for Water, monitors financial performance and represents the State Government's shareholder interests, including returns to Government and borrowing requirements.

The Commission regulates prices and customer service standards for prescribed water, sewerage, waterways and drainage and recycled water services across Victoria consistent with its legislative requirements[6] and the Water Industry Regulatory Order. EPA Victoria sets and enforces environmental standards consistent with key principles set out in the Environment Protection Act 1970.

Waterways and drainage service standards are set out in Melbourne Water's Waterways Operating Charter which is developed in consultation with its Waterways Advisory Committee representing key stakeholder and customer interests and the Department of Sustainability and Environment. Local governments manage the local drainage network (catchments generally less than 60 hectares) and work with Melbourne Water to provide flood protection and manage stormwater quality.

Melbourne Water also provides wholesale water, sewerage and recycled water services to the retail water businesses who provide reticulation services and manage the interface with water and sewerage customers.

[6] Legislative provisions relevant to the Commission's regulation of the water industry include those of the Essential Services Commission Act 2001 and the Water Industry Act 1994 as amended by the Water Legislation (Essential Services Commission and Other Amendments) Act 2003.

# Executive Summary

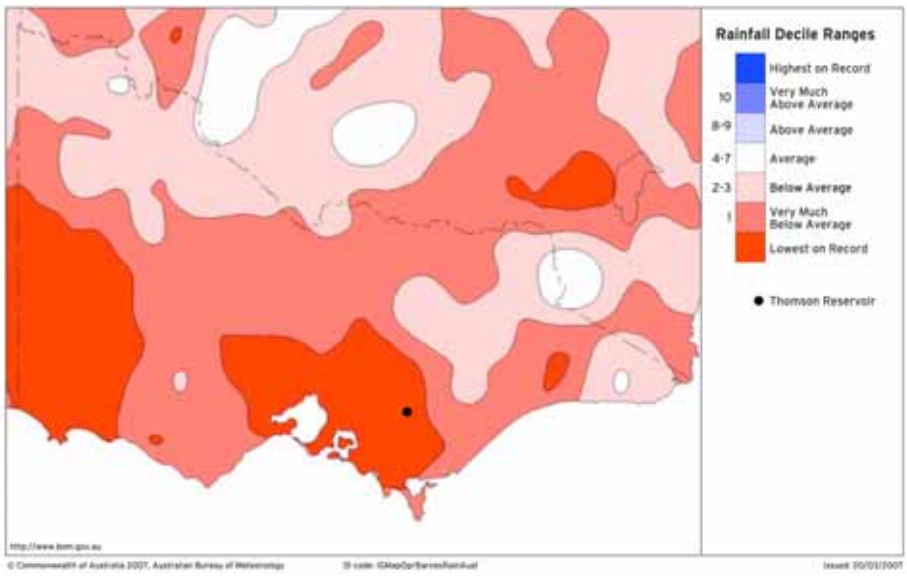
## Operating environment

This Waterways Water Plan has been prepared in a changing environment.

### Climate uncertainty

The last decade has seen some of the lowest rainfall on record across Melbourne's water supply catchments and its rivers and creeks (see Figure 3). For example, Yarra River stream flows for the 2006 calendar year were the second lowest on record and for the period 1997/98 to 2006/07 were about 63% less than the long term average (1892/93 to 2006/07).

**Figure 3: Rainfall deciles for Victoria – 1997 to 2006**




***Melbourne's water supply catchments and its rivers and creeks have experienced very low rainfall for an extended period.***

In addition to the effects of the drought, Melbourne has also experienced a number of major storms in recent times. Events in 2003, 2004, and 2006 led to localised flooding, disruption and property damage.

**Figure 4: Localised flooding in 2005**

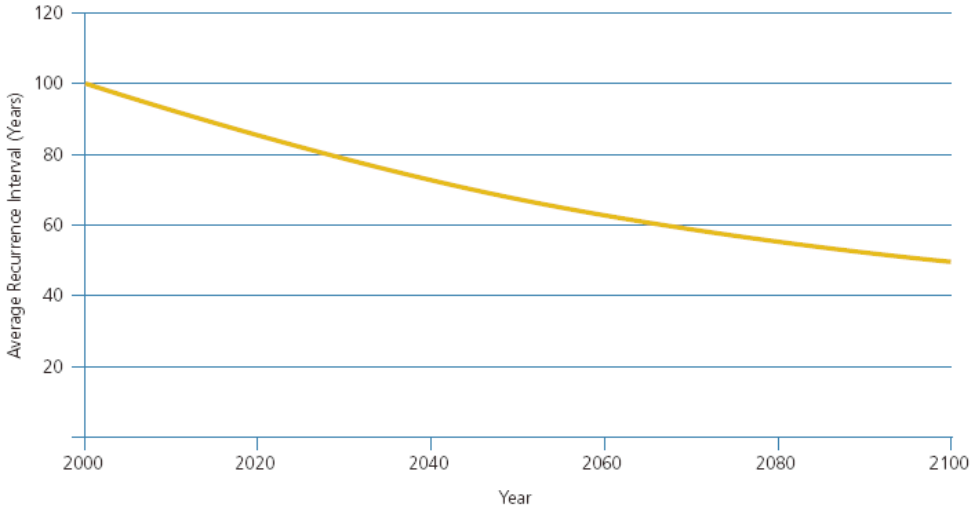
Dandenong Creek, Dandenong, 2005

Kororoit Creek, Deer Park, 2005

***While in the midst of drought Melbourne has also experienced major storms causing localised flooding.***

The Melbourne Climate Change Study was completed by CSIRO in March 2005. The study anticipates that while the amount of overall rainfall received each year is predicted to decrease, the rainfall may occur in more intense storm events rather than our normal winter and spring rains. This change in rainfall patterns is more likely to result in an increase in overland flows than riverine flooding because the short, sharp nature of these intense storms results in sudden large volumes of water. As illustrated in Figure 5, it is likely that storms that occur on average every 100 years in 2000 are likely to occur once every 50 years by 2100 which could also result in more frequent flooding above existing floor levels.

**Figure 5: Change in average storm recurrence intervals**




***Research suggests that storms that occur on average every 100 years in 2000 are likely to occur once every 50 years by 2100.***

## Implications for Melbourne Water

Melbourne Water has previously been able to rely on historical records as a basis for planning for the future. Recent experience and an increasing body of scientific information[7] suggest that Melbourne may have experienced a step change in the frequency, magnitude, location and duration of our weather events. While there will continue to be uncertainty as to the exact size of this change, it is clear that there is a need for:

- Ongoing research on climate change/variability and its implications for water businesses
- Effective planning and investment that optimises the use of available water supplies, strikes an effective balance between community and environmental needs and includes appropriate provision for contingency measures
- Adaptive program delivery
- A regulatory framework that not only creates incentives for improved performance while ensuring a reasonable allocation of risks in an uncertain operating environment.

[7] For example, The Intergovernmental Panel on Climate Change's Fourth Assessment Report 2007 concludes that the evidence supporting warming of earth's climate system is unequivocal. The Melbourne Climate Change Study was completed by the Commonwealth Scientific and Industrial Research Organisation (CSIRO) in March 2005 and identified the potential for higher average and summer temperatures, reduced rainfall and more extreme weather events.

Climatic conditions pose challenges in delivering waterways and drainage services. For example, Melbourne Water works in partnership with Government agencies, industries, landowners and the community to manage environmental flows for river health and to support a wide range of beneficial uses. The challenge for Melbourne Water is how to manage environmental flows given competing demands for water, particularly when a reduction in stream flows is anticipated with climate change.

The degree of impact on river health will depend upon the magnitude and variability of the change in stream flows. The current extreme drought has seen a temporary reduction in environmental flows. More frequent or intense droughts will require environmental flows to be carefully monitored and managed in consultation with Government and the community to avoid environmental decline of rivers and creeks. The current drought has also resulted in river diverters' access to water being restricted or suspended to avoid environmental impacts necessitating effective customer engagement and enforcement.

More frequent, intense storms in different locations have the potential to place increased demands on Melbourne Water's and local government's stormwater assets. Further, as experienced in the 2005 regulatory period, there may be significant expenditures associated with responding to the effects of flooding where there is inadequate provision for overland flows. Increasing urbanisation is also likely to increase run-off and infrastructure upgrades may be necessary to preserve required service levels.

The effects of climate change on the intensity and duration of storms are not well understood. The challenge, therefore, is to develop greater understanding of the likely timing and impacts of climate change to enable the development of appropriate adaptation strategies.

### New waterways and drainage obligations

Melbourne Water's operating environment has also changed as a result of ongoing industry reform and policy development that was not known at the time of the Commission's 2005 Price Determination. For example, additional waterways and drainage expenditures have arisen from:

- Undertaking initiatives in the Government's Yarra River Action Plan to reduce the environmental impact of stormwater on waterways in urban areas
- Managing waterway environmental flows in line with newly established bulk entitlements and environmental entitlements.

### Industry wide cost increases

Unanticipated industry wide increases in some key input costs have, and will, impact on expenditure levels and financial performance. For example, infrastructure providers in Australia, including water, electricity, gas and transport businesses, have, and will continue to, experience significant construction cost pressures. Industry wide increases are also being experienced in labour and contract rates.

# Executive Summary

## Progress over 2005 regulatory period

The urban water industry is a little over two thirds of the way through the 2005 regulatory period and Melbourne Water has achieved a high level of compliance with the targets included in the Commission's 2005 Price Determination. It has become clear, however, that continued achievement of high levels of compliance will see Melbourne Water's total capital and operating expenditures over the 2005 regulatory period vary from the benchmark expenditures adopted by the Commission in its 2005 Price Determination.

### Service outcomes

To date, Melbourne Water has achieved most of its 2005/06 and 2006/07 performance targets in relation to waterways and drainage services and is making good progress towards its end of period targets as illustrated in Tables 1 and 2.

**Table 1: Three year performance indicators**

| Key Performance Indicator | Progress towards three year target (%) | | Three year target (no.) |
|---|---|---|---|
| | 2005/06 | 2006/07 | 2007/08 |
| **Waterways condition** | | | |
| Regional River Health Strategy | | | |
| – rivers with negotiated environmental flow regimes | 40% | 67% | 6 |
| – rivers with improvements made to environmental flow regimes | 57% | 75% | 8 |
| – area of streamside land under management agreements | 20% | 55% | 500 Ha[8] |
| – length of streamside land revegetated | 46% | 76% | 260 km |
| – barriers where fish passage is improved | 30% | 40% | 10 |
| – length of river subject to streamside weed control | 37% | > 100% | 300 km |
| – plans developed for rivers and creeks of high social value | 100% | > 100% | 2 |
| – rivers where heritage values are protected or improved | 67% | > 100% | 15 |
| – plans developed for rivers and creeks of high environmental value | 100% | > 100% | 2 |
| – investigations to fill data gaps in high value or high risk rivers or creeks | 100% | > 100% | 6 |
| – sites subject to bed and bank stabilisation | 35% | > 100% | 20 |

[8] The target for area of streamside land under management agreements was originally incorrectly specified as five hectares. The target was revised following discussions with the Commission.

**Table 2: Annual performance indicators**

| Key Performance Indicator | 2005/06 | | 2006/07 | | 2007/08 |
|---|---|---|---|---|---|
| | 2005 Water Plan target | Actual | 2005 Water Plan target | Actual | 2005 Water Plan target |
| **Drainage and flood protection** | | | | | |
| – flood prone floors that are protected[9] | 32 | 52 | 36 | 52 | 81 |
| – development applications processed within timeframe | 100% | 100% | 100% | 100% | 100% |
| – planning controls: percentage of new properties meeting new flood protection | 100% | 100% | 100% | 100% | 100% |
| – planning controls: number of flood prone properties in redevelopment areas reduced (approximate number) | 250 | 250 | 250 | 267 | 250 |
| **Stormwater quality** | | | | | |
| – cumulative reduction in nitrogen loads to Port Phillip Bay from wetlands | 37 tonne | 52 tonne | 56 tonne | 54.5 tonne | 59 tonne |
| **Diversion services** | | | | | |
| – number of licences greater than 5ML/year metered or assessed for metering at 30 June | 640 | 642 | 732 | 704 | 732 |

As detailed in Table 1, Melbourne Water has made good progress towards achieving the 2007/08 targets in relation to the Regional River Health Strategy[10] and has achieved all drainage and flood protection targets specified in the Commission's 2005 Price Determination for 2005/06 and 2006/07. To improve response times for processing development applications, the current information technology processing system was upgraded in 2006 with a further upgrade planned before the end of the 2005 regulatory period to streamline the approval process.

The target for reduction in nitrogen loads to Port Phillip Bay from wetlands was met in 2005/06, with an annual reduction of 21.3 tonnes in nitrogen to give a cumulative reduction of 52 tonnes (Table 2).[11] Nitrogen loads arising from the impact of urban stormwater run-off to Port Phillip Bay have been reduced using water quality improvement infrastructure (e.g. wetlands). The result for 2006/07, however, is slightly short of the target due to delays experienced in completing the revegetation phase of some projects due to poor planting conditions arising from the drought. The program to achieve nitrogen reduction targets has been reviewed and further wetlands and projects are planned for the remainder of the 2005 regulatory period.

The 2005/06 target for the number of licences greater than 5 ML[12] per year metered, or assessed for metering, was met. However, the target for 2006/07 was not met due to delays in the supply of additional meters by the supplier and diversion of resources to urgent drought related projects.

[9] The yearly targets for 2005/06 – 2007/08 were revised following discussions with the Commission.

[10] These targets do not cover Melbourne Water's extended operating areas which were included subsequent to the Commission's 2005 Price Determination.

[11] This is a cumulative target that was carried over into the 2005 regulatory period.

[12] A megalitre (ML) is equivalent to a million litres.

# Executive Summary

## Demand outcomes

Melbourne Water's waterways and drainage customer numbers (excluding Melbourne Water's extended waterways area[13]) are expected to grow to 1.5 million by the end of the 2005 regulatory period consistent with the forecast used by the Commission in its 2005 Price Determination. Table 3 illustrates a minor difference between 2005 Water Plan forecasts and actual customer numbers over the 2005/06 to 2006/07 period.

**Table 3: Actual and forecast waterway and drainage customer cumbers**

| | 2005/06 | | 2006/07 | | 2007/08 |
|---|---|---|---|---|---|
| | 2005 Water Plan forecast | Actual | 2005 Water Plan forecast | Actual | 2005 Water Plan forecast |
| **Number of customers[14]** | 1,452,018 | 1,458,708 | 1,475,503 | 1,485,825 | 1,498,887 |

In relation to the cash contributions received by Melbourne Water from the development industry for the construction of drainage infrastructure to service urban growth, forecast contributions for the 2005 regulatory period are expected to be $13.8 million higher than forecasts used by the Commission in its 2005 Price Determination (excluding Melbourne Water's extended waterways area). This is a result of higher than anticipated levels of industrial land development activity occurring due to favourable economic conditions and, as discussed below, is more than off set by increased capital expenditure to meet the needs of the development industry.

Table 4 outlines developer cash contribution comparisons between 2005 Water Plan forecasts and actual numbers over the 2005/06 to 2006/07 period.

**Table 4: Actual and forecast developer cash contributions[15]**

| | 2005/06 | | 2006/07 | | 2007/08 | |
|---|---|---|---|---|---|---|
| | 2005 Water Plan forecast ($M) | Actual ($M) | 2005 Water Plan forecast ($M) | Actual ($M) | 2005 Water Plan forecast ($M) | Forecast ($M) |
| **Developer cash contributions** | 30.2 | 31.4 | 31.1 | 36.2 | 30.9 | 38.3 |

[13] Properties within Melbourne Water's extended waterways and drainage boundary areas were not included in the Commission's 2005 Price Determination.

[14] The mid-point has been applied to actual year end property numbers to ensure consistency with the methodology used to calculate 2005 Water Plan forecasts.

[15] 2007/08 figure is based on 2007/08 – 2009/10 Corporate Plan forecasts.

## Capital expenditure outcomes

Melbourne Water has, in the main, delivered the service standards and outcomes detailed in the Commission's 2005 Price Determination. However, delivering these outcomes and accommodating new obligations is expected to see Melbourne Water spend $34.7 million more than the allowance provided by the Commission for the 2005 regulatory period (including corporate allocations). Higher than planned expenditure has impacted on financial performance and been managed through increased borrows, reprioritisation of some capital projects, efficiency initiatives and higher than planned developer cash contributions.

Figure 8 illustrates, at an aggregate level, these higher than planned capital expenditures over the 2005 regulatory period, which are driven by:

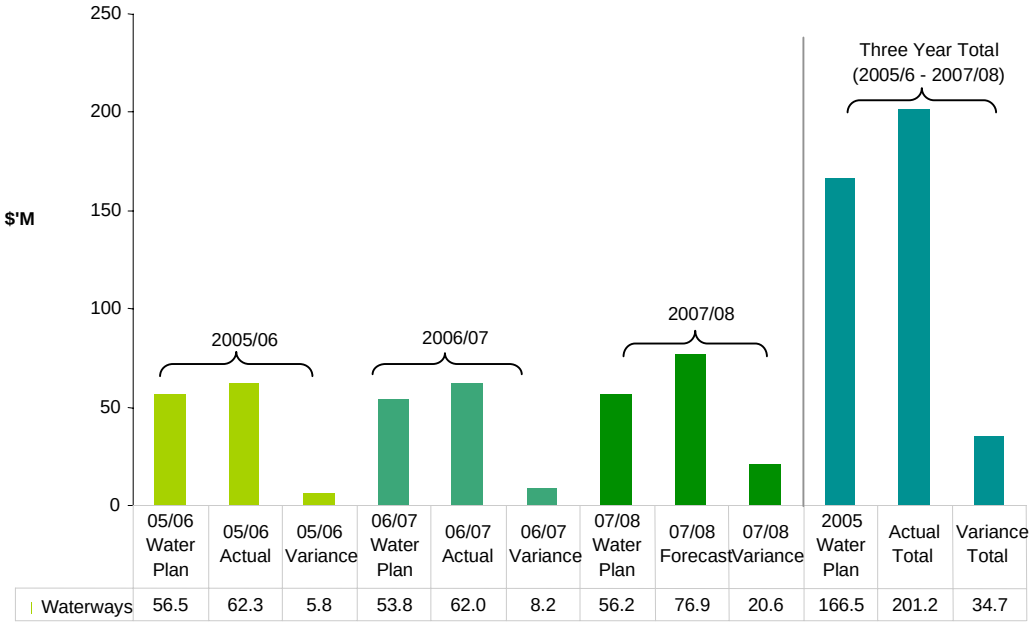
- New regulatory obligations not included in the 2005 Water Plan in relation to implementing initiatives in the Yarra River Action Plan to reduce the environmental impact of stormwater on waterways in urban areas ($0.9 million)
- Additional expenditure related to the extension of Melbourne Water's waterway boundary ($11.9 million) which was not included in the Commission's 2005 Price Determination given the timing of the Government's decision to extend Melbourne Water's operating area and the uncertainty regarding future expenditure requirements. As directed by the Commission in its 2005 Price Determination, Melbourne Water has ring fenced the additional extended area expenditures for recovery through prices in the 2008 regulatory period
- Higher than expected expenditure ($31.6 million) on developer-funded drainage growth works due to:
  - Higher than anticipated levels of industrial land development activity requiring capital works to be brought forward
  - Increased land acquisition costs for retarding basins and wetlands
  - Increased costs of meeting environmental standards and heritage requirements.

Melbourne Water has in place processes to ensure that the additional capital expenditures incurred over the 2005 regulatory period are prudent and efficient. This includes its competitive tendering processes, capital planning and delivery framework and its asset management system.

The drivers of increased capital expenditures are offset by reductions in Regional River Health Strategy expenditures and nitrogen water quality treatment works over the 2005 regulatory period ($11.8 million) due to project delays. Delays in project delivery have been attributed to building the necessary capacity to plan and deliver an extensive waterway improvement works program, comprised of a large number of small value projects which are dependant on weather conditions and require building relationships with landowners to access waterways. A subsequent review of project planning processes has been undertaken and improvements implemented to increase the capital planning and delivery capabilities for waterways related works.

There are no material variances in corporate related capital expenditures.

**Figure 8: Waterways and drainage capital expenditure – 2005/06 to 2007/08**[16]




| | 05/06 Water Plan | 05/06 Actual | 05/06 Variance | 06/07 Water Plan | 06/07 Actual | 06/07 Variance | 07/08 Water Plan | 07/08 Forecast | 07/08 Variance | 2005 Water Plan | Actual Total | Variance Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Waterways | 56.5 | 62.3 | 5.8 | 53.8 | 62.0 | 8.2 | 56.2 | 76.9 | 20.6 | 166.5 | 201.2 | 34.7 |

***Higher than expected expenditure on developer funded drainage growth works and additional expenditure in Melbourne Water's extended areas contribute to the increase in capital expenditure over the 2005 regulatory period.***

## Operating expenditure outcomes

Melbourne Water's operating expenditures are expected to exceed the expenditures allowed by the Commission in its 2005 Price Determination (including corporate allocations) by $41.4 million. Figure 9 illustrates, at an aggregate level, the higher than planned operating expenditures over the 2005 regulatory period which are driven by:

- New legislative and regulatory obligations not included in the 2005 Water Plan, in particular:
  - Implementing initiatives in the Yarra River Action Plan to reduce the environmental impact of stormwater on waterways in urban areas ($10.9 million)
  - Managing environmental flows in line with newly established Environmental Entitlements, as the Manager of Environmental Reserves ($0.5 million)
- Additional expenditure related to the extension of Melbourne Water's waterway boundary ($19 million)[17]
- Increase in business as usual expenditure as a result of:
  - Higher than planned expenditure for labour. This is driven by pay increases above the 3.5% allowed in the Commission's 2005 Price Determination consistent with Melbourne Water's Enterprise Agreement and by additional labour as the business positions itself to meet its obligations over the 2008 regulatory period ($3.6 million)

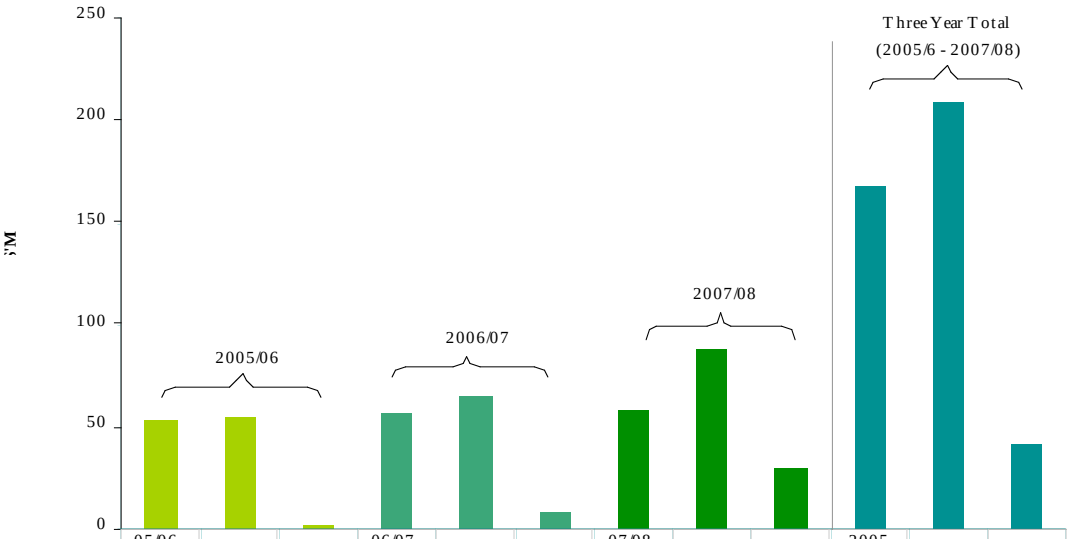
[16] 2007/08 figures are based on 2007/08 – 2009/10 Corporate Plan forecasts.

[17] Extended area expenditures were not included in the Commission's 2005 Price Determination given the timing of the Government's decision to extend Melbourne Water's operating area and the uncertainty regarding future expenditure requirements. As directed by the Commission in its June 2005 Final Decision, Melbourne Water has ring fenced the additional extended area expenditures which are eligible to be recovered through prices in the 2008 regulatory period. Expenditure includes estimate costs associated with introducing charges from 2008/09.

– Higher civil maintenance costs ($5.6 million). This includes additional clean up costs associated with the 2005/06 floods and more maintenance for the increasing number of wetlands and retarding basins (e.g. desilting)
– One off corporate costs associated with implementing drainage rate reform in Melbourne Water's existing waterways and drainage boundary area (estimated $2.8 million). [18]

Increased operating expenditures have impacted on financial performance and have been partially offset by costs savings through efficiency initiatives and project reprioritisation.

**Figure 9: Waterways and drainage operating expenditure – 2005/06 to 2007/08[19]**




| | 05/06 Water Plan | 05/06 Actual | 05/06 Variance | 06/07 Water Plan | 06/07 Actual | 06/07 Variance | 07/08 Water Plan | 07/08 Forecast | 07/08 Variance | 2005 Water Plan | Actual/ Forecast | Variance Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Waterways | 53.1 | 54.6 | 1.5 | 56.4 | 65.6 | 9.2 | 57.9 | 88.6 | 30.7 | 167.4 | 208.7 | 41.4 |

***Introducing services to Melbourne Water's extended boundary areas together with new obligations and increased business as usual expenditures have contributed higher operating expenditure than provided for in the Commission's 2005 Price Determination.***

[18] Preliminary estimate will be revised following further consultation with retail water businesses.

[19] 2007/08 figures are based on 2007/08 – 2009/10 Corporate Plan forecasts.

# Proposals for the 2008 regulatory period

## Regulatory framework

The current framework for economic regulation is in its fourth year, and while much has been achieved, further refinement is possible.

Melbourne Water supports moving to a longer regulatory period as a means of reducing the costs associated with economic regulation and strengthening incentives for improved performance. However, in doing so it will be important that the framework for economic regulation provides sufficient mechanisms to enable water businesses to deal with the uncertainties and risks that may arise over the 2008 regulatory period.

Melbourne Water has seen a significant number of new obligations added to its service responsibilities over the first two years of the current regulatory period due to Government directions. This, combined with the effects of the worst drought on record, has had a material impact on Melbourne Water's financial performance.

In order to adequately manage uncertainty and ensure optimal risk allocation, the regulatory framework for waterways and drainage services needs to incorporate a cumulative, end-of-period, pass through mechanism for additional and new legislative or regulatory obligations that are unforeseen and which arise once the 2008 Water Plan period has commenced. This would be symmetrical in application[20] and have a materiality threshold of 1% of waterways and drainage revenues (currently at 2.5% of revenues).

In principle, Melbourne Water also supports provision within the regulatory framework for a within-period pass through process (as identified in the Commission's March 2007 Guidance Paper) for certain, specified major projects that are either still being considered by regulatory agencies or the Government or which are in the very early stages of planning. In practice, there are no waterways and drainage projects planned for the next regulatory period that are sufficiently large or uncertain to warrant application of this mechanism.[21]

Provided these mechanisms are in place to manage uncertainty, Melbourne Water considers that over the 2008 regulatory period price caps should be applied to its waterways and drainage prices.

## Proposed service outcomes

In delivering its waterways and regional drainage services, Melbourne Water must comply with the Waterways Operating Charter, as required under its Statement of Obligations.

The Waterways Operating Charter is developed in consultation with a Waterways Advisory Committee made up of Government, regulatory and community representatives and summarises obligations emanating from various pieces of legislation and Government policy and sets out long term aims, specific ten year goals and performance targets for waterways and regional drainage services. The outcomes to be delivered over the 2008 regulatory period are summarised below for each service.

[20] That is, apply to increases and decreases in costs arising from additional and new legislative or regulatory obligations.

[21] This is in contrast to water and sewerage services where application of this mechanism would be appropriate for projects such as seawater desalination, the Sugarloaf Interconnector Pipeline or the Eastern Treatment Plant outfall extension or advanced effluent treatment.

## Managing river health

River and creek management works will be delivered to meet Regional River Health Strategy implementation targets that contribute towards the ten year goal of having 50% of rivers and creeks in good or excellent condition by 2015. This includes works to protect and improve the condition of river and creek beds and banks, aquatic habitat and streamside vegetation, programs to manage and improve environmental flows in major rivers and creeks, along with undertaking detailed planning to assist in the effective implementation of waterway programs. The five year implementation targets for river health are outlined in Table 5 below.

In addition, licences for stream diversions and farm dams will be managed to ensure environmental flows are protected and to meet service requirements set out in Melbourne Water's Customer Charter for Diversion Services.

**Table 5: River health five year implementation targets**

| | Five Year Target 2008/09 to 2012/13 |
|---|---|
| Number of rivers with negotiated environmental flow regimes[1] | 12 ^ |
| Number of rivers with improvements made to environmental flow regimes[1] | 17 ^ |
| Area of streamside land under management agreements | 10 $km^2$ |
| Length of streamside land revegetated ~ + | 1026 km# |
| Number of fish barriers removed | 31 |
| Length of riparian land subject to weed management + | 2042 km# |
| Number of plans developed for rivers and creeks of high social value | 15 ^ |
| Rivers where heritage values are protected or improved | 34 |
| Number of plans developed for rivers and creeks of high environmental value | 11 ^ |
| Number of investigations to fill data gaps in rivers or creeks | 55 |
| Number of sites subject to bed and bank stabilisation | 55 |
| Number of Index River Condition reaches with instream habitat reinstated | 12 |

[1] Target relates to rivers within Melbourne Water's area of responsibility.

~ Kilometres of rivers and creeks for streamside revegetation may overlap with kilometres of weed management.

+ Length calculated for both sides of the stream.

^ Denotes action which covers multiple Management Units counted as one target in the overall targets.

# Target has been adjusted to reflect 80% of the total kilometres of stream length.

## Managing water quality

Works and programs will be delivered to manage runoff from urban and rural areas to meet Waterways Water Quality Strategy implementation targets. These targets contribute towards the ten year goal to protect and improve water quality in waterways and bays in accordance with long term State environmental protection policies. This will be achieved by working collaboratively with others[22] to significantly counteract the effects of growth in greater Melbourne and achieve a net reduction in pollutant loads.

[22] This includes Government agencies, local government, industry, rural landholders and the community.

This includes working in partnership with stakeholders and the community to develop regulatory frameworks that ensures urban development meets best practice stormwater quality objectives and institutionalises water sensitive urban design. Also included are initiatives to increase community awareness of water quality improvement actions, programs to build the capacity of industry, and local government, to deliver sustainable urban water management and works to reduce pollutant loads from stormwater and rural runoff.

The five year implementation targets for water quality are outlined in Table 6 below.

**Table 6: Stormwater quality five year implementation targets**

| Target Area | Five Year Target 2008/09 to 2012/13 |
|---|---|
| **Planning for improved water quality** | |
| Develop a draft Better Bays and Waterways Plan | 2008 |
| Percentage of programs implemented from the Better Bays and Waterways Plan assigned to Melbourne Water | 100% |
| New or revised State Government requirements for all industrial, commercial, residential development to meet best practice water quality objectives | 2013 |
| **Equipping agencies, communities and industry to manage water quality** | |
| Develop and commence implementation of a land management program to manage run-off in rural areas | 2009 |
| Decrease in number of rivers and creeks where stock access poses a high risk to water quality | Demonstrated decrease |
| Number of training modules delivered under the Clearwater program per year with assistance from Melbourne Water | 10 |
| Percentage of local governments with improved performance in delivering sustainable urban water management (as measured by the Council Needs Analysis) | 70% |
| Number of guidelines and/or tools prepared to assist in the application of best practice stormwater management | 6 |
| Number of rain gardens built in the community with support from Melbourne Water | 10,000* |
| **Targeted water quality works** | |
| Percentage of local governments that have committed to water sensitive urban design implementation targets for pollutant loads, flow and effective imperviousness | 50% |
| Percentage of actions implemented from council Stormwater Management Plans assigned to Melbourne Water | 30% |
| Reduction of nitrogen loads in urban stormwater by 2010 | 100 tonnes |
| Annual reduction in nitrogen loads through the establishment of wetlands for the period 2010 to 2013 | 2 tonnes |
| Number of pollution load hotspots addressed | 8 |
| **Monitoring, investigations and research** | |
| Number of new monitoring programs to fill knowledge gaps for toxicants and pesticides | 2 |
| Percentage of health risk assessments completed for major rivers and creeks with a high level of recreational activity | 100% |
| Completion date for delivering the faecal investigations program | 2013 |

* Denotes a target that covers multiple programs.

In response to EPA Victoria comments on Melbourne Water's Consultation Draft, further information has been included in Chapter 5 to clarify Melbourne Water's responsibilities in relation to reducing catchment loads and the outcomes it proposes to deliver to meet State environment protection policy requirements.

### *Regional drainage and floodplain management*

Flood protection works will be delivered over the 2008 regulatory period to reduce currently known intolerable flood risks by 10%, which contributes towards the ten year goal of reducing intolerable flood risks by 30% by 2018. This includes further consultation with stakeholders and research into defining flood tolerability and programs designed to increase community and local government understanding and preparedness for flood risks.

### *Managing urban growth*

Works and programs will be delivered to meet the ten year goal of ensuring that urban development achieves appropriate standards of flood protection and environmental performance. At the same time these works will provide for regional drainage and water quality improvement infrastructure to service growth areas in a sustainable manner, whilst delivering an efficient level of service.

### *Monitoring, investigations and research*

Monitoring, investigations and research programs will be implemented for river health, environmental and recreational water quality and flood management to determine:

- Changes in condition over time
- Address gaps in understanding and to explore new technologies
- Provide information for management decisions so that activities, plans and policies are based on sound knowledge and best practice
- Track progress towards achieving targets.

### *Community and stakeholder engagement*

Communication and engagement programs will be implemented to inform the community, Government and stakeholders and raise awareness of issues related to the health of the region's rivers, water quality and flooding, and to provide opportunities for their involvement in improving waterway health.

## Forecast demands

The expected increase in rateable waterways and drainage properties is around 126,300 over the 2008 regulatory period, representing an average annual growth rate of 1.6%. This varies across retail water business areas due to different rates of development activity. The corresponding increase in rateable properties in the extended areas is forecast to be about 37,400 over the 2008 regulatory period, representing an average annual growth rate of 4.1%. The higher annual growth rate is due to a larger number of growth corridors in the extended areas compared to the existing retail water business areas.

Forecasts of property growth are consistent with the Government's Victoria in the Future 2004 projections.

In relation to developer cash contributions, Melbourne Water forecasts to receive a total of $228.8 million[23] in contributions from the development industry to provide drainage related works for urban expansion. This represents an average annual growth rate of 6% over the 2008 regulatory period from 2007/08 levels.

[23] Includes $19.9 million in the extended boundary areas.

Forecasts of land development activity have been informed by detailed planning, expected development rates sourced from the land development industry and Government's Victoria in the Future 2004 projections.

## Planning processes underpinning proposed expenditures

Melbourne Water's proposed outcomes and expenditure for the 2008 regulatory period have been developed through Melbourne Water's Planning Framework (see Figure 10) which:

- Ensures alignment with Government policy priorities, customer needs, regulator requirements and prudent risk management
- Ensures alignment between long term planning and day to day operational considerations
- Factors in broader economic, social and environmental considerations
- Achieves continuous improvement through regular benchmarking and review of planning processes and outcomes.

**Figure 10: Melbourne Water's planning framework**


***Melbourne Water's planning framework ensures alignment of planning processes and promotes continuous improvement.***

Melbourne Water's vision, sustainability principles, values and goals are outlined in Sustainable Water – A Strategic Framework.[24] This framework ensures Melbourne Water's long-term objectives are aligned to Government, regulatory and customer priorities as set out in key documents such as the Waterways Operating Charter, Our Water Our Future, the Central Region Sustainable Water Strategy, Our Environment Our Future and Melbourne 2030. It also provides the context for Melbourne Water's planning process, ensuring that social, environmental and economic aspects are all considered.

[24] A copy of the Strategic Framework is available on Melbourne Water's website www.melbournewater.com.au

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Regular review and continuous improvement are an integral part of Melbourne Water's Planning Framework. For example, since submission of the 2005 Water Plan, Melbourne Water has undertaken reviews and benchmarking studies with a view to strengthening its capital planning and delivery processes and systems:

- During 2005/06, a benchmarking study was undertaken with a leading United Kingdom water company with a specific focus on capital planning and delivery processes
- In June 2006, Melbourne Water engaged KPMG to review its capital planning and delivery process against industry 'best practice' to provide a basis for improving the process itself and the systems and other factors that support it.

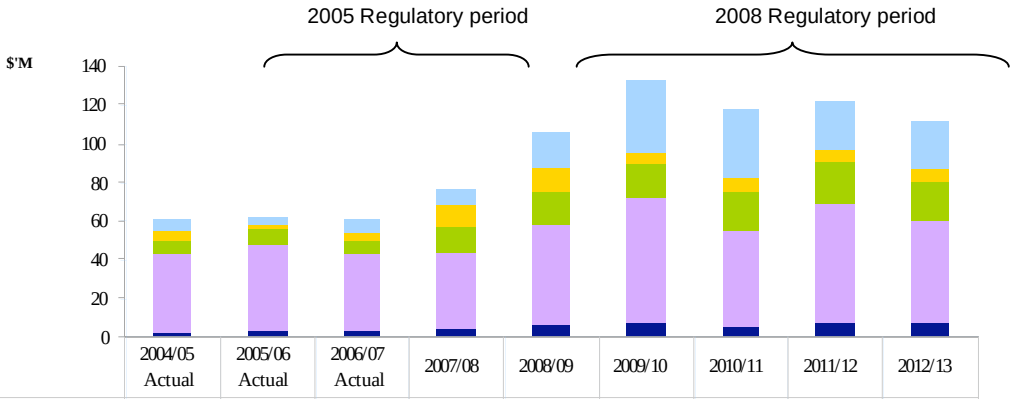
The results of these reviews are progressively being implemented. Improvements to date include:

- Strengthened governance arrangements through the establishment of a Board committee on capital planning and delivery
- A more rigorous process of review/challenge of project proposals
- A streamlined capital planning process which frees up resources for program/project review
- Improved forecasting of renewals capital expenditure on mechanical and electrical equipment
- Introduction of Triple Bottom Line guidelines for evaluating expenditure proposals
- Improved cost estimation methodologies for high value/high risk projects.

## Proposed capital expenditure

Planned waterways and drainage investments total $589.5 million over the 2008 regulatory period, which includes corporate overhead allocation of $33.7 million (5.7% of planned investment). Figure 11 shows historical and proposed expenditure by program.

**Figure 11: Waterways and drainage capital programs – 2004/05 to 2012/13**

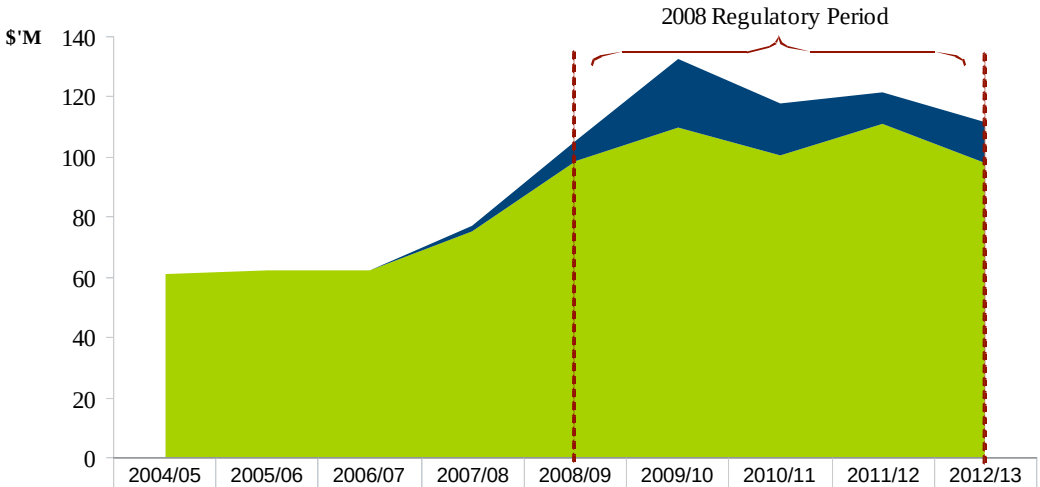



| | 2004/05 Actual | 2005/06 Actual | 2006/07 Actual | 2007/08 | 2008/09 | 2009/10 | 2010/11 | 2011/12 | 2012/13 |
|---|---|---|---|---|---|---|---|---|---|
| Drainage & Flood Protection | 5.7 | 4.3 | 8.5 | 9.2 | 18.0 | 37.3 | 35.5 | 24.9 | 23.9 |
| Stormwater Quality | 4.9 | 2.1 | 2.5 | 11.2 | 12.5 | 5.6 | 6.5 | 6.4 | 7.3 |
| Waterways Condition | 7.2 | 7.9 | 8.4 | 12.0 | 17.0 | 17.6 | 20.7 | 20.7 | 20.7 |
| Land Development | 40.8 | 45.1 | 39.3 | 40.0 | 51.4 | 64.2 | 49.9 | 62.6 | 53.1 |
| Corporate Overhead Allocation | 2.4 | 2.8 | 3.3 | 4.6 | 6.7 | 7.9 | 5.4 | 6.9 | 6.8 |
| **Product Total** | **61.0** | **62.3** | **62.0** | **76.9** | **105.7** | **132.6** | **118.0** | **121.4** | **111.8** |

***Capital expenditure is forecast to decrease after peaking in 2009/10.***

Capital investment is expected to increase over the 2008 regulatory period, on average, by approximately 8% per year relative to 2007/08. Increases are forecast for business as usual investments early in the regulatory period and additional investment is required to comply with new obligations and service standards. Figure 12 shows the profile of business as usual (88%) and new obligation (12%) investments over the 2008 regulatory period.

**Figure 12: New and business as usual capital expenditure – 2004/05 to 2012/13**




| | 2004/05 | 2005/06 | 2006/07 | 2007/08 | 2008/09 | 2009/10 | 2010/11 | 2011/12 | 2012/13 |
|---|---|---|---|---|---|---|---|---|---|
| New Obligations | 0.0 | 0.0 | 0.0 | 1.4 | 7.1 | 22.7 | 17.4 | 10.4 | 13.7 |
| Business as Usual | 61.0 | 62.3 | 62.0 | 75.5 | 98.6 | 109.9 | 100.6 | 111.0 | 98.1 |

***After an initial increase, business as usual capital expenditure is forecast to remain relatively stable. Expenditure on new obligations will fall after peaking in 2009/10.***

Melbourne Water has adopted a supplementary approach to the Commission's definition of new obligations to include obligations coming into effect within the 2005 regulatory period and which were not included in the 2005 Water Plan.

Over the 2008 regulatory period, capital expenditure on new obligations is $71.3 million. In particular, significant capital expenditure is planned to meet the following new obligations:

- Investment in flood protection works to meet the new Operating Charter requirement of reducing intolerable flood risks in areas where flooding results in high economic and social costs ($63.9 million)
- Program of load reduction works to remove a range of pollutants from stormwater and catchment run-off to meet new requirements in the Waterways Operating Charter and targets set out in the Waterways Water Quality Strategy ($4.4 million)
- Managing environmental flows in line with newly established Environmental Entitlements ($0.7 million) and works to improve estuary environments in line with new responsibilities as caretaker of river health in the Port Phillip and Westernport region ($2.3 million).

Planned investment in Melbourne Water's extended areas, which is business as usual expenditure, totals $55.1 million over the 2008 regulatory period.

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Increases in business as usual investments over the 2008 regulatory period, relative to 2007/08, are primarily driven by:

- Acceleration of works to restore waterway health to meet the objectives in the Regional River Health Strategy and Waterways Operating Charter ($18.5 million)
- Increased developer-funded growth works to meet industry and Government land development projections ($77 million).

Melbourne Water recognises the challenge of delivering a much larger investment program (not only for waterways and drainage services but also for its water and sewerage services) in a highly competitive contracting market.

Melbourne Water has consulted waterways, water and construction industry consultants and contractors on its planned waterways and drainage, water and sewerage capital expenditure over the 2008 regulatory period. The feedback is that the proposals are ambitious, but achievable. This view is supported by industry data that shows the recent rapid growth in construction activity has been absorbed by industry growth and therefore capacity will exist to service Melbourne Water's capital program.

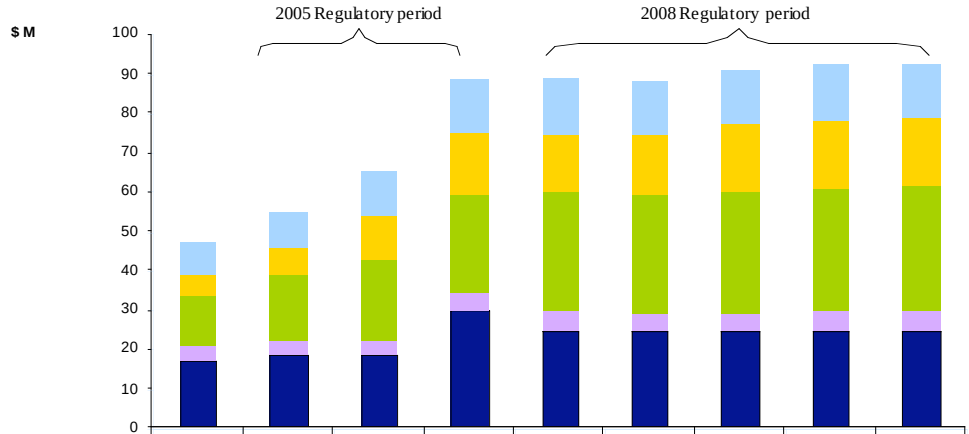
To deliver a significantly larger total business capital program (including waterways and drainage), Melbourne Water is making changes to the way projects are planned, contracted, resourced and delivered. Melbourne Water is confident that successful delivery of the capital program can be achieved based on:

- Its successful track record in delivering its capital expenditure program over the past five years during which time capital expenditure has nearly doubled
- Approaching the market early and publicising the upcoming work widely to assist contractors and consultants with their business planning and recruitment and training of industry specialists. This is important in both attracting the right contractors and consultants with specialised skills for the projects and in ensuring that Melbourne Water establishes arrangements that have the appropriate allocation of risk and resources
- Choosing contract and delivery strategies appropriate to the size, complexity and risk of projects. A decision matrix will be used to select the delivery model best suited to each project, group of projects or program
- For the Waterways and Stormwater Program, major and medium scale projects will be delivered through collaborative contracts. For minor capital works, service provider contracts will deliver both day to day maintenance and high volume, low risk capital works
- Continuing the current panel arrangements for consultants and spreading the workload across a number of firms to underpin and assist the expansion of the water sector consulting industry in Victoria
- Considering the 'bundling' of smaller projects to improve efficiency
- Improving working relationships with key stakeholders to negotiate optimum solutions and timing for projects
- Identifying the skills required to deliver the capital program and implementing human resources initiatives to attract and retain the requisite skills. Operations and asset management teams will be supplemented with additional staff to facilitate appropriate input to the program
- Enhancing the processes and information technology systems that support the capital planning and delivery process.

## Proposed operating expenditure

Forecast operating expenditure totals $453.5 million over the 2008 regulatory period, which includes corporate overhead allocation of $123.4 million (27% of total operating expenditure). Figure 13 shows historical and proposed expenditure by program. The corporate overhead allocation includes costs associated with functional areas such as information technology, human resources, finance, risk management, insurance and research and technology.

**Figure 13: Waterways and drainage operating expenditure by program – 2004/05 to 2012/13**

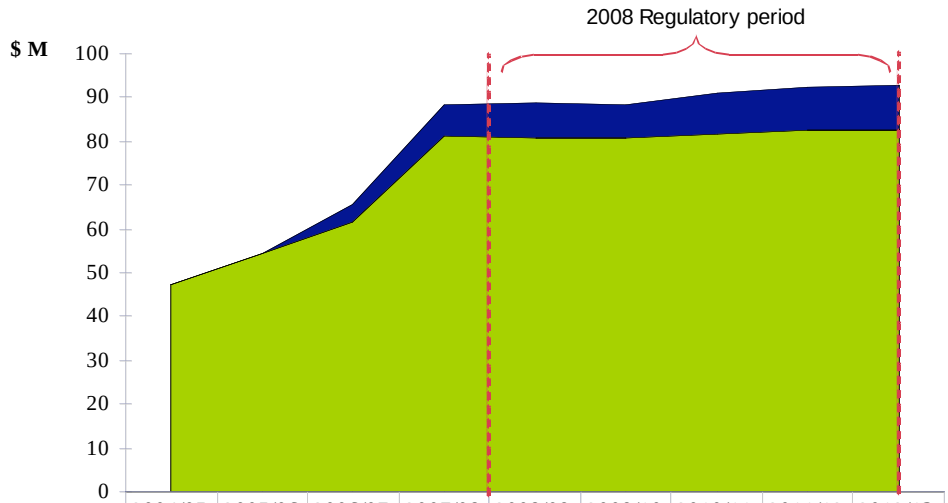



| | 2004/05 Actual | 2005/06 Actual | 2006/07 Actual | 2007/08 | 2008/09 | 2009/10 | 2010/11 | 2011/12 | 2012/13 |
|---|---|---|---|---|---|---|---|---|---|
| Drainage & Flood Protection | 8.5 | 8.5 | 11.2 | 13.2 | 14.1 | 14.0 | 14.0 | 14.1 | 13.9 |
| Stormw ater Quality | 5.4 | 7.1 | 11.7 | 15.9 | 14.5 | 14.7 | 16.8 | 17.5 | 17.4 |
| Waterw ays Condition | 12.6 | 16.4 | 20.3 | 25.0 | 30.2 | 30.4 | 31.0 | 31.1 | 31.5 |
| Land Development | 3.5 | 4.3 | 3.9 | 4.8 | 5.1 | 4.9 | 5.0 | 5.0 | 5.0 |
| Corporate Overhead Allocation | 17.5 | 18.4 | 18.5 | 29.7 | 24.7 | 24.5 | 24.4 | 24.8 | 25.0 |
| **Product Total** | **47.5** | **54.6** | **65.6** | **88.6** | **88.7** | **88.4** | **91.2** | **92.4** | **92.8** |

***After increasing over the 2005 regulatory period overall operating expenditure is forecast to remain relatively stable.***

Waterways and drainage operating expenditure is expected to increase over the 2008 regulatory period, on average, by approximately 0.9% per year relative to 2007/08. Figure 14 illustrates that a key driver of the increase in operating expenditure is due to meeting new obligations, while expenditure associated with business as usual activities will remain relatively stable relative to 2007/08.

**Figure 14: New and Business as usual Operating Expenditure – 2004/05 to 2012/13**




| | 2004/05 | 2005/06 | 2006/07 | 2007/08 | 2008/09 | 2009/10 | 2010/11 | 2011/12 | 2012/13 |
|---|---|---|---|---|---|---|---|---|---|
| New Obligations | - | 0.3 | 3.8 | 7.3 | 8.0 | 7.7 | 9.3 | 9.9 | 10.1 |
| Business as Usual | 47.5 | 54.3 | 61.8 | 81.2 | 80.6 | 80.7 | 81.9 | 82.5 | 82.8 |

***After increasing over the 2005 regulatory period business as usual operating expenditure is forecast to remain relatively stable. Expenditure on new obligations is the key driver of the increases in operating expenditure.***

The significant increase in operating expenditure for 2007/08 is mainly due to the continued phase-in of waterways management and drainage services to Melbourne Water's extended boundary areas, one-off billings and collections costs associated with implementing rate reforms and meeting requirements under new obligations.

Melbourne Water has adopted a supplementary approach to the Commission's definition of new obligations for the 2008 Water Plan to include obligations coming into effect within the 2005 regulatory period and which were not included in the 2005 Water Plan.

Over the 2008 regulatory period, operating expenditure planned for new obligations includes:

- Managing environmental flows in line with newly established Environmental Entitlements ($2.9 million)
- Implementing the final stages of the Lower Yarra Stormwater Quality Program (part of the Yarra River Action Plan) to reduce the environmental impact of stormwater on waterways from nominated local government areas ($1.2 million)
- Undertaking load reduction programs to remove a range of pollutants from stormwater and catchment run-off to meet targets in the Waterways Water Quality Strategy and the 2007 Waterways Operating Charter ($36 million)
- Implementing flood protection measures to reduce currently known intolerable flooding risks to public health and safety, property and infrastructure as set out in the 2007 Waterways Operating Charter ($4.9 million).

Business as usual expenditure is forecast to remain relatively stable over the 2008 regulatory period in absolute terms and, when adjusted for growth, reflects productivity savings of at least 1% per year relative to 2007/08.

This reflects initiatives expected to yield ongoing efficiency savings and is in spite of upward pressure on costs arising from:

- Higher labour costs based on current movements in the labour market, and additional headcount required to deliver services to extended areas ($11.5 million)
- Higher civil maintenance costs ($20.7 million) due to the:
  - Increasing size of Melbourne Water's waterways and drainage asset base
  - Assets experiencing a periodic increase in activity (e.g. the need for de-silting recently constructed wetlands), along with increased riparian management activities to ensure that the condition of vegetation near rivers and creeks is maintained
  - Above CPI increases in contract rates influenced by market conditions.

Provision of waterway and drainage services to Melbourne Water's extended boundary area will lead to business as usual costs of $41 million over the 2008 regulatory period.

## Regulatory asset value and depreciation

The Commission's 'building block' method for calculating prices adds actual investment over the 2005 regulatory period, and forecast investment over the 2008 regulatory period, to Melbourne Water's regulated asset value. This then forms the basis for the depreciation and commercial return provisions included in prices.

In determining the regulatory asset value as at 1 July 2008, Melbourne Water considers that using actual capital expenditure, contributions and disposals for the period from 1 July 2004 to 30 June 2006 and forecasts for 2007/08 is a more appropriate basis for rolling forward its regulatory asset value than using the provisions included in the Commission's 2005 Price Determination. This is particularly important given the significant changes to Melbourne Water's operating environment over the 2005 regulatory period outlined above, including new obligations and changes to project scopes and costs. Adopting this approach would result in a rolled forward regulatory asset value as at 1 July 2008 of approximately $861 million for waterways and drainage services.

Melbourne Water considers that the capital expenditure forecast for 2007/08 is both prudent and efficient.

Guidance provided by the Commission identifies straight line and reducing balance depreciation as options in calculating the return of capital over the regulatory period. Melbourne Water has adopted the straight line approach in preparing this Waterways Water Plan.

## Cost of capital and taxation

The Commission includes a commercial return in the prices as measured by its assessment of the Weighted Average Cost of Capital (WACC). Melbourne Water has used a real post-tax WACC of 5.1%, consistent with guidance provided by the Commission, in preparing this Waterways Water Plan.

Melbourne Water and the retail water businesses commissioned consultants, the Strategic Finance Group (SFG), to provide an empirical estimate of the WACC for their businesses.

SFG developed a real, post-tax WACC mid-point estimate of 6.2% but recommended a 75$^{th}$ percentile figure of 6.4%, based on empirical analysis of the underlying data, financial theory and the requirement for all WACC parameters to be estimated in an internally consistent manner. Adopting the recommended value could add at least an additional 1.7% to Melbourne Water's proposed price path.

While supporting the conclusions of the SFG consultancy, in light of stakeholders' concerns in relation to the numerous upward pressures on prices, at this point in time Melbourne Water has not used the recommended real, post-tax WACC estimate of 6.4%. Melbourne Water does, however, believe that the issue of the appropriate WACC for water businesses should be further debated particularly in relation to issues around the empirical estimates for equity beta and gamma.

The Commission makes provision for company tax in regulated prices, as it is seen to be a legitimate business cost. As a result of a large number of Melbourne Water's major assets becoming fully depreciated for tax purposes, tax payable over the 2008 regulatory period is expected to increase which will impact on the level of the proposed prices.

## Proposed required revenue

Over the 2008 regulatory period, Melbourne Water's revenue requirement for waterways and drainage services is $847 million.[25] This reflects the costs associated with delivering improvements in river health, reducing intolerable flood risks and consolidating the provision of services to Melbourne Water's extended boundary areas.

While the impact on individual customers will vary, for customers in Melbourne Water's existing service area, raising the required revenue will necessitate an average price increase of CPI+1% per annum. Melbourne Water also proposes to commence charging for services provided in the extended boundary areas.

## Prices proposals

A number of submissions in response to Melbourne Water's Consultation Draft question whether Melbourne Water's waterway and drainage services should be funded by Government directly, as is done for waterway services outside Melbourne Water's service area. While some Government funding is received for specific programs, for the purposes of this Water Plan, Melbourne Water has assumed that the vast majority of its costs will continue to be provided on a full cost recovery basis. Consequently, Melbourne Water has focused on developing prices that recover its costs from customers in the most efficient and equitable manner practical.

To this end Melbourne Water has investigated alternatives to the current property valuation based prices for waterways and drainage services. This was done with a view to establishing prices that better reflect the cost and benefits of the services received by different customer groups, which are easier for customers to understand and that are more cost effective to administer.

Microeconomic reform has seen water authorities across Australia move away from using property values as a basis for setting water, sewerage and drainage prices.

In Melbourne, the use of property values in setting water and sewerage prices was phased out in the late 1990s. While there are some important differences with water and sewerage services, the current approach to pricing waterways and drainage services needs to be reviewed because of:

- The link between a customer's capacity to pay (the original basis for choosing property values) and their current price is questionable as:
  - There have been significant changes in property values since 1990
  - 60% of residential customers currently pay the minimum price
- The use of 1990 property values is inconsistent with values used by local governments for rating properties, creating customer confusion and complaints

[25] Total NPV of waterways and drainage services revenue over the 2008 regulatory period equates to $748 million, which includes $15 million of miscellaneous revenue.

- The high cost of maintaining 1990 property values for billing purposes (over $1 million per annum)
- Appropriate pricing arrangements need to be developed and implemented in Melbourne Water's extended boundary areas.

Experience with the reform of water and sewerage prices indicates that any change to valuation based prices, including updating valuations, will result in material customer impacts. Melbourne Water has considered a range of alternative pricing methodologies including:

- Catchment based prices
- Area based prices
- Updating property valuations
- A fixed annual service price for each customer category.

Following extensive analysis, a suite of annual service prices has been selected as the preferred option as it:

- Better reflects the extent to which customers impact on, or benefit from, the services provided
- Achieves a higher level of transparency and customer understanding
- Delivers significant implementation and administration cost savings
- Results in lower customer impacts relative to some other options
- Will result in more stable prices over time, compared to catchment based charges, given that expenditure across catchments is prioritised and varies significantly from one regulatory period to the next.

The challenges associated with reforming valuation based water and sewerage prices also suggest a staged approach will enable an initial focus on the areas of greatest potential gain, help manage impacts on customer bills and allow sufficient time to work through complex issues.

Melbourne Water proposes an initial round of price reform over the 2008 regulatory period commencing with the 2008/09 prices set out in Box 1 and Appendix 4.

**Box 1: 2008/09 price proposals**

- Commence phasing in a single service price for residential customers by increasing the minimum price to $57 while maintaining prices for customers who currently pay above the minimum
- Decreasing reliance on property values for non-residential customers by increasing the minimum price to $75, with further reform during the next regulatory period
- Ensuring rural customers only pay for the services they receive by replacing existing prices for rural customers located outside the Urban Growth Boundary with a lower waterways service price of $36
- Commence charging customers in the extended area for the provision of waterways and regional drainage services by introducing a single service price of $57 per year for residential customers, $75 for non-residential customers and $36 for customers located outside Urban Growth Boundary
- Continuing discussions with customer committees within the special drainage areas to move towards an improved basis for pricing.

While price reform is proposed on a number of different fronts, and will affect customers differently, the proposed prices for customers in the existing service areas would increase on average by CPI+1% per year over the 2008 regulatory period. This increase is consistent with delivering the service outcomes discussed in earlier sections. The proposed prices for the different customer groups and associated impacts are discussed below.

## Residential customers

Broadly speaking, residential customers are fairly uniform in terms of the benefits they receive and the costs they impose on waterways and drainage services. Consequently, a single price based on the average cost of providing services to residential customers is a reasonable proxy for the true costs incurred and benefits received by this group.

Melbourne Water proposes to transition residential prices to the average cost by increasing the minimum price by $2 plus inflation each year over the 2008 regulatory period and maintaining prices for customers who currently pay above the minimum until the transitional arrangements are complete in 2012/13.

Setting the minimum price at $57 in 2008/09 would increase customer bills by $2 in real terms for 60% of residential customers (about 804,000) who currently pay the minimum price of $55. Prices for 40% of customers currently paying above the minimum (about 539,000) would remain constant in real terms until 2012/13.

Table 7 outlines the proposed price path for residential customers over the 2008 regulatory period. The average price for a customer paying above the minimum in 2007/08 has been used to illustrate the price path for these customers.

**Table 7: Proposed price path for residential customers – 2008/09 to 2012/13**

| | | Current 2007/08 ($/yr) | Proposed 2008/09 ($/yr) | 2009/10 ($/yr) | 2010/11 ($/yr) | 2011/12 ($/yr) | 2012/13 ($/yr) |
|---|---|---|---|---|---|---|---|
| **Residential properties** | Paying minimum price | 55.05 | 57.10 | 59.23 | 61.43 | 63.71 | 66.08 |
| | Above minimum price (average) | 88.13 | 88.13 | 88.13 | 88.13 | 88.13 | 66.08 |

## Non-residential customers

In contrast to residential customers, there are significant differences between non-residential customers (who range from cafes and shopping centres to warehouses) in terms of:

- The costs they impose on services (as measured by their contribution to stormwater run-off)
- The level of benefits they receive (e.g. the level of foregone earnings as a result of flooding)
- Opportunities to change behaviour to reduce the quantity (e.g. through stormwater reuse) or improve the quality of stormwater run-off from their property.

An extensive review that commenced following the Commission's 2005 Price Determination explored a number of price reform options for non-residential customers. The review highlighted the diversity within current non residential prices and the significant potential impacts of moving to a more cost reflective approach.

As a first stage reform measure, Melbourne Water proposes that the current minimum price be increased to $75 in 2008/09 and property values be retained pending further analysis and development of reform proposals for inclusion in the next regulatory period.

Increasing the minimum from $55 to $75 in 2008/09 results in increasing the number of non-residential customers paying the minimum price from around 16,000 (14%) to approximately 27,200 (23%). This reduces reliance on property values and establishes a higher base price upon which future tariff reform can take place.

Table 8 outlines the proposed price path for non-residential customers over the 2008 regulatory period. The average price for a customer paying above the minimum in 2007/08 has been used to illustrate the price path for these customers.

**Table 8: Proposed price path for non-residential customers – 2008/09 to 2012/13**

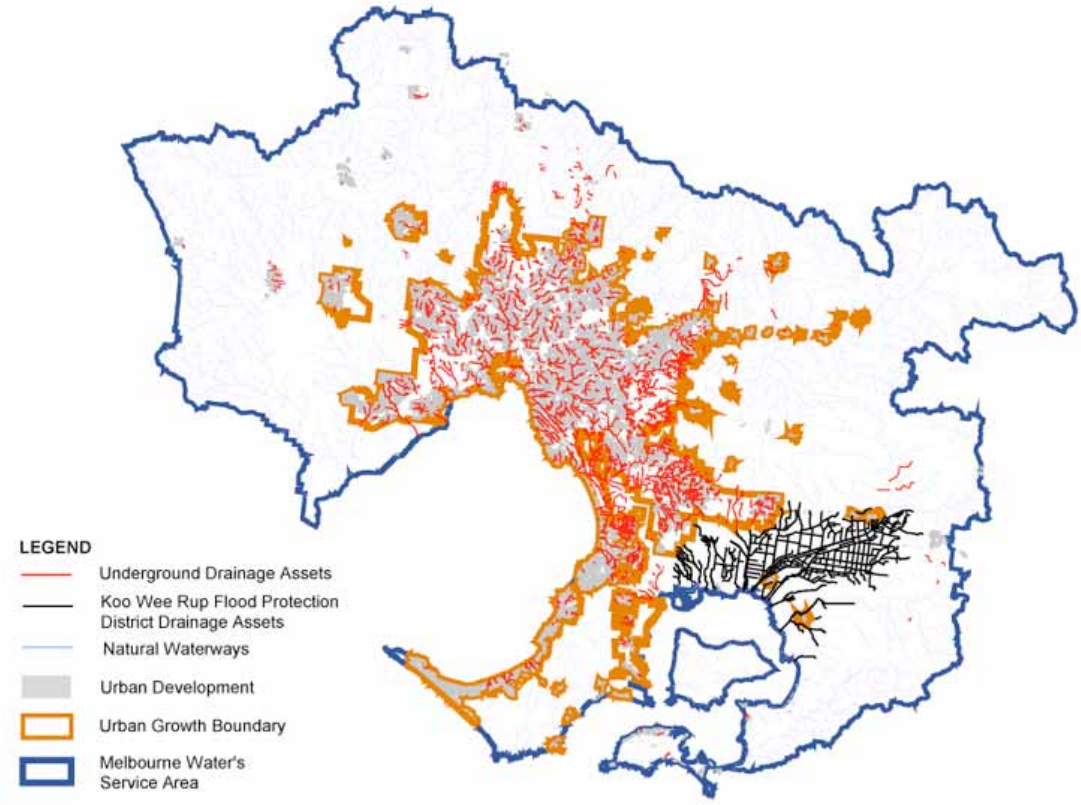
| | | Current 2007/08 ($/yr) | Proposed 2008/09 ($/yr) | 2009/10 ($/yr) | 2010/11 ($/yr) | 2011/12 ($/yr) | 2012/13 ($/yr) |
|---|---|---|---|---|---|---|---|
| **Non-residential properties** | Paying minimum price | 55.05 | 75.12 | 77.73 | 80.42 | 83.21 | 86.10 |
| | Above minimum price (average) | 455.00 | 470.79 | 487.12 | 504.03 | 521.52 | 539.61 |

### *Rural customers*

As illustrated by Figure 15, with the exception of the Koo Wee Rup Flood Protection District, Melbourne Water's regional drainage assets are located predominantly within urban areas which have been designated by the Urban Growth Boundary.[26] As customers located outside the Urban Growth Boundary (which is largely comprised of rural properties) do not receive the full benefits of Melbourne Water's regional drainage services, it is proposed that these customers pay for the cost of waterways services only. The average annual cost of providing waterways services in the greater Melbourne metropolitan area is around $36.

[26] Defined in the State Government's Melbourne 2030 which indicates the long term limits of urban development and where non-urban values and land uses should prevail in metropolitan Melbourne

**Figure 15: Urban Growth Boundary and Melbourne Water assets**




***A lower price is proposed for customers outside the Urban Growth Boundary to reflect the fact that they do not receive drainage services.***

Moving to a waterways service price of $36 in 2008/09 for rural customers located outside the Urban Growth Boundary would result in an average $45 decrease for about 47,000 residential and non-residential customers.

It is also proposed that historic exemptions be removed for 3,200 farm properties in the Yarra and Maribyrnong catchments which have received services following previous extensions of Melbourne Water's service area in 1981 and 1984. Of these properties, 95% are located outside the Urban Growth Boundary and would pay a price of $36 for waterways services.

Table 9 outlines the proposed price path for rural customers over the 2008 regulatory period. The average price for a customer paying above the minimum in 2007/08 has been used to illustrate the price path for these customers.

**Table 9: Proposed price path for rural customers – 2008/09 to 2012/13**

| | | Current 2007/08 ($/yr) | Proposed 2008/09 ($/yr) | 2009/10 ($/yr) | 2010/11 ($/yr) | 2011/12 ($/yr) | 2012/13 ($/yr) |
|---|---|---|---|---|---|---|---|
| **Rural properties** | Paying minimum price | 55.05 | 35.89 | 37.14 | 38.43 | 39.76 | 41.14 |
| | Above minimum price (average) | 112.44 | 35.89 | 37.14 | 38.43 | 39.76 | 41.14 |

## Extended areas

Given that customers within the extended areas will receive an equal level of waterways and regional drainage services to other areas within Melbourne Water's service area, it is proposed that prices be uniformly applied across the whole of the Port Phillip and Westernport catchment areas.

Introducing 1990 property values as a basis for charging residential and non-residential customers in the extended areas is expensive and likely to result in customer confusion and be difficult to explain. It is recommended, therefore, that in light of the proposal to move residential customers to a single service price over the 2008 regulatory period, a flat service price of $57 be applied in 2008/09 for all residential customers (approx 118,000) in the extended area. Due to further investigations planned for non-residential prices and potential future reforms, it is also proposed that a flat service price of $75 be applied in 2008/09 for all non-residential customers (approx 5,000 customers) in the extended area as an interim measure.

An estimated 54,000 customers outside of the Urban Growth Boundary would pay a fixed waterways service price of $36.

Table 10 outlines the proposed price path for extended area customers over the 2008 regulatory period.

**Table 10: Proposed price path for extended area customers – 2008/09 to 2012/13**

| | Current 2007/08 ($/yr) | Proposed 2008/09 ($/yr) | 2009/10 ($/yr) | 2010/11 ($/yr) | 2011/12 ($/yr) | 2012/13 ($/yr) |
|---|---|---|---|---|---|---|
| **Residential properties** | N/A | 57.10 | 59.23 | 61.43 | 63.71 | 66.08 |
| **Non-residential properties** | N/A | 75.12 | 77.73 | 80.42 | 83.21 | 86.10 |
| **Rural properties** | N/A | 35.89 | 37.14 | 38.43 | 39.76 | 41.14 |

## Special drainage areas

Special drainage area customers represent 0.3% of Melbourne Water's customer base. Melbourne Water sets prices for these customers in consultation with customer advisory committees. Melbourne Water has consulted on its intention to reform special drainage area prices over the 2008 regulatory period. Working with local customer advisory committees to appropriately manage any customer bill impacts will be an important consideration in this process. In the interim, it is proposed that the current approach and principles used to set prices for these customers be retained for around 3,000 customers in the Koo Wee Rup Flood Protection District and approximately 1,200 customers in the Patterson Lakes area.

## Diversion services

Melbourne Water proposes to retain the existing structure for diversions prices, where a flat service price and volume-based price (peak, off-peak and non-consumptive) is levied for administering waterway diversion licences. Price proposals for the 2008 regulatory period include increasing annual service prices by an average of 4% per annum and increasing volume based price by an average of 16% per annum.

Consultation with Melbourne Water's customer advisory committees indicate that the proposed prices and service outcomes for the 2008 regulatory period are considered to be not unreasonable, with the major concern for licence holders being the security of access to water resources.

The proposed price increases will ensure that Melbourne Water is able to effectively manage customer compliance to protect water entitlements for all diverters while respecting the needs of the environment as well as improving information services for customers.

### Developer cash contributions

Melbourne Water proposes to continue using pricing principles as a basis for setting developer charges in development service schemes. Cash contributions received from these schemes are used by Melbourne Water to construct drainage works to service urban growth areas. In applying these principles, Melbourne Water has responded to issues identified by the Commission in its 2005 Price Determination and subsequent consultation with industry. Melbourne Water has also responded to legislative change in relation to accountability for water sensitive urban design.

### Miscellaneous services

Melbourne Water currently charges for a variety of miscellaneous services provided to the retail water businesses, developers and the general public. The prices for these services are set to reflect the cost of the service delivered. Appendix 4 outlines the proposed prices in 2008/09.

## Consultation

Extensive stakeholder engagement has been critical in developing this Waterways Water Plan. The proposals included in this Waterways Water Plan have been developed in consultation with:

- The Waterways Advisory Committee
- Diversions customer advisory committees
- Department of Treasury and Finance
- Department of Sustainability and Environment
- EPA Victoria
- Port Phillip and Westernport Catchment Management Authority
- Essential Services Commission
- Retail water businesses.

This feedback has assisted Melbourne Water to:

- Clarify the outcomes to be delivered over the 2008 regulatory period
- Discuss the activities needed to deliver these outcomes and their associated cost
- Establish relative priorities given potential customer impacts
- Set the structure, level and phasing of proposed prices
- Agree appropriate planning assumptions
- Discuss the regulatory framework needed to create incentives for improved business performance and manage risks appropriately.

To facilitate broader public comment, Melbourne Water released a Consultation Draft Waterways Water Plan on 10 October 2007. Approximately 200 letters were also sent to our major stakeholders including all local members of parliament, local government CEOs and mayors, local interest groups and Landcare networks. Follow up phone calls were made to many of our key stakeholder to ensure they were aware of the release of our Consultation Draft.

Seven information sessions were advertised in Melbourne Water's extended waterways boundary area where charges are proposed to be applied for the first time in 2008/09 and media releases were also sent to all local newspapers.

Melbourne Water received 16 submissions in response to the Consultation Draft raising. Issued raised by the submissions include:

- The importance of integrated planning and effective collaboration between Melbourne Water and local government
- The importance of ongoing community engagement to feed back on performance
- The potential for alternative sources of funding for Melbourne Water’s waterway services.

Additional information has been included in this Water Plan to respond to these issues, where appropriate, including a response to questions raised by EPA Victoria in relation to stormwater quality monitoring and improvement.

All parties making a submission have received a written response thanking them for their submission, and noting the next steps in the Commission’s price determination process.

Chapter 1
# Background

Melbourne Water is a statutory corporation, fully owned by the Victorian Government.

Melbourne Water is a water resource manager, providing waterways and drainage services to the greater Melbourne community as well as wholesale water, sewerage and recycled water services to the retail water businesses.

Melbourne Water is committed to managing our business efficiently to achieve our vision of 'working together to ensure a sustainable water future'.

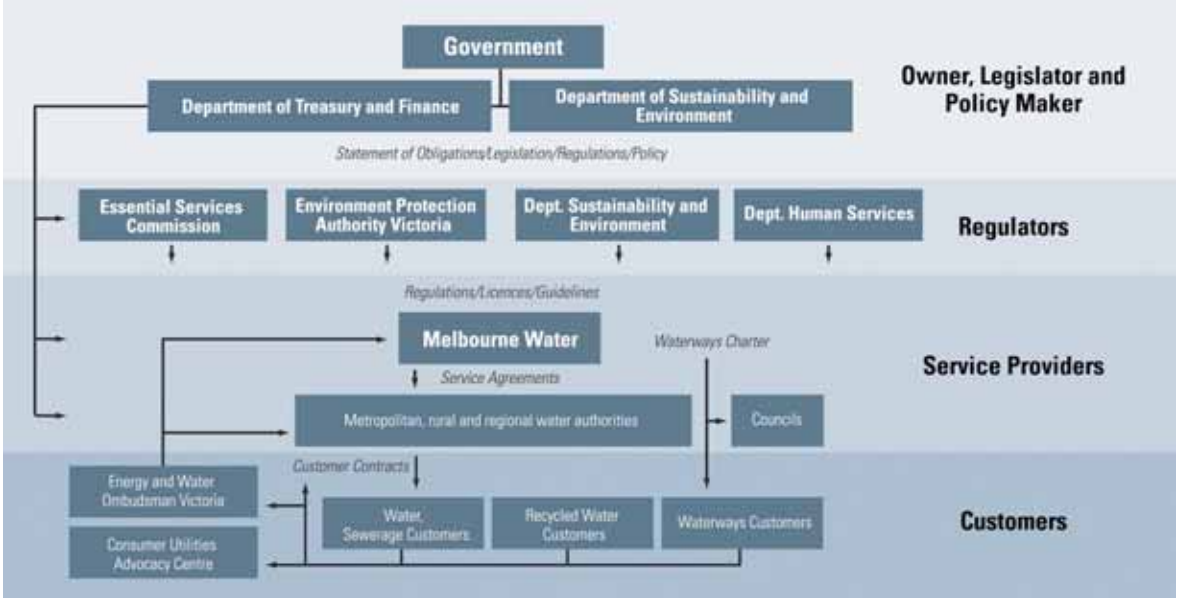
Melbourne Water's waterways and drainage responsibilities include providing river health, water quality, floodplain and regional drainage services across the Port Phillip and Westernport catchments.

This chapter outlines the current structure of the metropolitan water industry as well as the nature and scale of activities provided by Melbourne Water. The industry's current operating environments as well as future challenges are discussed in Chapter 4.

## 1.1 Industry structure and regulation

The structure of the Melbourne metropolitan water industry is illustrated in Figure 1.1. The roles and accountabilities of the principal participants are outlined below.

**Figure 1.1 – Industry structure and regulatory framework**




The State Government sets the policy and legal framework, specifies water business obligations and monitors water business performance. Legislation (e.g. Water Act 1989), regulations (e.g. drinking water quality regulations), legal instruments (e.g. bulk water entitlements) and policy documents (e.g. Our Water Our Future and Melbourne 2030) are issued by the State Government and guide business and regulatory decisions.

The Minister for Water, supported by the Department of Sustainability and Environment, sets out specific requirements for each business through Statements of Obligations. The Minister for Water is also responsible for allocating water resources. In the metropolitan sector, the Treasurer, in consultation with the Minister for Water, monitors financial performance and represents the State Government's shareholder interests, including returns to government and borrowing requirements.

The Essential Services Commission (the Commission) regulates prices and customer service standards for prescribed water, sewerage, waterways and drainage and recycled water services across Victoria consistent with its legislative requirements[1] and the Water Industry Regulatory Order.

The Environment Protection Authority (EPA) Victoria sets and enforces environmental standards consistent with key principles set out in the Environment Protection Act 1970. The Department of Human Services sets and enforces water quality standards to ensure water provided by the water businesses complies with relevant State Government legislation and regulations as well as national and international water quality guidelines.

The Energy and Water Ombudsman Victoria provides retail customer dispute functions. The Consumer Utilities Advocacy Centre provides retail customer advocacy functions.

Waterways and drainage services standards are set out in Melbourne Water's Waterways and Drainage Operating Charter which is developed in consultation with its Waterways Advisory Committee representing key stakeholder and customer interests and the Department of Sustainability and Environment. Local government manages the local drainage network (catchments generally less than 60 hectares) and work with Melbourne Water to provide flood protection and manage stormwater quality.

Melbourne Water also provides wholesale water, sewerage and recycled water services to the retail water businesses who provide reticulation services and manage the interface with water and sewerage customers, consistent with State Government, regulatory and customer requirements. Service standards for wholesale water, sewerage and recycled water services are set out in supply agreements that are commercially negotiated between Melbourne Water and the retail water businesses.

## 1.2 Melbourne Water

Melbourne Water is a water resource manager, providing waterways and drainage services to the greater Melbourne community and wholesale water, sewerage and recycled water services to the retail water businesses. In doing so, we are committed to managing our business efficiently to achieve a vision of 'working together to ensure a sustainable water future'.

### 1.2.1 Governance

Melbourne Water is a statutory corporation, fully owned by the Victorian State Government.

An independent Board of Directors responsible to the Minister for Water undertakes the governance of Melbourne Water. The Board previously operated under the provisions of the Melbourne Water Corporation Act 1992. However, the passage of the Water (Governance) Act in 2007 has seen the Melbourne Water Corporation Act 1992 repealed and the establishment of a more consistent governance framework for Victorian water authorities.

[1] Legislative provisions relevant to the Commission's regulation of the water industry include those of the Essential Services Commission Act 2001 and the Water Industry Act 1994 as amended by the Water Legislation (Essential Services Commission and Other Amendments) Act 2003.

### 1.2.2 Service responsibilities

Melbourne Water's service responsibilities span the urban water cycle ensuring integration of planning and operating decisions and include provision of:

- Waterways services, including flood and drainage management, waterway management and water quality protection to around 1.5 million people in the greater Melbourne metropolitan area, including the extended boundary area (see Figure 1.2). Melbourne Water also administers diversion licenses for the Yarra and Maribyrnong catchments
- Water to the three metropolitan retail water businesses (City West Water, South East Water and Yarra Valley Water) and two non-metropolitan water authorities (Western Water and Gippsland Water)[2]. In 2006/07, Melbourne Water supplied around 412 GL, representing over 60%[3] of the State's potable water and around 11% of total water supplied
- Sewerage services to the three metropolitan retail water businesses. In 2005/06, this involved transferring and treating 300 GL of sewage of which approximately 14.6% was recycled
- Recycled water services to metropolitan retail water businesses, Southern Rural Water and a private sector recycled water supplier.

Melbourne Water also engages in a limited number of activities related to the provision of its core services that add value to the business without impacting on the cost or quality of its core services. Significant activities in this regard include Werribee Agriculture, which undertakes agricultural operations at the Western Treatment Plant, and hydro electricity generation.

### 1.2.3 Strategic framework

Melbourne Water's strategic framework, Sustainable Water, reflects relevant legislation and State Government policy, and provides the context for Melbourne Water's planning and service delivery, ensuring that social, environmental and economic issues are all considered.

Key elements of the strategic framework are outlined below:

#### Our Vision

Working together to ensure a sustainable water future.

#### Our sustainability principles

Melbourne Water's commitment to sustainability will be demonstrated by:

- Protecting and conserving Melbourne's water resources
- Protecting and improving the environment, including biodiversity
- Our leadership, scientific research, creativity and innovation
- Ensuring responsible risk management
- Sharing information and fostering collaborative working relationships
- Maintaining long-term financial viability
- Contributing to the health of the community
- Demonstrating corporate social responsibility

[2] The Government's Our Water Our Future, The Next Stage of the Government's Water Plan, notes that supply will be extended to Geelong (Barwon Water) and towns in the Westernport' (Westernport Water) and the South Gippsland region (South Gippsland Water) by late 2011.

[3] Victorian Water Review 2005/06.

- Ensuring intergenerational equity by considering short term and long term implications in all decision making
- Providing an environment where employees are encouraged to achieve their full potential.

## Our values

- We recognise that we achieve more by working collaboratively
- We behave with integrity
- We attain excellence through creativity and innovation
- We celebrate our achievements and learn from our experiences
- We work with openness, transparency and accountability.

## Our goals

### Water resources

- Protect and conserve Melbourne's existing water resources
- Protect our water supply catchments from bushfire
- Develop alternative water resources, including recycled water, that meet our customers' current and future needs
- Increase water resource efficiency.

### Public health

- Supply high quality and reliable drinking water
- Deliver safe sewage transfer, treatment and disposal
- Manage flood risk.

### Natural environment

- Improve environmental outcomes from all aspects of our business
- Improve river health and the marine environment
- Improve biodiversity
- Preserve and promote our cultural heritage.
- Meet planned reductions in greenhouse emissions and increased use or export of renewable energy.

### Financial viability

- Increase business value through innovation and efficiency
- Balance investments and levels of risk and service
- Maximise resource efficiency
- Maintain sound governance
- Ensure investment decisions are sustainable
- Deliver planned shareholder returns.

### Infrastructure

- Ensure stringent regulatory obligations are met
- Provide efficient and effective capital planning processes and maintenance programs
- Develop and implement efficient capital investment and operations programs
- Minimise waste disposal and maximise resource recovery.

**Our people**

- Provide a safe and enjoyable work environment which brings out the best in people
- Attract and retain a diverse, motivated, skilled and experienced workforce
- Encourage our people to develop and share knowledge gained from each other and stakeholders
- Implement a framework, which rewards employees' performance against the delivery of our business objectives.

**Relationships**

- Identify and meet customer service expectations
- Develop enduring partnerships with retail water businesses, developers and other customers through open and transparent communication
- Build cooperation with all levels of government and regulators
- Further develop programs to support corporate social responsibility
- Foster the exchange of knowledge with the community
- Develop collaborative relationships with suppliers to gain support for our sustainability principles.
- Engage and inform the community to seek its support for our projects and priorities.

**Our workplace**

- Foster a culture that encourages sustainable behaviour
- Ensure that sustainability principles underpin our workplace policies and practices
- Encourage and recognise innovation and ideas for sustainable improvements.

### 1.2.4 Scale of activities

Melbourne Water's revenues for 2006/07 are set out in Table 1.1.

**Table 1.1 - Melbourne Water revenue – 2006/07**

| Services | Revenue ($M) |
|---|---|
| Waterways and drainage | 140.1 |
| Drainage developer | 46.4 |
| River diversion licences | 0.2 |
| Water | 175.4 |
| Sewerage | 181.4 |
| Recycled water | 1.83 |
| Unregulated services | 48.5 |
| **Total** | **593.8** |

By the end of the current regulatory period, Melbourne Water will manage water, sewerage, waterway, drainage, recycled water and corporate assets worth more than $5.3 billion[4]. Melbourne Water's asset base includes:

- Around 8,400 kilometres of waterways, 221 water quality treatment systems, comprising 107 wetland systems; 67 sediment traps; 32 litter traps and 15 combined sediment and litter traps
- Nine major water supply reservoirs, with a total capacity of 1,773 GL; 64 service reservoirs; 1,030 kilometres of water distribution mains; more than 200 kilometres of aqueducts and tunnels; 44 water treatment plants
- 343 kilometres of sewers, two main sewage treatment plants (the Western Treatment Plant and the Eastern Treatment Plant), three major sewage pumping stations at Kew, Hoppers Crossing and Brooklyn, and several minor pumping stations
- 46 drainage, sewage and water pumping stations.

Melbourne Water's assets are characterised by long lives. In the case of waterway and drainage services, asset lives range from ten years (pump station instrumentation) to up to 100 years (treatment carrier drains). Melbourne Water also manages a large number of natural assets including rivers, creeks and 156,756 hectares of protected water supply catchments.

### 1.2.5 Private sector involvement

While Melbourne Water is owned by the State Government, it makes extensive use of the private sector to access specialist expertise and improve service efficiency. For example, in 2005/06 some 75% of operating expenditure and 99% of capital expenditure was outsourced to the private sector.

## 1.3 Waterways and drainage services

Melbourne Water is responsible for the provision of waterways, floodplain and drainage services across the Port Phillip and Westernport catchments.

Melbourne Water's operating area was extended by Order-in-Council in November 2005, to include parts of the Westernport, Werribee and Maribyrnong catchments, for which there was previously no designated regional authority responsible for managing waterways and drainage (as illustrated in Figure 1.2). In those areas, it was up to the combined efforts of State agencies, local government, landowners, catchment management authorities and community groups to carry out local improvements. Under the new arrangements outlined in the State Government's White Paper, Our Water Our Future, Melbourne Water has been designated the caretaker of river health and is responsible for waterway management, regional drainage and floodplain management, the management of the environmental water reserve, and water quality monitoring for the whole Port Phillip and Westernport region.

Melbourne Water generally manages and maintains waterways and main drains that serve sub-catchments greater than 60 hectares and local government manage the local drainage systems upstream, below this limit.

Through these institutional arrangements, Melbourne Water is able to ensure an integrated and coordinated approach to planning and managing the system across the region.

[4] Regulatory asset value as at the start of the 2008 regulatory period.

This is especially important because local government boundaries are generally not catchment related, and independent decisions in one municipality can have significant effects on downstream or adjacent areas.

**Floodplain management and drainage (including for developer services)**

Melbourne Water manages the quantity and quality of run-off from rural and urban catchments to ensure new development achieves a safe level of flood protection and undertakes actions to manage flooding to tolerable levels for existing communities. This is achieved by:

- Undertaking strategic planning for proposed development areas and establishing and maintaining schemes for new urban areas and areas where considerable redevelopment is expected
- Undertaking mapping activities to identify areas at risk of flooding and providing advice on flooding issues and onsite development to the general public, developers and prospective landowners
- Implementing planning controls to prevent flood risks from increasing by managing development in floodplains and overland flowpaths to protect these areas for storage and conveyance of floodwaters
- Building and operating infrastructure such as drains, levees, and retarding basins to contain, detain and convey stormwater or floodwater to minimise existing flood risks
- Operating a flood warning network.

**River health**

As caretaker of river health and the waterway management authority for the Port Phillip and Westernport catchment, Melbourne Water has overall responsibility for achieving healthy rivers, creeks and floodplains that meet the environmental, economic, recreational and cultural needs of current and future generations. This is achieved by:

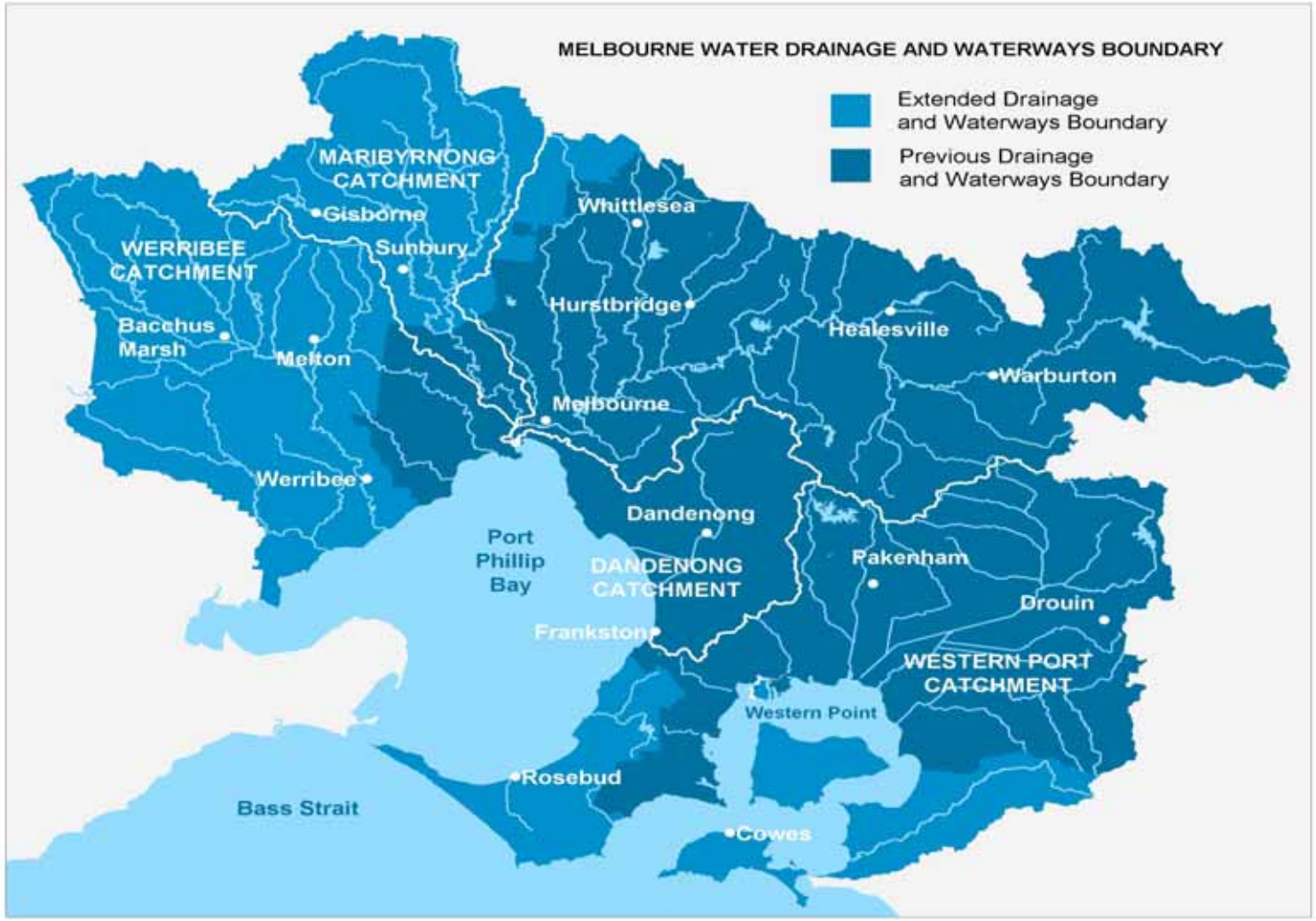
- Working with stakeholders and the community to manage practices that impact on waterway health
- Undertaking works programs to improve or create habitat, stabilise channels and improve water quality
- Ensuring development of land is planned to protect and enhance waterway values
- Managing the environmental water reserve
- For the Yarra catchment and several smaller western catchments, managing water extractions (diversions) to ensure that the needs of both our customers and the environment are met
- Implementing research and monitoring programs.

**Water quality**

As the caretaker of river health, Melbourne Water manages water quality and run-off from rural and urban catchments to protect the health of waterways and bays by:

- Working with stakeholders and the community to manage practices that impact on waterway and bay water quality
- Undertaking works to improve stormwater quality and rural run off entering waterways and bays
- Ensuring development and management of land is planned to protect waterway and bay water quality
- Implementing research and monitoring programs.

**Figure 1.2 Existing and extended service area**



Chapter 2
# Industry context

Melbourne Water has experienced a number of unanticipated changes in its operating environment since the Essential Services Commission set prices in mid 2005:

- Climate variability, the worsening drought and the introduction of tighter water restrictions has reduced revenues, increased operating costs and brought forward capital expenditure
- New legislative and regulatory obligations have seen material increases in expenditure
- There have been higher than planned increases in some input costs.

These considerations will continue to be important determinants of Melbourne Water's financial and non financial performance over the 2008 regulatory period.

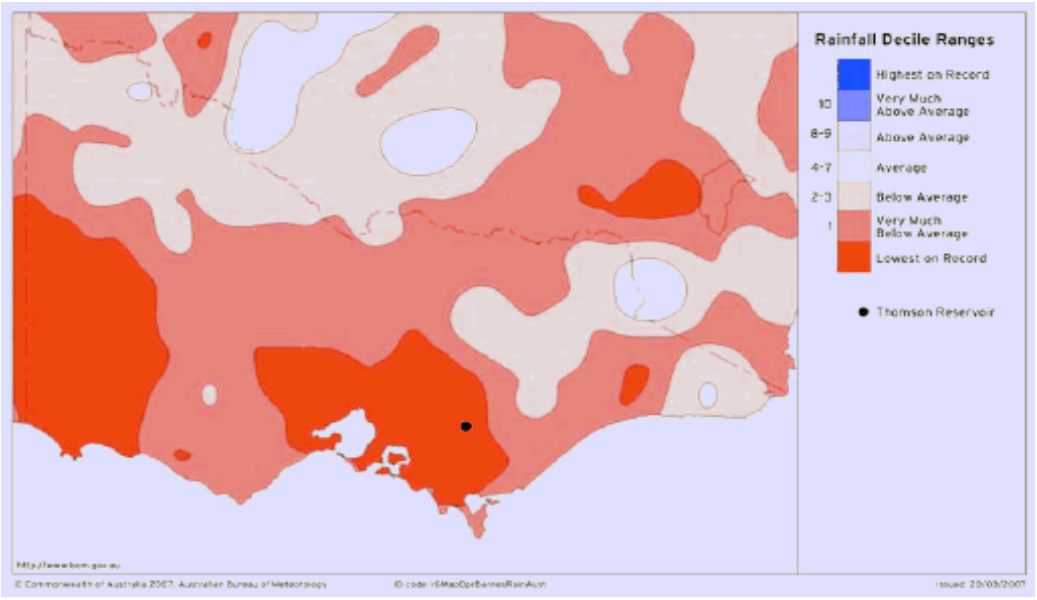
This chapter discusses factors that have impacted on business performance over the 2005 regulatory period and that are important to establishing business requirements and forecast expenditures for the 2008 regulatory period. Further information on the implications of these issues on Melbourne Water's financial and non-financial performance over the current regulatory period is provided in Chapter 3. Later chapters discuss their implications for the regulatory framework (Chapter 4), future business requirements (Chapter 5) and the associated capital and operating expenditures (Chapters 8 and 9).

## 2.1 Operating environment

### Climate uncertainty

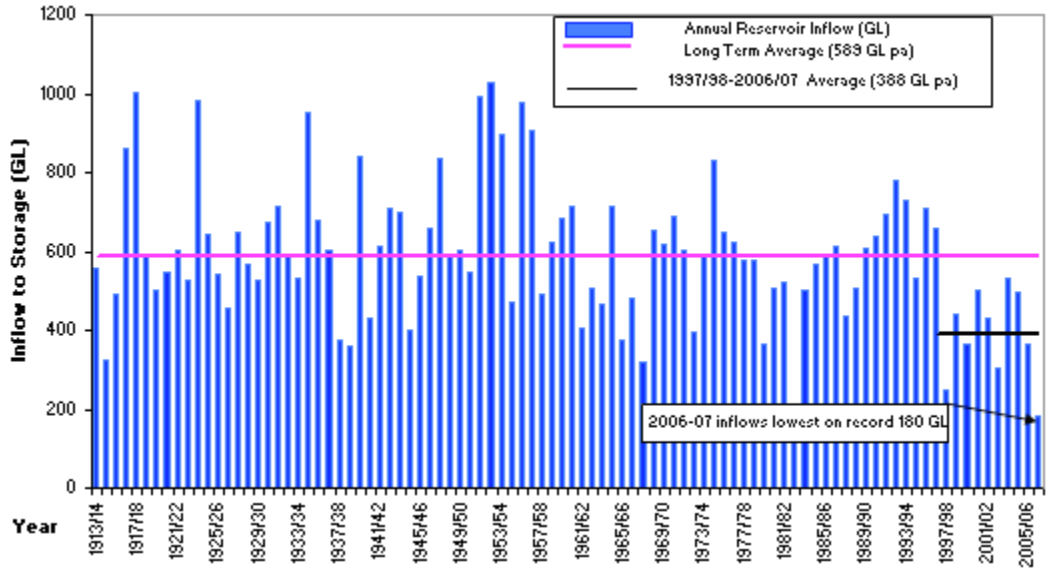
The last decade has seen some of the lowest rainfall on record across Melbourne's water supply catchments and its rivers and creeks (Figure 2.1). For example, Yarra River stream flows for the 2006 calendar year were the second lowest on record and for the period 1997/98 to 2006/07 were about 63% less than the long term average (1892/93 to 2006/07).

**Figure 2.1 – Rainfall deciles for Victoria – 1997 to 2006**



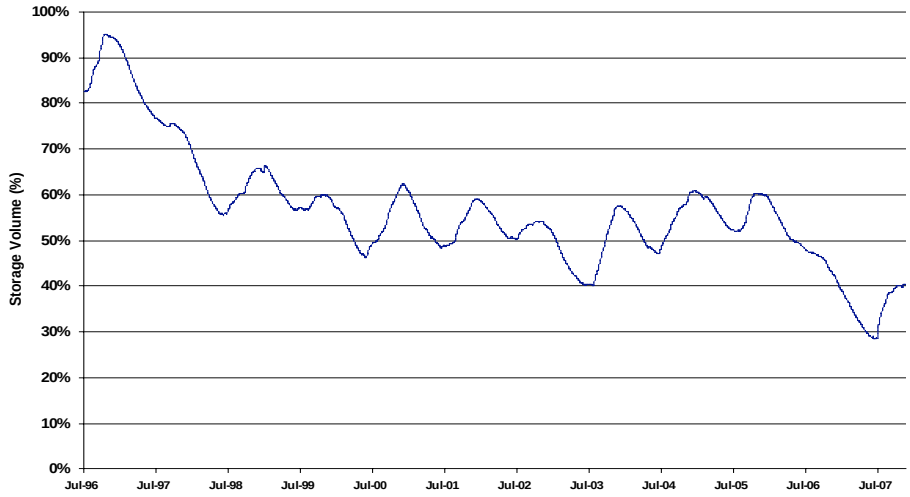

Inflows to Melbourne Water's major water storages for the 2006 calendar year were the lowest on record, while average inflows to Melbourne's four major harvesting storages for the period 1997/98 to 2006/07 were about 35% less than the long term average (1913/14 to 2006/07). This is illustrated in Figure 2.2.

**Figure 2.2 – Melbourne Water storage levels – 1913/14 to 2006/07**




The community has responded well, changing water use behaviour significantly and reducing per capita consumption by 22% on 1990s consumption levels. However, this behavioural change, along with increased water restrictions over the last 12 months, and a range of contingency measures implemented by Melbourne Water and the retail water businesses, has not fully offset the significant reduction of inflows and as a result Melbourne Water's storages have fallen significantly (Figure 2.3).

**Figure 2.3 – Melbourne Water storage levels – 1996/97 to 2006/07**




In addition to the effects of the drought, Melbourne has also experienced a number of major storms in recent times. Events in 2003, 2004, and 2005 led to localised flooding, disruption and property damage.

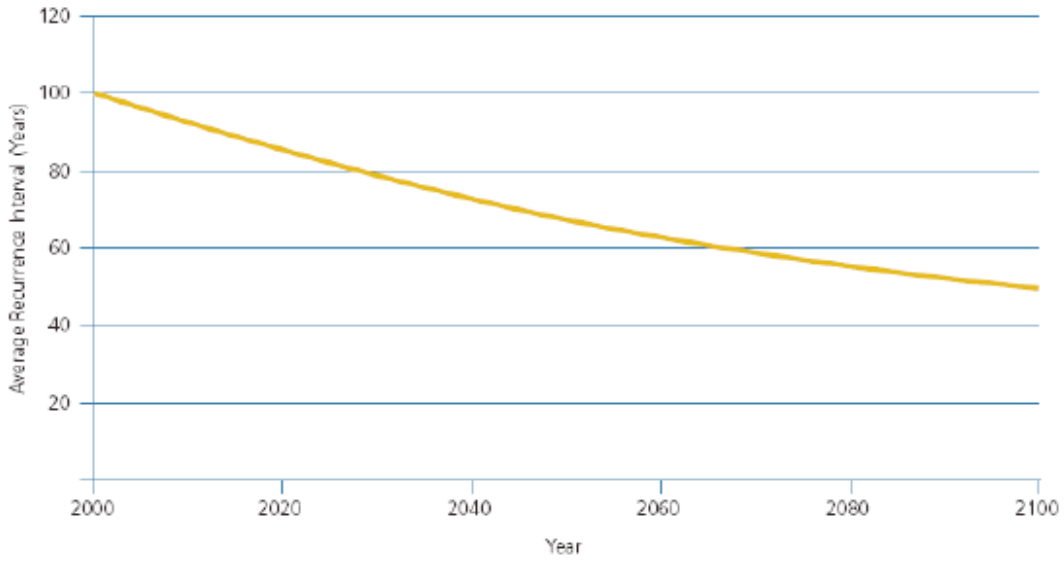
**Figure 2.4 - Localised flooding in 2005**

Dandenong Creek, Dandenong, 2005

Kororoit Creek, Deer Park, 2005

The Melbourne Climate Change Study was completed by CSIRO in March 2005. The study anticipates that while the amount of overall rainfall received each year is predicted to decrease, the rainfall may occur in more intense storm events rather than our normal winter and spring rains. This change in rainfall patterns is more likely to result in an increase in overland flows than riverine flooding because the short, sharp nature of these intense storms results in sudden large volumes of water. As illustrated in Figure 2.5, it is likely that storms that occurred on average every 100 years in 2000 are likely to occur once every 50 years by 2100, which could also result in more frequent flooding above existing floor levels.

**Figure 2.5 – Change in average storm recurrence intervals**




## Implications for Melbourne Water

Melbourne Water has previously been able to rely on historical records as a basis for planning for the future. Recent experience and an increasing body of scientific information[1] suggest that Melbourne may have experienced a "step" change in the frequency, magnitude, location and duration of our weather events. While there is still some uncertainty as to the exact size of this change, it is clear that there is a need for:

- Ongoing research on climate change/variability and its implications for water businesses
- Effective planning and investment that optimises the use of available water supplies, strikes an effective balance between community and environmental needs and includes appropriate provision for contingency measures
- Adaptive program delivery
- A regulatory framework that not only creates incentives for improved performance but also ensures a reasonable allocation of risks in an uncertain operating environment.

Melbourne Water's planned capital investment and forecast operating expenditure over the 2008 regulatory period incorporates measures to manage the impacts of climate change and prolonged drought (see Figure 2.6 and Figure 2.7 below)[2]. In particular, Our Water Our Future, The Next Stage in the Government's Water Plan contains a number of major water supply augmentations including:

- Funding construction of a seawater desalination plant which will provide up to an additional 150 GL per year by the end of 2011
- Constructing the Sugarloaf pipeline linking the Melbourne supply system to the Goulburn River and contributing to the Food Bowl Modernisation project to secure up to 75 GL per year by mid 2010

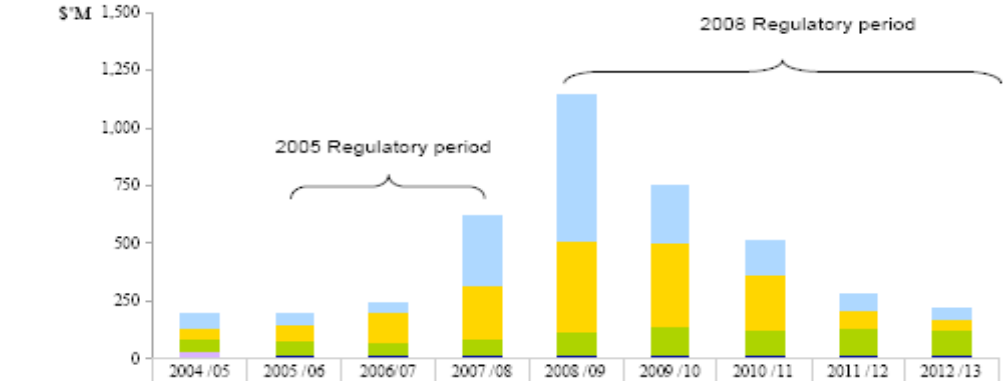
[1] For example, The Intergovernmental Panel on Climate Change's Fourth Assessment Report 2007 concludes that the evidence supporting warming of earth's climate system is unequivocal. The Melbourne Climate Change Study was completed by the Commonwealth Scientific and Industrial Research Organisation (CSIRO) in March 2005 and identified the potential for higher average and summer temperatures, reduced rainfall and more extreme weather events.

2 For the purpose of this Water Plan Melbourne Water has assumed that seawater desalination is delivered as a public private partnership (PPP)

- Constructing a water treatment plant at the Tarago Reservoir by the end of 2009 which will add around 15 GL to annual supply
- Upgrading the Eastern Treatment Plant to tertiary standard by 2012 to facilitate increased water recycling opportunities and improved environmental outcomes.

**Figure 2.6 – Actual and forecast Melbourne Water capital expenditure – 2004/05 to 2012/13**

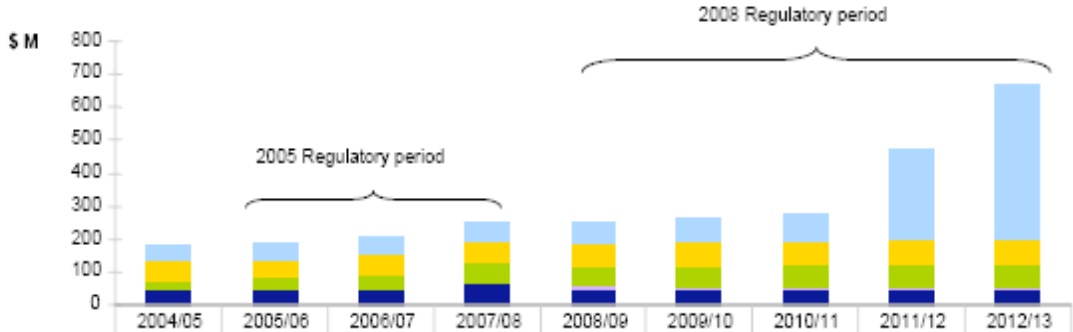
(2006/07 dollars)




| | 2004 /05 | 2005 /06 | 2006/07 | 2007 /08 | 2008 /09 | 2009 /10 | 2010 /11 | 2011 /12 | 2012 /13 |
|---|---|---|---|---|---|---|---|---|---|
| Water | 63.1 | 45.2 | 35.6 | 294.0 | 633.8 | 249.9 | 147.7 | 65.9 | 48.7 |
| Sewerage | 41.0 | 74.3 | 130.1 | 234.3 | 391.9 | 359.0 | 233.6 | 78.5 | 43.6 |
| Waterways | 58.6 | 59.5 | 58.7 | 72.3 | 99.0 | 124.7 | 112.5 | 114.5 | 105.0 |
| Recycled Water | 20.3 | 4.5 | 1.9 | 0.3 | 0.3 | 0.1 | 0.1 | 0.2 | 0.4 |
| Corporate | 8.0 | 9.2 | 10.7 | 14.2 | 16.6 | 17.0 | 13.7 | 17.4 | 17.2 |
| **Total Capex** | 190.9 | 192.6 | 237.0 | 615.0 | 1,141.6 | 750.7 | 507.6 | 276.7 | 214.8 |

**Figure 2.7 – Actual and forecast Melbourne Water operating expenditure – 2004/05 to 2012/13**

(2006/07 dollars)




| | 2004/05 | 2005/06 | 2006/07 | 2007/08 | 2008/09 | 2009/10 | 2010/11 | 2011/12 | 2012/13 |
|---|---|---|---|---|---|---|---|---|---|
| Water | 47.0 | 46.8 | 54.5 | 59.5 | 63.2 | 73.5 | 81.8 | 276.2 | 472.2 |
| Sewerage | 59.6 | 55.7 | 61.0 | 66.3 | 65.9 | 71.8 | 71.8 | 74.3 | 77.2 |
| Waterways | 30.0 | 36.3 | 47.0 | 58.9 | 63.9 | 64.0 | 66.8 | 67.6 | 67.8 |
| Recycled Water | 2.2 | 3.3 | 2.3 | 7.8 | 5.8 | 5.0 | 4.7 | 4.3 | 4.4 |
| Corporate | 44.5 | 45.6 | 44.1 | 62.3 | 51.9 | 51.3 | 51.0 | 51.4 | 51.7 |
| **Total Opex** | 183.3 | 187.7 | 208.9 | 254.7 | 250.7 | 265.6 | 276.0 | 473.9 | 673.3 |

Climatic conditions also pose challenges in delivering waterways and drainage services. Melbourne Water works in partnership with Government agencies, industries, landowners and the community to manage environmental flows for river health and to support a wide range of beneficial uses. The challenge for Melbourne Water is how to manage environmental flows given competing demands for water, particularly when a reduction in stream flows is anticipated with climate change.

The degree of impact on river health will depend upon the magnitude and variability of the change in stream flows. The current extreme drought has seen a temporary reduction in environmental flows. More frequent or intense droughts will require environmental flows to be carefully monitored and managed in consultation with Government and the community to avoid environmental decline of rivers and creeks. The current drought has also resulted in river diverters' access to water being restricted or suspended to avoid environmental impacts necessitating effective customer engagement and enforcement.

More frequent, intense storms in different locations have the potential to place increased demands on both Melbourne Water and local government stormwater assets. Further, as experienced in the 2005 regulatory period, there may be significant expenditures associated with responding to the effects of flooding where there is inadequate provision for overland flows. Increasing urbanisation is also likely to increase run-off, and infrastructure upgrades may be necessary to preserve required service levels.

The effects of climate change on the intensity and duration of storms are not well understood. The challenge, therefore, is to develop a greater understanding of the likely timing and impacts of climate change to enable the development of appropriate adaptation strategies.

### New obligations

Melbourne Water's operating environment has also changed as a result of ongoing industry reform and policy development that was not known at the time of the Commission's 2005 Price Determination. For example, additional expenditures have arisen from:

- Undertaking initiatives in the Yarra River Action Plan to reduce the environmental impact of stormwater on waterways in urban areas
- Managing waterway environmental flows in line with newly established bulk entitlements and environmental entitlements

### Industry wide cost increases

Unanticipated industry wide increases in some key input costs have, and will, impact on expenditure levels and financial performance. For example, infrastructure providers in Australia, including water, electricity, gas and transport businesses, have, and will continue to, experience significant construction cost pressures. Industry wide increases are also being experienced in labour and contract rates.

Chapter 3

# Outcomes over the 2005 regulatory period

- Melbourne Water has achieved a high level of compliance with targets set as part of the Commission's 2005 Price Determination.
- Actual capital and operating expenditure is expected to be higher than forecast in the 2005 Price Determination due to emerging challenges, including:
- New legislative and regulatory obligations
- Extension of services to Melbourne Water's new boundary areas
- Increased costs for existing projects and business as usual activities.

This chapter discusses Melbourne Water's progress in delivering waterway and drainage service outcomes set as part of the Commission's 2005 Price Determination. Actual and forecast capital and operating expenditures associated with delivery of these outcomes and the reasons for variances from benchmarks provided in the Price Determination are also examined, along with actual demand outcomes and progress in delivering key capital projects. The chapter also discusses the impact of changes in legislative and regulatory obligations over the 2005 regulatory period and lessons that can be applied to the 2008 regulatory period.

The service outcomes, capital and operating expenditures set as part of the Commission's 2005 Price Determination were based on the best available information at that time. Additional information and changes in circumstances have impacted on Melbourne Water's achievement of these benchmarks. As highlighted in the previous chapter, the current operating environment for Melbourne Water has shifted since the Commission made its 2005 Price Determination. This includes:

- Policy development such as the announcement of the State Government's Our Water Our Future and Yarra River Action Plan and release of the Central Region Sustainable Water Strategy (CRSWS)
- Changes in regulatory and legislative requirements (e.g. introduction of the Water (Resource Management) Act 2005).

As part of ongoing planning and risk management activities, new information continues to be used to identify the optimal manner in which to meet required outcomes. This includes asset condition, operational and cost information.

## 3.1 Service outcomes

The Commission's 2005 Price Determination detailed the approved service outcomes to be delivered over the 2005 regulatory period.

This section sets out relevant key performance indicators, actual results achieved in the first two years of the 2005 regulatory period and additional information relating to these results.

Tables 3.1 and 3.2 set out actual and target key performance indicator results for waterways and drainage services over the 2005 regulatory period.

Chapter 3

# Outcomes over the 2005 regulatory period

**Table 3.1: Percentage achievement of three year targets**

| Key Performance Indicator | Progress towards three year target (%) 2005/06 | 2006/07 | Three year target (no.) 2007/08 |
|---|---|---|---|
| **Waterways condition** | | | |
| Regional River Health Strategy | | | |
| – rivers with negotiated environmental flow regimes | 40% | 67% | 6 |
| – rivers with improvements made to environmental flow regimes | 57% | 75% | 8 |
| – area of streamside land under management agreements | 20% | 55% | 500 Ha[1] |
| – length of streamside land revegetated | 46% | 76% | 260 km |
| – barriers where fish passage is improved | 30% | 40% | 10 |
| – length of river subject to streamside weed control | 37% | > 100% | 300 km |
| – plans developed for rivers and creeks of high social value | 100% | > 100% | 2 |
| – rivers where heritage values are protected or improved | 67% | > 100% | 15 |
| – plans developed for rivers and creeks of high environmental value | 100% | > 100% | 2 |
| – investigations to fill data gaps in high value or high risk rivers or creeks | 100% | > 100% | 6 |
| – sites subject to bed and bank stabilisation | 35% | > 100% | 20 |

**Table 3.2: Performance against annual targets**

| Key Performance Indicator | 2005/06 | | 2006/07 | | 2007/08 |
|---|---|---|---|---|---|
| | 2005 Water Plan target | Actual | 2005 Water Plan target | Actual | 2005 Water Plan target |
| **Drainage and flood protection** | | | | | |
| – flood prone floors that are protected[2] | 32 | 52 | 36 | 52 | 81 |
| – development applications processed within timeframe | 100% | 100% | 100% | 100% | 100% |
| – planning controls: percentage of new properties meeting new flood protection | 100% | 100% | 100% | 100% | 100% |
| – planning controls: number of flood prone properties in redevelopment areas reduced (approximate number) | 250 | 250 | 250 | 267 | 250 |
| **Stormwater quality** | | | | | |
| – cumulative reduction in nitrogen loads to Port Phillip Bay from wetlands | 37 tonne | 52 tonne | 56 tonne | 54.5 tonne | 59 tonne |
| **Diversion services** | | | | | |
| – number of licences greater than 5ML/year metered or assessed for metering at 30 June | 640 | 642 | 732 | 704 | 732 |

[1] The target for area of streamside land under management agreements was originally incorrectly specified as five hectares. The target was revised following discussions with the Commission.

[2] The yearly targets for 2005/06 – 2007/08 were revised following discussions with the Commission.

Chapter 3

# Outcomes over the 2005 regulatory period

## Waterways condition

As detailed in Table 3.1, Melbourne Water has made good progress towards achieving its end of period targets in relation to the Regional River Health Strategy [3] specified in the Commission's 2005 Price Determination.

In addition, Melbourne Water has been able to meet and exceed a number of the targets in the first two years of the 2005 regulatory period by achieving better service outcomes within the expenditure approved by the Commission.

The Regional River Health Strategy assigns five year implementation targets to Melbourne Water that contribute to the ten year goal to have 50% of waterways in good or better condition. The implementation targets involve maintenance, waterway restoration works and community programs and are prioritised using an asset valuation and risk-based decision support tool.

The three year outcomes for the 2005 regulatory period were estimated from the five year implementation targets with some difficulty due to the non-linear and longer term nature of implementing and measuring results of waterway improvement works and programs. Additional monitoring, research and "hands on" experience has seen Melbourne Water's understanding of implementation actions increase compared to the initial compilation of the 2005 Water Plan. Melbourne Water's proposed targets for the 2008 regulatory period have been adjusted to reflect these learnings and achievements from the 2005 regulatory period.

## Drainage and flood protection

Melbourne Water has achieved all drainage and flood protection targets specified in the Commission's 2005 Price Determination for 2005/06 and 2006/07 (see Table 3.2).

To improve response times for processing development applications, the current information technology processing system was upgraded in 2006 with a further upgrade planned before the end of the 2005 regulatory period to streamline the approval process.

Through the use of planning controls all new development is currently complying with flood protection standards [4] and the number of flood prone properties was reduced by 250 [5] (2005/06) and 267 (2006/07) as a result of Melbourne Water placing conditions on proposals for redevelopment on flood prone land.

## Stormwater quality

The target for reduction in nitrogen loads to Port Phillip Bay from wetlands was met in 2005/06, with an annual reduction of 21.3 tonnes in nitrogen to give a cumulative reduction of 52 tonnes [6]. Nitrogen loads arising from the impact of urban stormwater run-off to Port Phillip Bay have been reduced using water quality improvement infrastructure (e.g. wetlands). The result for 2006/07, however, is slightly short of the target as a result of delays experienced in completing the revegetation phase of some projects due to poor planting conditions arising from the drought. The program to achieve nitrogen reduction targets has been reviewed and further wetlands and projects are planned for the remainder of the 2005 regulatory period.

[3] These targets do not cover Melbourne Water's extended areas which were included in its operating area subsequent to the Commission's 2005 Price Determination.

[4] As set out in Melbourne Water's Guidelines for Development in Flood Prone Areas.

[5] A further 50 floors were deemed as potentially being protected through conditions placed on redevelopment. However, due to insufficient information available to determine whether the previously existing buildings were flood prone, these were not included in the 250 properties counted as meeting the target.

[6] This is a cumulative target that was carried over into the 2005 regulatory period.

### Diversion services

The target in 2005/06 for the number of licences greater than 5ML per year metered, or assessed for metering, has been met. However, the target for 2006/07 was not met due to delays in the supply of additional meters by the supplier and diversion of resources to urgent drought related projects.

## 3.2 Actual capital expenditure outcomes

The Commission's 2005 Price Determination outlined its assessment of the capital expenditures associated with achieving the outcomes detailed in section 3.1, as well as with delivering the complete Capital Plan for waterways and drainage services. This section sets out the reasons for variations between the capital expenditure forecasts allowed by the Commission in the 2005 Price Determination and the actual expenditures for 2005/06 and 2006/07 and revised forecasts for 2007/08 [7].

As noted in section 3.1, Melbourne Water has, in the main, delivered the service outcomes detailed in the Commission's 2005 Price Determination. However, delivering these outcomes and accommodating new obligations is expected to see Melbourne Water spend $34.7 million more than the allowance provided by the Commission for the 2005 regulatory period (including corporate allocations). Further information in relation to new obligations is provided in Chapter 5.

Figure 3.1 illustrates, at an aggregate level, these higher than planned capital expenditures over the 2005 regulatory period, which are driven by:

- New regulatory obligations not included in the 2005 Water Plan in relation to implementing initiatives in the Yarra River Action Plan to reduce the environmental impact of stormwater on waterways in urban areas ($0.9 million)
- Additional expenditure related to the extension of Melbourne Water's waterway boundary ($11.9 million) which was not included in the Commission's 2005 Price Determination given the timing of the Government's decision to extend Melbourne Water's operating area and the uncertainty regarding future expenditure requirements. As directed by the Commission in its June 2005 Final Decision, Melbourne Water has ring fenced the additional extended area expenditures for recovery through prices in the 2008 regulatory period
- Higher than expected expenditure ($31.6 million) on developer-funded drainage growth works due to:
  - Higher than anticipated levels of industrial land development activity requiring capital works to be brought forward
  - Increased land acquisition costs for retarding basins and wetlands
  - Increased costs of meeting environmental standards and heritage requirements.

Melbourne Water has in place processes to ensure that the additional capital expenditures incurred over the 2005 regulatory period are prudent and efficient. This includes its competitive tendering processes, capital planning and delivery framework and its asset management system[8].

The drivers of increased capital expenditures are offset by reductions in Regional River Health Strategy expenditures and nitrogen water quality treatment works over the 2005 regulatory period ($11.8 million) due to project delays.

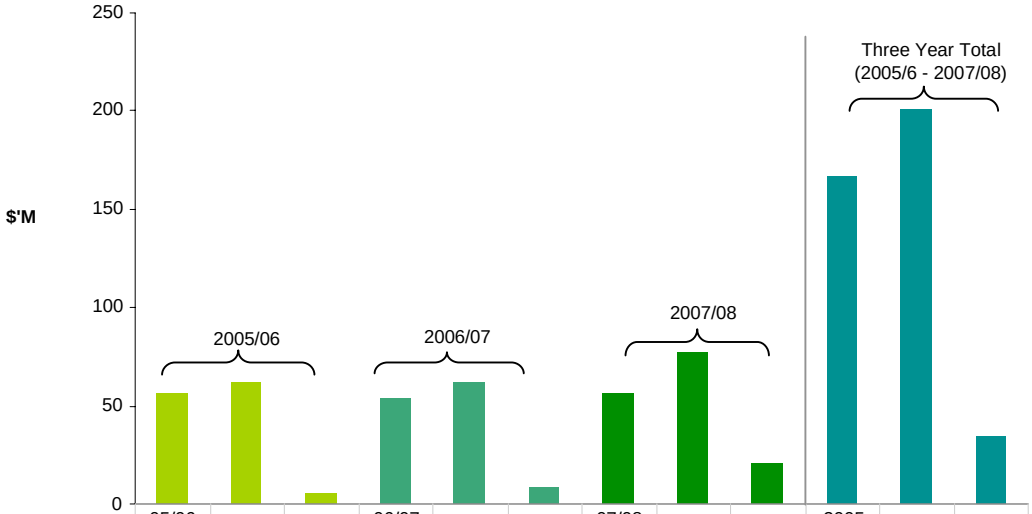
[7] For 2007/08 the forecasts are based on Corporate Plan forecasts.

[8] Further information in relation to these processes, and actions taken to ensure continuous improvement in processes around capital planning, estimation and delivery, is provided in Chapters 7 and 8.

The project delays have resulted in nitrogen reduction loads falling slightly short of the 2006/07 performance target. Delays in project delivery have been attributed to building the necessary capacity to plan and deliver an extensive waterway improvement works program comprised of a large number of small value projects which are dependant on weather conditions and require building relationships with landowners to access waterways. A subsequent review of project planning processes has been undertaken and improvements implemented to increase the capital planning and delivery capabilities for waterways related works.

There are no material variances in corporate related capital expenditures.

**Figure 3.1: Waterways and drainage capital expenditure – 2005/06 to 2007/08**




| | 05/06 Water Plan | 05/06 Actual | 05/06 Variance | 06/07 Water Plan | 06/07 Actual | 06/07 Variance | 07/08 Water Plan | 07/08 Forecast | 07/08 Variance | 2005 Water Plan | Actual Total | Variance Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Waterways | 56.5 | 62.3 | 5.8 | 53.8 | 62.0 | 8.2 | 56.2 | 76.9 | 20.6 | 166.5 | 201.2 | 34.7 |

## 3.3 Actual operating expenditure outcomes

The Commission's 2005 Price Determination outlined the operating expenditure associated with achieving the outcomes detailed in the 2005 Water Plan. This section sets out the reasons for variations between the operating expenditure forecasts allowed by the Commission in the 2005 Price Determination and the actual expenditures for 2005/06 and 2006/07 and revised forecasts for 2007/08[9].

Melbourne Water's operating expenditures are expected to exceed the expenditures allowed by the Commission in its 2005 Price Determination (including corporate allocations) by $41.4 million. Figure 3.2 illustrates, at an aggregate level, the higher than planned operating expenditures over the 2005 regulatory period which are driven by:

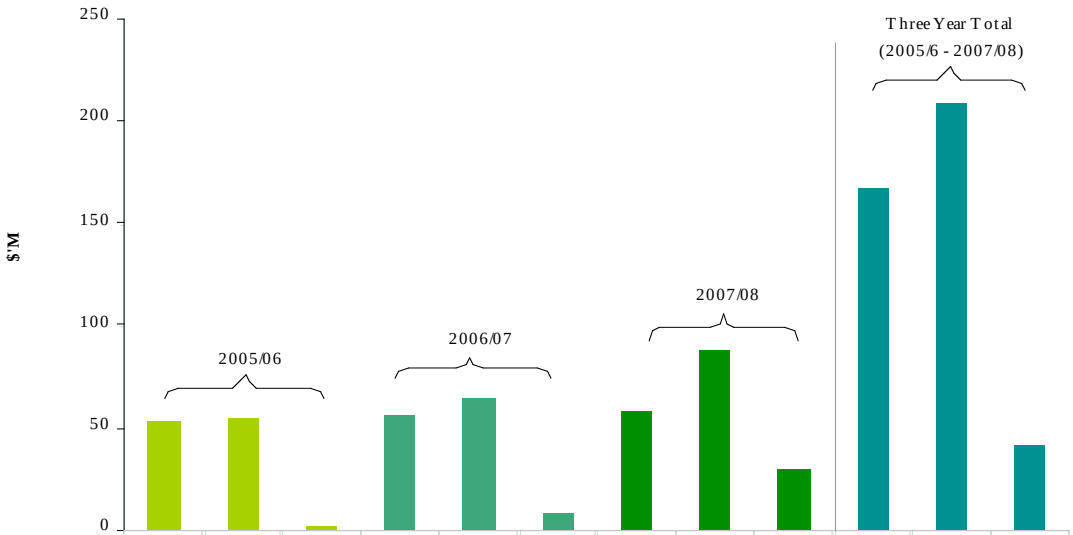
- New legislative and regulatory obligations not included in the 2005 Water Plan, in particular:
  - Implementing initiatives in the Yarra River Action Plan to reduce the environmental impact of stormwater on waterways in urban areas ($10.9 million)
  - Managing environmental flows in line with newly established Environmental Entitlements, as the Manager of Environmental Reserves ($0.5 million)

[9] For 2007/08 the forecasts are based on Corporate Plan forecasts.

- Additional expenditure related to the extension of Melbourne Water's waterway boundary ($19 million)[10]
- An increase in business as usual expenditure as a result of:
  - Higher than planned expenditure for labour. This is driven by pay increases above the 3.5% allowed in the Commission's 2005 Price Determination consistent with Melbourne Water's Enterprise Agreement and by additional labour as the business positions itself to meet its obligations over the 2008 regulatory period ($3.6 million)
  - Higher civil maintenance costs ($5.6 million). This includes additional clean up costs associated with the 2005/06 floods and more maintenance for the increasing number of wetlands and retarding basins (e.g. desilting)
  - One off corporate costs associated with implementing drainage rate reform in Melbourne Water's existing waterways and drainage boundary area (estimated $2.8 million) [11].

The drivers of increased operating expenditures are offset by cost savings through efficiency initiatives and project reprioritisation.

**Figure 3.2: Waterways and Drainage Operating Expenditure – 2005/06 to 2007/08** [12]




| | 05/06 Water Plan | 05/06 Actual | 05/06 Variance | 06/07 Water Plan | 06/07 Actual | 06/07 Variance | 07/08 Water Plan | 07/08 Forecast | 07/08 Variance | 2005 Water Plan | Actual/ Forecast | Variance Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Waterways | 53.1 | 54.6 | 1.5 | 56.4 | 65.6 | 9.2 | 57.9 | 88.6 | 30.7 | 167.4 | 208.7 | 41.4 |

[10] Extended area expenditures were not included in the Commission's 2005 Price Determination given the timing of the Government's decision to extend Melbourne Water's operating area and the uncertainty regarding future expenditure requirements. As directed by the Commission in its June 2005 Final Decision, Melbourne Water has ring fenced the additional extended area expenditures which are eligible to be recovered through prices in the 2008 regulatory period. Expenditure includes estimate costs associated with introducing charges from 2008/09.

[11] Preliminary estimate will be revised following further consultation with retail water businesses.

[12] 2007/08 figures are based on Corporate Plan forecasts.

## 3.4 Demand outcomes

Melbourne Water's waterways and drainage customer numbers (excluding Melbourne Water's extended waterways area[13]) are expected to grow to 1.5 million by the end of the 2005 regulatory period, consistent with the forecast used by the Commission in its 2005 Price Determination. Table 3.3 illustrates a minor difference between 2005 Water Plan forecasts and actual customer numbers over the 2005/06 to 2006/07 period.

**Table 3.3: Actual and forecast waterway and drainage customer numbers**

| | 2005/06 | | 2006/07 | | 2007/08 |
|---|---|---|---|---|---|
| | 2005 Water Plan forecast | Actual | 2005 Water Plan forecast | Actual | 2005 Water Plan forecast |
| **Number of customers**[14] | 1,452,018 | 1,458,708 | 1,475,503 | 1,485,825 | 1,498,887 |

In relation to the cash contributions received by Melbourne Water from the development industry for the construction of drainage infrastructure to service urban growth, forecast contributions for the 2005 regulatory period are expected to be $13.7 million higher than forecasts used by the Commission in its 2005 Price Determination (excluding Melbourne Water's extended waterways area). This is a result of higher than anticipated levels of industrial land development activity occurring due to favourable economic conditions.

Table 3.4 outlines developer cash contribution comparisons between 2005 Water Plan forecasts and actual numbers over the 2005/06 to 2006/07 period.

**Table 3.4: Actual and forecast developer cash contributions[15] (2006/07 dollars)**

| | 2005/06 | | 2006/07 | | 2007/08 | |
|---|---|---|---|---|---|---|
| | 2005 Water Plan forecast ($M) | Actual ($M) | 2005 Water Plan forecast ($M) | Actual ($M) | 2005 Water Plan forecast ($M) | Forecast ($M) |
| **Developer cash contributions** | 30.2 | 31.4 | 31.1 | 36.2 | 30.9 | 38.3 |

[13] Properties within Melbourne Water's extended waterways and drainage boundary areas were not included in the Commission's 2005 Price Determination.

[14] The mid-point has been applied to actual year end property numbers to ensure consistency with the methodology used to calculate 2005 Water Plan forecasts.

[15] 2007/08 figure is based on Corporate Plan forecasts.

Chapter 3

# Outcomes over the 2005 regulatory period

## 3.5 Delivery of key capital projects

The Commission outlined in its 2005 Price Determination the key waterways and drainage capital projects that Melbourne Water would undertake over the 2005 regulatory period.

Table 3.5 summarises Melbourne Water's progress as at March 2007 in delivering these projects over the 2005 regulatory period.

**Table 3.5: Major capital projects**

| Product/Project | Outputs to be achieved in the 2005 regulatory period | Current status as at March 2007 |
|---|---|---|
| **Waterways and Drainage** | | |
| **Waterways Restoration Program and Waterways Strategy** | Progress with implementing actions from Regional River Health Strategy. | See discussion in section 5.1.1. |
| **Bunyip River Restoration Allocation** | Major reshaping and levee bank restoration of the entire 14km to be completed by the end of 2007/08. Minor instream, minor bed and bank stability work to commence. Progress review to be undertaken for implementation strategy. | Final stage of the major levee reconstruction (south bank between 11 Mile and 13 Mile Rds) will be completed by June 2008 once planning issues are resolved with the Shire of Cardinia.<br>Review of implementation plan completed in 2006. Development of a Vegetation Management Plan has commenced. |

## 3.6 Changes in legislative and regulatory obligations

Since the Commission made its 2005 Price Determination, there have been several changes to the legislative and regulatory obligations that apply to Melbourne Water's waterways and drainage services. New obligations to date require additional operating expenditure of $11.4 million and financing costs of $0.02 million over the 2005 regulatory period. Table 3.6 sets out the nature and date of these changes, the outcomes that Melbourne Water must now deliver and the associated net operating costs.

As indicated by the Commission, these changes will be taken into account in determining prices for the 2008 regulatory period, where the net impact represents 2.5% of a business's total revenue over the regulatory period, or $1 million, whichever is greater.

However, at this stage it appears unlikely that when combined with other whole of business expenditures incurred to meet changes in legislative and regulatory obligations ($25.1 million), Melbourne Water will not meet the 2.5% revenue threshold established by the Commission.

This threshold is approximately $39.5 million, which equates to approximately 6% of Melbourne Water's allowed return on assets (profit) in the 2005 Water Plan. Melbourne Water notes that despite delivering the outcomes required by these new obligations, it will not be able to recover these additional operating and financing costs incurred within the regulatory period. Melbourne Water considers that 6% of its profit is material and that the threshold is, therefore, too high. It believes that the current threshold does not appropriately allocate risks between itself and its users, and also adversely impacts on returns to shareholders. This is discussed further in Chapter 4.

**Table 3.6: Additional waterways and drainage legislative and regulatory obligations for the 2005 regulatory period[16]**

| Additional obligations | Instrument and date of effect | Outcomes to be delivered | Operating costs ($M) | Financing costs ($M) |
|---|---|---|---|---|
| **Manage environmental flows in line with new established Environmental Entitlements** | Water (Resource Management) Act 2005 No. 99/2005<br>December 2005 | Manage environmental flows to maximise ecological benefits and operate the water supply system in line with the environmental requirements | 0.5 | – |
| **Undertake initiatives in the Yarra River Action Plan to reduce the environmental impact of stormwater on urban waterways** | Statement of Obligations Clause 23.2<br>July 2007 | Reduced stormwater pollution from catchments draining into the Yarra River | 10.9 | < 0.1 |
| **Total** | | | **11.4** | **< 0.1** |

Melbourne Water considers that the additional expenditure it has incurred, and will incur, in relation to these new obligations is efficient and reflects a least cost outcome. This expenditure was not incorporated in the 2005 Water Plan and Melbourne Water was not already meeting the higher level of service now required.

## 3.7 Lessons for the 2008 regulatory period

Experience over the 2005 regulatory period has established that:

- Uncertainty is created by the changing legislative and regulatory obligations, which in turn increases the difficulty associated with accurately forecasting capital and operating expenditures
- Improved information within the regulatory period can lead to changing cost estimates, reprioritisation of projects and additional projects being bought on line
- The Commission's current approach to assessing new obligations under a 2.5% revenue threshold can materially impact on a business' financial performance, as higher service standards or additional outcomes must be delivered but businesses are unable to reach the threshold and recover the associated costs
- It is realistic to expect that in the current environment, the above issues will continue in the 2008 regulatory period.

In chapter 4, Melbourne Water outlines its views in relation to the appropriate framework for economic regulation over the 2008 regulatory period. These views have been informed by the lessons learned during the 2005 regulatory period.

The proposed framework reflects the need for flexibility in a changing and uncertain environment and is consistent with the principles of optimal risk allocation, including that, where risk is unmanageable, it should be allocated to those parties best able to absorb the risk.

[16] Table 5.7 does not include the additional obligations that Melbourne Water now has in relation to the extended area for waterways and drainage services. These obligations require Melbourne Water to provide its existing waterways and drainage services in these new areas (parts of the Westernport, Werribee and Maribyrnong catchments). As agreed with the Commission at the time of the 2005 Price Determination, these obligations and the associated additional expenditures have been ring fenced and the additional costs will be recovered during the 2008 regulatory period. Additional expenditure arising from introducing Melbourne Water's Rural Customer Charter have also been omitted from Table 3.6 as 2007/08 requirements are still being discussed with the Commission.

Chapter 4

# Framework for economic regulation

Independent economic regulation of the Victorian water sector is in its fourth year and while much has been achieved, further refinement is possible to strengthen incentives for improved performance, allocate risks appropriately and minimise compliance costs.

Melbourne Water supports moving to a longer regulatory period. In doing so, the framework applied to waterways and drainage services should include a revised end-of-period pass through mechanism for additional regulatory obligations arising once the 2008 regulatory period has commenced.

Refinements are also proposed to the Commission's approach for determining the regulatory asset value at 1 July 2008, as well as assessing new obligations and operating cost efficiency improvements.

This chapter identifies the nature of the uncertainties facing Melbourne Water and outlines the regulatory mechanisms Melbourne Water believes are necessary to manage these uncertainties. It also sets out Melbourne Water's views on the appropriate basis for determining the regulatory asset value at 1 July 2008.

## 4.1 Challenges associated with the current operating environment

Chapter 2 outlined the following unanticipated changes in Melbourne Water's operating environment since the Commission set prices in mid 2005:

- Climate variability and the worsening drought
- New legislative and regulatory obligations
- Higher than planned increases in some input costs.

As discussed in Chapter 2, these factors have impacted on performance over the current period and contribute to both the level and potential variance in expenditures over the next regulatory period. Melbourne Water continues to review and improve its forecasting methodologies as new information becomes available. However, it is realistic to expect that there will be a significant level of uncertainty with respect to business requirements and costs during the 2008 regulatory period.

## 4.2 Approach to managing risks and uncertainties

The regulatory framework should be designed to create meaningful and achievable incentives for businesses to deliver improved performance to customers. This should include sound risk allocation. Inappropriate risk allocation could lead to inefficient investment and resource use, and stifle innovation.

As the next regulatory period for waterway services is expected to be five years, it will be particularly important to ensure there are appropriate mechanisms to enable water businesses to deal with any significant risks and uncertainties that may arise over that period. This includes risks and uncertainties around obligations, demands and the timing and cost of small number of very large capital projects.

Melbourne Water considers it is important to distinguish between risks for which a business may be expected to have some understanding of the likelihood of the event occurring and uncertainties, which are essentially unknowns. The principle of optimal risk allocation suggests that risks should be allocated to those parties who are best able to manage the risk and that where the risk is unmanageable that it is allocated to those parties best able to absorb the risk.

In terms of uncertainties, the current climatic conditions and potential for ongoing drought are outside historical planning expectations. Melbourne Water considers that this uncertainty will not be fully manageable through the normal reprioritisation of projects and cost estimation approaches.

In its March 2007 Guidance Paper, the Commission accepted that the regulatory framework should include adjustment mechanisms that deal with uncertainty around demand, predetermined major projects under consideration by the State Government at the time of any determination, and not yet decided upon, as well as material changes or the introduction of legislative obligations during the regulatory period. The Commission also listed the following possible mechanisms for dealing with uncertainty:

- Re-opening of the determination triggered by particular materiality thresholds or triggers
- Predetermined pass throughs
- Forms of price control
- Mid period reviews.

Taking account of experiences over the 2005 regulatory period and in light of expected future uncertainties, Melbourne Water supports retention of an end-of-period pass through mechanism for additional legislative or regulatory obligations. However, it considers that the materiality threshold should be revised to 1% of waterways and drainage revenues over the regulatory period, instead of the current 2.5% of total revenues.

Melbourne Water notes that on a business wide basis the current 2.5% threshold of revenues over the regulatory period equates to approximately 6% of the Commission's allowed return on assets (profit) in the 2005 Water Plan. Melbourne Water believes that the current threshold places an unacceptable level of risk on it given experiences over the current regulatory period and the fact that it has a limited ability to manage the introduction of new obligations.

As detailed in Chapter 3, the new obligations placed on Melbourne Water's waterways and drainage services since the 2005 regulatory period total more than $11 million (operating expenditure and unfunded financing costs). This figure increases to $25.1 million when additional water and sewerage obligations are also considered and represents approximately 57% of the 2.5% materiality threshold. It also represents approximately 3.1% of Melbourne Water's return on assets allowed by the Commission in the 2005 Water Plan.

Further expenditure as a result of additional obligations, over which in many cases the business has little influence, may result in:

- Increased borrowings, with less scope to do so without affecting the financial viability of the business
- Reduced returns to shareholders.

Melbourne Water has also previously noted its support for a within period pass through mechanism for certain predetermined major projects which are either in the very early stages of development or are still being considered by Government or regulatory agencies. While appropriate for a number of major water supply projects (e.g. the Sugarloaf Pipeline) and sewerage projects (e.g. the Eastern Treatment Plant tertiary treatment upgrade), current information suggests that there are no uncertain waterways and drainage projects that are sufficiently large enough to warrant application of this mechanism.

Melbourne Water considers that over the 2008 regulatory period individual price caps should be applied to its waterways prices provided a revised end-of-period pass through mechanism is incorporated into the regulatory framework to manage uncertainty and ensure optimal risk allocation. An alternative price control mechanism is likely to be sought in the event that the revised pass through mechanism is not incorporated into the regulatory framework and/or the Commission's draft decision on expenditures and demands is materially different to Melbourne Water's proposals.

Melbourne Water considers that its proposed approach appropriately balances the Commission's competing objectives in relation to protecting customers, minimising administrative costs of making pricing adjustments, protecting business' financial viability and creating incentives for efficient investment and system operation.

## 4.3 Opening regulatory asset value

The opening regulatory asset value is a key input to determining prices for a given regulatory period.

In its March 2007 Guidance Paper, the Commission noted its preferred approach to determining the regulatory asset base at 1 July 2008 is to use the actual capital expenditure, contributions and proceeds from disposals for the period from 1 July 2004 to 30 June 2006, and the forecasts of 2007/08 capital expenditure, contributions and proceeds from disposals used in the Commission's 2005 Price Determination. The regulatory depreciation used in determining the opening regulatory asset value is that forecast in the Commission's 2005 Price Determination. The Commission proposed that an adjustment would be made in 2013 for any difference between assumed and actual net capital expenditure for 2007/08 when the opening regulatory asset value is calculated for the next regulatory period.

However, the Commission also noted that it would be willing to consider the use of updated forecasts for 2007/08 where water businesses are able to present a compelling case for doing so.

Melbourne Water proposes to use updated capital expenditure forecasts for 2007/08 in determining the regulatory asset value at 1 July 2008. These forecasts are based on updated information, as are the actual capital expenditures for 2005/06 and 2006/07, and reflect Melbourne Water's changed operating environment as well as improved asset condition and operational information.

As discussed in Chapter 3, the current capital expenditure forecasts for 2007/08 waterway and drainage services are around $34.7 million higher than the estimate in the Commission's 2005 Price Determination. This significant and unanticipated increase has largely been driven by new obligations not included in the Commission's 2005 Price Determination, the extension of Melbourne Water's waterways and drainage operating boundary and increased developer-funded drainage growth works.

## 4.4 Approach to assessing expenditures

This section discusses Melbourne Water's positions on:

- Provision of information on expenditure associated with new obligations
- The approach for assessing efficiency improvements.

### 4.4.1 Information on new obligations

The Commission has defined new obligations as those that come into effect from 1 July 2008. It has indicated that the intent of distinguishing between the costs associated with business as usual and new obligations is to transparently identify the additional costs associated with regulatory decisions that are expected to take effect over the 2008 regulatory period.

The Commission has also indicated that the expenditure assessment process should be largely forward looking, with the focus on the outcomes to be delivered for the 2008 regulatory period and the expenditure needed to deliver these outcomes, rather than revisiting the forecasts from the last review.

Melbourne Water considers that a supplementary approach is to identify obligations which came into effect within the 2005 regulatory period and which were not included in the 2005 Water Plan.

As noted in Chapter 3, there have been a significant number of new obligations since the commencement of the 2005 regulatory period. These do not form a part of Melbourne Water's business as usual activities (e.g. Government initiatives under the Yarra River Action Plan to reduce the environmental impact of stormwater on urban waterway).

Supplying information on the cost of new obligations occurring since 1 July 2005 and which were not included in the 2005 Water Plan:

- Provides stakeholders with greater transparency around the factors contributing to price rises in the 2008 regulatory period
- To the extent that expenditure in relation to these obligations is forecast to increase, it provides transparency around future drivers of expenditure
- Provides a clearer basis to determine whether efficiency improvement assumptions can be reasonably applied (see next 4.4.2).

Provision of information on expenditures related to obligations put in place subsequent to the 2005 Water Plan is also consistent with the proposed technical review the Commission will undertake of capital and operating expenditures. As an example, the review of "business as usual" expenditures is typically commenced through a trend analysis of historical expenditures. In the case of obligations that have been imposed since 1 July 2005, little or no historical trend information will be available. The review of expenditures related to post 2005 obligations will have to be undertaken in a similar manner to the way in which post 2008 obligations are reviewed, i.e. prudency and efficiency. Therefore, Melbourne Water believes that it is appropriate to capture all new obligations, either post 1 July 2005 or 2008, in the same expenditure category.

In subsequent chapters Melbourne Water has used this approach when referring to new obligations, i.e. those obligations which came into effect within the 2005 regulatory period and which were not included in the 2005 Water Plan. At this stage, there are only two new obligations which can reasonably be expected to take effect from 1 July 2008 (the Commission's approach). These come into effect from 1 July 2008 under the Waterways Operating Charter and relate to implementing flood protection measures to reduce currently known intolerable flooding risks and undertaking load reduction programs to remove a range of pollutants from stormwater and catchment run-off.

### 4.4.2 Assessing efficiency improvements

Seeking efficiency improvements will continue to be an important part of the way in which Melbourne Water operates its business. However, the current operating environment, which holds greater uncertainty about demands, capital and operating expenditures, as well as shortages of skilled labour, and meeting stakeholder project delivery expectations, increases the challenge associated with achieving ongoing material efficiency gains.

In Chapter 9, Melbourne Water has set out its proposed efficiency improvements for operating expenditure and provides detail as to why it considers such gains are realistic in the current operating environment. These efficiency improvements relate to business as usual expenditures and not expenditures associated with new obligations.

The rationale for removing new obligations from efficiency considerations is that the operating expenditure associated with these obligations will, in the majority, be undertaken via contracting and the price will be struck at the most competitive industry rate available. The opportunity to derive material efficiencies from these services will only become available if the service/works are ongoing and when the contract comes up for renewal.

In its March 2007 Guidance Paper, the Commission has noted that, where businesses cannot demonstrate how they have accounted for efficiency gains, it will make an adjustment to expenditure levels. While it has not detailed how it will do so, Melbourne Water would have concerns if the Commission was to adopt the approach it used in the 2005 regulatory period. Under this approach, businesses were required to achieve a minimum of a 1% per year productivity improvement on their growth adjusted business as usual expenditure over the regulatory period, where growth was based on volume growth for water and sewerage and customer growth for waterways and drainage. Melbourne Water's concerns arise in the waterways and drainage context primarily because the Commission's definition of new obligations would imply that business as usual expenditure will incorporate expenditure to meet new obligations that occurred prior to 1 July 2008 and this will contribute to significant growth in business as usual expenditure.

In the event the Commission were to make efficiency adjustments, Melbourne Water believes that an appropriate approach would be to continue to apply an efficiency factor. However, it is proposed that application of the efficiency factor be limited to business as usual costs, excluding new obligations coming into effect from 1 July 2005 that were not included in the 2005 Water Plan. It is noted that the extended area operating expenditure is considered to be business as usual costs.

Further, it is proposed that growth of business as usual expenditure should be established by assessing specific operating expenditure resource inputs, such as labour and materials, and the different drivers of these expenditures. Two different drivers have been identified as being relevant, growth in business as usual assets[1] and growth in customers. Both business as usual assets and customer numbers are experiencing growth. As noted in Chapter 8, increased business as usual investment is largely due to acceleration of works to restore waterway health to meet Regional River Health Strategy objectives and increased developer-funded growth works.

[1] This is based on the regulatory asset value associated with business as usual activities, i.e. it does not include the regulatory asset value associated with new obligations coming into effect from 1 July 2005 which were not included in the 2005 Water Plan.

Table 4.1 sets out the various operating expenditure resource inputs, proposed drivers of growth and reasoning as to why these drivers are appropriate. The same classification has been used by Melbourne Water in reviewing its water and sewerage operating expenditures.

**Table 4.1 – Operating expenditure resource inputs and proposed drivers of growth**

| Resource input | Growth driver | Reasoning |
|---|---|---|
| Labour | Asset growth | Labour costs are largely driven by the increasing size of Melbourne Water's asset base – more people are required to plan, deliver and operate an increasing business as usual asset base |
| External Services | Asset growth | External service costs are largely driven by the increasing size of Melbourne Water's asset base – more services are required to maintain an increasing business as usual asset base |
| Materials | Customer growth | Materials costs are a very small component of overall waterways expenditure and can be seen as being driven by customer growth |
| Information Technology | Asset growth | Information Technology costs are largely driven by headcount and are therefore affected by the same driver as labour |
| Energy | Customer growth | Energy costs are a very small component of overall waterways expenditure and can be seen as being driven by customer growth |
| Fees and Charges | Asset growth | Fees and charges are largely driven by the increasing size of Melbourne Water's asset base |
| Transport | Asset growth | Transport costs, e.g. fleet services, are largely driven by headcount and are therefore affected by the same driver as labour |
| Other | Asset growth | Other costs are largely driven by the increasing size of Melbourne Water's asset base |
| Land Tax | Asset growth | Land tax costs are driven by the increasing size of Melbourne Water's asset base as additional land is acquired where required for further assets |

Consistent with the Commission's advice in its March 2007 Guidance Paper, Melbourne Water has assumed the efficiency factor would be applied to business as usual expenditure as incurred at the end of the regulatory period, i.e. in 2007/08.

Chapter 5

# Outcomes over the 2008 regulatory period

Legislative and regulatory requirements guide Melbourne Water in delivering community, shareholder and environmental outcomes.

Considerable new obligations have arisen since the Commission last set prices.

These new obligations, set out in Melbourne Water's revised Statement of Obligations and Waterways Operating Charter, the State Government's Our Water Our Future and the Central Region Sustainable Water Strategy, include managing environmental flows in line with newly established Environmental Entitlements, implementing flood protection measures to reduce currently known intolerable flooding risks and undertaking water quality programs to improve stormwater and catchment run-off. Large investment is required to meet these obligations.

Melbourne Water has consulted extensively to ensure that regulatory, Government and community service requirements over the 2008 regulatory period are as clearly defined as possible.

This Chapter sets out the obligations and requirements that guide the proposed community, shareholder and environmental outcomes that should be delivered by Melbourne Water's waterways and drainage services over the 2008 regulatory period. It also details where obligations and requirements are either business as usual or new obligations, and the main activities that will be undertaken to deliver these requirements. Consultation undertaken with the community and stakeholders is also outlined.

These obligations and requirements are based on the best information available to Melbourne Water at the time of formulating its 2008 Water Plan. Melbourne Water has undertaken substantial consultation to clarify the nature and timing of these obligations and requirements. Where obligations change or new obligations arise over the 2008 regulatory period, Melbourne Water will work with the State Government, regulators and the community to confirm relative priorities and the most appropriate source of funding including use of the mechanisms provided in the regulatory framework to manage such change.

Appendix 1 summarises the significant obligations over the 2008 regulatory period. The regulatory framework underpinning Melbourne Water's 2008 regulatory period obligations is summarised in Chapter 1. The costs associated with meeting these obligations and activities (capital and operating) are discussed in Chapters 8 and 9.

Chapter 5

# Outcomes over the 2008 regulatory period

## 5.1 Waterways and drainage services

As outlined in Chapter 1, Melbourne Water undertakes programs to improve and protect the health of rivers and creeks (which includes improving the water quality of waterways) and enhance their environmental, economic and social values. It also provides drainage infrastructure to service urban growth and provides a safe level of flood protection for communities within the Port Phillip and Westernport region to meet State Government requirements as well as its obligations under the Waterways Operating Charter.

## 5.2 Waterways Operating Charter

Melbourne Water's obligations in relation to waterways and drainage derive from a wide array of legislation given the diversity of responsibilities that range from managing river health to regional drainage systems, and minimising flood risks. The nature of legislation and government policies also means that specific standards can be open to interpretation. Because of this, Melbourne Water has sought to clearly articulate within an Operating Charter, the responsibilities and goals for its waterways functions, key service commitments/outcomes, priority setting processes for work programs, performance targets and measures.

The Statement of Obligations sets out the requirement for Melbourne Water to develop an Operating Charter which is to be reviewed at least every five years and provided to the Minister for Water. The Statement of Obligations also requires consultation on the development of the charter and associated work programs along with performance reporting, which is independently audited each year.

The Waterways Operating Charter outlines service outcomes for the following areas:

- Managing waterways (Waterways Condition program)
- Managing water quality (Stormwater Quality program)
- Flood and drainage management (Drainage and Flood Protection program)
- Managing urban growth (Land Development program)
- Monitoring, investigations and research
- Community and stakeholder engagement.

Monitoring, investigations and research, and community and stakeholder engagement are required for each of the key program areas.

## 5.3 Service outcomes

Service outcomes to be delivered over the 2008 regulatory period are detailed below for each key program area.

### Waterways Condition

As the caretaker of river health[1], Melbourne Water's requirement under the Port Phillip and Westernport Regional River Health Strategy is to work in partnership with State Government agencies, industry, landholders and the wider community to protect and improve the ecological health of rivers, creeks, estuaries, floodplains and wetlands in the region. This requirement has been incorporated into the Waterways Operating Charter as a long term aim and ten year goal. An Addendum to the Regional River Health Strategy has also been developed to translate priorities and targets in the Regional River Health Strategy to interim targets for the 2008 regulatory period. Targets included in the Addendum have been developed taking account of achievements and additional learning's acquired over the 2005 regulatory period.

***Long term aim***

To ensure that Melbourne's rivers and creeks are healthy, with increased numbers of native fish, platypus and plant life.

***Ten year goal***

To have 50% of rivers and creeks in good or excellent condition by 2015 (as measured by the Index of River Condition).

This is a business as usual obligation.

As the waterways manager for the Port Phillip and Westernport catchment, Melbourne Water is responsible for ensuring that environmental flows are managed, monitored and audited to maximise ecological benefits. New obligations arising from Melbourne Water's role as a waterway manager include managing the Environmental Water Reserve in accordance with requirements under the State Government's Our Water Our Future strategy. The new requirements include establishing and managing environmental entitlements for priority regulated rivers within Melbourne Water's area of responsibility, along with delivering environmental water reserves to priority unregulated rivers.

Under the Water Act 1989, Melbourne Water as a waterway manager is also responsible for licensing surface water extractions (diversions) and farm dams in the Yarra, lower Maribyrnong, Stony, Kororoit, Laverton and Skeleton Creek catchments. Diversions are managed in accordance with stream flow management plans, local management rules and drought response plans to ensure environmental flows are protected. This is a business as usual obligation.

As directed by the Commission, Melbourne Water has a new obligation to develop a Customer Charter for diversion services that sets out service standards for diversions licensing and administration. This Charter is currently with the Commission for approval.

[1] Under the new arrangements outlined in the State Government's White Paper, Our Water Our Future, Melbourne Water has been designated the caretaker of river health and is responsible for waterway management, water quality monitoring, management of the environmental water reserve, regional drainage and floodplain management for the whole Port Phillip and Westernport region.

Chapter 5

# Outcomes over the 2008 regulatory period

## 2008 Water Plan outcomes

River and creek management works will be delivered each year to achieve the implementation targets and regional priorities set out in the Regional River Health Strategy – Addendum.

Meet service requirements set out in Melbourne Water's Customer Charter for Diversion Services.

To deliver the Water Plan outcomes, Melbourne Water will:

- Deliver works to rehabilitate, protect and maintain the condition of river and creek beds and banks, aquatic habitat and streamside vegetation
- Undertake planning to assist in the effective implementation of waterway programs
- Provide financial assistance to local government, community groups and landholders to undertake waterway improvement and protection works on public and private land
- Undertake environmental flows studies for all major rivers and creeks within Melbourne Water's area of responsibility and implement a program to enhance the environmental water reserve for rivers and creeks that do not meet agreed scientific flow objectives

The above activities will form the basis of achieving the implementation targets outlined in Table 5.1. These targets contribute towards the ten year goal to have 50% of waterways in good or excellent condition and are used to measure the outcomes of river health actions.

Melbourne Water will also commence reporting against Customer Charter service standards set out in Table 5.2.

**Table 5.1: Regional River Health Strategy-Addendum implementation targets**

| Target Area | 5 Year Target 2008/09 to 2012/13 |
|---|---|
| Number of rivers with negotiated environmental flow regimes[1] | 12 ^ |
| Number of rivers with improvements made to environmental flow regimes[1] | 17 ^ |
| Area of streamside land under management agreements | 10 $km^2$ |
| Length of streamside land revegetated ~ + | 1026 km# |
| Number of fish barriers removed | 31 |
| Length of riparian land subject to weed management + | 2042 km# |
| Number of plans developed for rivers and creeks of high social value | 15 ^ |
| Rivers where heritage values are protected or improved | 34 |
| Number of plans developed for rivers and creeks of high environmental value | 11 ^ |
| Number of investigations to fill data gaps in rivers or creeks | 55 |
| Number of sites subject to bed and bank stabilisation | 55 |
| Number of Index of River Condition (IRC) reaches with instream habitat reinstated | 12 |

1 Target relates to rivers within Melbourne Water's area of responsibility

~ Kilometres of rivers and creeks for streamside revegetation may overlap with kilometres of weed management
+ Length calculated for both sides of the stream
^ Denotes action which covers multiple Management Units, counted as one target in the overall targets
# Target has been adjusted to reflect 80% of the total kilometres of stream length

**Table 5.2: Customer Charter service standards***

| Service Standards | Target |
|---|---|
| Percentage of applications for surface diversion licences determined within 60 days | 90% |
| Percentage of permanent transfer of surface diversion licences processed within 30 days | 90% |
| Percentage of temporary trade of water entitlement volumes processed within 60 days | 90% |
| Percentage of permanent trade of water entitlement volumes processed within 60 days | 90% |

* Melbourne Water's Customer Charter for Diversion Services is currently with the Commission for approval

## Stormwater quality

Melbourne Water, as caretaker of river health and a "Protection Agency" under the Environment Protection Act 1970, is required to undertake actions to help achieve water quality policy objectives for rivers, creeks and bays and to implement agreed attainment strategies identified in the State Government's State Environment Protection Policy (SEPP) (Waters of Victoria) and Schedules F6 (Waters of Port Phillip Bay), F7 (Waters of the Yarra Catchment) and F8 (Waters of Western Port and Catchment). The protection policies and schedules include objectives for water quality pollutants such as nutrients, several heavy metals, suspended solids and E. coli which aim to protect beneficial uses of waterways.

Schedule F6 (Waters of Port Phillip Bay) provides a nitrogen reduction target of 1000 tonnes per year from mid 1990 levels by 2006 for Port Phillip Bay. This target has been incorporated into an Environmental Management Plan (EMP) developed in 2002 by the former Department of Natural Resources and Environment (now the Department of Sustainability and Environment) in consultation with Melbourne Water and EPA Victoria. A key target of the EMP was assigned to Melbourne Water to reduce nitrogen loads from the Western Treatment Plant by 500 tonnes per year by 2006. A major upgrade to the Western Treatment Plant was completed in 2004 to achieve this target and has been designed to treat increased loads from future population growth.

The EMP also set a joint target to reduce catchment nitrogen loads to Port Phillip Bay by 500 tonnes per year by 2006. Melbourne Water's contribution to meeting this target involved undertaking targeted stormwater actions within urban areas. In 2000, Melbourne Water committed to a $60 million wetlands program aimed at achieving a 100 tonne reduction in nitrogen loads by 2010. As detailed in Chapter 3, the wetlands program has achieved a cumulative reduction in nitrogen loads of 54.5 tonnes for the year 2006/07.

In addition, Melbourne Water was assigned the responsibility for monitoring nitrogen loads to Port Phillip Bay to allow a comparison to be made against the baseline determined by EPA Victoria. The load monitoring program undertaken by Melbourne Water has been expanded and improved in line with recommendations from the Port Phillip Bay Environmental Study. The current network includes nine sites in the Port Phillip catchment including the Yarra-Maribyrnong and Patterson-Mordialloc catchments. There are also five sites in the Western Port catchment. The monitoring program also measures total suspended solids, total phosphorus and more recently pathogens, pesticides and heavy metals. Samples are taken in both dry weather and for each storm event. Proposed expenditure for the load monitoring program totals $0.5 million over the 2008 regulatory period.

At present, a statistically robust comparison of monitored loads against the 1996 Port Phillip Bay baseline cannot be determined as there has not been an adequate number of storm events to accurately represent storm events for the catchment. Melbourne Water expects that an acceptable level of monitoring data will be available within the next two years to make an assessment of the changes occurring in load inputs to Port Phillip Bay over a period of time.

In addition to the catchment scale load based targets associated with Schedule F6 of the SEPP (Waters of Victoria), Melbourne Water is also required to meet obligations and water quality objectives outlined in Schedule F7 (Waters of the Yarra Catchment) and F8 (Waters of Western Port and Catchment). Water quality targets based on SEPP objectives for individual rivers and creeks have been identified in the Regional River Health Strategy.

To assess water quality against SEPP objectives Melbourne Water manages an annual $0.4 million monitoring program for 136 fixed sites across the Port Phillip and Westernport region.

There are 37 sites within the Western Port catchment, 38 sites within the Yarra catchment and 61 sites across the Maribyrnong, Werribee and Dandenong catchments.

Water quality sampling that includes nutrients, metals and E. coli is undertaken on a monthly basis. The results are compared with relevant SEPP objectives and reported quarterly to EPA Victoria. See Monitoring, investigations and research on page 43 for further information.

These are all business as usual obligations.

To clarify its roles and responsibilities, and program of actions for water quality management, Melbourne Water has developed a Waterways Water Quality Strategy in consultation with key stakeholders. The integrated water quality program defines five year implementation targets and planned activities that progress towards achieving long-term SEPP objectives, meeting Regional River Health Strategy targets and priorities identified in the State Government's Yarra River Action Plan.

The Waterways Water Quality Strategy will form part of the Better Bays and Waterways action plan being developed by Melbourne Water and EPA Victoria to provide a long term regional plan for improving water quality in rivers, creeks, estuaries and bays. The action plan is expected to be released for public consultation in 2008 and will determine priority areas and sources for actions to improve water quality for a range of pollutants, as well as guide investment in regional water quality initiatives. Actions and targets arising from the Better Bays and Waterways action plan will be assigned to each responsible Government agency.

Modelling undertaken for the Waterways Water Quality Strategy suggests that increased loads from urban development, and to a lesser extent rural intensification, continue to pose a significant challenge in achieving the 500 tonne reduction target for nitrogen loads from the Port Phillip catchment. An important focus of the Waterways Water Quality Strategy is recognising that all human activities within the Port Phillip and Westernport region have varying degrees of impact on water quality, and that no single agency can undertake water quality management works on its own. Therefore, Melbourne Water's progress towards meeting State Environment Protection Policies and water quality targets can only be achieved by working in collaboration with State agencies, local government, industry, land managers and the general community to improve the quality of stormwater and catchment run-off.

The Waterways Water Quality Strategy identifies that significant opportunities exist for local government to reduce pollutant loads at their source by incorporating water quality works into their road and drainage renewal work programs along with placing planning conditions on all new developments. While retrofitting water sensitive urban design into existing urban catchments is increasing, it is still in its infancy and being applied to a very limited number of potential projects. Developing local targets, such as municipality based load reduction targets, will be an important action for the future to enable assessment against broader scale targets such as the 500 tonne reduction target for Port Phillip Bay. Melbourne Water responsibilities are focussed in areas such as supporting capacity building programs that assist local government to deliver best practice stormwater management and assisting EPA Victoria, Department of Sustainability and Environment and Department of Planning and Victorian Communities in the development of regulatory frameworks. These regulatory frameworks will aim to institutionalise water sensitive urban design and incorporate sustainable urban water management into planning provisions and building permits.

Another opportunity to reduce catchment loads is working in partnership with the Department of Primary Industries, land managers and other agencies to encourage the adoption of best management practices on rural land.

Responsibilities for undertaking load reduction programs in rural areas of the catchment are new to Melbourne Water and derive from its expanded role as caretaker of river health. This expanded role enables Melbourne Water to undertake programs and works away from waterways to improve river health.

As the load reduction programs are dependent on the participation of land managers, models of engagement will need to be trialled and the performance of different treatment systems tested. Therefore, specific nutrient load reduction targets have yet to be developed and will be set in consultation with EPA Victoria. In addition, Melbourne Water has the responsibility of constructing treatment facilities such as regional wetlands to improve water quality within rural areas where feasible.

The programs proposed within the Water Quality Strategy have been developed to support the long term aim and ten year goal outlined in the Waterways Operating Charter. This includes achieving a net reduction in a number of additional key pollutant loads including total phosphorus, total suspended solids and toxicants.

***Long term aim***

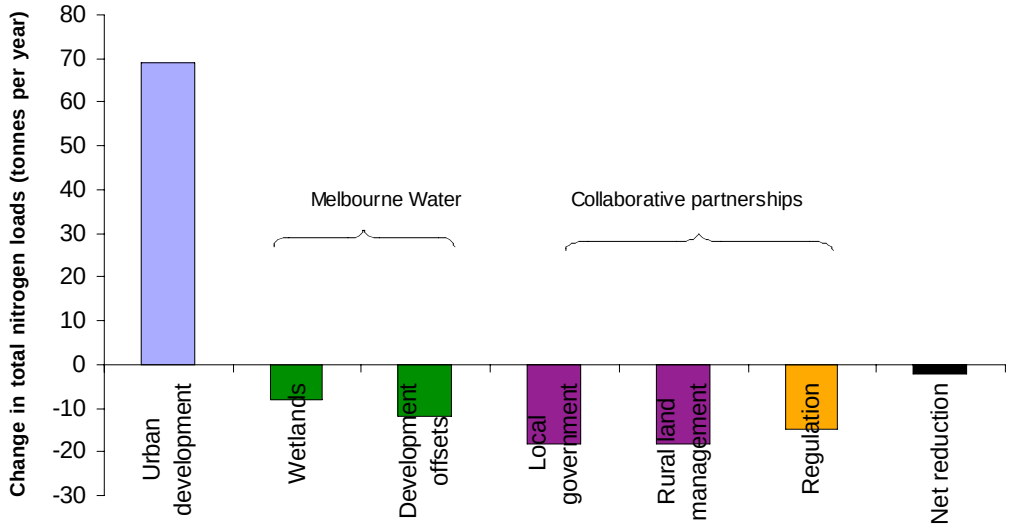
In collaboration with others, to achieve objectives for water quality in accordance with State Environment Protection Policies and targets set out in the Port Phillip and Westernport Regional River Health Strategy and Waterways Water Quality Strategy.

***Ten year goal***

In collaboration with others, protect and improve water quality to significantly counteract the effects of growth in greater Melbourne and achieve a net reduction in pollutant loads for the Port Phillip and Westernport region against 2001 levels.

Figure 5.1 illustrates the mix of proposed programs that aim to achieve the goal of counteracting the effects of urban growth on nitrogen loads to Port Phillip Bay against 2001 levels. The figure does not include the 100 tonne reduction in nitrogen loads achieved by the wetlands program by 2010.

**Figure 5.1: Programs to address load increases from urban growth**



Chapter 5

# Outcomes over the 2008 regulatory period

## 2008 Water Plan outcome

Water quality programs and works will be delivered each year to achieve the targets set out in the Waterways Water Quality Strategy and Regional River Health Strategy.

To deliver the Water Plan outcomes, Melbourne Water will:

- Project manage the development of the Better Bays and Waterways action plan and implement programs assigned to Melbourne Water
- Work with the Department of Primary Industries, landowners and other agencies to develop and implement a rural land management program that encourages the adoption of best management practices on rural land and, where feasible, construct treatment facilities such as regional wetlands to improve water quality and river health
- Continue to support programs that are designed to build the capacity of industry and local government to deliver best practice stormwater management such as the Clearwater program and increase knowledge within the community about actions that can be undertaken to improve stormwater quality (e.g. use of rain gardens)
- Work in partnership with the Department of Sustainability and Environment to develop regulatory frameworks that ensures that all new industrial, commercial and residential developments meet best practice stormwater quality objectives and institutionalises water sensitive urban design (see Land development on page 42)
- Undertake targeted programs to address pollution hotspots to remove known sources of pollutants
- Implement on ground works assigned to Melbourne Water in local government Municipal Stormwater Management Plans
- Work together with local government to provide incentives to support the delivery of water quality works and water sensitive urban design
- Deliver regional water quality treatment works that includes the construction of wetlands, bio-retention systems and other water sensitive urban design features to reduce nitrogen loads from stormwater and manage load increases associated with urban development
- Implement monitoring and investigation programs to better understand the threats of pollutants such as pesticides and metals on water quality and their impacts on aquatic life and assess the risks to public health associated with the recreational use of waterways (see Monitoring, investigations and research on page 43).

These activities will form the basis of achieving the Waterways Water Quality Strategy implementation targets outlined in Table 5.3. These targets contribute towards ten year resource condition targets and the ten year goal to collaborate with others to protect and improve water quality to significantly counteract the effects of growth in greater Melbourne and achieve a net reduction in loads for the Port Phillip and Westernport region from 2001 levels. Given that water quality is a key component of assessing river health, the implementation targets will also assist in measuring progress towards meeting Regional River Health Strategy targets and SEPP objectives.

Chapter 5

# Outcomes over the 2008 regulatory period

**Table 5.3: Waterways Water Quality Strategy implementation targets**

| Target Area | 5 Year Target 2008/09 to 2012/13 |
|---|---|
| **Planning for improved water quality** | |
| Develop a draft Better Bays and Waterways Plan | 2008 |
| Percentage of programs implemented from the Better Bays and Waterways Plan assigned to Melbourne Water | 100% |
| New or revised State Government requirements for all industrial, commercial and residential development to meet best practice water quality objectives | 2013 |
| **Equipping agencies, communities and industry to manage water quality** | |
| Develop and commence implementation of a land management program to manage run-off in rural areas | 2009 |
| Number of training modules delivered under the Clearwater program per year with assistance from Melbourne Water | 10 |
| Percentage of local governments with improved performance in delivering sustainable urban water management (as measured by the Council Needs Analysis) | 70% |
| Number of guidelines and/or tools prepared to assist in the application of best practice stormwater management | 6 |
| Number of rain gardens built in the community with support from Melbourne Water | 10,000* |
| Decrease in number of rivers and creeks where stock access poses a high risk to water quality | Demonstrated decrease |
| **Targeted water quality works** | |
| Number of pollution load hotspots addressed | 8 |
| Percentage of actions implemented from local governments Stormwater Management Plans assigned to Melbourne Water | 30% |
| Percentage of local governments that have committed to water sensitive urban design implementation targets for pollutant loads, flow and effective imperviousness | 50% |
| Reduction of nitrogen loads in urban stormwater by 2010 | 100 tonnes |
| Annual reduction in nitrogen loads through the establishment of wetlands for the period 2010 to 2013 | 2 tonnes |
| **Monitoring, investigations and research** | |
| Percentage of health risk assessments completed for major rivers and creeks with a high level of recreational activity | 100% |
| Number of new monitoring programs to fill knowledge gaps for toxicants and pesticides | 2 |
| Completion date for delivering the faecal investigations program | 2013 |

* Denotes a target that covers multiple programs

Chapter 5

# Outcomes over the 2008 regulatory period

Case Study:

## Building raingardens in the community

To increase knowledge within the community about actions that can be undertaken to improve stormwater quality, Melbourne Water has undertaken a number of flagship projects with local residents and several local governments to build raingardens in their areas. Stormwater run-off from driveways, pavements and road surfaces are directed into raingardens built around the base of street lining trees. The raingardens are comprised of soil and plants which help filter pollutants including oils, metals and litter before the stormwater is drained away. This provides a sustainable watering and feeding system for the trees as well as improving the quality of stormwater entering local waterways and Melbourne's Bays.

Over the 2008 regulatory period, Melbourne Water proposes to build community and local government capacity by providing support for the construction of 10,000 rain gardens across Melbourne.

Part of this program involves working with local governments to ensure raingardens are installed with regular street upgrades.

## Drainage and flood protection

Melbourne Water's obligations under part 10 of the Water Act 1989 as the Floodplain Management Authority for the Port Phillip and Westernport region includes the requirement to provide, operate and maintain drainage systems (that service areas generally greater than 60 hectares), determine how high floodwaters will rise and how far they will extend and to develop and implement plans to minimise flood damage.

Melbourne Water has historically focussed on mitigating flood risks by undertaking engineering works to improve flood protection in areas that have been identified as being at high risk with the aim of protecting 500 properties every ten years. It is recognised that the recent rates of expenditure on mitigation works are making little impact on about 40,000 identified properties that contain buildings or dwellings that would be at risk of flooding above floor level in a one-in-100 year storm.

In addition, a 2005 performance audit of stormwater drainage systems operated and maintained by Melbourne Water and six local governments identified that there is scope for more effective and collaborative consultation arrangements between Melbourne Water, local governments and key stakeholders. This will enable flood risk reduction targets to be set that are cost effective and that consider stakeholder expectations. In light of the above, Melbourne Water has developed a Flood Management and Drainage Strategy in consultation with stakeholders to clarify requirements and determine acceptable standards for managing flood risks.

The Strategy acknowledges that floods are a natural event and that it is not physically, or practically, possible or necessary to protect all properties in the region from a one-in-100 year flood.

Consequently, the approach to managing flood risk will see Melbourne Water and local governments undertake works to reduce flood risks that are determined to be intolerable, increase community understanding and awareness in relation to other flooding risks and their preparedness for flood events.

Intolerable flood risks are identified by taking account of consequences to public health and safety, numbers of properties at risk and impact on the environment, economic activity and public infrastructure.

Melbourne Water's requirements in relation to managing drainage systems and its new approach to managing flood risks that are determined to be intolerable have been clarified in the Waterways Operating Charter as a long term aim and ten year goals.

***Long term aim***

To minimise all currently known intolerable flooding risks to public health and safety, property and infrastructure, and increase community understanding and preparedness for floods.

***Ten year goal***

Implement flood protection measures to reduce currently known intolerable flood risks by 30% by 2018.

Implement a community flood awareness and preparation program.

Support the preparation of Municipal Emergency Management Plans to ensure local government and communities have an adequate understanding of flood risks and are well prepared for flood events, and that flood mitigation actions are co-ordinated with Melbourne Water.

| 2008 Water Plan outcome |
| --- |
| Currently known intolerable flood risks will be reduced by 10% by 2013. |
| All local governments in the Port Phillip and Westernport region who have flood risks will have Flood Management Plans in place by 2013. |
| Develop and implement a flood awareness and preparation program in partnership with the Victorian State Emergency Service and local governments. |
| Initial notification and subsequent forecast information will be provided to the Bureau of Meteorology for all notifiable flooding events on stipulated waterways. |
| There will be no instances of asset structural failure that result in significant flooding, damage, disruption or personal injury. |
| Develop and implement a program to undertake local flood extent and tidal mapping. |

To deliver the Water Plan outcomes, Melbourne Water will:

- Develop and implement a program to eliminate or reduce intolerable flood risks to tolerable levels through the combination of engineering works and non-structural solutions
- Provide technical and funding assistance to assist local governments who have flooding issues with the preparation and review of their Flood Management Plans which provide a local focus for integrating flood planning, prevention, preparedness and response activities
- Develop and implement community education programs to increase flood awareness and preparation in collaboration with the Victorian State Emergency Service and local governments

- Continue to provide the Bureau of Meteorology with predicted times and areas of inundation so that formal flood warnings can be issued to responsible agencies and the community
- Continue to maintain drainage infrastructure to meet public health, safety and environmental requirements
- Continue flood mapping and investigations of the region to identify all flood risk areas
- Develop and implement a program to better understand the social impacts of flooding on the community and how social impacts are considered in priority setting for flood mitigation along with understanding the potential long term pressures on the existing drainage system arising from urban consolidation and climate change (see Monitoring, investigations and research on page 43).

### Land development

Melbourne Water's responsibilities as a statutory referral authority for planning permit applications under the Planning and Environment Act 1987 and floodplain management authority under the Water Act 1989, requires it to provide flood risk information and undertake development planning. This ensures that new urban development meets appropriate standards of flood protection and will assist in ensuring that the costs of infrastructure required to service growth are equitably allocated among land developers.

Melbourne Water is also required to ensure that developments comply with State Government Best Practice Guidelines for the environmental management of urban stormwater to protect and enhance the condition and values of existing rivers and creeks where feasible.

These requirements have been further clarified in the Waterways Operating Charter as long term aims and ten year goals.

***Long term aim***

Ensure urban development achieves appropriate standards of flood protection, protects waterway health and is sensitive to other environmental and social values of waterways.

Deliver an efficient service and provide accurate, timely and reliable information to the development industry and community.

***Ten year goal***

Improve transparency and streamlining, and facilitate improved access to information for the development industry, community and other interested parties.

Ensure appropriate standards of flood protection and environmental performance are consistently and equitably achieved for all urban development.

Benefit the local community through the provision of drainage and waterway assets that integrate with the urban infrastructure and open space.

Achieve improved sustainability of urban development by implementing water sensitive urban design and facilitating increased stormwater reuse.

Manage the potential impacts of increasing redevelopment activity on levels of flood protection service in established areas of Melbourne.

Find cost-effective strategies for servicing growth that minimise impacts on housing affordability.

These are all business as usual obligations.

Chapter 5

# Outcomes over the 2008 regulatory period

| 2008 Water Plan outcome |
| --- |
| All new development will comply with flood protection standards. |
| All flood-related property information statement updates will be completed within one month of Melbourne Water receiving notification of a change in the relevant circumstances. |
| Statutory and agreed industry response times will be achieved for all development referrals. |

To deliver the Water Plan outcomes, Melbourne Water will:

- Prepare, implement and review development service schemes to ensure that all new urban development meets flood protection and environmental standards
- Work with local governments to incorporate flood overlays into local planning schemes and place conditions on development to ensure compliance with appropriate flood protection standards
- Support programs to provide local governments with the technical assistance to implement water sensitive urban design requirements into new planning scheme provisions and provide industry with the necessary tools and capacity to deliver sustainable design outcomes
- Investigate and identify further opportunities to streamline development referrals and planning control processes, and improve customer service levels by reducing the amount of administrative effort required to process planning permit applications
- Investigate opportunities to enhance online access to development service scheme information by the land development industry.

## Monitoring, investigations and research

Melbourne Water's responsibilities as a designated waterway manager include monitoring water quality throughout the Port Phillip and Westernport region in accordance with agreements with EPA Victoria and implementing monitoring, investigations and research priorities assigned through policies and strategies that include the CRSWS, State environment protection policies, Regional River Health Strategy, Waterways Water Quality Strategy, Yarra River Action Plan and Flood Management and Drainage Strategy.

Monitoring and investigations are a key part of ensuring Melbourne Water is meeting its obligations for river health and water quality. Investigations allow more efficient and effective targeting of resources to achieve outcomes, and research improves the understanding of risks and assists in the development of new management tools.  These requirements have been further clarified in the Waterways Operating Charter as a long term aim and ten year goal.

***Long term aim***

To build a comprehensive knowledge base on waterways, drainage and floodplains to improve decision making and the evaluation of progress.

***Ten year goal***

To undertake monitoring, investigations and research on rivers, creeks, wetlands, floodplains, estuaries and bays in order to:

- Better understand their condition
- Measure progress towards management targets

- Identify and understand threatening processes
- Improve effectiveness of management activities
- Inform government, community and stakeholders.

These are business as usual obligations.

Melbourne Water's new obligations arising from the Waterways Water Quality Strategy, Yarra River Action Plan and Flood Management and Drainage Strategy include undertaking monitoring programs to improve understanding of the impact of pollutants on river health and the recreational use of waterways, along with developing programs to better understand the intangible impacts of flooding on the community.

| 2008 Water Plan outcome |
| --- |
| Implement monitoring and investigation programs for river health, environmental and recreational water quality and flood management to determine changes in condition over time and provide information for management decisions, and track progress towards achieving targets. |
| Undertake research into river health, environmental and recreational water quality and flood management to address gaps in understanding and explore new technologies so that management activities, plans and policies are based on sound knowledge and best practice. |

To deliver the Water Plan outcomes, Melbourne Water will:

- Undertake detailed investigations on priority rivers identified in the Regional River Health Strategy to assess their ecological health, identify causes of degradation and inform rehabilitation programs
- Continue to conduct stream environmental monitoring and reporting programs as agreed with EPA Victoria and in line with priorities assigned through the Regional River Health Strategy and Yarra River Action Plan to assist in the identification of trends and variations in water quality and stream health
- Continue partnerships with institutional bodies such as the eWater Cooperative Research Centre, Universities and CSIRO to help deliver research programs which include understanding the likely impacts of climate change on waterway, floodplain and drainage management, the impacts of urbanisation on stream ecology and methods of urban stormwater treatment
- To better inform management responses, implement a program to better understand the sources of pesticides, herbicides, metals and hydrocarbons as well as their effect on aquatic life
- Implement programs to better understand and assess the risks to public health associated with the recreational use of waterways which include monitoring contaminants in fish, extending the YarraWatch network of faecal monitoring sites to areas with high recreational values and improving techniques for tracking sources of faecal contamination
- Help initiate and implement a Western Port Environment Study and a River Estuary Management Study to better understand the link between catchment, input drains, streams and the estuarine and marine receiving environment to inform management responses

- Develop and implement a program of social research on the intangible impacts of flooding to assess the effectiveness of flood awareness activities, define tolerable and intolerable flood risks and willingness to pay for mitigation measures.

### Community and stakeholder engagement

The Statement of Obligations requires Melbourne Water to develop and implement an open and transparent process to engage and involve stakeholders and the community in its planning processes to ensure that the waterway and drainage services it provides reflects their needs and expectations. This is a business as usual obligation.

Melbourne Water has developed a Waterways Stakeholder Engagement and Communications Framework to bring together all the associated engagement and communications initiatives for waterway and drainage programs. Requirements under the framework have been further clarified in the Waterways Operating Charter as a long term aim and ten year goal.

***Long term aim***

To build trust and strengthen working relationships with key stakeholders and the community.

***Ten year goal***

To achieve a high level of community and stakeholder understanding and active participation in programs related to the health of the region's rivers, water quality and flooding.

| 2008 Water Plan outcome |
|---|
| Achieve targets and implement actions identified in the Waterways Stakeholder Engagement and Communications Framework. |
| Maintain 70% community satisfaction with waterways. |
| Develop and implement a program to measure community and stakeholder satisfaction with Melbourne Water's engagement processes. |

To deliver the Water Plan outcomes, Melbourne Water will:

- Provide resource information and implement community initiatives such as education grants, organised events/festivals that help foster a sense of connection with waterways and increase the community's knowledge and awareness of river health, water quality and flooding programs
- Provide opportunities for community and stakeholder involvement in improving waterway health by undertaking education programs such as Waterwatch and providing support for partnership projects with the community and stakeholders to encourage participation in waterways related activities
- Provide opportunities for involving the community and stakeholders in the planning and delivery of waterway programs
- Utilise a range of studies and market research measures to report on community and stakeholder satisfaction with waterway programs.

**Case Study:**

### Strengthening Melbourne Water's working relationships with stakeholders

In 2006, Melbourne Water developed 'Making Connections', a new catchment-based method for building on existing cooperative relationships, strengthening understanding and connection between people, and exploring new opportunities for working with stakeholders to protect the health of catchments, waterways and bays. Organised events bring together a wide variety of people with an interest in waterways, representing community and environment groups, local government, schools and universities, private industry, rural landholders, and retail water companies. Ideas and actions generated at the events influence Melbourne Water's planning, programs, on-ground works and partnerships, highlighting the value of community and stakeholder input. Outcomes from events to date highlight the importance of Melbourne Water:

- building trust, demonstrating openness and transparency and following through on commitments
- improving support and forming effective partnerships with community groups to get people involved and connected to waterways
- continuously building knowledge and awareness of the health of waterways
- clarifying roles and responsibilities around waterways.

Melbourne Water proposes to conduct a series of events across the region on an annual basis to continue strengthening working relationships with stakeholders.

## 5.4 Customer and stakeholder consultation

### Overview of customer and stakeholder consultation

Melbourne Water has undertaken considerable consultation in clarifying its waterway and drainage requirements for the 2008 regulatory period. This has included:

- Regular meetings with the Waterways Advisory Committee to agree on priorities and develop targets to be included in the Waterways Operating Charter for waterway services. The advisory committee comprises key stakeholders which includes EPA Victoria, the Department of Sustainability and Environment, Port Phillip and Westernport Catchment Management Authority, local government and community representatives
- Developing strategies in consultation with relevant stakeholders and community representatives to agree on objectives, targets and priority programs. Commitments assigned to Melbourne Water through the Regional River Health Strategy-Addendum, Waterways Water Quality Strategy, Flood Management and Drainage Strategy, Regional Catchment Strategy and the Yarra River Action Plan form the basis of obligations contained in Melbourne Water's Waterways Operating Charter
- Utilising market research to explore public and stakeholder attitudes to water quality across the Port Phillip and Westernport region which has been used to inform and set priorities for the Waterways Water Quality Strategy, along with undertaking research to better understand the capacity of local governments to implement State Environment Protection Policies and best practice urban stormwater management

- Establishing reference groups comprised of representatives from key stakeholders, local government, local community groups and other relevant agencies to assist in developing policies and management programs. Examples include a Development Service Schemes Review Group, Edithvale-Seaford Wetlands Community Liaison Committee, reference groups for Waterways Activity Plans and 'Making Connections' which included four all day events involving over 500 community and stakeholder representatives
- Meetings with diversion customer committees (Diversions Management Advisory Committee and Keilor Diverters Advisory Group) comprised of customer and key stakeholder representatives to consult on proposed diversion prices and operational matters
- Release of a 2008 Waterways Water Plan Consultation Draft.

### Overview of key issues identified by customers

In responding to Melbourne Water's 2008 Water Plan Consultation Draft, EPA Victoria requested further clarification on Melbourne Water's proposed outcomes in relation to meeting attainment strategies identified in the State environment protection policy (Waters of Victoria) (SEPP) and Schedules F6, F7 and F8. Additional information has been provided in the 2008 Waterways Water Plan to help clarify Melbourne Water's responsibilities in relation to reducing catchment loads and the outcomes it proposes to deliver to meet SEPP requirements.

As a result of this consultation and an ongoing process of engagement, Melbourne Water understands that, at this stage, its customers and stakeholders have no significant outstanding issues in relation to the obligations and requirements detailed above and the outcomes and activities proposed to be undertaken to achieve outcomes over the 2008 regulatory period.

It is noted that these obligations and requirements are based on the best information available to Melbourne Water at the time of formulating its 2008 Waterways Water Plan. While considerable consultation has been undertaken to clarify and understand the extent of government requirements relating to river health and water quality, new government policies are likely to be developed and existing policies reviewed over the 2008 regulatory period which may impact on both the level of service and costs associated with meeting the revised objective or target. Where this occurs, Melbourne Water will use the mechanisms provided in the regulatory framework to manage such change.

Chapter 6
# Demand

The demand forecasts have been developed using the best available data and adopting robust methodologies.

The proposed forecasts reflect the effects of a growing population and economic development.

This chapter identifies the primary drivers of demand for waterways and drainage services provided by Melbourne Water and outlines the methodologies, assumptions and data used to develop the proposed demand forecasts.

## 6.1 Waterways and drainage

Guidance provided by the Commission[1] notes that any methodology used to prepare demand forecasts for water services should:

- Be statistically unbiased
- Recognise and reflect key drivers of demand and supply
- Be based on reasonable assumptions using the best available information
- Be consistent with other existing forecasts and methodologies
- Use the most recent data available, as well as historic data that can identify trends in demand
- Take account of current demand and economic conditions and reasonable prospects for future market development.

The Commission also notes that businesses should exercise discretion and match the level of detail contained in their demand forecasts with the materiality of the demand information (and hence revenue impacts) captured. In addition, the proposed forecasts are required to be consistent with relevant plans such as Victoria in the Future 2004.

The Commission has requested information on:

- Growth in properties consistent with metropolitan retail water business forecasts
- The expected level of property development activity subject to developer charges
- Tabular information that summarises the forecasts and provides relevant historical information on demand.

### 6.1.1 Drivers of demand

Estimating demand for waterways and drainage services differs from water and sewerage services, as it is not based directly on volumes.

Property development is the key driver of future demand for drainage infrastructure that meets legislative requirements for flood protection and offsets the impact on water quality of run-off from development. Developer charges fund 100% of capital infrastructure required for new developments. Customer charges fund ongoing operating expenses and asset renewals of drainage and waterway assets.

[1] ESC 2008 Water Price Review – Guidance on Water Plans, September 2006

There are three sources of revenue growth linked to demand:

- Customer charges – property rates
- Developer charges – cash contributions
- Developer contributed assets.

### 6.1.2 Customer charges

#### Forecasting methodology

The retail water businesses are contracted to provide billing and collection services on behalf of Melbourne Water. This includes maintenance of the customer database and assistance with revenue forecasts, based on expected property growth in the respective retail operating areas.

The growth forecasts provided by the retail water businesses are based on estimates of development activity using the Department of Sustainability and Environment's Victoria in the Future 2004 property forecasts. This is compared with historical rates of growth and known development in each retail area consistent with guidance received from the Commission.

Melbourne Water assessed the reasonableness of the property growth forecasts provided by the metropolitan retail water businesses by:

- Checking for any significant changes from historical growth
- Comparing the forecast against Victoria in the Future 2004 projections
- Comparing with Melbourne Water forecasts of developer charges as a reasonableness test, however, this is based on an estimate of lots developed[2].

Growth forecasts for development activity in Melbourne Water's extended service areas are based on estimates developed by an independent consultant using Victoria in the Future 2004 property forecasts. Independent forecasts were required while Melbourne Water works with retail water businesses to provide billing and collection services in the extended areas.

#### Assumptions and data input

It is assumed that growth for waterways and drainage customers is consistent with growth in water customers. There is a slight difference in the number of properties as waterways and drainage charges only apply to rateable properties, while water charges apply to metered properties. There are approximately 15,000 non-rateable properties in Melbourne Water's operating area.

There can also be a slight difference in property count for multi-unit developments because individual units may be separately metered for water use but are not rated separately for waterways and drainage if they are not individually owned.

These differences are not considered material for the purposes of revenue forecasts and therefore no adjustments have been made to retail water business forecasts of property growth.

The waterways and drainage revenue forecast is derived from the supplied property growth estimates for the end of each period.

[2] Whilst property development is the common driver for developer charges and growth in rateable properties, direct comparisons of forecasts are limited. Developer charges are based on a per hectare rate that varies for drainage schemes and development densities. Number of lots can be estimated, however, the correlation between sub-division and growth in rateable properties is weakened by a lag that varies between three months and two years, depending on the nature of development.

Melbourne Water's revenue forecast applies the mid-point for new properties in each year to take account of partial rates as new properties become rateable throughout the year.

The minimum charge for residential, non-residential and rural customers in each retail water business area is multiplied by the number of properties. An average charge has been used for residential and non-residential customers paying above the minimum charge in each retail area. The average charge used to forecast revenue varies between retail water businesses due to underlying property values (e.g. high central business district property values in City West Water's retail area result in a higher average non-residential charge than other retail water businesses).

## Forecasts

The results of applying the above methodology and assumptions are provided in Table 6.1 for the period 2007/08 to 2012/13, compared to actual growth for the period 2004/05 to 2006/07 for each retail water business. The expected increase in rateable waterways and drainage properties is 126,000 over the 2008 regulatory period, representing an average annual growth rate of 1.6%. This varies for retail water business areas due to different rates of development activity.

**Table 6.1: Annual property forecasts for existing retail water business areas ('000 properties)**

| | 2004/05 | 2005/06 | 2006/07 | 2007/08 | 2008/09 | 2009/10 | 2010/11 | 2011/12 | 2012/13 |
|---|---|---|---|---|---|---|---|---|---|
| **City West Water** | | | | | | | | | |
| **Residential** | **250.8** | **260.6** | **269.7** | **277.2** | **283.7** | **290.5** | **297.2** | **303.3** | **308.8** |
| Minimum charge | 155.3 | 161.3 | 167.0 | 171.6 | 190.3 | 205.2 | 222.8 | 234.9 | 308.8 |
| Above minimum | 95.5 | 99.2 | 102.7 | 105.6 | 93.5 | 85.3 | 74.3 | 68.4 | - |
| **Non-residential** | **30.6** | **32.2** | **33.8** | **34.7** | **35.6** | **36.4** | **37.2** | **38.0** | **38.7** |
| Minimum charge | 4.9 | 5.2 | 5.4 | 5.6 | 8.6 | 9.5 | 10.3 | 11.0 | 11.8 |
| Above minimum | 25.7 | 27.1 | 28.4 | 29.1 | 26.9 | 26.9 | 26.9 | 26.9 | 26.9 |
| **Rural[1]** | **0.3** | **0.3** | **0.3** | **0.4** | **0.6** | **0.6** | **0.6** | **0.6** | **0.6** |
| **Total** | **281.7** | **293.1** | **303.9** | **312.3** | **319.9** | **327.5** | **335.0** | **341.8** | **348.1** |
| **South East Water** | | | | | | | | | |
| **Residential** | **474.5** | **481.5** | **489.3** | **498.7** | **509.2** | **518.5** | **528.0** | **537.6** | **547.3** |
| Minimum charge | 294.9 | 299.2 | 304.1 | 309.9 | 337.1 | 359.4 | 386.3 | 404.9 | 545.9 |
| Above minimum | 179.6 | 182.3 | 185.2 | 188.7 | 172.0 | 159.0 | 141.7 | 132.7 | 1.4 |
| **Non-residential** | **41.9** | **41.9** | **41.9** | **42.6** | **43.3** | **44.0** | **44.6** | **45.3** | **46.0** |
| Minimum charge | 5.7 | 5.7 | 5.7 | 5.8 | 9.9 | 10.6 | 11.3 | 12.0 | 12.6 |
| Above minimum | 36.2 | 36.2 | 36.2 | 36.8 | 33.4 | 33.4 | 33.4 | 33.4 | 33.4 |
| **Rural[1]** | **19.3** | **19.5** | **19.7** | **20.1** | **20.5** | **20.9** | **21.2** | **21.6** | **22.0** |
| **Total** | **535.7** | **542.9** | **551.0** | **561.4** | **572.9** | **583.3** | **593.9** | **604.5** | **615.3** |

1 Refers to properties located outside of the Urban Growth Boundary (see Chapter 12 for further discussion)

| | 2004/05 | 2005/06 | 2006/07 | 2007/08 | 2008/09 | 2009/10 | 2010/11 | 2011/12 | 2012/13 |
|---|---|---|---|---|---|---|---|---|---|
| **Yarra Valley Water** | | | | | | | | | |
| **Residential** | **549.4** | **556.3** | **563.7** | **569.6** | **575.3** | **581.4** | **587.5** | **593.7** | **599.9** |
| Minimum charge | 311.4 | 315.3 | 319.5 | 322.8 | 354.7 | 379.9 | 412.2 | 431.4 | 599.9 |
| Above minimum | 238.0 | 241.0 | 244.2 | 246.7 | 220.5 | 201.4 | 175.3 | 162.3 | - |
| **Non-residential** | **39.3** | **40.2** | **40.7** | **41.1** | **41.6** | **41.9** | **42.3** | **42.7** | **43.1** |
| Minimum charge | 4.5 | 4.6 | 4.6 | 4.7 | 8.6 | 9.0 | 9.4 | 9.8 | 10.2 |
| Above minimum | 34.8 | 35.7 | 36.1 | 36.5 | 32.9 | 32.9 | 32.9 | 32.9 | 32.9 |
| **Rural**[1] | **25.8** | **26.2** | **26.5** | **26.8** | **30.1** | **30.3** | **30.6** | **30.9** | **31.2** |
| **Total** | **614.5** | **622.7** | **631.0** | **637.5** | **646.9** | **653.6** | **660.5** | **667.4** | **674.3** |
| **Total - Metropolitan** | **1,432.0** | **1,458.7** | **1,485.8** | **1,511.1** | **1,539.7** | **1,564.4** | **1,589.3** | **1,613.7** | **1,637.7** |

The results of applying the forecasting methodology and assumptions for Melbourne Water's extended service areas are provided in Table 6.2. Growth forecasts have been applied to the estimated number of rateable properties in the extended areas from 2006/07. Actual property numbers can only be ascertained by taking up property data from local government. Melbourne Water expects that this information will be made available to the Commission prior to making its final price determination.

The expected increase in rateable waterways and drainage properties is 30,000 over the 2008 regulatory period, representing an average annual growth rate of 4.0%. The higher annual growth rate is due to a larger number of growth corridors in the extended areas compared to the existing retail water business areas.

Melbourne Water proposes to introduce fixed waterways and drainage charges for extended area properties and therefore there is no need to distinguish between properties paying minimum and above minimum charges.

**Table 6.2: Annual property forecasts for total extended area ('000 properties)**

| | 2006/07 | 2007/08 | 2008/09 | 2009/10 | 2010/11 | 2011/12 | 2012/13 |
|---|---|---|---|---|---|---|---|
| Residential | 108.7 | 113.2 | 118.3 | 123.6 | 128.7 | 133.5 | 138.1 |
| Non-residential | 4.8 | 5.0 | 5.2 | 5.4 | 5.7 | 5.9 | 6.1 |
| Rural[1] | 49.8 | 51.8 | 54.1 | 56.6 | 58.9 | 61.1 | 63.2 |
| **Total– Extended area** | **163.3** | **170.0** | **177.6** | **185.6** | **193.3** | **200.5** | **207.4** |

[1] Refers to properties located outside of the Urban Growth Boundary

### 6.1.3 Developer charges

Developer charges are made up of:

- Cash contributions – based on a contribution rate calculated for the development service scheme or stormwater quality offset charge
- Contributed assets – assets constructed by the developer that are transferred to Melbourne Water to operate and maintain.

Chapter 12 and Appendix 5 describe the principles and methodology used by Melbourne Water to calculate developer charges and stormwater quality offset charges. Sections 6.1.4 and 6.1.5 describe the process for forecasting growth.

### 6.1.4 Cash contributions

#### Forecasting methodology

Development services schemes consist of detailed plans that identify and cost drainage related works required to be provided for urban expansion within a defined catchment or area. There are currently approximately ninety-four active schemes, and they are funded by financial contributions from land developers who contribute on the basis of land area and development density. This results in a unique contribution rate for each individual scheme.

Melbourne Water prepares two different types of development services schemes that are consistent with the State Government's Melbourne 2030 growth strategy. Greenfield schemes are designed to service new development on the urban fringe. Redevelopment schemes preserve existing levels of flood protection in established areas and charges apply to the increased stormwater run-off generated by redevelopment based on a calculated change in impervious surface area.

Forecasting developer contributions for greenfield and redevelopment schemes is informed by detailed planning and expected development rates sourced from the land development industry. While this is useful for pricing individual schemes, there is a tendency for the development industry to be overly optimistic in relation to aggregate rates of development. Melbourne Water, therefore, takes forecasts prepared by a housing industry economist, and converts these to annual growth rates which are applied to actual rates of demand for various development densities. Government land development activity forecasts are also taken into account.

#### Assumptions and data input

Developer contributions for schemes are based on an average per hectare contribution charge applied to various development categories (low, medium, high density) which are sourced from the development activity forecasts referred to above. Assumptions have been made on the timing of activity in the domestic housing construction sector and the future trend of industrial estate development.

### Forecast

Table 6.3 shows forecast cash contributions from developer charges for the 2008 regulatory period. The annual forecasts include cash contributions of $4.0 million from developer charges in the extended areas.

**Table 6.3: Forecast cash contributions ($ million)**

| | 2004/05 | 2005/06 | 2006/07 | 2007/08 | 2008/09 | 2009/10 | 2010/11 | 2011/12 | 2012/13 |
|---|---|---|---|---|---|---|---|---|---|
| Greenfield | 28.9 | 30.2 | 34.6 | 34.5 | 32.7 | 38.1 | 39.4 | 41.4 | 40.2 |
| Redevelopment | 0.2 | 0.3 | 0.5 | 2.1 | 3.0 | 4.3 | 5.9 | 7.7 | 9.9 |
| Corridor | 2.2 | corridor charges removed | – | – | – | – | – | – | – |
| Water quality offset charges | - | 0.9 | 1.1 | 1.5 | 1.6 | 1.3 | 1.2 | 1.1 | 1.0 |
| **Total** | **31.3** | **31.4** | **36.2** | **38.3** | **37.3** | **43.7** | **46.5** | **50.2** | **51.1** |

## 6.1.5 Contributed assets

It is difficult to accurately forecast contributed assets as Melbourne Water does not plan for the construction of these assets. Contributed assets are received when:

- Developers construct assets additional to the scheme design (e.g. larger diameter or longer drains, additional landscaping, water quality works in non-scheme areas)
- A single development is of significant size, representing the majority of the scheme, (e.g. Pakenham West (Delfin)). In these cases the developer constructs all of the works and hands them over to Melbourne Water to manage in lieu of paying contributions
- Significant freeway works are undertaken (e.g. EastLink).

The value of contributed assets can vary significantly from year to year if there are abnormally large gifted assets. This has occurred in recent years with contributions from large single developments.

The forecasts set out in Table 6.4 are based on underlying trends with additional income incorporated in anticipation of the receipt of assets associated with the construction of the Mitcham-Frankston Freeway. Extended areas are expected to contribute $2.4 million over the regulatory period.

**Table 6.4: Forecast contributed assets ($ million)**

| | 2004/05 | 2005/06 | 2006/07 | 2007/08 | 2008/09 | 2009/10 | 2010/11 | 2011/12 | 2012/13 |
|---|---|---|---|---|---|---|---|---|---|
| Contributed assets | 4.7 | 8.8 | 10.6 | 10.5 | 9.3 | 7.6 | 6.0 | 5.2 | 4.9 |

Chapter 7
# Planning

Melbourne Water's planning processes are integrated, robust and provide for appropriate stakeholder engagement and consultation.

Melbourne Water's capital planning and delivery processes have been strengthened to take account of the results of recent benchmarking studies.

Melbourne Water's asset management practices have been independently benchmarked as close to best industry practice.

This chapter provides an overview of how Melbourne Water undertakes planning in order to meet its obligations and future demands for its services discussed in the previous chapters.

The principal planning processes are outlined, together with the key planning documents and outcomes from each process:

- Strategic and corporate planning
- Capital planning
- Asset management
- Project planning approvals and delivery
- Operating planning.

## 7.1 Strategic and corporate planning

Melbourne Water's planning processes are integrated, robust and take explicit account of customer and stakeholder interests.

Melbourne Water's proposed outcomes and expenditure for the 2008 regulatory period have been developed through Melbourne Water's Planning Framework (Figure 7.1) which:

- Ensures alignment with government policy priorities, customer needs, regulator requirements and prudent risk management
- Ensures alignment between long term planning and day to day operational considerations
- Factors in broader economic, social and environmental considerations
- Achieves continuous improvement through regular benchmarking and review of planning processes and outcomes.

**Figure 7.1: Melbourne Water's planning framework**


Melbourne Water's vision, sustainability principles, values and goals are outlined in Sustainable Water – A Strategic Framework. This framework was developed in consultation with internal and external stakeholders and formalises Melbourne Water's commitment to sustainability. It also links Melbourne Water's programs to a range of State Government policy platforms including Our Water Our Future, Our Environment Our Future and Melbourne 2030. The Strategic Framework provides the context for Melbourne Water's planning process, ensuring that social, environmental and economic aspects are all considered.

The Corporate Plan is consistent with the Strategic Framework, articulating strategies, actions and key performance indicators over a three year planning period. Corporate Plan activities and expenditures are set mindful of the Water Plan process, which sets prices and expected regulated revenues for a five year period.

A Sustainability Improvement Plan was developed for the first time in 2007 to implement Sustainable Water – A Strategic Framework. This plan has facilitated the identification and prioritisation of opportunities for improvement in sustainability performance across all areas of Melbourne Water's business. It also addresses a requirement in its Statement of Obligations to apply Sustainable Management Principles and develop programs for improving sustainability performance including:

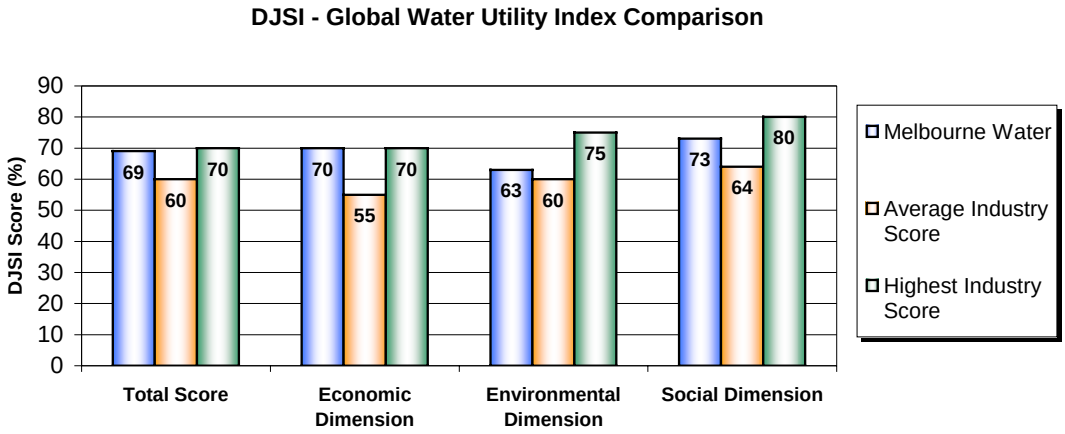
- Responding to climate change
- Maintaining and restoring natural resources
- Using resources more efficiently
- Managing everyday environmental impacts.

In 2006, Melbourne Water participated in a process to assess its sustainability performance against publicly listed companies considered to be world leaders in sustainability. The Sustainable Asset Management Group (SAM) which publishes and licenses the Dow Jones Sustainability World Indexes (DJSI), a series of global sustainability benchmarks, carried out the benchmarking survey. The indexes are based on SAM's corporate sustainability assessment, which identifies global sustainability leaders on the basis of economic, environmental and social criteria.

Overall, Melbourne Water performed well against global water utilities, being ranked at best practice for economic considerations. However, scope for improvement was identified in the social and environment dimensions, as Melbourne Water was above average but below the highest industry scores. This is illustrated in Figure 7.2 below.

Areas of improvement included waste and bi-products treatment, improved recording of water use, talent attraction and retention and corporate citizenship. Melbourne Water has considered the benchmarking results and improvement actions have been incorporated in a Sustainability Improvement Plan to be implemented over the 2008 regulatory period.

**Figure 7.2: Dow Jones sustainability world indexes – Global Water Utility Comparison**




The Board of Melbourne Water approves the Strategic Framework, the Corporate Plan and the Sustainability Improvement Plan. The Managing Director and Leadership Team are responsible for delivering the outcomes in accordance with these plans.

### 7.1.1 Strategic planning for waterways and drainage

In relation to waterways and drainage, strategic planning for these services encompasses flood management and drainage, waterways water quality, river health and planning to serve urban growth.

A regional Flood Management and Drainage Strategy has been prepared in consultation with the community and key stakeholders to improve the effectiveness of flood management in the Port Phillip and Westernport region**.** The strategy plans for future pressures on the drainage system and gives consideration to the effects of climate change and urban consolidation.

A Development Planning Strategy and Program has been prepared to identify the provision of drainage infrastructure needed to service urban development and improve the efficiency of information systems and processes to service the development industry and community. Individual development and redevelopment schemes are prepared, implemented and reviewed according to the Development Planning Strategy and Program.

A Waterways Water Quality Strategy has been prepared to improve the water quality of waterways in the context of a growing metropolis. This strategy forms part of the Better Bays and Waterways action plan being prepared by EPA Victoria and Melbourne Water, which will be released for public consultation in early 2008.

The Port Phillip and Westernport Regional River Health Strategy and Addendum has been prepared in consultation with the community and key stakeholders to improve the effectiveness of river health management in the region. The Minister for Water endorsed the strategy in 2006. Waterway Plans are prepared to help translate priorities in the Regional River Health Strategy into a program of works for individual rivers and creeks to improve their condition.

A Waterways Operating Charter has been developed in consultation with the Waterways Advisory Committee and sets out Melbourne Water's responsibilities, goals and initiatives for waterways and drainage management. The Charter includes initiatives from the new strategies referred to above.

## 7.2 Capital planning and delivery

Melbourne Water's approach to capital planning is set out in its Planning Framework and Capital Investment Policy. This document defines the process, principles and accountabilities for developing the Capital Plan. The aim is for Melbourne Water to achieve its strategic objectives and manage risk though a policy and planning framework that optimises value for customers, the community and shareholders.

The Capital Plan represents the aggregated capital program, prioritised by the Capital Investment Steering Committee for subsequent approval by the Board. Program Plans represent a group of projects associated with a common system component (e.g. drainage and flood protection) or strategic objective and form the building blocks for the Capital Plan. Program Plans summarise the key strategic considerations, performance obligations, risk assessment, long term trends, prioritisation considerations and rationale for allocations to major programs.

The Planning Framework and Capital Investment Policy recognises the principal drivers of capital expenditures – growth, renewals, compliance and other (which include environmental/social, customer service, strategic intent/risk mitigation, business efficiency and business development). These are outlined below:

- The growth component is developed in line with requirements detailed in Development Service Schemes and are consistent with population growth projections provided by State government planning departments and policy objectives outlined in Melbourne 2030
- The renewals component is developed by adopting a risk based approach that optimises lifecycle costs through maintenance, refurbishment and replacement of assets
- The compliance component is consistent with agreed customer service standards and regulatory obligations set out in the Waterways Operating Charter.

Since submission of the 2005 Water Plan, Melbourne Water has undertaken reviews and benchmarking studies with a view to strengthening its capital planning and delivery processes:

- During 2005/06, a benchmarking study was undertaken with a leading UK water company with a specific focus on capital planning and delivery processes
- In June 2006, Melbourne Water engaged KPMG to review its capital planning and delivery process against industry 'best practice' to provide a basis for improving the process itself and the systems and other factors that support it.

The results of these reviews are progressively being implemented. Improvements to date include:

- Strengthened governance arrangements through the establishment of a Board committee on capital planning and delivery
- A more rigorous process of review/challenge of project proposals, including greater accountability for Program Champions to develop Program Plans
- A streamlined capital planning process which frees up resources for program/project review
- Improved forecasting of renewals capital expenditure on mechanical and electrical equipment
- Introduction of Triple Bottom Line guidelines for evaluating expenditure proposals
- An improved cost estimation methodology for high value/high risk projects.

Melbourne Water has also enhanced its Contract Strategy and developed a Capital Delivery Strategy to address the issue of delivering a much larger capital program in a highly competitive contracting market. See Chapter 8 for further detail in relation to the Capital Delivery Strategy.

## 7.3 Asset management

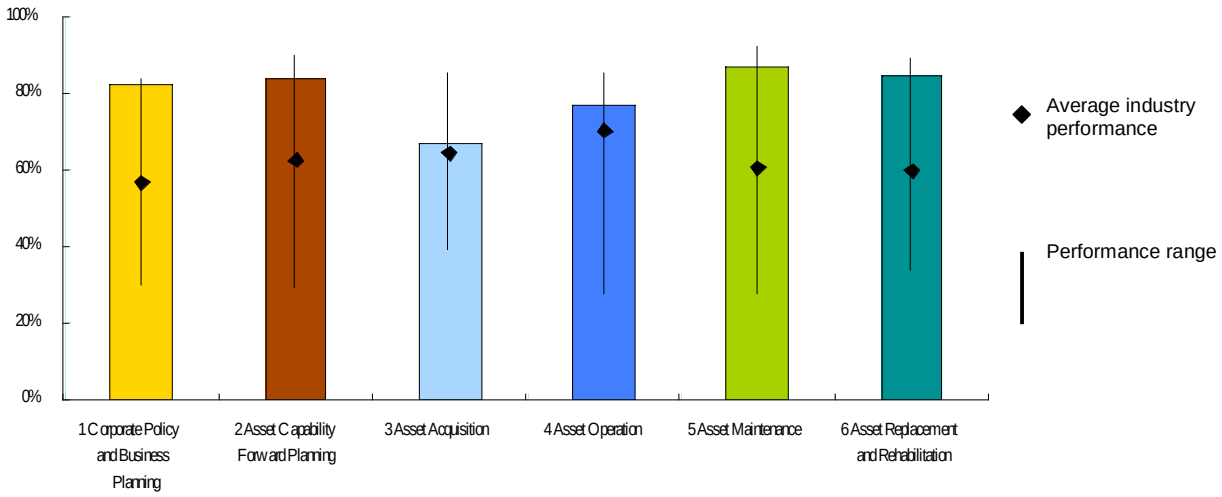
Melbourne Water has a comprehensive Asset Management System that involves appropriate planning throughout the asset lifecycle. As can be seen in Figure 7.3, the Asset Management System links to the Corporate Plan and Strategic Framework.

**Figure 7.3: Asset management system**

The Asset Management System achieves business performance targets for built and natural assets using sustainable management principles. The Asset Management System comprises guidelines, management plans, processes and procedures, instructions and forms and is guided at the strategic level by the Asset Management Policy and Asset Management Strategic Framework.

The Asset Management System is independently audited every four years to assess current performance against Australian and overseas utilities and to identify improvement opportunities. The results of the most recent audit (2004) are shown in Figure 7.4 below, which shows that Melbourne Water operates its asset management process at, or close to, best practice within the water industry.

**Figure 7.4: WSAA Asset Management Benchmarking 2004, Melbourne results summary**




An annual Condition Assessment Report ('State of the Assets') summarises the condition of assets at a point in time. This feeds into the renewals program, asset specific management plans, operating manuals and maintenance schedules. The State of the Assets Report informs renewal planning in the short term (one to two years) for civil, mechanical and electrical assets.

The State of the Assets Report is used to assess specific asset performance relative to levels of service as identified in the Strategic Asset Management Plans, including energy efficiency and maintenance frequency. Material deviations in levels of service (including average maintenance costs) will trigger a review of asset life cycle cost, which will then determine whether the asset should be repaired or renewed.

Longer term renewal planning (more than two years) varies in application depending on the asset class, but essentially uses historic asset performance and industry published data to model and predict asset life and therefore provide probabilistic replacement profiles for each asset class.

The State of the Assets Report is regularly updated and presented to the Board annually.

## 7.4 Project planning approvals and delivery

A project evolves through several approval stages with “gateways” established for preliminary project approval, business case approval and expenditure approval. Melbourne Water’s Capital Project Planning and Delivery Guidelines, Triple Bottom Line (TBL) Guidelines and Investment Evaluation Model User Guide specify in detail the process to follow for developing project approvals and the methodology to be applied in project evaluation. The Contract Strategy notes initiatives to streamline these processes to facilitate delivery of a larger capital program.

All projects use financial analysis to evaluate alternative solutions. Projects with capital expenditures greater than $1 million and involving significant environmental and/or social effects are subject to a TBL evaluation to ensure broader environmental and social values are taken into account in decision making.

Authorisation levels and delegations for approval are documented in Melbourne Water’s Authorisation Levels Policy. The Board approves all projects greater than $5 million. The Department of Treasury and Finance and the Department of Sustainability and Environment have to approve the business case for all projects greater than $5 million. Melbourne Water has subjected several high risk projects to the Department of Treasury and Finance’s Gateway Review Process to identify key issues in project planning and delivery.

All projects satisfying Partnerships Victoria criteria (e.g. greater than $10 million and having clearly specified outputs, including measurable performance standards) are also considered in terms of the form of private sector involvement.

## 7.5 Operating expenditure planning

Operating expenditure planning is undertaken within the context of the broader Melbourne Water strategic planning framework Sustainable Water – A Strategic Framework. The planning process expands the Strategic Framework into more detailed action plans (e.g. the waterways related planning documents detailed in Section 9.7).

This ensures that business structure, available resources and realistic timeframes are taken into account in operating expenditure planning. This planning process also draws on the Capital Plan for any associated operating expenditure impacts.

Planned operating expenditure is determined through a detailed submission and review process that draws upon:

- State Government policies including Our Water Our Future, Our Environment Our Future and Melbourne 2030, the CRSWS and the State Government’s Water Plan
- Statement of Obligations
- Regulatory obligations
- Customer requirements
- External environmental impacts (political, legal, economic, social and environmental).

As indicated above, this is drawn together through the Program Plans which summarise the key strategic considerations, performance obligations, risk assessment, long term trends, lifecycle costs, prioritisation considerations and rationale for allocations to major programs.

The principal document of the operating expenditure planning process is the Financial Operating Plan. This plan covers a six year expenditure period (currently 2007/08 to 2012/13) capturing operating expenditures. The planned operating expenditures are also reviewed for consistency with capital expenditures included in the Capital Plan. The Financial Operating Plan is reviewed by the Financial Management Steering Committee and approved by the Board.

Each business unit is responsible for development of future operational expenditure requirements. This approach ensures the business areas that spend the money are accountable for it through the budget and reporting process. Costs are classified against cost centres for specific expenditure types (e.g. civil maintenance costs) to ensure appropriate ongoing monitoring of performance against plan. In an asset intensive industry like the water industry, this approach has the advantage of aggregating the skills and expertise relating to specific asset classes enabling:

- Identification of best practice processes and systems
- Ensuring that service levels and quality outcomes are aligned with customer, stakeholder and regulatory outcomes
- Integration of capital and operating expenditure to ensure optimised overall expenditure levels.

Historical expenditure is an important consideration in determining future operating expenditure requirements. An understanding of historical trends and expenditure levels can significantly improve the understanding of likely future expenditures. The Melbourne Water operational expenditure planning process includes a system of checks and reporting frameworks that review historical expenditures against planned outcomes to ensure that variations are understood and justified. The process includes an escalating review requirement based on the magnitude of the variation.

Melbourne Water recognises the need for continual efficiency improvement and undertakes benchmarking and performance review programs on a regular basis to identify emerging best practice, identify opportunities for improvement and set targets for improved performance. Details of the benchmarking and performance improvement initiatives are discussed above, as well as in Chapters 8 and 9.

## 7.6 Planning documents

The key planning documents are summarised below.

| | |
|---|---|
| **Strategic and Corporate Planning** | – Strategic Framework – Sustainable Water<br>– Corporate Plan<br>– Sustainability Improvement Plan |
| **Capital Planning and Delivery** | – Planning Framework and Capital Investment Policy<br>– Capital Plan<br>– Program Plans<br>– Contract Strategy<br>– Capital Delivery Strategy |
| **Asset Management** | – Asset Management Policy<br>– Asset Management System Framework<br>– Independent audits of asset management processes<br>– Condition Assessment Report |
| **Project Planning Approvals** | – Capital Project Planning and Delivery Guidelines<br>– Triple Bottom Line Guidelines<br>– Investment Evaluation Model User Guide<br>– Authorisation Levels Policy |
| **Agreements and Schemes** | – Drainage Schemes |
| **Operating Expenditure Planning** | – Financial Operating Plan |
| **Waterways and Drainage Planning** | – Central Region Sustainable Water Strategy<br>– Port Phillip Region Flood Management and Drainage Strategy<br>– Regional River Health Strategy<br>– Waterways Water Quality Strategy<br>– Stream Flow Management Plans<br>– Waterways Operating Charter<br>– Climate Change and Variability Adaptation Study |

Chapter 8

# Capital Expenditure

Melbourne Water forecasts capital expenditure for waterway and drainage services of approximately $589.5[1] million over the 2008 regulatory period.

This investment is directed to meet the needs of urban growth, accelerating works to restore waterway health, reducing flood risk in areas where flooding results in high economic and social costs, and removing a range of pollutants from stormwater and catchment run off.

This large capital program is capable of being delivered by adopting a range of communication and contract and delivery strategies, increasing internal project management resources and skills, and enhancing critical processes and IT systems.

Melbourne Water seeks to maximise capital efficiencies and minimise lifecycle costs through innovative approaches to planning, design and delivery.

This chapter presents Melbourne Water's proposed capital investment forecast for waterways and drainage services over the 2008 regulatory period.

These forecasts are used to determine the revenue requirements in Chapter 11 based on obligations and demand forecasts and actions described in Chapters 5 and 6. The forecasts have been developed through the planning framework, processes and strategies described in Chapter 7 which ensures expenditures are linked to business strategy and stakeholder requirements as well as optimising operating and capital expenditures over asset lives. Appendix 1 provides a summary of obligations, activities and expenditures for each major program area. Details of the top ten projects over the 2008 regulatory period are provided in Appendix 2.

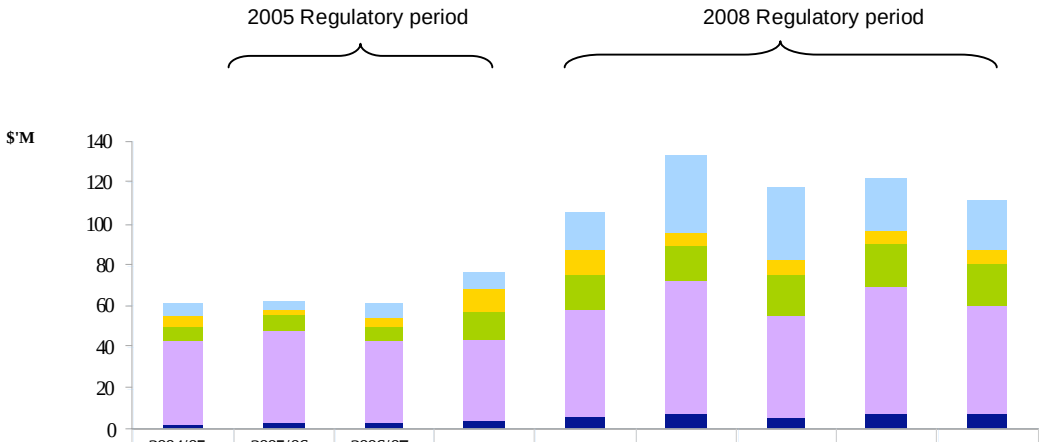
## 8.1 Capital expenditure forecasts

### 8.1.1 Waterways and drainage

Planned waterways and drainage investments total $589.5 million over the 2008 regulatory period. This includes an allocation of corporate investments of $33.7M (5.7% of planned investments) associated with business as usual information technology to replace hardware and software to maintain levels of performance. Figure 8.1 shows historical and proposed expenditures for each program.

[1] All expenditures in this chapter have been expressed in 2006/07 dollars.

**Figure 8.1: Actual and forecast capital expenditure by program – 2004/05 to 2012/13** [2]

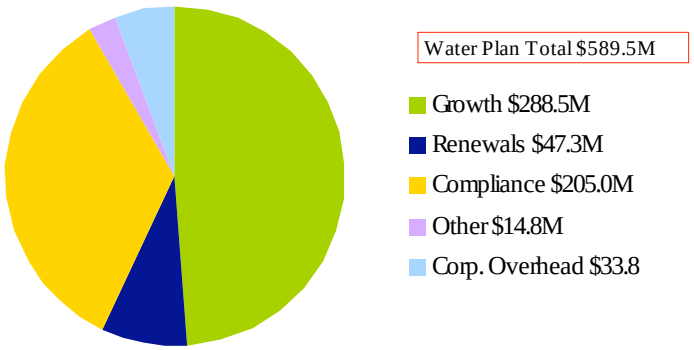



| | 2004/05 Actual | 2005/06 Actual | 2006/07 Actual | 2007/08 | 2008/09 | 2009/10 | 2010/11 | 2011/12 | 2012/13 |
|---|---|---|---|---|---|---|---|---|---|
| Drainage & Flood Protection | 5.7 | 4.3 | 8.5 | 9.2 | 18.0 | 37.3 | 35.5 | 24.9 | 23.9 |
| Stormwater Quality | 4.9 | 2.1 | 2.5 | 11.2 | 12.5 | 5.6 | 6.5 | 6.4 | 7.3 |
| Waterways Condition | 7.2 | 7.9 | 8.4 | 12.0 | 17.0 | 17.6 | 20.7 | 20.7 | 20.7 |
| Land Development | 40.8 | 45.1 | 39.3 | 40.0 | 51.4 | 64.2 | 49.9 | 62.6 | 53.1 |
| Corporate Overhead Allocation | 2.4 | 2.8 | 3.3 | 4.6 | 6.7 | 7.9 | 5.4 | 6.9 | 6.8 |
| **Product Total** | **61.0** | **62.3** | **62.0** | **76.9** | **105.7** | **132.6** | **118.0** | **121.4** | **111.8** |

Capital investment is expected to increase over the 2008 regulatory period, on average, by approximately 8% per year relative to 2007/08. A key driver of the increase in capital expenditure is due to meeting new obligations (see section 8.1.2).

Figure 8.2 summarises the major drivers of investment for the 2008 regulatory period.

**Figure 8.2 Waterways and drainage capital drivers – 2008/09 to 2012/13**

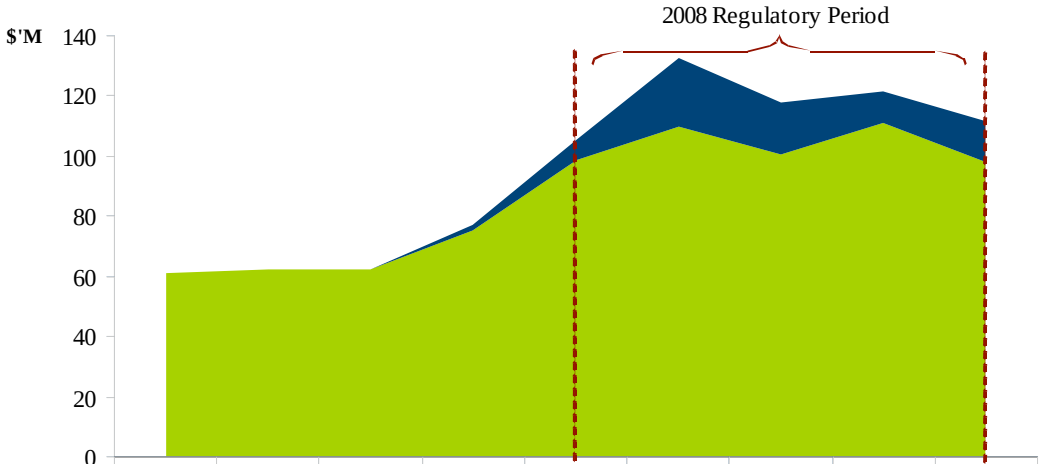



[2] Appendix 1 provides a summary of obligations, activities and expenditures for each major program area.

### 8.1.2 New obligations and business as usual expenditures

Increases are forecast for business as usual investments early in the regulatory period and additional investment is required to comply with new obligations and service standards. Figure 8.3 shows the profile of business as usual (88%) and new obligations (12%) investments over the 2008 regulatory period.

**Figure 8.3: Business as usual and new obligations/service standards capital – 2005/06 to 2012/13**




| | 2004/05 | 2005/06 | 2006/07 | 2007/08 | 2008/09 | 2009/10 | 2010/11 | 2011/12 | 2012/13 |
|---|---|---|---|---|---|---|---|---|---|
| New Obligations | 0.0 | 0.0 | 0.0 | 1.4 | 7.1 | 22.7 | 17.4 | 10.4 | 13.7 |
| Business as Usual | 61.0 | 62.3 | 62.0 | 75.5 | 98.6 | 109.9 | 100.6 | 111.0 | 98.1 |

As discussed in Chapter 4, the Commission has defined new obligations as those that come into effect from 1 July 2008. Melbourne Water considers that an alternative approach is to identify new obligations which came into effect within the 2005 regulatory period and which were not included in the 2005 Water Plan.

New obligations coming into effect from 1 July 2005, and which were not included in the 2005 Water Plan, were outlined in Chapter 3. Over the 2008 regulatory period, capital expenditure on new obligations is $71.3 million. In particular, significant capital expenditure is planned to meet the following new obligations:

- Investment in flood protection works to meet the new Operating Charter requirement of reducing intolerable flood risks in areas where flooding results in high economic and social costs ($63.9 million)
- Program of load reduction works to remove a range of pollutants from stormwater and catchment run-off to meet new requirements in the Waterways Operating Charter and targets set out in the Waterways Water Quality Strategy ($4.4 million)
- Managing environmental flows in line with newly established Environmental Entitlements ($0.7 million) and works to improve estuary environments in line with new responsibilities as caretaker of river health in the Port Phillip and Westernport region ($2.3 million).

Planned investment in Melbourne Water's extended areas totals $55.1 million over the 2008 regulatory period.

Increases in business as usual investments over the 2008 regulatory period, relative to 2007/08 are primarily driven by:

- Acceleration of works to restore waterway health to meet the objectives in the Regional River Health Strategy and Waterways Operating Charter ($18.5 million)
- Increased developer-funded growth works to meet industry and Government land development projections ($77 million).

### 8.1.3 Approach to cost estimation

The Commission requires capital expenditure forecasts to be adequate to efficiently deliver the service levels required by customers and to meet all regulatory obligations. The accuracy of cost estimates in the Capital Plan varies for each project according to its maturity when the plan is formulated.

In its 2005 Water Plan, Melbourne Water did not include contingency for projects in the Capital Plan without formal project approval, because the compounding effect of contingency estimates in every project would overstate the budget required on an annual basis.

To improve the accuracy of project cost estimates in this 2008 Water Plan, Melbourne Water has taken explicit account of project risk and uncertainty. Cost estimates for high value/high risk projects were developed using a risk-based, probabilistic analysis. This analysis was applied to 'one-off' projects at the early feasibility and design stages with expenditures greater than $5.0 million.

A risk-adjusted cost estimate defines the range of costs for a project in probability terms, based on a rigorous assessment of the risks that might cause the actual costs to change when the project is implemented. A risk-adjusted cost estimate is developed by applying a risk factor (likelihood and consequence) against each significant 'raw' cost element of the project and then using a probabilistic analysis to combine the risk-factored cost estimates into a total project cost. The combined estimate is then expressed as a cost distribution with the most likely cost at the mean (P50) and the extremes at the 5$^{th}$ percentiles (P5 and P95) on the distribution curve.

The statistical mean for each high-value/high-risk project (P50) is included in the 2008 Waterways Plan. Accuracy levels are shown as a range between the upper (P95) and lower (P5) percentiles i.e. there is a 90% chance that the project final cost will fall within this range.

Accuracy levels for project estimates not developed using the risk-adjusted analysis reflect the different stages of planning:

- Investigation: +/- 30% to +/- 50%
- Functional design: +/- 30%
- Detailed design: +/- 10% to +/- 20 %
- Construction: +/- 5%.

The accuracy bands for major waterways and drainage capital projects are given in Appendix 2.

In developing the Capital Plan, Melbourne Water also gave consideration to adjusting proposed capital expenditures to take account of differences between forecast increases in construction cost and the consumer price index (CPI). The metropolitan water businesses jointly engaged independent economic forecaster, Econtech, to forecast movements in construction costs over the 2008 regulatory period.

Econtech's forecast annual increases in construction costs for various categories of work are:

- Water distribution 4.3%
- Sewerage transfer 3.5%
- Treatment 3.4%

This compares to forecast CPI for Australia of 2.6% per year.

These forecasts were applied to the various categories of works in Melbourne Water's Capital Plan resulting in a weighted index of 3.4%, about 0.8% above forecast CPI. Applying this price differential would increase total Waterways capital expenditure over the 2008 regulatory period by $18 million (about 3%).

Whilst Melbourne Water considers that the principle of indexing capital expenditures for forecast increases in construction costs above CPI is important, it has not adjusted capital expenditures in the 2008 Water Plan given other cost pressures on customer bills for water, sewerage and waterways drainage services.

### 8.1.4 Capability to deliver large capital program

The Commission has indicated that deliverability of capital expenditure within the regulatory period is a key issue that it wishes to assess.

Melbourne Water recognises the challenge of delivering a larger investment program (not only for waterways and drainage services but also for its water and sewerage services) in a highly competitive contracting market.

Melbourne Water has consulted waterways, water and construction industry consultants, developers and contractors on its planned water, sewerage and waterways and drainage capital expenditure over the 2008 regulatory period. The feedback is that the proposals are ambitious, but achievable. This view is supported by industry data that shows the recent rapid growth in construction activity has been absorbed by industry growth and therefore capacity will exist to service Melbourne Water's capital program.

To deliver a significantly larger total business (including waterways and drainage) capital program, Melbourne Water is making changes to the way projects are planned, contracted, resourced and delivered. Melbourne Water is confident that successful delivery of the capital program can be achieved based on:

- Its successful track record in delivering its capital expenditure program over the past 5 years during which time capital expenditure has nearly doubled
- Approaching the market early and publicising the upcoming work widely to assist contractors and consultants with their business planning and recruitment and training of industry specialists. This is important in both attracting the right contractors and consultants with specialised skills for the projects and in ensuring that Melbourne Water establishes arrangements that have the appropriate allocation of risk and resources
- Choosing contract and delivery strategies appropriate to the size, complexity and risk of projects. A decision matrix will be used to select the delivery model best suited to each project, group of projects or program
- For the Waterways and Stormwater Program, medium scale projects will be delivered through collaborative contracts. For minor capital works, service provider contracts will deliver both day to day maintenance and high volume, low risk capital works

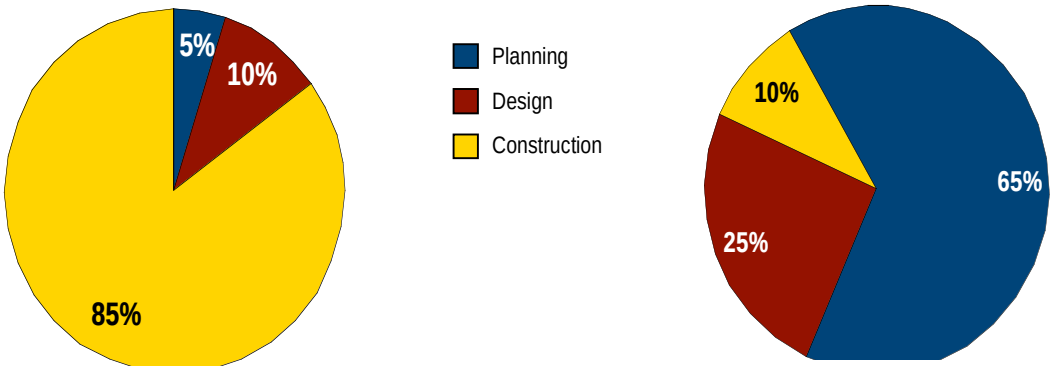
- Continuing the current panel arrangements for consultants and spreading the workload across a number of firms to underpin and assist the expansion of the water sector consulting industry in Victoria
- Considering the 'bundling' of smaller projects to improve efficiency
- Improving working relationships with key stakeholders to negotiate optimum solutions and timing for projects
- Identifying the skills required to deliver the capital program and implementing human resources initiatives to attract and retain the requisite skills. Operations and asset management teams will be supplemented with additional staff to facilitate appropriate input to the program
- Enhancing the processes and information technology systems that support the capital planning and delivery process.

## 8.2 Efficiency gains and initiatives

Melbourne Water is a capital-intensive business. The majority of opportunities to achieve efficiency gains are captured through the planning process by focussing on strategies to achieve cost-effective solutions for capital and operating expenditure.

Engineering studies of investment in water infrastructure have analysed opportunities for achieving capital efficiency by comparing actual project expenditure to the factors which influence final project cost. Figure 8.4 shows how the planning and design stages offer the most significant opportunity to influence final project cost. The delivery stage represents the majority of project expenditure. However, innovations at this stage have the least influence on final project cost.

**Figure 8.4:**
**Actual project expenditure** **Influence on final project cost**




The *planning stage* in the capital process identifies needs, potential solutions, scope, relative priority and timing of projects. Innovative solutions and prioritisation will have the most significant impact on costs.

The *design stage* includes the detailed definition and design for projects. Project design is contracted out through competitive tender processes. Emphasis is placed on maximising value from investments through processes such as value engineering studies at the early stages of project planning and design and by incorporating learnings from post-implementation reviews.

The *delivery stage* in the capital process includes materials purchase and construction of assets. Effective project management, contract management and strategic purchasing arrangements can improve capital efficiency at the delivery stage.

The following section discusses Melbourne Water's approach to achieving efficiencies in planning, design and delivery of assets and gives examples of where significant savings have been and will continue to be achieved.

### 8.2.1 Planning

The opportunity to influence capital efficiency through planning and prioritisation will depend on the project driver and stakeholder requirements. Table 8.1 describes Melbourne Water's prioritisation considerations and stakeholder involvement in the planning process. Managing risk is an integral part of the efficiency equation, measured through the probability and consequence of not doing or deferring investment.

**Table 8.1: Planning and prioritisation considerations**

| Driver | Planning and prioritisation considerations | Stakeholders |
|---|---|---|
| **Meeting existing services standards** | **Not if but when** | |
| Renewals | • Maintenance opportunities optimised?<br>• Consequences of deferral (residual risk) | • Internal<br>• Local government |
| Growth | • Can demand/peaks be influenced?<br>• Consequences of deferral (residual risk) | • Community<br>• Developers |
| **Meeting new services standards** | **Do we have to do it? If so, when?** | |
| Compliance | • Can timing/standard be negotiated?<br>• Consequences of deferral (residual risk) | • Technical regulators |
| Other | • Can it demonstrate positive efficiency gains?<br>• Will it meet environmental and social strategic objectives?<br>• Will it mitigate risk?<br>• Is the community willing to pay? | • Community<br>• Board |

#### Renewals

Melbourne Water conducts a comprehensive condition assessment as part of its asset management planning. This is reflected in a Condition Assessment Report prepared each year making planning for renewals timely, targeted and relative to other priorities. The risk matrix (Figure 8.5) used by Melbourne Water is consistent with the Australian Standard and best practice for risk management. Projects with high likelihood and consequence of failure are prioritised.

**Figure 8.5: Risk management matrix**

Criticality (Consequences of Failure) →

Condition (Probability of Failure) ↑

| | AAA | A | B | C |
|---|---|---|---|---|
| 5 | 5 | 4 | 3 | 2 |
| 4 | 4 | 3 | 2 | 1 |
| 3 | 3 | 2 | | |
| 2 | | | | |
| 1 | | | | |

## Growth

Drainage infrastructure is planned for the whole of the catchment in a greenfield situation. By undertaking the whole of the catchment planning investment in assets to be owned by Melbourne Water and local governments is optimised.

An example of this is provided by Melbourne Water's significant role in developing Clause 56 of the Victoria Planning Provisions for residential subdivision which directs local government to implement requirements for stormwater treatment, assess treatment design, and ultimately manage distributed treatments. Melbourne Water supports Clause 56 as it will see increased treatment at source and reduce reliance on Melbourne Water funded regional wetlands (which are becoming increasingly expensive as land and construction costs increase). To assist implementation of Clause 56, Melbourne Water has employed a Local Government Liaison Officer who assists local government in technical issues and training regarding application of the clause for urban runoff management. Melbourne Water has also initiated a number of local government capacity building initiatives (as discussed in Chapter 5).

## Compliance

Melbourne Water undertakes major research to inform decisions by government and regulators on environmental standards. It also invests in monitoring and modelling to develop cost effective solutions for meeting standards.

Compliance can be costly and often requires the application of evolving technologies. Melbourne Water remains abreast of international developments and technology transfer through membership of international water associations and participation in international study tours relevant to Melbourne Water regulatory issues.

An example of investigations being undertaken through monitoring and modelling to reduce costs or improve targeting of resources in future planning include the purchase and use of probes that measure the quality of runoff water in the piped drainage system. Sewage entering into the stormwater system and discharged into rivers and creeks creates health risks to recreational users of waterways. Special probes can detect the poor quality that is characteristic of sewage contamination. Detections allow the tracing of contamination to its source where problems can be rectified. Public health risks decrease and river health improves.

### 8.2.2 Design

Melbourne Water has typically out-sourced its design work through competitive tendering processes. Value is maximised at the design stage through design processes and contracting arrangements that provide incentives for innovation (captured through the Value Engineering process), minimise lifecycle costs and capture learning's from past experience.

Melbourne Water has appointed a panel of eight engineering consultants through a tender process. Projects are assigned based on relevant individual experience and skill. A formal annual performance evaluation is conducted for each firm on the panel to identify opportunities that enhance innovation and improve value.

In addition to minimising costs, innovative design delivers broader community benefits. For example, collaboration between City of Frankston and Melbourne Water has seen a skate park integrated into the embankment of the proposed Samuel Sherlock Reserve retarding basin.

#### Design process and contract incentives

Melbourne Water is increasingly using relationship agreements for large investments to improve project deliverables and reduce lifecycle costs. Compared to traditional lump sum contracting, relationship agreements:

- Allow Melbourne Water to better manage risk and scope changes
- Provide commercial incentives for parties to minimise costs and achieve key performance indicators
- Discourage disputes by encouraging cooperative behaviour and effective management of resources and efficient allocation of risk.

#### Post implementation reviews and adaptive management

Post Implementation Reviews are conducted for projects greater than $1.0 million, projects over budget, or where the potential for learning has been identified. A summary of key learnings is reported annually to the Board and shared with relevant planning and operational people to ensure the transfer of learnings.

Examples of key changes adopted since the last annual review include:

- Adopting risk methodologies when estimating project cost
- Improved stakeholder management and approaches to achieving statutory approval processes
- Promoting co-location of project teams.

### 8.2.3 Construction

The opportunities to capture capital efficiencies at the delivery stage become more limited as the majority of capital costs are dictated by the adopted solution and design. Delivery costs are minimised through effective project management and contract management.

#### Project management

Project and contract management is outsourced where necessary, providing flexibility and access to competitive processes to select specialised skills. Internal resources are focussed on the project initiation stage and development of delivery strategies.

The key benefits of project management are gathered up-front through the delivery planning. A contract delivery strategy developed for both large and complex projects and project programs can avoid significant costs by considering:

- Form of contract to be adopted
- Risk allocation decisions
- Contract interface risk and packages where there are multiple contractors
- Industrial relations strategies
- Time, cost and scope control.

#### Contract management and strategic purchasing

The relationship agreements and value engineering concepts previously discussed have flow-through benefits to the delivery stage. Melbourne Water's contract strategy further enhances capital efficiency and management of risk at the delivery stage.

The non-standard nature of projects related to trunk infrastructure means that design-and-construct forms of contract commonly used by other utilities are less attractive to Melbourne Water. These forms of contracts often lead to poor performing assets in the short to medium term and do not minimise lifecycle costs.

The use of benchmark unit costs used by network utility businesses with standard pipes or wires to demonstrate capital efficiency is not usually applicable to Melbourne Water investments where individual assets tend to be unique or infrequently acquired.

Strategic purchasing contracts have been identified where it is more cost-effective for Melbourne Water to undertake purchasing of equipment outside of individual contracts.

Melbourne Water's standard contracting arrangements prioritise issues such as safety, industrial relations and environmental management to avoid risks and adverse public perceptions associated with these delivery issues. These benefits are real but difficult to quantify as savings.

Chapter 9

# Operating expenditure

Melbourne Water's planned operating expenditure for waterways and drainage services totals approximately $453.5[1] million over the 2008 regulatory period.

Forecast annual operating expenditure will remain relatively stable, which reflects initiatives to reduce costs and improve efficiency and service performance. This is despite upward pressures on costs that include meeting new regulatory obligations, maintaining an expanding asset base and higher industry wide costs.

This chapter outlines Melbourne Water's proposed operating expenditure [2] for waterways and drainage services over the 2008 regulatory period, the primary drivers of planned increases and proposed initiatives to achieve efficiency savings in the context of the total business. The expenditure forecasts are based on waterway outcomes, actions and demand forecasts described in Chapters 5 and 6 and are used in determining revenue requirements in Chapter 11. The forecast operating expenditure has been developed through the planning processes described in Chapter 7 which ensure expenditures are aligned to business strategies and external requirements and is consistent with the proposed capital expenditure in Chapter 8. Appendix 1 provides a summary of obligations, activities and expenditures for each major program area.

## 9.1 Background

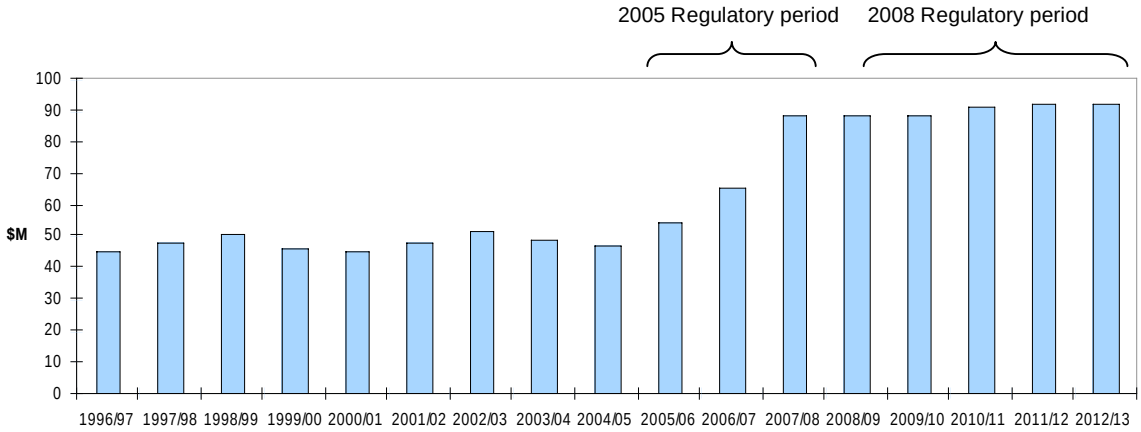
Melbourne Water as a business has achieved significant efficiency savings since the water industry was disaggregated in 1995. These savings have been achieved on an increasing asset base and with growing government, regulatory and customer requirements. These reductions have been captured through initiatives such as competitive tendering, streamlined business processes, enhanced business systems and lower power and chemical costs.

In relation to waterways and drainage services, operating costs have remained relatively stable in real terms over the period 1996/97 to 2004/05 as illustrated by Figure 9.1. The step increase in operating costs in 2005/06 is primarily due to the introduction of services in Melbourne Water's extended boundary area and commencing waterway improvement activities to meet targets included in the Regional River Health Strategy. Section 9.2.2 provides an explanation around the step increase in 2007/08.

[1] All expenditures in this chapter have been expressed in 2006/07 dollars.

[2] Total operating expenditure includes operating, maintenance and administration costs.

**Figure 9.1: Waterways and drainage actual and forecast operating expenditure – 1996/97 to 2012/13**

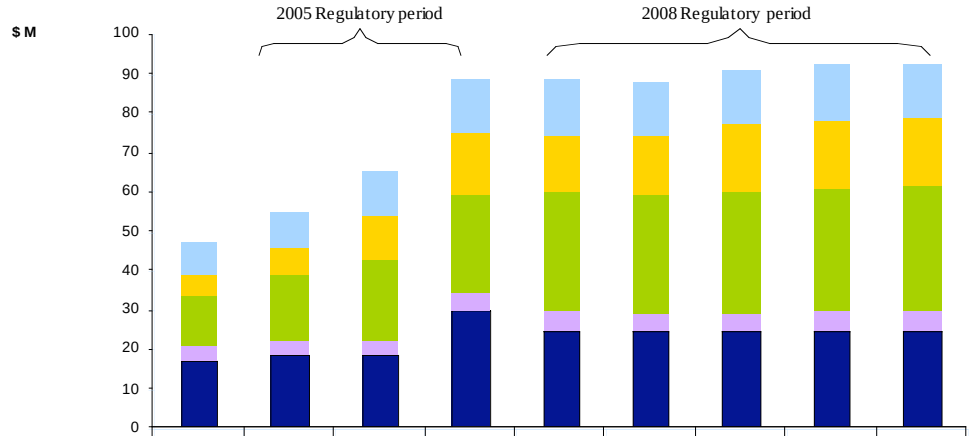



## 9.2 Operating expenditure forecasts

### 9.2.1 Waterways and drainage

Forecast operating expenditure over the 2008 regulatory period for waterways and drainage services is $453.5 million. This includes corporate overhead allocations of $123.4 million (27% of total operating expenditure) which includes costs associated with functional areas such as information technology, human resources, finance, risk management, insurance and research and technology. Average annual expenditure over the 2008 regulatory period is approximately $91 million compared to $70 million over the 2005 regulatory period. Figure 9.2 illustrates this on an annual basis, for each major operating program. Appendix 1 provides a summary of obligations, activities and expenditures for each major program area.

**Figure 9.2: Waterways and drainage operating expenditure by program – 2004/05 to 2012/13**

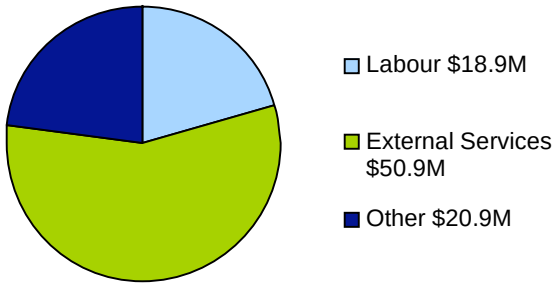



| | 2004/05 Actual | 2005/06 Actual | 2006/07 Actual | 2007/08 | 2008/09 | 2009/10 | 2010/11 | 2011/12 | 2012/13 |
|---|---|---|---|---|---|---|---|---|---|
| Drainage & Flood Protection | 8.5 | 8.5 | 11.2 | 13.2 | 14.1 | 14.0 | 14.0 | 14.1 | 13.9 |
| Stormw ater Quality | 5.4 | 7.1 | 11.7 | 15.9 | 14.5 | 14.7 | 16.8 | 17.5 | 17.4 |
| Waterw ays Condition | 12.6 | 16.4 | 20.3 | 25.0 | 30.2 | 30.4 | 31.0 | 31.1 | 31.5 |
| Land Development | 3.5 | 4.3 | 3.9 | 4.8 | 5.1 | 4.9 | 5.0 | 5.0 | 5.0 |
| Corporate Overhead Allocation | 17.5 | 18.4 | 18.5 | 29.7 | 24.7 | 24.5 | 24.4 | 24.8 | 25.0 |
| **Product Total** | **47.5** | **54.6** | **65.6** | **88.6** | **88.7** | **88.4** | **91.2** | **92.4** | **92.8** |

Waterways and drainage operating expenditure is expected to increase over the 2008 regulatory period, on average, by approximately 0.9% per year relative to 2007/08. A key driver of the increase in operating expenditure is meeting new obligations (see Section 9.2.2).

Figure 9.3 shows the average annual composition of the proposed operating expenditure over the 2008 regulatory period by resource input. The low level of mechanisation associated with waterway and drainage services means that expenditure on energy and materials is less than 1% of waterways operating costs. External services represent the majority of average annual operating expenditure which will continue to be subject to contracting and competitive tendering over the 2008 regulatory period. Major contract activities include maintenance, repairs and grass cutting.

**Figure 9.3: Average annual waterways and drainage operating expenditure by resource input – 2008/09 to 2012/13**

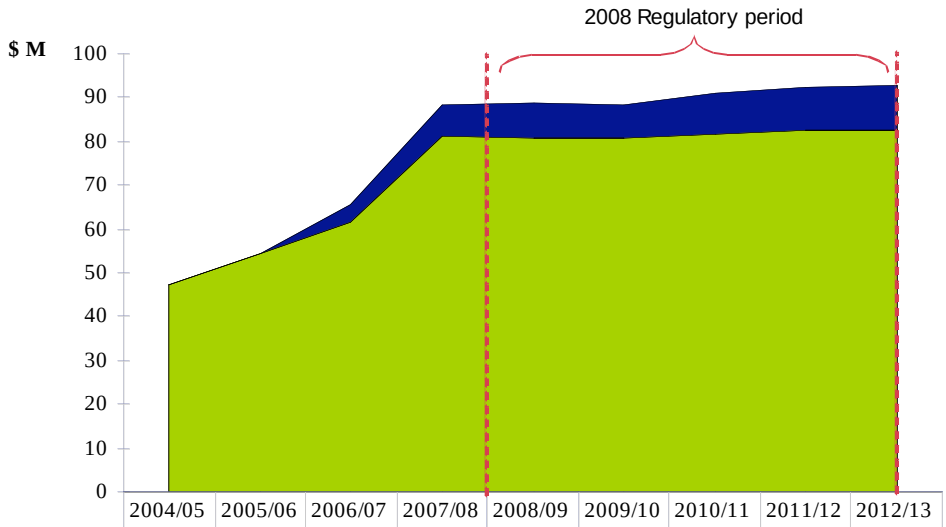



Note: Other includes materials, information technology, fees and charges, transport, and land tax.

## 9.2.2 New obligations and business as usual expenditures

Over the 2008 regulatory period operating expenditure associated with new regulatory obligations is forecast to increase, while expenditure associated with business as usual activities will remain comparatively stable relative to 2007/08 (see Figure 9.4).

**Figure 9.4: New and business-as-usual operating expenditure – 2005/06 to 2012/13**




| | 2004/05 | 2005/06 | 2006/07 | 2007/08 | 2008/09 | 2009/10 | 2010/11 | 2011/12 | 2012/13 |
|---|---|---|---|---|---|---|---|---|---|
| New Obligations | - | 0.3 | 3.8 | 7.3 | 8.0 | 7.7 | 9.3 | 9.9 | 10.1 |
| Business as Usual | 47.5 | 54.3 | 61.8 | 81.2 | 80.6 | 80.7 | 81.9 | 82.5 | 82.8 |

The significant increase in operating expenditure for 2007/08 is mainly due to the continued phase-in of waterways management and drainage services to Melbourne Water's extended boundary areas ($6.6 million), one-off billings and collections costs associated with implementing rate reforms in the existing waterways and drainage boundary area ($2.8 million) and meeting requirements under new obligations ($3.5 million).

### New obligations

As discussed in Chapter 4, the Commission has defined new obligations as those that come into effect from 1 July 2008. Melbourne Water considers that a supplementary approach is required to define new obligations and has included obligations which came into effect within the 2005 regulatory period and which were not included in the 2005 Water Plan.

New obligations coming into effect from 1 July 2005, and which were not included in the 2005 Water Plan were outlined in Chapter 3. Operating expenditure planned for these new obligations over the 2008 regulatory period includes:

- Managing environmental flows in line with newly established Environmental Entitlements ($2.9 million)
- Implement the final stages of programs identified in the Yarra River Action Plan to reduce the environmental impact of stormwater on waterways in urban areas ($6.9 million)

Operating expenditure to meet new obligations coming into effect from 1 July 2008 includes:

- Undertaking load reduction programs to remove a range of pollutants from stormwater and catchment run-off to meet targets in the Waterways Water Quality Strategy and the 2007 Waterways Operating Charter ($30.2 million)
- Implementing flood protection measures to reduce currently known intolerable flooding risks to protect public health and safety, property and infrastructure as set out in the 2007 Waterways Operating Charter ($4.9 million).

### Business as usual activities

Business as usual expenditure is forecast to remain relatively stable over the 2008 regulatory period in absolute terms and, when adjusted for growth, is expected to fall by at least 1% per year relative to 2007/08. This reflects initiatives expected to yield ongoing efficiency savings (see Section 9.4) and is in spite of forecast higher industry wide unit costs.

In terms of industry wide unit costs, market determined price increases will impact on Melbourne Water's operating expenditure estimates for both new obligations and business as usual activities over the 2008 regulatory period. In particular:

- Contract rates are forecast to increase by more than the consumer price index (CPI), as reflected by the anticipated movements in Melbourne Water's two largest contracts for civil and mechanical and electrical maintenance
- Labour rates are forecast to increase by more than CPI, based on current movements in the labour market and the likely outcome of Enterprise Agreement negotiations
- Material prices will increase broadly in line with CPI movements, although there will be some significant one off changes where contracts are renegotiated and there have been significant market movements since the contracts were signed.

Increases for waterways and drainage business as usual activities over the 2008 regulatory period, relative to 2007/08, are driven by:

- Higher labour costs based on current movements in the labour market, and additional headcount required to deliver services to extended areas ($11.5 million)
- Higher civil maintenance costs ($20.7 million) due to the:
  - increasing size of Melbourne Water's waterways and drainage asset base
  - assets experiencing a periodic increase in activity (e.g. the need for de-silting recently constructed wetlands, along with increased riparian management activities to ensure that the condition of vegetation near rivers and creeks is maintained
  - above CPI increases in contract rates influenced by market conditions.

As noted in Chapter 3, a key driver of increased operating expenditure in 2007/08 is the one off cost associated with waterways and drainage rate reform in Melbourne Water's existing boundary areas ($2.8 million) and the one off cost associated with implementing new systems and billing agreements in the extended boundary areas ($5.1 million).

Therefore, in 2008/09 corporate operating expenditure decreases and is lower than expenditure would have been in 2007/08 without these one off costs.

Provision of waterway services to Melbourne Water's extended areas will lead to business as usual costs of $41.0 million over the 2008 regulatory period.

## 9.3 Benchmarking operating efficiency

Melbourne Water participates in benchmarking to:

- Measure and assess its performance
- Improve its business performance.

In striving to continuously improve operating efficiency and customer service, Melbourne Water monitors best practice and innovation, both within and outside the water industry, and participates in national and international benchmarking studies. This includes a rolling program of process benchmarking of Australian and New Zealand businesses conducted by the Water Services Association of Australia (WSAA).

Melbourne Water as a business has generally performed well in benchmarking studies, reflecting its ongoing drive for continuous improvement and operating efficiency. Whilst there are no direct comparators to benchmark Melbourne Water's waterways and drainage services [3], areas for improvements and best practice identified through benchmarking water and sewerage activities are applied to waterways and drainage services where transferable. These improvements are described in greater detail below.

### Process benchmarking

Melbourne Water has focused on those areas of process benchmarking that are relevant to a wholesale bulk supplier and have the greatest impact on current and expected future costs. Recently, it has been involved in benchmarking studies examining the processes associated with mechanical and electrical maintenance and asset management. Melbourne Water has also reviewed its capital planning and delivery processes against industry best practice.

[3] Responsibility for waterway and drainage services at a state and national level is generally shared between a number of authorities including Catchment Management Authorities, State and local governments and Water Authorities

Melbourne Water has also participated in a benchmarking study on shared/corporate services[4]. The results of these benchmarking studies are outlined below and demonstrate Melbourne Water's operating efficiencies in these areas.

**Mechanical and electrical maintenance**

In 2006, on behalf of the WSAA, UMS-GHD completed a study of mechanical and electrical maintenance activities. This study involved 18 major Australian urban water businesses and overseas water utilities (from New Zealand and the United States). The areas covered by this benchmarking study included breakdown maintenance, scheduled maintenance and renewal maintenance for:

- Water and sewerage pumping stations
- Water and sewerage treatment plants
- Water disinfection plants.

The key outcomes from this study included:

- Melbourne Water was in the overall leading practice group
- Only 1% of prospective savings were identified for Melbourne Water – only one other participating authority was lower than this
- Comparison of results with the 2001 Mechanical and Electrical Maintenance Performance Benchmarking study highlighted that Melbourne Water has realised a 16% increase in efficiency on a composite cost performance
- Consistent alignment of results across all benchmarked categories and activities that indicates the overall strength of Melbourne Water's approach to mechanical and electrical maintenance practices.

The strong result of a 16% efficiency gain from the period of 2001 – 2006 can be attributed to:

- The implementation of Melbourne Water's contract strategy
- An increased focus on asset management, both in general and specifically in relation to understanding and management of required levels of service of assets.

Although these results are confined to mechanical and electrical assets, the strategies and improvements applied to the mechanical and electrical asset base are also applied to the remaining Melbourne Water asset base (including waterways and drainage assets) as part of the integrated Melbourne Water Asset Management System. For example, a review of service level requirements for drainage assets was undertaken as part of implementing Melbourne Water's Asset Management Strategic Framework. The review identified a deficiency in the delivery method for inspecting and assessing the condition of the underground drainage network which to date has been undertaken by specialist service providers using Closed Circuit Television technology. By purchasing camera equipment and providing the respective training for maintenance service providers, Melbourne Water has improved the annual condition assessment of drainage assets and expects to achieve operational expenditure savings of $0.12 million per annum.

[4] This study was undertaken by WSAA in 2003/04. At this stage, WSAA does not plan to repeat or update this study.

### Asset benchmarking

In March 2004, Melbourne Water participated in a benchmarking review of asset management practices conducted by WSAA. The results of this study are discussed in Chapter 7 (see section 7.3) and showed that Melbourne Water as a business operates its asset management process at, or close to, best practice within the water industry.

### Planning and delivery processes

In addition to formal benchmarking studies, Melbourne Water seeks opportunities to review its planning and delivery processes against industry best practice to identify efficiency improvement initiatives. Most recently this has included a review of Melbourne Water's capital planning and delivery processes by KPMG. The improvements made to date as a result of the review are discussed in Chapter 7 (see Section 7.2).

### Corporate services

In 2003, Melbourne Water participated in a WSAA benchmarking study around corporate services. In this study, WS Atkins Planning and Management Consultants benchmarked corporate services provided by ten Australian water businesses including finance, human resources, information technology and communications. As illustrated in Figure 9.7, Melbourne Water has a relatively small number of corporate staff compared to other Australian and overseas water businesses. The study also showed that Melbourne Water's corporate service areas provide high levels of service at low cost with each service area ranked within the top quartile of participating businesses.

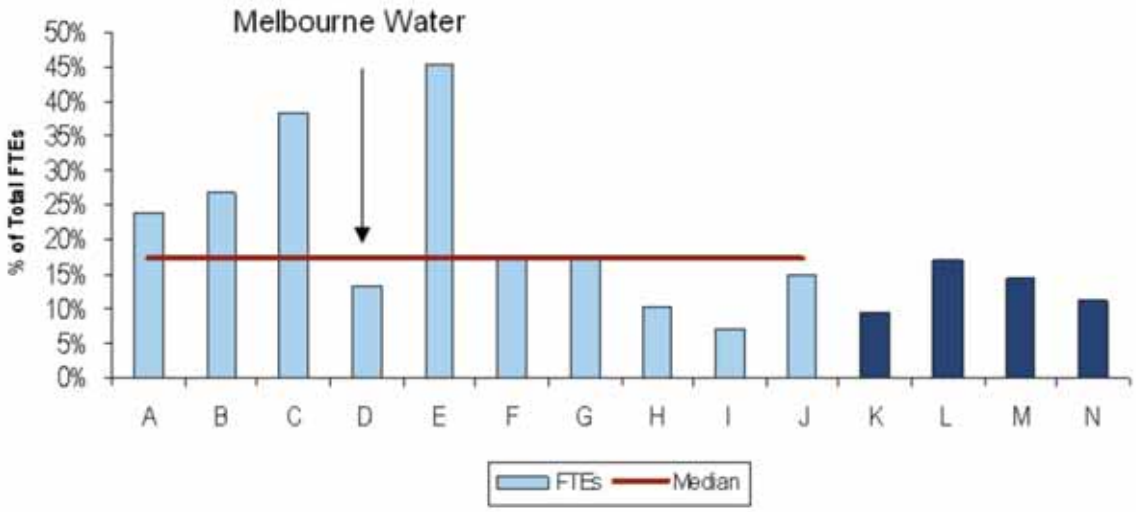



**Figure 9.7: Corporate employees as a proportion of total**

Note: Businesses A to J are Australian water businesses; K to N are comparable overseas water businesses.
Source: Water Services Association of Australia 2004

Melbourne Water demonstrated best practice in human resources, including implementing performance cultures along with management development programs, financial management reporting and procurement practices.

The Melbourne Water focus on continuous improvement includes:

- A long-term program (Preferred Culture Program) to build a more constructive and progressive culture within Melbourne Water
- Improvements in recruitment and staff development programs
- Improved human resources related processes and workflow
- Increased technical and personal training to progress the individual development of employees
- Deployment of a new Safety Management System.

Since this study, Melbourne Water has maintained its relatively small number of corporate staff. In 2007/08, business service staff are forecast to represent approximately 11.2% of total staff [5]. This includes an increase in business service staff to perform human resource functions that were previously not done in-house and which will generate efficiencies. Over the 2008 regulatory period, the ratio of business service staff to total staff will remain stable and is forecast be 11.0% in 2012/13.

## 9.4 Efficiency gains and initiatives

Melbourne Water pursues operating efficiencies in the context of maximising value and managing risks. This requires a balance to be struck between seeking immediate cost savings and the need to:

- Minimise costs over the asset life cycle by identifying the most efficient mix of capital and operating expenditure
- Meet environmental or community requirements and minimise the risk of injury to Melbourne Water employees or contractors
- Ensure that all significant risks are identified, understood, allocated to the party best placed to manage them and, to the extent possible, are mitigated.

As noted above, while Melbourne Water as a business has achieved significant efficiency improvements in the past, it strives for continuous improvement and innovation. Melbourne Water has implemented a range of efficiency initiatives since the Commission's 2005 price determination, including those identified in its 2005 Water Plan. In relation to efficiencies gains detailed in its 2005 Water Plan for waterways and drainage services, Melbourne Water has achieved the $0.14 million cost saving from implementing a web-based system for providing property flood level information online through two specialist agencies.

Additional efficiency savings have also been generated through improved information technology systems and continued use of community grant based programs to reduce operating costs for waterway management. This is illustrated by the case studies below.

[5] This includes Finance, Information Technology, Human Resources, and Risk Management staff.

**Case Study:**

## ATLAS – Integrating and improving development responses

Melbourne Water provides flood information and requirements for land development to local governments and the development industry as part as part of its responsibilities as a statutory referral authority for planning permit applications and floodplain management authority. A corporate based system, ATLAS, is used to process town planning and building permits, requests for feasibility advice and enquiries on flood levels.

The computer-based job tracking system was comprehensively upgraded in November 2006 to assist Melbourne Water to deliver integrated and coordinated responses by highlighting applications that require input or advice from teams within Melbourne Water on issues such as river health, asset management and water quality. The system co-ordinates responses from areas of the organisation that advise on development referrals and automates responses including the calculation of developer contributions where applicable.

By improving business processes, Melbourne Water has reduced input costs of $0.13 million per annum, improved response times and is able to provide customers with a better service by streamlining the approval process, ensuring there is a consistent approach to assessing developments in areas of flood risk.

**Case Study:**

## Community grants programs

Melbourne Water's grants program provides assistance to the community to carry out works on private or public land with waterway frontage to protect and improve the health of rivers and creeks in the Port Phillip and Westernport region. The program funds affordable, non-technical works that include tree planting, installing fencing, revegetation projects and weed control.

Melbourne Water's contribution to the joint projects is mainly in relation to the cost of materials. Most grants require that the participants contribute a minimum of 50% of the total project cost, either financially or by contributing time through project management and/or labour (which includes arranging the delivery of works and ongoing maintenance of the project site). This enables Melbourne Water to meet its service obligations in a cost effective manner while also engaging local communities.

The grants program results in land managers, community groups, local government and agencies developing practical skills, creates partnerships, promotes community engagement in waterways issues and increases the quantum and robustness of river health outcomes.

Melbourne Water has a demonstrated history of implementing innovations to achieve operating costs savings. Melbourne Water plans to continue this trend over the 2008 regulatory period with its operating expenditure proposal reflecting initiatives expected to yield ongoing savings.

As 70% of Melbourne Water's total operating expenditure is incurred through contracted services, a Planning Framework and Contract Strategy has been developed to increase the value provided by contract maintenance and goods/capital acquisition to ensure that:

- Capital and operating costs are considered together to minimise life cycle costs
- The mix of internal service provision versus externally contracted services is reviewed periodically and optimised
- Appropriate incentive arrangements are in place to align Melbourne Water and service provider objectives to promote improvements in service quality and reduce costs
- Strategic purchasing and bundling of inputs are considered to reduce total operating costs.

Consistent with this strategy, Melbourne Water's maintenance contracts are developed based on:

- Building relationships with contract service providers and developing contracts that align commercial objectives and include performance based financial and, where appropriate, non-financial incentives (e.g. increasing the scope or duration of the contract)
- Consolidating maintenance contracts for generic services where appropriate
- Maintaining separate contracts for highly specialised services
- Exercising caution in contracting out core functions or where outcomes and performance are difficult to define.

Over the 2008 regulatory period, examples of anticipated business wide savings to be achieved through improved contract processes include:

- Restructured contractual arrangements for mechanical and electrical maintenance leading to targeted savings of up $0.2 million per year. In addition, savings will be achieved through more efficient contractor performance under these arrangements, targeted at up to $0.2 million per year
- Renegotiation of the telecommunications supply contract resulting in cost savings of approximately $0.3 million per year.

As the Contract Strategy is a corporate wide initiative the anticipated savings will extend to waterways and drainage related contracts.

In terms of efficiency improvements, Melbourne Water notes that using the methodology proposed in Chapter 4 it will more than achieve the minimum of 1% per year productivity improvement on growth adjusted business as usual expenditure. This reflects an efficiency improvement relative to 2007/08, consistent with the Commission's advice in its March 2007 Guidance Paper that it proposes to establish a business as usual level of cost derived from the current expenditure incurred by businesses at the end of the regulatory period.

Chapter 10

# Financing capital investments and taxation

In determining its draft 2008 Water Plan revenue requirement, Melbourne Water has adopted a real, post-tax weighted average cost of capital (WACC) of 5.1% and has applied a straight line depreciation profile.

This chapter details the WACC that Melbourne Water intends to use in establishing the appropriate rate of return on the regulatory asset value for the 2008 regulatory period. It also details Melbourne Water's views around the appropriate depreciation methodology.

## 10.1 Opening regulatory asset value and new assets for 2008 regulatory period

As discussed in Chapter 4, Melbourne Water proposes to use actual capital expenditure, contributions and disposals for the period from 1 July 2004 to 30 June 2007 and forecasts for 2007/08 in determining its regulatory asset value as at 1 July 2008.

Forecast capital expenditure, contributions, disposals and depreciation occurring in the 2008 regulatory period are included in the regulatory asset value, which is used to determine the return on and of assets.

Return on assets and depreciation are both major inputs to Melbourne Water's revenue requirement for the 2008 regulatory period and are discussed below.

## 10.2 Weighted average cost of capital (WACC)

For the purposes of 2008 Waterways Water Plan, Melbourne Water has used the Commission's preliminary WACC estimate of 5.1%.

Melbourne Water and the retail water businesses commissioned consultants, the Strategic Finance Group (SFG), to provide an empirical estimate of the WACC for their businesses. SFG developed a real, post-tax WACC mid-point estimate of 6.2% but recommended a 75$^{th}$ percentile figure of 6.4%, based on empirical analysis of the underlying data, financial theory and the requirement for all WACC parameters to be estimated in an internally consistent manner.

Adopting the recommended value could add at least an additional 1.7% to Melbourne Water's proposed price path.

The report detailing SFG's estimate (see Appendix 3) notes that a number of WACC parameters cannot be estimated with great precision, but can be narrowed down to an economically reasonable range. Further, SFG believes that a regulator should set the return from this range by taking account of estimation uncertainty and consider the consequences of under investment. The consequences of under investment include adverse impacts on the financial viability of the regulated water business and on future investment (see Appendix 3).

An economically reasonable range can be established using Monte Carlo simulation and this is the basis for the parameter estimates and resultant inter-quartile ranges set out in Table 10.1.

**Table 10.1: SFG recommended WACC parameter value ranges**

| Parameter | Recommended range for the 2008 price determination |
|---|---|
| Real risk-free rate | 2.64 – 3.36% |
| Market risk premium | 5 – 7% |
| Gearing | 50 – 60% |
| Credit rating | BBB – BBB+ |
| Debt issuance costs | 0.125% |
| Total debt margin | 1.24 – 1.36% |
| Equity beta (geared to 60%) | 0.9 – 1.1 |
| Gamma | 0 |
| Corporate tax rate | 30% |
| Real, post tax WACC, mid-point | 6.2% |
| Real, post tax WACC, 75$^{th}$ percentile | 6.4% |

Importantly, the ranges for equity beta and gamma are significantly different to those used by the Commission (0.75 and 0.5 respectively) to develop its real, post-tax WACC of 5.1%. SFG notes that there is limited empirical evidence to support water business having a lower equity beta, or systematic risk, than other utilities, such as gas and electricity. In particular, that data over the last 30 years indicates that the estimated betas of water businesses are not statistically significantly different from those of other utilities. In addition, SFG notes that any estimate of gamma other than zero is inconsistent with the Officer Capital Asset Pricing Model WACC that is used by Australian regulators.

The report also draws on regulatory precedent to recommend that the 75$^{th}$ percentile estimate is a way of balancing the asymmetric consequences of over and under investment in key infrastructure, i.e. the costs of setting the WACC too low are much more severe than the costs of setting it too high.

While supporting the conclusions of the SFG consultancy, in light of the numerous upward pressures on prices, at this point in time Melbourne Water has not adopted the proposed real, post-tax WACC estimate of 6.4% determined as being appropriate for the Melbourne metropolitan water businesses. Melbourne Water does, however, believe that the issue of the appropriate WACC for water businesses should be further debated. Importantly, this includes the issues around the empirical estimates for equity beta and gamma.

The return on assets has been determined by applying the Commission's proposed WACC of 5.1% to the average regulatory asset value for each year of the 2008 regulatory period. This represents around 30% of waterways and drainage services total revenue requirement. Return on assets is shown in Table 10.2

**Table 10.2: Return on assets waterways and drainage assets ($ million)**

| | Forecast Year Ending | | | | | |
|---|---|---|---|---|---|---|
| | 08/09 | 09/10 | 10/11 | 11/12 | 12/13 | Total |
| **Opening RAV 2008 regulatory period** | 43.5 | 42.7 | 41.9 | 41.2 | 40.4 | **209.7** |
| **New assets** | 1.7 | 5.7 | 9.6 | 13.0 | 16.1 | **46.1** |
| **Total** | **45.2** | **48.4** | **51.5** | **54.2** | **56.5** | **255.8** |

## 10.3 Depreciation method

Melbourne Water proposes to adopt the straight line depreciation method to calculate the return of capital (depreciation) allowance.

The allowance for a return of capital, or depreciation, represents the revenue Melbourne Water requires to efficiently maintain its capital asset base. Depreciation represents around 11% of waterways and drainage services revenue requirement.

The following sections discuss Melbourne Water's proposed depreciation method and the asset lives to be applied.

### 10.3.1 Depreciation method

Melbourne Water believes that the straight line depreciation method is superior to alternatives in terms of simplicity, consistency and transparency. It used a straight line depreciation profile in its 2005 Water Plan and supports the continued use of this approach for its waterways and drainage services.

### 10.3.2 Asset lives to be applied

Melbourne Water has calculated its depreciation forecasts using a straight line depreciation method and average asset lives. Different average asset lives are applied to the opening regulatory asset values as compared to new assets. This is necessary because of the different characteristics of existing and new assets. An average asset life for the opening regulatory asset value for waterways and drainage assets is 61 years and for corporate asset allocations is 21 years, compared to an average asset life for new waterways and drainage assets of 103 years and for corporate asset allocations of seven years.

### 10.3.3 Capital depreciation allowance

The capital depreciation allowance forecasts for the 2008 regulatory period are detailed in Table 10.3.

**Table 10.3: Capital depreciation allowance forecasts ($ million)**

| | Forecast Year Ending | | | | | |
|---|---|---|---|---|---|---|
| | 08/09 | 09/10 | 10/11 | 11/12 | 12/13 | Total |
| **Opening RAV 2008 regulatory period** | 14.6 | 14.6 | 14.6 | 14.6 | 14.6 | **73.0** |
| **New assets** | 0.8 | 2.5 | 4.0 | 5.5 | 7.1 | **19.9** |
| **Total** | 15.4 | 17.1 | 18.6 | 20.1 | 21.7 | **92.9** |

### 10.3.4 Taxation

Under the Commission's approach to determining the revenue requirement, businesses are able to directly recoup the cost of company tax during the regulatory period. The Commission prescribes a calculation for benchmark tax liability that allows Melbourne Water to recoup company tax costs.

The benchmark tax liability is based on Melbourne Water's revenue forecasts less allowable deductions for operating expenditure, interest, tax depreciation and franking benefit. This represents around 3% of waterways and drainage services revenue requirement.

In the 2005 regulatory period, Melbourne Water did not have a benchmark tax liability due to the tax depreciation allowance being able to fully offset the tax liability. A significant number of large assets will be fully depreciated for tax purposes prior to the Commission resetting prices, which will increase Melbourne Water's benchmark tax liability, thus increasing the required revenue.

Chapter 11

# Revenue requirement

Over the 2008 regulatory period, Melbourne Water's proposed revenue requirement for waterways and drainage services is $847 million[1].

The average price path is CPI + 1% per annum for customers in Melbourne Water's existing service area.

This chapter summarises Melbourne Water's forecast revenue requirement based on expenditure proposal and service outcomes discussed in earlier chapters. The prices that are proposed to raise the required revenue are discussed in the next chapter.

## 11.1 Summary

Melbourne Water has calculated the revenue it needs to fund its activities over the regulatory period using the Commission's building block methodology which includes:

- Return on assets
- Depreciation
- Operating expenditure
- Adjustments from last regulatory period
- Benchmark tax liability.

The Commission also smoothes Melbourne Water's annual raw revenue requirement over the regulatory period to avoid price volatility.

Melbourne Water's proposed raw and smoothed revenue requirements are summarised in Table 11.1.

**Table 11.1 Revenue requirement for waterways and drainage services ($ million)**

| | Forecast Year Ending | | | | | |
|---|---|---|---|---|---|---|
| | 08/09 | 09/10 | 10/11 | 11/12 | 12/13 | Total |
| Melbourne Water's **raw** revenue requirement | 157.6 | 162.6 | 170.4 | 176.0 | 180.3 | **846.9** |
| Melbourne Water's **smoothed** revenue requirement | 161.9 | 166.1 | 170.4 | 177.1 | 171.2 | **846.7** |

[1] Total NPV of waterways and drainage services revenue over the regulatory period equates to $748M, which includes $15M of miscellaneous revenue.

Melbourne Water has analysed the implications of the smoothed revenue requirement for the financial viability and sustainability of its business[2] and is of the view that:

- The revenue level is consistent with maintaining (at a minimum) the shareholder's financial interest in the business over the long term (assuming that prices will be increased in subsequent regulatory periods reflecting the revenue requirement generated by rolling-forward the regulatory asset value)
- A lower revenue requirement would potentially impact on Melbourne Water's ability to meet its regulatory and customer service obligations as well as to provide an acceptable return to its shareholder.

## 11.2 Revenue requirements

### 11.2.1 Raw revenue requirement

Melbourne Water's proposed waterways and drainage services raw revenue requirement for each year of the 2008 regulatory period is set out in Table 11.2 and summarised in Figure 11.1.

**Table 11.2 Raw revenue requirement ($ million)**

| | Forecast Year Ending | | | | | |
|---|---|---|---|---|---|---|
| | 08/09 | 09/10 | 10/11 | 11/12 | 12/13 | Total |
| Return on capital assets in place 1 July 2008 | 43.5 | 42.7 | 41.9 | 41.2 | 40.4 | **209.7** |
| Depreciation of assets in place 1 July 2008 | 14.6 | 14.6 | 14.6 | 14.6 | 14.6 | **73.0** |
| Return on new assets | 1.7 | 5.7 | 9.6 | 13.0 | 16.1 | **46.1** |
| Depreciation of new assets | 0.8 | 2.5 | 4.0 | 5.5 | 7.1 | **19.9** |
| Operating expenditure | 88.7 | 88.4 | 91.3 | 92.5 | 92.8 | **453.7** |
| Adjustments from last regulatory period[3] | 4.4 | 4.4 | 4.4 | 4.4 | 4.4 | **22.0** |
| Benchmark tax liability | 3.9 | 4.3 | 4.6 | 4.8 | 4.9 | **22.5** |
| **Raw revenue requirement** | **157.6** | **162.6** | **170.4** | **176.0** | **180.3** | **846.9** |

[2] This analysis has assumed water, sewerage and recycled water expenditures and revenues are consistent with those provided to the Commission on 26 September 2007.

[3] Extended area expenditures were not included in the Commission's 2005 Price Determination given the timing of the Government's decision to extend Melbourne Water's operating area and the uncertainty regarding future expenditure requirements. As directed by the Commission in its June 2005 Final Decision, Melbourne Water has ring fenced the additional extended area expenditures which are eligible to be recovered through prices in the 2008 regulatory period. Expenditure includes estimate costs associated with introducing charges from 2008/09.

### 11.2.2 Smoothed revenue requirements

Melbourne Water agrees that the Commission's approach to smoothing the amount by which prices deliver the raw revenue requirement over the regulatory period is appropriate. Using this approach, Melbourne Water's smoothed revenue requirement over the 2008 regulatory period is shown in Table 11.3.

While the impact on individual customers will vary (see Chapter 12), for customers in Melbourne Water's existing service area, raising the required revenue will necessitate an average price increase of CPI+1% per annum. Melbourne Water also proposes to commence charging for services provided in the extended boundary areas.

**Table 11.3 Proposed smoothed revenue requirement for waterways and drainage services ($ million)[4]**

| | Forecast Year Ending | | | | | |
|---|---|---|---|---|---|---|
| | 08/09 | 09/10 | 10/11 | 11/12 | 12/13 | Total |
| Melbourne Water's **smoothed** revenue requirement | 161.9 | 166.1 | 170.4 | 177.1 | 171.2 | **846.7** |

### 11.2.3 Financial viability

In approving its revenue requirement, the Commission needs to consider the Essential Services Commission Act 2001 objective of maintaining Melbourne Water's financial viability.

Based on the proposed waterways and drainage expenditure and revenue and the assumed expenditures and revenues for water and sewerage, our analysis suggests that Melbourne Water will achieve the Commission's benchmark of at least a BBB+ credit rating.

[4] Proposed revenue requirements include miscellaneous revenue as set out in Chapter 12.

Chapter 12
# Prices

Melbourne Water proposes to commence a process of reform of waterways and drainage prices over the 2008 regulatory period with a view to moving away from property valuations as a basis for charging. Further reform is proposed for the 2013 regulatory period.

Individual price caps are proposed for waterway and drainage and diversion services.

It is proposed to continue the current methodology, approved by the Commission, for setting developer charges in development services schemes.

It is proposed that a core set of miscellaneous prices will be subject to the Commission's annual price approval process and additional miscellaneous prices will be subject to pricing principles.

This chapter sets out the proposed prices for waterways and drainage, diversions, developer and miscellaneous services for the 2008 regulatory period needed to recover the required revenues detailed in Chapter 11. The chapter also details the current prices and how the proposed prices differ from those in place during the 2005 regulatory period. It also provides details on the underlying cost justification for the proposed prices and discusses how the prices will change customer behaviour, as well as the impact these prices will have on customers.

Appendix 4 provides the price schedule setting out the proposed 2008/09 prices for waterways and drainage services, as well as diversions and miscellaneous services.

## 12.1 Principles

Clause 14 of the Water Industry Regulatory Order sets out the matters that must be taken into account in setting prices. In particular prices must:

- Provide appropriate signals to customers about the costs of providing particular services and choices regarding alternative supplies for different purposes
- Take into account the interests of customers including low income and vulnerable customers
- Enable customers to understand the prices charged
- Be consistent with a sustainable revenue stream for the business.

The proposed prices comply with these regulatory principles where applicable to waterways related services.

## 12.2 Waterways and drainage

### 12.2.1 Current prices

Melbourne Water's metropolitan prices for waterways and regional drainage services are calculated by multiplying a rate in the dollar by the 1990 Net Annual Value (NAV) of a property, subject to a minimum price. The metropolitan waterways and drainage prices for 2007/08 are set out in Table 12.1.

**Table 12.1: Metropolitan waterways and drainage prices for 2007/08 (in 2006/07 dollars)**

| Minimum price ($) | Rate in $NAV (cents) |
|---|---|
| 55.05 | 0.7728 |

The minimum price is currently paid by approximately 60% of residential customers and 14% of non-residential customers. Prices for typical residential customers range from the minimum to $4,000, while prices for non-residential customers range from the minimum to over $500,000.

The same rate in the NAV dollar applies to residential and non-residential customers with the exception of Koo Wee Rup Flood Protection District and Patterson Lakes special drainage areas, where higher rates in the dollar are charged to reflect the higher level of drainage services provided. Customers in the Shires of Baw Baw, South Gippsland and part of the Bass Coast pay a lower rate reflecting the fact that they receive waterways services but do not receive drainage services. Waterways and drainage prices for these areas for 2007/08 are set out in Table 12.2.

**Table 12.2: Special drainage area prices for 2007/08 (in 2006/07 dollars)**

| | Minimum ($) | Rate in $NAV (cents) |
|---|---|---|
| **Koo Wee Rup Flood Protection District** | | |
| Division A | 55.05 | 3.600 |
| Division B | 55.05 | 2.000 |
| **Other Special Rate Areas** | | |
| Shires of Baw Baw, South Gippsland and part Bass Coast | 31.46 | 0.3722 |
| All other prices in the former special rate area | 55.05 | 0.7728 |
| **Extra Fees for Patterson Lakes** | | |
| Tidal waterways | 0.00 | 0.4066 |
| Quiet Lakes | 0.00 | 0.3346 |

### 12.2.2 Proposed prices

Microeconomic reform has seen water authorities across Australia move away from using property values as a basis for setting water, sewerage and drainage prices. In Melbourne, the use of property values in setting water and sewerage prices was phased out in the late 1990s. While there are some important differences with water and sewerage services (see Section 12.2.4), there is a need to develop pricing arrangements for waterways and drainage services that more effectively:

- Reflect the extent to which customers impact on, or benefit from, the services provided
- Achieve a higher level of transparency and customer understanding
- Deliver significant implementation and administration cost savings
- Take account of customer impacts relative to some other options
- Take account of the relationship between waterways and drainage services and other elements of the water cycle which promote more sustainable and efficient outcomes (e.g. creating incentives for greater stormwater re-use to reduce the demand on scarce potable water supplies)
- Provide an adequate and stable level of revenue to maintain services at an agreed standard.

An important first step in developing improved pricing arrangements is to move away from property based prices while recognising the need to manage customer impacts. Experience with the reform of water and sewerage prices indicates that any change to valuation based prices, including updating valuations, will result in material customer impacts. Therefore, reform of waterways and drainage prices to the preferred long-term position requires a staged approach. The staged approach will focus reform on areas of greatest gain first, while allowing sufficient time to work through complex issues and facilitate further work with State Government to clarify long-term objectives in relation to 'water cycle thinking'.

After investigating a number of alternative pricing methodologies to valuation based prices, Melbourne Water proposes an initial round of price reform over the 2008 regulatory period that includes the following prices from 2008/09:

- Commence phasing in a single service price for residential customers by increasing the minimum price to $57 while maintaining prices for customers who currently pay above the minimum
- Decrease reliance on property values for non-residential customers by increasing the minimum price to $75, with further reform during the next regulatory period
- Ensure rural customers only pay for the services they receive by replacing existing prices for rural customers located outside the Urban Growth Boundary with a lower waterways service price of $36 (see Figure 12.1)
- Commence charging customers in the extended area for the provision of waterways and regional drainage services by introducing a single service price of $57 per year for residential customers, $75 for non-residential customers and $36 for rural customers located outside Urban Growth Boundary
- Continue discussions with customer committees within the special drainage areas to move towards an improved basis for pricing.

The proposed waterways and drainage prices to apply from 2008/09 are outlined in Appendix 4.

### 12.2.3 Underlying cost justification

The current approach to pricing waterways and drainage services needs to be reviewed because of:

- The high cost of maintaining 1990 property values for billing purposes (almost $1 million per annum)
- The link between a customer's capacity to pay (the original basis for choosing property values) and their current price is questionable as:
  - There have been significant changes in property values since 1990
  - 60% of residential customers currently pay the minimum price
- The use of 1990 property values is inconsistent with values used by local governments for rating properties, thereby creating customer confusion and complaints
- The consistency of valuation based prices with Water Industry Regulatory Order principles (e.g. prices reflect cost of service) is questionable
- There are a number of inherited pricing inconsistencies and anomalies within existing arrangements
- Appropriate pricing arrangements need to be developed and implemented in Melbourne Water's extended boundary areas.

#### Residential customers

Residential customers receive a wide range of social, recreational, economic and environmental benefits from the provision of regional services which includes flood protection for households and community assets (e.g. roads) and higher quality waterways. These benefits are broadly available to all customers who live, work or travel within the catchment and can be considered to be essentially uniform for all customers.

Consequently, a single price based on the average cost of providing services to residential customers is a reasonable proxy for the benefits received and costs incurred by this group.

#### Non-residential customers

In contrast to residential customers, there are significant differences between non-residential customers (who range from cafes and shopping centres, to warehouses) in terms of:

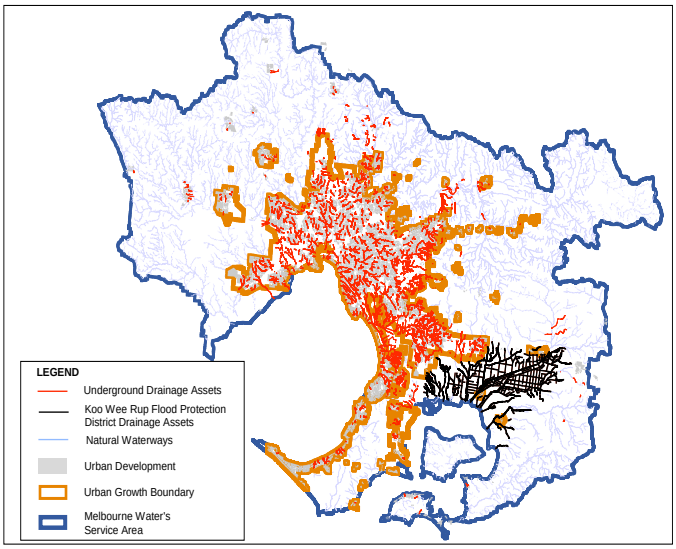
- The costs they impose on services (e.g. as measured by their contribution to stormwater run-off)
- The level of benefits they receive (e.g. the level of foregone earnings as a result of flooding)
- Opportunities to change behaviour to reduce the quantity (e.g. through stormwater reuse) or improve the quality of stormwater run-off from their property.

#### Rural customers

As illustrated by Figure 12.1, with the exception of the Koo Wee Rup Flood Protection District, Melbourne Water's regional drainage assets are located predominantly within urban areas which has been designated by the Urban Growth Boundary[1]. As customers located outside the Urban Growth Boundary (which is largely comprised of rural properties) do not receive the full benefits of Melbourne Water's regional drainage services, it is proposed that these customers pay for the cost of waterways services only.

[1] Defined in the State Government's Melbourne 2030 which indicates the long term limits of urban development and where non-urban values and land uses should prevail in metropolitan Melbourne

**Figure 12.1: Urban Growth Boundary and Melbourne Water assets**




### Extended areas

Given that customers within the extended areas will receive an equal level of waterways and regional drainage services to other areas within Melbourne Water's service area, it is proposed that prices be uniformly applied across the whole of the Port Phillip and Westernport catchment areas.

## 12.2.4 Changes in customer behaviour

Melbourne Water provides waterways and drainage services on a regional basis. Unlike water and sewerage services, waterways and drainage services provided to individual customers are not metered, as revenue from volumetric stormwater prices would only be collected during rainfall events. It is, therefore, not possible to accurately measure the unique benefits individual customers receive or the costs they impose on the diverse nature of the waterway and drainage services.

Expenditures in individual catchments are prioritised on a regional basis that generally provide benefits over long periods of time. Consequently, expenditures within any given catchment vary significantly from one regulatory period to the next, whereas benefits do not vary significantly. If prices reflected actual expenditure within regulatory periods and were levied on a catchment basis, this would result in significant volatility and adverse customer impacts. There would also be significant differences in the prices that would be applied between catchments. This could lead to inequitable outcomes given that customers outside a catchment and customers in future periods could enjoy the benefits from works paid for by existing customers within the catchment [2].

[2] Examples of where customers living outside a catchment could benefit from Melbourne Water works within that catchment include a farmer using a road that would have otherwise been flooded to transport their crop to market or a residential customer enjoying the aesthetic benefits of visiting a healthy waterway.

Melbourne Water, therefore, proposes that the objective for the 2008 regulatory period should be to:

- Move to a basis for pricing that is more reflective of the costs and benefits associated with different classes of customers
- Establish pricing arrangements that are more cost effective to administer i.e. so that the revenue collected from customers is spent on delivering outcomes rather than calculating bills.

Finally, it is worth noting that continuing with the current basis for pricing is an unattractive option because:

- Current prices bear no relation to costs
- It is a poor reflection of customers' capacity to pay
- Simply updating property values based on the most recent valuation will involve significant customer impacts and substantial ongoing administrative costs.

### 12.2.5 Customer impact issues

While price reform is proposed on a number of different fronts, and will affect customers differently, the proposed prices for customers in the existing service areas would increase on average by CPI+1% per year over the 2008 regulatory period. This increase is consistent with delivering the service outcomes discussed in Chapter 5 and expenditures in Chapters 8 and 9. The proposed prices for the different customer groups and associated impacts are discussed below.

#### Residential customers

Melbourne Water proposes to transition residential prices to the average cost by increasing the minimum price by $2 plus inflation each year over the 2008 regulatory period and maintaining prices for customers who currently pay above the minimum until the transitional arrangements are complete in 2012/13.

Setting the minimum price at $57 in 2008/09 would increase customer bills by $2 in real terms for 60% of residential customers (about 804,000) who currently pay the minimum price of $55. Prices for 40% of customers currently paying above the minimum (about 539,000) would remain constant in real terms.

Table 12.3 outlines the proposed price path for residential customers over the 2008 regulatory period. The average price for a customer paying above the minimum in 2007/08 has been used to illustrate the price path for these customers.

**Table 12.3: Proposed price path for residential customers – 2008/09 to 2012/13 (in 2006/07 dollars)**

| | | Current | Proposed | | | | |
|---|---|---|---|---|---|---|---|
| | | 2007/08 ($/yr) | 2008/09 ($/yr) | 2009/10 ($/yr) | 2010/11 ($/yr) | 2011/12 ($/yr) | 2012/13 ($/yr) |
| **Residential properties** | Paying minimum price | 55.05 | 57.10 | 59.23 | 61.43 | 63.71 | 66.08 |
| | Above minimum price (average) | 88.13 | 88.13 | 88.13 | 88.13 | 88.13 | 66.08 |

## Non-residential customers

As experienced with the reform of water and sewerage prices, there are challenges associated with moving away from property values for the non-residential sector given the large diversity in property sizes, land uses, land management activities and prices paid by customers. Any form of tariff reform will result in customer impacts and would take time to manage and implement.

An extensive review that commenced following the Commission's 2005 Price Determination explored a number of price reform options for non residential customers. The review highlighted the diversity within current non residential prices and the significant potential impacts of moving to a more cost reflective approach.

As a first stage reform measure, Melbourne Water proposes that the current minimum price be increased to $75 in 2008/09 and property values be retained pending further analysis and development of reform proposals for inclusion in the next regulatory period.

Increasing the minimum from $55 to $75 in 2008/09 increases the number of non-residential customers paying the minimum price from around 16,000 (14%) to approximately 27,200 (23%). This reduces reliance on property values and establishes a higher base price upon which future tariff reform can take place.

Table 12.4 outlines the proposed price path for non-residential customers over the 2008 regulatory period. The average price for a customer paying above the minimum in 2007/08 has been used to illustrate the price path for these customers.

**Table 12.4: Proposed price path for non-residential customers – 2008/09 to 2012/13 (in 2006/07 dollars)**

| | | Current | Proposed | | | | |
|---|---|---|---|---|---|---|---|
| | | 2007/08 ($/yr) | 2008/09 ($/yr) | 2009/10 ($/yr) | 2010/11 ($/yr) | 2011/12 ($/yr) | 2012/13 ($/yr) |
| **Non-residential properties** | Paying minimum price | 55.05 | 75.12 | 77.73 | 80.42 | 83.21 | 86.10 |
| | Above minimum price (average) | 455.00 | 470.79 | 487.12 | 504.03 | 521.52 | 539.61 |

## Rural customers

Moving to a waterways service price of $36 in 2008/09 for rural customers located outside the Urban Growth Boundary would result in an average $45 decrease for about 47,000 residential and non-residential customers.

It is also proposed that historic exemptions be removed for 3,200 farm properties in the Yarra and Maribyrnong catchments which have received services following previous extensions of Melbourne Water's service area in 1981 and 1984. This would ensure these customers contribute equitably to reflect the benefits they receive. Of these properties, 95% are located outside the Urban Growth Boundary and would pay a price of $36 for waterways services.

Table 12.5 outlines the proposed price path for rural customers over the 2008 regulatory period. The average price for a customer paying above the minimum in 2007/08 has been used to illustrate the price path for these customers.

**Table 12.5: Proposed price path for rural customers – 2008/09 to 2012/13 (in 2006/07 dollars)**

| | | Current | Proposed | | | | |
|---|---|---|---|---|---|---|---|
| | | 2007/08 ($/yr) | 2008/09 ($/yr) | 2009/10 ($/yr) | 2010/11 ($/yr) | 2011/12 ($/yr) | 2012/13 ($/yr) |
| **Rural properties** | Paying minimum price | 55.05 | 35.89 | 37.14 | 38.43 | 39.76 | 41.14 |
| | Above minimum price (average) | 112.44 | 35.89 | 37.14 | 38.43 | 39.76 | 41.14 |

## Extended areas

Introducing 1990 property values as a basis for charging residential and non-residential customers in the extended areas is expensive and likely to result in customer confusion and be difficult to explain.

It is recommended, therefore, that in light of the proposal to move residential customers to a single service price over the 2008 regulatory period, a flat service price of $57 be applied in 2008/09 for all residential customers (approx 118,000) in the extended area. Due to further investigations planned for non-residential prices and potential future reforms, it is also proposed that a flat service price of $75 be applied in 2008/09 for all non-residential customers (approx 5,000 customers) in the extended area as an interim measure.

An estimated 54,000 customers outside of the Urban Growth Boundary would pay a fixed waterways service price of $36.

Table 12.6 outlines the proposed price path for extended area customers over the 2008 regulatory period.

**Table 12.6: Proposed price path for extended area customers – 2008/09 to 2012/13 (in 2006/07 dollars)**

| | Current | Proposed | | | | |
|---|---|---|---|---|---|---|
| | 2007/08 ($/yr) | 2008/09 ($/yr) | 2009/10 ($/yr) | 2010/11 ($/yr) | 2011/12 ($/yr) | 2012/13 ($/yr) |
| **Residential properties** | N/A | 57.10 | 59.23 | 61.43 | 63.71 | 66.08 |
| **Non-residential properties** | N/A | 75.12 | 77.73 | 80.42 | 83.21 | 86.10 |
| **Rural properties** | N/A | 35.89 | 37.14 | 38.43 | 39.76 | 41.14 |

## Special drainage areas

Customers in the Koo Wee Rup Flood Protection District and Patterson Lakes special drainage areas represent 0.3% of Melbourne Water's customer base. Melbourne Water sets prices for these customers in consultation with local customer advisory committees.

Melbourne Water has consulted on its intention to reform special drainage area prices over the 2008 regulatory period. Working with customer advisory committees to appropriately manage any customer bill impacts will be an important consideration in this process. In the interim, it is proposed that the current approach and principles used to set prices for these customers be retained for around 3,000 customers in the Koo Wee Rup Flood Protection District and approximately 1,200 customers in the Patterson Lakes area.

### 12.2.6 Stakeholder consultation

A working group with representatives from Melbourne Water and the Department of Sustainability and Environment was established to agree on long term objectives, review the options available to reform waterways and drainage prices, and explore options for managing customer impacts.

Melbourne Water has consulted with retail water businesses on implementation issues. Local government in Melbourne Water's extended area has also been consulted on service levels and proposed prices.

### 12.2.7 Community consultation

A number of submissions were received from the community in response to Melbourne Water's 2008 Waterways Water Plan Consultation Draft. Some of these questioned whether Melbourne Water's waterway and drainage services should be funded directly by the State Government, as done for waterway services outside Melbourne Water's service area. While some Government funding is received for specific programs, for the purposes of this Water Plan Melbourne Water has assumed that the vast majority of its costs will continue to be provided on a full cost recovery basis. Consequently, Melbourne Water has focused on developing prices that recover its costs from customers in the most efficient and equitable manner practical.

## 12.3 Diversion prices

### 12.3.1 Current prices

Melbourne Water currently administers about 1,900 active licences and farm dam registrations for diversion of some 45,000 megalitres (ML) of surface water from waterways. Licences in the Yarra catchment, Stony Creek, Kororoit Creek, Laverton Creek and Skeleton Creek are for supply of water from unregulated streams. Licences for the Maribyrnong River are supplied from a regulated river system via releases made to the river from Rosslynne Reservoir. Licences are issued according to the period when water can be diverted from the waterway, peak (year round) or off-peak (winter fill), and whether the water is diverted for consumptive or non-consumptive uses (whereby water is returned to the system under a discharge licence).

Active licences that have an entitlement of greater than 5 ML are metered to monitor a licensee's compliance with their allocated entitlement, which is subject to water availability.

Diversion prices are set to recover the costs for services related to billing and collections and monitoring and enforcing customer compliance with licence conditions.

Melbourne Water's current diversion prices comprise two components – an annual service price for the administration of licences and a volumetric price that applies to each ML of the licence entitlement (as opposed to actual usage).

In addition to the annual service and volumetric prices, once-off administration fees are charged to process applications for new licences, transfer licence entitlements or reissue licences.

The diversion prices applying in 2007/08 are shown in Table 12.7.

**Table 12.7: Diversion prices for 2007/08 (in 2006/07 dollars)**

| Licence | Annual service price ($/Annum) | Volumetric per ML price ($/ML) |
|---|---|---|
| **Unregulated waterways** | | |
| All months | 173.66 | 11.71 |
| Off-stream winter-fill | 173.66 | 5.90 |
| On-stream winter-fill | 173.66 | 5.90 |
| Licensed farm dam | 173.66 | 5.90 |
| Dam operating licence | 61.46 | N/A |
| Non-consumptive | 173.66 | 1.13 |
| Power generation (plus $16.59 per kilowatt) | 173.66 | N/A |
| **Regulated waterways** | | |
| All months | 173.66 | 35.12 |
| Off-stream winter-fill | 173.66 | 5.90 |
| **Administration fee** | | **Fee ($)** |
| **Unregulated waterways** | | |
| Works/construction licence | | 526.83 |
| Transfer of ownership (including temporary) | | 87.80 |
| Transfer of ownership with dam sharing agreement | | 175.61 |
| Resource assessment fee for downstream trade/transfer | | 282.9 |
| Resource assessment fee for upstream or cross catchment trade/transfer | | 565.85 |
| Licence renewal fee following failure to renew (domestic and stock) | | 87.80 |
| Licence renewal fee following failure to renew (all other licences) | | 175.61 |
| Reissue after Melbourne Water cancellation or breach of conditions | | 487.80 |
| Diversion licences - meter | | Cost of meter |
| **Regulated waterways** | | |
| Diversion licence | | 273.17 |
| Works/construction licence | | 526.83 |
| Transfer of ownership along Maribyrnong River (includes temporary) | | 87.80 |
| Licence renewal fee following failure to renew (domestic and stock) | | 87.80 |
| Licence renewal fee following failure to renew (all other licences) | | 175.61 |
| Reissue after Melbourne Water cancellation or breach of conditions | | 487.80 |
| Diversion licences - meter | | Cost of meter |

### 12.3.2 Proposed prices

Melbourne Water proposes to retain the existing two part tariff structure for diversion services which comprise an annual service price and a volumetric price, as well as individual one-off administration prices where relevant. Consistent with reforms introduced in the 2005 regulatory period, and the WIRO principles, it is proposed to increase prices to achieve full cost recovery in order to:

- Strengthen price signals around scarce water resources
- Inform customer decisions on water use
- Ensure that service levels meet changed Government requirements and customer expectations.

Due to continuing drought conditions, which have caused considerable hardship on many licence holders, there has been a need to balance cost reflectivity principles with equity and affordability considerations in determining prices for the 2008 regulatory period.

Melbourne Water has attempted to balance these considerations by applying a larger increase to volumetric prices than annual service prices, as customers are more able to respond to the volumetric price signal by decreasing their costs through more efficient water use.

Melbourne Water's proposal for the 2008 regulatory period is to increase annual service prices by an average of 4% per annum, increase volumetric prices by an average of 16% per annum and increase administration fees on average by 4% per annum.

The increase in prices is due to additional costs incurred to meet changes in water resource management requirements along with new initiatives to improve customer service. These include:

- Contributing to the creation of a State-wide register for water entitlements and collection of an environmental water reserve contribution from water users under the State Government's White Paper
- Additional labour to more effectively manage customer compliance and enforcement with license requirements and to manage emerging requirements for licensing stormwater diversions in accordance with the CRSWS
- Implementing technology to improve the level of information customers receive on their metered water levels and status on restrictions or bans on extracting water, and to meet the Commission's requirements in relation to performance reporting
- Implementation of Streamflow Management Plan requirements in regards to monitoring water flows.

Melbourne Water is also working with the State Government to clarify the framework for unbundling diversion prices for regulated waterway systems to meet requirements under the Government's Our Water Our Future. A decision is likely to be made within the 2008 regulatory period.

The diversion prices proposed to be applied in 2008/09 are shown in Table 12.8.

**Table 12.8: Diversion prices for 2008/09 (in 2006/07 dollars)**

| Licence | Annual service price ($/Annum) | Volumetric per ML price ($/ML) |
|---|---|---|
| **Unregulated waterways** | | |
| All months | 182.75 | 13.65 |
| Off-stream winter-fill | 182.75 | 6.88 |
| On-stream winter-fill | 182.75 | 6.88 |
| Licensed farm dam | 182.75 | 6.88 |
| Dam operating licence | 62.44 | N/A |
| Non-consumptive | 182.75 | 1.25 |
| Power generation (plus $16.75 per kilowatt) | 182.75 | N/A |
| Stormwater | 182.75 | 13.65 |
| **Regulated waterways** | | |
| All months | 182.75 | 41.17 |
| Off-stream winter-fill | 182.75 | 6.88 |
| **Administration fee** | | **Fee ($)** |
| **Unregulated waterways** | | |
| Diversion/stormwater licence | | 320.38 |
| Works/construction licence | | 537.78 |
| Transfer of ownership (including temporary) | | 92.33 |
| Transfer of ownership with dam sharing agreement | | 185.60 |
| Resource assessment fee for downstream trade/transfer | | 320.38 |
| Resource assessment fee for upstream or cross catchment trade/transfer | | 589.36 |
| Licence renewal fee following failure to renew (domestic and stock) | | 86.81 |
| Licence renewal fee following failure to renew (all other licences) | | 173.61 |
| Reissue after Melbourne Water cancellation or breach of conditions | | 584.79 |
| **Regulated waterways** | | |
| Diversion licence | | 320.38 |
| Works/construction licence | | 537.78 |
| Transfer of ownership along Maribyrnong River (includes temporary) | | 92.33 |
| Licence renewal fee following failure to renew (domestic and stock) | | 86.81 |
| Licence renewal fee following failure to renew (all other licences) | | 173.61 |
| Reissue after Melbourne Water cancellation or breach of conditions | | 584.79 |
| Diversion licences – meter | | Cost of meter |

### 12.3.3 Underlying cost justification

Melbourne Water's proposed prices are reflective of the overall efficient costs associated with providing diversion services and are considered consistent with Water Industry Regulatory Order requirements as the proposed prices:

- Create incentives for the sustainable use of water resources by providing signals to water users about the costs of providing services during peak and off-peak filling periods and setting prices that promote the extraction of water during higher flow periods
- Introduce prices for obtaining a new licence for stormwater diversions providing customers with signals around alternative supplies
- Take into account the interests of customers by setting prices that attempt to balance cost reflectivity principles with equity and affordability considerations
- Acknowledge that customers are familiar and readily understand and support the two part tariff structure which is used by other water authorities
- Provide a sustainable revenue stream for Melbourne Water that is based on an efficient level of expenditure.

Melbourne Water is currently finalising its Customer Charter for Diversion Services with the Commission. As a result of feedback received, Melbourne Water will need to implement measures not included in proposed diversion prices and further consult with customer committees on other suggested amendments. Melbourne Water is working to resolve these issues before the Determination is released.

### 12.3.4 Changes in customer behaviour

River and stream diversions are subject to water availability and, therefore, there is a need to manage the limited water resource and enforce compliance with licence conditions to protect the rights of users along with protecting the needs of the environment.

It is important that price signals are provided to customers in terms of the value of, and access to, water during different filling periods.

Melbourne Water considers that setting differential prices according to peak and off-peak filing periods provides customers with information on the underlying costs of providing services and therefore, facilitates a better understanding of economically desirable water trading opportunities. In addition, applying a larger increase to volumetric prices than annual service prices will strengthen signals around the value of water resources and promote the diversion of water from waterways during higher flow periods.

### 12.3.5 Customer consultation

Melbourne Water has consulted on proposed services, costs and diversion prices for the 2008 regulatory period with its customer advisory committees. Feedback received from the advisory committee representing licence holders on regulated waterway systems indicates that the proposed costs and price increases are not considered unreasonable. However, the committee placed a greater weighting on Melbourne Water delivering the proposed actions to improve information services than providing additional resources to manage customer compliance with license requirements.

The advisory committee representing licence holders on unregulated waterway systems were supportive of Melbourne Water's proposals and recognised that increased compliance monitoring is necessary to protect water entitlements for all diverters.

Both committees noted that the major concern for license holders is currently the security of access to water resources.

## 12.4 Developer charges

Melbourne Water proposes to continue the current methodology for setting developer charges in development service schemes. The methodology consists of:

- Identifying future capital expenditure for each year of the expected life of the development service scheme
- Identifying forecast developable hectares for each year using an estimate of development density
- Applying a pre-tax real discount rate (consistent with that determined by the Commission) to convert future cash flows into present value terms
- Setting the developer charge such that the present value of future income equals the present value of future costs. Future income is equal to the developable hectares in each year multiplied by the developer charge
- Reviewing the financial assumptions relating to each scheme on an annual basis and reviewing engineering specifications every five years.

Examples of charges for development scenarios covered by Melbourne Water's developer charges (greenfield, redevelopment and non-scheme areas) can be found in Appendix 5 and a detailed description of Melbourne Water's developer charges and how they are calculated can be found at http://ldm.melbournewater.com.au.

Since September 2005, Melbourne Water has operated a general stormwater quality offset (a financial contribution to Melbourne Water for regional water quality works) on new development. This provides a mechanism for equitably addressing stormwater quality standards that optimise contributions made by onsite works, development service scheme and regional initiatives. Melbourne Water proposes to retain this program and its associated principles in its current form.

The following areas are discussed in the sections below:

- Addresses issues raised by the Commission in its 2005 Price Determination
- Reforms of development service schemes
- Identifies customer impact issues associated with a government initiative to further promote at source water sensitive urban design
- Updates the stakeholder consultation process.

### 12.4.1 Issues raised by the Commission

In its 2005 Price Determination, the Commission raised issues in relation to developer charges generally and drainage developer charges. In particular, the Commission recommended that Melbourne Water change its methodology to recognise:

- That only those assets that directly contribute to servicing development are recovered via developer charges (i.e. exclusion of sunk costs)
- That there is an interaction between waterways and drainage annual rates and developer charges
- Adjustments for errors in forecasting.

Responses to these issues are set out below.

In considering water and sewerage developer charges, the Commission was of the view that only those assets that directly contribute to servicing development are recovered via developer charges. Melbourne Water contends that the instance of sunk assets in development service schemes is negligible due to the absence of pre-existing assets in the schemes. Schemes are highly localised geographically to minimise cross subsidies and planned so that infrastructure is only provided when specified growth triggers are reached.

The Commission observed in its 2005 Price Determination that it would be appropriate for Melbourne Water to consider the interaction between its drainage charges and developer charges over the next regulatory period.

In other words, it is contended that a revenue offset be considered to discount up front developer charges by an amount equivalent to the present value difference between the costs of maintaining brand new drainage assets and the ongoing annual drainage rates paid by householders in new estates. While this may be valid for pipelines and hard engineering assets, a major and increasing proportion of development service scheme assets are made up of soft engineering works such as wetlands, which have consistently high maintenance costs (e.g. grass cutting, vegetation maintenance, etc) over their entire lives.

In view of the likely reduction in materiality (due to the offsetting impact of soft engineering maintenance profiles), and the ongoing nature of the annual drainage charge structure reform process, which increases the complexity of responding to this issue, Melbourne Water does not propose the introduction of revenue offsets for the 2008 regulatory period.

The Commission has commented that annual scheme financial reviews only adjust charges paid by future developments for errors in forecasting. The charges are also regarded as heavily dependent upon long-term forecasts and, therefore, Melbourne Water has substantial discretion over the size of developer charges at any point in time. In response, Melbourne Water considers that attention to detailed planning as well as regular financial reviews (annual) and engineering reviews (five yearly) are the keys to maximising forecasting accuracy and minimising discretion over the setting of developer charges. Scheme rate adjustments for annual financial reviews are also limited to no more than +/- 10 % per annum (following consultation with the development industry) and, therefore, cross subsidisation is not considered excessive.

### 12.4.2 Reforms of development services schemes

Over the 2005 regulatory period a number of reforms have been or are in the process of being implemented to improve the robustness of the development services schemes from a pricing perspective. These include:

- Revision and periodic review of interim charges paid by developers while new development service schemes are being prepared to more accurately signal the expected final rate. Developers will continue to receive refunds if the final rate is less than the interim rate.
- Reform of development service scheme provisions to more accurately estimate likely additional expenditures or loss of contributory land area
- Retirement of completed schemes and conversion of nearly complete development service schemes to “inactive” status in order to more effectively manage the overall portfolio of schemes
- Review of the criteria for adjusting development service scheme rates following engineering reviews
- Review of redevelopment services scheme program and implementation of a risk management plan
- Bi-annual review of the general stormwater quality offset rate.

### 12.4.3 Customer impact issues

With the exception of Clause 56 of the Victorian Government's Sustainable Neighbourhoods package to create more sustainable and livable communities, i.e.: local government is required to set water sensitive urban design requirements for residential subdivisions with the costs to be met by developers, customer impacts are minimal given that no significant changes are proposed.

New measures for residential subdivisions were introduced from October 2006 as part of the State Government's Sustainable Neighbourhoods package (Victorian Planning Provisions) to create more sustainable and liveable communities. The measures replace existing Clause 56 provisions in planning schemes.

The new provisions require local government to become more involved in managing the achievement of best practice water quality objectives within each subdivision by setting requirements for individual developers.

For Melbourne Water, the impact of Clause 56 is to downsize planned water quality works in future development service schemes in proportion to expected water quality outcomes achieved by developers under council guidance. Local government and developers have required assistance in coming to terms with the new requirements. Melbourne Water has therefore established a dedicated resource for the provision of technical assistance and support to local government.

### 12.4.4 Stakeholder consultation

Melbourne Water maintains an ongoing forum, the Development Services Scheme Review Group, consisting of development industry peak bodies and local government representatives. The purpose of the group is to maintain overarching principles governing the operation of development service schemes and consider issues relevant to the effective operation of schemes from a stakeholder's viewpoint. The principles are set out in Appendix 5.

## 12.5 Miscellaneous services

Melbourne Water provides a small number of miscellaneous waterways and drainage services to the public. Some are similar in nature to the retail water businesses, such as services to the land development industry and information statements. Other services are specialist in nature, i.e. hydrological and flood level data provision.

In its December 2006 Framework and Approach paper, the Commission raised concerns about the range, definition and pricing for miscellaneous services. In particular, the Commission felt that the prices proposed for miscellaneous services should address the following principles:

- Prices should be consistent with the broader objectives of the business
- Prices should be effective in providing adequate signals to customers
- Proposed prices need to have consideration for their impact on customers.

Following consideration of the responses to its Framework and Approach paper, the Commission's March 2007 Guidance Paper further proposed that businesses identify within their Water Plans a core set of miscellaneous services that will be subject to the annual price approval process and subsequently included in the tariff schedule. The Commission proposed that non-scheduled miscellaneous prices should be set such that they:

- Reflect the direct costs of service provision (including materials and/or costs associated with contractors)

- Reflect the internal costs incurred by the water businesses such as labour, transport and general overheads
- Exclude costs previously accounted for in approved prices for new miscellaneous services
- Are transparent.

Melbourne Water's miscellaneous prices for waterways and drainage services are identified in Appendix 4 and summarised in Table 12.9.

**Table 12.9: Definitions of key regulated miscellaneous charges**

| Definition of charge | Fee charged to | Basis for charge |
|---|---|---|
| **Property flood level information** – provision of a flood level certificate in PDF format within 10 days of receiving a request under S. 264 of the *Water Act 1989.* | Information retailers (ANSTAT, Land Data) | Recovery of administrative costs |
| **Provision of hydraulic data** – stream flow, levels, storm intensity and rainfall in hardcopy or digital format within 10 days of receiving a request. | Public | Recovery of administrative costs |
| **Build overs** – costs of processing development proposals that involve construction over Melbourne Water easements. | Developers | Recovery of administrative costs |
| **Stormwater connections** - Melbourne Water requires all new stormwater connections to be made to the local council system. Where this is not possible a stormwater connection application must be made to Melbourne Water under S.145 of the *Water Act 1989*. | Developers | Recovery of administrative costs |
| **Flood feasibility studies** - Melbourne Water's assistance in determining the most appropriate drainage works that would be required to service a development. | Developers | Recovery of administrative costs |
| **Encumbrance and certificate fees** (Property Information Statements) provided consistent with S.158 of the *Water Act 1989.* | Public / developers | Recovery of administrative costs |

## 12.6 Form of price control

At this stage, Melbourne Water proposes to use individual price caps for its waterways and drainage, diversions and miscellaneous services over the 2008 regulatory period. This continues the approach used during the 2005 regulatory period and means that each of the prices approved by the Commission will be escalated annually by applying the 'CPI+X' formula with no rebalancing between prices within the regulatory period. It will provide customers with certainty regarding the prices they will face in the future.

In addition, Melbourne Water proposes to continue to use the Commission's drainage pricing principles for its special drainage areas to facilitate the reform of prices for these areas over the 2008 regulatory period. Pricing principles are also recommended for development service schemes and the stormwater quality offsets program.

2008 Waterways Water Plan

Appendix 1

# Key EPA Victoria and Department of Sustainability and Environment obligations

## Melbourne Water's EPA Victoria Key Obligations

**Waterways Condition**

| Issue | Regulatory Instrument | Relevant SOO Clause | Required Standard | Business response | Key Activities over Water Plan Period | Capital Expenditure ($M) | WP Opex |
|---|---|---|---|---|---|---|---|
| Environment | | | | | | | |
| Existing Obligations | | | | | | | |
| Managing waterways | Water Act, SEPPs (WoV, schedules), Managing Waterways section of the Waterways Operating Charter, Regional River Health Strategy and Addendum, Melbourne Water Waterways Water Quality Strategy | SOO Part 6, River and Aquifer Health | **10-year goal from the Waterways Operating Charter**<br><br>To have 50% of rivers and creeks in good or excellent condition by 2015 (as measured by the Index of River Condition) | Guided by river health target outcomes set out in the Waterways Operating Charter with priorities set consistent with:<br><br>Regional River Health Strategy and Addendum Waterways Water Quality Strategy | River and creek management works to achieve implementation targets and regional programs in the Regional River Health Strategy - Addendum<br>This includes implementing monitoring, investigation and research programs to determine changes in river health condition over time, provide information for management decisions, track progress towards achieving targets and address gaps in understanding<br><br>Implementation targets for the whole of the waterways boundary area include:<br><br>Number of rivers with negotiated environmental flow regimes - 12<br>Number of rivers with improvements made to environmental regimes - 17<br>Area of streamside land under management agreements - 10km2<br>Length of streamside land revegetated - 1026km<br>Number of fish barriers removed - 31<br>Length of riparian land subject to weed management - 2042km<br>Numbers of plans developed for rivers and creeks of high social value - 15<br>Rivers where heritage values are protected or improved - 34<br>Number of plans developed for rivers and creeks of high environmental value - 11<br>Number of investigations to fill data gaps in rivers or creeks - 55<br>Number of sites subject to bed and bank stabilisation - 55<br>Number of IRC reaches with instream habitat reinstated - 12 | $77.5M | $148.2M |
| New Obligations | | | | | | | |
| Managing Environmental Water Reserve | Victorian Government's 'Our Water Our Future', Water Resource Management Act (part 2), Managing Environmental Flows section of the Waterways Operating Charter, Regional River Health Strategy, Central Region Sustainable Water Strategy | SOO Part 6, River and Aquifer Health | **Long-term aim from the Waterways Operating Charter**<br><br>Waterways are managed to ensure sufficient environmental flows to support river health and protect beneficial uses<br><br>**10-year goal from the Waterways Operating Charter**<br><br>Significant progress is made towards implementing Environmental Water Reserve recommendations of the Central Region Sustainable Water Strategy and Our Water Our Future | Guided by river health target outcomes set out in the Waterways Operating Charter and implement initiatives identified in 'Our Water Our Future' and the Central Region Sustainable Water Strategy | Activities and programs to manage environmental flows in line with Environmental Entitlements and to meet environmental water reserve outcomes and the Waterways Operating Charter performance targets:<br><br>Performance targets include:<br><br>Complete an environmental flows study for all major rivers and creeks by 2013 (to identify the required environmental water reserve)<br>Develop and implement a program to improve environmental flows in major rivers and creeks that currently do not meet agreed scientific flow objectives to enhance existing Environmental Water Reserves and build the capacity of water managers to meet their environmental water reserve obligations | $0.7M | $2.9M |

**Stormwater Quality**

**Note: Due to the integrated nature of the water quality program, many programs contribute to the achievement of each implementation target**

| Issue | Regulatory Instrument | Relevant SOO Clause | Required Standard | Business response set out in… (under review / development) | Key Activities over Water Plan Period | Capital Expenditure ($M) | WP Opex |
|---|---|---|---|---|---|---|---|
| Environment | | | | | | | |
| Existing Obligations | | | | | | | |
| Managing water quality | SEPPs (Waters of Victoria, Schedule F6 Port Phillip Bay, Schedule F7 Yarra Catchment, Schedule F8 Western Port and Catchment), Regional River Health Strategy and Addendum, Port Phillip Bay Environmental Management Plan, Yarra River Action Plan, Managing Water Quality section of the Waterways Operating Charter, Melbourne Water Waterways Water Quality Strategy | SOO Part 5, Waterways and Drainage Services - Operating Charter | **Long-term aim from Waterways Operating Charter**<br><br>In collaboration with others, to achieve objectives for water quality in accordance with State environmental protection policies and targets set out in the Regional River Health Strategy and Waterways Water Quality Strategy<br><br>**10-year goal from Waterways Operating Charter**<br><br>In collaboration with others, protect and improve water quality to significantly counteract the effects of growth in greater Melbourne and achieve a net reduction in loads for the Port Phillip and Westernport region against 2001 levels | Guided by target outcomes set out in the Waterways Operating Charter with priorities set consistent with:<br><br>Relevant State environment protection policies<br><br>Regional River Health Strategy and Addendum<br><br>Waterways Water Quality Strategy<br><br>Incorporates new obligations that form part of the Yarra River Action Plan (which includes a Lower Yarra program) | Water quality programs and works to achieve implementation targets set out in the Waterways Water Quality Strategy and Regional River Health Strategy.<br>This includes implementing monitoring, investigations and research programs to determine changes in water quality and river health condition over time, provide information for management decisions, track progress towards achieving targets and address gaps in understanding<br><br>Implementation targets for the whole of the waterways boundary area include:<br><br>**Planning for Improved Water Quality**<br>Develop a draft Better Bays and Waterways Plan - 2008<br>Percentage of programs implemented from the Better Bays and Waterways Plan assigned to Melbourne Water - 100%<br>New or revised State Government requirements for all industrial, commercial, residential development to meet best practice water quality objectives - 2013<br><br>**Equipping Agencies, Communities and Industry to Manage Water Quality**<br>Number of training modules delivered under the Clearwater program per year with assistance from Melbourne Water - 10<br>Percentage of councils with improved performance in delivering sustainable urban water management (as measured by the Council Needs Analysis) - 70%<br>Number of guidelines and/or tools prepared to assist in the application of best practice stormwater management - 6<br>Number of rain gardens built in the community with support from Melbourne Water - 10,000 (also contributes to the targeted works<br>program below)<br>Decrease in number of rivers and creeks where stock access poses a high risk to water quality - demonstrated decrease<br><br>**Targeted Water Quality Works**<br>Percentage of actions implemented from council Stormwater Management Plans assigned to Melbourne Water - 30%<br>Reduction of nitrogen loads in urban stormwater by 2010 - 100 tonnes<br>Annual reduction in nitrogen loads through the establishment of wetlands for the period 2010 to 2013 - 2 tonnes<br><br>**Monitoring and Research**<br>Percentage of health risk assessments completed for major rivers and creeks with a high level of recreational activity - 100%<br>Completion date for delivering the faecal investigations program – 2013 | $33.9M | $50.7M |
| New Obligations | | | | | | | |
| Reduction of pollutant loads in addition to Nitrogen | SEPPs, Regional River Health Strategy and Addendum, Yarra River Action Plan, Melbourne Water Waterways Water Quality Strategy, Managing Water Quality section of the Waterways Operating Charter | Revised SOO Part 5, Waterways and Drainage Services - Operating Charter | **Long-term aim from Waterways Operating Charter**<br><br>In collaboration with others, to achieve objectives for water quality in accordance with State Environmental Protection Policies and targets set out in the Regional River Health Strategy and Waterways Water Quality Strategy | Guided by target outcomes set out in the Waterways Operating Charter with priorities set consistent with:<br><br>Relevant State Environment Protection Policies<br><br>Regional River Health Strategy and Addendum<br><br>Melbourne Water Waterways Water Quality Strategy | Expansion of load reduction programs and targeted works to include pollutant load sources other than nitrogen to achieve implementation targets set out in the Waterways Water Quality Strategy and Regional River Health Strategy<br><br>Implementation targets include:<br><br>**Equipping Agencies, Communities and Industry to Manage Water Quality**<br>Develop and commence implementation of a land management program to manage run-off in rural areas - 2009<br><br>**Targeted Water Quality Works**<br>Number of pollution load hotspots addressed - 8<br>Percentage of local governments that have committed to water sensitive urban design implementation targets for pollutant loads, flow and effective imperviousness - 50%<br><br>**Monitoring and Research**<br>Number of new monitoring programs to fill knowledge gaps for toxicants and pesticides - 2 | $4.4M | $30.2M |

## Melbourne Water's Department of Sustainability and Environment Key Obligations

**Waterways Condition**

| Issue | Regulatory Instrument | Relevant SOO Clause | Required Standard | Business response set out in… (under review / development) | Key Activities over Water Plan Period | Capital Expenditure ($M) | WP Opex ($M) |
|---|---|---|---|---|---|---|---|
| Environment | | | | | | | |
| Existing Obligations | | | | | | | |
| Managing waterways | Water Act, SEPPs (WoV, schedules), Managing Waterways section of the Waterways Operating Charter, Regional River Health Strategy and Addendum, Melbourne Water Waterways Water Quality Strategy | SOO Part 6, River and Aquifer Health | **10-year goal from the Waterways Operating Charter**<br><br>To have 50% of rivers and creeks in good or excellent condition by 2015 (as measured by the Index of River Condition) | Guided by river health target outcomes set out in the Waterways Operating Charter with priorities set consistent with:<br><br>Regional River Health Strategy and Addendum<br>Waterways Water Quality Strategy | River and creek management works to achieve implementation targets and regional programs in the Regional River Health Strategy - Addendum<br>This includes implementing monitoring, investigation and research programs to determine changes in river health condition over time, provide information for management decisions, track progress towards achieving targets and address gaps in understanding<br><br>Implementation targets for the whole of the waterways boundary area include:<br><br>Number of rivers with negotiated environmental flow regimes - 12<br>Number of rivers with improvements made to environmental regimes - 17<br>Area of streamside land under management agreements - 10km2<br>Length of streamside land revegetated - 1026km<br>Number of fish barriers removed - 31<br>Length of riparian land subject to weed management - 2042km<br>Numbers of plans developed for rivers and creeks of high social value - 15<br>Rivers where heritage values are protected or improved - 34<br>Number of plans developed for rivers and creeks of high environmental value - 11<br>Number of investigations to fill data gaps in rivers or creeks - 55<br>Number of sites subject to bed and bank stabilisation - 55<br>Number of IRC reaches with instream habitat reinstated - 12 | $77.5M | $148.2M |
| Licensing river diversions | Victorian Government's Our Water Our Future, Water Resource Management Act (part 2), Managing Environmental Flows section of the Waterways Operating Charter, Central Region Sustainable Water Strategy, Customer Charter for Diversion Services | SOO Part 6, River and Aquifer Health, Part 5, Metering | Link to Waterways Operating Charter long-term aim and 10-year goal to manage waterways to ensure sufficient environmental flows to support river health and beneficial uses and make significant progress towards implementing Environmental Water Reserve recommendations of the Central Region Sustainable Water Strategy and Our Water Our Future | Guided by target outcomes set out in the Waterways Operating Charter with priorities set consistent with:<br><br>Irrigation management initiatives identified in Our Water Our Future and the Central Region Sustainable Water Strategy<br><br>Regional River Health Strategy<br><br>Customer Charter for Diversion Services | Diversions will be managed in accordance with rules specified in stream flow management plans, local management rules or drought response plans, and to meet service requirements in Melbourne Water's Customer Charter for Diversion Services | $0.4M | $3.3M |
| New Obligations | | | | | | | |
| Managing Environmental Water Reserve | Victorian Government's 'Our Water Our Future', Water Resource Management Act (part 2), Managing Environmental Flows section of the Waterways Operating Charter, Regional River Health Strategy, Central Region Sustainable Water Strategy | SOO Part 6, River and Aquifer Health | **Long-term aim from the Waterways Operating Charter**<br><br>Waterways are managed to ensure sufficient environmental flows to support river health and protect beneficial uses<br><br>**10-year goal from the Waterways Operating Charter**<br><br>Significant progress is made towards implementing Environmental Water Reserve recommendations of the Central Region Sustainable Water Strategy and Our Water Our Future | Guided by river health target outcomes set out in the Waterways Operating Charter and implement initiatives identified in 'Our Water Our Future' and the Central Region Sustainable Water Strategy | Activities and programs to manage environmental flows in line with Environmental Entitlements and to meet environmental water reserve outcomes and the Waterways Operating Charter performance targets:<br><br>Performance targets include:<br><br>Complete an environmental flows study for all major rivers and creeks by 2013 (to identify the required environmental water reserve)<br>Develop and implement a program to improve environmental flows in major rivers and creeks that currently do not meet agreed scientific flow objectives to enhance existing Environmental Water Reserves and build the capacity of water managers to meet their environmental water reserve obligations | $0.7M | $2.9M |

**Drainage and Flood Protection**

| Issue | Regulatory Instrument | Relevant SOO Clause | Required Standard | Business response set out in… (under review / development) | Key Activities over Water Plan Period | Capital Expenditure ($M) | WP Opex ($M) |
|---|---|---|---|---|---|---|---|
| Government / shareholder | | | | | | | |
| Amended Obligations | | | | | | | |
| Floodplain management | Water Act, Flood Management and Drainage section of the Waterways Operating Charter | SOO Part 5, Waterways and Drainage Services - Operating Charter | Provide a safe and effective system for dealing with stormwater run-off by operating and maintaining drainage systems, determining how high floodwaters will rise and how far they will extend and developing and implementing plans to minimise flood damage. | Guided by targets and outcomes set out in the Waterways Operating Charter with priorities set consistent with:<br><br>Melbourne Water's Asset Management Framework and associated plans, policies and procedures | Program of drainage works, monitoring, mapping and maintenance activities to meet the Waterways Operating Charter performance target of no instances of asset structural failure that results in significant flooding, damage, disruption or personal injury | $75.7M | $65.2M |
| New Obligations | | | | | | | |
| Flood mitigation | Water Act, Flood Management and Drainage section of the Waterways Operating Charter, Port Phillip and Westernport Region Flood Management and Drainage Strategy, Auditor General Victoria Report 'Managing Stormwater Flooding Risks in Melbourne' | SOO Part 5, Waterways and Drainage Services - Operating Charter | **Long-term aim from the Waterways Operating Charter**<br>To minimise all currently known intolerable flooding risks to public health and safety, property and infrastructure and increase community understanding and preparedness for floods<br><br>**10 year goals from Waterways Operating Charter**<br>Implement flood protection measures to reduce currently known intolerable flood risks by 30% by 2018<br><br>Implement a community flood awareness and preparation program<br><br>Support the preparation of Municipal Emergency Management Plans to ensure local government and communities have an adequate understanding of flood risks and are well prepared for flood events, and flood mitigation actions are co-ordinated with Melbourne Water | Guided by targets and outcomes set out in the Waterways Operating Charter with priorities set consistent with:<br><br>Port Phillip and Westernport Region Flood Management and Drainage Strategy<br><br>2005 performance audit of stormwater drainage in Metropolitan Melbourne | Flood protection works and related programs to achieve Waterways Operating Charter goals and performance targets.<br>This includes implementing rainfall and streamflow monitoring programs, undertaking research to address gaps in understanding and educating the community about flood related issues<br><br>Performance targets for the whole of the waterways and drainage boundary area include:<br><br>**Flood Mitigation**<br>Currently known intolerable flood risks will be reduced by 10% by 2013<br><br>**Complete knowledge base**<br>Develop and implement a program to undertake local flood extent and tidal mapping<br><br>**Flood warning system**<br>Initial notification and subsequent forecast information will be provided to the Bureau of Meteorology for all notifiable flooding events on stipulated waterways<br><br>**Flood awareness and preparation**<br>Develop and implement a flood awareness and preparation program in partnership with VICSES and local governments<br>All local governments in the Port Phillip & Westernport region will have Flood Management Plans in place by 2013 | $63.9M | $4.9M |

**Stormwater Quality**

**Note: Due to the integrated nature of the water quality program, many programs contribute to the achievement of each implementation target**

| Issue | Regulatory Instrument | Relevant SOO Clause | Required Standard | Business response set out in… (under review / development) | Key Activities over Water Plan Period | Capital Expenditure ($M) | WP Opex ($M) |
|---|---|---|---|---|---|---|---|
| Environment | | | | | | | |
| Existing Obligations | | | | | | | |
| Managing water quality | SEPPs (Waters of Victoria, Schedule F6 Port Phillip Bay, Schedule F7 Yarra Catchment, Schedule F8 Western Port and Catchment), Regional River Health Strategy and Addendum, Port Phillip Bay Environmental Management Plan, Yarra River Action Plan, Managing Water Quality section of the Waterways Operating Charter, Melbourne Water Waterways Water Quality Strategy | SOO Part 5, Waterways and Drainage Services - Operating Charter | **Long-term aim from Waterways Operating Charter**<br><br>In collaboration with others, to achieve objectives for water quality in accordance with State environmental protection policies and targets set out in the Regional River Health Strategy and Waterways Water Quality Strategy<br><br>**10-year goal from Waterways Operating Charter**<br><br>In collaboration with others, protect and improve water quality to significantly counteract the effects of growth in greater Melbourne and achieve a net reduction in loads for the Port Phillip and Westernport region against 2001 levels | Guided by target outcomes set out in the Waterways Operating Charter with priorities set consistent with:<br><br>Relevant State environment protection policies<br><br>Regional River Health Strategy and Addendum<br><br>Waterways Water Quality Strategy<br><br>Incorporates new obligations that form part of the Yarra River Action Plan (which includes a Lower Yarra program) | Water quality programs and works to achieve implementation targets set out in the Waterways Water Quality Strategy and Regional River Health Strategy.<br>This includes implementing monitoring, investigations and research programs to determine changes in water quality and river health condition over time, provide information for management decisions, track progress towards achieving targets and address gaps in understanding<br><br>Implementation targets for the whole of the waterways boundary area include:<br><br>**Planning for Improved Water Quality**<br>Develop a draft Better Bays and Waterways Plan - 2008<br>Percentage of programs implemented from the Better Bays and Waterways Plan assigned to Melbourne Water - 100%<br>New or revised State Government requirements for all industrial, commercial, residential development to meet best practice water quality objectives - 2013<br><br>**Equipping Agencies, Communities and Industry to Manage Water Quality**<br>Number of training modules delivered under the Clearwater program per year with assistance from Melbourne Water - 10<br>Percentage of councils with improved performance in delivering sustainable urban water management (as measured by the Council Needs Analysis) - 70%<br>Number of guidelines and/or tools prepared to assist in the application of best practice stormwater management - 6<br>Number of rain gardens built in the community with support from Melbourne Water - 10,000 (also contributes to the targeted works program below)<br>Decrease in number of rivers and creeks where stock access poses a high risk to water quality - demonstrated decrease<br><br>**Targeted Water Quality Works**<br>Percentage of actions implemented from council Stormwater Management Plans assigned to Melbourne Water - 30%<br>Reduction of nitrogen loads in urban stormwater by 2010 - 100 tonnes<br>Annual reduction in nitrogen loads through the establishment of wetlands for the period 2010 to 2013 - 2 tonnes<br><br>**Monitoring and Research**<br>Percentage of health risk assessments completed for major rivers and creeks with a high level of recreational activity - 100%<br>Completion date for delivering the faecal investigations program - 2013 | $33.9M | $50.7M |
| New Obligations | | | | | | | |
| Reduction of pollutant loads in addition to Nitrogen | SEPPs, Regional River Health Strategy and Addendum, Yarra River Action Plan, Melbourne Water Waterways Water Quality Strategy, Managing Water Quality section of the Waterways Operating Charter | Revised SOO Part 5, Waterways and Drainage Services - Operating Charter | **Long-term aim from Waterways Operating Charter**<br><br>In collaboration with others, to achieve objectives for water quality in accordance with State Environmental Protection Policies and targets set out in the Regional River Health Strategy and Waterways Water Quality Strategy | Guided by target outcomes set out in the Waterways Operating Charter with priorities set consistent with:<br><br>Relevant State Environment Protection Policies<br><br>Regional River Health Strategy and Addendum<br><br>Melbourne Water Waterways Water Quality Strategy | Expansion of load reduction programs and targeted works to include pollutant load sources other than nitrogen to achieve implementation targets set out in the Waterways Water Quality Strategy and Regional River Health Strategy<br><br>Implementation targets include:<br><br>**Equipping Agencies, Communities and Industry to Manage Water Quality**<br>Develop and commence implementation of a land management program to manage run-off in rural areas - 2009<br><br>**Targeted Water Quality Works**<br>Number of pollution load hotspots addressed - 8<br>Percentage of local governments that have committed to water sensitive urban design implementation targets for pollutant loads, flow and effective imperviousness - 50%<br><br>**Monitoring and Research**<br>Number of new monitoring programs to fill knowledge gaps for toxicants and pesticides - 2 | $4.4M | $30.2M |

**Land Development**

| Issue | Regulatory Instrument | Relevant SOO Clause | Required Standard | Business response set out in… (under review / development) | Key Activities over Water Plan Period | Capital Expenditure ($M) | WP Opex ($M) |
|---|---|---|---|---|---|---|---|
| Environment | | | | | | | |
| Existing Obligations | | | | | | | |
| Development planning and services | Water Act (part 10, division 4), Planning and Environment Act (clause 55), Melbourne 2030 Metropolitan Strategy, Managing Urban Growth section of the Waterways Operating Charter, Victorian Planning Provisions (Cl 56), Central Region Sustainable Water Strategy | SOO Part 5, Waterways and Drainage Services - Operating Charter | **Long-term aim from Waterways Operating Charter**<br>Ensure urban development achieves appropriate standards of flood protection, protects waterway health and is sensitive to other environmental and social values of waterways<br>Deliver an efficient service and provide accurate, timely and reliable information to the development industry and community<br><br>**10-year goal from Waterways Operating Charter**<br>Improve transparency, streamlining and facilitate improved access to information for the development industry, community and other interested parties;<br>Ensure appropriate standards of flood protection and environmental performance are consistently and equitably achieved for all urban development;<br>Benefit the local community through the provision of drainage and waterway assets that integrate with the urban infrastructure and open space;<br>Achieve improved sustainability of urban development by implementing water sensitive urban design and facilitating increased stormwater reuse;<br>Manage the potential impacts of increasing redevelopment activity on levels of flood protection service in established areas of Melbourne;<br>Find cost-effective strategies for servicing growth that minimize impacts on housing affordability | Guided by target outcomes in the Waterways Operating Charter with priorities set consistent with:<br><br>Port Phillip and Westernport Region Flood Management and Drainage Strategy<br><br>Development planning programs<br><br>Regional River Health Strategy<br><br>Waterways Water Quality Strategy<br><br>Central Region Sustainable Water Strategy | Program of in drainage works to service growth areas and achieve Waterways Operating Charter goals and performance targets.<br><br>Performance targets for the whole of the waterways and drainage boundary area include:<br><br>All new development will comply with flood protection standards<br>Statutory and agreed industry response times will be achieved for all referrals<br>Flood related property information statement updates will be completed within one month of Melbourne Water receiving notification of a change in relevant circumstances | $281.3M | $25.0M |

# 2008 Waterways Water Plan

## Appendix 2
## Major Projects - 2008/09 to 2012/13 Water Plan: Top 10 Projects

**Dollars are all in Real 06/07 $'M**

| Project | Description | Primary Business Driver | Outcome /Benefit | Est. Completion Date | 2008/09 | 2009/10 | 2010/11 | 2011/12 | 2012/13 | 2008 Water Plan Total | Project Total | Accuracy Range ($'M or %) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | 2008 Water Plan Period | | | | | | |
| Sandgate Avenue Drain Stages 1 - 5 | Construction of retarding basins within Samuel Sherlock reserve and Jubilee Park as well as up to 2100mm diameter drains to carry flows up to 20 cubic metres per second | Drainage & Flood Protection Compliance - New | Works will contribute towards addressing Melbourne Waters 10-year goal of reducing 30% of currently known intolerable flood risks by 2018 | Jun-14 | 4,750.0 | 12,600.0 | 6,800.0 | 3,300.0 | 2,000.0 | 29,450.0 | 35,303.0 | +/-50% |
| Fairfield main drain | Construction of a 3000mm diameter drain from the corner of Duncan and Gillies Streets, Fairfield to the Yarra River to provide capacity of up to approximately 30 cubic metres per second | Drainage & Flood Protection Compliance - New | Works will contribute towards addressing Melbourne Waters 10-year goal of reducing 30% of currently known intolerable flood risks by 2018 | Jun-11 | 300.0 | 7,900.0 | 11,000.0 | | | 19,200.0 | 19,250.0 | +/-20% |
| Glass Creek main drain | Construction of retarding basins and increased storage in drainage reserves | Drainage & Flood Protection Compliance | Improved flood protection to areas of Glass Creek catchment | Jun-12 | | 1,000.0 | 1,000.0 | 1,500.0 | | 3,500.0 | 3,650.0 | +/-50% |
| Hawthorn main drain | Construction of retarding basins subject to further investigations | Drainage & Flood Protection Compliance | Improved flood protection to areas of Hawthorn main drain catchment | Jun-12 | | | 2,000.0 | 1,500.0 | | 3,500.0 | 3,603.0 | +/-50% |
| Rigby's wetland | Construction of stormwater quality improvement wetlands within the Dandenong Creek Floodplain (downstream of Femtree Gully Road) | Stormwater Quality Compliance | Improved water quality in Dandenong Creek and Port Phillip Bay including a reduction of approximately 17 tonnes of Nitrogen annually | Dec-09 | 2,800.0 | 2,000.0 | | | | 4,800.0 | 7,300.0 | +/- 30% |
| Riviera outlet reconstruction | Demolition and reconstruction of the last 50 metres of a large twin cell rectangular culvert structure located on the Seaford foreshore. Riviera Outlet is a flood protection structure on the Kannanook Creek and protects the downstream Frankston central business district | Drainage Flood Protection Renewals | Reconstruction of outlet will mitigate the structural risk of the outlet failing during a flood event | Jun-09 | 200.0 | 2,143.0 | | | | 2,343.0 | 2,343.0 | +/- 25% |
| Construction of erosion walls along Patterson River | Construction of approximately 1km of erosion protection rock work along sections of the Patterson River near the Tidal Gate locations and other locations identified along the Levee Bank | Drainage Flood Protection Strategic Intent /Risk Mitigation | Installation of protection system to ensure structural integrity of flood protection structures are maintained | Jul-13 | 300.0 | 300.0 | 300.0 | 300.0 | 300.0 | 1,500.0 | 1,500.0 | +/- 30% |
| Yarra River Dights Falls rehabilitation | Replacement of heritage listed weir which is at the end of its life | Waterways Condition Renewals | Improvement of critical fish passage | Jun-09 | 1,500.0 | | | | | 1,500.0 | 1,650.0 | +/- 30% |
| Merrilands drain flood mitigation | Construction of drains having diameters up to 1800mm to carry up to approximately 7.5 cubic metres per second | Drainage & Flood Protection Compliance - New | Improved protection of areas within the catchment | Jun-10 | | 75.0 | | 1,000.0 | | 1,075.0 | 1,075.0 | +/-50% |
| Dandenong floodplain wetlands (Nth Green Rd), including waterway remodelling | Construction of wetlands and waterway rehabilitation of approx 2.2 km of Dandenong Creek in Dandenong South | Stormwater Quality Compliance | Improved water quality, waterway rehabilitation and flood mitigation | Dec-07 | 1,050.0 | | | | | 1,050.0 | 4,675.0 | +/- 25% |

2008 Waterways Water Plan

Appendix 3

**Weighted average cost of capital**

# Cost of Capital for Metropolitan Water Businesses

*Report prepared for*

*City West Water*
*Melbourne Water*
*Southeast Water*
*Yarra Valley Water*

14 May 2007

PO Box 29, Stanley Street Plaza
South Bank QLD 4101
Telephone +61 7 3844 0684
Email s.gray@sfgconsulting.com.au
Internet www.sfgconsulting.com.au

STRATEGIC FINANCE GROUP
SFG CONSULTING

Level 1, South Bank House
Stanley Street Plaza
South Bank QLD 4101
AUSTRALIA

## Contents

## 1. Executive Summary

The Strategic Finance Group: SFG Consulting has been retained by the metropolitan Melbourne water businesses (City West Water, Melbourne Water Corporation, South East Water, and Yarra Valley Water) to provide an empirical estimation of the Weighted-Average Cost of Capital (WACC) for the businesses.

The present project has been divided into two stages. The first stage (previously completed) involved an analysis of the likely parameter estimates that might be adopted by the Essential Services Commission (ESC) in the absence of further submissions from the businesses. This second stage provides an estimation of the WACC based on an empirical analysis of the underlying data, financial theory, and the requirement of all WACC parameters to be estimated in an internally consistent manner.

In undertaking the estimation of the WACC, we have:

- Reviewed a range of regulatory determinations from Australian regulators relating to water, gas, and electricity distribution. We have also drawn on our experience in assisting a whole range of regulated entities and regulatory bodies;
- Performed a comprehensive estimation of the systematic risk (beta) faced by water businesses;
- Analysed whether the systematic risk of listed gas and electricity businesses is statistically different from water businesses;
- Examined the merit of using Bloomberg as opposed to CBA Spectrum as the source for debt margins; and
- Empirically estimated the value of franking credits (gamma) and considered the consistency of various estimates of gamma with other WACC parameters and the regulatory framework.

A number of WACC parameters cannot be estimated with great precision, but can only be narrowed down to an economically reasonable range. Consequently, it is also impossible to produce a precisely measured WACC – which is an aggregation of the individual parameters, some of which are subject to estimation uncertainty. Thus, the aggregated WACC itself cannot be pinpointed, but it can be narrowed down to an economically reasonable range.

The return set by the regulator should be selected from within this economically reasonable range in a way that takes account of estimation uncertainty and considers the consequences of under-investment. An economically reasonable range (indeed a full probability distribution) can be established using standard Monte Carlo simulation. This technique has recently been endorsed by the Australian Competition and Consumer Commission (ACCC), Independent Pricing and Regulatory Tribunal (IPART) and the Queensland Competition Authority (QCA).

Table 1 summarises each recommended parameter estimate and the resultant inter-quartile range for the WACC based on standard Monte Carlo simulations. We note that the New Zealand Commerce Commission has recently adopted the approach of setting the regulated WACC according to the 75$^{th}$ percentile as a way of balancing the asymmetric consequences of over- and under-investment in key infrastructure.[1] We support this approach and recommend a real vanilla post tax weighted average cost of capital of 6.4%.

[1] New Zealand Commerce Commission, 2004, Gas Control Enquiry: Final Report, 29 November 2004, www.med.govt.nz/ers/gas/control-inquiry/final-report/final-report.pdf.

**Table 1: Recommended Parameter Values**

| Parameter | 2005 Price Determination Applied | 2008 Price Determination Recommended | Comments |
|---|---|---|---|
| **Real Risk-free Rate** | 2.67% | 2.64 – 3.36% | 20-day average yield on 10-year inflation-indexed bonds, range allows for bias induced by present demand-supply imbalance recognised by RBA and market participants. |
| **Market Risk Premium** | 6% | 5 – 7% | Regulatory precedent, historical data and forward looking estimates. |
| **Gearing** | 60% | 50 – 60% | Regulatory precedent and examination of comparables. |
| **Credit Rating** | BBB to BBB+ | BBB to BBB+ | Regulatory precedent. |
| **Debt Issuance Costs** | 0.10% | 0.125% | Regulatory precedent based on evidence from market practitioners. |
| **Total Debt Margin** | 1.16% | 1.24 - 1.36% | Difference between yield on 10-year corporate bonds and corresponding government bonds (includes debt issuance costs). |
| **Equity Beta (geared to 60%)** | 0.75 | 0.9-1.1 | Based on an empirical examination of data, and presented with 60% gearing for comparison with other regulatory determinations. |
| **Gamma** | 0.5 | 0 | Gamma does not enter the WACC formula directly, but impacts regulated revenues via the allowance for tax. |
| **Corporate Tax Rate** | 30% | 30% | The corporate tax rate does not enter the WACC formula directly, but impacts regulated revenues via the allowance for tax. |
| **Cost of Equity Midpoint** | 7.2% | 8.42% | Computed using CAPM. |
| **Cost of Debt Midpoint** | 3.9% | 4.30% | Computed as sum of risk-free rate and debt margin. |
| **Real WACC mid-point estimate** | 5.2% | 6.15% | Real Vanilla Post-Tax WACC. |
| **Proposed regulatory WACC** | | 6.4% | 75$^{th}$ percentile of estimated WACC distribution. |

## 2. Form of WACC

The Melbourne metropolitan water businesses support the use of a post-tax real WACC defined as:

$$WACC = r_e \frac{E}{V} + r_d \frac{D}{V}$$

where:

$r_e$ = real after-tax required return to equityholders;

$r_d$ = the real required return to debtholders;

$\frac{D}{V}$ = the benchmark gearing assumption (proportion of debt financing on a market-value basis); and

$\frac{E}{V} = 1 - \frac{D}{V}$.

The businesses also advocate using the standard domestic Capital Asset Pricing Model (CAPM) to estimate the required return on equity:

$$r_e = r_f + \beta_e MRP$$

where:

$r_f$ = real risk-free rate of interest;

$\beta_e$ = the equity beta of the regulated firm (an estimate of systematic risk); and

$MRP$ = the market risk premium – the amount by which the return on the average stock is expected to exceed the risk-free rate.

## 3. Risk-free rate and expected inflation

### 3.1 Real risk-free rate

In previous decisions where no 10-year index-linked bond is available, the ESC has used linear interpolation based on current yields of available bonds. At present, the two inflation-indexed bonds with maturities closest to 10 years are:

- Bond TI405 which matures in August 2015 – maturity of 8.35 years; and
- Bond TI406 which matures in August 2020 – maturity of 13.36 years.

These bonds have yields (averaged over 20 trading days to 16 April 2007) of 2.66% and 2.52%, respectively. Standard linear interpolation produces a yield of 2.61%.

Treasury capital indexed bonds pay coupons quarterly, and the Reserve Bank of Australia's convention is to report an annual yield by multiplying the effective quarterly yield by a factor of 4.[2] However, the computation of a WACC estimate requires an effective annual rate. Consequently, the quoted rate must be converted as follows:

$$\left(1+\frac{reported\ annual\ rate}{4}\right)^4 - 1 = Effective\ Annual\ Rate,$$

so in this case we have:

$$\left(1+\frac{2.61\%}{4}\right)^4 - 1 = 2.64\%.$$

The ESC has used this approach in its most recent determination.

### 3.2 Expected Inflation

Despite the fact that the ESC uses a real WACC, the expected inflation rate must still be estimated as it forms an input when calculating benchmark revenues. The method favoured by the ESC is to take the difference (using the Fisher transformation) between the average yields (i.e., 20 day average) on a 10-year nominal Treasury bond and a 10-year index-linked Treasury bond. This estimate is then checked against the RBA's target range for inflation of 2 – 3%.

The current 10-year nominal bond yield (20 day average to 16 April 2007) is 5.86%. This is a semi-annual yield that must be converted to an effective annual rate:

$$\left(1+\frac{5.86\%}{2}\right)^2 - 1 = 5.94\%.$$

Expected inflation is then computed using the Fisher relation:

$$(1+r_{\text{real}})(1+i) = (1+r_{\text{nominal}}).$$

[2] This is often referred to as a bond-equivalent yield.

In this case, we have:

$$(1.0264)(1+i) = (1.0594)$$

in which case the implied expected inflation is 3.22% p.a.

### 3.3 Downward bias in the estimate of real risk-free rate

There are a number of reasons why the present yield on 10-year Australian government inflation-indexed bonds can be considered to be downwardly biased. These reasons are reviewed in the remainder of this section.

*Demand-supply imbalance*

1. The Australian Government ceased issuing inflation-indexed bonds in 2003. Consequently, the supply of government inflation-indexed securities is fixed, such that any changes in institutional demand will have a proportionately larger impact on yields.

2. Moreover, it is widely recognised that the market for inflation-indexed bonds is constrained by tight supply. Indeed, the Reserve Bank of Australia (RBA) noted this in its recent Statements on Monetary Policy (SMP). In the August 2006 SMP the RBA noted:

> yields on indexed securities may have been held down by some specific factors that are unrelated to expectations about inflation. In particular, institutional demand has increased in the face of unchanged tight supply.[3]

Furthermore, in the November 2006 SMP the RBA reiterated this point.

> The implied medium-term inflation expectations of financial market participants, as measured by the difference between nominal and indexed bond yields was around 3¼ per cent in early November. However, as noted in previous Statements, this measure can be affected by factors unrelated to expectations about inflation, such as changes in institutional demand for indexed securities.[4]

A similar statement is contained in the RBA's most recent February 2007 SMP:

> The implied medium-term inflation expectations of financial market participants, as measured by the difference between nominal and indexed bond yields, was a little over 3 per cent in early February. Given the institutional factors noted in previous *Statements*, this figure may overstate actual inflation expectations.[5]

Moreover, Queensland Investment Corporation (QIC) has recently announced its intention to enter this market due to the presently pronounced demand-supply imbalance. A recent QIC press release on this issue states:

[3] Reserve Bank of Australia (2006), Statement on Monetary Policy, August, p.50.
[4] Reserve Bank of Australia (2006), Statement on Monetary Policy, November, p.58.
[5] Reserve Bank of Australia (2007), Statement on Monetary Policy, February, p.54.

> An increasingly sought after and traded asset class internationally, inflation-linked bonds (ILB) are currently extremely hard to source in Australia. They have been primarily issued by governments, but are now in limited supply.[6]

Without these supply constraints, the estimated real risk-free rate (and consequently the WACC) would be higher.

*Implications for expected inflation*

As noted above, the present yield on Australian government inflation-indexed bonds implies an inflation expectation of 3.22% p.a. over the life of the bonds. This is above the upper boundary of the RBA's target band. This can only be reconciled with the RBA's demonstrated tough stance on inflation and its success in generally keeping inflation within the target band in one of two ways. Either:

1. The market's expectation is now that the RBA's policy of targeting inflation and its success in generally keeping inflation within the stated band is no longer relevant, and that the best estimate of the forward-looking 10-year period is that the RBA will now consistently fail to keep inflation within the target band; or

2. The present yield on inflation-indexed bonds is downwardly biased due to a demand-supply imbalance.

The source of the demand-supply imbalance in inflation-indexed bonds is well known – the Australian government simply stopped issuing them some years ago, so the supply is fixed. The effect of the imbalance has been recognised by the RBA itself in stating that the imbalance has "held down" yields.

In the February 2007 SMP the RBA noted that while inflation expectations derived from inflation-indexed bond yields are above 3%, market economists':

> median expectation for headline inflation over the year to the December quarter 2007 was 2.5 per cent…Over the year to December 2008, the median inflation expectation was also 2.5 per cent.[7]

The RBA's own forecasts of inflation are also below the implied expectations derived from inflation-indexed bond yields:

> The central forecast is for year-ended underlying inflation – currently around 3 per cent – to fall to 2¾ per cent in 2007 and 2008….With the recent falls in oil prices and the unwinding of the banana price increases, headline CPI inflation is expected to fall below 2 per cent in mid 2007 before rising to be about the same as underlying inflation later in the forecast period.[8]

On any view of the matter, it seems that the second of the two explanations above is more plausible – the present yield on inflation-indexed bonds is downwardly biased due to a demand-supply imbalance. This implies that the procedure used by the ESC, in the present market circumstances, results in:

- Estimates of the real risk-free rate that are downwardly biased; and
- Estimates of expected inflation that are upwardly biased.

[6] Queensland Investment Corporation (2006), QSuper and QIC create new swaps market, 23 October.
[7] Reserve Bank of Australia (2007), Statement on Monetary Policy, February, p.53-54.
[8] Reserve Bank of Australia (2007), Statement on Monetary Policy, February, p.55.

### 3.4 Regulatory framework

The regulatory framework that has been adopted by the Commission indexes revenues against ***actual inflation*** outcomes. The point here is that the overestimation of the inflation expectations due to the limited supply of inflation-indexed bonds will, all else remaining equal, lead to actual inflation being below expected inflation.

Note that the benchmark cost of debt allowed by the Commission, excluding transaction-related and hedging costs, can be decomposed as follows:

$$\begin{bmatrix} Benchmark\ Cost \\ of\ Debt \end{bmatrix} = \begin{bmatrix} Inflation\ Indexed \\ Govt\ Bond\ Rate \end{bmatrix} + \begin{bmatrix} Credit\ spread\ on \\ nominal\ bonds \end{bmatrix} + \begin{bmatrix} Actual\ inflation \\ outcomes \end{bmatrix}$$

If the firm raises fixed-rate nominal debt, its actual cost, excluding transaction-related and hedging costs, can be decomposed as:

$$\begin{bmatrix} Actual\ Cost \\ of\ Debt \end{bmatrix} = \begin{bmatrix} Nominal \\ Govt\ Bond\ Rate \end{bmatrix} + \begin{bmatrix} Credit\ spread\ on \\ nominal\ bonds \end{bmatrix}$$

$$\begin{bmatrix} Actual\ Cost \\ of\ Debt \end{bmatrix} = \begin{bmatrix} Inflation\ Indexed \\ Govt\ Bond\ Rate \end{bmatrix} + \begin{bmatrix} Expected \\ Inflation \end{bmatrix} + \begin{bmatrix} Inflation\ Risk \\ Premium \end{bmatrix} + \begin{bmatrix} Credit\ spread\ on \\ nominal\ bonds \end{bmatrix}$$

Hence the difference between the actual cost and the allowable cost is:

$$\begin{bmatrix} Expected \\ Inflation \end{bmatrix} + \begin{bmatrix} Inflation\ Risk \\ Premium \end{bmatrix} - \begin{bmatrix} Actual \\ Inflation \end{bmatrix}$$

The inflation risk premium will be discussed in more detail in the following section. Assuming for now that premium is zero, the allowable cost of debt will systematically understate the actual cost of debt because implied inflation expectations are overstated due to tight supply of indexed bonds. Determining the precise magnitude of this overestimation is difficult. A rough approach is to assume that market economists' expectations and bond market participants' expectations are equivalent. Currently, market economists' inflation expectations are 2.5% for the year to December 2008.[9] If we assume that the expectations for 2008 are equivalent to the expectations 10 years forward, then the overestimation approximates 50 – 70 basis points (3.22% embedded in bond prices less 2.5% based on survey results).[10]

### 3.5 Inflation risk premium

A number of recent papers have identified, and sought to quantify, an inflation risk premium in nominal interest rates. These papers note that lenders face the risk that actual inflation may be unexpectedly high, reducing the value of nominal bonds. This results in lenders requiring an inflation

[9] Reserve Bank of Australia (2007), Statement on Monetary Policy, February, p54.

[10] The lower-end of this range is based on the RBA's mid-point inflation forecast of 2.75% (based on a range of 2.5%-3.0%) for December 2008. This forecast implies that inflation will be towards the upper-end of the RBA's 2%-3% target range at December 2008. However, it is unlikely that inflation will remain at the upper-end of this band over the entire 10-year period. Assuming that inflation will average the RBA's mid-point target of 2.5% over a 10-year period is a more unbiased forecast.

risk premium to compensate them for this risk. Consequently, a further component of the cost of raising debt finance is the payment to lenders of this inflation risk premium.

The simple approach is to estimate expected inflation essentially as the difference between the yield on nominal and inflation-indexed government bonds. This assumes that the Fisher relation holds exactly between nominal and inflation-indexed bonds and implicitly sets the inflation risk premium to zero. The literature on inflation risk premium demonstrates that the difference between these yields represents expected inflation ***plus*** the inflation risk premium.

Even if expected inflation is assumed to equal actual inflation, on average, the regulated entity's costs exceed revenues by the inflation risk premium. That is, the regulated entity must pay the inflation risk premium to lenders to raise the required debt finance. However, there is no mechanism, under the Commission's current approach, for this cost to be recovered.

*Adjusting for the inflation risk premium*

A number of recent papers in the academic and practitioner literatures have proposed the existence of an inflation risk premium. The idea is that holders of nominal bonds require a yield premium to compensate them for inflation risk. If actual inflation is higher than expected, their bonds will fall in value.[11]

Symmetrically, of course, if actual inflation is lower than expected, the bonds will rise in value. But this is risk – there is some chance that outcomes may differ from expectations in a way that adversely affects the bondholders. Consequently bondholders require compensation in the form of higher yields.

Note that this is similar to the risk premium that equity investors require to compensate them for the risk of holding shares. The return from holding shares might be higher or lower than investors expect. In aggregate, investors require a risk premium to compensate them for this risk even though this risk might be symmetrical. The result is that the market portfolio generates a return that is higher than the risk-free rate on average. The same applies to the inflation risk premium. The real return from nominal bonds might be higher or lower than the return from inflation-indexed bonds depending upon whether inflation is higher or lower than expected. Investors require a premium to compensate them for this risk. The result is that the real return from nominal bonds (which is subject to inflation risk) is higher than that from inflation-indexed bonds (which is not subject to inflation risk), on average. This implies that nominal and inflation-indexed bond yields differ by (i) an unbiased expectation of inflation, and (ii) an inflation risk premium.

The implication of this literature is that the difference between nominal and inflation-indexed government bond yields reflects two things: expected inflation and the inflation risk premium. The basic Fisher relation assumes that the inflation risk premium is zero so that the difference reflects expected inflation only.

Measuring the inflation risk premium is more difficult than measuring the market risk premium for equities. In the latter case, we can observe the return on a stock index relative to the risk-free rate. For the inflation risk premium, we must measure the yield of nominal and inflation-indexed bonds ***and*** we need a measure of expected inflation. As for the market risk premium, a long period of data is required to obtain a reliable long-run average estimate. Just as observing a few stock market returns lower than the risk-free rate (as in the early 1970s, for example) does not mean that the MRP has been eliminated,

[11] Consider, for example, a 10-year fixed-rate 7% bond issued at par. Now suppose that expected inflation over the term of the bond increases by 1% immediately after the bond is issued so that the yield to maturity increases to 8%. This would cause the bond to depreciate by 7%.

one can draw few conclusions about the inflation risk premium from a short period of interest rate data.

A number of papers have tried to estimate this inflation risk premium that holders of nominal bonds require. Recent papers that document and measure the inflation risk premium include Shen (1998), Buraschi and Jiltsov (2005) and Ang and Bekaert (2005).[12]

The simplest technique for estimating the inflation risk premium is to obtain an independent measure of expected inflation. Two approaches have been proposed in this regard – consumer surveys and the midpoint of the central bank's target band (this would be 2.5% in Australia). Under this approach, the measure of expected inflation is subtracted from the difference between nominal and inflation-indexed yields (as estimated above). Whatever remains must be the inflation risk premium. Shen (1998) applies both of these approaches to UK data from 1996-97 and estimates an average inflation risk premium of 70 to 100 basis points.[13]

Of course, this approach relies on the independent estimates of expected inflation. Even though Shen's (1998) survey data is based on responses from market professionals (rather than the general population) a source of market data is preferred when estimating any parameter. Moreover, the use of this approach effectively assumes that the inflation risk premium and expected inflation are both constant over time and do not vary with business cycles or economic circumstances. This approach also ignores the information about expected inflation and the inflation risk premium that is embedded in the current term structure of interest rates.

Clearly, this adjustment is equivalent to the one proposed above. There are two alternative reasons why implied inflation expectations may not equal other independent estimates of expected inflation. One is that implied inflation expectations are heavily influenced by institutional constraints, while the other is the existence of a risk premium. Of course, the real reason could be a combination of the two.

The alternative approach to estimate the inflation risk premium is to develop an economic model that allows for the inflation premium to vary over time and which is consistent with the current term structure. Two recent papers that pursue this approach are Buraschi and Jiltsov (2005) and Ang and Bekaert (2004).

Buraschi and Jiltsov (2005) develop a real business cycle model in which the structural parameters are estimated using US Treasury bond data. They report that the average inflation risk premium over the last 40 years is 45 basis points for 5-year maturities and 70 basis points for 10-year maturities. Under this model, the inflation risk premium varies substantially over the business cycle. In particular, the inflation risk premium is higher during periods of high and volatile inflation. Consequently, the 10-year inflation risk premium is estimated to be over 100 basis points during the late 1970's and early 1980's. The most recent estimates of the 5- and 10-year inflation risk premiums are 35 and 40 basis points respectively. This reflects the presently low levels of inflation and the relatively low volatility.

Ang and Bekaert (2004) develop a regime-switching model in which the dynamics of real interest rates and inflation are allowed to vary between two regimes. They calibrate their model to U.S. data from 1952 to 2004. They estimate the unconditional (average) inflation premium to be 97 basis points over their sample.

[12] Ang, A., & Bekaert, G. (2005). The Term Structure of Real Rates and Expected Inflation. Working Paper, Columbia University and NBER;
Buraschi, A., & Jiltsov, A. (2005). Inflation Risk Premia and the Expectations Hypothesis. Journal of Financial Economics, 75, 429-490; Shen, P. (1995). Benefits and Limitations of Inflation Indexed Treasury Bonds. Economic Review - Federal Reserve Bank of Kansas City, 80(3), 41-58.
[13] Slightly higher estimates are obtained when the second approach is applied to long-term yield differentials.

However, their estimate is 47 basis points in a "disinflation regime" and 104 basis points in the "high-inflation" regime. The longest period they examine is a maturity of five years. Their results are consistent with the extant literature in documenting that the inflation risk premium increases monotonically with the time to maturity. These results also corroborate those of Buraschi and Jiltsov (2005) in that the inflation premium is higher in periods of high and volatile inflation. Ang and Bekaert summarise the history of the inflation premium in the US as follows:

> Figure 6 graphs the 20-quarter inflation risk premium over time. The inflation risk premium has decreased in every recession, except for the 1981-83 recession, coinciding with monetary targeting. After the 1953-54 recession, the inflation risk premium was almost zero. The general trend is that the premium steadily rose from the 1950's throughout the 1960's and 1970's before entering a very volatile period during the monetary targeting period from 1979 to the early 1980's. It is then that the premium reached a peak of 2.1%. Whereas the trend since then has been downward, there have been large swings in the premium. From a temporary low of 60 basis points in the mid-eighties it shot up to 1.3%, coinciding with the halting of the large dollar appreciation of the early 1980's, and then dropped to around 40 basis points in 1993. In 1995 the premium shot up to 1.3% at the same time the Fed started to raise interest rates. During the late 1990's bull market inflation risk premiums were fairly stable and averaged around 80 basis points.

In summary, the academic and practitioner literature on the inflation premium establishes that this premium varies over time and is higher when inflation is high and volatile. All of these papers suggest that the average inflation risk premium over recent decades is in the range of 70 to 100 basis points. The most recent estimates, which relate to a period of low and stable inflation range from 40 to 80 basis points.

Of course these estimates relate to US data. If inflation levels and volatility are higher (lower) in Australia than in the US, we would expect a higher (lower) inflation risk premium to be embedded in Australian nominal bond yields. In recent periods, Australian inflation (excluding the GST spike in 2000) has been slightly lower than US inflation, but substantially more volatile (Table 2).

**Table 2. Inflation in Australia and the United States**

| Period | Statistic | Australia | United States |
|---|---|---|---|
| 1990-2005 | Mean | 2.58% | 2.87% |
| | Standard Deviation | 1.76% | 1.16% |
| 1995-2005 | Mean | 2.35% | 2.53% |
| | Standard Deviation | 1.28% | 0.85% |

Sources: Reserve Bank of Australia; US Bureau of Labor Statistics.
Calculations based on year-ended inflation rates computed from non-seasonally adjusted data.

Consequently, the estimates of an inflation risk premium of 40-80 basis points that are based on low and stable inflation regimes in US data are likely to be similar to what occurs in the Australian setting.

In summary, it is difficult to precisely estimate the inflation risk premium. What we do know is that it is not zero. The recent research demonstrates conceptually and empirically why lenders will demand a risk premium for providing nominal debt financing. The best estimates that are currently available suggest that an inflation risk premium of 40-80 basis points is appropriate, conditional on believing that we are in a low and stable inflation regime. On average, the inflation risk premium is higher.

### 3.6 Conclusion

The procedure the Commission uses to estimate the real risk-free rate and expected inflation, applied in the present circumstances of the inflation-indexed bond market, is likely to under-state the true cost of debt financing for the regulated businesses. There are a number of reasons for this:

1. The real risk-free rate is underestimated and expected inflation is overestimated due to the presently tight supply in the indexed bond market. The Reserve Bank of Australia has noted that increased institutional demand in the face of tight supply has depressed real yields. The overestimation is difficult to quantify, but a rough approximation can be made by using the difference between implied inflation expectations incorporated into bond prices and the results of surveys of market economists. This difference is currently around 50 – 70 basis points; and

2. Lenders require an inflation risk premium. The best estimates that are currently available suggest that an inflation risk premium of 40-80 basis points is appropriate, conditional on believing that we are in a low and stable inflation regime.

Of course, the two estimates provided here are not independent. Implied inflation expectations may differ from survey expectations due to institutional factors restricting the supply of indexed bonds or due to the existence of an inflation risk premium, or a combination of the two. However, the point remains that two separate reasons (each based on empirical and market evidence) support the contention that a firm's actual cost of debt will exceed the allowable cost under the regulatory framework.

This can be incorporated into the regulatory WACC estimate either by a specific allowance for the downward bias in estimates of the real risk free rate, or by recognising that the Commission's preferred approach on this issue produces an estimate of the real risk-free rate that is at the very lower end of what could be considered reasonable.

**One approach that could be used to incorporate a specific allowance for bias is to adopt a range of 2.64% to 3.36% for the risk-free rate. The lower end of that range corresponds to the yield of inflation-indexed government bonds, albeit presently subject to a demand-supply imbalance, and implying inflation expectations for the next 10 years above the top of the stated RBA band. The upper end of the range is the real risk-free rate that corresponds with inflation expectations of 2.5%, which is the mid-point of the RBA target band and is consistent with current market economists' forecasts. This range of 72 basis points is broadly consistent with the ranges in both (1) and (2) above.**

# 4. Market risk premium

## 4.1 Context

The weight of quantitative evidence on the market risk premium (MRP) supports a range of 6 – 7%. A number of theoretical arguments, raised in the academic literature, propose reasons why we might expect that the MRP in future may be lower than it has been in the past. However, the debate in the academic literature is ongoing, and the most recent empirical estimates of MRP (using the most recent 30 years of data) remain well above 6%. Moreover, it is common among Australian corporations to use and MRP estimate of 6%. Nevertheless, giving weight to the theoretical academic views on the issue, as well as the empirical evidence from the market, produces a range of 5-7% with a mid-point of 6%. This range for the MRP is broadly consistent with values adopted in recent Australian regulatory determinations.

## 4.2 Regulatory Precedent

There is a strong Australian regulatory precedent for the use of 6% as an estimate of the market risk premium. MRP estimates from recent regulatory determinations from Australian regulators are documented in Table 3.

Table 3 indicates that where Australian regulators have selected a single point estimate for MRP, they have uniformly selected 6%. Where they have adopted a range, that range has included 6%. The ESC has consistently adopted a MRP of 6%.

**Table 3: Assumed Market Risk Premium in Recent Australian Regulatory Determinations**

| Regulator | Industry | Decision Date | Assumed Value |
|---|---|---|---|
| **ESC** | Water | 06/05 | 6% |
| | Gas | 10/02 | 6% |
| | Electricity | 10/05 | 6% |
| **IPART** | Water | 06/05 | 6% |
| | Gas | 04/05 | 5.5-6.5% |
| | Electricity | 06/04 | 5-6% |
| **QCA** | Water | 03/05 | 6% |
| | Gas | 05/06 | 6% |
| | Electricity | 04/05 | 6% |
| **ESCOSA** | Water | -- | -- |
| | Gas | 06/06 | 6% |
| | Electricity | 04/05 | 6% |
| **ICRC** | Water | 03/04 | 6% |
| | Gas | 10/04 | 6% |
| | Electricity | 03/04 | 6% |
| **ERA** | Water | 11/05 | 6% |
| | Gas | 11/05 | 5-6% |
| | Electricity | 03/06 | 5-6% |

### 4.3 Historical Data

Whether the last 30, 50, 75, or 100 years of historical data are examined, the mean excess of market returns over the risk-free rate exceeds 6% and indeed exceeds 7% for many historical periods. Although the mean excess return over the carefully-chosen period between 1970 – 2004 is below 6%, this period is heavily influenced by the early 1970's oil price shock. By excluding only five years of data, the mean excess return between 1975 – 2004 supports an MRP well in excess of 7%.

This is not to say we recommend making ad-hoc adjustments by excluding particular one-off shocks. Rather, we need to accept that there are many economic events that affect stock returns. To eliminate those that are claimed to be unexpected and non-recurring would be to leave a scant and practically useless data set. Indeed it is precisely because there are unexpected events that affect markets in different ways that there exists a MRP in the first place. Instead of selectively eliminating from the data events that are considered to be unexpected, the preferred approach must be to analyse a longer data set that contains both positive and negative shocks.

Clearly, a MRP towards the upper-end of the recommended 5 – 7% range is supported by the raw historical data. However, the literature on the MRP is based on the argument that realised returns overstate what was expected during this period of time, and what market participants expect today.

**We consider these arguments below, but emphasise that the proposed range of 5 – 7% (with a mid-point of 6%) has already accounted for this evidence. The historical average of 7% (from actual market data) represents the upper end of the proposed reasonable range.**

**Table 4. Market risk premium estimates implied by historical data**

| Period of Estimation | Period Length | Mean Excess Return (%) | Gamma increment (historic average) | Gamma adjusted mean excess return |
|---|---|---|---|---|
| 1975 – 2004 | 30 | 7.70 | 0.65 | 8.34% |
| 1970 – 2004 | 35 | 4.04 | 0.55 | 4.59% |
| 1960 – 2004 | 45 | 5.27 | 0.43 | 5.71% |
| 1955 – 2004 | 50 | 6.43 | 0.39 | 6.82% |
| 1950 – 2004 | 55 | 6.77 | 0.35 | 7.12% |
| 1930 – 2004 | 75 | 6.58 | 0.26 | 6.84% |
| 1905 – 2004 | 100 | 7.15 | 0.19 | 7.34% |
| 1900 – 2004 | 105 | 7.26 | 0.18 | 7.44% |
| 1885 – 2004 | 120 | 7.17 | 0.16 | 7.33% |

Source: ESC (2005) Electricity Distribution Price Review 2006-10, Final Decision, October, p. 361.

Table 4 illustrates the historical estimates of MRP used in a recent decision of the Commission. The "gamma increment" is an adjustment for the assumed value of franking credits, since historical estimates of MRP ignore franking credits. We examine this adjustment, and the resulting internal inconsistency, in a separate report.

If the MRP really were declining due to a reduction in transaction costs or better information flow or the ability to diversify or an increase in Price/Earnings ratios, we would expect that the most recent estimates of MRP would be below longer-term historical averages. However, the mean MRP from the most recent 30-year period is in fact the highest estimate among all the periods that were examined!

Moreover, the only periods that produce estimates lower than 6% are those based on the very specific periods of 35 and 45 years. If this is to be the basis of the historical estimate of MRP, the most recent

35 and 45 year periods should be used (through to the end of 2005). If this is done, the respective estimates (based on the Commission's own procedures) are 5.73% and 6.20% respectively. Thus, there is no empirical evidence based on historical data to support an estimate of MRP lower than 6%.

### 4.4 Ex Ante MRP and Flawed Adjustments to Historical Data

Historical data provides an estimate of the ex post MRP. That is, the historical data presented above is the observed difference between the return on the market ($R_m$) and the return on the risk-free government bond ($R_f$). However, the CAPM requires an ex ante estimate of the MRP, or an estimate of the required premium that will induce investors to hold stocks rather than risk-free government bonds.

Controversy, therefore, arises as to how to estimate the ex ante MRP. Is the historical average ex post MRP estimate appropriate or should some other adjustment be used? Two recent papers – Hathaway (2005) and Hancock (2005) – have applied ad-hoc adjustments and different statistical methods to estimate an ex ante MRP.[14]

These papers have been reviewed in detail by Gray and Officer (2005), who conclude:[15]

- Despite the methodological problems, the statistical techniques employed in both papers confirm that the mean excess return over recent years is in excess of 6%; and

- Ad-hoc adjustments are responsible for the authors' independent conclusions that the MRP equals 4.5%. Hathaway (2005) makes an adjustment for the increase in the price-earnings ratio that has occurred over the last 30 years. Hancock (2005) makes adjustments based on arguments that discount rates have fallen over the last 30 years that the introduction of dividend imputation caused a massive appreciation in stock prices in 1987. There is no theoretical justification for these adjustments, and as outlined above, excluding unexpected events would leave a very thin dataset. Rather than selectively eliminating from the data events that are considered to be unexpected, a preferred approach must be to analyse a long data set that contains both positive and negative shocks that would on average offset each other. Furthermore, Hancock's (2005) dividend adjustment is internally inconsistent – the paper argues that the introduction of dividend imputation caused the unexpected boost to stock prices, but then treats franking credits as being worthless when estimating equity returns.

Estimating an ex ante MRP is difficult. In forming expectations for required risk premiums, investors must frame their decisions on past experiences. The historical data highlighted above provides investors with many observations on what the market returned relative to the risk-free rate over a one-year period. To the extent that each of these should be given equal weight, a simple arithmetic average is appropriate.

### 4.5 Forward Looking Estimates of MRP

In previous determinations the ESC has paid particular attention to forward looking estimates of the MRP, derived from the relationship between dividend yield and expected growth in the dividends. An estimate of the growth in dividends stems from historical averages of dividend growth, earnings growth

[14] Hathaway, N., 2005, Australian Market Risk Premium, Capital Research, January; and
Hancock, J., 2005, The Market Risk Premium for Australian Regulatory Decisions, South Australian Centre for Economic Studies, April.
[15] Gray, S. and R. Officer, 2005, A Review of the Market Risk Premium and Commentary on Two Recent Papers, Report prepared for the Energy Networks Association, August.

or GNP growth. Papers which rely on this estimation methodology include Fama and French (2002) and Jagannathan, McGrattan and Scherbina (2000).[16]

*A methodological flaw*

The constant growth dividend discount model upon which these papers rely requires the researcher to estimate two parameters – dividend yield and expected growth in those dividends:

$$r_e = \frac{D_1}{P_0} + g$$

In estimating growth, different researchers have used realised values for dividend growth, earnings growth, GNP growth and growth in aggregate corporate earnings.

We contended that these studies suffer from a methodological flaw in that the realised growth in dividend yields is not necessarily the same as growth expectations which are embedded in equity prices. Simply, we can observe a price and expected dividend for next year. With the available data we could either (a) assume that growth in dividends will continue at the same rate as observed historically (or will be equal to growth in some other variable like GNP) and use this assumption to estimate the cost of equity capital; or (b) assume that the cost of equity capital is the same as we have observed historically, and use this assumption to estimate the growth rate being assumed by the equity market.

In other words, these papers assume that market participants necessarily form their expectations for growth from what they have observed historically. However, it is equally possible they could form their expectations for returns from the historical data, and use these returns to infer growth rates. Indeed, in our view it is much more likely that it is earnings growth rates, rather than required returns, that vary over time.

The method used in these papers imposes an estimate on dividend growth equal to the historical mean – it is an assumption of the models that future growth is equal to historical growth. This takes no account of the reinvestment rate or expected returns on reinvested earnings. That is, if a smaller proportion of available funds are reinvested in the firm, future growth must also (logically) be smaller. However, the models take no account of this. Below we show the following important results in relation to the Fama and French (2002) conclusions:

- If we assume that the reinvestment rate is 50% (the mean reinvestment rate for the period under study) and that reinvested earnings earn a real return of 7.60% (the mean value reported in the study) the estimate for the market risk premium rises to **5.3%.**

- If we estimate corporate earnings growth directly from national accounts (i.e., use growth in aggregate corporate profits rather than listed firms only) the market risk premium for the Fama and French (2002) sample period rises to **6.5%** and to **7.4%** if the most recent five-year period is included.

In a recently published paper, Easton (2006) recognises this exact point.[17] He notes the implicit assumption that the market's forecast of growth is equal to the growth that actually occurred and argues that this approach should be rejected against alternative approaches that *estimate*, rather than

[16]Fama, E.F. and K.R. French, 2002. The equity premium, *Journal of Finance*, 57 (2), 637-659.
Jagannathan, R., E.R. McGrattan and A.. Scherbina, The declining US equity premium, *Reserve Bank of Minneapolis Quarterly Review*, 24 (4), 3-19.

[17] Easton, P., 2006, Use of Forecasts of Earnings to Estimate and Compare Cost of Capital Across Regimes, Journal of Business Finance and Accounting, 33 (3), 374-394.

*assume*, what the market was forecasting about future growth. The objective of the paper is to elaborate on the:

> differences between the approaches and compare the estimates of the implied expected rate of return when the growth rate is assumed with the estimates when the growth rate is (simultaneously) estimated from the data. In light of the fact that assumptions about the terminal growth rate are unlikely to be descriptively valid, the inferences based on the estimates of the expected rate of return that are based on these assumptions may be spurious. The appeal of O'Hanlon and Steele (2000), Easton, Taylor, Shroff and Sougiannis (2002) and Easton (2004) is that they simultaneously estimate the expected rate of return and the expected rate of growth that are implied by the data. The other methods assume a growth rate and calculate the expected rate of return that is implied by the data and the assumed growth rate. Differences between the true growth rate and the assumed growth rate will lead to errors in the estimate of the expected rate of return.

This is precisely the point we are making – differences between the true growth rate and the assumed growth rate will lead to errors in the estimate of the expected rate of return. In particular, if the market was expecting growth to be higher than what actually occurred, the forward-looking MRP will be over-estimated using the models and techniques favoured by the ESC.

The MRP computations presented by Fama and French (2002) and Jagannathan, McGrattan and Scherbina (2000) attribute the entire rise in US equity prices to their 2000 peak to a reduction in the cost of equity capital. They make explicit statements that market expectations were reasonable, despite the fact that the US market fell by 40% over the subsequent three years. Perhaps the 40% fall in equity prices over the subsequent three years is the result of earnings growth failing to reach the market's lofty expectations? **If so, results that are conditional on no overestimation of growth expectations cannot be relied upon.**

*The empirical results*

Consider first the results presented in Fama and French (2002). Their primary results, drawn from the period 1951-2000, are estimates for MRP of:

- 2.55% where real growth is estimated as the mean real dividend growth of 1.05%; and
- 4.32% where real growth is estimated as the mean real earnings growth of 2.82%.

The estimate made using dividend growth is unreliable. The low real dividend growth rate of 1.05%, compared to the real earnings growth rate of 2.82%, is due to a declining dividend payout ratio over time. From 1993-2005, the dividend payout ratio on the S&P500 declined from 62% to 35%. Subsequently, this recent period saw dividends grow at half the rate of earnings. S&P500 firms have made a deliberate decision to provide a higher proportion of returns in the form of future dividend growth, rather than near-term dividend yield. Hence, real mean dividend growth of 1.05% during the sample period is unlikely to be indicative of the market's expectations for future growth.

Now consider the MRP estimate of 4.32% derived from mean real earnings growth of 2.82%. The authors' computations rely upon the assumption that these growth rates were reflected in equity prices, so that stock market fluctuations reflect changes in the market risk premium. Several alternative growth assumptions would lead to materially-higher estimates for MRP.

Standard finance textbooks illustrate how growth can be expressed as the product of the reinvestment rate and the return on reinvested earnings:

$$g = (1 - DPR) \times E(ROE)$$

*or*

$$g = RR \times E(ROE)$$

In the period under study, the mean reinvestment rate was 50%. What would be reasonable estimates for the return on reinvested earnings?

- Fama and French (2002) report that the mean real income return on investment during the period was 7.60%. If we estimate the expected return on reinvested earnings at this same level, the long-term growth rate becomes 3.8% and the estimate for MRP rises to 5.3%;

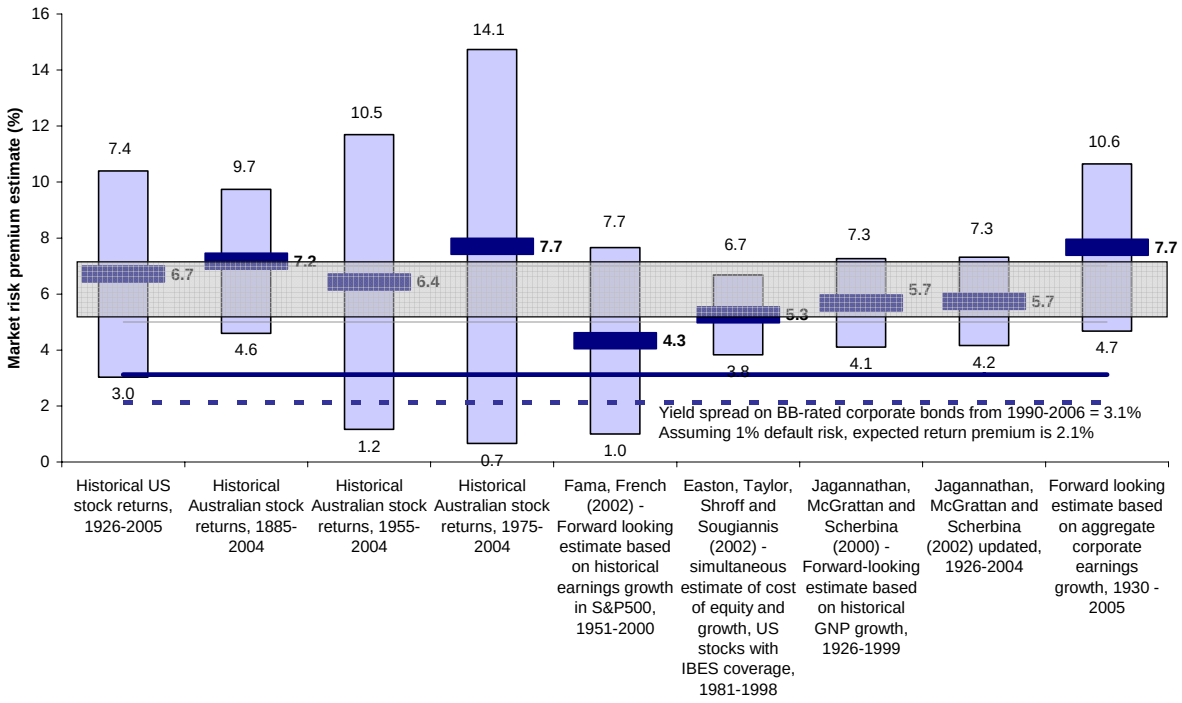
- Alternatively, we could attempt to estimate the return on reinvested earnings directly from the national accounts in the US. During the period under study, median growth in corporate earnings in the US was 9.2%.[18] If the most recent five-year period is included, median growth in corporate earnings rises to 9.9%.[19] This implies real growth rates of 5.0 and 5.9%, respectively. *These growth rates, combined with the other assumptions documented by Fama and French (2002) imply estimates of the MRP of 6.5% and 7.4%.*

The figure below illustrates alternative estimates of the MRP based on historical data and papers which derive estimates of MRP from equity prices and dividend or earnings growth. This chart shows that the 90% confidence interval derived from the latter series of papers encompasses the mean estimate of MRP implied by the historical data. It also supports the proposed reasonable range of 5 – 7% on the basis that the mean estimate of MRP derived from three MRP estimates inferred from equity prices is 5.1%, compared to the mean estimate of 7.0% from Australian historical data. Furthermore, the chart includes a mean estimate of 7.7% derived from estimating corporate earnings growth from U.S. national accounts.

[18] Data source: Bureau of Economic Analysis.

[19] The means are affected by negative skewness and are 7.0% for 1951-2000 and 7.3% for 1951-2004.

**Figure 1: Mean estimates of the market risk premium**




Notes: The mean and standard error used for the Australian stock returns are sourced from Allen Consulting Group. The data for US stock returns is CRSP data. Aggregate corporate earnings growth in the US is obtained from the Bureau of Economic Analysis. These growth rates are truncated at the 10th and 90th percentiles due to the presence of extreme observations. This correction has the effect of *decreasing* the mean estimate. Historical US stock returns are returns on the CRSP value-weighted index. Standard errors are computed as the standard deviation divided by the square root of the number of observations. In the case of Easton et al (2002), standard errors are adjusted to take account of serial correlation in the estimates.[20] We have computed the standard error for Jagannathan et. al., because they do not report the standard deviation in their results.

The chart also provides a comparison with the yield premium on BB-rated corporate bonds to provide a reasonableness check on estimates of the market risk premium. Assuming a default risk premium of 1%, the expected return on BB-rated corporate bonds is estimated at 2.1%.

We also computed the standard deviation of monthly returns on these bonds, which was 5.6% on an annualised basis. Hence, the Sharpe ratio for BB-rated corporate bonds can be estimated at 0.38 over this time period, where the Sharpe ratio is the premium for bearing systematic risk, relative to volatility as shown in the equation below:

$$Sharpe = \frac{r_{BB} - r_f}{\sigma_{BB}}$$

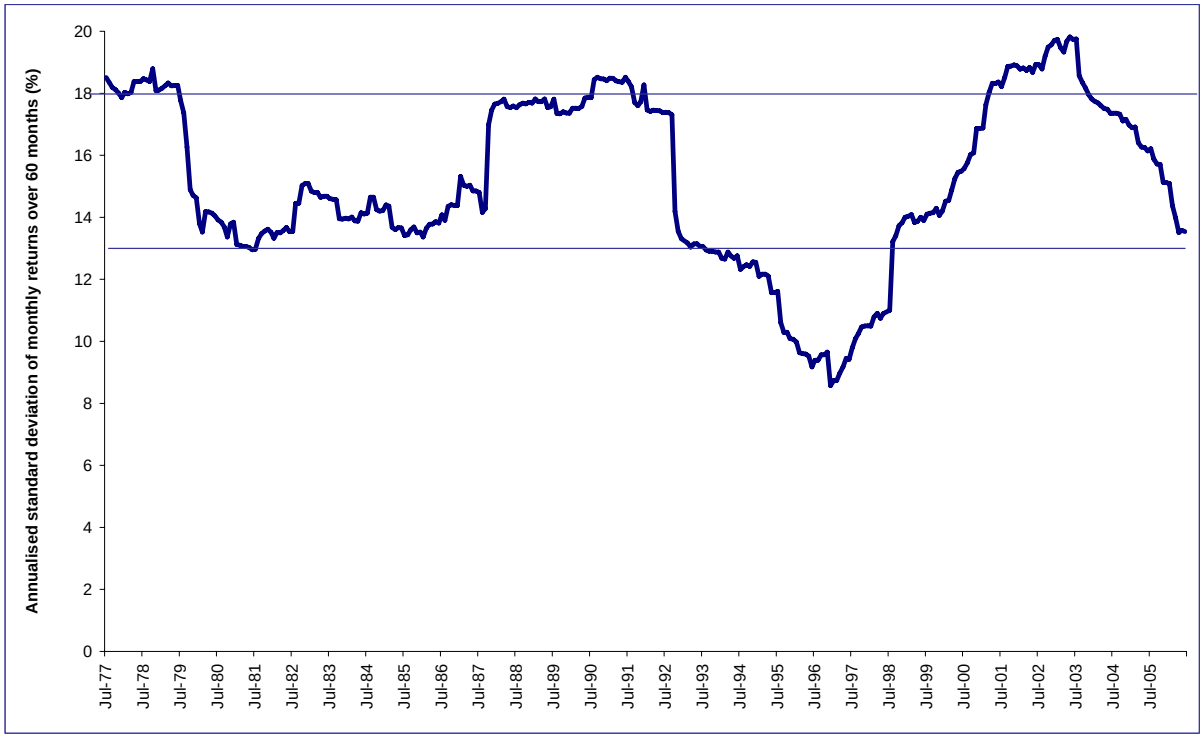
where:

$r_{BB}$ = the return on BB-rated bonds;
$r_f$ = the risk-free rate of interest; and
$\sigma_{BB}$ = the standard deviation of returns on BB-rated bonds.

[20] Easton, P., G. Taylor, P. Shroff and T. Sougiannis, 2002, Using forecasts of earnings to simultaneously estimate growth and the rate of return on equity investment, Journal of Accounting Research, 40 (3), 657-676.

Using this estimate of the Sharpe ratio implied by the expected return on BB-rated bonds, the proposed market risk premium of 5 – 7% is consistent with volatility estimates for US equity returns in the range of 13 – 18%. That is, given an estimate of the price of risk (Sharpe ratio) and an estimate of the MRP, one can solve for the implied amount of risk (volatility). This estimate is entirely consistent with the volatility of US equity market returns over the past 30 years, as presented below. Furthermore, if we use 0.38 as the Sharpe ratio estimate, the Fama-French MRP estimate of 4.3% corresponds to a volatility of only 11%. Considering the data presented in Figure 2 below, this is a particularly aggressive assumption. That is, the Fama-French results seem to imply implausibly low equity risk premia (relative to corporate bonds) even after accounting for the risk of default.

**Figure 2: Rolling standard deviation of US equity market returns over the last 30 years, estimated using monthly data over rolling 5 years**




## 4.6 Conclusion

It is difficult to precisely estimate the market risk premium. The historical data is noisy and the theoretical models are complex, incomplete, and cannot reconcile with the observed data. It is for this reason that we advocate the use of a range. Our conclusion is that a range of 5 – 7% is appropriate. We note that this is consistent with the range of estimates from a variety of studies in Figure 1 and regulatory precedent.

An MRP below 5% has been advocated based on ad-hoc adjustments to Australian data and US forward looking estimates. However:

- No theoretical support exists for the ad-hoc adjustments (and some adjustments proposed are internally inconsistent); and
- The forward-looking estimates implicitly apply a set of unrealistic assumptions – expected growth rates are equal to historic averages but required returns are not. Studies that have

attempted to simultaneously estimate growth rates and required returns support an MRP in the 5 – 7% range.

**Our recommendation is to use a range of 5-7% as the estimate of MRP. This range takes into account the relevant historical data, market practice, and the theoretical debate in the academic literature.**

## 5. Value of imputation credits, gamma

A separate report entitled *The impact of franking credits on the cost of capital* has been prepared for the Melbourne metropolitan water business. We have considered in this report:

1. The available empirical evidence;

2. The extent to which particular estimates are consistent with the Officer CAPM-WACC that is used by Australian regulators;

3. The extent to which particular estimates are consistent with observed dividend yields and regulatory estimates of the market risk premium; and

4. The extent to which particular estimates are consistent with commercial market practice.

The conclusions of the report are that:

1. The empirical evidence reports a range of estimates. The one result about which there is effectively unanimous agreement is that the package of a $1.00 dividend and the associated franking credit is valued by the market at $1.00. The various studies disagree about how much of the total $1.00 value should be attributed to the $1.00 dividend and how much to the associated franking credit;

2. Any estimate of gamma other than zero is inconsistent with the Officer CAPM-WACC that is used by Australian regulators in a way that causes a downward bias to regulated returns;

3. The common regulatory estimate of 0.5 is inconsistent with observed dividend yields and regulatory estimates of the market risk premium, but there is no such inconsistency if gamma is set to zero. Moreover, any attempt to reconcile these inconsistencies requires the abandonment of the Officer CAPM-WACC framework; and

4. Australian commercial market practice is to set gamma to zero when estimating WACC.

# 6. Benchmark Gearing , Credit Rating, and Debt Margin

## 6.1 Regulatory Precedent

There is a strong Australian regulatory precedent for setting the benchmark gearing assumption for regulated distribution assets at 60%. Regulatory precedent is also to ascribe a benchmark credit rating assumption in the range of BBB to BBB+. A strong precedent has also developed for making a 12.5 basis point allowance for debt issuance costs. Benchmark gearing assumptions from recent regulatory determinations from Australian regulators are documented in Table 5.

**Table 5: Assumed Gearing in Recent Australian Regulatory Determinations**

| Regulator | Decision | Decision Date | Assumed Gearing | Assumed Credit Rating | Debt Issuance Costs Allowed |
|---|---|---|---|---|---|
| **ESC** | Water | 06/05 | 60% | BBB+ | 0.10% |
| | Gas | 10/02 | 60% | BBB+ | 0.05% |
| | Electricity | 10/05 | 60% | BBB+ | 0.125% |
| **IPART** | Water | 06/05 | 60% | BBB to BBB+ | 0.125% |
| | Gas | 04/05 | 60% | BBB+ | 0.125% |
| | Electricity | 06/04 | 60% | BBB to BBB+ | 0.125% |
| **QCA** | Water | 03/05 | 50% | BBB | 0.125% |
| | Gas | 05/06 | 60% | BBB+ | 0.125% |
| | Electricity | 04/05 | 60% | BBB+ | 0.125% |
| **ESCOSA** | Water | -- | -- | -- | -- |
| | Gas | 06/06 | 60% | BBB | 0.125% |
| | Electricity | 04/05 | 60% | BBB+ | 0.125% |
| **ICRC** | Water | 03/04 | 60% | BBB+ | 0.125% |
| | Gas | 10/04 | 60% | BBB+ to A | 0.125% |
| | Electricity | 03/04 | 60% | BBB+ to A | 0.125% |
| **ERA** | Water | 11/05 | 60% | BBB+ | 0.125% |
| | Gas | 11/05 | 60% | BBB+ | 0.08-0.125% |
| | Electricity | 03/06 | 60% | BBB+ | 0.125% |

## 6.2 Benchmark Gearing

The benchmark gearing for water utilities assumed by Australian regulators is generally 60%, with only the QCA adopting a lower gearing level of 50%. The ESC, along with other regulatory bodies in Australia, has stressed that the leverage figure used should be that of an efficiently financed business, rather than the actual level of debt of the particular entity.

Determining the leverage of an efficiently financed firm is complex. Given the lack of Australian comparables, we examined 11 listed comparable firms within the Dow Jones water industry group. The gearing of these firms is outlined in Table 6.

**Table 6: Estimated Gearing for Listed Comparable Companies**

| Company | Country | Gearing (D/V) |
|---|---|---|
| Nalco Holdings | US | 57% |
| SJW | US | 26% |
| AWG | UK | 74% |
| United Utilities | UK | 46% |
| Severn Trent | UK | 44% |
| Pennon Group | UK | 48% |
| Kelda Group | UK | 40% |
| California Water Services Group | US | 28% |
| American States Water Company | US | 36% |
| Aqua America | US | 23% |
| Southwest Water | US | 29% |
| **Average** | | **42%** |

Source: Datastream. Leverage computed with reference to market capitalisation and book value of debt at 1 January 2006.

The current leverage ratios for comparable firms are predominantly below 60%. Only one company, AWG, has a gearing level in excess of 60%. For this reason, **we recommend that a range of leverage from 50 – 60% be used, given the uncertainty over the firms' optimal leverage. This range places weight on both Australian regulatory precedent and the available empirical evidence.** Note that the majority of firms in the set of comparables have gearing below this range, so substantial weight has already been afforded to regulatory precedent.

### 6.3 Selection of Debt Margin

In recent determinations, Australian regulators (including the ESC) have examined the source of data that is used to determine an appropriate debt margin. The standard procedure is for the regulator to specify a benchmark credit rating and term to maturity – BBB-rated 10-year bonds, for example. The regulator then seeks to estimate the yield, in excess of the risk-free rate, of this type of corporate bond. The problem, however, is that 10-year BBB-rated corporate bonds are quite scarce in the Australian market, so this debt premium needs to be estimated. Different estimation methods are used by different data service providers such as CBA Spectrum and Bloomberg.

### 6.4 Merits of Various Sources of Debt Margin Data

Some regulated entities have argued that the CBA Spectrum method systematically under-estimates the debt premium. In the recent Victorian Electricity Distribution Price Review, for example, the ESC notes that:

> a number of the distributors indicated a concern that the yields estimated by CBA Spectrum may understate the cost of debt raising. In its price-service proposal AGLE (2004e) referred to research that suggested that the CBA Spectrum service may understate the yield on long-term, low rated debt by 20 to 25 basis points. In subsequent submissions, AGLE, CitiPower and Powercor reiterated the view that the sole reliance on CBA Spectrum may not be appropriate, given concerns about the accuracy of the predicted corporate bond yields.[21]

CBA Spectrum seeks to fit a smooth curve through the yields of corporate bonds with a particular rating. That is, a curve must be produced for BBB corporate bonds of different maturities, another for

[21] Essential Services Commission, 2005, Electricity Distribution Price Review: Final Decision, October, p. 367.

BBB+, and so on. The way CBA Spectrum does this is to have regard to the available data and to impose some statistical restrictions that ensure that the curves are smooth and that they do not overlap. For example, the BBB+ curve is constrained to be below the BBB curve, and so on.

The issue that has been raised by regulated entities is essentially that the econometric process used by CBA Spectrum, combined with the very small set of long-term BBB or BBB+ corporate bonds in the Australian market, results in an under-estimate of true yields. This occurs because higher-rated bonds are effectively included in the estimate.

To illustrate the issue in a simple way, consider the BBB and BBB+ corporate bonds with more than four years to maturity that are contained in the CBA Spectrum data set. These bonds are listed in Table 7 below.

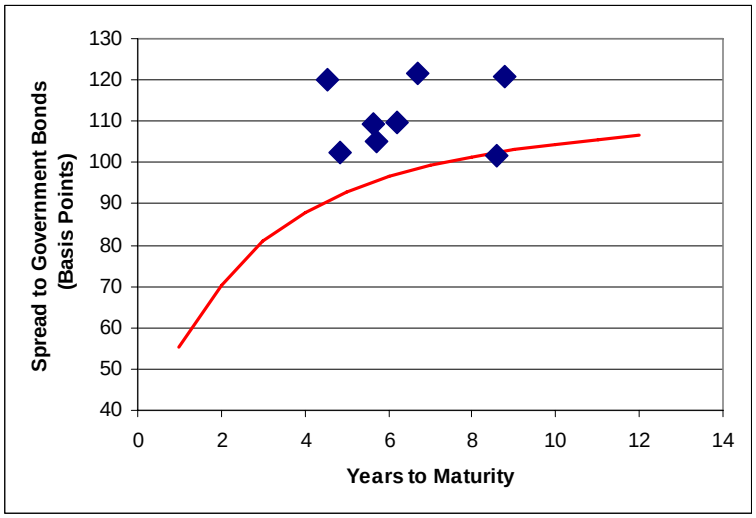
**Table 7: BBB and BBB+ corporate bonds**

| Company | Maturity (Years) | Rating | Spread to Bond (Basis Points) |
|---|---|---|---|
| Coles | 5.6 | BBB | 109.3 |
| GPT | 6.7 | BBB+ | 121.4 |
| Investa Property Group | 5.7 | BBB+ | 105.1 |
| PBL | 8.6 | BBB+ | 101.7 |
| Santos | 8.8 | BBB+ | 120.7 |
| Snowy Hydro | 6.2 | BBB+ | 109.6 |
| TabCorp | 4.9 | BBB+ | 102.6 |
| Fairfax | 4.6 | BBB | 119.9 |
| **Mean** | | | **111.3** |

Source: CBA Spectrum, 6 December 2006.

The spread to government bonds for these individual bonds can be compared against the CBA Spectrum curve. This is illustrated in Figure 3 below.

**Figure 3: CBA Spectrum BBB Curve and Individual Corporate Bonds**




In Figure 3 it is apparent that the CBA Spectrum BBB curve indicates a spread below that observed for actual individual BBB and BBB+ corporate bonds.

### 6.5 Regulatory Consideration

The view that CBA Spectrum may systematically under-estimate yields of longer term (10 years) low-rated (BBB and BBB+) corporate bonds has gained broad regulatory acceptance, with regulators now not relying exclusively on CBA Spectrum but examining a range of data sources.

For example, in the Electricity Distribution Price Review Final Decision, the ESC examined a range of data sources and stated:

> In light of the concerns that were expressed about the use of the CBA Spectrum service, the Commission reviewed other sources of information on corporate bond yields, including:
>
> • the predictions provided by the Bloomberg service (which employs a different econometric technique to derive a 'fair value' yield curve that is used by the CBA Spectrum service),
> • the yields on prevailing corporate bonds, including the implied current total cost of borrowing through issuing credit-wrapped debt.[22]

The ESC has also concluded that in:

> the analysis undertaken for the Draft Decision and that presented by NERA (2005), the Bloomberg service estimates were found to be close to the actual bond margins, while CBA Spectrum was found to significantly under-estimate observed margins for longer maturities."[23]

Similarly, the QCA position is that:

> The Authority accepts the view of National Economic Research Associates (NERA) and ACG that the estimates of long-term bond yields using the CBASpectrum data are likely to underestimate the actual debt margins for Australian firms. The Authority also notes that Bloomberg do not provide estimates for 10-year BBB+ rated bonds, although it appears that Bloomberg consistently provides more accurate forecasts of actual debt margins than does CBASpectrum.
>
> It appears reasonable to place the heaviest weight on the estimates that are provided by Bloomberg, given that the Bloomberg estimates tend to be fairly accurate predictors of actual debt margins observed in the market across a range of credit ratings and maturities. It is also reasonable to consider the CBASpectrum estimates with a further addition to the estimated spread of around 20-25 basis points to account for downward bias in the CBASpectrum estimates.[24]

ESCOSA has also recently concluded that:

[22] Essential Services Commission, 2005, Electricity Distribution Price Review: Final Decision, October, p. 367.
[23] Victorian ESC, *Final Decision Electricity Distribution Price Review 2006-10 Final Decision Volume 1 Statement of Purpose and Reasons*, October 2005, Pages 368 to 370.
[24] Queensland Competition Authority, 2006, Revised Access Arrangement for Gas Distribution Networks: Allgas Energy, Final Decision, May, p. 69.

> Recent research and other indicators suggest that the CBA Spectrum predicted yields for 10 year BBB+ rated bonds contain a downward bias and an underestimation in the order of 20-25 basis points.[25]

### 6.6 Present Debt Margin

The CBA Spectrum estimated spreads for 10-year BBB and BBB+ bonds are 98.5 and 91.3 basis points respectively.[26] Given the uncertainty about the rating that a benchmark water utility would obtain, we consider a (relatively narrow) range of BBB to BBB+. Following the regulatory precedent of adding 20-25 basis points to the CBA Spectrum spread to correct for potential bias, produces a range of 111.3 to 123.5 basis points.

### 6.7 Conclusion

Based on the above review of regulatory precedent and the examination of current market data, we make the following conclusions in relation to gearing, credit rating, and debt margin:

- An appropriate benchmark level of gearing is in the range of 50-60%;
- An appropriate benchmark credit rating is in the range of BBB to BBB+;
- The appropriate debt margin is obtained by adding 20-25 basis points to the relevant CBA Spectrum estimates and then adding a further 12.5 basis points in respect of debt issuance costs. This produces a range for the total debt margin of 123.8 to 136.0 basis points.

[25] ESCOSA *Proposed Revisions To The Access Arrangement For The South Australian Gas Distribution System Final Decision*, 2005, Page 75

[26] 20-day average spread as at 17 April 2007. Source: CBA Spectrum.

# 7. Equity Beta

Equity beta measures the degree of systematic (or market-based) risk associated with an equity investment in a particular business. It is therefore the main determinant of the return that equity investors require before committing capital to the firm. The reason for computing an equity beta is to provide an estimate of the risk of owning shares in a particular firm over some future period. This risk estimate can then be used to determine the return that will be demanded by equity investors. Therefore, what is needed is a determination of the likely relationship (over the relevant future period) between the returns of those shares and the returns on the broad market.

The Commission typically considers beta values from a range of sources, including:

- Beta estimates used for similar regulated businesses; and
- Beta estimates based on historical data.

This section reviews these beta estimates and concludes that:

- Equity beta estimates for water businesses are not statistically different from other utilities such as electricity or gas distribution businesses (although slightly lower), which the Commission has previously assumed to equal 1.0; and
- Beta estimates based on historical data support an equity beta estimate (geared to 60%) in the range of 0.9 to 1.1.

## 7.1 Regulatory Precedent

In its previous determinations, the Commission has assumed an equity beta of 0.75 for water utilities in Victoria and equity betas of 1.0 for gas and electricity distribution businesses. It has adopted the same gearing assumption for all three industries of 60 percent, so the variation in equity beta estimates must stem from an assumption that the asset beta (that is, an estimate of business risk in the absence of financial leverage) must be relatively low for water businesses, compared to gas and electricity distribution businesses.

The equation relating to asset and equity betas adopted by the Commission is as follows:

$$\beta_a = \beta_e \frac{E}{V} + \beta_d \frac{D}{V}$$

where:

$\beta_a$ = an estimate of the systematic risk of returns to the firm (that is, an estimate of business risk). It is an estimate of the equity beta which would prevail in the absence of any financial leverage.
$\beta_e$ = an estimate of the systematic risk of returns to equityholders.
$\beta_d$ = an estimate of the systematic risk of returns to debtholders.
$D/V$ = an estimate of leverage, the market value of debt relative to market value of the firm.
$E/V$ = 1 – $D/V$.

Table 8 provides a summary of the assumptions used in a number of recent regulatory decisions.

**Table 8: Assumed Beta Assumptions in Recent Regulatory Decisions**

| Regulator | Industry | Decision Date | Equity Beta | Debt Beta | D/V |
|---|---|---|---|---|---|
| **ESC** | Water | 06/05 | 0.75 | 0 | 60% |
| | Gas | 10/02 | 1.0 | 0-0.18 | 60% |
| | Electricity | 10/05 | 1.0 | 0 | 60% |
| **IPART** | Water | 09/06 | 0.8-1.0 | 0 | 60% |
| | Gas | 04/05 | 0.8-1.0 | 0 | 60% |
| | Electricity | 06/04 | 0.78-1.11 | 0-0.06 | 60% |
| **QCA** | Water | 03/05 | 0.79* | 0.11 | 50% |
| | Gas | 05/06 | 1.10 | 0.12 | 60% |
| | Electricity | 04/05 | 0.9 | 0.1 | 60% |
| **ESCOSA** | Water | -- | -- | -- | -- |
| | Gas | 06/06 | 1-1.1 | 0 | 60% |
| | Electricity | 06/05 | 0.9 | 0 | 60% |
| **ICRC** | Water | 03/04 | 0.9 | 0.06 | 60% |
| | Gas | 10/04 | 0.9-1.09 | 0.06 | 60% |
| | Electricity | 03/04 | 0.9 | 0.06 | 60% |
| **ERA** | Water | 11/05 | 0.8 | 0.19 | 60% |
| | Gas | 11/05 | 0.8-1.2 | 0 | 60% |
| | Electricity | 03/06 | 0.8-1.0 | 0 | 60% |

* The QCA assumed an equity beta of 0.65 (geared to 50%). This equity beta has been re-geared to 60% using the ESC's preferred methodology.

In the most recent regulatory decision in Australia, IPART concluded an appropriate equity beta estimate for the water industry is in the range of 0.8 – 1.0.[27] Other regulators have generally applied a lower estimate, with the ESC assuming an equity beta of 0.75 in its last water determination.

Adopting the ESC parameters implies the assumed asset beta for a water business is 0.30, compared to 0.40 for electricity and 0.40 – 0.51 for a gas distribution business. In other words, a water business is assumed to have less than three-quarters of the underlying systematic risk of energy distribution businesses. The following section outlines whether there is any statistical evidence to support the lower beta estimate employed by the ESC for water utilities compared to electricity or gas utilities.

## 7.2 General principles

*Recognising uncertainty*

Equity betas cannot be observed directly but instead must be inferred from market data. Consequently, equity betas are *estimated* using quantitative techniques. These techniques do not determine the true equity beta. Rather, the techniques are used to estimate an equity beta, and these estimates are generally imprecise. For instance, the average standard error of equity beta estimates provided by the Centre for Research in Finance (CRIF) for Australian-listed stocks at 31 December 2005 was 0.9. This implies that the 90% confidence interval for the average stock is ± 1.5 from its point estimate. Furthermore, many different techniques, as well as different data sets, can be used to estimate equity betas.

[27] IPART, 2006, Bulk Water Prices for State Water Corporation and Water Administration Ministerial Corporation: Water Report, September 2006.

Consequently, any equity beta used in determining the required return is only an estimate. Due to the uncertainty in these estimates, a reasonable range of equity betas should be considered. In other words, it may not be possible to say that "the equity beta is 0.98 and not 1.0" but it may be possible to conclude, for instance, that "the equity beta more than likely lies between 0.9 and 1.1." Employing a reasonable range also gives due consideration to the consequences of mis-estimating the equity beta.

*Time variation of estimates – fundamental versus statistical changes*

Observed equity beta estimates can shift over time for two main reasons. First, equity beta estimates can shift due to changes in the firm's systematic risk attributable to a particular economic event. For instance, an expansion of the firm into a new industry, or a divestiture of part of the firm's operations, may cause the average systematic risk of the firm to change. Second, equity beta estimates can shift due to statistical variations despite no change in the systematic risk of the firm. In other words, simply employing a different or updated data set can alter the estimate of the equity beta. Absent any economic event, changes in observed equity beta estimates that rely on a small estimation window are more likely to reflect estimation error rather than a fundamental shift in the firm's systematic risk.

Due to the uncertainty in equity beta estimates, compelling evidence must exist to support a substantial shift in the equity beta. Without any underlying shift in the firm's operations, there is a high possibility that the change in the observed equity beta estimate simply reflects a statistical aberration rather than a fundamental change in systematic risk.

*Consideration of foreign comparable firms*

Theoretically, foreign comparable beta estimates are not a perfect proxy for the beta of a domestic company. Differences between markets – such as, average leverage and industry composition – can lead to differences in beta estimates. However, given the lack of domestic comparables for utilities, some consideration must be given to foreign comparables.

Regulators generally recognise this trade-off. Foreign comparables may not provide perfect estimates of a domestic beta, but given the lack of domestic comparables, ignoring this data entirely may result in even larger estimation error. Examination of foreign comparables, therefore, should be a component of the range of information considered by regulators in assessing beta estimates. A similar conclusion was reached by the ESC in its last urban water review:[28]

> The empirical evidence of comparable UK and US entities provides guidance as to the systematic risk associated with capital water investments. However, it is important to distinguish between the Australian and international markets, and to not exclusively rely on international markets.

A number of potential complications arise in assessing foreign comparables. As discussed by Lally (2004) these include:[29]

- Differences in market leverage;
- Differences in industry weights; and
- Impact of sensitivity of asset prices to macroeconomic shocks;

[28] ESC, 2005, Metropolitan and regional businesses' water plans, Draft decision 2005-06 to 2007-08, March, p.91.
[29] Lally, M., 2004, The cost of capital for regulated entities: Report prepared for the Queensland Competition Authority, February 26.

While these differences may impact the comparability of equity beta estimates across countries, the intra-country comparisons will not be affected. In other words, comparing the relative beta estimates of the US water industry to other utilities will not be impacted by differences in market leverage between the US and Australia. Similarly, differences in industry weights or macroeconomic shocks will not invalidate intra-country comparisons. Consequently, our approach is to consider the beta estimates from foreign countries, but to also examine whether any differences exist between beta estimates from different industries within these foreign markets. The latter analysis overcomes the traditional concerns with examining foreign comparables.

### 7.3 Statistical analysis of the returns to listed water and energy utilities

Equity betas are generally estimated using listed comparable companies. However, with no listed water businesses in Australia, an alternative approach is required. Our approach is to:

- Examine whether water utilities have lower systematic risk than energy utilities; and
- Measure the systematic risk of water businesses in other countries.

*Methodology*

We measured the systematic risk of 109 utilities listed in Australia, the United States and the United Kingdom across all four Dow Jones industry groups for the utilities sector – water, electricity, gas distribution and multi-utilities. To be as comprehensive as possible, we examine *all* firms that are classified as utilities by Dow Jones. Even then, we have small sample sizes for some sub-sectors in some countries. We discuss below the trade-off between larger sample sizes to improve estimation precision versus small samples of very close comparables.

The following four steps summarise our approach:[30]

**1. Estimate raw equity beta.** A raw equity beta was estimated by regressing monthly stock returns from January 1973 to October 2006 against market index returns.[31] Two filters were applied to our regression. First, firms with less than ten months of returns were excluded. Second, observations between October 1998 and September 2001 were excluded from the analysis. In other words, a three year period around the peak of the equity markets in March 2000 was excluded. This technique is broadly consistent with the approach undertaken by Annema and Goedhart (2003) and Gray and Officer (2005).[32]

Annema and Goedhart (2003) examine the impact of the dot-com bubble between 1998 -2001 on beta estimates:[33]

[30] Unless otherwise noted, all raw data was sourced from Datastream.

[31] Indices used were the ASX All Ordinaries Accumulation Index for Australia, FTSE All Share Accumulation Index for the United Kingdom and the S&P 500 Accumulation Index for the United States.

[32] Annema, Andre and Marc H. Goedhart (2003), A Better Beta, *McKinsey Quarterly* , 1, 1-5.
Gray, S. F. and R. Officer, 2005, The equity beta of an electricity distribution business, submission to the Essential Services Commission of South Australia by ETSA Utilities.

[33] Ibid, p.1.

> despite volatility in the market during the 20 years before 1998, industry-specific betas were remarkably stable. But during the bubble, betas for many industries appeared to decline significantly…these apparent decreases actually reflect the influence of telecom, media, and technology share prices on the indexes during the 1998-2001 bubble and distort the real change in the relative risk borne by companies in other industries.

An adjustment is now also generally accepted in Australia, as indicated by Gray and Officer (2005):[34]

> …the Australian regulators who have had detailed analysis carried out, now generally accept that this unique market event is likely to have downwardly biased equity beta estimates for utility stocks, even in Australia.

Indeed, in the most recent Victorian Electricity Price Determination:[35]

> The Commission accepts that the recent technology 'boom and bust' is likely to have had a depressing impact on measured equity betas over the relevant period, and which is likely to lead to an understatement of the expected (forward-looking) equity beta where observations over the 'boom and bust' period are included in the sample.

Commercial practice typically uses five years of monthly data to estimate equity betas. This is due more to convenience than evidence, with academic studies generally suggesting that longer time periods result in more reliable estimates. Gray, Hall, Bowman, Brailsford, Faff and Officer (2005) present evidence to suggest a longer time period should be used.[36] Our approach estimates betas using up to 33 years of data (average period in the sample is 22 years). The appropriateness of a long estimation period is considered in more detail below.

**2. Estimate the average leverage for each firm over the entire beta estimation period.** Leverage is based on the market capitalisation and book value of debt at the start of each calendar year.

**3. Estimate the debt beta for each firm.** Our approach estimated the debt beta using the CAPM, where the required return to debtholders is the current long term yield on similar rated bonds less a default premium. The default premium is that component of yield on corporate debt that must be offered to compensate debtholders for the risk of default. It is a function of the probability of default and the likely recovery rate, given default. That is, the yield on debt can be expressed as the sum of the expected return, estimated using the CAPM, and the default risk premium:

$$Yield = r_f + \beta_d MRP + DRP$$

where $DRP$ = default risk premium.

In other words, the yield must exceed the expected return, because, in the absence of interest rate changes, there is some probability that debtholders will receive less than the yield to maturity, but no probability that they will receive a return greater than the yield to maturity. This implies that the debt beta can be estimated according to the following equation:

- $\beta_d = \dfrac{yield - DRP - r_f}{MRP}$

[34] Ibid, p.27.
[35] Ibid, p. 351.
[36] Gray, S., J. Hall, G. Bowman, T. Brailsford, R. Faff and R. Officer, 2005. The performance of alternative techniques for estimating equity betas of Australian firms, Report prepared for the Energy Networks Association (May);

For ease of computation, we assumed each firm had the minimum investment grade rating. Furthermore, the debt premium ($yield - r_f$) was assumed to equal the yield to maturity on the Lehman US Corporate Baa long bond yield minus the yield to maturity on 10-year US Treasury Bonds, taken at January of each year. In other words, the debt premium in US, UK and Australia is assumed to be equivalent. Our analysis also assumed a default risk premium of 0.4% consistent with estimates by Elton, Gruber, Agrawal and Mann (2001) for the US.[37]

We also note that a number of Australian regulators have also examined results based on a debt beta of zero. This implies that the firm's debt has no systematic risk and is therefore inconsistent with the adoption of a debt margin when estimating the cost of debt. Nevertheless, we also present results from this approach.

Of course, in all cases we ensure that whatever debt beta assumption is used in the unlevering step is also used in the re-levering step.

**4. Estimate the asset beta for each firm and re-gear to 60% leverage.** The asset beta for each firm was estimated using the following equation:

$$\beta_a = \beta_e \frac{E}{V} + \beta_d \frac{D}{V}$$

This un-levering technique has traditionally been employed by the ESC.[38]

*Results*

Table 9 provides a summary of the estimated equity betas re-geared to 60% for each industry and country. Limited comparable companies are available for Australia and the UK resulting in imprecise equity beta estimates. This is evident by the wide 90 per cent confidence intervals reported in Panel A. For instance, the estimated 90 per cent confidence interval for Australian electricity firms is anywhere between -9 and 10! This essentially means that the available data, by itself, is completely uninformative. Focus should be directed to the shaded cells in the table, which highlight the more precise estimates (those with at least eight firm observations).

The key results of our analysis are that:

- **The estimated re-geared equity betas of water utilities are not statistically significantly different from those of other utilities.** Importantly, all 90% confidence intervals reported in Table 9 overlap substantially and there is also no significant difference between the equity beta estimates between industries within each country. Within the U.S. sample, for example, the 90% confidence intervals for gas and electricity distribution fall 100% within the corresponding confidence interval for water utilities;

- **When the re-gearing is based on an estimated debt beta, the 90% confidence intervals for water, gas, and electricity distribution are all very much consistent with the range of 0.9 to 1.1.** This range is consistent with much Australian regulatory precedent for gas and electricity distribution where it is common to use a re-geared (to 60%) mid-point equity beta estimate of 1.0. The empirical data supports this regulatory precedent for gas and electricity distribution. Moreover, the 90% confidence interval for water businesses is also consistent

[37] Elton, E. J., M.J. Gruber, D. Agrawal and C. Mann, 2001. "Explaining the rate spread on corporate bonds," *Journal of Finance*, 56(1), 247 – 277.
[38] For example, see Essential Services Commission, 2002. Review of gas access arrangements: Final decision (October).

with this conclusion. To the extent that beta estimates for water business are statistically indistinguishable from those of gas and electricity distribution firms, we prefer to focus on the broader set of firms, rather than just water firms specifically. This is because there are relatively few water firms available and a larger sample produces a more precise estimate. However, none of the results relating specifically to water firms in the first section of Panel A are at all inconsistent with the proposed range of 0.90 to 1.10; and

- **When the re-gearing is based on an assumed debt beta of zero, the estimated re-geared (to 60%) equity beta is slightly lower.** We provide these results for completeness, but do not focus on them as a zero debt beta is inconsistent with the use of any sort of debt margin – if there is no risk, why is a return margin required?

**Table 9. OLS Equity beta estimates (re-geared to 60%) for listed utilities.**

| Panel A: Mean (90% Confidence Interval) | Australia | United States | United Kingdom | Overall |
|---|---|---|---|---|
| **Re-geared equity betas based on estimated debt beta** | | | | |
| Water | na | 0.70 (0.37-1.04) | 1.09 (0.97-1.22) | **0.88 (0.68-1.09)** |
| Electricity | 0.49 (-8.79-9.77) | 0.92 (0.79-1.04) | 1.48 (1.06-1.91) | **0.97 (0.83-1.11)** |
| Gas distribution | 1.04 (0.48-1.60) | 0.90 (0.82-0.99) | 1.44 (-3.13-6.00) | **0.96 (0.84-1.08)** |
| Multi-utilities | na | 0.85 (0.78-0.91) | 0.96 (na) | **0.86 (0.80-0.92)** |
| **Overall** | **0.82 (-0.25-1.89)** | **0.89 (0.79-1.00)** | **1.31 (1.13-1.50)** | **0.94 (0.86-1.03)** |
| **Re-geared equity betas based on assumed debt beta of zero** | | | | |
| Water | na | 0.60 (0.30-0.90) | 1.02 (0.88-1.16) | **0.79 (0.60-0.98)** |
| Electricity | 0.57 (-7.93-9.07) | 0.74 (0.63-0.84) | 1.46 (1.10-1.83) | **0.82 (0.70-0.94)** |
| Gas distribution | 0.82 (-0.08-1.72) | 0.77 (0.70-0.84) | 1.36 (-4.38-7.11) | **0.82 (0.70-0.94)** |
| Multi-utilities | na | 0.66 (0.62-0.71) | 0.92 (na) | **0.68 (0.63-0.74)** |
| **Overall** | **0.72 (-0.26-1.71)** | **0.73 (0.63-0.82)** | **1.27 (1.10-1.43)** | **0.80 (0.73-0.88)** |

| Panel B: Number of observations | Australia | United States | United Kingdom | Overall |
|---|---|---|---|---|
| Water | na | 6 | 5 | **11** |
| Electricity | 2 | 50 | 7 | **59** |
| Gas distribution | 3 | 22 | 2 | **27** |
| Multi-utilities | na | 11 | 1 | **12** |
| **Overall** | **5** | **89** | **15** | **109** |

Source: Datastream, SFG calculations.

*Vasicek adjustment*

It is widely accepted that ordinary least squares (*OLS*) equity beta estimates are imprecise. Outliers can substantially impact the *OLS* equity beta estimate, especially when only 60 monthly observations are considered. Removal of the outliers can improve the precision of the equity beta estimates, but

determining which observations are outliers can be difficult. Another technique that can be used to reduce the bias in *OLS* equity beta estimates and reduce imprecision is the Vasicek (1973) adjustment.[39]

The Vasicek (1973) adjustment mitigates against bias because the resulting equity beta is a weighted average of the *OLS* equity beta and a prior estimate of one, discussed in the following paragraph. The weights are determined by the precision of the *OLS* estimate – *OLS* equity betas with high standard errors are shifted further towards one than *OLS* estimates with low standard errors. This offsets the "order bias" in *OLS* equity beta estimates documented by Fama and MacBeth (1973).[40] The order bias is present because the further an observed equity beta estimate is from one, the greater the probability that this occurred because of sampling error, rather than representing the true systematic risk of the firm.

We assume a prior equity beta estimate of one under the reasoning that beta estimation is an incremental process. Suppose a practitioner was asked to estimate the equity beta of a company, with no company- or industry-specific information. By construction, the market-capitalisation weighted average of all companies in the market is one, thus by making an estimate of one, there is equal probability that the practitioner has over- or under-estimated systematic risk. Next, the practitioner performs an *OLS* regression of stock returns against market returns (without any additional company- or industry-specific information) and is able to refine the original estimate. The Vasicek (1973) adjustment applies weight to the *OLS* equity beta on the basis of its precision, and some weight to the prior estimate of one. More formally, the *Vasicek* equity beta is computed as follows:

$$\beta_{Vasicek} = \frac{\beta' / s_{\beta}^{2\,\prime} + \hat{\beta} / s_{\hat{\beta}}^{2}}{1 / s_{\beta}^{2\,\prime} + 1 / s_{\hat{\beta}}^{2}}$$

where:

$\hat{\beta}$ and $s_{\hat{\beta}}$ are the equity beta estimate and its standard error; and

$\beta'$ and $s_{\hat{\beta}}'$ denote the prior expectations of beta and its standard error.

Gray, Hall and Klease (2006) examine the relative performance of *OLS* equity beta estimates, Vasicek beta estimates and other adjustments that have been used in practice.[41] Each equity beta estimate was assessed according to three criteria:

- *Unbiasedness*. Equity beta estimates should be unbiased in the sense that the expected return implied by the Capital Asset Pricing Model has an equal chance of over- or under-estimating realised returns;
- *Stability*. Considerable fluctuation in equity beta estimates between time periods is more likely to stem from statistical error rather than a fundamental shift in systematic risk characteristics; and

[39] Vasicek, O. A., 1973, A note on using cross-sectional information in Bayesian estimation of security betas, *Journal of Finance*, 28(5), 1233–1239.
[40] Fama, E. F. and J. D. MacBeth, 1973, Risk, return and equilibrium: Empirical tests, *Journal of Political Economy*, 81(3), 607–636.
[41] Gray, S. , Hall, J. and D. Klease, 2006, Bias, stability and predictive ability in the measurement of systematic risk, *UQ Business School Working Paper*.

- *Returns predictability.* Equity betas should be assessed on their ability to predict future stock returns. For regulated firms, beta estimates which are better predictors of returns means that their regulated returns will more closely match the returns which would prevail in a competitive market.

Based on an examination of equity beta estimates according to these criteria, the authors conclude that "the results support the use of the Vasicek (1973) adjustments to *OLS* estimates." Importantly, *OLS* equity beta estimates were not as good predictors of future returns as Vasicek equity beta estimates. However,

> Vasicek beta estimates had average ability to predict future returns which was comparable to the naïve assumption that all firms have a beta estimate of one….Hence, whether it is more beneficial to use the Vasicek estimate or an assumption of one in the estimated cost of capital, depends upon whether the aim is to minimise the mean absolute prediction error, or to minimise the probability of obtaining the worst available estimate.

Our approach outlined above was repeated to estimate the re-geared equity beta for utilities after applying the Vasicek (1973) adjustment.[42] Table 10 outlines the results after applying a Vasicek adjustment. The Vasicek adjustment:

- Has a substantial impact only on the small sub-samples that are measured more imprecisely. For instance, the *OLS* re-geared equity beta estimate for Australian electricity firms is within a range of -8.79 to 9.77. Due to the substantial uncertainty around this estimate, the Vasicek adjustment places more weight on the average market equity beta estimate of one. As a result, the Vasicek adjusted range is 0.74 to 2.76. Even though the Vasicek adjustment substantially improves the precision of the estimate, the sample size (of two firms) is simply too small to rely on. That is, no statistical adjustment can replace the need for an adequate amount of data on which to base conclusions. In the case of this sub-sample of two firms, the raw beta estimates are extremely imprecise and both sample firms have very low leverage, relative to the 60% level to which they are to be re-geared. The consequences of estimation uncertainty are simply compounded by the substantial impact of the re-gearing procedure. *This makes the results from cells with few sample firms essentially uninterpretable. Consequently, we seek to interpret the results only from the shaded cells – where sample sizes are more reasonable.*

- Has a minor impact on the overall water re-geared equity beta estimate or the overall utility beta estimate. For instance, the *OLS* beta point estimate for the water industry is 0.88 compared to a *Vasicek* beta point estimate of 0.91. Furthermore, the overall utility *Vasicek* beta estimate of 0.98 is only modestly different to the *OLS* beta estimate of 0.94.

- Reduces the width of the 90% confidence interval for all sub-samples. The magnitude of the reduction depends on the imprecision of the *OLS* beta estimates.

[42] A prior beta estimate of one was assumed and a standard error of 0.5.

**Table 10. Vasicek beta estimates for listed utilities assuming gearing of 60%**

| Panel A: Mean (90% Confidence Interval) | Australia | United States | United Kingdom | Overall |
|---|---|---|---|---|
| **Re-geared equity betas based on estimated debt beta** | | | | |
| Water | na | 0.73 (0.43-1.04) | 1.12 (1.00-1.24) | **0.91 (0.71-1.10)** |
| Electricity | 1.75 (0.74-2.76) | 0.92 (0.83-1.01) | 1.48 (1.16-1.80) | **1.01 (0.91-1.12)** |
| Gas distribution | 1.08 (0.48-1.67) | 0.92 (0.84-1.01) | 1.49 (-2.68-5.67) | **0.98 (0.86-1.10)** |
| Multi-utilities | na | 0.86 (0.80-0.92) | 1.02 (na) | **0.87 (0.81-0.94)** |
| **Overall** | **1.35 (0.90-1.80)** | **0.90 (0.81-0.99)** | **1.33 (1.19-1.47)** | **0.98 (0.91-1.05)** |
| **Re-geared equity betas based on assumed debt beta of zero** | | | | |
| Water | na | 0.63 (0.36-0.90) | 1.05 (0.91-1.18) | **0.82 (0.64-1.00)** |
| Electricity | 1.83 (1.60-2.06) | 0.74 (0.67-0.82) | 1.46 (1.18-1.74) | **0.87 (0.77-0.96)** |
| Gas distribution | 0.87 (-0.06-1.79) | 0.78 (0.71-0.86) | 1.42 (-3.94-6.78) | **0.84 (0.72-0.96)** |
| Multi-utilities | na | 0.68 (0.63-0.72) | 0.98 (na) | **0.70 (0.64-0.76)** |
| **Overall** | **1.25 (0.62-1.88)** | **0.74 (0.65-0.82)** | **1.29 (1.16-1.41)** | **0.84 (0.77-0.90)** |

| Panel B: Number of observations | Australia | United States | United Kingdom | Overall |
|---|---|---|---|---|
| Water | na | 6 | 5 | **11** |
| Electricity | 2 | 50 | 7 | **59** |
| Gas distribution | 3 | 22 | 2 | **27** |
| Multi-utilities | na | 11 | 1 | **12** |
| **Overall** | **5** | **89** | **15** | **109** |

Source: Datastream, SFG calculations.

The key results of our *Vasicek* beta estimates essentially corroborate the OLS results reported earlier:

- **The estimated betas of water utilities are not statistically significantly different from those of other utilities.** Importantly, all 90% confidence intervals reported in Table 10 overlap substantially and there is also no significant difference between the equity beta estimates between industries within each country;

- **When the re-gearing is based on an estimated debt beta, the 90% confidence intervals for water, gas, and electricity distribution are all very much consistent with the range of 0.9 to 1.1.** This range is consistent with much Australian regulatory precedent for gas and electricity distribution where it is common to use a re-geared (to 60%) mid-point equity beta estimate of 1.0. The empirical data supports this regulatory precedent for gas and electricity distribution. Moreover, the 90% confidence interval for water businesses is also consistent with this conclusion. To the extent that beta estimates for water business are statistically indistinguishable from those of gas and electricity distribution firms, we prefer to focus on the broader set of firms, rather than just water firms specifically. This is because there are relatively few water firms available and a larger sample produces a more precise estimate.

However, none of the results relating specifically to water firms in the first section of Panel A are at all inconsistent with the proposed range of 0.90 to 1.10; and

- **When the re-gearing is based on an assumed debt beta of zero, the estimated re-geared (to 60%) equity beta is slightly lower.** We provide these results for completeness, but do not focus on them as a zero debt beta is inconsistent with the use of any sort of debt margin – if there is no risk, why is a return margin required?

*Regulatory precedent on the Vasicek adjustment*

The ESC has previously considered the Vasicek adjustment in the 2002 Review of Gas Access Arrangements:[43]

> Likewise, the Commission does not consider that the other commonly used adjustment to equity betas – the Vasicek adjustment – is appropriate when deriving a proxy beta for regulated activities. This adjustment involves taking the beta for an individual firm as the weighted average of the raw estimate for that firm, and the average beta of a peer group of firms (with the weights reflecting the inverse proportion of the variance of the peer group average and individual beta estimates). To the extent that the peer group that is employed for the purpose of performing the Vasicek adjustment is similar to the group that forms the comparable entities, then the adjustment should is likely to have little effect on the average of the group. However, to the extent that the peer group differs – and betas for entities that undertake activities that differ to those of a regulated gas distributor are taken into account – then bias to the estimate of the proxy beta may be introduced.

While the Commission rejected the use of the Vasicek adjustment in the last Gas determination, they did consider a weighted-average technique, where the weights were based on the relative standard errors of the comparable beta estimates:[44]

> $$w_j = \frac{\frac{1}{SE(\beta_a)_j^2}}{\sum \frac{1}{SE(\beta_a)_i^2}}$$
>
> where $w_j$ is the weight for the asset beta of the $j^{th}$ firm, and $SE(\beta a)_j$ is the standard error of the asset beta for that firm.

In other words, the Commission recognises that equity beta estimates are imprecise and that more weight should be given to the more precise estimates.

This is exactly the rationale behind the Vasicek adjustment – the weight an observation receives should be based on the statistical precision with which it is estimated. The Vasicek technique compares the precision of a beta estimate for an individual firm with the precision of a prior benchmark estimate. The Commission's proposal is that there is no prior benchmark and estimates of individual firm betas should simply be weighted by their own statistical precision.

The difference is in what is used as the prior benchmark. Our proposed approach is that, prior to examining any data, an appropriate prior belief is that the firm's equity beta is one – the average across

[43] ESC, 2002, Review of Gas Access Arrangements, Draft Decision, July, p. 235.
[44] ESC, 2002, Review of Gas Access Arrangements, Draft Decision, July, p. 236.

the market. This approach is similar to the approach adopted by the London Business School's Risk Management Service and has been used by regulators including Ofwat, Ofgem and ORR in the UK and DTe in the Netherlands.[45]

The Commission's approach is appropriate only if a large sample of comparable firms is available. To the extent that the set of appropriate Australian comparables is usually very small, the Commission's approach is unlikely to improve the statistical reliability of beta estimates much at all.

Finally, it can be argued that the Commission does effectively apply a Vasicek-style adjustment in an implicit way. Suppose that the true systematic risk of all firms in the comparable set is 1.0, but that the standard error of beta estimates is 0.93 (consistent with the standard error for the average beta estimate reported by CRIF). If the comparable set consists of only four firms, there is a 14% chance that the mean beta estimate from this comparable set is less than 0.5 and a 10% chance that the mean will be less than 0.4. That is, there is a significant chance that the empirical estimate will be extremely low, due solely to the imprecision with which betas are estimated. Now suppose that the Commission conducted this exercise and obtained an empirical estimate of 0.4. Clearly, the Commission would not base the regulated return on this estimate, but would adopt a higher value. Why? Because there is an implicit recognition that such a low estimate is likely to have been so affected by estimation error that it is unreasonably low. But adopting a value above the mechanical statistical estimate is nothing more than adjusting the empirical data toward a prior expectation – exactly what the Vasicek adjustment does in a transparent way.

*Length of estimation period*

The results outlined above are based on an average estimation period of around 22 years. A number of academic papers have considered the appropriate length of data that should be used to estimate equity betas. For instance, Gray, Hall, Bowman, Brailsford, Faff and Officer (2005)[46] and Hooper, Ng and Reevers (2005) [47] present evidence to suggest a longer time period should be used than the commercial practice of 5 years of monthly data. In particular the latter study, finds that an autoregressive model estimated on 20 years of data minimises the error associated with forecasting the next period's beta.

## 7.4 Conclusion

Based on an analysis of 109 utilities in Australia, US and UK, there is limited evidence to support water utilities having a lower systematic risk, or beta, than electric or gas utilities. Using data over the past 30 years indicates that each industry has a similar beta. Importantly, these estimates are not statistically different from one another.

An examination of the equity betas of the comparable firms indicates the following:

The key results of our analysis are that:

1. The estimated betas of water utilities are not statistically significantly different from those of other utilities;

[45] See PWC, 2006, Comparison study of the WACC, May 8, available at:
http://www.dte.nl/images/Comparison%20study%20of%20the%20WACC-%20Mei%202006_tcm7-87013.pdf
[46] Gray, S., J. Hall, G. Bowman, T. Brailsford, R. Faff and R. Officer, 2005. The performance of alternative techniques for estimating equity betas of Australian firms, Report prepared for the Energy Networks Association (May.
[47] Hooper, V. J., K. Ng and J. J. Reeves, 2005, Beta forecasting: A two-decade evaluation, Working paper: University of New South Wales and Stanford University.

2. When the re-gearing is based on an estimated debt beta, the 90% confidence intervals for water, gas, and electricity distribution are all very much consistent with the range of 0.9 to 1.1.

3. When the re-gearing is based on an assumed debt beta of zero, the estimated re-geared (to 60%) equity beta is slightly lower.

**Our recommendation is that a range of 0.9 to 1.1 be used for the equity beta (geared to 60%). This is consistent with a mid-point estimate of 1.0, as used in many Australian regulatory determinations in relation to gas and electricity utilities.**

## 8. Using Parameter Ranges Rather Than Point Estimates

A number of WACC parameters simply cannot be estimated with great precision, but can only (reasonably) be narrowed down to an economically-reasonable range. This then leads to a range, rather than a single point estimate for the aggregated WACC. The statistical estimation uncertainty about the WACC can be quantified in the form of a standard probability distribution constructed using standard Monte Carlo simulation techniques. This then provides the regulator with a proper basis for the exercise of regulatory judgment in accordance with the enabling legislation. For example, the regulator can use this probability distribution to set a regulatory WACC to provide the regulated entity with a 75% chance (for example) of being able to recover its true cost of funds. This recognises the severe consequences (in terms of the incentives to make adequate investment) of setting the regulatory WACC too low to provide the entity with a reasonable prospect of being able to earn an adequate return.

Australian regulators generally accept that the estimated cost of capital influences the ability of businesses to finance infrastructure projects, and consequently deliver essential services. They also argue that setting too high a rate of return encourages overinvestment and results in unnecessarily high prices. Estimating the distribution of the WACC merely provides an objective framework for performing this analysis, and enhances the transparency of the regulator's decision-making.

That is, if the regulator were to adopt an estimated WACC at the upper end of the distribution, it is explicitly acknowledging that the risk of inadequate infrastructure outweighs the risk of overinvestment. If the regulator were to adopt an estimated WACC at the mid-point of the distribution – which is essentially what the ESC does at the moment – it is explicitly acknowledging that these two risks have equal consequences for consumers. Providing a mechanism for increased transparency is likely to have long-term benefits for regulated businesses. The more transparency in regulatory decision-making, the more ability the business has to make future submissions made with specific regard to that decision-making process.

### 8.1 Using Monte Carlo Simulations

The Monte Carlo simulation approach is not a proposal to reject the current framework in favour of a new and untested approach. Monte Carlo simulations simply involve examining the effect of estimation errors within the current framework. That is, the question is not one of which framework to use, but one of whether to recognise or ignore estimation errors, *within the existing framework*. Ignoring estimation uncertainty does not make it go away.

A Monte Carlo approach allows the aggregation of reasonable estimates of the various parameter inputs into a probability distribution for the weighted average cost of capital (WACC) in a transparent fashion. This distribution can then be used to consider whether a proposed WACC is within a reasonable range.

A Monte Carlo simulation is conducted in the following fashion:

1. Estimate an appropriate distribution for each uncertain parameter;

2. Perform a random draw from these distributions for each uncertain parameter. Calculate the resultant WACC;

3. Repeat Step 2 many times to form a probability distribution of the WACC. Enough simulations should be conducted to ensure a stable distribution (around 10,000).

The rationale behind the Monte Carlo simulations is that we can not be certain that our observed parameter estimate is correct. For instance, beta can only be measured imprecisely. We may estimate a beta of 1.0 but the true unobservable beta could be between 0.9 and 1.1, for example. As such, a

distribution is assumed and a random beta estimate is chosen from within this range. We can consequently compute a range of potential WACC estimates that takes into account this uncertainty. This forms the estimate of the firm's true cost of funds.

In particular, Monte Carlo analysis produces a full probability distribution for the firm's true cost of funds. Any proposed regulated WACC can then be assessed against this probability distribution. It allows the regulator to estimate the probability that a proposed regulatory WACC is sufficient to meet the firm's true cost of funds. For example, a regulated WACC that gives the firm a 30% chance of covering its cost of funds is likely to be considered unreasonably low under the WIRO. Conversely, a regulated WACC that gives the firm a 99% chance of covering its cost of funds is likely to be considered unreasonably high. Whether a proposed WACC is reasonable can be assessed by examining the probability that this return will be sufficient to cover the true cost of funds. This probability is informative about whether the proposed WACC is consistent with previous market conditions and whether it provides the incentive to develop the market.

### 8.2 Monte Carlo Simulations: Subjectivity or Transparency?

Using Monte Carlo analysis has been criticised by some regulators/consultants due to its reliance on subjective judgement. However, it is difficult to understand how a simulation procedure adds to the subjectivity in estimating WACC. Regulators accept that the regulated WACC is only an estimate of the regulated entity's cost of funds, arrived at by assessing evidence on seven parameters – risk-free rate, debt premium, market risk premium, equity beta, leverage, corporate tax rate and the value of imputation tax credits – applying its judgement to the evidence presented in submissions, from other regulatory decisions and market practice, and in the finance literature. This could be described as a subjective process because there is no explicit formula to reconcile conflicting evidence. The regulator applies weights (judgment) to difference pieces of evidence to determine a final result.

In the absence of a specified range or distribution for each parameter, it is difficult to determine exactly how this regulatory judgment has been applied – whether it has been applied in an aggressive or conservative manner. Moreover, specifying the range or probability distribution for a parameter and articulating the reasons for why and how regulatory judgment has been applied would be consistent with the principle of Transparency that has been adopted by the Regulators' Forum.

> Transparency requires regulators to be open with stakeholders about their objectives, processes, data and decisions. Regulators should establish visible decision-making processes that are fair to all parties and provide rationales for decisions. Such openness can assist in gaining stakeholders' confidence and acceptance of the regulator's decisions.[48]

In our view, specifying probability distributions for the parameters does not increase subjectivity, but reduces it. All the distributions do is provide a mechanism for determining the weight placed on different evidence. For example, in estimating a parameter with a uniform distribution, the regulator is assuming that each point within a range carries equal weight in decision-making; in estimating a parameter with a normal distribution, the regulator is assuming that points closer to the mean carry greater weight than points further away; and in estimating a parameter with a gamma distribution, the regulator is assuming that points above the median carry greater weight than points below the median.

[48] Utility Regulators Forum, Best Practice Utility Regulation, July 1999.

Specifying probability distributions can in no way increase the subjectivity with which parameters are estimated. They simply provide a clear mechanism for weighting alternative pieces of evidence.

By basing its regulatory decisions on point estimates for underlying parameters, the regulator has already assumed a very specific probability distribution – one which implies that the standard error of the parameter estimate is zero. This involves at least as much subjectivity as specifying probability distributions that more realistically reflect the statistical uncertainty of parameter estimates that are known to be statistically imprecise.

### 8.3 Regulatory Precedent

Many regulators have advocated the use of Monte Carlo simulations. Some have not used the Monte Carlo simulations to set a point estimate, but to test whether a particular point estimate lies within a reasonable range. We agree that this is the appropriate use of Monte Carlo simulation – the role of the regulator is not to propose a particular return, but to assess where a proposed return lies within the range of rates.

Specifically, under the WIRO, the regulator is required to approve prices that provide for "a sustainable revenue stream that does not represent monopoly rents." To be sustainable, a revenue stream must include an adequate return on existing and new investments. The central issue is how the regulator determines whether the regulated return (and ultimately the price) that is awarded provides a sustainable revenue stream. That is, how does the regulator know whether a proposed regulated return is adequate? A distribution for the true cost of funds can be used to answer exactly this question that must be answered under the WIRO. A regulated return that provides the business with a 30% chance of covering its cost of funds, for example, would clearly be inadequate.

A regulated return that provides the business with a 50% chance of covering its cost of funds, would also be inadequate. Consider, for example, pitching a new project to a Board where the project had a 50% chance of covering the firm's cost of funds. That is, whether the project creates or destroys shareholder value is a coin flip. Such a project is unlikely to be endorsed by any commercial Board. Consequently, a regulated return that provides the business with a 50% chance of covering its cost of funds, should be considered to be unsustainable.

The New Zealand Commerce Commission has adopted the 75$^{th}$ percentile of the WACC distribution as a way of balancing the requirement of the business to generate a sustainable revenue stream without imposing monopoly prices on consumers. In any specific regulatory determination (including the case at hand), the regulator must balance this type of competing interest. A distribution of the true cost of funds is a tool that provides the regulator with a framework to do exactly this.

Ignoring the estimation uncertainty inherent in WACC parameter estimates or simply selecting mid-point estimates from parameter ranges is inconsistent with the WIRO – this effectively gives the business only a 50% chance of covering its cost of funds and is therefore commercially unsustainable.

An alternative approach is to simply select a "conservative" point estimate from a range for each parameter. In this case, we have no idea about whether the regulated return gives the business a 55%, 75%, or 95% chance of covering its true cost of funds. Presumably, we would need to know this in order to determine whether a proposed return is consistent with the WIRO. Moreover, in order to claim that a particular parameter estimate is conservative, a regulator must first specify a reasonable range for that parameter, then demonstrate that they have selected a point estimate above the mid-point of that range. But those parameter ranges are all that is required to construct a full probability distribution, so that the assessment of "sustainability" or "reasonableness" can be assessed within an accepted and robust framework.

The New Zealand Commerce Commission, IPART, ACCC, QCA and the ERA all recognise the merits of using Monte Carlo simulation.

*New Zealand Commerce Commission*

The New Zealand Commerce Commission (NZCC) has recognised the uncertainty and statistical imprecision in its WACC estimates in a formal probabilistic manner.[49] Rather than producing a single point estimate, the NZCC constructs a probability distribution for the WACC and recognises that the firm's true cost of funds could come from anywhere within that distribution. The NZCC also notes the asymmetric consequences of regulatory error – that the costs of setting the regulatory WACC too low are much more severe than the costs of setting it too high. For this reason, the NZCC adopts the 75th percentile from the probability distribution as the appropriate regulatory WACC estimate. This reflects the statistical uncertainty of its WACC estimate and the balancing of the risks of regulatory error. Specifically, the NZCC (based on work conducted by its consultant, Ass Prof. Martin Lally) describes its position on this issue as follows:

> The point estimate on WACC reflects five parameters over which there is significant uncertainty i.e., the market risk premium and the four components of the asset beta. Such parameter uncertainty results in uncertainty over WACC and this can be formalised in a probability distribution for WACC…the percentiles of the WACC distribution are derived as shown in Table 9.2 below.

**Table 9.2: Percentiles of the WACC Distribution**

| Percentile | 50th | 60th | 70th | 80th | 90th | 95th |
|---|---|---|---|---|---|---|
| WACC | .072 | .075 | .078 | .082 | .087 | .092 |

> Thus, if one wished to choose a WACC for which there is only a 20% probability that the true value was less than this (80th percentile), that WACC value would be 8.2%.
>
> The Commission notes concerns about the asymmetric nature of errors in assessing WACC, i.e., underestimation is the more serious error because it may lead to underinvestment by the regulated companies…The Commission has used the 75th percentile of the WACC distribution.

*Independent Pricing and Review Tribunal*

In the recent Review of Gas Access Arrangements, IPART received submissions from AGL Gas Networks (AGLGN) proposing a framework for quantifying estimation error in the WACC similar to that proposed in this paper. AGLGN proposed that probability distributions rather than point estimates should be used for several parameters that are subject to estimation error, that Monte Carlo simulation should be used to aggregate these uncertain parameter estimates into a probability distribution for the WACC, and that the regulatory WACC should be set at the 80th percentile to provide the business with a sufficient probability of being able to earn a return sufficient to recover its cost of funds.

[49] New Zealand Commerce Commission, 2004, Gas Control Enquiry: Final Report, 29 November 2004, http://www.med.govt.nz/upload/15178/chapter9.pdf.

In its Final Decision,[50] IPART accepted the use of Monte Carlo simulation to construct a probability distribution to quantify the statistical uncertainty in WACC estimates. Specifically, IPART states that[51]:

> The Tribunal's view is that use of a Monte Carlo simulation framework does allow for uncertainty through the use of probability distribution for individual parameters, and thus meets the requirements of the Code in producing a range of returns that may reflect prevailing market conditions for funds.

AGLGN made further submissions as to the probability distributions that should be used to characterise the uncertainty in relation to the estimates of each WACC parameter. In the Final Decision, IPART adopts slightly different distributions and ranges than those proposed by AGLGN for some of these parameters. Nevertheless, IPART expresses four parameters, equity beta, market risk premium, debt margin, and the value of franking credits (gamma) in terms of probability distributions rather than using point estimates.[52]

The result of aggregating IPART's parameter distributions is a probability distribution for the WACC that ranges between 5.9% and 7.3% (pre-tax real). In selecting a point from within this distribution, IPART argues that a pre-determined and fixed percentile point in the distribution should not be used, but that each determination must be made with reference to the case at hand. In particular, IPART states that:[53]

> In practice, the aim of Monte Carlo simulation is to produce a wide range of possible outcomes for the rate of return. The Tribunal's view is that, in deciding where to determine the rate of return within this range, it must be guided by the factors in sections 2.24 and 8.1 of the Code. This assessment must be made on a case by case basis.

Although IPART rejects AGLGN's proposal to select the 80$^{th}$ percentile of the resulting WACC distribution to balance the asymmetric consequences of setting the regulatory WACC above or below the true cost of funds, IPART adopts a regulatory WACC of 7.0% (pre-tax real). Note that this value is 79% of the way between the lower and upper bounds of the WACC range constructed by IPART.[54] In this context, we recommend a proposed WACC for the Melbourne metropolitan water businesses at the 75$^{th}$ percentile of the WACC distribution.

In practice, IPART has accepted the Monte Carlo simulation framework to quantify the statistical uncertainty involved in estimating WACC. IPART recognises that its estimate may be higher or lower than the regulated entity's true cost of funds. It also recognises that the consequences of setting the regulatory WACC lower than the true cost of funds are more severe than the reverse. Consequently, IPART has adopted a regulatory WACC substantially above the mid-point of its WACC probability distribution.

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[50] IPART, 2005, Revised Access Arrangement for AGL Gas Networks: Final Decision, April 2005, http://www.ipart.nsw.gov.au/documents/RevisedAccessArrangementforAGLGasNetworks-AGLGN-April2005-FinalDecision-PDFversion.PDF

[51] Ibid, p.95.

[52] Ibid, Table 8.6, p. 104.

[53] Ibid, p. 95.

[54] That is, $\frac{7.0-5.9}{7.3-5.9}=0.79$.

*Australian Competition and Consumer Commission*

In its assessment of Telstra's ULLS and LSS monthly charge undertakings, the ACCC advocated the use of Monte Carlo simulations. The ACCC states:[55]

> Because each WACC parameter cannot be known with certainty, there is a ***range*** of input parameters which could be termed 'reasonable'. This seems to be an area of common agreement. A literal application of this argument, however, may allow a regulated firm to take a high, but reasonable, value for all input parameters and generate a WACC which is unreasonably high. A more defensible approach to determining the range of possible WACCs is to use a Monte Carlo (MC) simulation…

*Queensland Competition Authority*

The QCA also supports the use of Monte Carlo simulations:

> The Authority agrees with the ACCC that such an approach [Monte Carlo simulation] may be useful to test claims regarding the reasonableness of a WACC estimate. As a consequence, the Authority has applied this approach to testing the reasonableness of its WACC for QR.[56]

*Economic Regulation Authority*

The ERA has not used Monte Carlo simulation, but does use ranges rather than point estimates for market risk premium, equity beta, gamma, and debt margin. This creates a range for the aggregated WACC. The ERA notes that:

> The wide ranges in estimates of the WACC result from the multiplicative effect of differences in assumptions for CAPM parameters.[57]

The ERA goes on to conclude that it would be unreasonable for any party to select values from the extreme end points of the range for each parameter. This (correctly) recognises that it is highly unlikely that the true value of *all* parameters would be at the extreme end point of the range that is considered reasonable.

[55] ACCC (2005). *Assessment of Telstra's ULLS and LSS monthly charge undertakings: Draft decision,* p.62.
[56] QCA (2005). *QR's 2005 Draft Access Undertaking: Decision*, p. 34.
[57] ERA (2005), *Draft Decision on Proposed Revisions to the Access Arrangement for the Dampier to Bunbury Natural Gas Pipeline*, p. 50. Note that this aspect of the Draft Decision was affirmed in the Final and Further Final Decisions.

> The Authority considers that the range of values that different minds acting reasonably could attribute to the cost of equity and WACC is narrower than the ranges that the extremes of ranges in CAPM parameters would suggest. An approach by a Service Provider to determination of the Rate of Return that adopted the highest value within the reasonable range for each of the relevant CAPM parameters would not, in the Authority's view, result in a value for the Rate of Return that different minds, acting reasonably, would attribute to the Rate of Return. Also, such an approach would be inconsistent with the nature of regulatory oversight because the incentive throughout the process of consideration of a Rate of Return would be for the Service Provider to contend for those values for each of the underlying parameters that would produce the highest rate of return. The process would be reduced to a consideration of what would be the highest possible Rate of Return rather than determining a best estimate of the Rate of Return on a reasonable basis.
>
> Similarly it would not be reasonable for the Authority to make a determination based on, or implying, a Rate of Return at the lower extreme of the range.[58]

The ERA concludes that

> while the Authority recognises that no reasonable person would adopt the extremes of this range, the Authority is of the view that there is no apparent rigorous statistical or other methodology for determining precisely at which point values close to the extreme values of the range do not reflect a reasonable view of the current market for funds.[59]

But this is *exactly* what the Monte Carlo simulation approach is designed to do. That is, the proposed Monte Carlo approach achieves exactly that purpose which the ERA believes to be required by the Code. The Monte Carlo approach provides the regulator with the full set of information required to determine the reasonableness of the proposed return. It provides the regulator with an indication of the probability that a proposed return is deficient or excessive. This would seem to be exactly the information the regulator requires to fulfil the requirements of the Code. The ERA, being unaware of and not having considered the Monte Carlo approach, uses an arbitrary mechanical procedure for determining reasonableness:

> the Authority is of the view that the range of values that would comply with the Code should not include the values that lie within the lower 10 percent or upper 10 percent of the range that is derived by the application of the extremes of values for each of the parameters of the CAPM.[60]

*Essential Services Commission*

The ESC considered the use of Monte Carlo simulation in the 2005 Electricity Distribution Price Review:[61]

[58] ERA (2005), *Draft Decision on Proposed Revisions to the Access Arrangement for the Dampier to Bunbury Natural Gas Pipeline*, p. 50.
[59] ERA (2005), *Draft Decision on Proposed Revisions to the Access Arrangement for the Dampier to Bunbury Natural Gas Pipeline*, p. 50.
[60] ERA (2005), *Draft Decision on Proposed Revisions to the Access Arrangement for the Dampier to Bunbury Natural Gas Pipeline*, p. 51.
[61] ESC (2005), Electricity Distribution Price Review 2006-2010, Final Decision, October, p. 335.

> The Commission has not been persuaded to use the Monte Carlo method on the basis of the comments made by AGLE, United Energy or the ENA regarding the ability of the methodology to increase transparency and certainty. The Commission acknowledges the concerns expressed by, amongst others, the Productivity Commission in its review of the National Access Regime and Gas Access Regime that there is sound reason for setting regulated charges at a level at which the Commission is confident the returns provided to investors are sufficient to continue to attract capital into the industry. Indeed, the Commission's primary objective — referring as it does to the long term interests of consumers — directs the Commission to this end in any event. However, the Commission remains of the view that the methodology that is has used in previous reviews remains appropriate for this exercise.

The Commission's main concerns with the use of Monte Carlo simulations primarily related to:

- *Difficulties in deriving probability distributions*. The Commission concluded that it is not possible to derive a distribution with any degree of confidence. We demonstrate below that the form of probability distribution for each parameter is a second order effect – the important thing is to recognise that there is uncertainty in some WACC parameter estimates. Whether this uncertainty is modelled as a uniform or normal distribution is relatively unimportant to the shape of the distribution of the aggregated WACC. Our example below illustrates this. Moreover, as discussed in Section 8.2, the Commission is already assuming a very specific probability distribution – one which implies that the standard error of the parameter estimate is zero.

- *Central estimates adopted by the Commission already exhibit conservatism*. If the Commission considers the estimates to be conservative, they must have already formed some opinion about the distribution. Otherwise, how does the Commission know the estimates are conservative? The Commission has indicated that they rely on alternative sources of data when forming their views about the appropriate parameter inputs. These alternative sources of evidence must be given different weights by the Commission in order to recommend conservative inputs; and

- *Limited benefits from improving transparency*. Although a number of regulated business have declared the potential transparency improvements that would result from the adoption of Monte Carlo simulation, the Commission considers that the process will be entirely speculative resulting in no improvements in transparency. However, this is not the case. As discussed above, the Commission has already considered alternative data sources, and must place some weight on each source. Providing more details on the information relied upon to determine the parameter inputs must improve transparency.

- Form of probability distribution for each parameter

The Commission's primary concern in the EDPR is that "in addition to a view on expected value for a parameter, a view is required on the shape of the probability distribution around that value."[62] That is, there are many different shapes of probability distribution and a particular type of distribution would have to be selected for each parameter that was estimated with uncertainty.

However, due to the number of uncertain parameters (three or more, depending upon the form of WACC that is used) and their non-linear aggregation via the WACC formula, the shape of the distribution around each parameter is almost inconsequential. The dominant effect is that parameter estimation uncertainty is taken into account and reflected in a distribution, rather than a point estimate,

[62] Essential Services Commission. (March 2005). Electricity Distribution Price Review 2006-10 Position Paper. p. 168.

for the aggregated WACC. The precise form of the probability distribution around each parameter (e.g., normal or uniform) has little effect on the distribution of the aggregated WACC.

To demonstrate this, we use Monte Carlo simulation to construct a probability distribution for the true WACC based on three sets of parameter estimates and distributions. The first corresponds to the AGLE submission to the EDPR – a normal distribution is used for the MRP and a uniform distribution is used for all other parameters. The second uses uniform distributions for all parameters and the third uses normal distributions for all parameters.

In all cases, distributional parameters are selected so that the mean and standard deviation of the distribution are equal whether a normal or uniform distribution is used. That is, the standard deviation of the normal distribution is set so that it matches the standard deviation of the corresponding uniform distribution.

The parameter estimates and ranges are summarized in Table 11.

**Table 11: WACC Parameter Estimates and Ranges for Victorian EDPR**

| Parameter | EDPR Submission | Uniform Distributions | Normal Distributions |
|---|---|---|---|
| **Real risk-free rate of interest** | 2.79% | 2.79% | 2.79% |
| **Capital Structure** | 60% | 60% | 60% |
| **Debt margin** | Uniform: 1.51-1.71% | Uniform: 1.51-1.71% | Normal: (1.61%, 0.05%) |
| **Equity beta** | Uniform: 0.9-1.1 | Uniform: 0.9-1.1 | Normal: (1.00, 0.05) |
| **Market risk premium** | Normal (6%, 1.8%) | Uniform 3.5%-8.5% | Normal (6%, 1.8%) |

The resulting WACC distributions are illustrated in Figure 3 below.

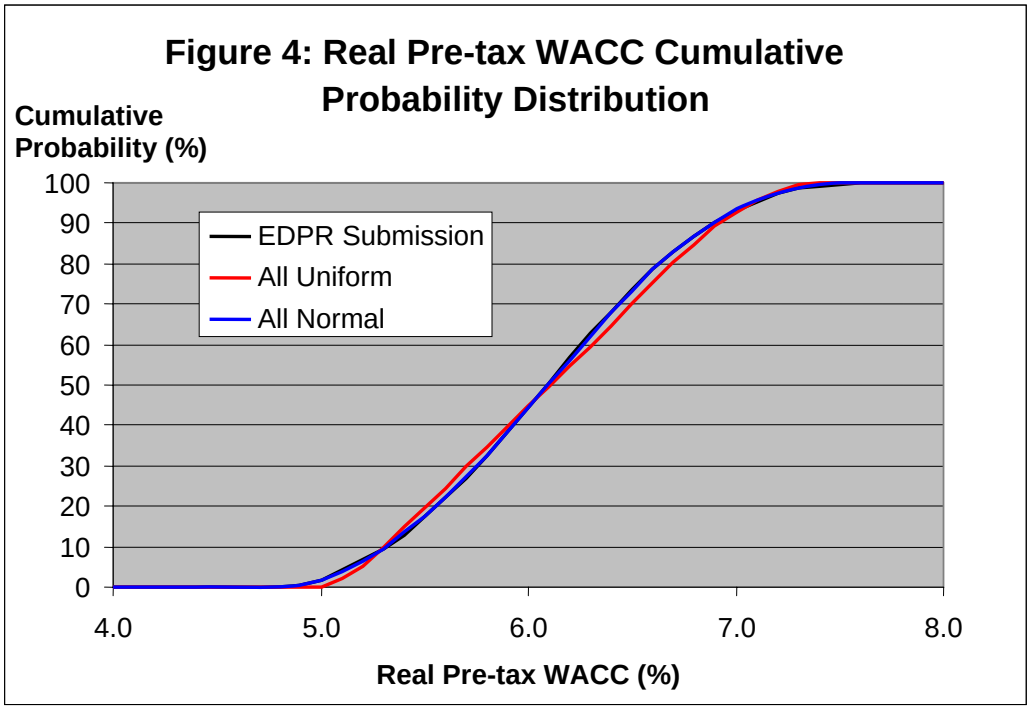


Figure 4 shows that whether a uniform or normal distribution is used to quantify the uncertainty of each parameter, or whether some mixture of distributions is used, the resulting WACC distributions are almost indistinguishable.

Therefore, a simple approach that involves selecting a range for each uncertain parameter and using a uniform distribution over that range can be used to construct a WACC distribution.

This approach has a number of advantages:

- It removes all debate about the shape of probability distributions to be used,
- It is consistent with the parameter ranges that are already used by several regulators (and even when a regulator does not expressly publish a range, they must have constructed a range in order to consider that their point estimate is conservative), and
- It produces a final WACC distribution that is equivalent to that constructed using more complex distributions for each parameter.

This provides a straightforward way to quantify estimation uncertainty without requiring any additional analysis – existing parameter ranges are simply converted into a WACC distribution, from which the regulator selects a regulated WACC, with full knowledge of the probability that the selected WACC will be sufficient to cover the service provider's true cost of funds.

## 8.4 Application of Regulatory Judgment

Those regulators that have employed ranges or distributions rather than a single point estimate for WACC parameters have set the regulated return above the mid-point of the range or distribution. The NZCC has specifically stated that setting the regulated return at the 75$^{th}$ percentile is an appropriate way to balance the competing regulatory objectives.

This issue has recently been addressed in some detail by the Productivity Commission, Australian Courts, and the Australian Competition Tribunal. For example, the Productivity Commission's Review of the National Access Regime recognises that the effects of too little infrastructure investment are far more severe than those associated with too much (or too early) investment.

*Productivity Commission*

The Productivity Commission states[63] that "Given that precision is not possible, access arrangements should encourage regulators to lean more towards facilitating investment than short term consumption of services when setting terms and conditions" and that "given the asymmetry in the costs of under- and over-compensation of facility owners, together with the informational uncertainties facing regulators, there is a strong in principle case to 'err' on the side of investors".

The Productivity Commission goes on to quote from a submission to the review by NECG, which stated that:

[63] Productivity Commission, Review of the National Access Regime: Inquiry Report, 28 September 2001, p.xxii.

> "In using their discretion, regulators effectively face a choice between (i) erring on the side of lower access prices and seeking to ensure they remove any potential for monopoly rents and the consequent allocative inefficiencies from the system; or (ii) allowing higher access prices so as to ensure that sufficient incentives for efficient investment are retained, with the consequent productive and dynamic efficiencies such investment engenders. There are strong economic reasons in many regulated industries to place particular emphasis on ensuring the incentives are maintained for efficient investment and for continued productivity increases. The dynamic and productive efficiency costs associated with distorted incentives and with slower growth in productivity are almost always likely to outweigh any allocative efficiency losses associated with above-cost pricing. (sub. 39, p. 16)"

The Productivity Commission Review highlighted the need to modify implementation of the regime and made 33 recommendations to improve its operation. In particular it identified as a "threshold issue, the need for the application of the regime to give proper regard to investment issues" and "the need to provide appropriate incentives for investment."

This view is supported by the Commonwealth Government, which has resolved to amend the Trade Practices Act in this regard. In particular, the access regime will be modified to include a clear objects clause: "The objective of this part is to promote the economically efficient operation and use of, and investment in, essential infrastructure services thereby promoting effective competition in upstream and downstream markets…"[64]

In addition, a set of pricing principles will be included that requires "that regulated access prices should: (i) be set so as to generate expected revenue for a regulated service or services that is at least sufficient to meet the efficient costs of providing access to the regulated service or services; and (ii) include a return on investment commensurate with the regulatory and commercial risks involved…"

*Australian Competition Tribunal – EPIC*

The ACT decision on Epic Energy's appeal against the ACCC's refusal to approve its access arrangements for the Moomba Adelaide pipeline also provides guidance on how a regulator should select estimates under circumstances where a range of possible values exist. In particular, the Tribunal found that "regulators must give clear and substantiated reasons for reaching their conclusions regarding the values they select where a range of possible values exist."[65] This can be easily accommodated within a Monte Carlo simulation framework that quantifies the range of possible values that exist for each parameter and how they aggregate together to form the WACC.

*Australian Competition Tribunal – GasNet*

Important principles regarding the role and powers of the regulator can also be drawn from the recent ACT decision on GasNet's appeal against the ACCC's final decision on its access arrangements. In the GasNet appeal, the Tribunal expressed the view that it is not the regulator's role to determine specific parameter values, but rather to determine whether the proposed return is consistent with the legislation:

[64] Government Response to the Productivity Commission Review of the National Access Regime, released 17 September 2002.
[65] Application by Epic Energy South Australia Pty ltd [2003] AcompT 5, 10 December 2003, para. 32, 48, 84.

> "…where the AA [access arrangement] proposed by the Service Provider falls within the range of choice reasonably open and consistent with Reference Tariff Principles, it is beyond the power of the Relevant Regulator not to approve the proposed AA simply because it prefers a different AA."[66]

In relation to WACC, the Tribunal concluded that:

> "Contrary to the submission of the ACCC, it is not the task of the Relevant Regulator under s 8.30 and s 8.31 of the Code to determine a 'return which is commensurate with prevailing conditions in the market for funds and the risk involved in delivering the Reference Service'. The task of the ACCC is to determine whether the proposed AA in its treatment of Rate of Return is consistent with the provisions of s 8.30 and s 8.31 and that the rate determined falls within the range of rates commensurate with the prevailing market conditions and the relevant risk."

For the regulator to determine whether a proposed rate falls within the appropriate "range of rates," the regulator must first construct the range of rates that is appropriate. The most appropriate and complete way to do this is via Monte Carlo simulation.

### 8.5 Summary

Monte Carlo simulation is a common tool in finance practice. A few examples of the standard applications of Monte Carlo simulation include:

1. Simulating future stock prices to value stock and executive options;

2. Simulating future interest rates to value interest rate sensitive securities – as part of a Value-at-Risk calculation (this is very much standard practice among banks and financial institutions);

3. Simulating future electricity demand and plant outages to determine the range of possible future pool prices (this is very much standard practice among energy generators and retailers and forms the basis of their hedging policy);

4. Simulating future realizations of the key value drivers of a proposed project to generate a distribution of its value to the organization – a form of sensitivity analysis as part of the project appraisal activity.

We have advocated the use of this standard technique to quantify how the uncertainty surrounding several individual parameters affects the aggregated WACC. In our view:

1. Monte Carlo simulation is a standard technique that is frequently used for many applications in finance;

2. It has been accepted by a number of regulators as an appropriate way of quantifying the uncertainty in WACC estimates;

3. Its use is consistent with the Transparency Principle advocated by the Australian Regulators Forum; and

[66] Application by GasNet Australia (Operations) Pty Ltd [2003] AcompT 6, 23 December 2003, paragraph 29.

4. Its use is consistent with the views expressed by the Productivity Commission and the Australian Competition Tribunal – it provides a framework within which a regulator can assess whether a "rate determined falls within the range of rates commensurate with the prevailing market conditions."

## 9. Weighted average cost of capital for the Melbourne metropolitan water businesses

Table 12 summarises the economically reasonable ranges for the various WACC parameter estimates discussed in the prior sections.

**Table 12. Proposed reasonable ranges for WACC parameters**

| Parameter | Range | Distribution |
|---|---|---|
| Real risk-free rate | 2.64% – 3.36% | Uniform |
| Gearing | 50% to 60% | Uniform |
| Debt margin (total) | 1.24% to 1.36% | Uniform |
| Market risk premium | 5% to 7% | Uniform |
| Equity beta (geared to 60%) | 0.9 to 1.1 | Uniform |
| Value of imputation credits | 0 | - |

Below we estimate the weighted average cost of capital using:

- Mid-point estimates of the parameters; and
- Complete distribution of the parameters.

Importantly, these two approaches yield equivalent mid-point estimates. Using the complete distribution simply provides more information about the uncertainty surrounding the point estimate by presenting the results in the form of a probability distribution.

### 9.1 Mid-point estimate

The Commission has previously adopted a real vanilla after-tax WACC:

$$Real\ vanilla\ after\text{-}tax\ WACC = r_d \times \frac{D}{V} + r_e \times \frac{E}{V}$$

where:

$r_e$ = real after-tax required return to equity holders;

$r_d$ = the real required return to debt holders;

$\frac{D}{V}$ = the benchmark gearing assumption (proportion of debt financing on a market-value basis);

$\frac{E}{V} = 1 - \frac{D}{V}$;

To estimate the real required return on equity, the Commission employs the domestic Capital Asset Pricing Model (CAPM):

$$r_e = r_f + \beta_e MRP$$

where:

$r_f$ = real risk-free rate of interest;

$\beta_e$ = the equity beta of the regulated firm (an estimate of systematic risk); and

$MRP$ = the market risk premium – the amount by which the return on the average stock is expected to exceed the risk-free rate.

The equity beta assumption reported in Table 12 is geared to 60% to ensure comparability with previous regulatory decisions. However, the mid-point gearing estimate is 55%. Consequently, the equity beta must be adjusted to reflect the assumed gearing level. Un-levering the equity beta using the Commission's preferred technique requires an assumption for the debt beta. The debt beta can be estimated from the expected return on debt by reverse-engineering the CAPM. This approach, which was adopted by the Commission in the 2002 Review of Gas Access Arrangements, is represented by the following equation:[67]

$$\beta_d = \frac{yield - r_f - DRP}{MRP}$$

where:

$yield - r_f$ = the yield on corporate bonds with a comparable credit rating less the yield on risk-free bonds. As indicated in section 6.6, the current margin for a benchmark water utility with a BBB to BBB+ credit rating is 111.3 to 123.5 bp, implying a mid-point estimate of 117.4 bp;

$DRP$ = the default risk premium. Empirical estimates in the US from Elton, Gruber, Agrawal and Mann (2001) imply a default risk premium of around 0.4% for BBB-rated bonds.

Given a mid-point estimate of the market risk premium of 6%, an appropriate mid-point debt beta is around 0.129:

$$\beta_d = \frac{0.01174 - 0.004}{0.06} = 0.129$$

Consequently, the asset beta can be computed using the Commission's preferred un-levering approach:

$$\beta_a = \beta_e \frac{E}{V} + \beta_d \frac{D}{V}$$

$$\beta_a = 1.0 \times 0.4 + 0.129 \times 0.6 = 0.4774$$

Re-levering this asset beta to the target leverage of 55% results in an equity beta of:

$$\beta_e = \frac{\beta_a - \beta_d \frac{D}{V}}{\frac{E}{V}} = \frac{0.4774 - 0.129 \times 0.55}{0.45} = 0.903$$

Substituting this equity beta estimate into the CAPM results in a real required return on equity of 8.42%, given a mid-point estimate of the risk-free rate of 3%:

$$r_e = r_f + \beta_e MRP$$
$$r_e = 0.03 + 0.903 \times 0.06 = 8.42\%$$

[67] ESC, 2002, Review of Gas Access Arrangements, Draft Decision, July.

The required return on debt is computed by adding a debt margin, including issuance costs, to the risk-free rate. The mid-point margin is around 130 basis points, resulting in a real required return on debt of 4.3%:

$$r_d = r_f + Margin$$
$$r_d = 0.03 + 0.0130 = 4.3\%$$

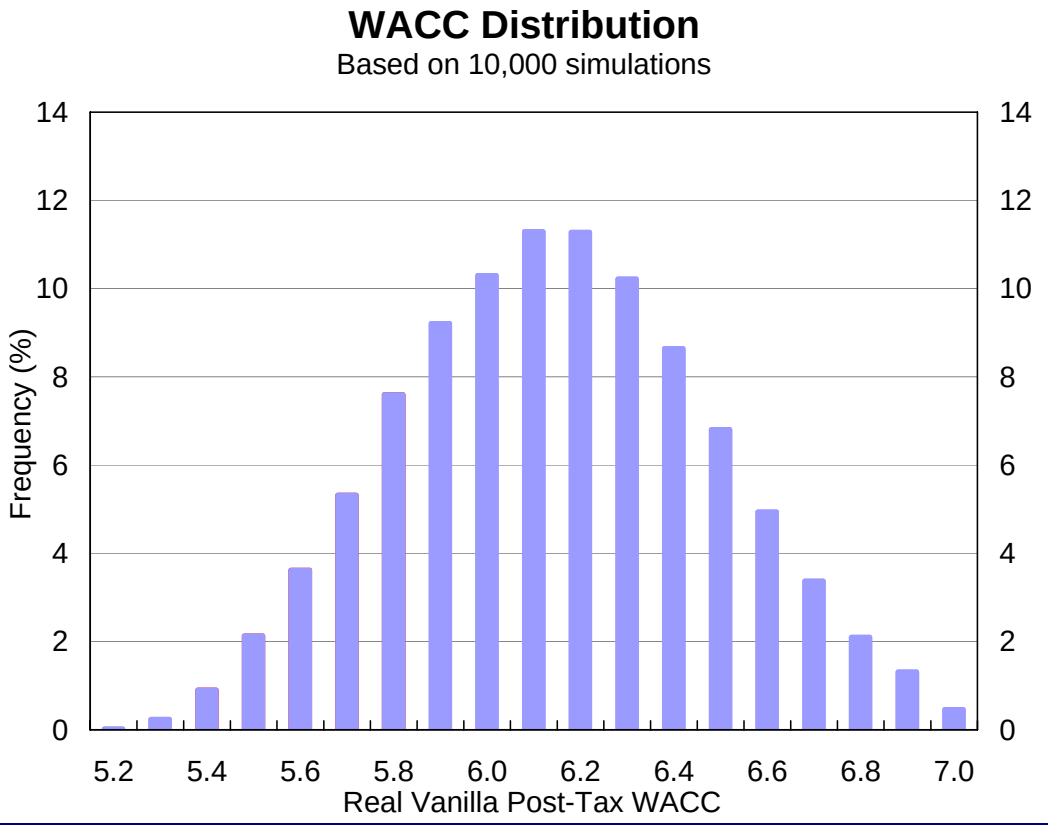
Consequently, the real vanilla after-tax nominal WACC equals 6.15%, computed as follows:

$$Real\ vanilla\ after\text{-}tax\ WACC = r_d \times \frac{D}{V} + r_e \times \frac{E}{V}$$
$$Real\ vanilla\ after\text{-}tax\ WACC = 0.043 \times 0.55 + 0.0842 \times 0.45 = 6.15\%$$

### 9.2 WACC distribution

Based on the ranges outlined in Table 12, a WACC distribution can be computed using Monte Carlo simulations. The distribution is prepared by simultaneously generating random estimates for each WACC parameter from within the reasonable ranges listed above. This procedure is repeated 10,000 times, producing 10,000 different WACC estimates – consistent with the reasonable ranges that have been specified for each parameter. The entire distribution is summarised in Figure 5 and Table 13. The mean estimate within this distribution is 6.15%, consistent with our mid-point estimate above.

**Figure 5**



As outlined above, Monte Carlo simulations provide the Commission with a proper basis for exercising regulatory judgment in accordance with the enabling legislation. This distribution can be used to set a regulatory WACC to provide the regulated entity with a *x*% chance of being able to recover its true cost of funds. Given the severe consequences (in terms of the incentives to make adequate investment) of setting the regulatory WACC too low, we would recommend setting the regulated WACC at the 75th percentile. This is broadly consistent with the approach adopted by the NZCC and IPART.[68] This equates to setting the regulated WACC at 6.4%.

**Table 13. Real Post-Tax WACC Distribution Percentiles**

| 10th | 20th | 30th | 40th | 50th | 60th | 70th | **75th** | 80th | 90th |
|---|---|---|---|---|---|---|---|---|---|
| 5.71% | 5.85% | 5.96% | 6..06% | 6.15% | 6.23% | 6.33% | **6.38%** | 6.44% | 6.59% |

However, if the Commission continues to adopt the same parameter estimates as the 2005-2008 decision (except updating the risk-free rate and debt-margin) the regulated WACC will decline to 5.05%.[69] This occurs as small declines are observed in the real risk-free rate (from 2.67% to 2.64%) and the debt margin for BBB+ bonds (from 116 bp to 101 bp, including the 10 bp allowance for debt issuance costs). Such a determination will result in the water businesses having no chance of covering their true cost of funds, as is illustrated in the left-hand tail of Figure 5.

[68] IPART, 2005, Revised Access Arrangement for AGL Gas Networks: Final Decision, April 2005, http://www.ipart.nsw.gov.au/documents/RevisedAccessArrangementforAGLGasNetworks-AGLGN-April2005-FinalDecision-PDFversion.PDF;
New Zealand Commerce Commission, 2004, Gas Control Enquiry: Final Report, 29 November 2004, http://www.med.govt.nz/upload/15178/chapter9.pdf.

[69] This computation does not assume any adjustment is made to the raw CBA spectrum data or the implied real risk-free rate (such as those outlined in Section 3 and 6).

# Table of proposed prices

## Melbourne Water
## Proposed prices for 2008/09 (in 2006/07 dollars)

| Tariff and Price Component | | Price (1 July 2008) |
|---|---|---|
| **1.1** | **Waterways and drainage charge – All properties located within the area designated as the Urban Growth Boundary as at 1 July 2008** | |
| | Residential | |
| | – Rate in $ NAV (cents per annum) | 0.7728 |
| | – Minimum fee ($ per annum) | 57.10 |
| | Non-residential | |
| | – Rate in $ NAV (cents per annum) | 0.7997 |
| | – Minimum fee ($ per annum) | 75.12 |
| **1.2** | **Waterways and drainage charge ($ per annum) – All new properties within the area designated as the Urban Growth Boundary from 1 July 2008** | |
| | Residential | 57.10 |
| | Non-residential | 75.12 |
| **1.3** | **Waterways charge ($ per annum) – All properties located outside the area designated as the Urban Growth Boundary** | 35.89 |
| **1.4** | **Diversion charges unregulated waterways** | |
| | Licence service fee – All months ($ per annum) | 182.75 |
| | Licence service fee – On-stream winter-fill ( $ per annum) | 182.75 |
| | Licence service fee – Off-stream winter-fill ($ per annum) | 182.75 |
| | Licence service fee – Licensed farm dam ($ per annum) | 182.75 |
| | Licence service fee – Non-consumptive ($ per annum) | 182.75 |
| | Licence service fee – Power generation ($ per annum) | 182.75 |
| | Licence service fee – Stormwater ($ per annum) | 182.75 |
| | Plus fee per kilowatt ($) | 16.75 |
| | Charge $ per ML – All months | 13.65 |
| | Charge $ per ML – On–stream winter-fill | 6.88 |
| | Charge $ per ML – Off–stream winter-fill | 6.88 |
| | Charge $ per ML – Licensed farm dam | 6.88 |
| | Charge $ per ML – Non-consumptive | 1.25 |
| | Charge $ per ML – Stormwater | 13.65 |
| | Diversion/stormwater licence application fee ($) | 320.38 |
| | Works/construction licence application fee ($) | 537.78 |
| | Dam operating licence ($ per annum) | 62.44 |
| | Transfer of ownership (including temporary) ($) | 92.33 |
| | Transfer of ownership with dam sharing agreement ($) | 185.60 |
| | Resource assessment fee for downstream trade/transfer ($) | 320.38 |
| | Resource assessment fee for upstream or cross catchment trade/transfer ($) | 589.36 |
| | Licence renewal fee following failure to renew (Domestic and stock) ($) | 86.81 |
| | Licence renewal fee following failure to renew (all other licences) ($) | 173.61 |
| | Reissue after Melbourne Water cancellation or breach of conditions ($) | 584.79 |

Appendix 4

# Table of proposed prices

| Tariff and Price Component | | Price (1 July 2008) |
|---|---|---|
| **1.5** | **Diversion charges regulated waterways** | |
| | Licence service fee – All months ($ per annum) | 182.75 |
| | Licence service fee – Off-stream winter-fill ($ per annum) | 182.75 |
| | Charge $ per ML – All months | 41.17 |
| | Charge $ per ML – Off-stream winter-fill | 6.88 |
| | Diversion licence application fee ($) | 320.38 |
| | Works/construction licence application fee ($) | 537.78 |
| | Transfer of ownership along Maribyrnong River (includes temporary) ($) | 92.33 |
| | Licence renewal fee following failure to renew (Domestic and Stock) ($) | 86.81 |
| | Licence renewal fee following failure to renew (all other licences) ($) | 173.61 |
| | Reissue after Melbourne Water cancellation or breach of conditions ($) | 584.79 |
| | Diversion licences - meter | cost of meter |
| **1.6** | **Property Information Statements ($ per statement)** | |
| | City West Water | 4.30 |
| | South East Water | 4.30 |
| | Yarra Valley Water | 4.30 |
| **1.7** | **Provision of flood level information ($)** | 36.00 |
| **1.8** | **Provision of hydrologic data ($)** | |
| | Storm frequency analysis for selected storm events | 119.00 |
| | Standard fee: One type of daily data from maximum of two stations | 74.00 |
| | Standard fee: One type of hourly data from a single station | 74.00 |
| | Provision of one type of 6 minute data from a single station for a period of up to 5 years | 74.00 |
| | Other requests (per hour) | 119.00 |
| **1.9** | **Application fee for construction over Melbourne Water easements or underground pipe ($)** | 155.00 |
| **1.10** | **Storm water connections/other authorities works ($ per connection)** | |
| | Application fee | 115.00 |
| | Inspection fee | 315.00 |
| **1.11** | **Flood feasibility study ($ per half day)** | |
| | Flood feasibility study | 610.00 |
| **1.12** | **Developer charges, drainage schemes pricing principles** | |
| | (a) Identifying future capital expenditure for each year of the expected life of the scheme<br>(b) Identifying forecast developable hectares for each year using an estimate of development density<br>(c) Applying a pre-tax real discount rate to convert future cash flows into present value terms<br>(d) Setting the developer charge such that the present value of future income equals the present value of future costs. Future income is equal to the developable hectares in each year multiplied by the developer charge<br>(e) Reviewing the financial assumptions relating to each scheme on an annual basis and reviewing engineering specifications every five years | |

# Table of proposed prices

| Tariff and Price Component | | Price (1 July 2008) |
|---|---|---|
| 1.13 | **Developer charges, stormwater quality pricing principles**<br>For development in existing greenfield schemes, existing and future commercial-industrial schemes and / or where on-site stormwater treatment works undertaken by the developer do not meet pollution reduction targets, stormwater quality pricing principles apply.<br>(a) The Stormwater quality charges comprise of a Scheme Stormwater Quality Charge and a General Stormwater Quality Charge and reflect the nitrogen discharged by the scheme relative to the minimum standard<br>(b) The Scheme Stormwater Quality Charge is scheme-specific and recovers the cost of scheme related Stormwater quality initiatives<br>(c) The General Stormwater Quality Charge is equal to the average cost for nitrogen removal as identified by Melbourne Water's regional Stormwater quality improvement program<br>(d) Both charges are applied to the mass of nitrogen discharged, relative to the required minimum standard<br>(e) Where a development does not meet the minimum standard, Stormwater quality charges will apply. Where on-site Stormwater treatment is undertaken the developer will receive an offset of up to the full amount of their Stormwater Quality Charges<br>(f) Charges for Greenfield Schemes will be based on on-site works undertaken by the developer, the general stormwater quality charge and scheme stormwater quality charges the general Stormwater water quality charge | |

# Basis for proposed developer charges

## Development services scheme charges

### Worked examples

Table 1 provides an example of charges for the three development scenarios covered by developer charges, these being greenfield, redevelopment and non scheme areas. A detailed description of Melbourne Water's developer charges and how they are calculated can be found at: http://ldm.melbournewater.com.au/.

- Greenfield development services schemes provide an integrated solution to increased stormwater flows and water quality issues associated with urban development in areas typified by paddocks and natural drainage lines
- Redevelopment service schemes provide incremental solutions to address increased stormwater flows associated with redevelopment of established urban areas
- Development that occurs outside of schemes contributes to regional stormwater quality works only.

**Table 1: Example of greenfield, redevelopment and non scheme area developer charges based on a 450m$^2$ lot**

| Greenfield Scheme (Mernda) | Redevelopment Scheme (Box Hill North) | Non – Scheme (Macedon Ranges) |
|---|---|---|
| Hydraulic charge = $1,197<br>Water quality charge =$396 | Hydraulic charge = $1,479 | Water quality charge = $111 |

### Water Sensitive Urban Design

Treatment of stormwater to protect receiving waterways is now common practice in many greenfield developments in Victoria.

The Government's Melbourne 2030 strategy includes an objective to reduce the negative impact of stormwater on waterways and bays. Growth is expected to generate up to 200 tonnes of increased nitrogen loads by 2030 (Ports E2 model for the Better Bays and Waterways Plan – March 2007).

For all other developments targets are designed to retain 80% of the suspended solid annual load, 45% of total phosphorus and 45% of total nitrogen annual loads for all new development. These targets have been mandated for all new Greenfield residential subdivisions through the Victorian Planning Provisions, Clause 56.

Developers are encouraged to meet these standards through on-site works (e.g. rainwater tanks, bio-retention systems).

Since September 2005 Melbourne Water has operated a general stormwater quality offset on new development to provide a mechanism for equitably addressing stormwater quality standards that optimise contributions made by on-site works, scheme and regional initiatives.

Stormwater offsets are a financial contribution to Melbourne Water for regional water quality works, undertaken elsewhere within the catchment to offset pollution loads not treated with the development. Offsets provide flexibility for developers where best practice performance objectives cannot be achieved on site, or where water quality works are planned as part of a drainage scheme. The program operates in the Port Phillip and Western Port catchments.

Appendix 5

# Basis for proposed developer charges

From October 2006, as part of the Victorian Government's Sustainable Neighbourhoods package to create more sustainable and livable communities, local governments are now required to set water sensitive urban design requirements for residential subdivisions with the costs to be met by developers.

With the new provisions, water quality treatment will need to be implemented at a local scale and therefore, the traditional approach of implementing treatments on a regional scale only, will need to change. New greenfield drainage schemes will continue to provide flood protection for all developments. For industrial and commercial development where there are no current planning controls these schemes will continue to provide regional water quality treatment benefits.

Future residential developments in schemes that contain no water quality works or for those developments that lie outside of schemes, water quality treatment measures must now be provided within the subdivision. In developments where on-site treatment is not feasible, Melbourne Water will continue to operate the Stormwater Offsets Strategy. This strategy allows for a developer to seek an offset for treating stormwater offsite however, cases where this offset applies are now limited to sites less than 1ha. For industrial / commercial developments the threshold is 5 hectares, however this may change if new state planning provisions are introduced.

## Principles for the creation of development services schemes

### Creating development services schemes

1. There shall be no formal limit on the size of the scheme area.
2. The boundary of a scheme will be determined by the drainage characteristics of the land.
3. Schemes will be planned to service all developable lots.
4. Schemes should propose infrastructure to service development that is optimal in terms of cost and performance.
5. Infrastructure benefits common to more than one scheme will have the cost apportioned.
6. All landowners will receive an equivalent level of service.
7. Infrastructure designed to accommodate run-off from non-developable land within the scheme boundary will be funded by development contributions.
8. Scheme infrastructure to service existing developed land within the scheme will not be funded by development contributions.
9. Infrastructure to service existing and future development external to the scheme will not be funded by development contributions from within the scheme.
10. Environmental works downstream of development services schemes will be funded by schemes where upstream development is the cause of the problem.
11. Melbourne Water or local governments will meet the cost of improved flood protection for existing development.
12. Contribution rates will be structured to balance income and expenditure over the life of a development services scheme.
13. A robust consultation process will govern the creation of development services schemes.
14. Schemes will be adjusted for innovation works that benefit the scheme.

15. Schemes will have annual financial reviews and engineering reviews at least once every five years.
16. Schemes will include land acquisition costs based on the undeveloped broad acre value.

### Funding of drainage works outside of development services schemes

1. The Developer will be required to contribute to water quality treatment works as a part of the development.
2. The Developer will be required to fund the infrastructure necessary to cater for upstream rural flows.
3. Melbourne Water will fund the upsizing of infrastructure to cater for upstream-developed flows from catchment areas larger than 60 hectares.
4. The Developer will be required to fund works to retard flows in their own property if necessary to protect downstream development.
5. Melbourne Water will fund flood mitigation works associated with existing development.
6. Melbourne Water will fund basic works for stabilisation, revegetation and protection works to Melbourne Water waterways and creeks caused by upstream development.
7. The Developer will fund additional enhancement of waterways and creeks above basic works.
8. Waterway Plans will be prepared by Melbourne Water.
9. New roads or crossing of waterways and drains will be funded by the developer or road authority.

### Stormwater quality offsets

1. All urban developments shall achieve best practice water quality objectives.
2. Objectives can be achieved through on-site works, a contribution to off-site works or a combination.
3. Nitrogen will be used as the common unit of measure for achievement of stormwater quality objectives.
4. Outside development services schemes offsets will be based on the cost of regional water quality works designed to achieve equivalent stormwater pollutant load reductions.
5. Outside of development services schemes offsets will vary according to land use and climatic conditions across the catchment.
6. The water quality contribution in development services schemes will be based on scheme specific costs to achieve water quality objectives.

### Creating redevelopment services schemes

1. Redevelopment within a catchment shall not result in a reduction to the existing level of drainage service.
2. A robust consultation process will govern the creation of schemes.
3. Properties redeveloping within a catchment will be required to contribute to the scheme or required to mitigate the impacts of redevelopment on site.
4. The scheme contribution will generally apply to redevelopment of existing residential areas within the catchment irrespective of the existing site coverage.

5. Existing industrial and commercial areas being redeveloped will generally not be required to contribute to the scheme unless an impact to the existing level of drainage service can be determined.
6. Greenfield contribution rates for sites within redevelopment scheme catchments will be calculated at the time of scheme implementation and included in the scheme contribution rate.
7. Schemes are catchment based and all residential developments will contribute at the same rate.
8. Properties with existing buildings that pre-date the redevelopment services scheme will not be required to contribute to the scheme.
9. Schemes generally cover works on Melbourne Water assets i.e. catchments greater than 60ha.
10. When an impact to a waterway is directly attributed to redevelopment, schemes shall also apply to waterway catchments.
11. No water quality works are included in the schemes. .
12. Schemes will operate until the expected level of redevelopment has been reached.
13. Schemes are financially reviewed each year and an engineering review is undertaken at least once every five years.
14. Melbourne Water will fund improvements to the existing drainage system to meet current standards.
15. An annual capital program will be prepared and works will be undertaken on a priority basis from all scheme projects.
16. Melbourne Water will generally undertake scheme works from the downstream end of the catchment to the upstream end of the catchment. If a development contains scheme works, the works could be constructed in conjunction with development, even though it may be “out of sequence”.

2008 Waterways Water Plan

Appendix 6

# Submissions received

Melbourne Water has received submissions on its Waterways Water Plan Consultation Draft from the following parties:

- Arnie Azaris
- Bernie OFarrell
- Christina Cheers
- David Gibb
- Donald Gamble
- EPA Victoria
- Francis Overmars
- Hume City Council
- Interface Councils Submission
- Jack Medcraft
- Keith Stephens
- Mannington City Council
- Mornington Peninsula Shire Council
- Municipal Association of Australia
- Rueben van Bemmel
- Victorian Farmers Federation

Melbourne Water
100 Wellington Parade, East Melbourne
PO Box 4342 Melbourne Victoria 3001
Telephone 131 722 Facsimile 03 9235 7200
www.melbournewater.com.au

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