



ICRC

independent competition and regulatory commission

Context paper

**Water in the ACT**

**Report 8 of 2011**

**November 2011**

The Independent Competition and Regulatory Commission (the Commission) was established by the *Independent Competition and Regulatory Commission Act 1997* (ICRC Act) to determine prices for regulated industries, advise government about industry matters, advise on access to infrastructure, and determine access disputes. The Commission also has responsibilities under the ICRC Act for determining competitive neutrality complaints and providing advice about other government-regulated activities. Under the *Utilities Act 2000*, the Commission has responsibility for licensing utility services and ensuring compliance with licence conditions.

Correspondence or other inquiries may be directed to the Commission at the addresses below:

Independent Competition and Regulatory Commission  
GPO Box 296  
CANBERRA ACT 2601

Level 2  
12 Moore Street  
CANBERRA CITY ACT 2601

The secretariat may be contacted at the above addresses, by telephone on (02) 6205 0799 or by fax on (02) 6207 5887. The Commission's website is at [www.icrc.act.gov.au](http://www.icrc.act.gov.au) and its email address is [icrc@act.gov.au](mailto:icrc@act.gov.au).

# Foreword

The Commission has recently received references on water and sewerage services, including a requirement to make a pricing determination, and secondary water use. The Commission regards it as vitally important that its inquiry processes engage the community in a discussion about our need for water, its sustainable uses and the condition in which it is returned to the environment. The aim of this document is to provide a framework for that discussion.

As the Commission was finalising its last report into water and sewerage services in 2008, the ACT community was enduring the most serious drought in the modern history of the region. As a consequence of that extended experience of low rainfall, severe water restrictions had been imposed and many aspects of the provision of water and sewerage services to the ACT community were under review.

The breaking of the drought in 2010 has seen the ACT go from famine to feast in the water available to meet its needs. As the Commission now receives the reference for its forthcoming review of the provision of water and sewerage services, there are no water restrictions, except permanent water conservation measures, our dams are full, and Canberra gardens are blooming. We are also experiencing the consequences of decisions taken at the height of the drought and witnessing the phenomenon, puzzling to many Canberrans, that plentiful water does not equate to lower water prices.

The provision of the water and sewerage reference in these circumstances gives the Commission an opportunity to stand back from the high emotion of the those recent traumatic years, consider carefully the consequences of all that was done and decided then, and ask what would best serve the needs of the ACT community for water and sewerage services in the coming years.

In this task the Commission has been greatly assisted by the simultaneous provision of the reference on secondary water use. This broadens the scope of the issues the Commission has been called upon to consider in the coming months and, most importantly, gives the Commission the opportunity to consider all the diverse range of elements that make up the ACT's strategy for providing water and sewerage services to its community.

Although the Commission will be producing separate reports on these two references, we intend to conduct all our analysis in one integrated framework to ensure the full set of interactions between the matters under reference are properly considered. While the Commission always welcomes all submissions, we would like to encourage those making submissions to adopt a similar holistic approach to the matters under reference. To facilitate this, the Commission has taken the unusual step of issuing this context paper to explain the overall framework we propose to adopt in tackling these references.

An issues paper for the secondary water use reference is being released at the same time as this context paper and an issues paper for the water and sewerage services reference will follow shortly. We encourage all in the ACT community to read these papers. It is hard to identify a more important issue confronting our community than the continued secure and efficient provision of these services. The issues papers have been written on the assumption that the reader will have read the context paper first and the Commission encourages you to do that.

While references of this kind raise many technical issues, it is vitally important that consideration of these not be allowed to crowd out the more fundamental questions such as equity, environmental responsibility and, most basically, what kinds of services does the ACT community

want. The Commission cannot give proper consideration to these matters unless we hear the views of the ACT community. Please assist us by providing those views, now and in response to the other documents the Commission will be releasing over the course of these inquiries.

All the relevant documents will be available from the Commission's website at [www.icrc.act.gov.au](http://www.icrc.act.gov.au). The Commission can also be contacted by telephone on (02) 6205 0799 or by writing to GPO Box 296, Canberra, ACT 2601.

The Commission looks forward to hearing from you.

Malcolm Gray  
Senior Commissioner

23 November 2011

# Contents

<b>Foreword</b>	<b>i</b>
<b>Contents</b>	<b>iii</b>
<b>Definitions</b>	<b>iv</b>
<b>1 Introduction</b>	<b>1</b>
<b>2 Water and human settlement in the ACT region</b>	<b>3</b>
<b>3 Urban water services</b>	<b>8</b>
<b>4 Water in the ACT</b>	<b>13</b>
4.1 Water and wastewater	13
4.2 Governance and institutional arrangements	17
4.3 Recent developments	18
<b>5 Key matters for consideration</b>	<b>20</b>
5.1 Integrated water management	20
5.2 Identifying opportunities for improving service delivery	21
5.3 Pricing	21
<b>6 Overview of current water investigations</b>	<b>25</b>
6.1 Inquiry into secondary water use	25
6.2 Regulated water and sewerage services inquiry	25
6.3 Consultation	26
<b>Appendix 1: Inquiry into secondary water use—terms of reference</b>	<b>27</b>
<b>Appendix 2: Regulated water and sewerage services inquiry—terms of reference</b>	<b>28</b>
<b>Abbreviations and acronyms</b>	<b>29</b>

# Definitions

Many water-related terms are used throughout this paper and the current inquiries. To ensure consistency in the meaning of each term, definitions are provided below. These definitions are derived from those commonly used in the water sector by a range of key stakeholders including, but not limited to, water technical specialists, policy makers, and water-related institutions such as the National Water Commission and Murray–Darling Basin Authority.<sup>1</sup>

**Black water** is water containing human excrement.

**Effluent** is treated sewage that flows out of a treatment plant.

**Greywater** is water discharged from bathrooms (excluding black water), laundries and kitchens.

**Non-potable water** is water deemed to be unsafe for human consumption and/or unpalatable for drinking.

**Potable water** is water suitable for human consumption (alternatively termed drinking water) as defined by standards established by the National Health and Medical Research Council.

**Rainwater** is water collected directly from roof run-off.

**Raw water** is water captured from the environment that has yet to be treated and supplied to users.

**Recycled water** includes water sourced from wastewater (treated effluent from a treatment plant, sewer mining scheme or greywater), stormwater and rainwater. Recycled water has a range of uses including residential, commercial and industrial, agricultural and environmental.

**Reticulation network** is a network of pipes used to transport water to the point where water is consumed and remove wastewater to a treatment plant.

**Return flows** is the return of treated wastewater to the river system for use as environmental flows and extraction by other downstream users.

**Secondary water** is an alternative term for recycled water.

**Sewer mining** is the process of tapping into a sewer before it reaches the water treatment plant and extracting the wastewater for treatment in a separate treatment facility for use as recycled water.

**Stormwater** is water run-off in urban environments arising from rain events, which may be collected for flood mitigation and water quality purposes, and/or stormwater recycling (stormwater harvesting).

**Third pipe** residential systems supply treated wastewater to households through an additional pipe for non-drinking purposes such as garden watering and toilet flushing.

**Wastewater** (or **sewage**) is residential, commercial, industrial and agricultural material collected from internal building drains and transported through the sewerage network for extraction via sewer mining or treatment at a treatment plant before being discharged as return flows.

---

<sup>1</sup> An online water dictionary is available from the National Water Commission at [http://dictionary.nwc.gov.au/water\\_dictionary/index.cfm](http://dictionary.nwc.gov.au/water_dictionary/index.cfm).

# 1 Introduction

The Independent Competition and Regulatory Commission (the Commission) has developed this paper to provide an introduction to the services and objectives of the ACT water sector. It also provides a framework for understanding and evaluating the sector's management and operation.

The provision of clean water and removal of wastewater and stormwater is vital for public health, a strong economy and a pleasant environment. Water policy is a core function for government and encompasses day-to-day oversight of the resource and its supply to the community, as well as ensuring long-term security of supply.

While the ACT is an affluent society it does not have unlimited resources, nor are all citizens wealthy. In addition, the community continually makes implicit trade-offs between expenditures on water, energy, health, education and other services.

Measures to address both the day-to-day water management and longer term security requirements must therefore be cost-effective and affordable for both the community and individual citizens. It is also important that environmental considerations are taken into account to ensure that water consumption is sustainable and adverse impacts on the environment are minimised.

The ACT, like all communities, must make choices about the water resources it draws on and the condition in which water is returned to the environment. These decisions are influenced by geography, history, population size and industrial and commercial requirements as well as the community's capacity to finance public works.

In addition, the water, wastewater and stormwater sector, herein referred to as the 'water sector', operates in the context of uncertain water supply and climate conditions. As such there is a need to balance competing ACT uses against seasonal and longer term variability of natural flows. The potential for this variability to become more significant is increased by the prospect of climate change.

The ACT has historically met its growing need for water through enhancing its capacity to collect and store water by undertaking major capital works. Indeed, the ACT is currently undertaking major augmentations in the form of an enlargement of the existing Cotter Dam from 4 to 78 gegalitres (GL) and the construction of the Murrumbidgee to Googong Water Transfer. The ACT is also investing in pilot programs aimed at assessing the applicability of large-scale stormwater harvesting and reuse.

Simultaneously, the community has been engaged in a discussion about the need to conserve water and to use existing resources more effectively. That is, while significant works are being considered to increase supplies, there has also been an increased emphasis on demand-management activities such as the introduction of permanent water conservation measures and revisions to urban planning and building requirements to reduce overall water use.

Based on the imminent completion of major water supply augmentations and the current level of embedded demand-management initiatives, it is likely that the ACT will not face severe water shortages for some time, estimated currently at around 20 to 25 years. In this context it is appropriate to ask whether there is a need to pursue further augmentations and additional demand-management activities.

Further, the ACT is an inland centre and as such all decisions must take into account the impact of its actions on communities downstream from the ACT. Accordingly, the ACT needs to be concerned about the quality and quantity of the water it returns to the environment as well as the constraints which exist due to the ACT's location within the Murray–Darling Basin.

The two current inquiries, related to the role of secondary water in the ACT and the ACTEW Corporation's (ACTEW's) water and wastewater pricing, require the consideration of a range of significant issues.

This context paper provides an introduction to issues concerning the ACT water sector and highlights important matters that may arise in the current inquiries. The paper is structured as follows:

- Chapter 2 describes the impact of human settlement in the ACT region in relation to water.
- Chapter 3 provides a conceptual overview of water service provision.
- Chapter 4 describes the ACT water sector in terms of its physical characteristics, institutional and governance arrangements and recent developments.
- Chapter 5 outlines the significant matters that are likely to be raised throughout the current inquiries.
- Chapter 6 describes the two current investigations.

## 2 Water and human settlement in the ACT region

The natural water cycle generally consists of water falling as rain over land and flowing into and along rivers before running into the ocean. However, not all the water that falls in the catchments flows into the ocean. A proportion of water is consumed by vegetation and animals while some evaporates and some filters into groundwater systems. Viewed in its entirety as a fully integrated system, no water is lost or gained—although there is variability over time in the water available at specific locations. Water moves through the system, being used for various functions based on its location and quality.

Human settlements require several basic services, including the provision of drinking water and removal of waste products. The provision of these services has an impact on the environment through the disruption of the natural water cycle, including the consumption of water and its potential contamination. A settlement's population, density and associated economic activity are key factors affecting the amount of disruption. The challenge faced by human settlements is to provide the required services at an efficient cost while minimising the impact on the environment in general, and the natural water cycle in particular.

In the ACT region, the first significant pressures on the natural water cycle occurred with the development of Canberra. Canberra was named as the national capital in 1908 with construction commencing in the following decades. However, it was not until the post–World War Two period that rapid expansion occurred. Before the development of Canberra, the farmers and small settlements in the area were self-sufficient in water provision and their limited waste production had minimal effects in terms of water contamination. The population of the ACT was 363,000 in March 2011 (and over 400,000 when Queanbeyan and surrounding regions are included). As the largest urban centre in the Murray–Darling Basin, Canberra now has a significant impact on the natural system.

The water needs of the ACT, and their growth over time, were paramount in the minds of those responsible for the development of Canberra. Indeed, the provision of sufficient water sources was the driving factor behind the geographic area set aside for the ACT, which saw it granted access to much of the water falling in the nearby Brindabella mountain ranges.

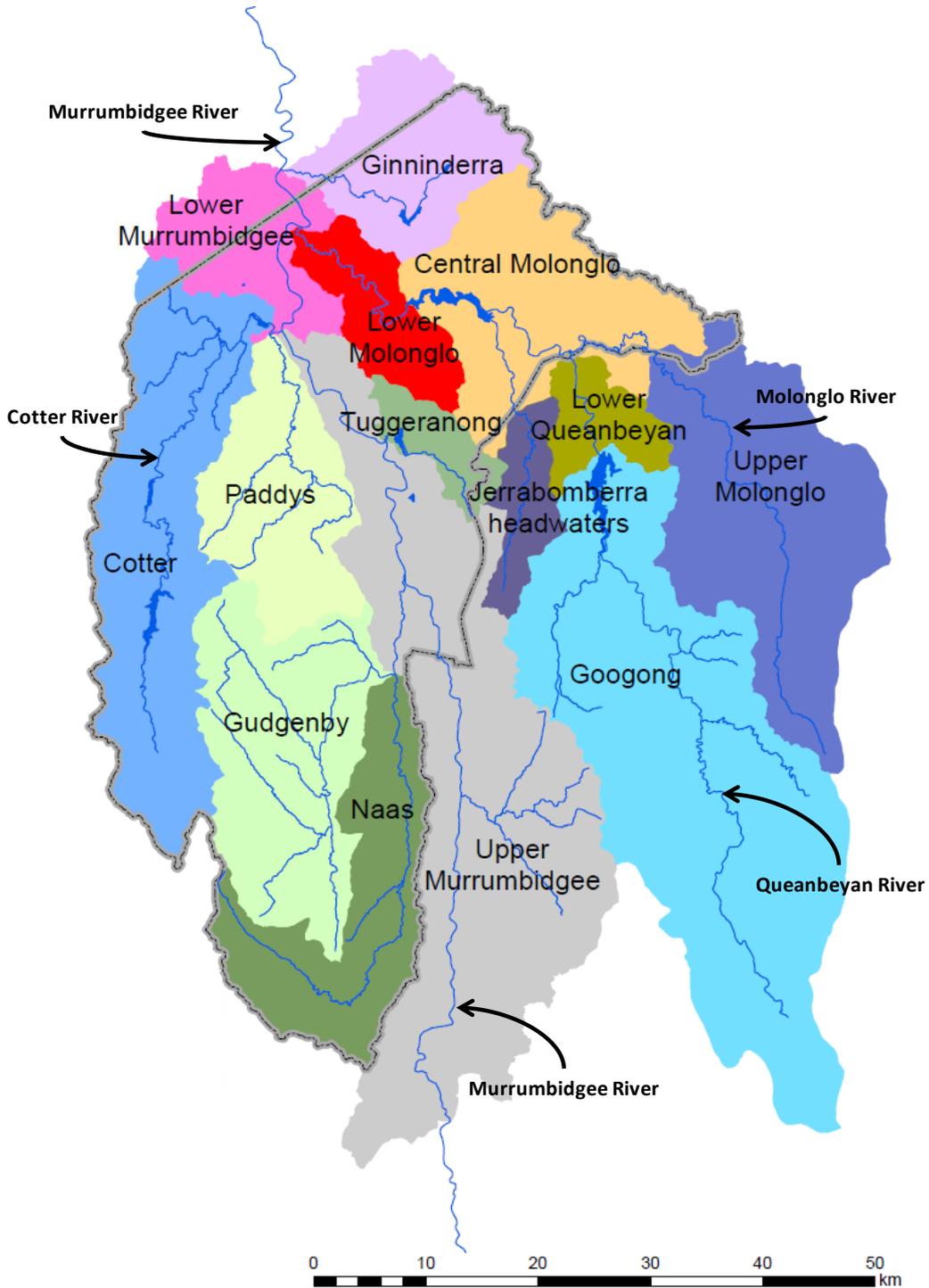
The ACT draws its water supply from three separate catchment systems:

- the Cotter River catchment, located within the ACT, which has seen the construction of three dams in response to increases in Canberra's population. These are the Cotter Dam completed in 1912 (4 GL), Bendora Dam completed in 1961 (12 GL) and Corin Dam completed in 1968 (71 GL). In addition, the Cotter Dam is under expansion, which will see its capacity increased to 78 GL
- the Queanbeyan River catchment, located wholly within New South Wales, which is the site of Googong Dam completed in 1979 (121 GL)
- the Murrumbidgee River, from which water can be drawn to supplement other storages.

Figure 2.1 shows the ACT and its surrounding catchments. As can be seen, the ACT border is based on catchment divides and incorporates significant water flows. The Queanbeyan and Molonglo river catchments are also considered ACT water flows, despite being located in New

South Wales, and fall under the ACT's catchment management regime. The figure also shows the flow of water into and out of the ACT for use downstream via the Murrumbidgee River.

Figure 2.1: ACT water catchments



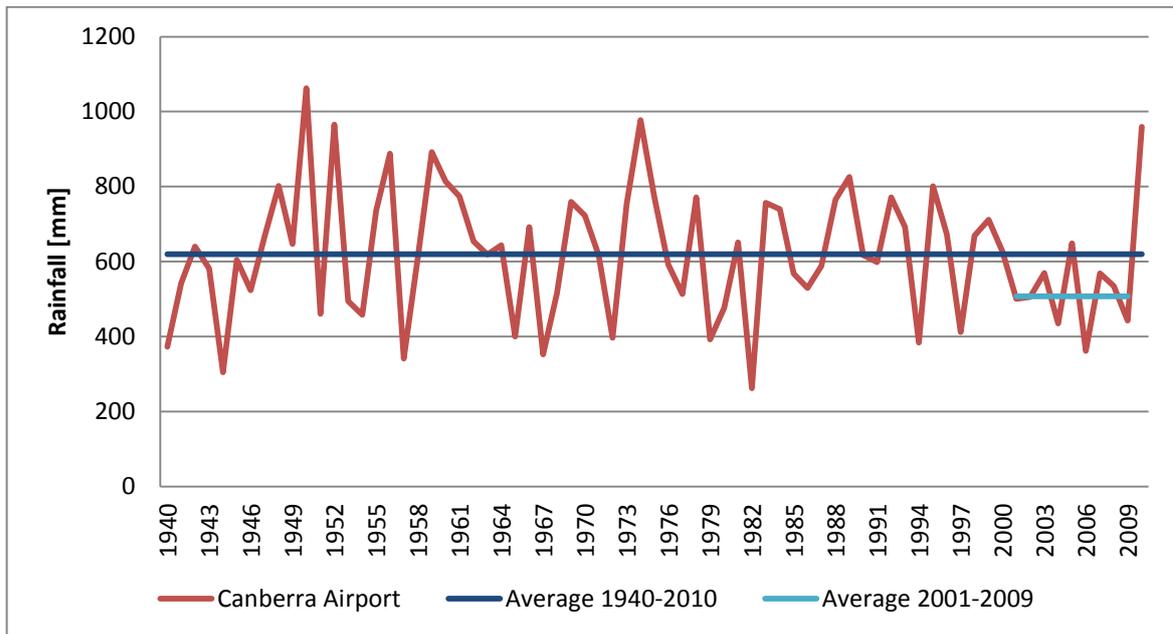
Source: Adapted from ACT Government, *ACT water management areas*, [http://www.environment.act.gov.au/\\_\\_data/assets/pdf\\_file/0007/151576/ACT\\_Water\\_Management\\_Areas.pdf](http://www.environment.act.gov.au/__data/assets/pdf_file/0007/151576/ACT_Water_Management_Areas.pdf).

Water flows are dependent on rainfall in upstream regions and catchments, and in some circumstances melting snow and ice. In the ACT, water flows are largely dependent on rainfall in the catchments and further upstream in the Murrumbidgee River’s catchments.

Rainfall is not constant throughout the year and varies over time; extended periods of above-average and below-average rainfall are common. The ACT long-term annual average rainfall is 619 mm. The wettest months on average are October and November, and June and July are the driest.

Figure 2.2 shows annual rainfall in the ACT as measured at the Canberra Airport (the commonly reported daily rainfall statistics are from this weather station) over the period from 1940 to 2010.

**Figure 2.2: ACT annual rainfall—Canberra Airport, 1940 to 2010**



Source: Bureau of Meteorology, <http://www.bom.gov.au/climate>, weather station no. 070014 and 070351.

There are two interesting aspects illustrated in Figure 2.2. First, there is significant variation in the amount of annual rainfall from the long-term average of 619 mm per year. The maximum measured annual rainfall occurred in 1950 when Canberra received 1063 mm of rain. This contrasts with 1982 when the total rainfall was only 262 mm, or just less than one-quarter of the rainfall received in the wettest year.

The other interesting aspect is that there have been prolonged periods with sustained below-average rainfall or droughts. Figure 2.2 also shows the average rainfall over the recent drought from 2001 to 2009. The average rainfall during that period was 507 mm per year, 18% less than the long-term average of 619 mm per year. This included an intense period of drought from 2006 to 2009 where average annual rainfall was only 477 mm.

As a result of the variation within years and over time, it is necessary to store sufficient water to deal with expected fluctuations in water availability. Indeed, if conservative forecasts for rainfall in the ACT prove to be correct, the impact of climate change may result in lower average rainfall and greater incidence of prolonged drought. This highlights the inherent timing mismatch between when water is available from natural sources and when it is required to meet urban demand.

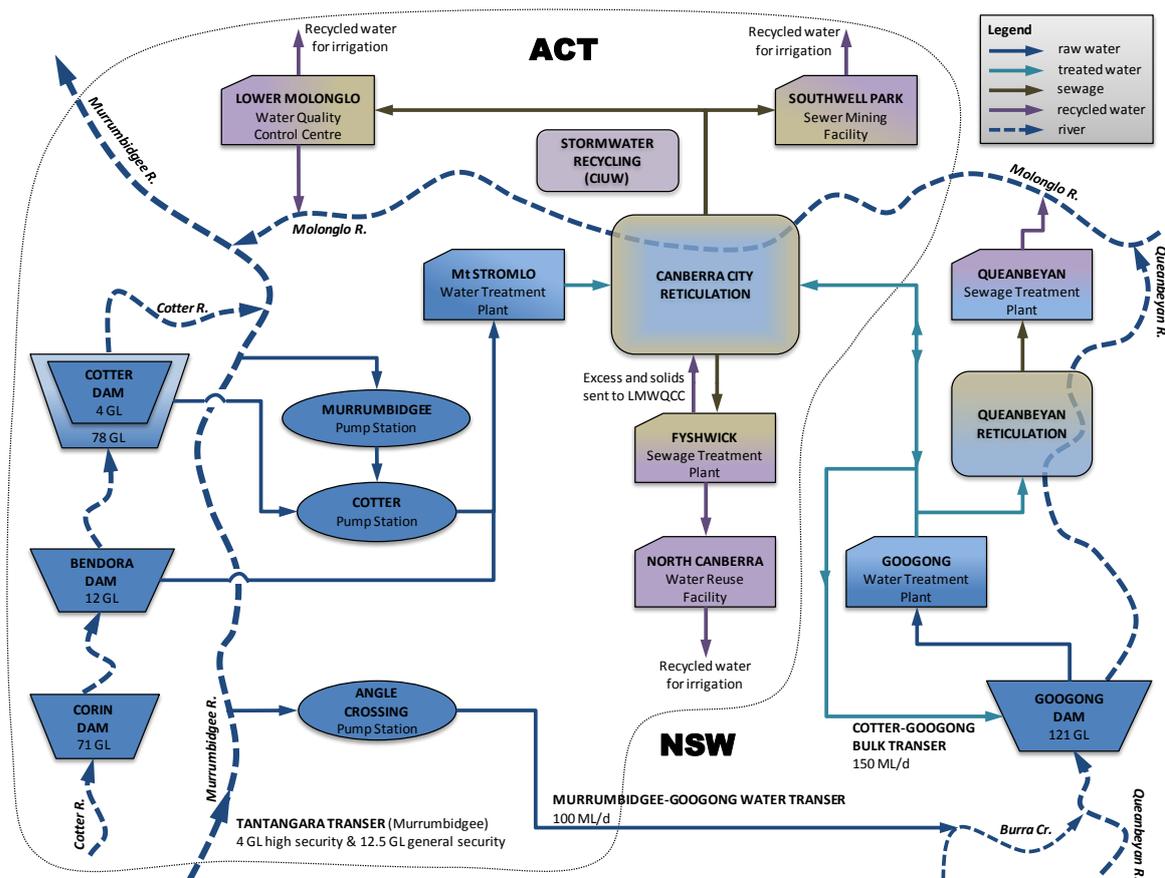
Furthermore the amount of storage needed is greater when there is a greater likelihood of prolonged drought.

In urban areas it may not be convenient for people to meet their potable water needs by personally collecting and storing water from the environment. Moreover, unless population densities are low, centralised systems are required to maintain public health, especially considering the difficulties that exist if all individuals are required to treat the wastewater they produce. As such, urban centres have generally met their water and wastewater needs through centrally managed systems.

These centrally managed systems typically consist of storages, water treatment plants and reticulation networks to provide water and remove waste. In an inland urban centre such as the ACT, treatment of waste takes on a greater importance compared to coastal centres. This is due to the ability of coastal centres to partially treat waste and discharge it into the ocean, whereas inland centres are required to consider the impact of any waste on downstream users. Inland centres therefore tend to treat wastewater to higher standards before returning it to the system.

Figure 2.3 illustrates the ACT's centralised water network. It shows the dams that surround Canberra, the water treatment plants, water and wastewater reticulation networks, wastewater treatment plants, recycling and sewer mining schemes, and the flows of water back into the natural environment.

Figure 2.3: ACT water network



Source: Adapted from Expert Panel on Health, *Public health and safety in relation to water purification for drinking water supplies*, ACT Government.

Specifically, Figure 2.3 shows the three dams on the Cotter River (Corin, Bendora and Cotter), Googong Dam to the east of Canberra, the two water treatment plants at Mt Stromlo and Googong, the various significant reticulation connections, the sewage treatment plants, and the flows from the Lower Molonglo Water Quality Control Centre back into the Murrumbidgee River for use downriver.

The impact of human settlements on the environment and the natural water cycle is not benign. The ACT water network, while creating a significant disruption to natural water flows and water quality of the region, has been designed to minimise this disruption through investments such as wastewater treatment plants. However, there is an unavoidable impact on the environment which comes with all human settlements. In the case of the ACT, a major impact is the consumption of water which would otherwise have flowed down the river.

A total of approximately 500 GL of water flows through the ACT in a typical year, although the volume can vary substantially due to rainfall and other circumstances affecting catchments and rivers. In the past decade, between 49 GL and 66 GL per year has been extracted for consumption and approximately 25 GL to 30 GL returned.<sup>2</sup> This suggests that, for a typical year, net abstraction from the natural system represents only a small percentage of the total flow of water. Nonetheless, there are constraints on the ACT's ability to draw water from the system for environmental reasons. These include inter-jurisdictional agreements which currently place a cap on net extractions of 40 GL and the ability to trade water within and between certain catchments. These arrangements are designed to ensure that sufficient water remains in the natural system for environmental purposes and use downstream. In addition, there are flows of water generated within the ACT urban setting via stormwater, the treatment of which is being debated as part of the Murray–Darling Basin arrangements.

As the ACT is an inland centre, wastewater is required to be treated before being returned to the river system. The level of treatment may involve one or more mechanical, chemical or biological processes to remove sediments, nutrients and pathogens.

In the ACT, the small volume of water consumed relative to the overall available supply, combined with the investments made to treat wastewater, has meant that many of the potentially adverse consequences of human settlement have been avoided. The challenge of water management in the ACT over coming years is to ensure that water services continue to be provided at an efficient cost while minimising the impact on the environment and meeting obligations to downstream users.

---

<sup>2</sup> Approximations based on data from *ICRC performance and compliance report 2009–10* (unpublished).

### 3 Urban water services

The manner in which water services are provided in an urban centre is the result of a range of factors such as geography, climate, history and other local characteristics. However, there are general concepts which guide effective water service provision. In the case of Australia, each state and territory government, along with the Australian Government, has endorsed, through the Council of Australian Governments (COAG), a set of national urban water planning principles. These principles are:

1. Deliver urban water supplies in accordance with agreed levels of service.
2. Base urban water planning on the best information available at the time and invest in acquiring information on an ongoing basis to continually improve the knowledge base.
3. Adopt a partnership approach so that stakeholders are able to make an informed contribution to urban water planning, including consideration of the appropriate supply–demand balance.
4. Manage water in the urban context on a whole-of-water-cycle basis.
5. Consider the full portfolio of water supply and demand options.
6. Develop and manage urban water supplies within sustainable limits.
7. Use pricing and markets, where efficient and feasible, to help achieve planned urban water supply–demand balance.
8. Periodically review urban water plans.<sup>3</sup>

Based on these principles, and guided by the need to provide water services to a growing urban population, it is the Commission’s view that an appropriate **overall objective of the urban water sector is meeting the community’s demand for water, wastewater and stormwater services in a secure, reliable, effective and economically efficient manner.**

A physical description of the stocks and flows of water and wastewater through the ACT was presented in Figure 2.3. Figure 3.1 expands on this information and provides a detailed conceptual overview of water service delivery in an inland urban water network, such as the ACT’s. It shows the flows (and potential flows) of water through the ACT from alternative sources such as rainfall, rivers, water trading, stormwater ponds, rainwater tanks, aquifers, greywater systems, sewer mining and third pipe networks.

---

<sup>3</sup> <http://www.environment.gov.au/water/policy-programs/urban-reform/nuw-planning-principles.html>.

Figure 3.1: Conceptual overview of an inland urban water network

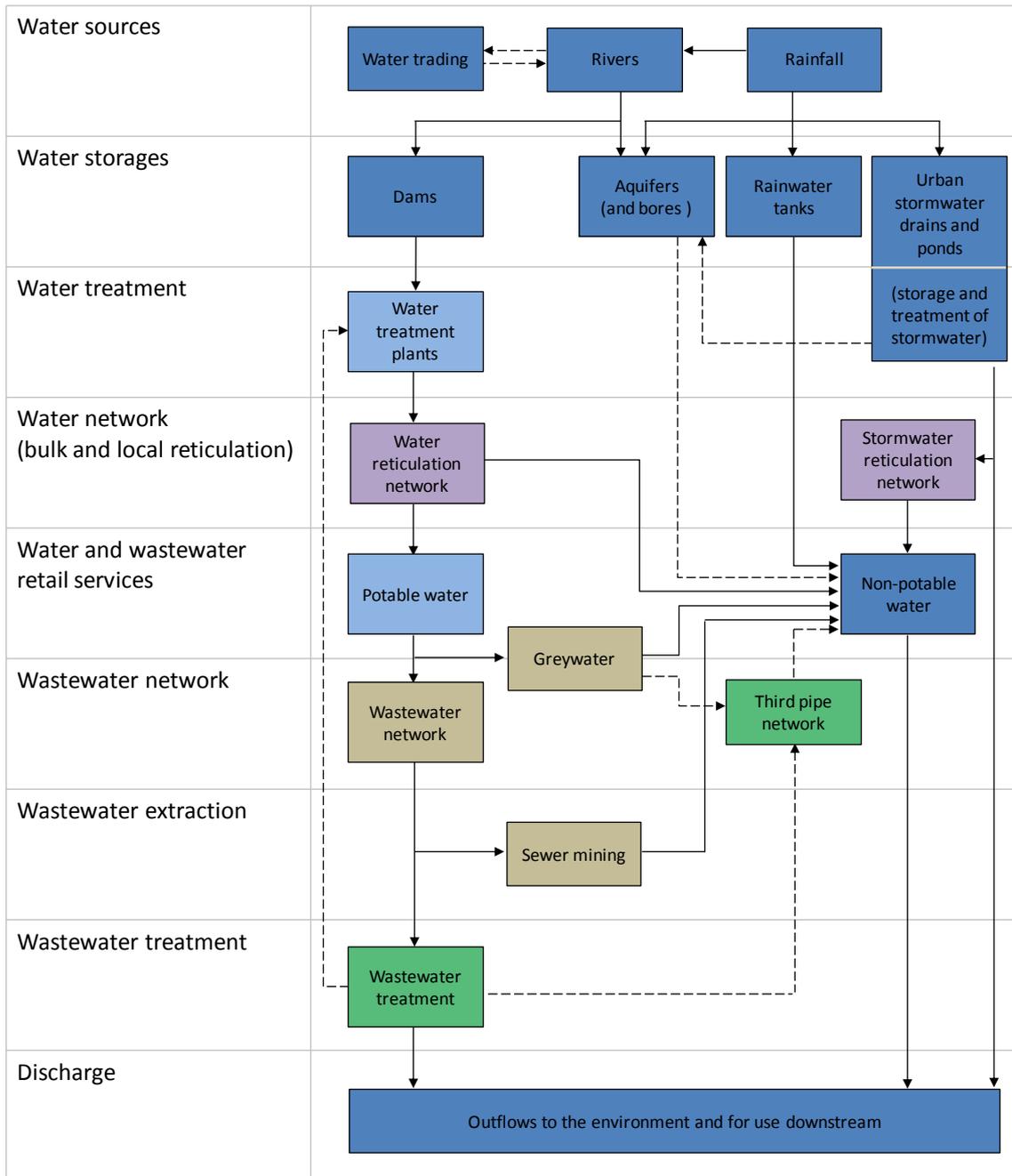


Figure 3.1 also shows that water treated to a potable standard can be used for non-potable uses. The ability to use potable water for non-potable uses introduces the concept of **substitutability in water use**.

Substitutability in water use is based on the potential for water from any source (for example, raw water, potable water, wastewater or stormwater) to be provided for any use so long as it is treated (if required) to the appropriate level for that use. In reality, the extent by which water from one source may substitute that from another is limited at any time by the technology available to provide the necessary level of treatment and delivery for the intended use, and the full costs and benefits (economic, social and environmental) of doing so.

It is important to recognise that in some instances it will be appropriate to use water treated to a potable standard for non-potable uses. Furthermore, this may be entirely consistent with the overall objective of meeting an urban community's demand for water services in a secure, reliable, effective and economically efficient manner. The issue of substitutability, and more importantly the trade-offs that are inherent in any decision over the most appropriate water source, is a key element of a fully integrated approach to managing water resources.

Figure 3.1 illustrates a crucial characteristic of an inland water network by showing where the outflows of water from the network become available for use downstream. In the ACT, these outflows are from water which flows from the ACT via the Murrumbidgee River, including treated wastewater from the Lower Molonglo Water Quality Control Centre. This characteristic of an inland urban settlement may impose more stringent requirements on treating wastewater and stormwater than occurs in coastal urban centres.

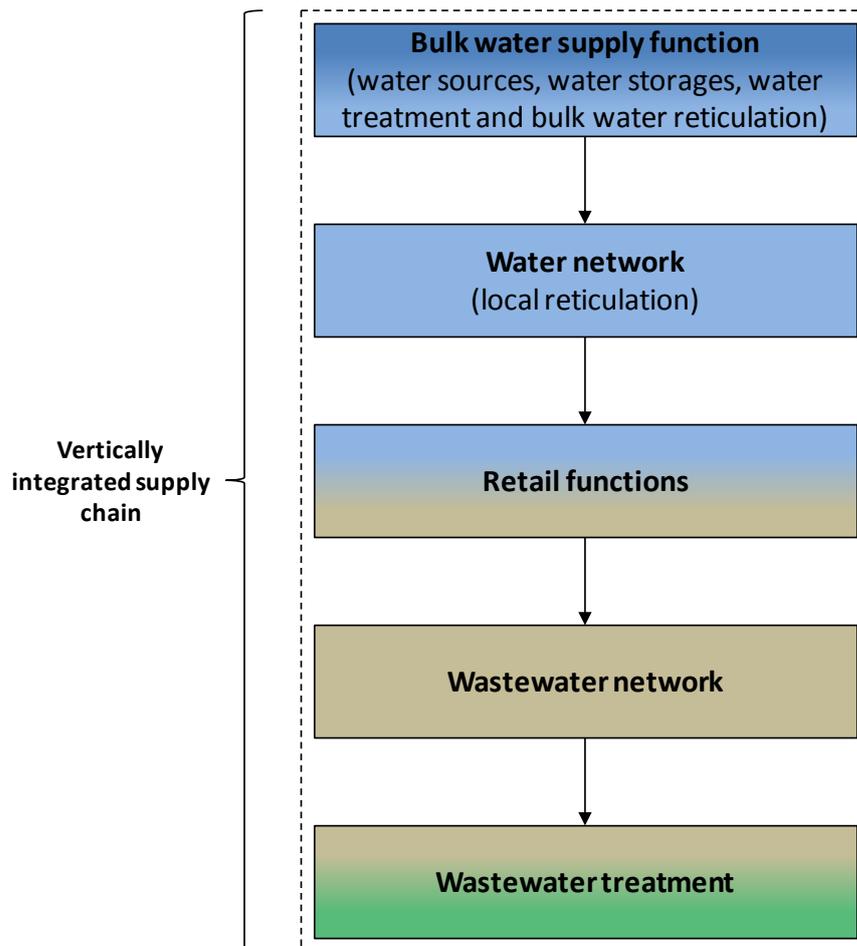
Another important implication of being an inland centre is the effect of water recycling (such as through stormwater pond reuse schemes, rainwater tanks, greywater systems, sewer mining or third pipe networks) on total water use. It has been suggested that some forms of water recycling may increase overall water usage, and thereby reduce the water flows leaving the urban boundary, due to a 'rebound' in water consumption.<sup>4</sup> Should this occur in the ACT, there may be consequences for water supply to downstream users in New South Wales, Victoria and South Australia, notwithstanding any potential consequences that result from the ACT's involvement in the Murray–Darling Basin Agreement and the as yet uncertain treatment of flows such as stormwater.

The range of possible water sources, the potential for substitutability, and individual jurisdictions' historic, economic, social and environmental circumstances have led to a variety of service delivery models. In Australia, services such as water and wastewater, electricity and gas have historically been provided by government through vertically integrated businesses. The structure of a vertically integrated water utility, which focuses on the flow of water, is illustrated in Figure 3.2.

---

<sup>4</sup> Information presented on 27 October 2011 by Rodney Stewart at a National Water Commission Seminar: 'The thirst for efficiency in Australia's urban water utilities'.

Figure 3.2: A vertically integrated water services monopoly



The majority of jurisdictions in Australia have retained a vertically integrated service delivery model for urban water. The water and wastewater systems in the ACT, Northern Territory, South Australia and Western Australia are operated by government-owned corporations that are vertically integrated with wastewater services provided by local governments.

Models in other jurisdictions exhibit different levels of vertical and horizontal separation between and within segments of the supply chain. Southeast Queensland has adopted the most decentralised service delivery model.

The vertically integrated model is reinforced by the natural monopoly characteristics of the reticulation network which means it is uneconomical to duplicate. While the water and wastewater reticulation systems are distinct and could be managed by separate entities, there are network benefits from coordination which reinforce integration and support a single provider. However, where it is economical for wastewater to be reused the economic reasons for keeping the delivery of services within a vertically integrated entity are not as strong.

The urban water sector also plays a significant part in supporting economic activity, environmental amenity and social wellbeing. Community ownership and delivery of water services, and the view that water is an essential service, have influenced the way that water is priced. In some jurisdictions consumers pay for the delivery of water through their rates rather than usage charges. These pricing arrangements are justified on the basis that the provision of reticulated water is linked to land values. Where water pricing is not cost-reflective either inefficient entry into the market may occur or efficient entry is precluded.

As highlighted in the discussion above, there are many factors that influence the way in which water services are provided. These include the overall objective, the ability to substitute between supply sources, the applicability of recycling schemes, the delivery model adopted, the economic characteristics of particular segments of the supply chain, and the governance and institutional arrangements for pricing water services and determining the nature and scope of supply augmentations. However, while these factors contribute to the current approach to service delivery, the arrangements are not set in stone. There is a need to periodically reassess the arrangements to ensure that they are the most effective and efficient way to provide secure and reliable water services.

## 4 Water in the ACT

This chapter describes the ACT urban water sector in terms of its physical infrastructure and institutional and governance arrangements, and the significant recent developments that have impacted on the sector. The ACT urban water and wastewater network can be characterised as a vertically integrated monopoly supplier with all elements of the supply chain provided by ACTEW.

### 4.1 Water and wastewater

The main components of the ACT water and wastewater network were identified in Figure 2.3 and are discussed in more detail below.

#### Major storages

The ACT has four major water storages. These are the three dams to the west of Canberra on the Cotter River; Corin Dam (71 GL), Bendora Dam (12 GL) and Cotter Dam (4 GL); and Googong Dam to the east of Canberra on the Queanbeyan River (121 GL). The current total storage capacity is 208 GL.

Several significant water supply augmentations are underway currently. The Cotter Dam wall is being raised, which will increase capacity from 4 GL to around 78 GL, almost 20 times its current size. Once the expansion of the Cotter Dam is completed, expected in 2012, the ACT's total storage capacity will have increased by a substantial 36% to 282 GL.

**Table 4.1: ACT major storages**

Infrastructure—existing	Current capacity	Augmented capacity
Cotter Dam	4 GL	78 GL
Bendora Dam	12 GL	12 GL
Corin Dam	71 GL	71 GL
Googong Dam	121 GL	121 GL
<b>Total capacity</b>	<b>208 GL</b>	<b>282 GL</b>

Source:

<http://www.actew.com.au/Water%20and%20Sewerage%20Systems/Water%20Supply%20System.aspx>.

In addition, the Murrumbidgee to Googong Water Transfer, once it is completed in 2012, will enable extraction of water from the Murrumbidgee River to provide additional supply to Googong Dam.

Another project is the Tantangara Transfer, which involves purchasing water rights from the regulated Murrumbidgee River in New South Wales (below the Burrinjuck and Blowering dams) to the ACT via the Snowy Mountains Scheme. This project, once the necessary arrangements are in place, will provide the ACT with access to a source of water from the established trading market in New South Wales conditional on availability.

#### Water treatment plants

The ACT has two main treatment plants that treat water from the various storages to the required potable standard before supply to consumers. The first is the plant at Mt Stromlo, which treats the water from the dams to the west of Canberra. The second plant is located at the base of the

Googong Dam. Water from the various dams is piped to the ACT’s water treatment plants when required for usage. Table 4.2 shows the existing plants and their treatment capacity.

**Table 4.2: ACT water treatment plants**

Plant	Capacity
Mt Stromlo Water Treatment Plant	0.25 GL/day (91 GL/year)
Googong Water Treatment Plant	0.27 GL/day (99 GL/year)

### Reticulation network

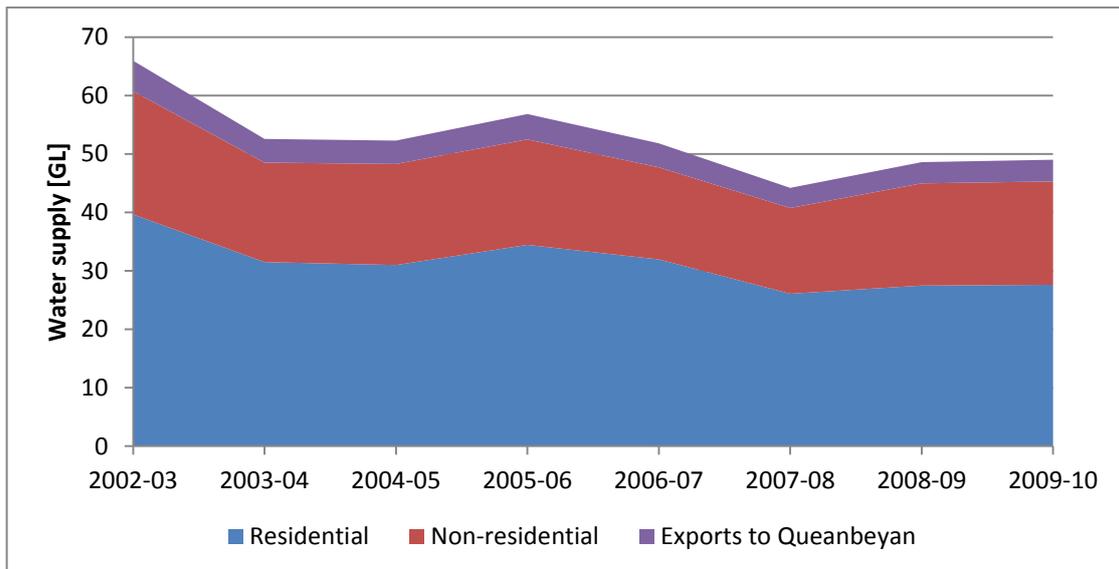
Water from the treatment plants is transferred to the 46 local reservoirs, via the reticulation network, where it is stored until required by ACT water users. The reservoirs have a capacity of approximately 0.9 GL and must maintain certain volumes to ensure sufficient water supply and pressure.<sup>5</sup> The reticulation network also transports wastewater away from the urban centre to wastewater treatment plants.

### Water consumption

The ACTEW water network provides water for a range of potable and non-potable uses within the residential and commercial, industrial and government (that is, non-residential) sectors. In 2009–10 residential and non-residential consumption was 27.6 GL and 17.7 GL, respectively. This is a reduction since 2002–03 of 30% in residential consumption and 16% in non-residential consumption.

Figure 4.1 shows the total volume of mains water supplied by ACTEW over the period 2002–03 to 2009–10, broken down by residential and non-residential usage. The figure also shows water provided by ACTEW to the Queanbeyan City Council, which it then provides to Queanbeyan residents.

**Figure 4.1: Total urban water supplied by ACTEW, 2002–03 to 2009–10**



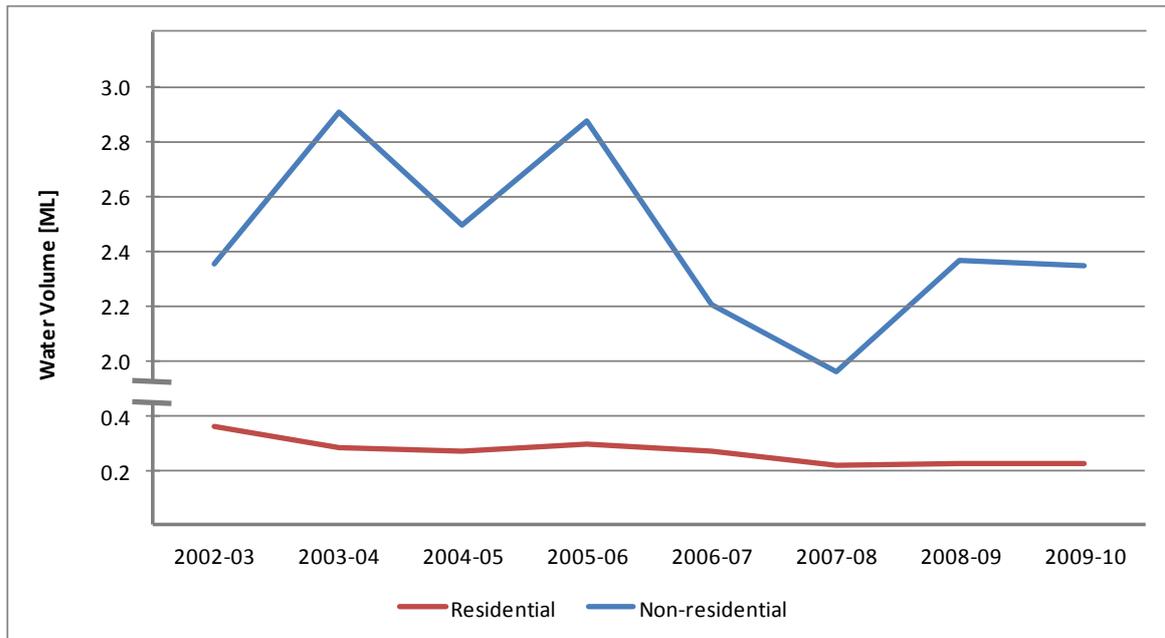
Source: ICRC performance and compliance report 2009–10 (unpublished).

<sup>5</sup> Data from ActewAGL, *Water supply and distribution*, available at: <http://www.actewagl.com.au/About-us/The-ActewAGL-network/Water-network/How-water-gets-to-you/Water-supply-and-distribution.aspx>.

Total consumption of water, both residential and non-residential, has been trending lower since 2002–03. This is due to a number of factors affecting demand such as water conservation measures, mandatory water restrictions, price increases and greater consumer awareness of opportunities for reduced consumption. Figure 4.1 also shows that water consumption in the ACT, as a largely urban jurisdiction, is primarily residential.

Figure 4.2 shows the average ACT residential and non-residential water consumption per property. In line with falling total water consumption, average use per connection in both sectors has shown a declining trend over recent years.

**Figure 4.2: Average ACT residential and non-residential water consumption per connection, 2002–03 to 2009–10**

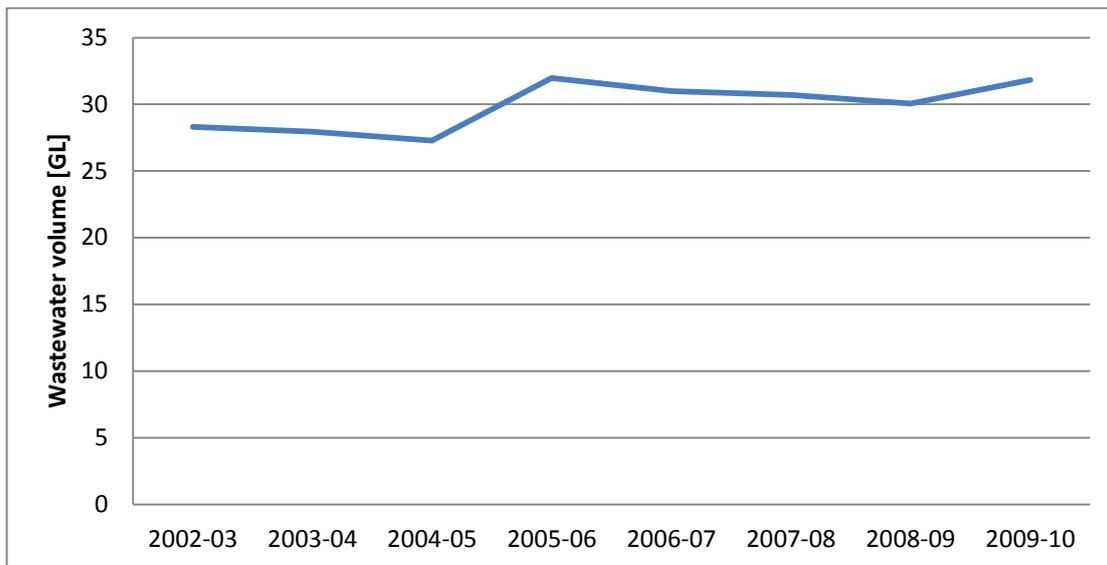


Source: ICRC performance and compliance report 2009–10 (unpublished).

### Wastewater discharge

Figure 4.3 shows the total volume of wastewater from ACT residents and businesses discharged into the wastewater network. The figure shows a slightly positive trend which reflects a growing population and the essential nature of indoor water use.

Figure 4.3: Total urban wastewater discharged into sewerage system, 2002–03 to 2009–10



Source: ICRC, *Performance and compliance report 2009–10* (unpublished).

### Wastewater treatment plants

Wastewater (or sewage) from homes and businesses across the ACT is treated at one of two treatment plants before being released into the river system for use downstream (or used as recycled water for non-potable uses). The main plant is the Lower Molonglo Water Quality Control Centre, and the other is the Fyshwick Treatment Plant. Table 4.3 provides more detail on each plant.

Table 4.3: ACT wastewater treatment plants

Plant	Capacity and treatment level	Comment
Lower Molonglo Water Quality Control Centre	0.09 GL/day (33 GL/year) High-level treatment (physical, chemical and biological)	Some treated sewage effluent is provided for irrigation purposes, and the remainder is discharged into the river system for use downstream
Fyshwick Treatment Plant	Minimal capacity Basic level of treatment	Provides water to North Canberra Water Reuse Scheme and temporary storage for further processing at the Lower Molonglo Water Quality Control Centre

Source: ACTEW,  
<http://www.actew.com.au/Water%20and%20Sewerage%20Systems/Sewerage%20System/Sewerage%20Treatment%20Plants.aspx>.

### Water recycling

The current significant water recycling activities in the ACT include:

- the Canberra Urban Integrated Waterways Project—an ACT Government stormwater recycling project
- the Southwell Park Watermining Project—a small treatment plant is used to supply recycled water to irrigate playing fields
- the North Canberra Water Reuse Scheme—a recycled water network which provides recycled water from the Fyshwick treatment plant to irrigate playing fields and open spaces across north Canberra

- the Lower Molonglo Water Quality Control Centre—treated water from the centre is supplied to irrigate vineyards and a golf course in Belconnen.

### **Queanbeyan**

The ACT also supplies water to the Queanbeyan City Council under a bulk water supply arrangement. Under this arrangement, Queanbeyan City Council reticulates water to Queanbeyan urban area residents and businesses. The Queanbeyan City Council also treats wastewater at its sewage treatment plant with discharges released into the Molonglo River. This water then flows through Lake Burley Griffin before entering the Murrumbidgee River and leaving the ACT.

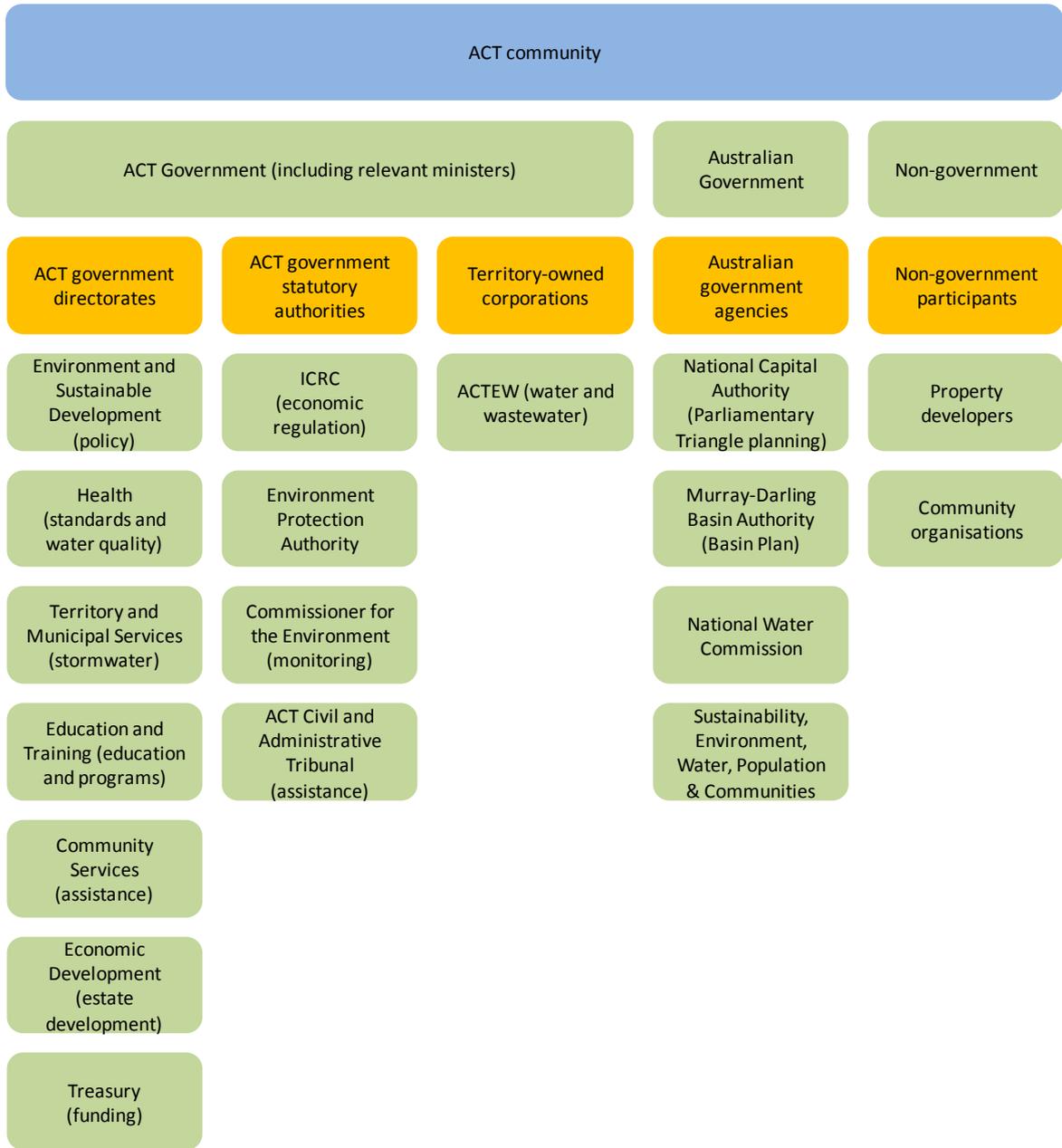
## **4.2 Governance and institutional arrangements**

Figure 4.4 provides an overview of the institutions responsible for water management and the legislative and administrative arrangements in the ACT water sector. Water management functions include:

- water pricing and economic regulation
- water planning and management
- water markets
- water supply and services
- water quality management—environmental for downstream use
- water quality management—health and consumptive purposes
- recycled water management
- environmental health management.

Some governance arrangements are the result of agreements on water reform reached by COAG at the national level and involve Commonwealth agencies for implementation such as the National Water Commission and the Department of Sustainability, Environment, Water, Population and Communities.

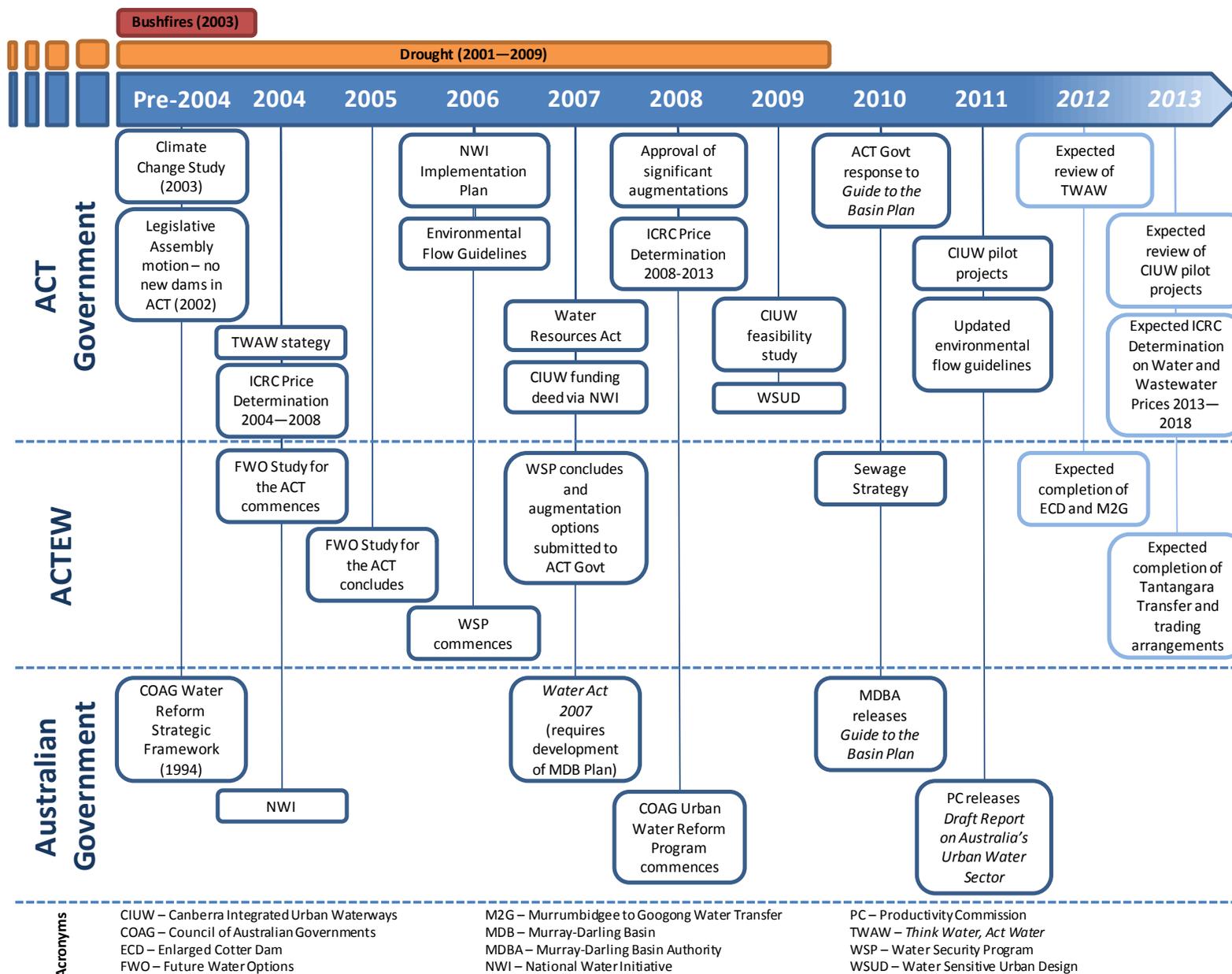
**Figure 4.4: ACT institutional arrangements**



### 4.3 Recent developments

There have been a series of events over the last decade which have shaped the current state of the ACT’s water resources and will have profound impacts over coming years. Table 4.4 shows a timeline of the key events, policy documents and milestones.

Table 4.4: Key events, policies and milestones in the ACT water sector



## 5 Key matters for consideration

The Commission has commenced two significant inquiries concerning the ACT's water sector. The first relates to secondary water use while the second will determine the prices that ACTEW will charge for water and wastewater services from 1 July 2013. Several significant themes emerge from this context paper that are relevant to the secure, reliable, effective and efficient delivery of water services to the ACT community. These consist of ensuring that:

- the management and policy framework relating to water services adopts a holistic approach in assessing and evaluating options and measures
- opportunities for improvement to the range and delivery of services in the water sector are identified so they may be acted upon
- the pricing of services provides the correct incentives for suppliers and consumers in both the short and long runs.

### 5.1 Integrated water management

An integrated approach to water management implies that all possible sources of supply and demand-management options are considered in a holistic manner to ensure that the ACT's water requirements are provided at least cost to the community. For example, in satisfying the community's need for water security there are potentially a range of water sources available. Depending on the end-use requirement, treatment technology and cost, water may be sourced from:

- greywater
- stormwater harvesting (from lakes, ponds, rivers or other sources)
- aquifers and bores
- potable water from the water supply network (via rivers, rainfall and water trading)
- rainwater tanks
- sewer mining
- a third pipe network
- a wastewater treatment plant.

There are also various demand-management initiatives that are aimed at reducing consumption, including:

- water restrictions and conservation measures
- planning measures—water-sensitive urban design
- various water-saving rebates, subsidies and programs.

In assessing and evaluating each of these options, the Commission considers it necessary to take into account their full impact on the water sector when determining the overall economic, social and environmental costs and benefits. There are potentially adverse outcomes in the form of increased costs and ineffective service delivery if individual policy initiatives and measures are considered without an assessment of their contribution to, and impact on, the entire urban water sector. The adoption of an integrated water management approach will assist in achieving the most cost-effective combination of supply source and demand-management options to ensure that the

ACT's water demands are met in a manner consistent that is with the water sector's overall objective.

## 5.2 Identifying opportunities for improving service delivery

The service delivery model that currently exists in the ACT's water sector arose in response to the territory's geography, climate, settlement history, and economic, social and environmental requirements. The model the ACT has inherited may be considered a traditional water and wastewater service delivery model consisting of a single vertically integrated entity (ACTEW) that services all segments of the supply chain (except for stormwater services, which are provided by the ACT Government). While the current arrangements are an outcome of local ACT circumstances, it should be noted that depending on the extent to which the water supply network is vertically and/or horizontally separated into individual businesses, there are many other service delivery models that are possible.<sup>6</sup>

While it may be sensible for a single entity to provide most water services in the ACT, any barriers that prevent or restrict the delivery of services in segments of the supply chain by alternative providers should be removed where feasible.

With respect to the ACT, the opportunity for alternative service providers would seem to be limited by the physical nature of the water supply network. Notwithstanding the opportunities that may exist within the supply network for alternative service providers, there are several preconditions necessary for the creation of a market in a particular service, including:

- secure property (or ownership) rights
- minimal barriers to entry (and exit) for potential market participants
- conducive institutional and regulatory settings
- sufficient information
- willingness of suppliers and customers to participate in the market
- third-party access regimes to allow access to infrastructure.

The exact institutional arrangements required to underpin a functioning commercial market in the ACT water sector will depend on a range of unique industry, institutional, ownership, policy and legacy arrangements.

## 5.3 Pricing

The pricing of water services is an important component of service delivery and efficient pricing regimes are fundamental to ensuring that services are delivered in the most cost-effective manner, and where relevant, reflect to some extent the scarcity value of water.

Given that water services are currently provided by a vertically integrated natural monopoly in the ACT, economic regulation is required to price water services at more efficient levels than would likely otherwise occur. At present, water and wastewater prices are determined by the Commission under an incentive regulation cost-recovery framework. That is, the prices charged by ACTEW are determined such that it is able to recover the prudent and efficient cost of service provision. The full range of factors that are taken into account in determining water and wastewater prices in the

---

<sup>6</sup> Some of these alternative models are adopted in other Australian jurisdictions. See, for example, Productivity Commission, *Australia's urban water sector*, inquiry report, volume 1, 2011.

ACT is provided in the Commission’s discussion of pricing issues relating to the 2008 water price determination:

- revenue recovery and stability
- community expectations
- government policy
- social and equity matters
- marginal and average prices
- reduced consumption
- simplicity and ease of understanding
- timing
- marginal costs.<sup>7</sup>

The pricing structure adopted by the Commission for water services to ensure cost recovery is a fixed annual fee along with a two-step inclining block tariff. An intention of this approach is to provide a lower priced ‘allowance’ of water for non-discretionary use and a higher price for additional use. Wastewater services are priced as a single annual charge per residential household (with a per fixture charge for non-residential consumers) given the difficulties associated with measuring the volume of wastewater produced. Table 5.1 shows current prices for water and wastewater in the ACT.<sup>8</sup> Stormwater services are provided by the ACT Government directly; funding is sourced from general revenues, including rates.

**Table 5.1: ACT water and wastewater prices 2011–12**

Product	Fixed price	Variable price
Water	\$95.63 pa	Tier 1 (0-200kL) – \$2.33 kL-1 Tier 2 (201kL +) – \$4.66 kL-1
Wastewater <sup>9</sup>	\$555.39 pa	Class 4 – \$271.58 fixture/pa Class 5 – \$543.15 fixture/pa

Source: [http://www.icrc.act.gov.au/\\_\\_data/assets/pdf\\_file/0018/225360/MediaRelease110420\\_-\\_Water\\_Pricing\\_Mid-Term\\_Review\\_Decision.pdf](http://www.icrc.act.gov.au/__data/assets/pdf_file/0018/225360/MediaRelease110420_-_Water_Pricing_Mid-Term_Review_Decision.pdf).

There are important implications arising from the particular approach to pricing ACTEW’s water and wastewater services. Specifically, given the adoption of an integrated approach to water management and a desire to reduce barriers to service delivery if they exist, the pricing of water and wastewater plays a crucial role in whether alternative options—such as alternative supply sources or demand-management initiatives—are financially viable.

Moreover, the regulatory approach which allows ACTEW to recover its efficient operating and capital costs necessarily means that if water from the ACTEW network is displaced (for example, through increased recycling), the prices charged for the remaining water must increase by an amount that allows the recovery of costs. This outcome also has important implications in the

<sup>7</sup> ICRC, *Water and wastewater discussion paper 3: Prices*, report 8, 2007, p. 22, available at [http://www.icrc.act.gov.au/\\_\\_data/assets/pdf\\_file/0020/65144/2007report08\\_web.pdf.pdf](http://www.icrc.act.gov.au/__data/assets/pdf_file/0020/65144/2007report08_web.pdf.pdf).

<sup>8</sup> Water supply prices for other capital cities are available from, Water Services Association of Australia, *A sustainable future for the urban water industry – report card 2011*.

<sup>9</sup> Wastewater prices comprise a fixed supply charge for residential premises, and the same fixed supply charge plus a charge per flushing fixture (in excess of two) for non-residential premises.

consideration of the cost-effectiveness of potentially competing supply sources and demand-management options.

In addition, there has been a debate in recent years, and highlighted recently in the Productivity Commission's report on Australia's urban water sector,<sup>10</sup> about the role of scarcity pricing—that is, an approach whereby water prices increase during times of scarcity and fall during times of relative abundance. This approach to pricing has also initiated a debate in the ACT about whether some members of the community should be able to pay more to avoid being subject to water restrictions.

---

<sup>10</sup> Productivity Commission, *Australia's urban water sector*, inquiry report, volume 1, 2011.



## 6 Overview of current water investigations

In undertaking the two inquiries, the Commission will be conscious of the conceptual and physical linkages discussed above which are relevant to each of the water, wastewater and secondary water sectors. An overview of each inquiry is provided below.

### 6.1 Inquiry into secondary water use

The terms of reference require the Commission to undertake an inquiry into secondary water uses in the ACT including:

- opportunities for a commercial market in greywater in both commercial and domestic applications and in new construction and retro-fits
- the ACT Government's urban waterways and stormwater harvesting programs and their associated built wetlands.

The Commission is also to include a consideration of:

- the economic, environmental and social costs and benefits of the secondary water sources, with and without the Murray–Darling Basin Plan
- any other water conservation initiatives that also have the potential to deliver economic, environmental and social outcomes.

A full copy of the terms of reference for the secondary water use inquiry is at Appendix 1.

The Commission's proposed timetable for the review is shown in Table 6.1.

**Table 6.1: Inquiry into secondary water use proposed timetable**

<b>Task</b>	<b>Expected date</b>
Release of context paper	23 November 2011
Release of issues paper	23 November 2011
Submissions on issues paper close	20 December 2011
Release of draft report	Late March 2012
Public hearing	Mid April 2012
Submissions on draft report close	Early May 2012
Final report presented to Legislative Assembly	Late June 2012

### 6.2 Regulated water and sewerage services inquiry

The terms of reference for the review of ACTEW's water and wastewater prices requires the Commission to take into consideration:

- the policies of the ACT Government as they relate to water security and the use of water
- national water initiatives, policies and agreements
- the impact of a price on carbon on the provision of water and sewerage services in the ACT
- the ability of the pricing path to match revenue-recovery requirements to the consumer benefits accrued from the water security program

- all potential regulatory models, including consideration of the provision of sufficient flexibility in price setting across the regulatory period to minimise the impact of significant price fluctuations
- the legislative requirements outlined in section 20 of the Independent Competition and Regulatory Act
- any other matters the Commission considers relevant to the inquiry.

A full copy of the terms of reference is at Appendix 2.

The Commission's proposed timetable for the review is shown in Table 6.2.

**Table 6.2: Regulated water and sewerage services inquiry proposed timetable**

<b>Task</b>	<b>Expected date</b>
Receive terms of reference	October 2011
Release of context paper	23 November 2011
Release of issues paper	December 2011
Submissions on issues paper close	February 2012
Release of preliminary conclusions report	May 2012
Submissions on preliminary conclusions report close	June 2012
Release of working conclusions report	July 2012
Submissions on working conclusions report close	August 2012
Release of draft report	November 2012
Workshops and information sessions (if required)	December 2013
Submissions on draft report close	February 2013
Public hearing	February 2013
Final report	May 2013

### **6.3 Consultation**

The Commission is not seeking submissions on this context paper. The purpose of this paper is to act as an introduction to the current inquiries. Submissions to these inquiries may include comment on the context paper.

The Commission will be undertaking extensive consultation as part of each inquiry. If you wish to be included on future correspondence lists to receive reports and information as it becomes available, please contact the Commission by telephone on (02) 6205 0799, by fax on (02) 6207 5887, or by email at [icrc@act.gov.au](mailto:icrc@act.gov.au).

# Appendix 1: Inquiry into secondary water use—terms of reference

Australian Capital Territory

**Independent Competition and Regulatory Commission (Inquiry into Secondary Water Use)  
Terms of Reference Determination 2011**

**Disallowable instrument DI2011–255**

Made under the

***Independent Competition and Regulatory Commission Act 1997, Section 15 (Nature of industry references) and Section 16 (Terms of industry references)***

---

## ***Reference for investigation under Section 15***

Pursuant to sections 15(1) and 16 of the Act, I refer to the Independent Competition and Regulatory Commission (the Commission) the task of undertaking an inquiry into and assessment of secondary water uses in the ACT.

1. The Commission is to report on the following matters:

- a) opportunities for a commercial market in grey water in both commercial and domestic applications and in new construction and retro-fits;
- b) the ACT Government's urban waterways and stormwater harvesting programs and their associated built wetlands; and

2. The Commission is to include consideration of:

- a) the economic, environmental and social costs and benefits of the matters set out in 1(a) and (b), with and without the Basin Plan, to the extent possible given that the Basin Plan is under development;
- b) any water conservation initiatives other than those captured in 1(a) and (b) that also have the potential to deliver economic, environmental and social outcomes; and
- c) any other matters the Commission considers relevant to the inquiry.

The Commission will report by the end of June 2012.

Andrew Barr MLA

Treasurer

21 September 2011

# Appendix 2: Regulated water and sewerage services inquiry—terms of reference

Australian Capital Territory

**Independent Competition and Regulatory Commission (Regulated Water and Sewerage Services) Terms of Reference Determination 2011**

**Disallowable instrument DI2011–287**

Made under the

***Independent Competition and Regulatory Commission Act 1997* ('the Act'), Section 15 (Nature of industry references) and Section 16 (Terms of industry references).**

---

## ***Reference for investigation under s. 15:***

Pursuant to subsection 15(1) of the Act, I refer to the Independent Competition and Regulatory Commission (the 'Commission') the matter of an investigation into, and the making of a price direction for, regulated water and sewerage services provided by ACTEW Corporation Limited.

## ***Specified requirements in relation to investigation under s.16:***

Pursuant to subsection 16(1) of the Act, I specify the following requirements in relation to the conduct of the investigation.

1. The Commission should take into consideration:
  - a. policies of the ACT Government as they relate to water security and the use of water;
  - b. national water initiatives, policies and agreements;
  - c. the impact of a price on carbon on the provision of water and sewerage services in the ACT;
  - d. the ability of the pricing path to match revenue recovery requirements to the consumer benefits accrued from the water security program;
  - e. all potential regulatory models, including consideration of the provision of sufficient flexibility in price setting across the regulatory period to minimise the impact of significant price fluctuations;
  - f. the legislative requirements outlined in Section 20 of the Act; and
  - g. any other matters the commission considers relevant to the enquiry.
2. In accordance with subsection 16(2)(a) of the Act, the Commission is to provide its final report by 1 May 2013.

Andrew Barr MLA  
Treasurer

13 October 2011

## Abbreviations and acronyms

ACT	Australian Capital Territory
ACTEW	ACTEW Corporation
Commission	Independent Competition and Regulatory Commission (ACT)
COAG	Council of Australian Governments
GL	gigalitre
ICRC	Independent Competition and Regulatory Commission
ICRC Act	<i>Independent Competition and Regulatory Commission Act 1997</i> (ACT)
ML	megalitre
mm	millimetre