SA Water

Regulatory Business Proposal 2013

Government of South Australia

SA Water

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OUR PURPOSE

Delivering water and wastewater services in efficient, responsive, sustainable and accountable ways.

SA Water

Regulatory Business Proposal 2013

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Foreword by the Chairman and Chief Executive

South Australia recently experienced the most severe drought in recorded history, serving to underline the critical importance of water to our human needs, way of life, and future prosperity.

Delivery of major infrastructure such as the Adelaide Desalination Plant means current and future generations of South Australians can rely on secure water supply, and represents another important contribution by SA Water to the community – the latest of many such contributions during the Corporation's proud 156-year history.

In this context, Water for Good – the South Australian Government's blueprint for securing South Australia's water supply – has initiated a series of reforms of the water industry, including new legislative and regulatory arrangements. Although this is a time of significant change within the industry, the expectations of our customers and our owner – the South Australian Government – mean that SA Water must continue to deliver safe, reliable, responsive and cost-effective services.

As we enter our first period of economic regulation, this imperative remains paramount in our minds, and guides our strategic direction.

Among other things, this Proposal outlines the capital investment and operating expenditure required to:

- Enable prudent and efficient delivery of water and sewerage services, consistent with customer expectations; and
- Ensure we can deliver an appropriate commercial return to our owner, the South Australian Government, representing the people of South Australia.

In preparing this Proposal we have drawn on past research and feedback from the community to ensure we have a clear understanding of customer expectations.

We have also undertaken benchmarking to measure our performance against peers and, where necessary, have enlisted external expertise to provide independent scrutiny and enhance our forecasting methodologies.

The degree of rigour applied to developing this Proposal is evident throughout its chapters.

Thorough risk assessment and review of every capital project has underpinned development of our capital investment proposal – the nature of which is changing. Whereas our capital expenditure has been dominated by drought-response initiatives in the recent past, necessary capacity upgrades and asset renewal works will act as the key drivers of capital expenditure through to 2015–16.

At its peak, SA Water's annual capital expenditure for 2009–10 amounted to approximately $1.1 billion, and during the three years leading into the initial regulatory period averaged approximately $590 million. In contrast, the annual capital expenditure proposed for the initial regulatory period averages approximately $368 million.

The operating expenditure proposed by SA Water will enable efficient delivery of water and sewerage services, consistent with the high quality our customers expect and receive. SA Water's commitment to balancing service quality, reliability and cost outcomes for our customers means that, although we

face significant challenges in our operating environment, we benchmark favourably among our peers.

Despite significant cost pressures associated with rising energy prices, carbon pricing, and the operation and maintenance of new infrastructure, we are proposing a relatively flat level of operating expenditure for delivery of sewerage services through to 2015–16.

The operating expenditure proposed in relation to delivery of water services is forecast to decline from a peak of approximately $484 million in 2013–14 to approximately $466 million in 2015–16, largely reflecting the commissioning and proving plan developed for the Adelaide Desalination Plant.

Through a decade of customer research and discussions with the SA Water Customer Council we understand our customers want safe and healthy drinking water, assets that are reliable, and a water utility that is quick to respond when things go wrong.

However, customer expectations change.

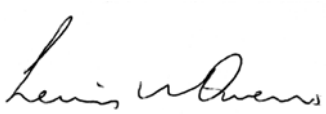
While this Proposal marks an important milestone for SA Water as it enters a new era of economic regulation, it will also set in train a new dialogue with our customers and key stakeholders, including ESCOSA and two new customer councils being established to represent the business and broader communities.

SA Water considers this level of engagement will be crucial if we are to meet customer expectations into the future and, along with internal mechanisms to manage customer feedback, we will work closely with the Energy and Water Ombudsman as a means of further understanding customer issues.

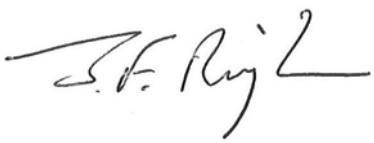
The issues we will face through to 2015–16 are transparently set out in this Proposal, which clearly describes how we will continue to operate in line with the expectations of our customers and owner.

We believe this Proposal provides the appropriate information to support ESCOSA as it makes its first revenue determination for SA Water.

On behalf of the Board of SA Water, we recommend this Proposal as an efficient and responsible approach for the initial regulatory period.



Lewis Owens
Chairman



John Ringham
Chief Executive

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Table of acronyms and shortened forms

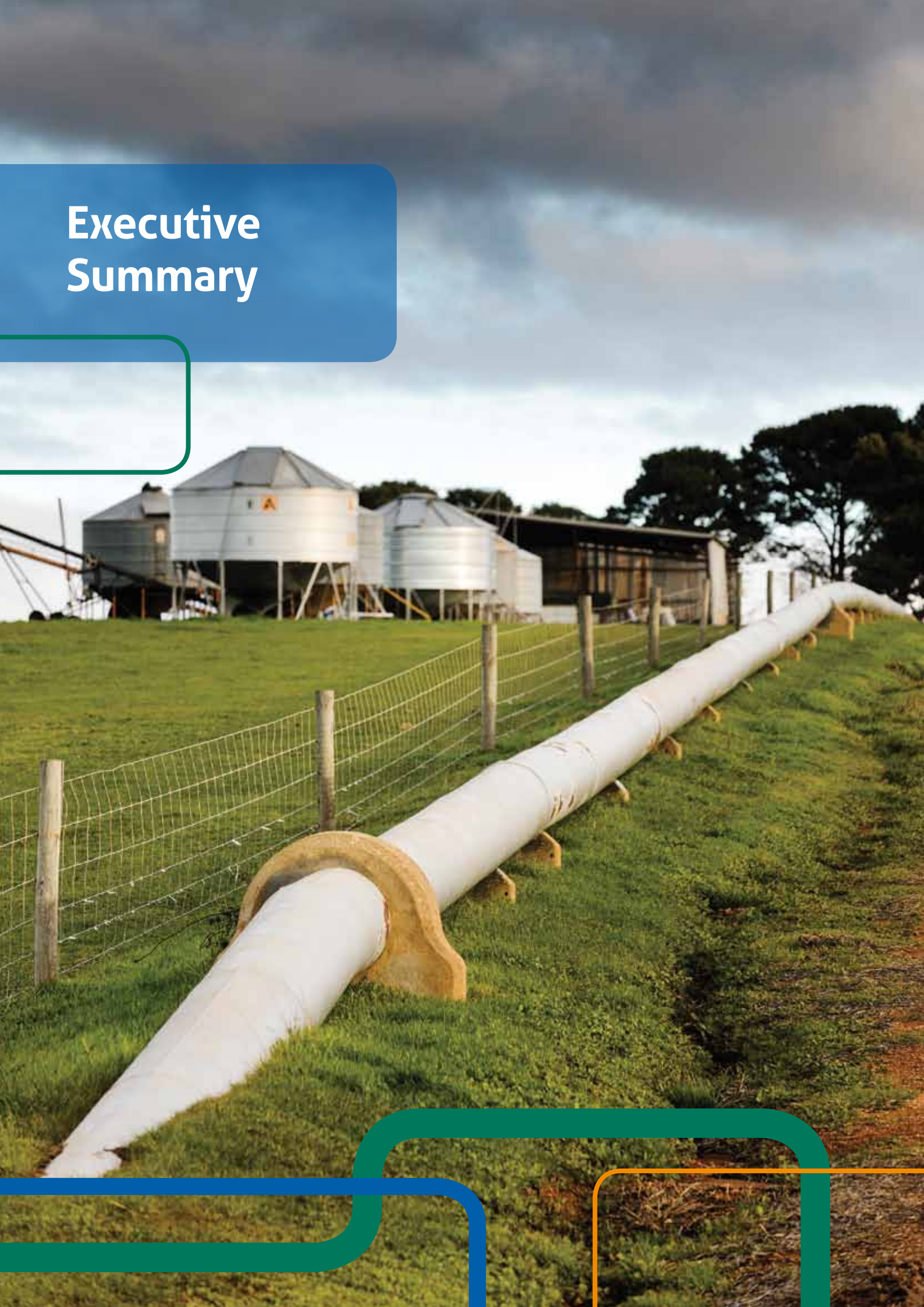
Acronym / shortened form	Full form
Proposal	Regulatory Business Proposal 2013–2016 (this document)
AAB	Accounting Asset Base
AAS	Australian Accounting Standards
ABS	Australian Bureau of Statistics
ADP	Adelaide Desalination Plant
ADWG	Australian Drinking Water Guidelines
AER	Australian Energy Regulator
ANCOLD	Australian National Committee on Large Dams
APF	Accounting Policy Framework
ATA	Australian Teleservices Association
BOD	Biochemical Oxygen Demand
CAM	Cost Allocation Methodology
CAPM	Capital Asset Pricing Model
CCTV	Closed Circuit Television
CDD	Cooling Degree Days
CGB	Commonwealth Government Bond
Charter	SA Water's Customer Charter
CLD	A composite measure of number of customers, length of network and demand
Code	ESCOSA's Water Retail Code (draft)
CPMM	SA Water's Corporate Project Management Methodology
CSIRO	Commonwealth Scientific and Industrial Research Organisation
Customer Assist Program	SA Water's Customer Assist Program
Customer Council	SA Water Customer Council
Customer Service Centre	SA Water's Customer Service Centre
CWMS	Community Wastewater Management System
DORC	Depreciated Optimised Replacement Cost
DPTI	Department of Planning, Transport and Infrastructure
DRC	Depreciated Replacement Cost
EIP	Environment Improvement Program
EP	Equivalent population
EPA	Environment Protection Authority
ERA	Economic Regulation Authority of Western Australia
ESCOSA	Essential Services Commission of South Australia
ESCV	Essential Services Commission (Victoria)
Final Advice	Advice on a Regulatory Rate of Return for SA Water – Final Advice, February 2012

Acronym / shortened form	Full form
FVC	Fair Value Curve
GAP	Glenelg to Adelaide Parklands
GIP	Government Inspection Points
GL	Gigalitre
GPCC	Government Planning and Coordination Committee
GSP	Gross State Product
Guidance Paper	ESCOSA's Guidance Paper with respect to Review of SA Water's Prices for 2013/14–2015/16
Initial Pricing Order/IPO	Pricing Order for the Regulatory Period 1 July 2013–30 June 2016
IPART	Independent Pricing and Regulatory Tribunal
IRP	Iron Removal Plant
ML	Megalitre
MRP	Market Risk Premium
MVA	Megavolt Ampere
NSIS	North South Interconnection System
NTER	National Tax Equivalent Regime
NWC	National Water Commission
NWI	National Water Initiative
Ombudsman	Energy and Water Ombudsman SA
PAC	Powdered Activated Carbon
PL	Pipe Line
PMF	Probable Maximum Flood
PMP	Project Management and Procurement
PVC	Polyvinyl Chloride
PWC	Public Works Committee
RAB	Regulatory Asset Base
RBA	Reserve Bank of Australia
REC	Renewable Energy Certificate
RET	Renewable Energy Targets
RTAB	Regulatory Tax Asset Base
RTU	Remote Telemetry Unit
SCADA	Supervisory Control and Data Acquisition
SMT	SA Water's Senior Management Team
TCorp	NSW government borrowing authority
TFP	Total Factor Productivity
The Act	Water Industry Act 2012 (SA)

Acronym / shortened form	Full form
The Board	SA Water's Board of Directors
The Treasurer	The Treasurer of South Australia
VAA	Value Advisor Associates
WA	Water Association
WACC	Weighted Average Cost of Capital
WSAA	Water Services Association of Australia
WTP	Water Treatment Plant
WWTP	Wastewater Treatment Plant

Table of Attachments

Executive Summary



Context

SA Water is part of the fabric of the South Australian community, operating extensive networks developed over more than 156 years to provide water and sewerage services to the majority of the population.

Wholly government owned, SA Water manages assets spanning the full water and sewerage supply chain – from catchments, dams, reservoirs and bores, to individual connections and meters at customer properties. It is one of three vertically integrated water utilities in Australia to cover an entire state or territory and, of these, only SA Water and Water Corporation in Western Australia have a significant geographic spread.

While most of its customers are Adelaide householders, SA Water – unlike many other Australian water utilities – caters for the needs of all sectors of the community across metropolitan, regional and rural areas. This includes more than 150,000 people in country South Australia who rely on the River Murray as their sole source of drinking water.

As the population served by SA Water has grown, its water and sewerage networks have expanded accordingly, to reach customers in new growth areas and to cater for urban infill development.

The vast spread of SA Water's networks – which include 26,500km of water mains – and the dispersed nature of its customer base are just two of many significant operational challenges for SA Water. Other challenges that impose costs on SA Water's operations that, in many cases, are materially greater than those faced by other water utilities include:

- The disparate quality of raw water – including water drawn from the highly variable River Murray, reservoirs in the Mount Lofty Ranges and elsewhere in the State, and aquifers that serve from as few as 50 customers, to as many as 25,000;
- Highly variable climate – from hot, dry summers that lead to high peaks in demand at times of low rainfall, to generally mild, damp winters;
- Significant variances in yield from rainfall-dependent water sources; and
- Low storage capacity – the metropolitan reservoirs hold approximately one year's supply compared to several years' supply in other states.

Despite these challenges, SA Water is recognised as a global leader in water management and supply. In April 2012, SA Water was named Public Water Agency of the Year at the Global Water Awards in Rome.[1]

For many years, SA Water enjoyed a high degree of water security as it could draw on two major sources – the River Murray and the Mount Lofty Ranges catchments – to supply the majority of its customers. However, the prolonged and serious nature of the recent drought in both of these catchments – unprecedented in a recorded history extending beyond 100 years – required a fundamental shift in water security planning for the State, and resulted in construction of the Adelaide Desalination Plant as a rainfall-independent water source for Adelaide, along with other water security infrastructure.

These investments have come at a cost, and it has been necessary to increase water prices to ensure SA Water can continue to deliver high quality, reliable services to the community and recover the cost of these works.

In the meantime, water restrictions, recent price increases, changes in housing stock, a concerted effort to support customers in modifying their water usage, and growing community awareness about the vulnerability of the River Murray have impacted water consumption across all of SA Water's customer segments, with sales declining from 222GL in 2006–07, to 184GL in

1 Global Water Intelligence, http://www.globalwaterintel.com/archive/13/5/general/new-conquest-rome.html.

2011–12 (a 17% reduction)[2]. Declining water sales have affected revenue generation, and added to the overall pressure on prices for customers.

Along with the need to invest in water security infrastructure and support the growth and development of the State, more stringent water quality and environmental requirements have emerged in recent years, requiring SA Water to further enhance its water and wastewater treatment facilities and networks. SA Water's capital and operating expenditure proposals, in part, address these continuing challenges.

SA Water's Strategic Plan aims to ensure it remains a resilient and high performing business in a water industry that is undergoing significant legislative and regulatory change. The Plan – like this Proposal – balances the delivery of safe, reliable and efficient services to SA Water's customers in a highly diverse and demanding environment, while delivering an appropriate commercial return to the South Australian Government on behalf of the people of South Australia.

Regulatory environment

In 2009, the South Australian Government released Water for Good and detailed its intent to introduce economic regulation of the water industry. Formalised through the *Water Industry Act 2012*, this reform and the appointment of ESCOSA as the independent economic regulator is welcomed by SA Water.

In 2013, ESCOSA will make its first revenue determination for SA Water, setting maximum allowed revenues for drinking water and sewerage retail services for the period 1 July 2013 to 30 June 2016.

As an essential service provider, SA Water sees clear alignment between its objectives and those of ESCOSA in terms of ensuring the efficient delivery of services that are reliable, and of an appropriate quality.

This first Proposal to ESCOSA deals with expenditure and service standards relating to SA Water's direct control services – defined as retail services that include the supply, delivery and sale of water and supply of sewerage services. The information contained within this Proposal will assist ESCOSA in assessing the revenue required for SA Water to deliver water and sewerage services at an appropriate level of quality and reliability for customers and the South Australian community.

While this Proposal covers a three year regulatory period, it is expected that subsequent submissions will cover four-year periods. SA Water will participate in various reviews to be led by ESCOSA and finalised prior to commencement of the subsequent regulatory period, and will undertake rigorous engagement programs, research and benchmarking to ensure future Proposals continue to reflect customer and stakeholder expectations.

For this Proposal, SA Water has drawn on past research and feedback from the community and its customers, benchmarked itself against peers, and validated and enhanced the information contained within the Proposal through external independent advisers.

SA Water considers this Proposal:

- Appropriately takes into account the views of its customers, owner and other stakeholders, and aligns with their expectations; and
- Provides sufficient, transparent and robust information to assist ESCOSA in making its revenue determination.

Service outcomes for customers

Through customer research and dialogue with its Customer Council, SA Water has clearly identified that the most important areas of service delivery to its customers are:

2 ACIL Tasman, SA Water's demand forecasting, July 2012, Chapter 3.2

- Providing safe and healthy drinking water;
- Maintaining water and sewerage infrastructure; and
- Responding quickly if something goes wrong.

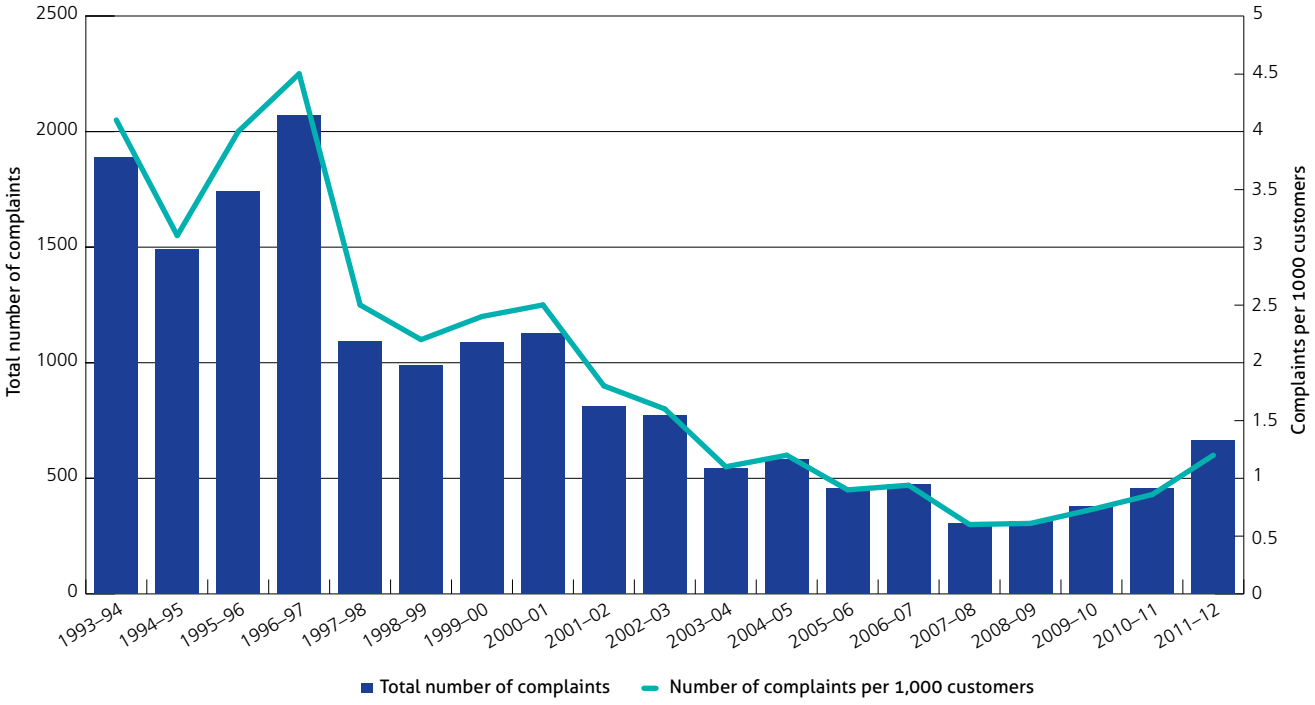
SA Water's service commitments to its customers will be formalised in a new Customer Charter that will include a range of service standards and performance targets – agreed by ESCOSA – in relation to areas such as:

- Water infrastructure reliability – duration of unplanned interruptions and water loss from the system;
- Sewerage infrastructure reliability – average sewerage interruption;
- Response time for attending to water breaks, bursts and leaks, and sewer overflows;
- Time taken to restore water supply or sewerage services after such events; and
- Response times for customers calls and complaints (including drinking water quality complaints).

For many of these service areas SA Water has a strong track record of safety, reliability and responsiveness, despite numerous significant challenges inherent in its operating environment.

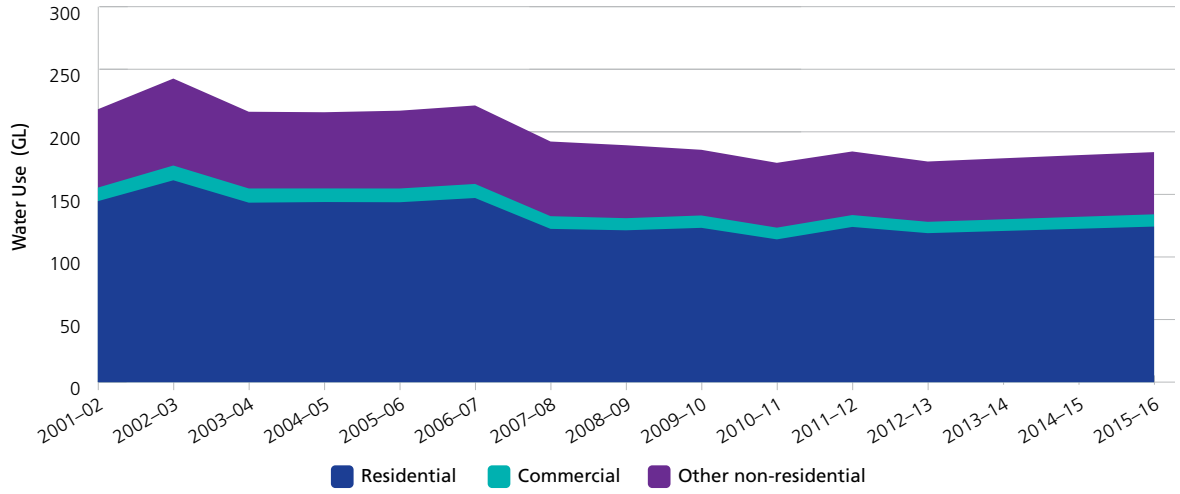
There is no better illustration of this than SA Water's drinking water quality performance. Treatment plant upgrades along with improvements to processes for monitoring, testing and treating drinking water, have led to a dramatic decrease in complaints from customers since the mid-1990s, as shown in Figure A. Although challenges relating to the flushing of accumulated soil, salt and organics into river systems since 2009 (following the recent drought) have led to a marginal increase in water quality complaints, SA Water's excellence in this area has been internationally recognised – with a dramatic step-change improvement achieved within just one generation.

Figure A: Drinking water quality complaints per 1000 customers (metropolitan area)[3]



3 SA Water operational data.

Figure B: Actual and forecast water use (2001–02 to 2015–16)[4]



Although SA Water has a strong record of achieving its performance targets relating to attendance at water main breaks and restoring supply following water outages, it is acutely aware of the community's sensitivity to water loss from its systems. It is also alert to the fact that the age and condition of some infrastructure, combined with adverse local conditions such as reactive soils, can lead to performance outcomes for some customers that need to be improved. SA Water's mains replacement program aims to prevent any increase in the annual failure rate, and to address localised issues as they arise.

In delivering appropriate levels of service to customers, SA Water is sensitive to the fact that customers are feeling the impact of a rise in the cost of many household living expenses – including water prices.

Supporting customers who face financial difficulties has become an emerging concern for SA Water. With the introduction in 2007 of its Customer Assist Program and Hardship Policy, SA Water provides residential customers experiencing hardship with a number of assistance options. Since its introduction, the number of customers participating in this program has increased, from 425 in 2007–08 to 1,691 in 2011–12.

SA Water will continue to balance service delivery performance and affordability, and to improve its delivery of services to customers in line with their expectations and the standards applied by ESCOSA and other regulators.

Demand for water and sewerage services

Direct control water services

Demand for water has fallen significantly in recent years across all customer sectors. For much of the past decade SA Water has played a significant role in encouraging its customers to use water wisely and, as expected, there has not been a full "bounce back" in water use with the easing of water restrictions.

In the forthcoming regulatory control period there will not be a return to the levels of consumption experienced prior to the recent drought.

Demand forecasting has become a more complex process in recent years. Previously, forecasts of water use were generally based on long-term climate trends and adjusted to account for growth in customer numbers. However, more sophisticated modelling has been required to take into account

4 ACIL Tasman, SA Water's demand forecasting, July 2012, Chapter 7.

possible demand fluctuations relating to the price of water, and SA Water has engaged independent specialists to support the development of forecasting models for this Proposal[5].

These models show that the key drivers of water use for each customer segment are:

- **Residential:** population growth, price, temperature, restrictions on use;
- **Commercial:** economic activity, price, temperature, restrictions on use; and
- **Other non-residential:** economic activity, price, temperature, restrictions on use.

The demand forecast detailed within this Proposal indicates only moderate increases in water use across all customer sectors during the forthcoming regulatory period, (refer Figure B). The price elasticity of demand for water, combined with other factors, is expected to suppress growth in water use through to 2015–16 with increases of about 4.3% (7.5GL) forecast for total water use for the period.[6]

Direct control sewerage services

Forecasting the demand for sewerage services takes into account, on a catchment-by-catchment basis:

- Historic flows into networks;
- Metered flows within networks;
- Connections to the system;
- Proposed residential and industrial developments in catchments areas; and
- Forecasts for water demand.

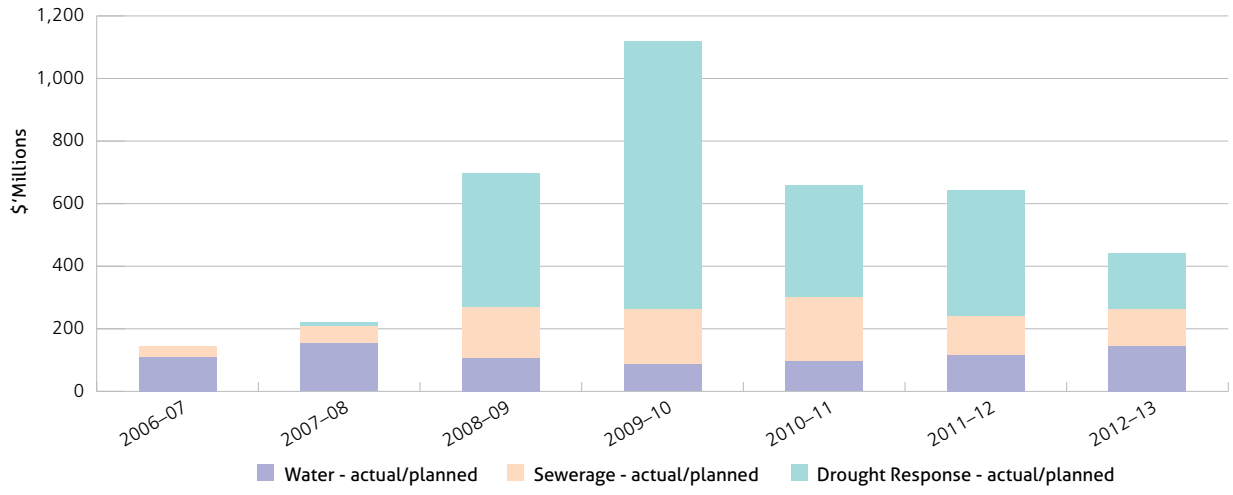
The forecast for each catchment considers both the volume of wastewater and its quality, and has been relied upon to inform the capital works program and operating expenditure forecast detailed within this Proposal.

At an aggregate State-wide level, SA Water's wastewater treatment plants are expected to receive only marginally increased volumes of sewage during the forthcoming regulatory period. Despite this, the generally disconnected nature of the networks means that a number of catchments will receive sewage volumes and quality that vary significantly compared to the State-wide aggregate.

Proposed capital expenditure

SA Water's capital expenditure in recent years has been dominated by significant investment in projects to secure water supplies for the State's

Figure C: SA Water's capital expenditure for direct control services leading into the regulatory period (nominal $'M to 2011–12; real, March 2012 $'M in 2012–13 excluding real cost escalation)



5 ACIL Tasman, SA Water's demand forecasting, July 2012.
6 ACIL Tasman, SA Water's demand forecasting, July 2012, Chapter 7.

future. The scale of these drought response initiatives – which include construction of the Adelaide Desalination Project (approximately $1.8 billion) and North South Interconnection System (approximately $0.4 billion) – is unprecedented in SA Water's history.

Figure C shows the significant increase in SA Water's capital expenditure for the seven years leading into the forthcoming regulatory period, and highlights the extent to which this has been dominated by the investment in drought response initiatives.

Benchmarking of SA Water's capital expenditure relative to its peers within the Australian water industry demonstrates prudence and efficiency. This benchmarking also highlights the fact that effective comparison of recent capital expenditure between Australian water utilities is difficult due to differences in the investments in desalination plants.

In determining the prudent and efficient level of capital expenditure for the forthcoming regulatory control period, SA Water has undertaken detailed risk assessment and review of every capital program, and the individual projects within those programs. The expenditure proposed represents the minimum which SA Water considers necessary to remain within acceptable levels of risk. The proposed total capital expenditure is shown in Figure D.

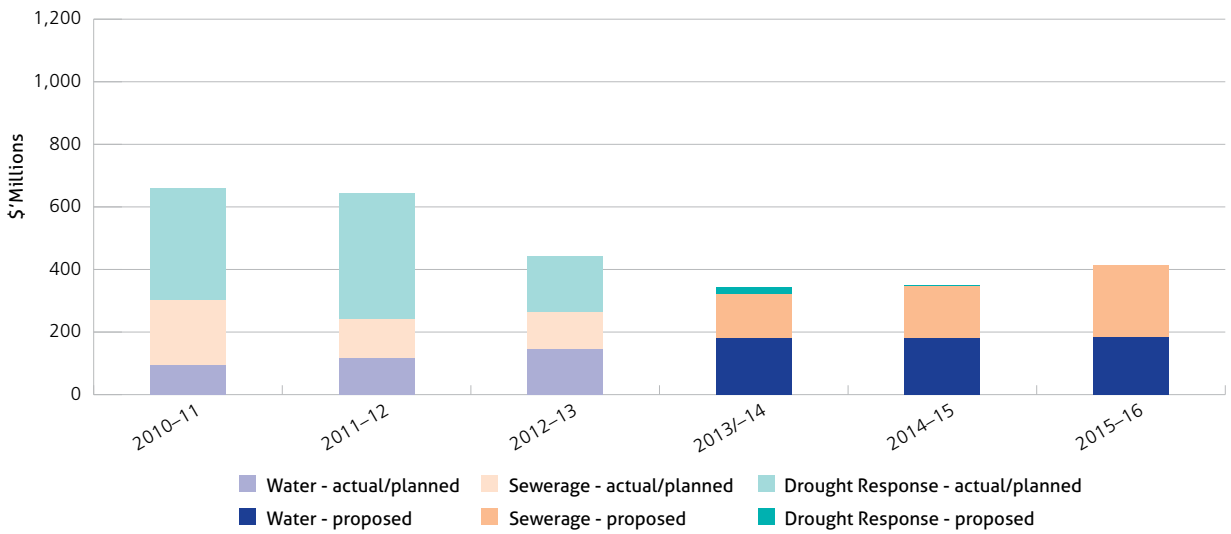
Direct control water services

In relation to direct control water services, SA Water proposes to:

- Finalise delivery of drought response initiatives (with approximately $21 million proposed in 2013–14 and $2 million in 2014–15 to complete this program of works);
- Allocate approximately $291 million to address asset renewal requirements;
- Invest approximately $150 million to comply with various external obligations (largely relating to safety and water quality management); and
- Allocate $56 million to cater for system growth (with the bulk of this investment required to upgrade or extend pipe networks).

The capital expenditure proposed for the forthcoming regulatory control period includes significant projects that were deferred during the recent period of extraordinary investment in drought response initiatives, and which are essential to ensure the ongoing reliability of the

Figure D: SA Water's proposed capital expenditure for direct control services (nominal $'M to 2011–12; real, March 2012 $'M from 2012–13 excluding real cost escalation)



services delivered to customers. This includes approximately $119 million worth of investment in renewal of pipe networks, with the largest sum relating to renewal of the century-old water main beneath Marion Road (which has recorded 29 failures since 2007).

The investment to comply with external obligations includes approximately $75 million for a major upgrade of the Kangaroo Creek dam to meet guidelines for flood capacity, and approximately $10 million for refurbishment of the filters and process control improvements at metropolitan water treatment plants to meet performance targets agreed with SA Health for the management of *Cryptosporidium*.

The bulk of system growth in the water supply network is forecast to occur in areas such as Roseworthy, Murray Bridge, Mount Barker and Kangaroo Island – where infrastructure extensions and upgrades are required to accommodate new developments. The two key projects driven by system growth in the forthcoming regulatory control period relate to a water supply scheme for Mount Barker (approximately $32 million), and an upgrade to the water supply at Kingscote on Kangaroo Island (approximately $9 million).

Direct control sewerage services

In relation to direct control sewerage services, SA Water proposes to:

- Allocate approximately $224 million to address asset renewal requirements;
- Invest approximately $207 million to cater for system growth (primarily addressing capacity issues at selected wastewater treatment plants); and
- Allocate approximately $67 million for compliance with external obligations (largely relating to environmental and safety obligations).

Sewerage infrastructure is exposed to a highly aggressive environment due to build-up of corrosive gases, requiring intensive asset management and renewal. The expenditure proposed for renewal of these assets relates to the mechanical and electrical aspects of the network (approximately $89 million), and structural works (approximately $65 million). The proposed structural works include a major project to rehabilitate the primary treatment structure at the Bolivar wastewater treatment plant. Additionally, approximately $31 million is proposed for renewal of wastewater pipe networks.

The capital expenditure proposed in relation to system growth primarily relates to selected wastewater treatment plants – specifically at Murray Bridge and Aldinga. The Murray Bridge plant was commissioned in 1970 and has been considerably overloaded in recent years. Additionally, this plant is located on a flood plain adjacent to the River Murray, and residential developments have encroached within very close proximity of the plant. SA Water proposes to invest approximately $107 million in relation to this plant during the regulatory period, with further investment planned for the subsequent period.

SA Water's wastewater networks and treatment plants may lead to environmental harm if not managed and operated prudently. All of SA Water's wastewater treatment plants require licences issued by the Environment Protection Authority (EPA), and there are significant obligations and conditions arising from these. SA Water has allocated approximately $40 million during the forthcoming regulatory control period to comply with such environmental obligations, including approximately $14 million in relation to an overflow abatement program. This program is required by the Code of Practice for Wastewater Overflow Management published by the EPA.

Proposed operating expenditure

SA Water's operating expenditure in recent years has been significantly impacted by the most severe drought in recorded history. Specifically, SA Water incurred additional operating expenditure in relation to:

- Enforcement of water restrictions and related community information programs;
- Processing and payment of rebates;
- A range of works to address low flows in the River Murray and secure water for critical human needs; and
- Additional pumping from the River Murray to supplement metropolitan reservoirs.

Going forward, the extraordinary capital investment made in response to the drought will further impact SA Water's operating expenditure. The ADP began producing water in 2011, and will undergo a significant proving regime commencing in 2013 – the cost of which will result in a step-change increase to SA Water's operating expenditure. Significant operating expenditure associated with the ADP will also be required on an ongoing basis, beyond the ADP's two year proving period.

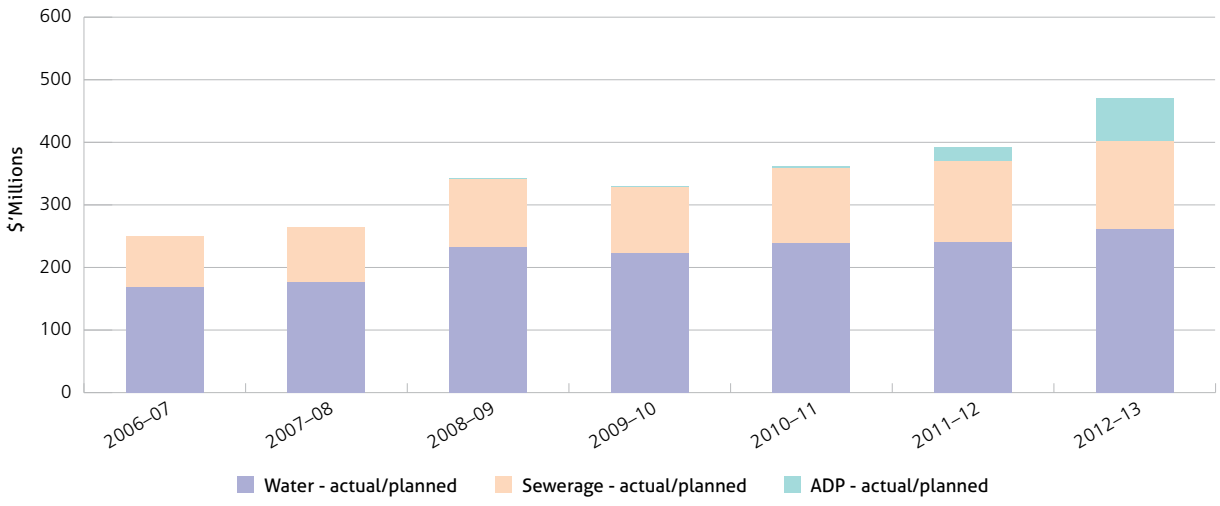
Figure E shows SA Water's operating expenditure for the seven years leading into the forthcoming regulatory period and highlights the:

- Pronounced impact of the recent drought during 2008–09; and
- Step-change in operating expenditure associated with operation and maintenance of the ADP.

In benchmarking the efficiency of its operating expenditure, SA Water has considered three distinct benchmarking methods – each of which shows that SA Water compares favourably with its peers in the Australian water sector. These favourable outcomes have been achieved despite significant challenges inherent in SA Water's operating environment that, in many cases, lead to materially higher operating costs than those incurred by other Australian water utilities.

Figure F graphically depicts the outcome of one of the three benchmarking methods, and shows that when SA Water's operating expenditure is benchmarked relative to its size (based on a composite size variable[7]), SA Water's operating expenditure for 2010–11 is more efficient than the average of Australian water utilities (indicated by the dotted line on the chart).

Figure E: SA Water's operating expenditure for direct control services leading into the regulatory period (nominal $'M to 2011–12; real, March 2012 $'M in 2012–13 excluding real cost escalation)



7 The composite size variable is denoted as "CLD", and comprises a measure of the number of customers, length of network, and demand from customers.

Figure F: Comparative analysis of SA Water's operating expenditure and size

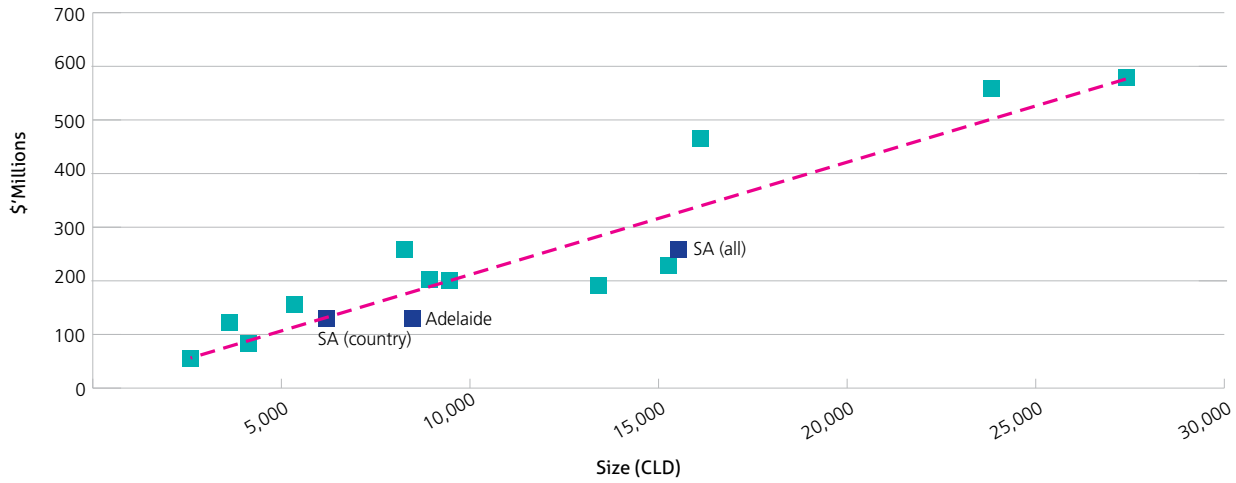
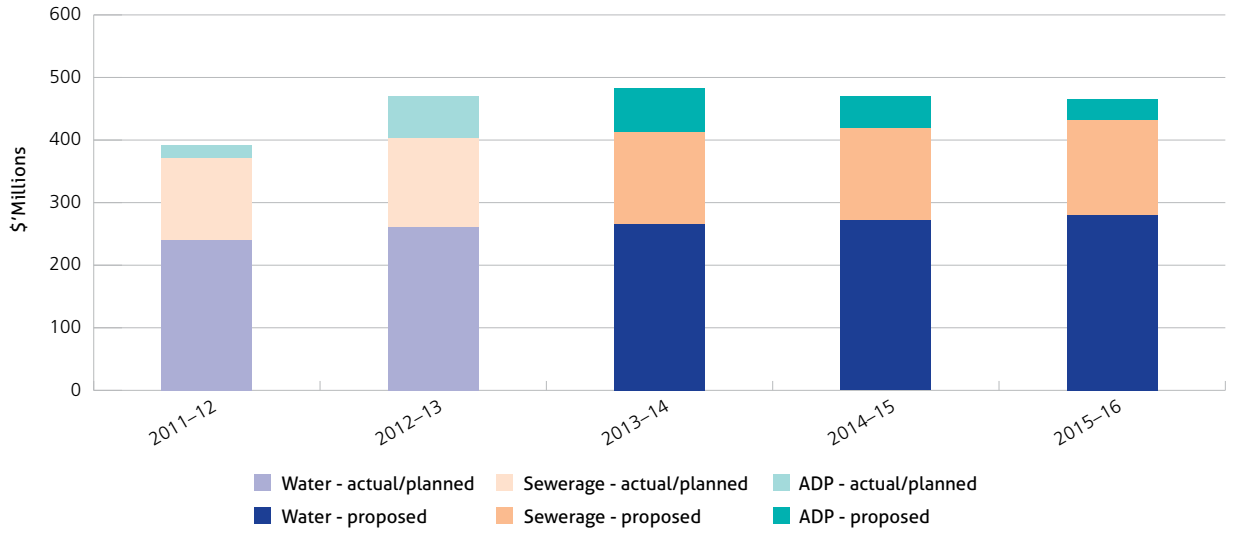


Figure G: SA Water's proposed operating expenditure for direct control services (nominal $'M to 2011–12; real, March 2012 $'M from 2012–13)



In forecasting the expenditure that will be required during the forthcoming regulatory control period, SA Water and ESCOSA have agreed to apply a "base year" approach. SA Water has nominated 2011–12 as the base year as the expenditures are the most recent, and therefore best relate to the prudent and efficient operating expenditure expected to be incurred for the forthcoming regulatory period. The proposed total operating expenditure through to 2015–16 is shown in Figure G.

The key drivers of change to SA Water's operating expenditure during this period will be:

- The operation and maintenance of new assets, including the ADP;
- Externally imposed obligations, including operating expenditure associated with the carbon pricing mechanism and the new legislative and regulatory framework applicable to SA Water;
- Enhanced asset condition monitoring methods; and
- Rising energy prices.

Despite these significant cost pressures, SA Water is proposing:

- Operating expenditure associated with delivery of direct control water services that declines from a peak of approximately $484 million in 2013–14, to approximately $466 million in 2015–16; and
- A relatively flat profile of operating expenditure for delivery of direct control sewerage services through to 2015–16.

ESCOSA, through its Guidance Paper[8], has specified that costs associated with the ADP be reported separately to other direct control water services.

SA Water has complied with this requirement, and commissioned expert consultants Sinclair Knight Mertz (SKM) to review:

- The plan developed by SA Water for proving of the ADP; and
- The prudence and efficiency of SA Water's forecast of the operating expenditure associated with the ADP.

Through its review, SKM concludes that SA Water's forecasts of the operating expenditure associated with the ADP are reasonable for an asset of this type, and that it is prudent for SA Water to:

- Perform the various tests it intends to perform during the proving period, as these will satisfy requirements within contractual documents; and
- Operate the ADP for at least 12 of the 24 months of the proving period to comply with monitoring requirements associated with the EPA licence for the ADP.

SKM also note that there would be risks associated with a move to achieve the requirements of the proving period in a shorter timeframe than the 24 months proposed.

Uncertainty in a regulatory context

Like any regulated entity, SA Water faces the possibility that costs forecast at the time of submitting a regulatory proposal will need to change materially due to circumstances beyond its control, or because it was not possible to estimate these costs accurately in advance. Furthermore, events that were not foreseeable at the time of submission may arise that have material cost implications.

Such uncertainties in a regulatory context are typically dealt with via a "pass through mechanism", thereby removing the risk associated with estimating their timing and financial impact, and the need to include costs associated with such events within this Proposal. This has a beneficial impact to customers in terms of prices, and enables SA Water to be compensated for the efficient cost associated with such events at an appropriate time.

In nominating the pass through events which it considers appropriate for the forthcoming regulatory period, SA Water has been guided by the pass through events previously applied by ESCOSA in its regulation of other utilities.
SA Water proposes pass through events to address changes in its costs associated with:

- Taxes;
- Service standards;
- Other regulatory changes;
- Extraordinary events;
- Delivery of unforeseeable or unquantifiable major projects;
- The operating mode of the ADP; and
- Management of its water licences.

8 ESCOSA, Review of SA Water's Prices: 2013/14 – 2015/16 Guidance Paper, July 2012

In addition to uncertainties concerning the nominated pass through events, forecasting demand for water during the forthcoming regulatory period involves making a key assumption with respect to prevailing weather conditions. The forecast detailed within this Proposal assumes that weather conditions consistent with the long-term average will prevail through to 2015–16, with analysis indicating that actual demand may vary by as much as 7% from one year to the next due to the weather.

Accordingly, SA Water has proposed an adjustment mechanism within the form of revenue control applicable to its water service which allows for its maximum allowable revenue to be amended by the marginal change in efficient operating expenditure associated with changes in demand. In this way, customers only pay for the efficient cost to supply actual demand. Where actual demand for water is less than forecast, customers will retain the benefit of the lower expenditure incurred by SA Water via reductions in allowable revenue.

Implementation of the regulatory determination

Prices for the provision of SA Water's direct control water and sewerage services can be set only once ESCOSA has determined the maximum allowable revenue in relation to these services. ESCOSA has nominated 17 May 2013 as the date for release of its final determination, with new prices based on this determination to be made effective from 1 July 2013.

ESCOSA's final determination is also dependent on the release of a second Pricing Order to be issued by the Treasurer, which will specify the initial Regulated Asset Base values to be applied by ESCOSA.

While recognising the compressed timeframe to develop prices following release of ESCOSA's final determination, SA Water will use its best endeavours to release prices for 2013–14 in June 2013.

Chapter 1
Introduction

1 Introduction

This document and its attachments – SA Water's first Regulatory Business Proposal ("the Proposal") – provide information by which the Essential Services Commission of South Australia ("ESCOSA") can assess the revenue required for SA Water to deliver water and sewerage services at an appropriate level of quality and reliability for customers and the South Australian community.

This Proposal has been prepared in accordance with requirements and guidance provided through relevant legislation, the Treasurer of South Australia ("the Treasurer") and ESCOSA – specifically:

- *Water Industry Act 2012*[9];
- Pricing Order for the Regulatory Period 1 July 2013–30 June 2016 ("Initial Pricing Order, or IPO")[10];
- Economic Regulation of the South Australian Water Industry Final Advice[11] (and associated instruments);
- Review of SA Water's Prices: 2013/14 – 2015/16 Guidance Paper[12] ("Guidance Paper");
- Advice on a Regulatory Rate of Return for SA Water Final Advice[13]; and
- Statement of Approach[14].

This Proposal is supported by various attachments and other supplementary material.

The Water Industry Act 2012 is a key reform arising from Water for Good – the South Australian Government's blueprint to securing South Australia's water supply – and has created the framework for economic regulation of SA Water by ESCOSA.

1.1 Regulatory context

Water for Good – the South Australian Government's blueprint to securing South Australia's water supply – initiated a series of reforms to address existing and emerging challenges in the water industry. This included new legislative arrangements to provide a fresh approach to managing a more competitive and diverse water industry.

A key reform, the *Water Industry Act 2012*, created the framework for economic regulation and assigned this regulatory function to ESCOSA under the *Essential Services Commission Act 2002*[15]. Prior to this appointment, ESCOSA had been engaged in an advisory role by the South Australian Government to review processes for setting water and sewerage prices, and provide related advice upon request.

In an extension of this role, ESCOSA will assume greater responsibility for the economic regulation of SA Water's business in accordance with the *Essential Services Commission Act 2002*.

To facilitate ESCOSA's role as economic regulator, the IPO issued by the Treasurer sets out a number of key requirements that have shaped this Proposal – and which ESCOSA must apply in making its determination – including that it:

1. Must only determine the revenue which may be derived from the provision of SA Water's water and sewerage retail services;
2. Must determine separate revenue controls for water retail services and sewerage retail services;
3. Must not establish, or require the establishment of, a revenue control for a relevant service based on a customer class or location;

9 *Water Industry Act 2012* (SA).
10 South Australian Government, Department of Treasury and Finance, *Pricing Order for the Regulatory Period 1 July 2013–30 June 2016*, Final Draft, May 2012.
11 ESCOSA, Economic Regulation of the South Australian Water Industry Final Advice, 12 June 2012.
12 ESCOSA, Review of SA Water's Prices: 2013/14 – 2015/16 Guidance Paper, July 2012.
13 ESCOSA, Advice on a Regulatory Rate of Return for SA Water Final Advice, February 2012.
14 ESCOSA, Statement of Approach, July 2012.
15 *Essential Services Commission Act 2002* (SA).

4. May apply either a revenue cap control, an average revenue control, or a combination of both of those forms of revenue control in respect of each service;
5. Must include a mechanism which allows for the adjustment of the allowable revenue to be derived where there is a relevant and material variation between forecast and actual rates of water consumption or sewerage connections; and
6. Must adopt the initial Regulated Asset Base ("RAB") for SA Water as at 1 July 2013 to be specified by the Treasurer in a subsequent pricing order.

SA Water understands that the subsequent pricing order referenced in the IPO – which will specify the initial RAB value to be adopted by ESCOSA – will be issued by the Treasurer after SA Water has submitted this Proposal to ESCOSA, but prior to ESCOSA delivering its final determination.

The absence of the initial RAB value at the time of submitting this Proposal means that SA Water has not been able to calculate important elements of the "building block" equation which determines its required revenue. Accordingly, this Proposal describes the forms of revenue control and revenue and pricing models by which SA Water proposes to calculate its required revenue and set its tariffs once the initial RAB value has been specified in the Treasurer's subsequent pricing order.

The Initial Pricing Order issued by the Treasurer sets out a number of key requirements that have shaped this Proposal, and will be supplemented by a subsequent pricing order which will specify the initial RAB value to be adopted by ESCOSA in its final determination. The initial RAB value to be specified in the second pricing order will enable calculation of important elements of the building block equation, and SA Water's required revenue.

In accordance with the regulatory framework described above, ESCOSA will conduct periodic reviews of SA Water's business to determine the levels of expenditure, rate of return and, ultimately, prices for SA Water's retail services. Submission of this Proposal represents a key step in the first of these periodic reviews.

1.2 Purpose and compliance

This Proposal contains the necessary information to facilitate a comprehensive review and determination by ESCOSA in accordance with the context described at 1.1. This information includes descriptions of SA Water's:

- Business context and operating environment;
- Customer service framework and performance;
- Proposed service classification and cost allocation method;
- Demand forecasts for water and sewerage retail services;
- Capital and operating expenditure requirements for water and sewerage retail services;
- Financial arrangements in a regulatory context, including SA Water's approach to:
  - Calculating depreciation;
  - Adjusting the value of its RAB (once the initial RAB value is set by the Treasurer);
  - Estimating its income tax (under a tax equivalency regime); and
  - Calculating what SA Water considers to be a fair rate of return to be earned on the cost of its capital;

- Proposed forms of revenue control which SA Water considers appropriate for its water and sewerage retail services; and
- Revenue and pricing models by which SA Water proposes to calculate its required revenue, and set its tariffs.

SA Water notes that ESCOSA will assess this Proposal and make a draft determination on or before 1 February 2013. SA Water and other interested parties will then have the opportunity to respond to ESCOSA's draft determination and, after consideration of the submissions received, ESCOSA will publish a final determination on or before 17 May 2013[16], prior to commencement of the initial regulatory control period on 1 July 2013.

This Proposal has been prepared in accordance with the regulatory requirements and materials referenced above. SA Water acknowledges that a number of the regulatory instruments are currently in draft form, and may be subject to revision after the submission of this Proposal. SA Water respectfully reserves the right to reconsider any elements of this Proposal directly or indirectly affected by any such revisions to the regulatory instruments.

The contents of this Proposal have been authorised by SA Water's Board of Directors. This authorisation is attached to this Proposal as Attachment A.1.

1.3 Structure

This Proposal is structured to facilitate a comprehensive review and determination by ESCOSA and includes extensive supporting material (refer Table 1–1).

The contents of this Proposal and all supporting material were produced and/or collated specifically for the purposes of this Proposal and were current at the time of submission. SA Water indicates, however, that much of the documentation and data provided – although forming part of this Proposal – is operational in nature and therefore subject to change beyond the time of submission.

Data provided within this Proposal has been sourced from models and may not balance due to the effects of rounding. The terms "sewerage" and "wastewater" are used interchangeably within this Proposal.

Table 1–1: Description of information presented in each chapter of this Proposal

Chapter	Description of contents
2 Business context	• SA Water's role as an essential service provider and its significant contribution in delivering positive outcomes for the community of South Australia; • The nature of water and sewerage retail services provided by SA Water; • The scale of SA Water's networks and operations; and • SA Water's strategic response to emerging challenges in its operating environment.
3 Customer services	• SA Water's commitment to delivering high levels of customer service; • The new customer service framework applicable to SA Water, including introduction of the "Water Retail Code";

continued...

16 These milestone dates have been published by ESCOSA in its Statement of Approach, published 12 July 2012. In publishing these dates ESCOSA recognises that there are dependencies around the receipt of information from other parties which may require changes to these dates.

Chapter		Description of contents
3	**Customer services** *…continued*	• The customer service outcomes currently being delivered by SA Water; and • The methods by which SA Water engages with its customers and adapts to their evolving needs.
4	**Service classification**	• Definition of "retail services" in accordance with the *Water Industry Act 2012*; • SA Water's approach to classifying its services, and the form of regulation which SA Water understands will be applicable to each class of service; and • The method by which SA Water has allocated costs between each class of service, and individually to its retail water and sewerage services.
5	**Demand forecasts**	• The forecast demand for SA Water's water and sewerage retail services; • The classification of SA Water's customers for demand forecasting purposes, and the factors influencing demand within each class of customer; and • The inputs and assumptions relied upon in developing the demand forecasts.
6	**Capital expenditure**	• The prudent and efficient capital expenditure proposed by SA Water for delivery of its retail water and sewerage services; • The process by which the capital expenditure proposal was developed; • SA Water's recent performance in delivering capital projects; and • The methods by which the proposed capital projects will be delivered.
7	**Operating expenditure**	• The prudent and efficient operating expenditure proposed by SA Water for delivery of its retail water and sewerage services; • The process by which the operating expenditure proposal was developed; • Various benchmarks of SA Water's efficiency; and • The operating impact of the Adelaide Desalination Plant ("ADP").
8	**Pass through events**	• The nature and purpose of pass through events; • Details of the pass through events nominated by SA Water to apply during the forthcoming regulatory control period; and • The "pass through process" proposed by SA Water.

continued…

…continued

Chapter	Description of contents
9 Regulatory finance	• The composition of SA Water's RAB, and "roll forward" approach; • The rate of return proposed by SA Water, and the method by which this has been calculated; • SA Water's asset depreciation methods; and • Approach to estimating income tax.
10 Required revenue and pricing	• Forms of revenue control proposed by SA Water; • Revenue models by which SA Water proposes to calculate its required revenue; and • The process and timetable for setting prices of the water and sewerage retail services provided by SA Water.

Chapter 2

Business Context

Key points

SA Water manages all aspects of water and sewerage service delivery – one of only two vertically integrated water utilities of its size and significant geographic spread in Australia.

Challenges facing SA Water are greater than those faced by most other Australian water utilities, particularly in terms of the geographical spread of networks, supply catchments that are open to mixed land use, climate variability and water scarcity.

SA Water's success in managing water supply challenges was recognised on the international stage recently when it was named Public Water Agency of the Year at the 2012 Global Water Awards in Rome.

SA Water has delivered significant positive outcomes for the South Australian community, including:

- Water security – through the construction of the Adelaide Desalination Plant and a range of other initiatives;
- Reliable, high quality drinking water – even during the most significant drought in Australia's recorded history and the subsequent flood waters with poor source water quality; and
- Public health benefits through effective wastewater collection, treatment and disposal.

Economic regulation of the water industry is welcomed by SA Water and there is close alignment between ESCOSA's objectives and the direction SA Water has been pursuing, and will continue to pursue.

2.1. About SA Water

2.1.1. Regulatory context

As a vertically integrated water utility, SA Water manages all aspects of water and sewerage service delivery to its customers. Notably, Water Corporation in Western Australia and ACTEW in the ACT are the only other Australian vertically integrated water utilities servicing greater than 100,000 connections and covering a whole state or territory[17].

This Proposal deals with the expenditure and standards relating to SA Water's direct control services, defined by ESCOSA to be retail services including the supply, delivery and sale of drinking water, and supply of sewerage services[18].

Other services provided by SA Water, which are not dealt with in this Proposal, but are subject to separate review processes, include:

- External research, development and laboratory services;
- Remote and indigenous community services;
- River Murray operations;
- Engineering functional services;
- Metropolitan floodwaters drainage administration; and
- Water transportation services for others.

17 Australia's Urban Water Sector: Productivity Commission Inquiry Report Volume 1, No. 55, 31 August 2011.
18 ESCOSA, Review of SA Water's Prices 2013/14 – 2015/16 Guidance Paper, July 2012.

SA Water manages all aspects of water and wastewater service delivery to its customers – one of only two vertically integrated water utilities of its size and significant geographic spread in Australia.

SA Water has developed a Cost Allocation Methodology (CAM) ensuring that costs are allocated appropriately between its direct control, excluded and non-regulated services. This is described in Attachment D.2 to this proposal.

2.1.2. Strategic intent

SA Water enters its first period of economic regulation having, in recent years:

- Invested significantly in infrastructure to ensure a secure water future for South Australians; and
- Maintained high quality products and services despite the worst drought in Australia's recorded history, and subsequent floodwaters that posed water quality and treatment challenges.

These significant achievements demonstrate SA Water's ability to innovate, adopt new technologies and manage extremely large and complex projects, all of which provide confidence that it can meet future challenges.

With its new Strategic Plan – further detailed in Section 2.3 and Attachment B.1 to this Proposal – SA Water will focus on four strategic priorities as it strives to deliver water and sewerage services in efficient, responsive, sustainable and accountable ways:

- **Customers and community**: to achieve customer satisfaction by delivering the services they value, enhance reputation within the community and build strategic relationships with key stakeholders;
- **Quality and delivery**: to deliver water and wastewater services that are fit for purpose, cost effective and comply with regulatory requirements;
- **Business success**: to ensure long term financial success, with a safe, skilled and committed workforce demonstrating excellence in regulatory management and governance; and
- **Planning for the future**: to plan for a sustainable future through integrated water planning and stewardship of physical and natural assets.

The significant challenges and opportunities identified in the Plan which are particularly relevant to the delivery of standard control services are, in summary:

- **Demand and pricing**: water use has fallen over the past decade, affecting revenue generation, while significant investment in water security infrastructure has led to a sharp increase in water prices. Striking a balance between prices and service standards expected by customers will be a key focus for SA Water in the first regulatory period;
- **Safety**: SA Water is committed to organisational safety, and has developed targeted safety programs aimed at ensuring its safety record is improved, never compromised and driven by all employees and contractors;
- **Regulation**: the introduction of independent economic regulation from 1 July 2013 reinforces the objective to be prudent and efficient within the business. SA Water must also demonstrate it can continue to meet requirements in relation to the environment and water quality in the face of changes in these regulatory landscapes;
- **Climate**: the climate is changing and, over time, expected to become more variable. Many factors outside of SA Water's control will lead to energy price rises. SA Water must be prepared for climate change, in terms of water security (which may also be affected by the eventual Murray-Darling Basin Plan) and exposure to the energy market, while managing the associated cost impacts on customers; and
- **Assets**: SA Water has an extensive portfolio of infrastructure, which includes a mix of

ageing assets and brand new high-cost capital investments. Appropriate lifecycle planning, management and maintenance is required to ensure continuity in supply and quality while maintaining the best value for customers.

Through its Strategic Plan, SA Water has set a clear direction that will ensure the Corporation continues to meet the needs of its customers, the community, its owner and regulators in the face of these challenges. SA Water will also continue to plan for, and address, issues such as network growth, workforce competition and an ageing population, which are also expected to impact the business in the future.

2.1.3. Governance and structure

SA Water is subject to more than 120 Federal and State Acts, along with various other regulations, codes, industry guidelines, internal policies and operating procedures. Strong commitment to sound governance is evident at all levels of the business to ensure SA Water's Board, management and employees discharge their duties in line with these directions.

The SA Water Board of Directors ("the Board") – which is appointed by the Minister for Water and the River Murray – is guided by a charter that seeks to balance a commitment to community service with prudent commercial principles. Three standing committees assist the Board with the discharge of its responsibilities – Audit Committee, Asset Management Committee and Human Resources Committee.

The Board has delegated authority to officers in line with Government and SA Water policies and all delegations are reviewed annually by the Audit Committee and referred to the Board for approval.

Key legislation guiding SA Water includes:

- *South Australian Water Corporation Act 1994* – establishes SA Water and makes it subject to the *Public Corporations Act*. SA Water's primary functions, as set out in the Act, include:
  - Supply of water by means of reticulated systems;
  - Storage, treatment and supply of bulk water; and
  - Removal and treatment of wastewater by means of sewerage systems.
- *Public Corporations Act 1993* – subject to this Act, SA Water is a commercial entity providing services in accordance with prudent commercial principles and striving to provide a commercial return to Government; and
- *Water Industry Act 2012* – includes the provision for independent economic regulation of water and sewerage pricing, ensuring the safety and quality of services and ongoing technical regulation. This legislation replaces the *Waterworks Act 1932, Sewerage Act 1929 and the Water Conservation Act 1936*.

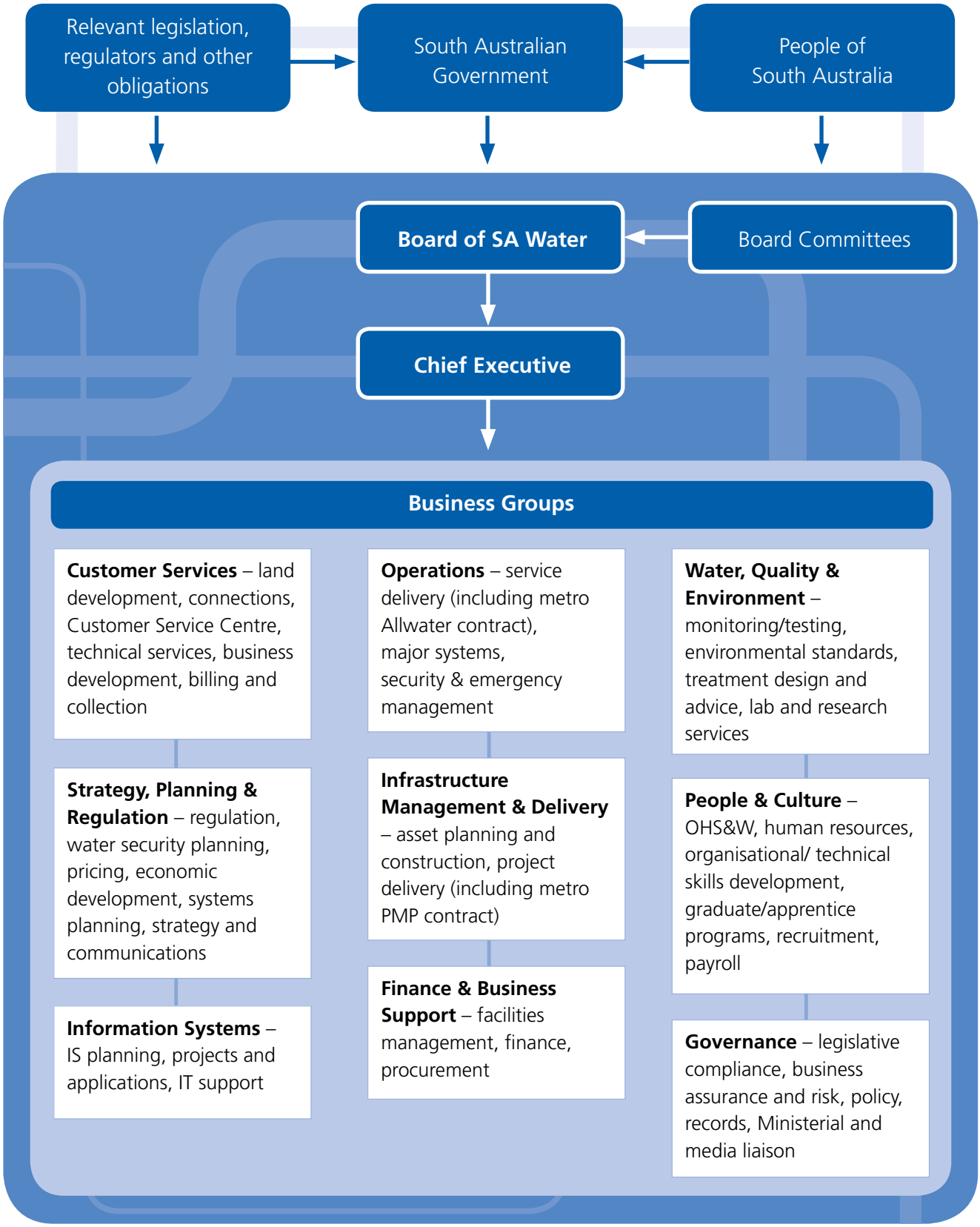
Legislation also directs other agencies that have a role in regulating SA Water's activities. Key legislation under which the Environment Protection Authority (EPA) and the Department of Health operate includes:

- *Environment Protection Act 1993* – provides the regulatory framework to protect South Australia's environment (including land, air and water) and requires, among other conditions, SA Water to hold a licence to undertake a prescribed activity of environmental significance, including its wastewater treatment operations; and
- *Safe Drinking Water Act 2011* – requires that drinking water is fit for purpose and provides guidance on how this can be achieved and measured.

Figure 2–1 provides an overview of SA Water's governance and reporting arrangements.

Strong commitment to sound governance is evident at all levels of SA Water.

Figure 2–1: Governance and reporting structure



2.1.4. Scale and nature of activities

The vast majority of South Australians are served by SA Water. Its water and wastewater networks and operations span vast distances and – unlike many other Australian water utilities – SA Water caters for the needs of householders, businesses and industries across metropolitan, regional and rural areas. In many cases, customers receive water that has been delivered from distant sources. Whyalla, for instance, receives water from the River Murray about 400km away.

SA Water provides:

- Water services to about 1.56 million people – almost 95% of the South Australian population; and
- Sewerage services to approximately 1.24 million people.

SA Water accounts are tied to land, so the account holder is the land owner, not necessarily the consumer. Products and services supplied by SA Water also extend to water users who do not hold an SA Water account – including tenants, tourists and other consumers.

SA Water – unlike many other Australian utilities – serves residential and non-residential customers across most of the State.

Table 2–1: Water account holders, by segment

	Number of account holders as at end June 2012	% of total water accounts
Residential		
Metropolitan	494,976	67.6%
Country	166,617	22.7%
Total residential	661,593	90.3%
Non-residential		
Metropolitan	29,189	4.0%
Country	41,763	5.7%
Total non-residential	70,952	9.7%

Table 2–2: Wastewater account holders, by segment

	Number of account holders as at end June 2012	% of total wastewater accounts
Residential		
Metropolitan	475,532	83.2%
Country	64,942	11.4%
Total residential	540,474	94.6%
Non-residential		
Metropolitan – total non-residential	25,824	4.5%
Country – total non-residential	4,860	0.9%
Total non-residential	30,684	5.4%

SA Water customers

Most of SA Water's water and sewerage account holders are residential and located in the metropolitan area, as shown in Table 2–1 and Table 2–2.

However, a substantial portion of infrastructure is required in non-urban areas to serve smaller communities across the State.

Residential customers use the greatest portion of water supplied by SA Water – about 66%.

In some country areas, SA Water delivers water that is not intended for drinking purposes. This non-potable supply is provided to about 700 properties in small and often remote communities, as well as individual properties serviced directly from untreated water mains.

Residential customers also represent the largest percentage of wastewater account holders.

Of the non-residential wastewater customers, there are about 8,000 metropolitan and 965 regional premises subject to an alternative tariff structure for the disposal of commercial/ trade waste. This accounts for about 1.6% of metropolitan wastewater customers and 1.4% of regional wastewater customers. Wastewater produced by all customer sectors is transported and treated using common wastewater infrastructure and processes.

SA Water also supplies recycled water to a number of customers in both urban and non-urban environments. SA Water is a national leader in wastewater recycling, with the highest percentage of effluent recycled of major water utilities in Australia. Recycling initiatives undertaken have been driven by two key requirements, to:

1. Meet, in the most cost-effective way, discharge requirements set by the EPA; and
2. Secure supply – particularly in times of drought – by reducing the demand on mains water and diminishing groundwater sources.

Figure 2–2: Water use billed in 2011–12, by segment

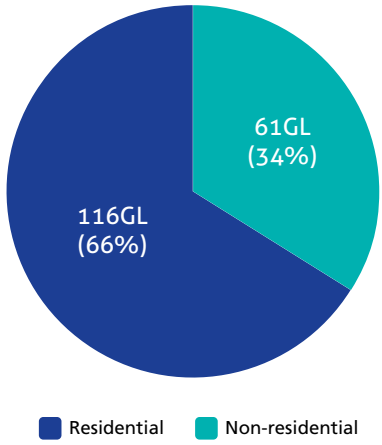
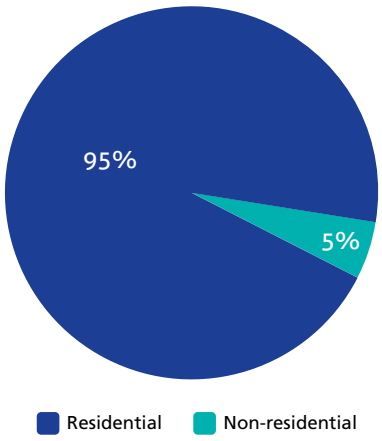


Figure 2–3: Wastewater account holders 2011–12, by segment



Networks, assets and geographic spread

Across the State, SA Water owns, manages, operates and maintains vast water and sewerage networks valued at $7.1 billion[19].

These assets are extremely diverse, as are the factors influencing their design and construction. Country and remote assets, for instance, are uniquely designed for their situation and offer limited opportunities for scale and operating efficiency.

Figure 2–4 and Figure 2–5 (see following pages) provide a visual representation of the extent of SA Water's infrastructure for water supply and sewerage services, while Attachment B.2 provides a more detailed description of these assets.

2.2. Key challenges in the operating environment

SA Water faces significant operational challenges when it comes to delivering high quality water to South Australians. Poor source water quality, low storage capacity, highly variable yields and the need to pump and transport water over long distances, all impose significant costs on the business, in many cases materially greater than those faced by other Australian water utilities.

Hot, dry summers result in much higher peak demand on SA Water's supplies compared to other States, requiring disproportionately larger water treatment plants, pumping stations and pipework, along with more rigorous maintenance schedules, which incur significantly higher capital and operating costs. Sophisticated planning and infrastructure design to enable flexible transfer between different sources of water is also critical to meeting the highly variable demand.

In the 30 years to 2010, Adelaide experienced an annual average 55 days above 30 degrees – more than three times higher than Sydney's average and almost double that of Melbourne.

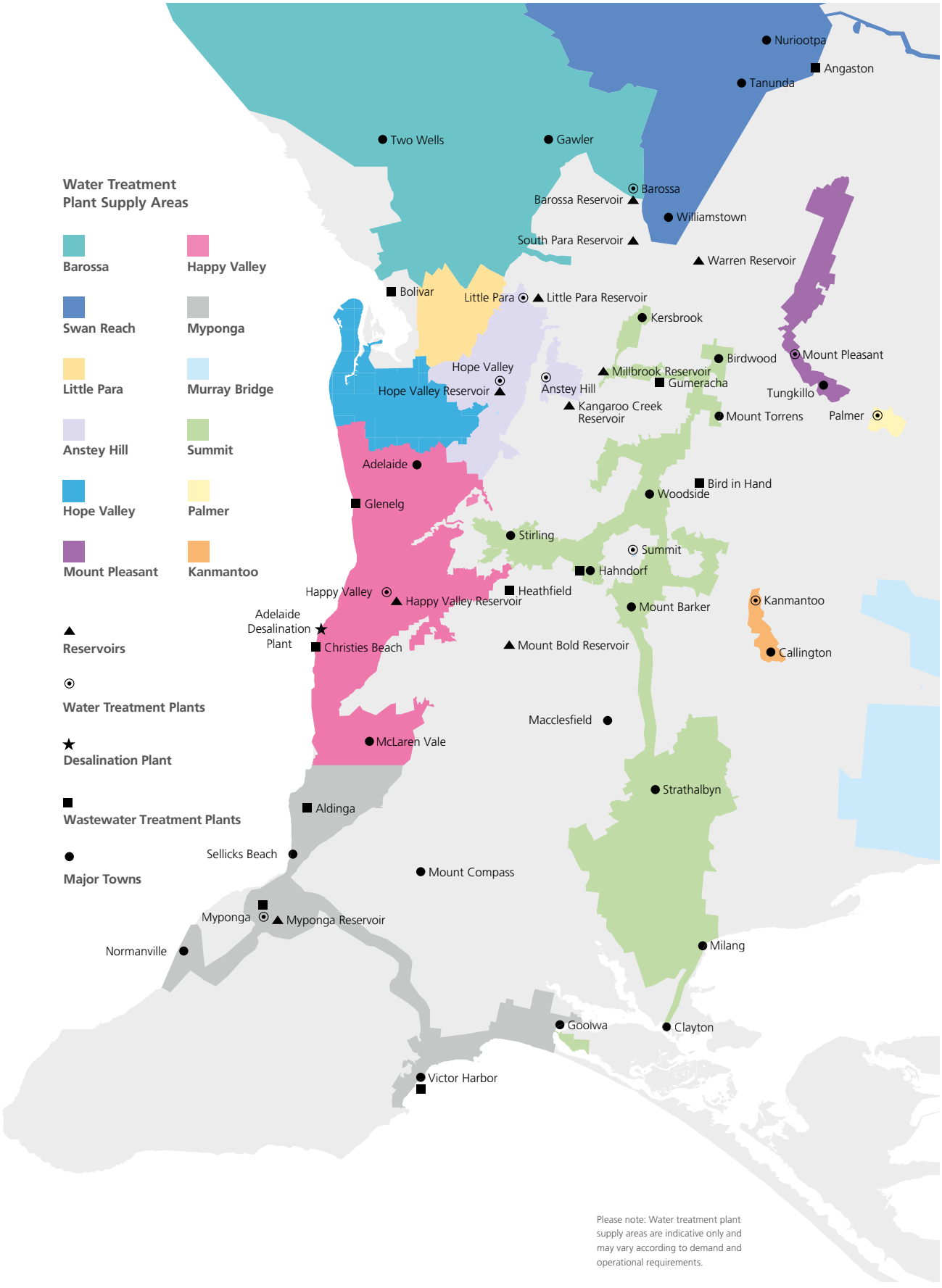
Despite these obstacles, SA Water is recognised as a global leader in water management and supply. In April 2012, SA Water was named Public Water Agency of the Year at the Global Water Awards in Rome[20] – recognising, in particular, its achievements in securing water for the State's future. Its nomination focussed on major 2011 milestones, including the production of water from the ADP, construction work on the North South Interconnection System Project and the Adelaide Alliance contract with Allwater.

It also highlighted work in wastewater recycling and the efforts by SA Water customers to reduce water use. SA Water won the honour over shortlisted water and wastewater agencies from Abu Dhabi, Saudi Arabia and Korea.

19 As indicated by the asset value forecast by SA Water for 1 July 2013 as part of the National Tax Equivalent Regime (NTER). This value does not correspond to SA Water's Regulatory Asset Base (RAB).

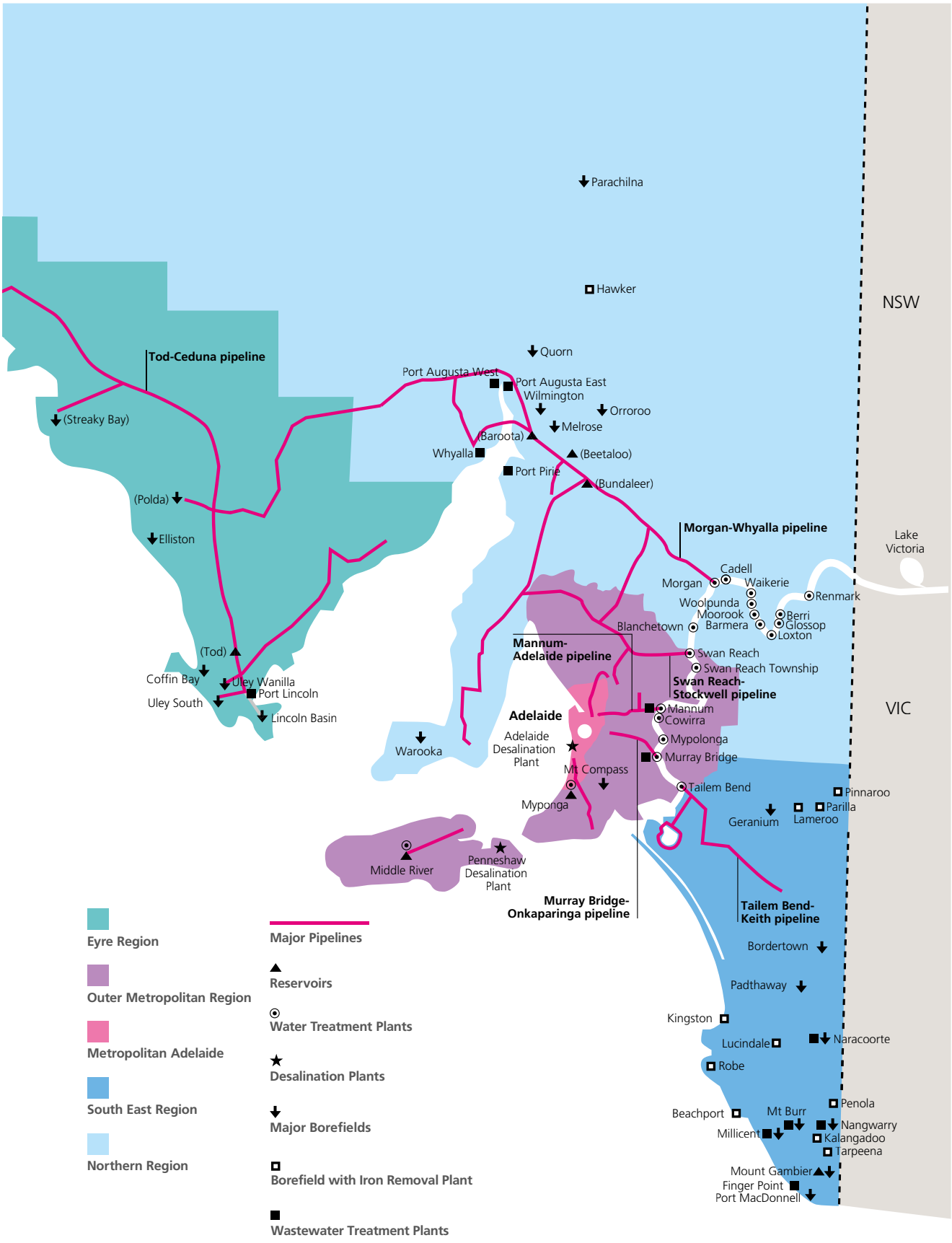
20 Global Water Intelligence, http://www.globalwaterintel.com/archive/13/5/general/new-conquest-rome.html.

Figure 2–4: SA Water assets – greater Adelaide area



Please note: Water treatment plant supply areas are indicative only and may vary according to demand and operational requirements.

Figure 2–5: SA Water assets – State-wide



(Reservoirs and bore fields in brackets are off-line)

2.2.1. Climate variability and change

South Australia – the driest state in the driest inhabited continent – is also a state of climatic extremes, with generally mild, wet winters and hot dry summers. The climate variation between different areas of the State served by SA Water is also extreme: from the cooler, wetter region in the south-east, to the hot and dry remote regions to the north.

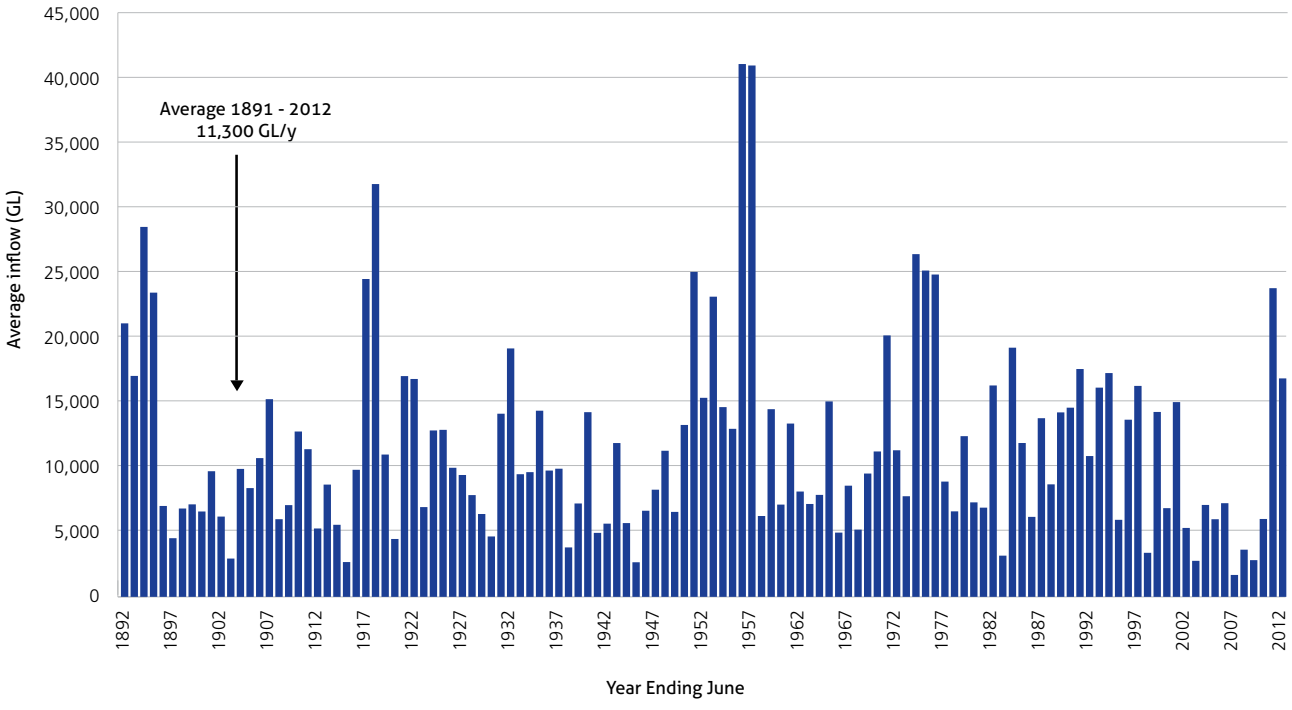
In the 30 years to 2010, Adelaide's average annual rainfall was lowest of the major capital cities – approximately half that of Sydney and about 10% lower than for Melbourne. The average number of days above 30 degrees (55.4) was more than three times higher, on average, than Sydney and almost double that of Melbourne. During this period, Adelaide recorded more days without rainfall than most other capitals[21].

Temperature and rainfall extremes in South Australia are generally more severe than those faced interstate and pose a number of challenges for SA Water and its customers. The key challenges include:

- Significant variances in the quality and yield of water associated with multiple, disparate sources of water;
- Meeting a demand which is highly weather-dependent, and difficult to predict in advance and, therefore, enable the optimisation of supply options;
- Low storage capacity: while other States have storage capacity for several years' supply, SA Water's metropolitan reservoirs hold approximately one year's supply; and
- High temperatures combined with low rainfall: Adelaide's highest temperatures are experienced in summer, at times of low rainfall. This means the periods of highest demand are generally from December to March, and water storages need to be supplemented by water from the River Murray and, under future extended drought conditions, from the Adelaide Desalination Plant ("ADP").

In South-East Australia, lower rainfall and higher temperatures over an extended period have had the effect of reducing run-off into the

Figure 2–6: River Murray system inflows 1892–2012[22]



21 Bureau of Meteorology, Climate Data Online, www.bom.gov.au/climate/data.
22 Murray Darling Basin Authority, www.mdba.gov.au (includes inflows to Menindee, excludes Snowy releases)

watercourses, rivers, aquifers and reservoirs upon which South Australia depends for its water supplies. As Figure 2–6 shows, until recently, reduced rainfall across the whole Murray-Darling Basin meant that flows into the River Murray were at their lowest levels since records began.

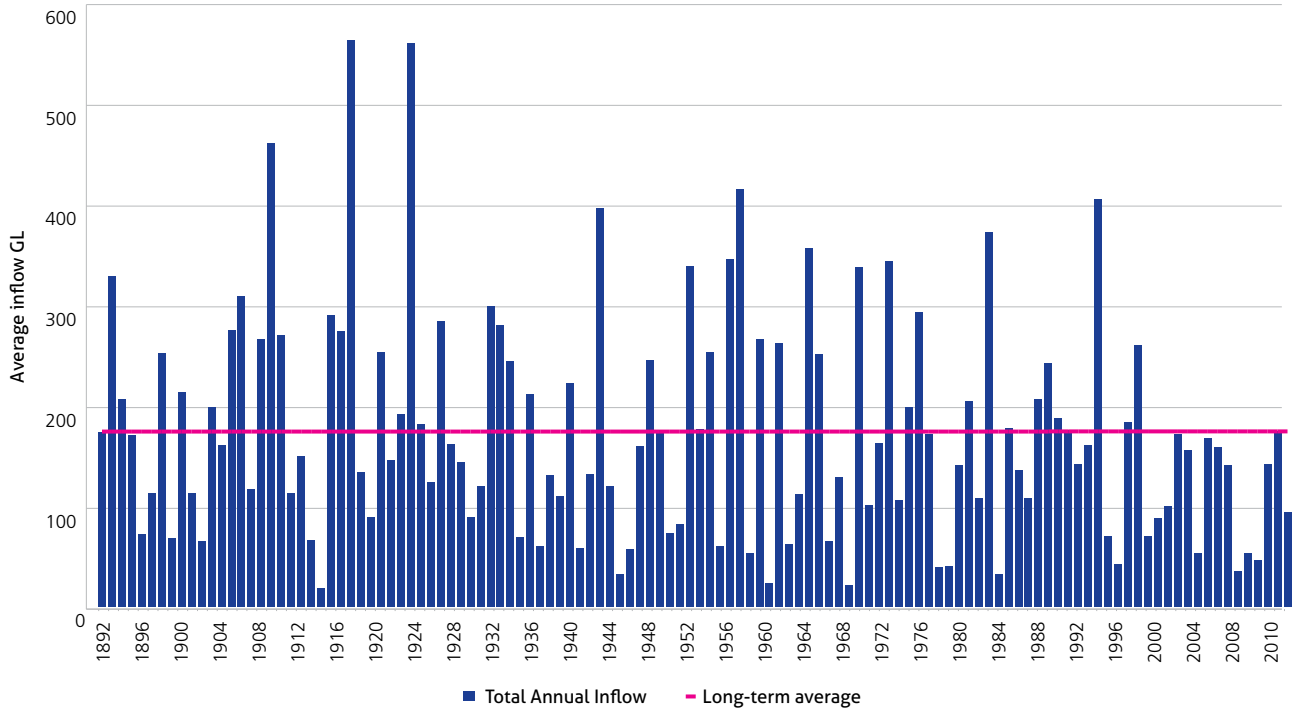
The prolonged drought that affected the Murray-Darling Basin forced SA Water to undertake a series of emergency and contingency measures from 2006, including:

- Construction of the $1.8 billion ADP and associated water distribution infrastructure;
- $13.4 million initial site access works for a temporary weir on the River Murray near Wellington as a contingency measure to stop intrusion of salt into the lower reaches of the river, from which water is drawn for SA Water customers and other river users;
- Construction of new pumps at Mannum, Swan Reach and Tailem Bend, and extensive modifications to existing major pumps to ensure they could continue to draw water from the river as the water levels dropped; and
- Acceleration of the $54 million Country Water Quality Improvement program, including construction of 9 new water treatment plants to deal with looming water quality issues for 17 country and regional communities.

Climate change has been identified by the Murray Darling Basin Authority as a significant risk to the availability of surface water in the Basin[23]. According to the Commonwealth Scientific and Industrial Research Organisation ("CSIRO"), future run off in the southern-most parts of the Basin may decrease by 15% by 2030[24].

Over the past 10 years significantly less rain and run-off also occurred in the surface-water catchment of the Mount Lofty Ranges, as shown in Figure 2–7, and many of the other catchments

Figure 2–7: Total natural annual inflows to Mount Lofty Ranges reservoirs 1892–2011[25]



23 Murray Darling Basin Authority, Proposed Basin Plan, www.mdba.gov.au/draft-basin-plan
24 CSIRO, Water Availability in the Murray-Darling Basin Report (2008), www.csiro.au
25 SA Water, Headworks Optimisation Model Adelaide data, June 2012.

for aquifers from which regional town water supplies are drawn. Recent experience has shown the previous assumptions made about the security of supply are no longer valid and the full impact of changing climatic conditions may not be fully understood for many years.

In terms of water quality, it is important to note flooding, rather than drought, can have the most serious effects on source water due to the flushing of accumulated soil, salt and organics into river systems. Treatment plants must be capable of dealing with multiple challenges in flood events such as those that followed the prolonged drought, as explained in later pages.

2.2.2. Water resource management

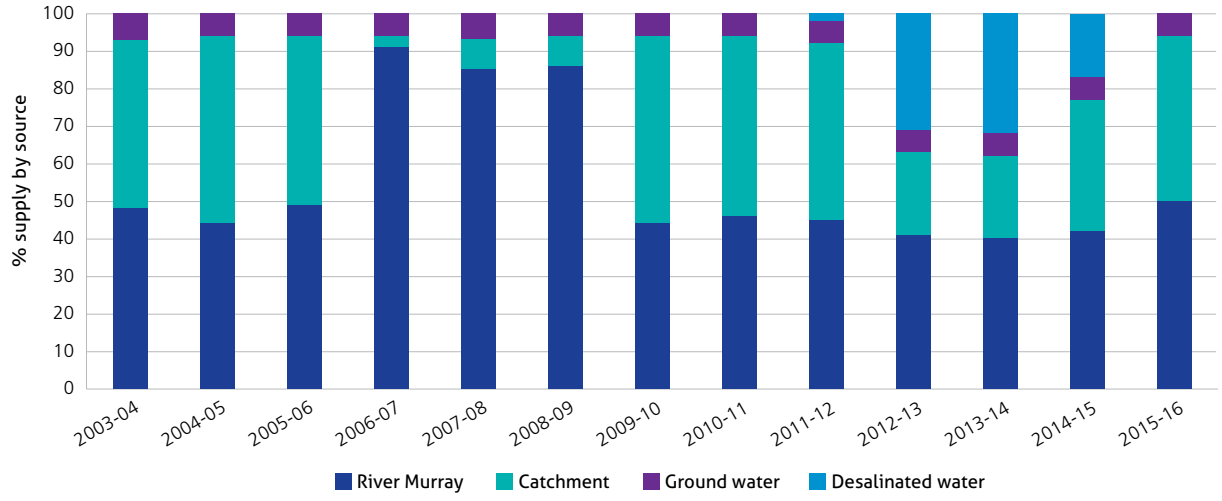
Water availability and storage capacity

SA Water extracts water from a variety of sources to meet customer demand. The climate changes described earlier in this chapter mean the profile of water sources will change significantly during the forthcoming regulatory period and beyond, primarily due to commissioning requirements of the ADP. Water sources available to SA Water are:

- The River Murray – subject to a water entitlement and allocation regime;
- Other surface water – predominantly from the Mount Lofty Ranges reservoirs;
- Groundwater reserves – aquifers in a number of regional areas; and
- The sea – a small desalination plant has operated on Kangaroo Island at Penneshaw for more than a decade, while the major ADP started producing water in 2011.

Figure 2–8 shows how these sources have been – and are forecast to be – used to supply the State, demonstrating the highly variable and changing nature of supply source. Desalinated water provided by the small Kangaroo Island desalination plant represents less than one percent and, therefore, is not reflected in the graph:

Figure 2–8: Water delivered and forecast to 2015–16 (% by source)



Although SA Water's draw on the River Murray accounts for approximately 1% of the total Murray-Darling Basin resource, approximately 90% of SA Water's customers receive at least some of their water from this river and, for more than 150,000 people in regional areas, it is the sole source of drinking water supply.

SA Water's extraction of water from the River Murray is governed by Federal and State legislation. At a Federal level, the Murray-Darling Basin Agreement – Schedule 1 of the *Water Act 2007* – specifies separate caps that apply to extractions by South Australia for metropolitan Adelaide and country towns. Within the framework of this Agreement, licences to extract water from the river are issued under the *SA Natural Resources Management Act 2004* and entitle SA Water to a share of the available resource, reflecting the caps required under the Murray-Darling Basin Agreement.

The entitlements provided by these licences are permanent. However, the amount that can be extracted in any one year varies in line with directions from the Department for Water. SA Water has access to other water allocations which provide a temporary right to extract a specific volume of water within a given year. These expire at the end of each year unless a carryover arrangement is in place with the relevant State government which allows for the water to be used the following year.

Along with River Murray licences, SA Water holds other licences issued under the *Natural Resources Management Act 2004* to access groundwater supplies, subject to a range of conditions, and primarily for the purpose of providing potable or non-potable water to certain country towns.

In terms of reservoir storage, SA Water faces greater challenges than interstate utilities, and there is a requirement for greater flexibility to transfer between different sources of water to meet demand. In 2010–11, the total water delivered to the greater metropolitan area was 129GL – equivalent to about 65% of the total reservoir storage capacity (200GL) in the Mount Lofty Ranges. On average, other capital cities have from two to five years' worth of reservoir storage[26]. Figure 2–9 provides a snapshot of reservoir storage available to SA Water for the metropolitan area compared to other State capitals and how this compared to 2010–11 consumption.

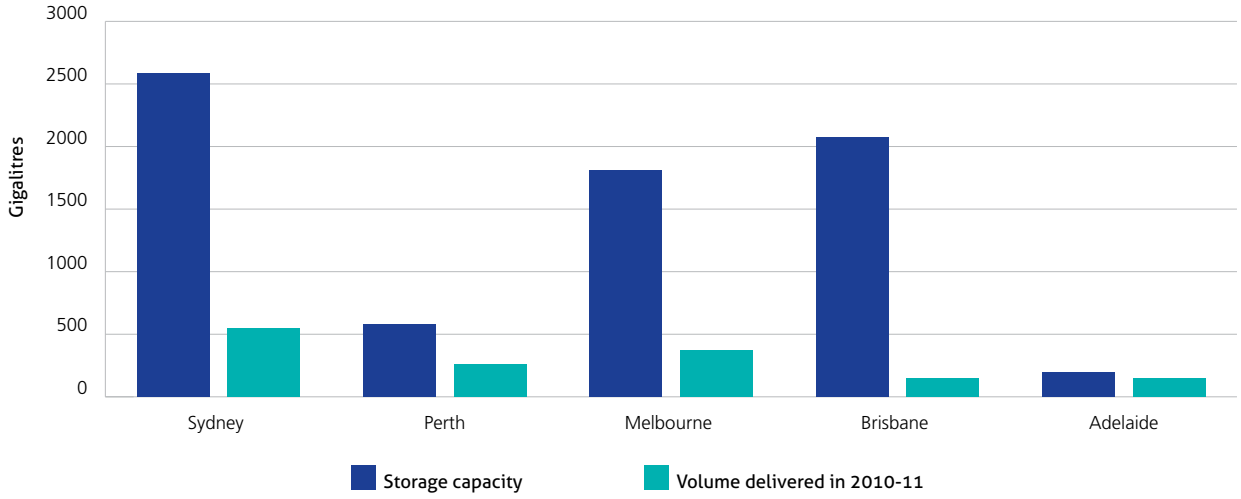
Interstate catchments are generally protected from development and other water-affecting activities. In contrast, most of SA Water's reservoir catchments are privately owned and open to multiple uses, as described in the water quality section later in this chapter. As a result of these issues, SA Water's supply systems are more vulnerable to influences from fluctuations in demand, climate variability and subsequent yield and water quality impacts.

Analysis undertaken into supply options as part of the South Australian Government's Water for Good plan indicated that the option of expanding storage in the Mount Lofty Ranges would impose significant social and environmental costs on the community. Options for increasing storage require further detailed assessment and, with other measures recently implemented, it is considered that such an option will not need to be explored until at least 2050.

Adelaide has far less storage capacity than other capital cities and its reservoirs are not in protected catchments such as many of those found interstate.

26 Australian Bureau of Meteorology, Water Sewerage levels for Australia, http://www.bom.gov.au/waterstorage/awris/, last accessed 20 July 2012.

Figure 2–9: Reservoir storage capacity for major cities compared to capital city volume delivered in 2010–11[27]



Groundwater

SA Water manages 46 separate groundwater systems, 36 of which are used to supply drinking water to customers. These systems serve populations ranging from about 50 in locations such as Parilla and Padthaway, to 25,000 in Mount Gambier, in the South-East. In some coastal areas, such as Robe, the population served increases tenfold during holiday periods.

The age and condition of these systems – as well as the quality and availability of water – varies significantly. Aquifers supplying source water often are challenged by limited recharge capacity (in some supply areas rainfall is less than 250mm a year) and are taken off-line or rested if the supply becomes depleted or quality declines. The systems are also often located in fractured rock aquifers (such as Hawker and Wilmington) or small freshwater lenses within a brackish water environment (such as Streaky Bay and Bordertown), which means the risks to the quality and quantity of available water can vary significantly in short timeframes. Combined, these issues mean that SA Water must implement intensive water quality treatment and monitoring regimes, significantly greater than those typically found in areas with higher rainfall and more readily available surface water.

Issues such as naturally occurring iron or arsenic content, salinity and other factors require discrete methods of treatment and management. Persistence of these issues in several locations has led to SA Water declaring supplies non-potable or investigating alternative sources of supply, typically through the construction of alternative bores and associated pipe infrastructure to transport source water across longer distances to township treatment plants. Iron Removal Plants (IRPs) have been constructed in towns primarily in the south east of South Australia, leading to dramatic improvements in aesthetic water quality. For instance, since the completion of the Kalangadoo IRP in 2003, the quality of water supplied to the township of Kalangadoo has improved such that iron levels in the bore water supply (which were slightly above 1.0 mg/L) have been reduced to levels averaging 0.016 mg/L in 2010–11, consistent with levels found in Adelaide's supply.

27 *National Performance Report 2010–11: urban water utilities*, National Water Commission, Canberra, and Australian Bureau of Meteorology information.

About 90% of SA Water's reservoir catchments are privately owned and open to multiple uses – meaning almost all of the source water has impaired quality, requiring greater treatment costs than for other States, where most catchments are protected.

Water quality

SA Water currently draws the bulk of its water from the end reaches of the River Murray, and the Mount Lofty reservoirs. About 90% of the reservoir catchments are privately owned and open to multiple uses, including agriculture, forestry and development. This means almost all of the source water has impaired quality, resulting in greater treatment costs than for other States where catchments are largely protected from development.

Due to the limited water storage capacity, all metropolitan reservoirs – with the exception of Myponga – are supplemented from the River Murray. Treatment plants are subject to significant variances in the quality of raw water and – as well as membrane treatment or full conventional treatment processes – additional advanced treatment is required to deal with changing pH, alkalinity, turbidity, organic matter and dissolved organic compounds, cyanobacteria/protozoa and dissolved oxygen. High turbidity and levels of organics require increased coagulant dosages, higher caustic dosing for pH correction and, in some cases, activated carbon dosing. These operational adjustments add significant operational and maintenance costs to the production of water for drinking.

Increases in algal species that produce taste and odour issues require increased powdered activated carbon (PAC) dosing at relevant treatment plants. For 10 Riverland water treatment plants serving about 150,000 people, the amount of PAC required more than trebled from 2008–09 to 2010–11 (24 tonnes to 88 tonnes), when major water quality issues affected the River Murray. In Mount Lofty reservoirs, *Anabaena circinalis* has persisted in larger reservoirs, requiring longer term monitoring and management programs, including the application of PAC to remove blue-green algal derived taste and odour compounds.

Another major water quality challenge for SA Water lies in delivering water through pipelines over long distances. This necessitates the use of chloramination (a combination of chlorine and ammonia) for disinfection, as it is longer lasting than chlorine alone and is crucial to minimise the risk from waterborne organisms, such as *Naegleria fowleri*.

SA Water is a world leader in the detection and management of cyanobacteria. During drought years, the subtropical species *Cylindrospermopsis raciborskii* became more prevalent and, while this species is not known to produce taste and odour compounds, it may produce potentially toxic components and is more difficult to detect. Routine algae sampling at Swan Reach showed average cell counts increasing from about 900 cells per mL in 2005 to more than 4,000 cells per mL in 2008, necessitating more frequent sampling, monitoring and toxin testing, along with aerial photography and routine monitoring. This species has now almost disappeared from the river as normal flows have resumed.

Water consumption

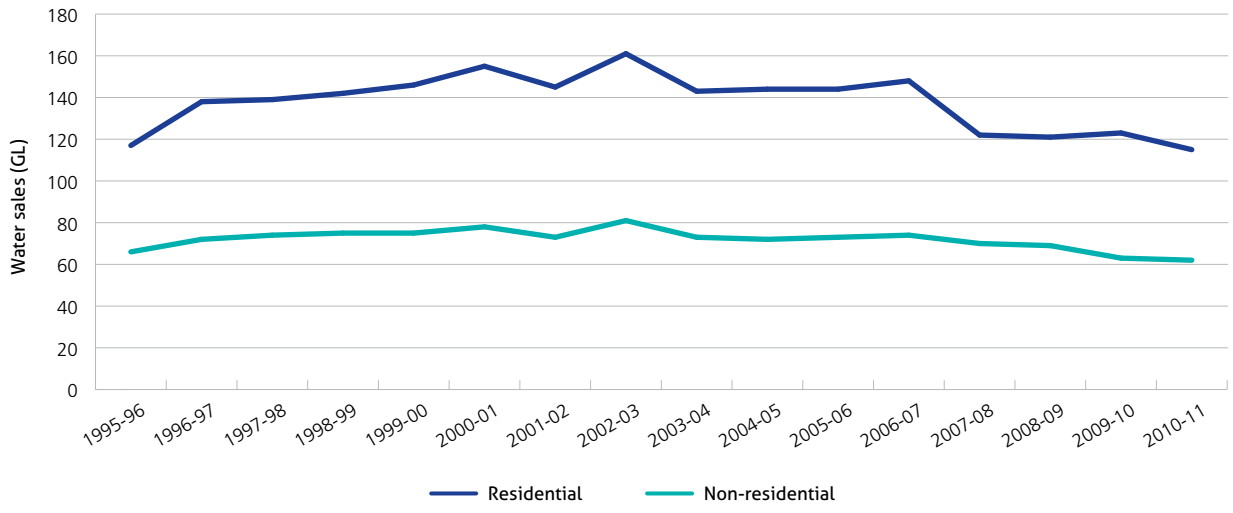
The population served by SA Water has grown significantly since the 1960s, however the trend in overall demand for water has been declining over the past decade. In 2010–11, the amount of potable water delivered to a population of 1.14 million metropolitan residents (129GL) was just 7% above the amount delivered to about 680,000 people in the early 1960s (approximately 119GL).[29]

The recent drought led to the introduction of Adelaide's first mandatory water restrictions in 2003 and, several years later, more severe restrictions across much of the State. The heightened awareness of the vulnerability of water supplies, and the introduction of measures to restrict outdoor water use, were highly effective in reducing demand.

In 2010–11, the amount of water delivered to a population of 1.14 million metropolitan residents was only 10GL more than the amount delivered to about 680,000 people in the early 1960s.

Potable water sales declined from approximately 220GL prior to the 2003–2009 drought years, to 196GL in 2010–11 (11% reduction), as shown in Figure 2–10. While this reduction has occurred across all customer groups, total average residential water sales declined from approximately 260kL per household in 2001–02, to 180kL in 2010–11 (28% reduction).

Figure 2–10: Total water sales by segment, 1995–96 to 2010–11[28]



28 SA Water annual reports, 1963–64 to 2010–11.
29 ACIL Tasman, SA Water's demand forecasting, July 2012.

When restrictions were eased in 2010, there was no immediate increase in water use, suggesting there has been a long-term change in water use within the community.

Despite reduced demand, the size and scale of SA Water's infrastructure continues to increase as more land is developed to facilitate population growth, and water quality, security and environmental requirements endure. Particularly in recent years, increased water prices have been necessary to ensure SA Water can continue to deliver high quality, reliable services to the community and recover the fixed costs of these investments.

2.2.3. Wastewater inflows, treatment and disposal

SA Water's sewerage networks are designed to carry and treat sewage that varies both in terms of volume and quality. Treatment plants employ a range of technologies – from modern, activated sludge processes, to technologies that are cheap to operate but would be unlikely choices if the plants were being constructed today. SA Water continues to balance operating costs against capital investment, while meeting its environmental obligations for discharging to the sea or inland water courses.

In meeting stringent environmental obligations and seeking to keep treatment costs to a minimum, SA Water employs a range of wastewater technologies – including older, low-cost processes – and recycles sewage where this represents the cheapest method of wastewater disposal.

The *South Australian Environment Protection Act 1993* requires SA Water to hold a licence to undertake a prescribed activity of environmental significance, including its wastewater treatment operations. As a condition of the EPA licence for each of the metropolitan wastewater treatment plants, SA Water is required to develop and implement an Environmental Improvement Program (EIP).

The $240 million EIP initiated when these licences were introduced in the 1990s was the largest infrastructure program in South Australia at the time, and involved major developments at all four metropolitan wastewater treatment plants and most of the 19 country plants. Benefits included reduction in the load of nitrogen in treated wastewater discharged to the marine environment – an issue which SA Water continues to tackle through treatment plant upgrades and reuse in order to meet EPA requirements.

In meeting its EPA licence conditions and environmental obligations SA Water has, over a number of years, focussed on recycling wastewater. A number of plants (Gumeracha, Mannum, Murray Bridge and Myponga) achieve 100% reuse. Licence conditions for the Aldinga wastewater treatment plant stipulate SA Water must not discharge any treated wastewater into the marine environment without the EPA's written consent. An Aquifer Storage and Recovery Scheme at Aldinga involves recycled water being stored in the aquifer in winter when irrigation demand is low, and then retrieved and used by irrigators during summer months.

The 2010–11 inflows and design capacities for the sewage treatment plants are shown in Table 2–3 and Table 2–4.

Table 2–3: Metropolitan wastewater treatment plant capacities and inflows

Location	Design capacity (ML/day)	Average daily inflow 2010–11 (ML/day)	Average daily inflow 2010–11 as % of design capacity
Metropolitan			
Bolivar	165	144.39	87.5%
(& Bolivar High Salinity)	32	23.87	74.6%
Glenelg	60	48.11	80.1%
Aldinga	2.1	1.52	72.4%
Christies Beach	45	26.48	58.8%

Table 2–4: Country wastewater treatment plant capacities and inflows

Location	Design capacity (ML/day)	Average daily inflow 2010–11 (ML/day)	Average daily inflow 2010–11 as % of design capacity[30]
Country			
Myponga	0.05	0.11	220.0%
Murray Bridge	2.12	2.56	120.8%
Gumeracha	0.13	0.14	107.7%
Angaston	0.43	0.45	104.7%
Port Pirie	4.1	4.23	103.2%
Hahndorf	1.01	0.98	97.0%
Finger Point	6.0	5.19	86.5%
Port Lincoln	4.0	3.10	77.5%
Victor Harbor	3.40	2.59	76.2%
Millicent	1.4	1.00	71.4%
Naracoorte	1.54	1.01	65.6%
Port Augusta West	1.26	0.75	59.5%
Heathfield	3.6	2.07	57.5%
Port Augusta East	2.66	1.51	56.8%
Whyalla	6.94	3.75	54.0%
Bird-in-Hand	2.4	1.15	47.9%
Mannum	0.81	0.38	46.9%
Nangwarry	0.24	0.10	41.7%
Mount Burr	0.24	0.06	25.0%

30 The hydraulic capacity of some plants enables them to process daily flows that exceed nominal design capacities.

2.2.4. Resourcing for efficiency

Although there are only two other Australian water utilities servicing more than 100,000 connections and covering an entire state or territory, and despite the significant challenges inherent in SA Water's operating requirement, SA Water's commitment to balancing service quality, reliability and cost outcomes for its customers means that it benchmarks favourably among its peers.

When benchmarked on the basis of a composite variable used to measure the size of a water utility, SA Water's operating expenditure for 2010–11 (the most recent year of actual expenditure available for benchmarking) falls within the "efficient" frontier (indicated by the dotted trend line in Figure 2–11).

SA Water's capital expenditure for 2010–11, with capital expenditure associated with construction of desalination plants removed for all utilities, similarly benchmarks favourably (refer Figure 2–12).

These analyses, as well as other analyses based on alternative benchmarking methods (including the method adopted by the National Water Commission (NWC) for national performance reporting) are described in more detail within chapter 6 (Capital Expenditure) and chapter 7 (Operating Expenditure) of this Proposal, and yield similar results.

Figure 2–11: Comparative analysis of SA Water's operating expenditure and size

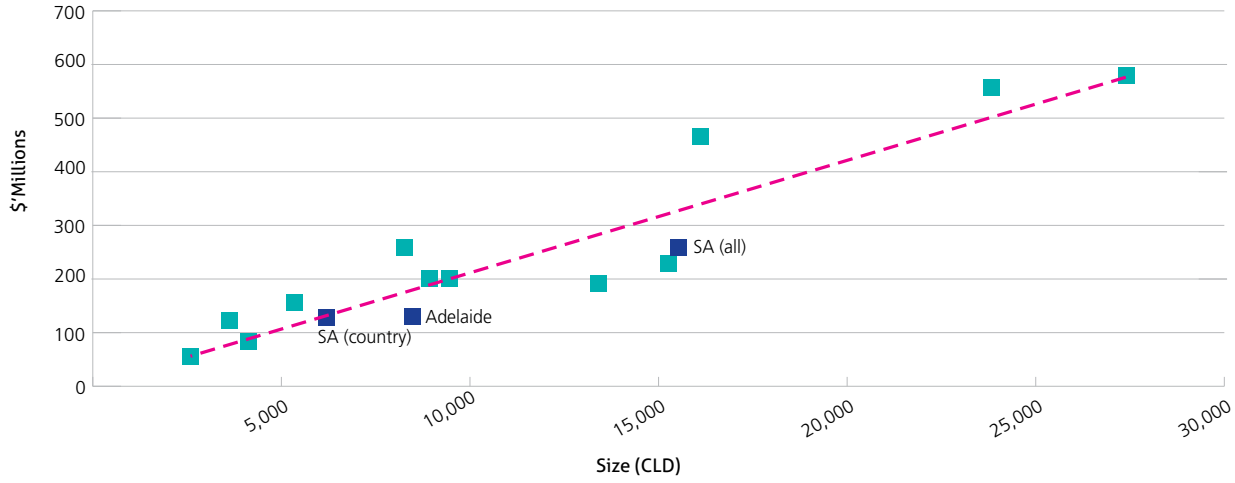
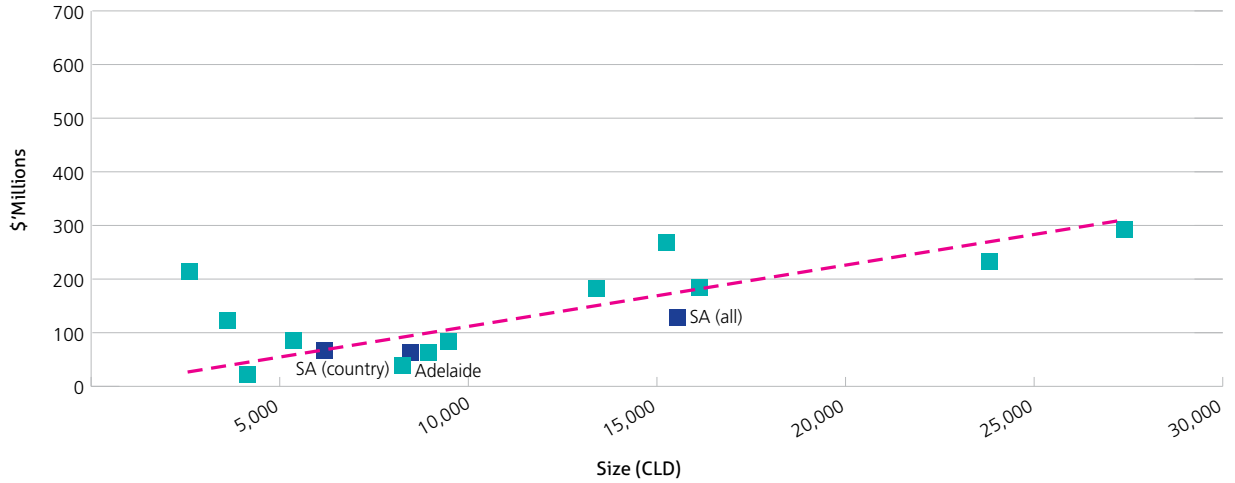


Figure 2–12: Comparative analysis of SA Water's capital expenditure and size (excluding desalination)



2.3. SA Water Strategic Plan: 2012–16

As highlighted in this Chapter, SA Water has a proud history of dealing with challenges by being innovative and adaptive.

SA Water's strategic priorities – summarised in Figure 2–13 will ensure SA Water remains resilient into the future and can achieve its purpose: 'delivering water and wastewater services in efficient, responsive, sustainable and accountable ways'.

Detailed on the following pages, these are: customers and community; quality and delivery; business success; and planning for the future.

Customers & community

With significant investment in water security infrastructure in recent years, water prices have risen significantly and this has had impacts on SA Water customers. Within the ***customers & community*** strategic priority, SA Water seeks to deliver services customers truly value and ensure external stakeholder views are integrated into decision making.

SA Water needs to understand, more fully, customer expectations about price and service. For example, SA Water's Customer Council has indicated it does not wish to see a reduction in service standards in order to reduce water prices. This view needs to be tested: is this view shared by

Figure 2–13: SA Water strategic priority areas

customers more broadly and what does it mean for the operations of the business?

Work is under way to improve a number of customer policies and processes, including SA Water's customer feedback and complaints management processes, management of hardship customers and billing processes. SA Water's commitments in these areas will be defined in its new Customer Charter, along with service commitments such as response times for water and wastewater issues, in line with the Water Retail Code released by ESCOSA.

A more detailed discussion of SA Water's commitment to customer service, the new Customer Charter and the Water Retail Code is provided in chapter 3 of this Proposal.

Quality & delivery

In terms of the ***quality & delivery*** strategic priority, SA Water's water and wastewater strategy will ensure products and services are fit for purpose, cost effective and comply with regulatory requirements. SA Water will continue to work closely with strategic partners, including Allwater and KBR, to deliver services efficiently, in line with customer expectations.

The excellent progress made over many years in managing water quality will continue, with a focus on meeting the regulatory requirements of the new *Safe Drinking Water Act 2011*. The water quality challenges of recent years have led SA Water to implement more permanent mechanisms for the monitoring and control of issues such as algae and cryptosporidium in rivers and reservoirs. At a number of water treatment plants, SA Water is installing new instrumentation to further enhance processes for identifying potential water quality risks and, through more rapid detection of any issues, reducing the risk to customers.

A major challenge for the future lies in the area of climate variability and various legislated responses to this issue. SA Water looks for opportunities to offset costs of energy, such as mini-hydro plants which can harness the power of water flowing through SA Water's pipes and generate revenue to offset the costs of delivering water and wastewater services. SA Water's strategic approach to managing its energy portfolio will be further enhanced to provide greater flexibility in the way energy is procured.

Business success

The ***business success*** strategic priority will include strategies that seek to pursue an equitable balance between delivering customer value and returns to the South Australian Government. A focus will be the development of structures, efficiencies and cultural initiatives to meet new business needs in the regulatory environment.

Technical skills development and workforce planning will be key strategies in the first regulatory period, with programs to target parts

SA Water's Anstey Hill mini-hydro plant – a joint venture with Hydro Tasmania – has been producing electricity from the flow of water through major pipelines and returning it to the grid since 2003.

The revenue received by SA Water from this plant helps offset the cost of SA Water's revenue requirement for delivery of direct control water services.

of the business where higher workforce turnover is forecast in the longer term. SA Water is also refining its occupational health and safety risk management and will further embed a safety culture across all activities. Engaging its workforce and partners, and ensuring leaders demonstrate strong safety leadership will be of critical importance.

A framework for strategy, risk and compliance will ensure risk management is integrated into all decision making processes. Electronic business systems and tools are being developed and implemented to assist SA Water with governance and compliance requirements. There will also be a focus on ensuring greater financial accountability at all levels of budget development, financial planning and performance reporting.

Planning for the future

Projections show a significant increase in Adelaide's population over the next 30 years. While customer numbers may fall in some areas of the State, many outer urban areas will expand and there will also be a greater focus on infill housing in the metropolitan area. SA Water needs to ensure networks can cater for this growth.

Stewardship of SA Water's assets – including ageing infrastructure and brand new investments – will be a key strategy in the ***planning for the future*** strategic priority.

A more sophisticated approach to prioritising and selecting capital projects will assess the value of investments (including to customers), the risk of not investing and the financial sustainability of each proposed project. Planning and managing vast networks of infrastructure to meet required standards of service, asset reliability and growth at the lowest cost and acceptable level of risk will be a crucial measure of success.

SA Water's portfolio of water sources to provide security to customers for the future has been significantly enhanced by the construction of the ADP. However, SA Water will continue to balance water supply and demand through a portfolio that includes purchased water entitlements. Its water resource and security portfolio strategy will seek best value options for supplying water to customers.

Recent changes to SA Water's asset management will ensure the business is in a better position to respond to the challenge of managing a mix of assets that includes ageing infrastructure and new, high-cost investments. Improved asset planning will focus on optimising whole-of-life costs of infrastructure and introduce better systems and processes to monitor the condition of assets across SA Water's vast water and wastewater networks.

For over 150 years, SA Water has been adaptive and innovative, responding to significant changes and challenges. The Corporation enters its first period of economic regulation having secured the State's water supply for the future, and maintaining high standards of service.

However, SA Water recognises it needs to be resilient to ensure it can manage changing and emerging expectations of customers and stakeholders. That's why its new Strategic Plan and this Proposal consider what needs to be delivered today, to ensure the success of the business for its customers and all South Australians into the future.

SA Water has developed this Proposal such that it provides the right balance between delivering safe, reliable, efficient and cost-effective services in a highly diverse and demanding environment, while at the same time delivering an appropriate commercial return to its owner, the South Australian Government.

Chapter 3
Customer Service

Key points

- Customers tell SA Water that the things they most value in their water utility are safe and healthy water, service reliability and responsiveness when things go wrong. In all of these areas SA Water has performed consistently well;
- In just two decades, SA Water has significantly improved the quality of the water to customer taps – reducing the number of customer complaints about water quality from almost 2,000 in the mid-1990s to less than 500 in 2010–11;
- SA Water has measured its performance against a range of customer service standards since 2005 and welcomes the opportunity to align these with a new Water Retail Code to be issued by ESCOSA;
- Relative to many of its peers, SA Water has low costs in relation to managing contacts from customers, and the SA Water Customer Service Centre is high performing – managing more calls per operator than most other major water utilities;
- SA Water's Customer Assist Program for customers facing financial difficulty has been praised by those who have used the service. The number of customers requiring this support has increased significantly since the Program was established in 2007; and
- SA Water joined the Energy Ombudsman Scheme early as a means of further improving its service to customers.

3.1. SA Water's commitment to customer service

SA Water is committed to providing a high level of customer service, in line with customer and community expectations, and doing so in a cost-effective way.

In the service areas customers say they most value – safe and healthy water, service reliability and responsiveness – SA Water performs exceptionally well in the face of significant challenges, including poor source water quality and the need to operate vast and diverse water and wastewater networks. These challenges are detailed in the preceding Business Context chapter.

SA Water's record in improving water quality for customers has involved major investment and innovation in water quality science, treatment plant upgrades and operating processes, so that the water delivered to customers today has vastly superior aesthetic qualities to the water delivered just two decades ago. Even in the face of Australia's worst drought in recorded history, SA Water customers continued to receive safe and reliable drinking water supplies.

In terms of responsiveness, SA Water has made significant improvements over many years in attending to water and wastewater outages, and restoring services to customers as quickly as possible.

While past research has shown customers are satisfied with the key services they receive from SA Water, the plans SA Water has in place will ensure it can maintain its standards of service into the future and deliver the levels of quality and reliability its customers expect.

In recent years, a number of steps have been taken to place customers at the heart of SA Water's decision making and planning processes.

These have included:

- Establishment of the SA Water Customer Council;
- Development of performance targets for customer services;
- Establishment of in-house community engagement capabilities; and
- Implementation of new programs to support customers facing financial difficulty.

SA Water's new Strategic Plan has a strong customer focus, with "achieving customer satisfaction" one of the four key performance outcomes for the Corporation. Strategies and initiatives to benefit customers are included in each of the strategic focus areas to ensure SA Water's excellent progress in the past will continue into the future.

3.2. Water Retail Code

In line with the *Water Industry Act 2012*, SA Water and other water industry licence holders will need to comply with a Water Retail Code ("the Code") that specifies obligations between the licence holders and their customers in relation to such matters as:

- Standard contractual terms and conditions;
- Minimum standards of service;
- Restrictions, disconnections and reinstatement of supply;
- Provision of information on pricing and other matters;
- Enquiries, complaints and dispute resolution; and
- Bill payment and related programs for managing customer hardship.

The Code – which broadly aims to protect the interests of South Australian water consumers – will be issued by ESCOSA in accordance with its powers under the *Essential Services Commission Act 2002*, and represents an important element of the regulatory framework which will apply to SA Water.

ESCOSA issued the draft Code in July 2012 to coincide with commencement of the *Water Industry Act* and is undertaking public consultation with a view to having the Code finalised when SA Water's licence commences on 1 January 2013. This Proposal is based on the draft Code.

SA Water will submit a formal public response to the draft Code as part of ESCOSA's consultation process. Once ESCOSA has considered all submissions in relation to the draft code, and following further discussion, SA Water may need to adjust its Proposal for ESCOSA's consideration prior to the release of its final pricing decision for the period 2013–14 to 2015–16.

SA Water has, for many years, had processes in place for managing these aspects of customer relationships and welcomes the opportunity to align its practices with the formal conditions detailed in the Code. SA Water has provided ESCOSA with information about its existing standards, customer processes and recent performance data to support preparation of the draft Code.

3.3. Customer Charter & performance

SA Water's Customer Charter ("the Charter") will provide information on SA Water's customer service commitments and processes for managing customer issues in relation to water, sewerage and other services. It will also set out customer rights and obligations in relation to these services.

In shaping the Charter, to be published in January 2013, SA Water has been guided by:

- *Water Industry Act 2012*;
- Other legislation (including the *Safe Drinking Water Act 2011* and *Environment Protection Act 1993*);
- Draft Water Retail Code 2012, issued by ESCOSA;
- Customer feedback, including through the SA Water Customer Council and customer satisfaction research; and
- Previous versions of its Customer Charter.

The Charter will apply to most SA Water residential and non-residential customers. The Charter will not cover certain services provided to a relatively small number of customers under separate arrangements. These include some small, rural townships and individual customers receiving non-potable water supplies.

Feedback from the SA Water Customer Council, past performance, customer research and benchmarking with other utilities has also been relied upon to determine appropriate levels of service commitment.

The setting of standards and performance targets is an important part of ESCOSA's price setting process. In its Guidance Paper[31], ESCOSA recognises SA Water should be allowed to recover efficient costs, including a return on investment, in exchange for providing customers with these agreed levels of service. The forecast costs SA Water provides to ESCOSA must be based on achieving the standards and targets set out in the Code.

For the draft Code, ESCOSA has proposed performance targets based on a 'best endeavours' approach and, for many indicators, has set the target at 100%. Based on assessment of performance to date, it is unlikely SA Water will be able to meet all of these targets unless, in some instances, significant and costly investment is made to upgrade networks and systems. While some of the targets may not be possible to meet, SA Water will comply with ESCOSA's directions by demonstrating it has employed its best endeavours with available resources to meet each target.

The targets to be outlined in the Charter – reflecting the draft Code – will relate to three broad areas of service delivery:

1. Quality of supply – namely water quality and delivery;
2. Reliability of supply – including response times to planned/unplanned interruptions, wastewater disruptions, information provision in these instances and restoration of services; and
3. Customer service – including telephone/written responses.

Performance targets in these areas are discussed in more detail below, along with SA Water's recent performance.

3.3.1. Quality of supply

Drinking water

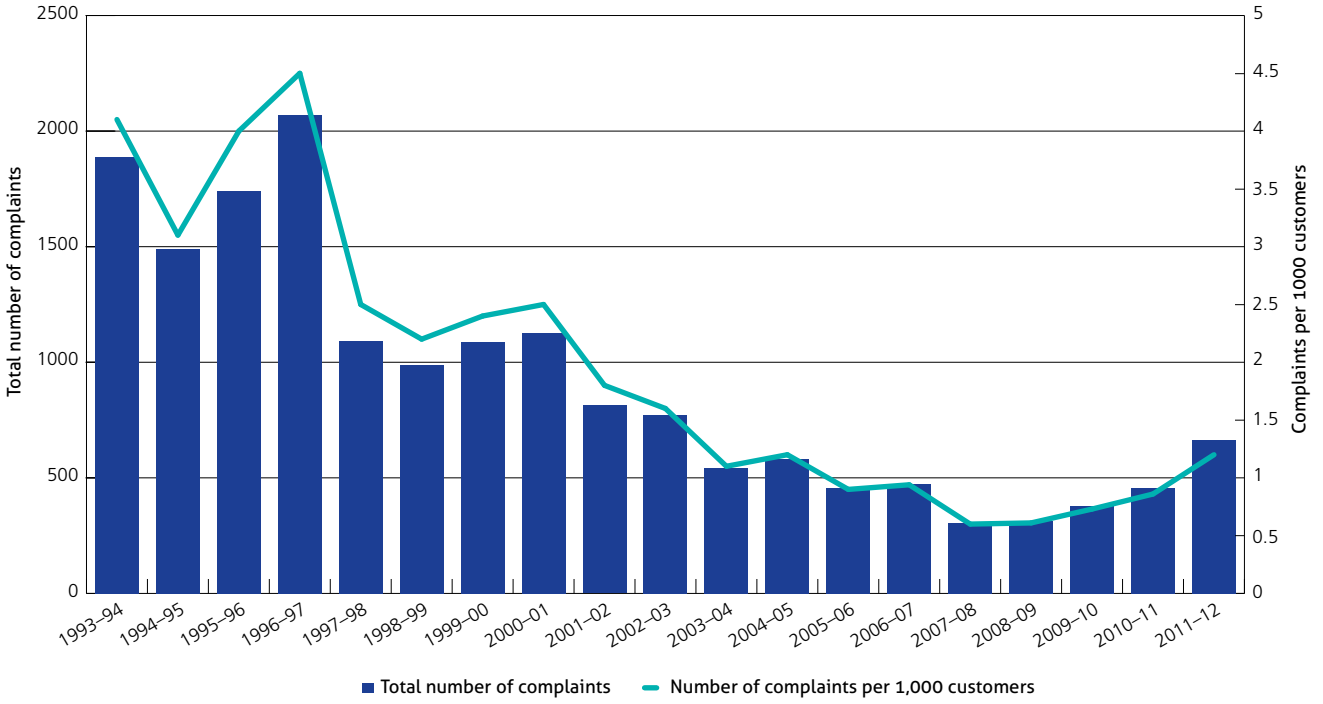
SA Water's customers receive drinking water from a variety of sources including the Mount Lofty Ranges reservoirs, the River Murray, groundwater and the ADP. While the quality of the raw water varies considerably and requires different treatment methodologies – as outlined in chapter 2 – SA Water is committed to providing drinking water it knows is safe and complies with relevant quality standards.

Since 2009 there has been a marginal increase in water quality complaints, largely stemming from the challenges related to floodwaters in the River Murray flushing accumulated soil, salt and organics into river systems. However, this marginal increase needs to be considered in the broader context of the significant improvements in water quality achieved by SA Water since the 1990s due to treatment plant upgrades and internationally recognised excellence in water quality management (including monitoring, testing and treatment). This is reflected in the dramatic decrease in complaints since that time, as shown in Figure 3–1.

In just one generation, SA Water has significantly improved the quality of the water to customer taps – reducing the number of customer complaints from almost 2,000 a year two decades ago to just over 650 today.

31 ESCOSA, Review of SA Water's Prices: 2013–14 – 2015–16 Guidance Paper, July 2012.

Figure 3–1: Customer drinking water complaints – metropolitan Adelaide



SA Water prioritises water quality complaints so that any potential health-related issues take precedence over aesthetic issues, such as taste, odour or discolouration. The target response times for these complaints will be detailed in the Customer Charter. In the metropolitan area in the past five years, 100% of water quality complaints for the three priority categories (Priority 1, 2 and 3)[32] have been responded to in line with target timeframes. There have also been performance improvements in country areas, with 100% attendance of complaints within target timeframes in 2010–11.

3.3.2. Reliability of supply

Water retail services

The Charter will detail SA Water's performance targets in relation to interruptions to supply, notification in the event of planned interruptions, attendance to bursts and leaks and restoration of supply.

In the metropolitan area, performance targets for responding to Priority 1[33] main breaks have been met within agreed timeframes 100% of the time over the past five years, while for country areas attendance within target timeframes has varied, as shown in Figure 3–2. Similar performance against targets has been achieved for restoring supply after a water main break, as shown in Figure 3–3.

While SA Water's performance has been good, it is conscious of issues relating to bursts and leaks, and community views about water loss. There are parts of the network where burst rates are higher, and SA Water has implemented asset management programs and practices to ensure it delivers consistent performance. For example, SA Water's cathodic protection asset program aims to protect mild steel pipes from corrosion, a particular issue given most of the soils found in South Australia are classified as corrosive. A program to retrofit protection to existing buried mild steel pipes is approximately 91% complete (almost 800km

32 "Priority 1" complaints in relation to water quality are where a customer indicates the water supplied is causing an adverse health reaction; "Priority 2" complaints relate to taste/odour or alleged contaminated water (without reference to an adverse health reaction); "Priority 3" complaints cover all other issues.

33 "Priority 1" breaks are defined as those that: result (or may result) in a total loss of supply to a customer/major loss of water; cause (or may cause) damage to property; or pose (or may pose) an immediate danger to people or the environment.

Figure 3–2: Attendance to water main breaks[34]

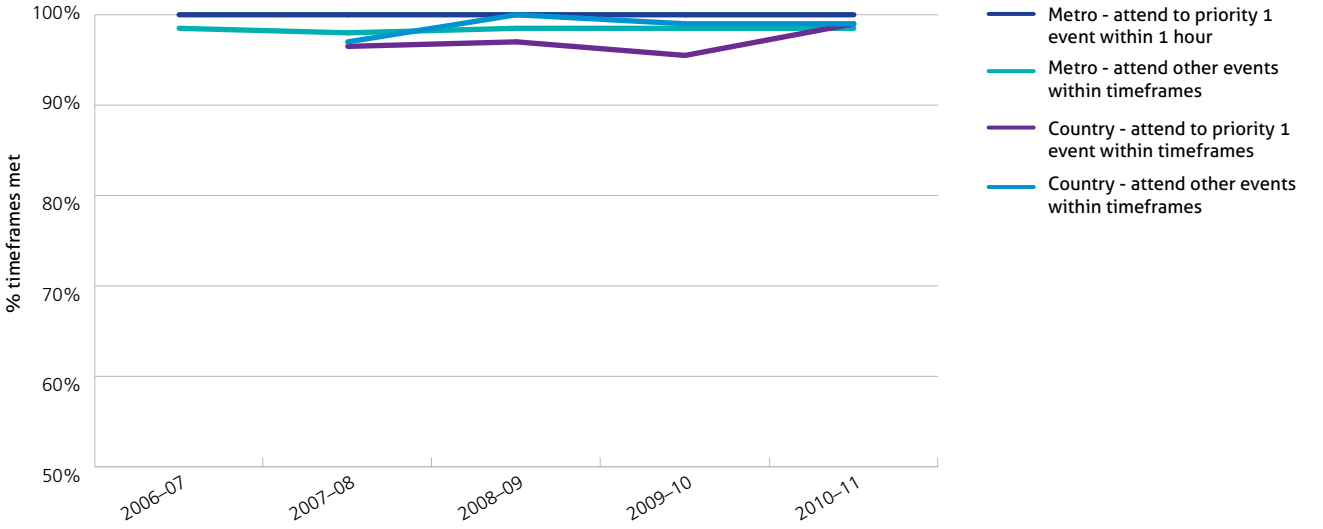
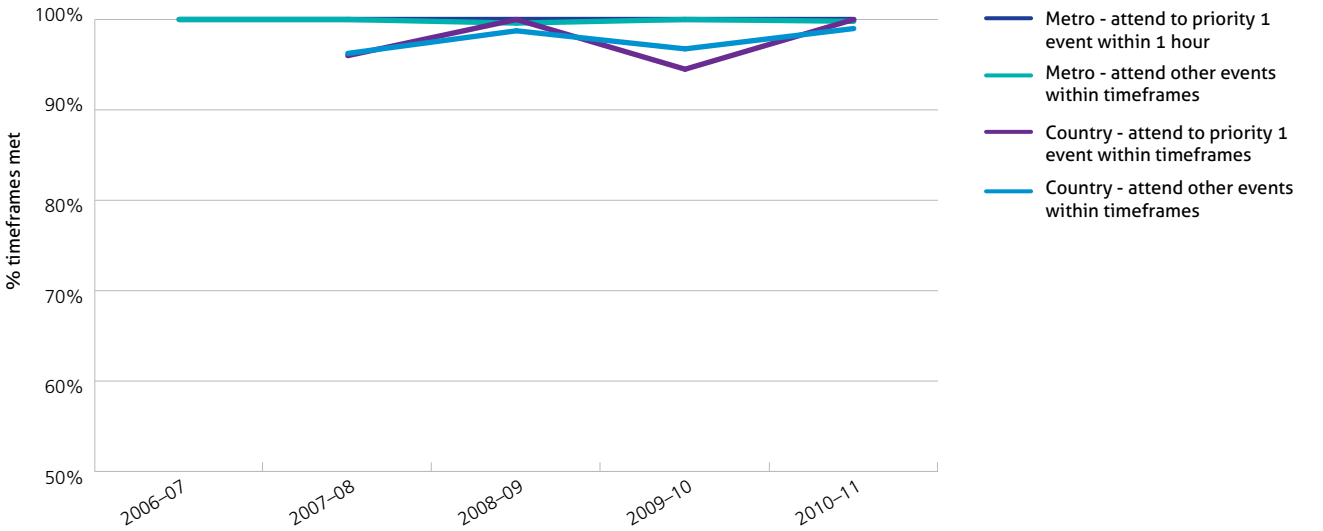


Figure 3–3: Restoration of supply after water main breaks[35]



protected) and, since the program was initiated in 1981, there have been no unexplained bursts or leaks on protected assets due to external corrosion.

Sewerage retail services

SA Water is mindful of the health and environmental consequences of sewer overflows and, as with water events, disruptions to service are prioritised according to severity and possible impact. SA Water has performed exceptionally well against its targets in metropolitan and country areas both in terms of responding to sewerage disruptions and restoring services to customers. From 2007–08 to 2010–11, SA Water achieved 100% of its target timeframes for restoration and cleanup in almost every year for each of the categories of service.

This performance has been achieved despite SA Water tracking marginally above the national average for major utilities in terms of the number of annual sewerage main breaks and chokes, and significantly higher for property connection

34 SA Water operational data, 2006–2011.
35 Ibid.

breaks and chokes[36]. These rates are largely due to specific challenges inherent in SA Water's dry operating environment. Approximately 80% of sewer main chokes can be attributed to tree root intrusion, while ground movement and reactive soils also have an impact.

Nevertheless, SA Water has significantly reduced the frequency of service disruptions in recent years, as seen in Figure 3–4 and Figure 3–5, as it has implemented strategies to manage these issues.

Approximately 700–800km of pipes are cleared each year by way of vapour rooting (the most efficient method to prevent roots from invading sewer pipes). SA Water intends to continue its vapour rooting program in future years, in addition to other strategies, to reduce sewer main and property connection breaks and chokes.

Figure 3–4: Sewer chokes – mains[37]

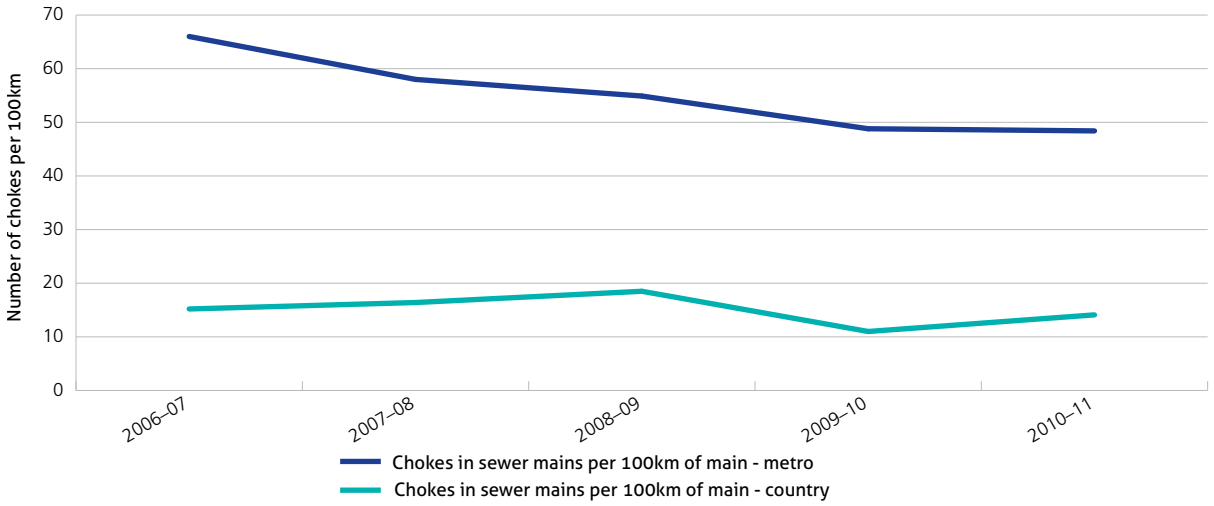
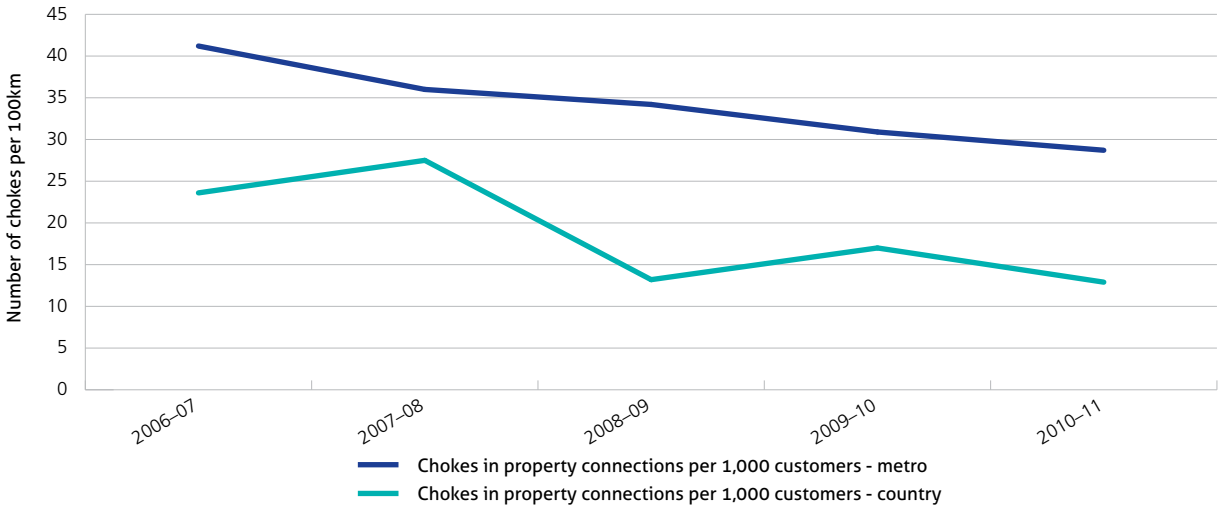


Figure 3–5: Sewer chokes – connections[38]



36 NWC, National Performance Report 2010–11, Part B, indicators A14 and A15, April 2012.
37 SA Water Annual Report 2010–11, September 2011, p84.
38 Ibid.

3.3.3. Customer service

Contacting SA Water

The primary customer contact channels to SA Water are via phone or email through SA Water's Customer Service Centre ("Customer Service Centre").

The Customer Service Centre's high performance was recognised in 2005, when it was named State winner in the Australian Teleservices Association (ATA) awards for call centres under 50 seats, and again in 2009 when its manager won the ATA Contact Centre Manager of the Year Award. The Customer Service Centre has received praise from customers who appreciate speaking to "real people" and customer satisfaction research has also shown consistently high levels of satisfaction in the overall service provided by operators[39]. The media has, on several occasions, favourably compared the timeframe taken to respond to calls by SA Water against other major utilities[40].

SA Water's response time for answering phone calls increased by about 10 seconds from 2007–08 to 2010–11, largely due to more complex inquiries following the move to quarterly billing and the price increases faced by customers. As part of the transition to a new metropolitan service delivery contract on 1 July 2011, the Customer Service Centre became available around the clock, responsible for managing all customer calls in relation to operational matters. This led to a significant increase in the volume of calls from 2010–11 to 2011–12 (386,657 to 495,054), and a lengthening of average wait times as operators adjusted to new work processes and scripts.

However, surveys of those who have made recent contact with the Customer Service Centre in 2010 and 2011 in relation to billing queries show high levels of overall satisfaction with how their calls have been handled (78% in 2010 and 82% in 2011 were completely satisfied), and the speed with which the calls have been answered (91% and 86%).

Other major utilities generally measure performance in terms of the percentage of calls answered by an operator within 30 seconds. SA Water introduced this performance measure in 2011–12 and responded within the 30-second timeframe 60% of the time. For other major utilities in 2010–11, this performance ranged from 60% to 97%, with a national average of 77%[43].

While the time taken to respond to calls has increased during this period of change, the IWA/WSAA benchmarking undertaken in 2011 shows SA Water's cost per contact remains the equal lowest of all utilities surveyed – as shown in

Relative to its peers in the Australian water industry, SA Water has low "costs to serve" per customer. Benchmarking undertaken as part of a 2011 customer service performance improvement project by the International Water Association and Water Services Association of Australia (IWA/WSAA) showed SA Water's cost to serve was $25 per connected property – well below the average of $31 and third lowest out of the 16 utilities surveyed.[41]

The benchmarking also showed SA Water's cost per customer contact received was the equal lowest of all utilities surveyed ($5, compared to a high of $21 and average of $8.90) and the number of calls handled per full time equivalent employee (13,700 per year, compared to an average of 7,700) was the second highest loading. [42]

39 SA Water customer satisfaction research: 2001–2011.
40 Channel 7 (Adelaide), *Today Tonight* 1 July 2010; *The Advertiser*, 12 February 2004.
41 Third Horizon Consulting Partners, WSAA Customer Service Cost to Serve Performance Improvement Project – SA Water Corporation Participant Report, December 2011. "Cost to serve" examines all costs relating to customer service including labour, contractors, overheads and indirect costs. The project report includes a disclaimer provided by its author specifically in relation to when this information is used in the regulation context. SA Water has provided a copy of this report as part of its submission and draws attention to this disclaimer, on page 2 of the report.
42 Ibid.
43 National Water Commission, 2010–11 National Performance Report, April 2012.

Figure 3–6: IWA/WSAA benchmarking – customer contact centre unit cost comparison[45]

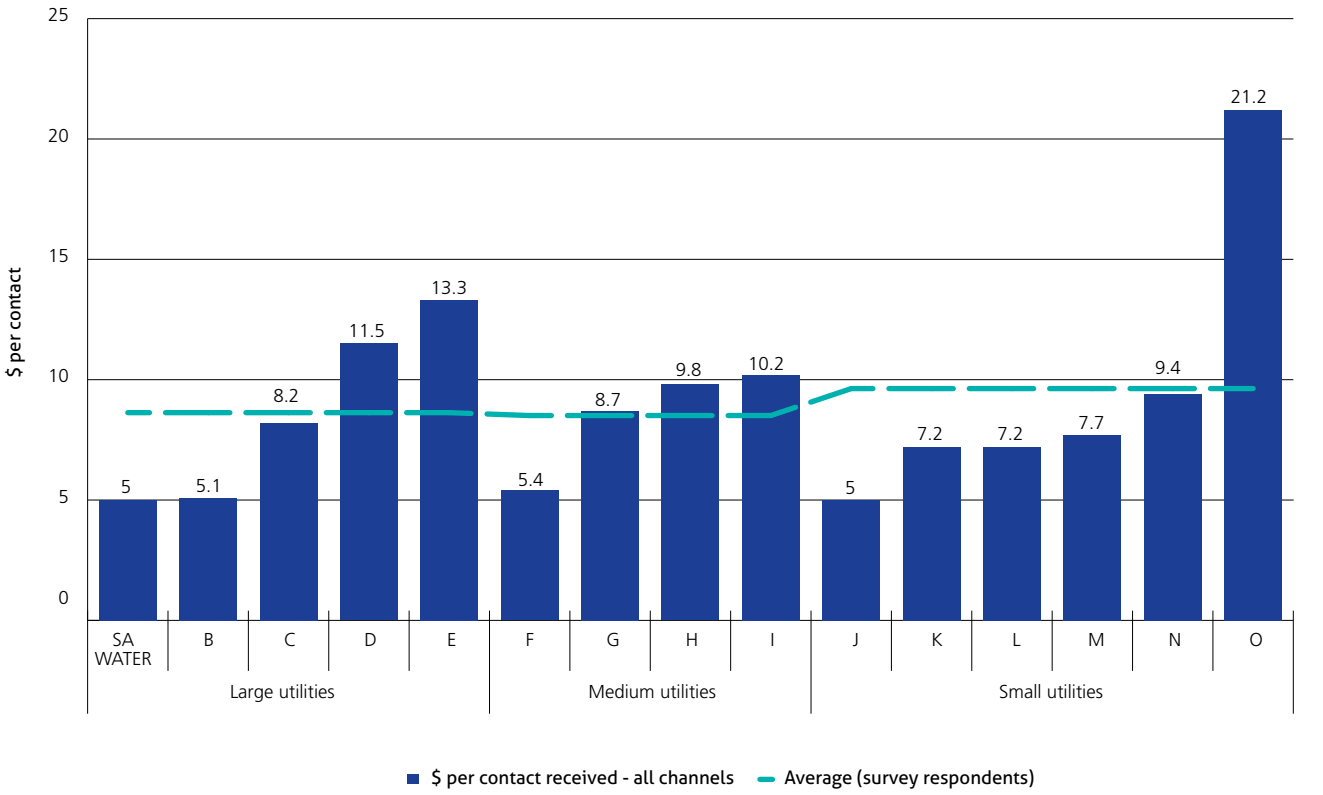


Figure 3–6 – and the number of calls handled per full time equivalent employee (13,700 per year, compared to an average of 7,700) is the second highest loading[44].

Feedback and complaint management

SA Water has implemented policies and procedures for monitoring and responding to customer feedback. Feedback directed to the Customer Service Centre is logged and assigned to designated officers for action.

SA Water's complaint handling practices are guided by *Australian Standard – Complaint Handling AS 10002–2006*. A complainant is provided access to an open and responsive complaint handling process. SA Water's overall aim is to satisfy the issue at the first point of contact. For those enquiries that cannot be resolved quickly, there is a process for escalating the issue and, where necessary, investigating within target timeframes.

Customers also have the right to seek external resolution of a dispute that has not been resolved to their satisfaction via the Energy and Water Ombudsman ("Ombudsman"). Although SA Water was not required to become a member of the scheme until the *Water Industry Act 2012* came into effect on 1 July 2012, the Corporation voluntarily joined in March 2012.

The Ombudsman provides an independent, free service to customers in the electricity, gas and water sectors. However, customers must have attempted to solve the problem directly with SA Water in the first instance. These new arrangements will enhance customer service, but as a participant in this scheme SA Water will be

44 Third Horizon Consulting Partners, WSAA Customer Service Cost to Serve Performance Improvement Project – SA Water Corporation Participant Report, December 2011.
45 Ibid.

required to pay an annual fee to the Ombudsman. To the end June 2012, the Ombudsman had referred 12 cases to SA Water, 11 of which had been resolved by the end of the financial year, and one of which was carried over into 2012–13.

SA Water accounts

SA Water sends out more than 2.6 million residential customer bills every year. In 2008–09, in consultation with its Customer Council, SA Water redesigned its residential account to provide more information about water efficiency, a better understanding of water consumption compared to similar households and a simpler explanation of water and sewerage charges. These changes were consistent with National Water Initiative guidelines that aim to promote water efficiency by providing information to allow residents to compare their own usage[46].

In 2012, SA Water undertook further customer research to better understand the current level of customer satisfaction with the SA Water bill – including content, readability, layout and design, payment options and how queries are handled[47]. The research involved focus groups and a telephone survey and key findings included:

- Overwhelming satisfaction with the layout and content of the SA Water bill and the total billing experience;
- 70% thought there were no better bills than those issued by SA Water (citing clarity/simplicity of information and the level of detail as key reasons); and
- Satisfaction with payment options was high (93%), with respondents wanting no change to the way they pay their bills.

Research undertaken by SA Water in 2012 has shown the overwhelming majority of customers (93%) are satisfied with their bill payment options and rate the content and layout of SA Water's accounts favourably against other bills they receive[48].

Hardship and pricing impacts

After years of serious and prolonged drought, and to prepare for the impacts of climate change on water resources, the South Australian Government announced in 2007 that water prices would need to increase over several years to ensure SA Water could invest in water security projects for the State's future. The most significant cost in infrastructure investment has related to the $1.83 billion ADP, but there have been major investments in other areas as well.

Prices are determined in the context of a range of Council of Australian Governments and National Water Initiative pricing principles, which include the adoption of pricing regimes based on user pays water pricing and full–cost recovery. This has translated to significant price increases for customers.

In 2007, SA Water introduced a Customer Assist Program ("Customer Assist Program") – including a Hardship Policy – to provide support and assistance to residential customers who were experiencing financial hardship and were unable to pay their bills. It was considered such a move was necessary to:

- Provide a consistent approach to working with customers experiencing hardship;
- Reduce the number of accounts requiring recovery action (and reduce the overall amount of debt owing);
- Limit the use of flow restriction as a credit management tool; and
- Fulfil obligations as an essential service provider by assisting customers and families in need.

46 Natural Resource Management Ministerial Council, National Guidelines for Residential Customers' Water Accounts, 2006.
47 SA Water Residential Billing Research 2012.
48 Ibid.

The Customer Assist Program was strongly supported by the SA Water Customer Council. For the past five years, using a case management approach, SA Water has worked with customers offering a number of assistance options including revised payment schemes, debt deferral, and retrofitting of plumbing to provide low water use options. Over that time the number of customers participating in the program has increased, as shown in Table 3–1. In 2010–11, the number of customers relying on this support almost trebled, and in 2011–12 it increased by a further 60%.

The Customer Assist Program has attracted praise from hardship customers and the social services sector. In 2011 SA Water undertook research, with the support of the SA Council of Social Services, to better understand the needs of customers experiencing financial stress, with a view to expanding and improving its hardship programs[49]. For the most part, the feedback from those customers in the Customer Assist Program and financial counsellors was highly positive, in particular in relation to their dealings with SA Water staff. Through the research SA Water has identified areas for improvement that it is now addressing, particularly in relation to:

- Mechanisms for identifying potential hardship customers;
- Early intervention strategies – including more targeted communication;
- Wider promotion of bill payment options;
- Ongoing skills development for customer service staff; and
- Processes for managing calls.

In addition to the Customer Assist Program, other support programs apply to specific customer groups. These include pensioner and low income household concessions, fully funded through Community Service Obligation payments from the South Australian Government to SA Water, and special rating exemptions for several classes of eligible properties.

3.4. Listening to customers

3.4.1. Customer research

SA Water has conducted annual customer satisfaction surveys through external market research providers since 2001, surveying residential and business customers, and those with a recent contact experience with the SA Water Customer Service Centre. Ad hoc research on specific programs has been undertaken from time to time.

In the past five years, respondents have consistently indicated high levels of satisfaction in the service quality and reliability attributes they have identified as most important, namely: providing safe and healthy drinking water; maintaining water and sewer infrastructure; and responding quickly if something goes wrong – as seen in Figure 3–7.

Table 3–1: Number of customers participating in SA Water's Customer Assist Program

	2006–07	2007–08	2008–09	2009–10	2010–11	2011–12
Metropolitan	68	243	111	261	692	1137
Country	51	182	64	129	374	554
TOTAL	**119**	**425**	**175**	**390**	**1,066**	**1,691**

49 SA Water Hardship Qualitative Research: October 2011.

SA Water's most recent customer satisfaction research, undertaken in April 2012, shows householders are very satisfied when it comes to SA Water providing the following key services – safe and healthy drinking water, water and sewerage services without interruption, water at an acceptable pressure and responding quickly if something goes wrong. Householders indicated relatively high levels of overall satisfaction with the job SA Water was doing, with an average rating of 7.3 out of 10[50].

While customer satisfaction levels have been tracked over time, SA Water plans to improve its research capabilities to assess more accurately areas where customers consider there are gaps in performance, and develop ways to refine service delivery in line with customer expectations. SA Water currently spends less on customer research than most other Australian water utilities[51].

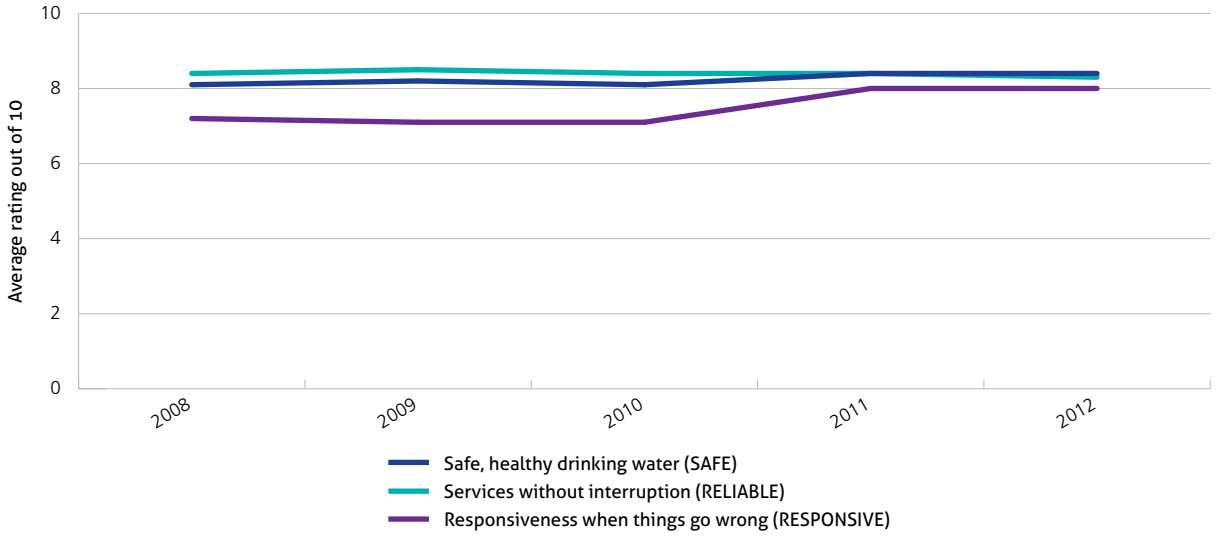
To this end, SA Water has proposed as part of its operating expenditure proposal for the forthcoming regulatory period to implement a refined customer research program to identify and address issues for customers more effectively. This will include:

- Quarterly customer satisfaction survey (quantitative and qualitative) of customers with recent service experience – measuring satisfaction against key service contact points and service standards;
- Major consumer issues/perception survey – every three years to allow SA Water to track key consumer issues and propose measures to address these in its plans;
- Caller experience survey – ongoing tracking of recent customer experience to identify areas for improvement; and
- Website experience surveys – to gauge levels of satisfaction with the SA Water website, better understand areas of importance in terms of communication and improve the customer experience.

3.4.2. SA Water Customer Council

The SA Water Customer Council ("Customer Council") first met in 2004 to increase interaction

Figure 3–7: Satisfaction with key service attributes – residential customers[52]



50 McGregor Tan Research, SA Water 2012 Customer Satisfaction Study, April 2012.
51 Third Horizon Consulting Partners, WSAA Customer Service Cost to Serve Performance Improvement Project – SA Water Corporation Participant Report, December 2011.
52 McGregor Tan Research, SA Water 2012 Customer Satisfaction Study, April 2012.

between SA Water and peak customer groups and, on average, has met five times a year. The Chair of the Council is appointed by, and reports directly to, the Minister for Water and the River Murray.

The Council recently has been separated into two groups to represent residential and non-residential customers and allow SA Water to undertake more targeted, relevant consultation with these sectors. The separate forums will continue to provide SA Water with mechanisms to:

- Obtain customers' views about its services, initiatives and policies;
- Seek guidance on appropriate ways to communicate with customers;
- Ensure it understands customer needs and can test assumptions about expectations; and
- Deliver information back to the community through the bodies represented on the Council.

In the past eight years, the Council has provided valuable feedback that has been used in development of policies, including SA Water's Hardship Policy, Customer Feedback Policy and Social Sustainability Policy. The Council also has provided advice on the content of the Customer Charter, the design and content of SA Water bills, impacts of water restrictions on the community and a range of communication activities.

3.4.3. Consultation on capital works

All capital projects delivered by SA Water must comply with SA Water's Corporate Project Management Methodology – a framework that includes stakeholder engagement in the development and delivery phases of projects, consistent with SA Water's Community Involvement Policy. Section 49 of the *Development Act 1993* also requires consultation for any project costing more than $4 million.

SA Water's Community Involvement Policy details commitments to engage and work collaboratively with communities and other key stakeholders. Depending on the nature and scale of a project or activity, this may range from the provision of information, to opportunities for the community to influence project decisions.

Where possible, SA Water engages with communities early, seeking input in the planning and development stages of projects. This helps ensure projects align with community expectations from the start and are less likely to face interruptions at later stages. For example:

- On numerous occasions, local councils and residents have assisted in determining final pipeline routes to ensure impacts on the community are minimised;
- Community feedback has helped inform traffic management plans to minimise interruptions to local traffic, provide alternative entry points for residents or redirect heavy vehicles; and
- For a number of projects, communities have provided input into landscaping plans and aesthetic aspects of infrastructure.

Community engagement is also crucial in developing SA Water's 25-year long term plans for infrastructure. This engagement will usually include a number of steps including providing information about infrastructure in the area and options for future enhancements, inviting comment to gauge particular areas of community interest and seeking feedback from key stakeholders, including local government. The Eyre Peninsula Long Term Plan, for instance, was developed after consultation that included:

- A water summit of key stakeholders;
- Establishment of a Reference Group to review the plan;
- Establishment of a Technical Working Group to exchange technical information critical to the development of the plan;
- Distribution of 15,000 information brochures to the community inviting contributions; and
- 19 community information sessions.

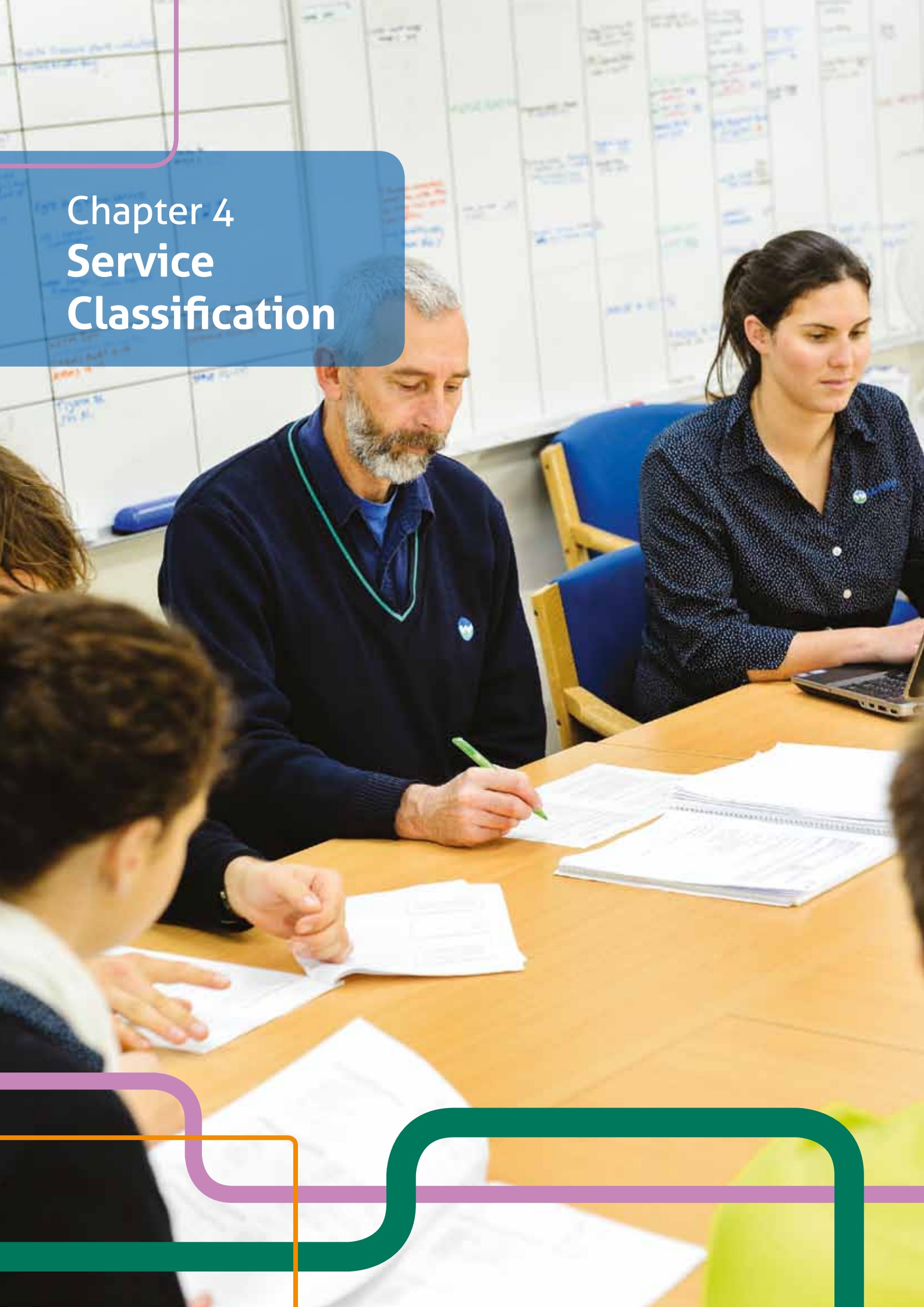
Customers have consistently told SA Water the areas of most importance to them are:

- Water that is safe to drink;
- Reliability of water and wastewater services; and
- Responsiveness when something goes wrong.

While customer satisfaction in these areas has remained high for the past decade, SA Water will continue to seek more efficient and cost effective ways to deliver services and products to customers.

With its new Strategic Plan in place and Customer Charter being finalised, SA Water is sharpening its focus to ensure that the services it delivers remain aligned with customers' expectations.

This Proposal has at its heart three key attributes that resonate with customers – safe, reliable, responsive.



Chapter 4
Service Classification

Key points

- SA Water has classified its services in accordance with the definition of a retail service provided in the *Water Industry Act 2012*, and guidance provided by ESCOSA. Consistent with ESCOSA's guidance, SA Water has further classified its retail services as either direct control or excluded retail services.
- The direct control water and sewerage services provided by SA Water encompass service provision to residential, commercial and other non-residential customers.
- SA Water has developed a cost allocation method by which it appropriately allocates costs between provision of its direct control, excluded and non-regulated services. This cost allocation method has been subjected to an independent assurance engagement by KPMG.

4.1. Purpose

This chapter of the Proposal:

- Describes the services provided by SA Water;
- Classifies these services in accordance with relevant legislation and the classification method agreed between ESCOSA and SA Water (referenced by ESCOSA in its Guidance Paper[53]) and comprises:
  - Retail services that are classified either as "direct control" or "excluded" services; and
  - Non-regulated services; and
- Outlines the methodology adopted by SA Water to allocate costs between:
  - Direct control, excluded and non-regulated services; and
  - Water and sewerage retail services.

4.2. Retail services

The *Water Industry Act 2012* ("the Act"), in tandem with the *Essential Services Commission Act 2002*, gives ESCOSA the power to regulate prices and standards in relation to the provision of SA Water's "retail services", defined within section 4 of the Act to be a service constituted by:

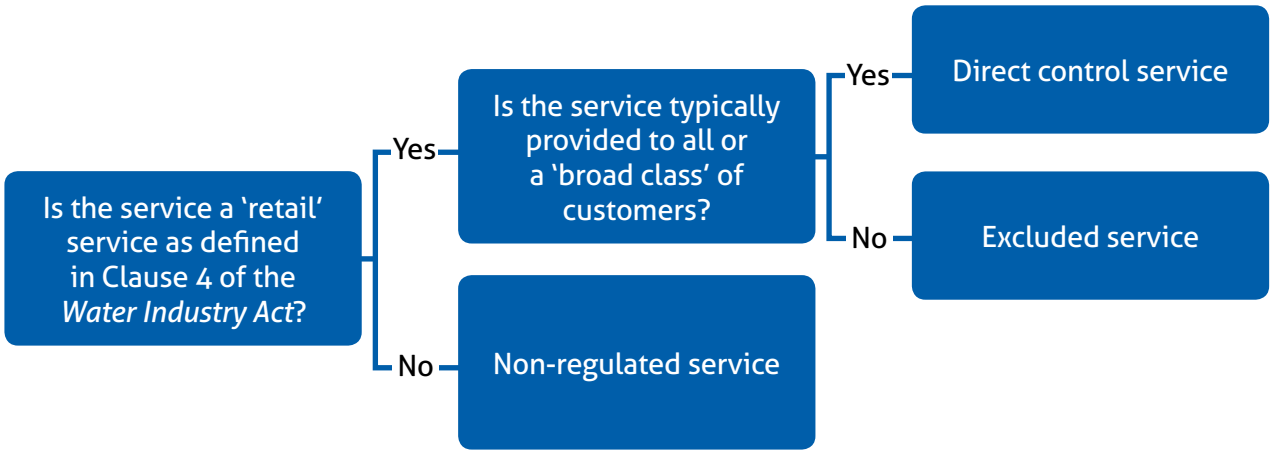
(a) The sale and supply of water to a person for use (and not for resale other than in prescribed circumstances (if any)) where the water is to be conveyed by a reticulated system; or

(b) The sale and supply of sewerage services for the removal of sewage, (even if the service is not actually used) but does not include any service, or any service of a class, excluded from the ambit of this definition by the regulations.[54]

In addition to retail services such as those described above, SA Water provides other services such as water quality testing, research and development, and water engineering technology services on a commercial basis. These services – termed "non-regulated services" – are not subject to price regulation as they do not fit the definition of a retail service within section 4 of the Act. Section 4.5 of this chapter describes the cost allocation method developed by SA Water to ensure that the costs associated with provision of these non-regulated services are appropriately dealt with.

53 ESCOSA, Review of SA Water's Prices: 2013/14 – 2015/16 Guidance paper, July 2012, p4–5.
54 *Water Industry Act 2012*, section 4.

Figure 4–1: Service classification decision tree



With respect to retail services, the *Essential Services Commission Act 2002*[55] enables ESCOSA to apply different forms of price regulation to specific categories of retail services. In its Guidance Paper ESCOSA has stated its intention that SA Water's retail services should be separated into direct control services and excluded services[56]. In distinguishing direct control versus excluded retail services, ESCOSA's Guidance Paper indicates that:

> *"In general, excluded services are those provided to specific customers and the cost of such services should therefore be recovered through specific charges to those customers (or potential customers) rather than being costs paid for by all customers through tariffs."*[57]

Based on this guidance, SA Water has employed the service classification decision tree shown in Figure 4–1, the two key decisions being:

i. Whether the service is a retail service (and therefore subject to regulation); and
ii. If the service is a retail service, whether it is provided to all or a broad class of customers (in which case it is classified as a direct control service).

According to this classification method, any retail service that is not deemed a direct control service is deemed an excluded service.

4.3. Direct control services

Applying the service classification decision tree detailed in Figure 4–1, SA Water has determined that it provides the following direct control services:

i. Sale and supply of water ("direct control water service"); and
ii. Sale and supply of sewerage services ("direct control sewerage service").

Provision of these services requires the construction, maintenance and operation of infrastructure and includes activities such as asset refurbishment, preventative and corrective maintenance, management of water quality, research into water quality and environmental issues, and the management of water reserves.

For the avoidance of doubt, the direct control sewerage service provided by SA Water includes the sale and supply of sewerage services to residential, commercial and other non-residential

55 *Essential Services Commission Act 2012*, section 25(3)
56 ESCOSA, Review of SA Water's Prices: 2013/14 – 2015/16 Guidance paper, July 2012, p4–5.
57 Ibid, p4.

customers – including those subject to alternative "Trade Waste" tariffs. The waste from all such customers is transported and treated using common infrastructure and methods, with different tariffs applying to reflect waste treatment and disposal costs.

Also for the avoidance of doubt, SA Water has examined the drivers underpinning each of the schemes it currently operates with respect to water "recycling" and "reclamation". Through this review SA Water has determined that there are two key drivers underpinning these schemes, and that it is appropriate to incorporate the operation of these schemes within its direct control water and sewerage services as follows:

i. *Wastewater recycling schemes aimed at securing the least-cost option for treating and disposing of effluent in accordance with Environment Protection Authority ("EPA") requirements:* incorporated within the direct control sewerage service, with any revenue derived from the reuse of treated wastewater used to offset the cost of the direct control sewerage service; and
ii. *Demonstration sites to assess storm water reclamation as a water supply resource:* incorporated within the direct control water service, with any revenue derived from the beneficial use of the reclaimed stormwater used to offset the cost of the direct control water service.

The capital and operating expenditure forecasts detailed within this Proposal have been developed on this basis.

The form of revenue control proposed by SA Water in relation to each of these direct control services is detailed within chapter 10 (Required Revenue and Pricing) of this Proposal.

4.4. Excluded services

The service classification decision tree drawn from ESCOSA's Guidance Paper (refer Figure 4–1) indicates that excluded services are retail services provided for individual customers, or a narrow class of customers.

This service classification allows for any future specific requirements of individual customers, or a narrow class of customers, to be met and charged appropriately – such that those customers who require a specific service cover the cost of its provision through a specific charge, as opposed to its cost being paid for by all customers through tariffs.

The key excluded services currently offered by SA Water are:

- Standard and non-standard water connection services;
- Standard and non-standard sewerage connection services;
- Annual sewerage and recycled water audit services;
- Easement extinguishment services;
- Fire plug flow testing services; and
- Network analysis services.

A summary of the key services delivered by SA Water showing their regulatory classification is provided in Table 4–1.

A complete list of excluded services currently offered by SA Water is provided in Attachment D.1 to this Proposal. The capital and operating expenditure forecasts detailed in this Proposal have been adjusted to exclude costs associated with provision of these services.

Table 4–1: Regulatory classification of key services provided by SA Water

Direct control services	Excluded services	Non-regulated services
• Sale and supply of water; and • Sale and supply of sewerage services.	• Standard and non-standard connection services; • Miscellaneous minor services; • Annual sewerage and recycled water audit services; • Easement extinguishment services; • Fire plug flow testing services; and • Network analysis services.	• Laboratory services provided on a commercial basis; • Project management services provided on a commercial basis; • Water transportation services provided to third parties; • Operation and maintenance of the River Murray lock system; • Soil and sand testing services; • Emergency functional services; and • Metropolitan floodwaters drainage administration.

4.5. Cost allocation methodology

SA Water has developed a Cost Allocation Methodology ("CAM") to:

- Appropriately allocate costs between provision of its direct control, excluded and non-regulated services;
- Satisfy the information requirements specified by ESCOSA in its Guidance Paper; and
- Establish the methodology to be used for all regulatory financial reporting.

Among other things, ESCOSA's Guidance Paper specifies information requirements in regard to the expenditures that SA Water submits as part of this Proposal, and how expenditures should be separated and allocated. For example, it requires operating expenditures to be split by:

- Category (water or sewerage);
- Service (direct control, excluded and non-regulated); and
- Resource (direct labour, contract labour, materials and other).[58]

Attachment D.2 to this Proposal describes SA Water's CAM including:

- The general cost allocation principles and policies adopted;
- The methods for allocating costs to a service including the allocation of directly attributed costs and allocated costs; and
- The processes to allocate costs to business segments.

SA Water's CAM has been subjected to an assurance engagement by independent auditors KPMG to confirm that it satisfies ESCOSA's requirements, and financial accounts have been properly applied in preparation of this Proposal. KPMG's assurance is provided as Attachment D.3 to this Proposal.

58 ESCOSA, Review of SA Water's Prices: 2013/14 – 2015/16 Guidance paper, July 2012, p 13.

Chapter 5
Demand Forecasts

Key points

- Demand for water has fallen significantly, primarily due to serious drought and price increases – from 222GL in 2006–07, to 184GL in 2011–12 (17%). Despite the easing of water restrictions in December 2010, water consumption will not return to pre-drought levels during the forthcoming regulatory period;
- Price elasticity of demand for water, combined with other factors, is expected to suppress growth in water use through to 2015–16, with residential demand forecast to increase by approximately 7.5GL (4.3%) during this period;
- Demand for water has become much more volatile in recent years, leading SA Water to engage independent experts ACIL Tasman to develop sophisticated demand forecasting models. Despite this, demand forecasts have a high degree of uncertainty; and
- While water demand is considered on a State-wide basis (apart from smaller, stand alone systems), the nature of SA Water's primarily disconnected and diverse wastewater zones requires the Corporation to consider more localised forecasts for its sewage demand.

5.1. Demand for water services

5.1.1. Water use in 2011–12

In the decade leading up to 2006–07, water use by SA Water's customers averaged approximately 220GL per annum, fluctuating by approximately 10% per annum due to variances in temperature or rainfall. However, in recent years this demand has decreased significantly, as shown in Figure 5–1. Demand in the past four years has ranged from 175GL to 189GL – well below the 226GL average for the five years leading up to 2003–04.

The introduction of more stringent water restrictions, campaigns to change community water use behaviours, water management programs (such as those aimed at reducing local government water use and H_2OME rebate[59]), installation of water efficient technology and, more recently, price increases all have contributed to this decline in demand.

Despite water restrictions being eased in December 2010, an immediate "bounce back" in water use has not occurred. While there has been a marginal increase in 2011–12, current consumption remains well below levels experienced when Level 3 restrictions were imposed in 2006–07.

Demand by residential customers accounts for approximately 67% of the total, with non-residential customers' demand representing 33%[60]. This ratio of water use has remained relatively steady for many years, and is not forecast to change significantly in the foreseeable future.

Although the ratio is not forecast to change significantly, there are key uncertainties facing SA Water during the forthcoming regulatory period which make it particularly difficult to forecast water use, including:

- Impacts of a new Third Party Access regime;
- Weather conditions;

59 Department of Environment, Water and Natural Resources, Water for Good, http://www.waterforgood.sa.gov.au/using-water/rebates/.
60 Figures based on 2011–12 forecast: ACIL Tasman, SA Water's demand forecasting, July 2012.

- Price elasticity; and
- The degree of "bounce back" in consumption.

The general decline in water demand is evident across all regional areas, as shown in Table 5–1. The metropolitan area recorded the largest reduction in terms of volume of water consumed (25GL – or 20% over 10 years). However, the largest reductions as a percentage of overall use were experienced in the South-East (4GL – or 24% over 10 years) and on Eyre Peninsula (2GL – or 24%).

In recent years, various demand management initiatives and, more recently, price increases have contributed to a significant reduction in water use by SA Water's customers. Despite the easing of water restrictions, an immediate "bounce back" in demand has not occurred.

Figure 5–1: Water demand 2001–02 to 2011–12, all customers[61]

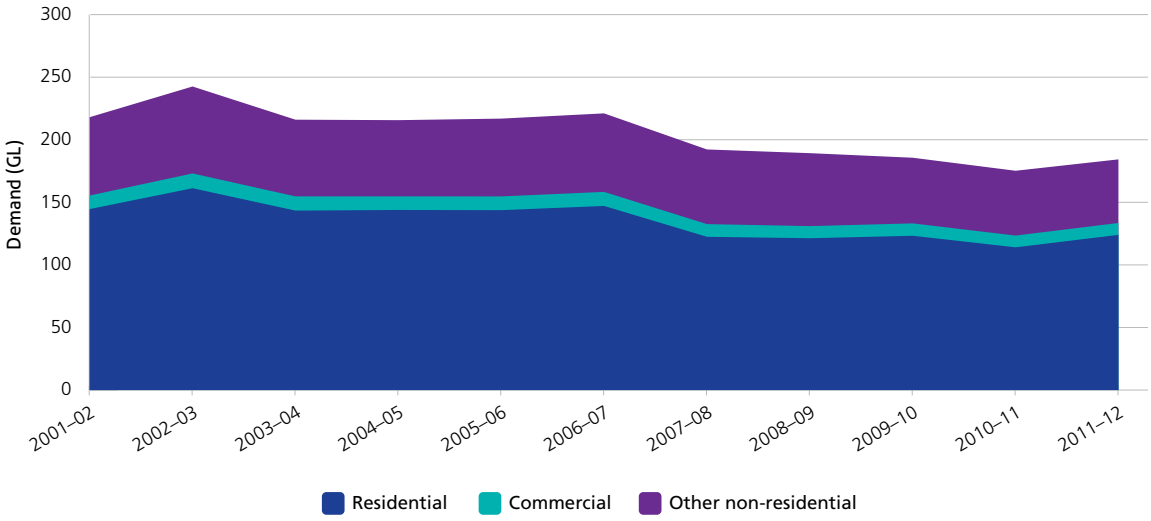


Table 5–1: Water demand by region*[62]

Region	2001–02 demand (GL)	2011–12 demand (GL)	Variation (GL)	Variation (%)
Metro	127	102	- 25	-20%
Outer metro	45	38	- 7	-16%
North	22	18	- 4	-17%
South East	18	13	- 4	-24%
Eyre	7	6	- 2	-24%

* GL based on water use billed for financial year.

61 ACIL Tasman, SA Water's demand forecasting, July 2012.
62 Figures based on SA Water billing information, 2011–12

5.1.2. Demand forecasting methodology

In the past, temperature and rainfall were the key drivers of variation in demand for water, and SA Water's forecasts of demand were based on long-term trends, with relatively straightforward adjustments to account for growth in the number of customers serviced. Prices for water were relatively stable in real terms and, therefore, did not play a major role in SA Water's forecasting methodology.

More recently, however, demand for water has become much more volatile. This volatility, combined with the fact that a greater component of SA Water's revenue is now derived through sale of water, has led SA Water to develop a much more sophisticated demand forecasting methodology.

In 2011, SA Water engaged specialist consultants ACIL Tasman to develop a water demand forecasting methodology which could be used for pricing and revenue forecasting purposes. ACIL Tasman has substantial experience in government and industry analyses and has developed similar methodologies and models within the Australian gas, water and electricity industries. ACIL Tasman has also acted as an expert consultant in reviewing such models on behalf of economic regulators (including ESCOSA).

The methodology, approach and modelling outputs developed by ACIL Tasman for SA Water are detailed in Attachment E.1 to this Proposal, and reflect the principles outlined by ESCOSA in its Guidance Paper[63]. These principles include that demand forecasts should:

1. Be free from statistical bias;
2. Recognise and reflect key drivers of demand;
3. Be based on sound assumptions using the best available information;
4. Be consistent with other available forecasts and methodologies;
5. Be based upon the most recently available data;
6. Reflect the particular situation and the nature of the market for services; and
7. Be based upon sound and robust accounts of current market conditions and future prospects.

Increasing volatility in water use, combined with a growing component of SA Water's revenue being derived through water sales, has led SA Water to develop more sophisticated demand forecasting models with the help of specialist consultants.

In particular, the models developed by ACIL Tasman are based on the most up-to-date data and are free from statistical bias, implying the models are no more likely to overestimate than underestimate demand[64].

In developing these models, ACIL Tasman gave consideration to the nature of the market for SA Water's services and determined that it would not be necessary to perform any modelling to reflect competition from substitutes[65]. Despite this, the fact that the models are based on historical data means that the models implicitly assume the effects of any historic competitive forces and/or substitution will be similar in future.

ACIL Tasman's development process also involved validation of the models by comparison with other available forecasts and methodologies, and a literature review of the latest economic studies into the price elasticity of demand for water[66].

Recent price increases coincided with the implementation of rigorous demand management programs, including water restrictions, and ACIL Tasman's analysis considered the price elasticity of demand in the context of additional pressures on the community to conserve water. This introduces a level of uncertainty in forecasting demand.

63 ESCOSA, Review of SA Water's Prices: 2013/14 – 2015/16 Guidance Paper, July 2012.
64 ACIL Tasman, SA Water's demand forecasting, July 2012, Chapter 2.1
65 Ibid.
66 Ibid.

ACIL Tasman conducted separate analyses on three customer classes:

i. Residential;
ii. Commercial; and
iii. Other non-residential.

Commercial customers are defined in accordance with the *Waterworks Act 1932*[67], but essentially comprise service providers, including for wholesale and retail trade.

With respect to the other non-residential customer class, ACIL Tasman recognised that "other non-residential" captured a broad range of customers, including "industrial customers", and that the data available was not sufficient to allow for analysis at a more granular level. In particular, ACIL Tasman sought to distinguish "industrial" customers, but this was not possible. Therefore, ACIL Tasman's report aggregates all industrial and other non-residential customers together for forecasting purposes.

ACIL Tasman's report identifies key drivers of demand for each class of customer, and accounts for the different nature of demand and responsiveness to these drivers[68]. These drivers were chosen empirically, but were also required to be logical. SA Water considers the drivers selected by ACIL Tasman are reasonable, and consistent with the drivers of demand observed by SA Water.

For residential and commercial customers, two separate forecasting models were developed for each class of customer:

i. A forecast of the number of customers in that class; and
ii. A forecast of water use per customer in that class[69].

Combined, the two models for each customer class were used to develop separate forecasts of demand for water by residential and commercial customers.

In all, ACIL Tasman has developed five separate models to forecast total demand for water and each of these models has a high degree of accuracy based on historical data. For example, ACIL Tasman has demonstrated the consumption per customer model can explain 89–95% of the variation in demand for water by SA Water's customers (on a historic basis)[70].

5.1.3. Drivers of water demand

In developing its models, ACIL Tasman identified and analysed drivers of demand separately for each customer class. Through this approach, it is possible to adopt and weight different drivers for each customer class.

The drivers of demand identified by ACIL Tasman for each customer class are summarised in Table 5–2, with the influence of each driver described in detail in the following sub-sections.

Drivers of residential and commercial customer numbers

Through its analysis, ACIL Tasman determined that the best predictor for growth in SA Water's residential customer numbers is population growth, as measured by the Australian Bureau of Statistics (ABS)[71]. Population growth can explain 99% of the change in residential customer numbers, meaning the correlation between population growth and SA Water's residential customer numbers is very strong. This model implicitly assumes that historic changes in household size will continue at the same rate. Through this correlation, ACIL Tasman forecasts that for each 100 additional South Australian residents, SA Water will gain 59 new customers[72].

67 This Act has been replaced by the *Water Industry Act 2012* since ACIL Tasman's analysis was performed. The new Act does not introduce an alternative definition which would necessitate a change to ACIL Tasman's approach.
68 ACIL Tasman, SA Water's demand forecasting, July 2012, Chapter 4.
69 A linear regression model is used to forecast residential and commercial customer numbers separately. A log-log regression model is then used to forecast water demand for residential and commercial customers respectively. A log-log model is based on the natural logarithm of variables rather than the variables themselves. This allows the regression coefficients to be interpreted as elasticities of demand (i.e. each regression coefficient shows the responsiveness of demand for water to a 1% change in each driver, assuming all else is constant. This specification also assumes that, unlike linear demand curves, elasticity is constant at all price levels.
70 ACIL Tasman, SA Water's demand forecasting, July 2012, Chapter 5.2.
71 Ibid. Chapter 6.2.
72 Ibid. Chapter 5.2.

Table 5–2: Drivers of demand[73]

Customer class/model	Population growth	Economic activity	Price of water (Tier 2)	Temperature	Water restrictions
Residential customer numbers (Model 1)	√				
Commercial customer numbers (Model 2)		√			
Residential use (Model 3)			√	√	√
Commercial use (Model 4)		√	√	√	√
Other non-residential use (Model 5)		√	√	√	√

Figure 5–2 illustrates the growth in number of residential customers serviced by SA Water since 2001–02, together with the forecast growth in this number through to 2015–16 (derived through ACIL Tasman's model). The forecast provided in Figure 5–2 indicates the number of residential customers serviced by SA Water is forecast to grow at an annualised rate of 1.4% per annum – from 646,000 in 2011–12 to 684,000 in 2015–16 (approximately 10,000 customers per annum).

ACIL Tasman identified Gross State Product (GSP) – a measure of economic growth in South Australia – as the most accurate driver of the number of commercial customers serviced by SA Water. This driver explains 98% of the change in number of commercial customers – again, an extremely strong relationship. Through this analysis, ACIL Tasman forecasts that the number of commercial customers will increase by 120 new customers for each $1 billion increase in South Australia's GSP[74].

Figure 5.3 illustrates the growth in number of commercial customers serviced by SA Water since 2001–02, together with the forecast growth in this number through to 2015–16 (derived through ACIL Tasman's model). The number of commercial customers serviced by SA Water is forecast to grow at an annualised rate of 1.1% per annum – from 27,000 in 2011–12 to 28,000 in 2015–16 (approximately 300 customers per annum).

Drivers of water use

In developing models which are used to forecast water use for the residential, commercial and other non-residential customer classes, ACIL Tasman considered a broad range of possible drivers including:

- Price;
- Various weather-related measurements;
- Water restrictions;
- Economic activity;
- SA Water's meter replacement program (through which improved metering accuracy could influence reported use);
- Water saving rebates; and
- Household size and occupancy rates for residential and commercial dwellings.

ACIL Tasman determined that, of these possible drivers, the dominant ones driving water use across the various customer classes are:

73 ACIL Tasman, SA Water's demand forecasting, July 2012, Chapter 5.1
74 Ibid, Chapter 5.2.3

Figure 5–2: Historical and forecast residential customer numbers[75]

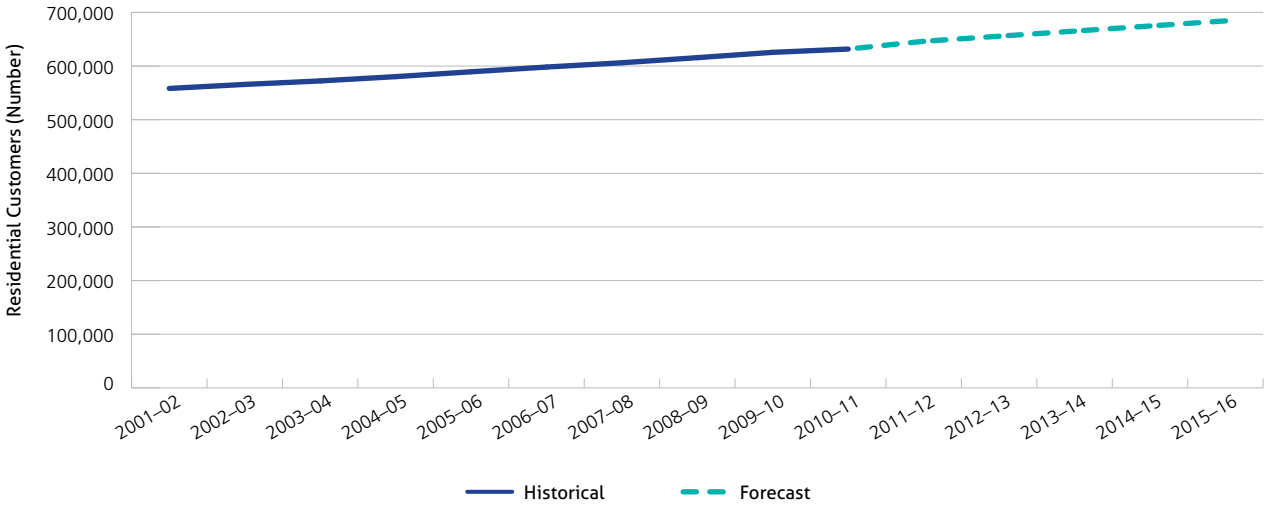
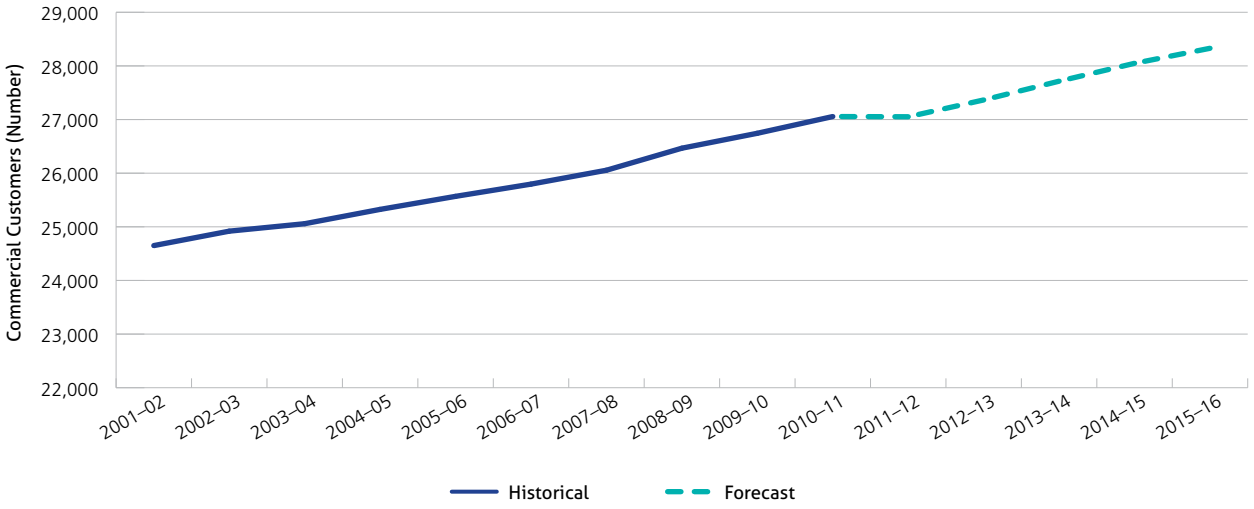


Figure 5–3: Historical and forecast commercial customer numbers[76]



- Price;
- Temperature;
- Water restrictions; and
- Economic activity[77].

Price (price elasticity of demand)

There are two components to a customer's water charges:

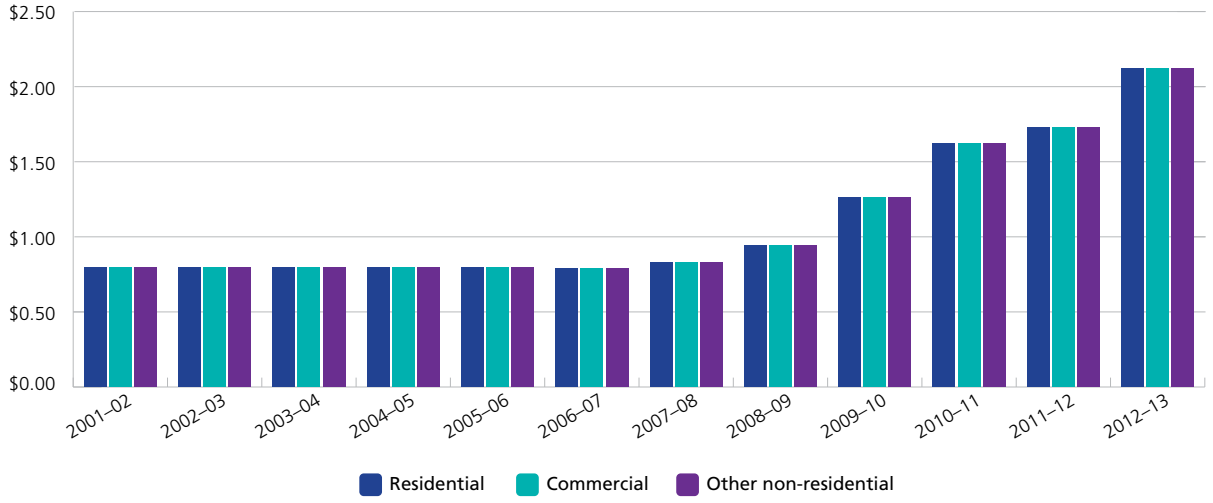
i. A fixed (supply) charge; and
ii. Various tiers representing volumetric (use) charges.

In assessing the impact of price on water use, ACIL Tasman tested the impact of two forms of price, being the "second tier" water use price, and a "representative" total price incorporating the supply charge and use charges.

For the majority of SA Water's customers, the second tier water use price is the marginal price (i.e. the price paid for the last kL of water). Economic theory suggests this price will have the greatest influence on a customer's decision to consume additional water – a theory that was

75 ACIL Tasman, SA Water's demand forecasting, July 2012, Chapter 7.1.1
76 Ibid, Chapter 7.1.2
77 All drivers included in the models were significant at the 95% confidence level.

Figure 5–4: Real second tier water price 2001–02 to 2012–13[78]



found to be supported by ACIL Tasman's analysis. Of the two forms of price tested by ACIL Tasman, the second tier water use price was found to provide the best correlation to variations in water use[79].

In this context, the second tier water use price paid by each customer class has increased significantly since 2006–07, prior to which the price had remained stable in real terms since 2001–02 (refer Figure 5–4).

Ordinarily, ACIL Tasman's analysis of the impact of price on water use could be considered a measure of the price elasticity of demand. However, the price increases depicted in Figure 5–4 coincided with the implementation of rigorous demand management programs. Consequently, it is not possible to distinguish the extent to which each of these factors separately influenced water demand, and this introduces uncertainty in forecasting price elasticity.

ACIL Tasman has stated that the price elasticity of demand, in this instance, is capturing the combined impact of rising prices, rebates, water conservation programs, educational programs and the general pressure to conserve water occurring at the same time[80].

ACIL Tasman's analysis concludes that, during this period, a 1% real price increase in the second tier water use price resulted in a 0.38% reduction in water demand for the average residential customer – an outcome which, when compared to other studies, appears high. This finding is not surprising given the fact it combines the impact of extraordinary water conservation measures and price. ACIL Tasman therefore considers it unlikely this level of price response will continue into the future.

Following a review of other studies, ACIL Tasman has determined that a more conservative value for the residential price elasticity of demand is appropriate (-0.28%)[81] and this value has been applied in ACIL Tasman's model.

Recent price increases have coincided with the application of various restrictions on water use and campaigns aimed at modifying water use behaviours, making it impossible to distinguish accurately the influence of each of these factors.

78 ACIL Tasman, SA Water's demand forecasting, July 2012, Chapter 4.1.3, and SA Water pricing for 2012–13.
79 ACIL Tasman, SA Water's demand forecasting, July 2012, Chapter 4.1.3.
80 Ibid, Chapter 6.6.
81 Ibid, Chapter 6.6.

ACIL Tasman's analysis also suggests that, with respect to:

- Commercial customers – a 1% increase in price will result in a decrease of 0.37% in water demand per customer; and
- Non-residential customers – a 1% increase in price will result in a decrease of 0.32% in water demand per customer.

ACIL Tasman's research into non-residential price elasticity found there were few studies available and, of those that were sighted, there was a wide variance in outcomes. As such, ACIL Tasman has recommended there be no change to the model outcomes and, in the absence of sufficient evidence to the contrary, SA Water supports this view.

A summary of the price elasticity of demand applied in ACIL Tasman's models for each customer class is summarised in Table 5–3.

In May 2012, the South Australian Government announced a Water Security Rebate[84] payable to residential customers in the first quarter of 2013. This rebate will amount to either $45 or $75 per customer, and will not influence the marginal cost of water. On this basis, SA Water considers this rebate will not influence water use.

Temperature

In determining the influence of weather on demand for water, ACIL Tasman gave consideration to a range of weather-related measures, including:

- Maximum temperature;
- Days over 32 degrees;
- Cooling degree days (CDD);
- Evaporation; and
- Rainfall.

ACIL Tasman's analysis shows that the strongest relationship between a weather-related measure and water use is provided by the CDD measure[85]. CDD is a measure of how much (in degrees), and for how long (in days), outside air temperature was higher than a specific base temperature. The CDD measure is particularly useful as an indicator of weather where hot temperature may be sustained around the clock, but may not necessarily reach a high daily maximum.

Table 5–3: Price elasticity of demand values applied in ACIL Tasman's models

Customer class	Price elasticity of demand[82]
Residential	-0.28[83]
Commercial	-0.37
Other non-residential	-0.32

Table 5–4: Impact of CDDs applied in ACIL Tasman's models

Customer class	Impact on water use (%)
Residential	0.15
Commercial	0.12
Other non-residential	0.10

82 As noted earlier, the coincidence of price rises and extraordinary water conservation measures means it is not possible to separately identify the impact of each of these factors.
83 Adjusted to better align with the values calculated in other studies, and to offset the influence of water conservation measures (which are likely to have resulted in an extraordinarily high price elasticity of demand value in SA Water's case).
84 SA Water, water and sewer pricing, <http://www.sawater.com.au/SAWater/YourAccount/UnderstandingYourAccount/Pricing+Information.htm>.
85 ACIL Tasman, SA Water's demand forecasting, July 2012, Chapter 4.1.4

The influence of a 1% increase in CDD upon water use, as calculated by ACIL Tasman for each customer class, is summarised in Table 5–4 and indicates, for example, that for every 1% increase in the CDD measure, residential water use increases by 0.15%.

However, as shown later in Figure 5–7, although CDD provides the strongest links to water use, as with other weather-related measures there is a degree of volatility with CDD and, therefore, uncertainty in forecasting.

Water restrictions

ACIL Tasman's analysis shows that various demand management initiatives, in tandem with price increases, have had the greatest impact upon water use across all customer classes over the past five years (during which water use has fallen significantly). Various forms of water restrictions have applied to SA Water's customers since 2003[86], and remain in effect today. The water restrictions applied over this period can be grouped into three categories, and have been estimated to influence water use as summarised in Table 5–5. Note the influences on use summarised in this table are broad estimates, and cannot be quantified in a precise manner to facilitate discrete analysis of these and various other demand management initiatives versus the impact of price.

The extent to which water use "bounces back" following the lifting of water restrictions is an important consideration in forecasting water demand. Given the fact that Water Wise Measures (Level 1 restrictions) are expected to remain in effect through to the end of the forthcoming regulatory control period, the degree of bounce back that is relevant for the purpose of this Proposal is the bounce back attributable to the change from Level 3 to Water Wise Measures (approximately 15% per the estimates in Table 5–5).

Table 5–5: Influence of water restrictions on water use

Category of water restriction	Influence on water use[87]
"Level 1" (permanent) • Permanent water conservation measures (applied Oct 2003–Oct 2006) • "Water Wise Measures" (Dec 2010–present)	It is estimated that these restrictions have the effect of reducing use per customer by about 11–12% when they are applied (as is presently the case).
"Level 2" (temporary) • Level 2 (Jul–Oct 2003) • Enhanced Level 2 (Oct 2006–Jan 2007)	It is estimated that these restrictions have the effect of reducing use per customer by about 14–15% when they are applied.
"Level 3" (temporary) • Enhanced level 3 (Jan 2007–Oct 2007) • Relaxation of restrictions from 2008–2010	It is estimated that these restrictions have the effect of reducing use by residential and commercial customers by about 25–27% when they are applied. In contrast, these restrictions are estimated to have the effect of reducing use by other non–residential customers by about 19% when they are applied.

86 Restrictions were in place on Eyre Peninsula from December 2002. However, more widespread restrictions were not in place until July 2003.
87 For the avoidance of doubt, the influences on water use described in this table are mutually exclusive, not cumulative. For example, the reduction in water use under Level 2 restrictions is estimated at 14–15% per customer – the 11–14% reduction under Level 1 restrictions should not be added to it.

It should be noted that other factors which influence water use – particularly the price of water – are forecast to suppress growth in water use through to 2015–16, and therefore the models developed by ACIL Tasman do not forecast water consumption for any customer class returning to levels experienced prior to the introduction of restrictions.

Economic activity

ACIL Tasman's analysis found a strong correlation between the level of economic activity in South Australia (indicated by GSP) and water use – but only for the commercial and other non-residential customer classes[88]. The analysis shows that a higher level of economic activity in South Australia leads to a strong increase in water use for commercial customers, and to a lesser extent, other non-residential customers.

Note that, in addition to GSP being identified as a driver of water use for commercial and other non-residential customers, ACIL Tasman identify GSP as a driver of customer numbers across these customer classes. This implies that, as GSP increases, new commercial customers arrive, and existing customers use more water.[89]

The influence of a 1% increase in GSP upon water use, as calculated by ACIL Tasman for each customer class, is summarised in Table 5–6 and indicates, for example, that for every 1% increase in GSP, water use by a commercial customer increases by 0.48%.

5.1.4. Key inputs and assumptions

Consistent with ESCOSA's best practice principles, various forecasts of inputs and explanatory variables were obtained by ACIL Tasman from reputable independent sources, and are described in the sub-sections which follow.

Population

The population forecast relied upon by ACIL Tasman was developed by the ABS assuming "medium" growth[90]. ACIL Tasman selected this forecast because it was found to align more closely with the actual growth in South Australia's population in recent years. This forecast indicates population growth of between 0.9% and 1% per annum through to 2015–16 (refer Figure 5–5).

Economic growth

Estimates of South Australia's GSP were relied upon by ACIL Tasman to develop a forecast of SA Water's commercial customer numbers, and to forecast the water use of SA Water's commercial and other non-residential customers. The South Australian Department of Treasury and Finance's estimate of annual GSP growth[91] was relied upon through to 2014–15. For 2015–16, the "medium" annual growth rate of GSP over the period 1991 and 2011 has been applied (refer Figure 5–6).

Temperature

As noted earlier, ACIL Tasman considered a broad range of weather-related indicators to model the influence of weather upon water use, and ultimately determined that the strongest relationship between a weather-related indicator and water use is provided by the "CDD" indicator[92].

In recent years, temperature as measured by CDD has been high by historical standards but has varied considerably from year to year, as shown in Figure 5–7.

It is important to note that the median CDD varies depending on the period chosen:

88 ACIL Tasman, SA Water's demand forecasting, July 2012, Chapter 4.1.1.
89 Ibid, Chapter 5.2.4.
90 Derived growth rate from Australian Bureau of Statistics, 3222.0 Population Projections, Australia, Series B.
91 Government of South Australia, 2011–12 Budget, Mid-Year Budget Review, December 2011.
92 ACIL Tasman, SA Water's demand forecasting, July 2012, Chapter 4.1.4

Table 5–6: Impact of GSP applied in ACIL Tasman's models

Customer class	Impact on water use (%)
Residential	n/a
Commercial	0.48
Other non-residential	0.36

Figure 5–5: ABS population growth forecast (South Australia)[93]

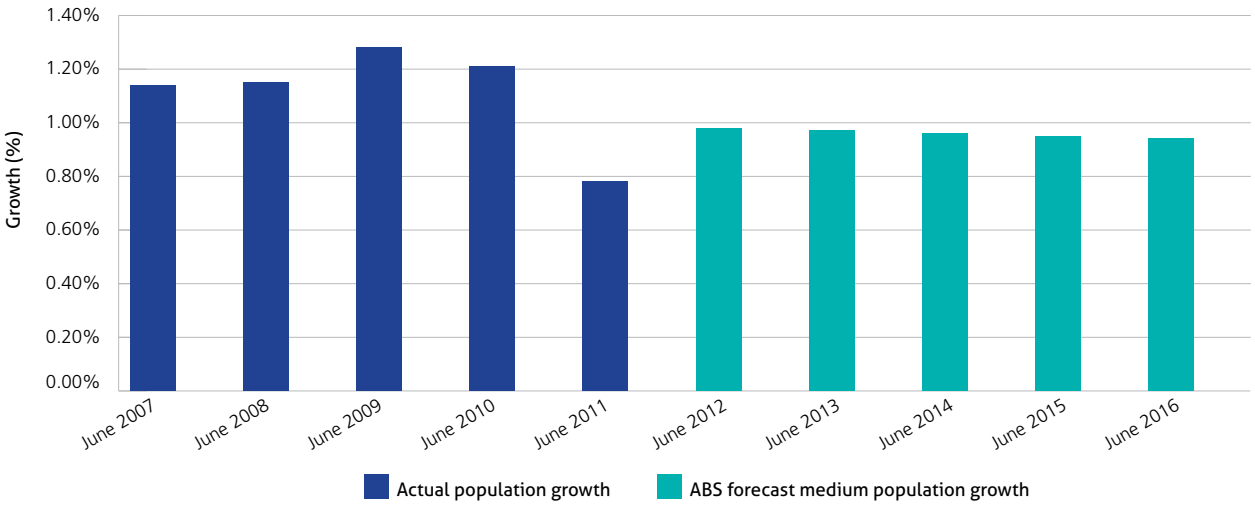
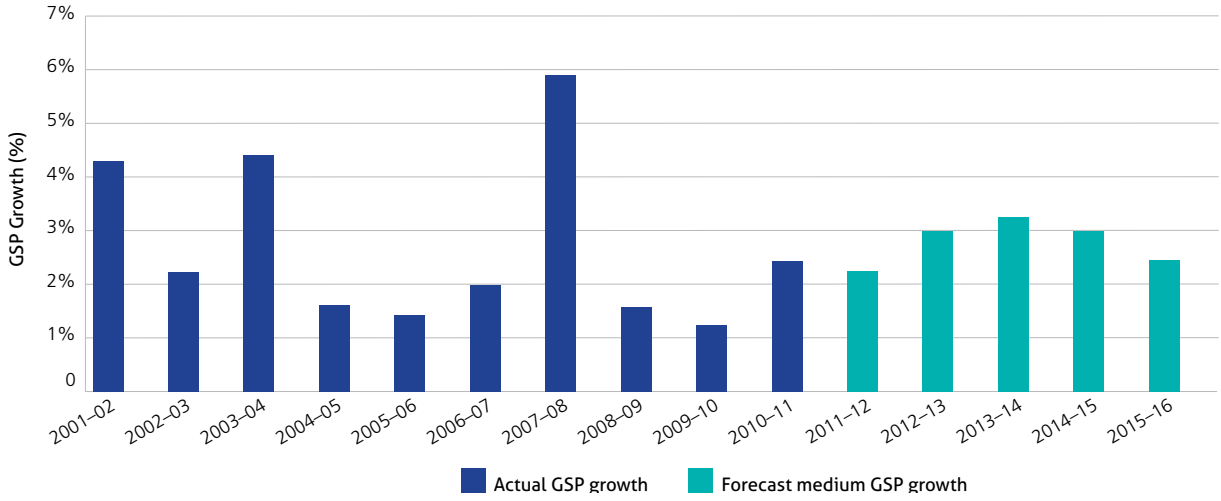


Figure 5–6: Forecast growth in GSP (South Australia)[94]



93 ACIL Tasman, SA Water's demand forecasting, July 2012, Chapter 6.2.
94 Ibid.

Temperature, as measured by the CDD, fluctuates significantly depending on the period used for forecasting purposes – with recent years indicating much hotter temperatures.

- Median CDD for the 33 year period 1977–78 to 2010–11 is approximately 682 CDD per year;
- Median CDD over the past 10 years is approximately 713, almost 5% higher;
- Median CDD over the past 5 years is 891, or 30% higher than the longer term figure and 25% higher than the 10-year figure.

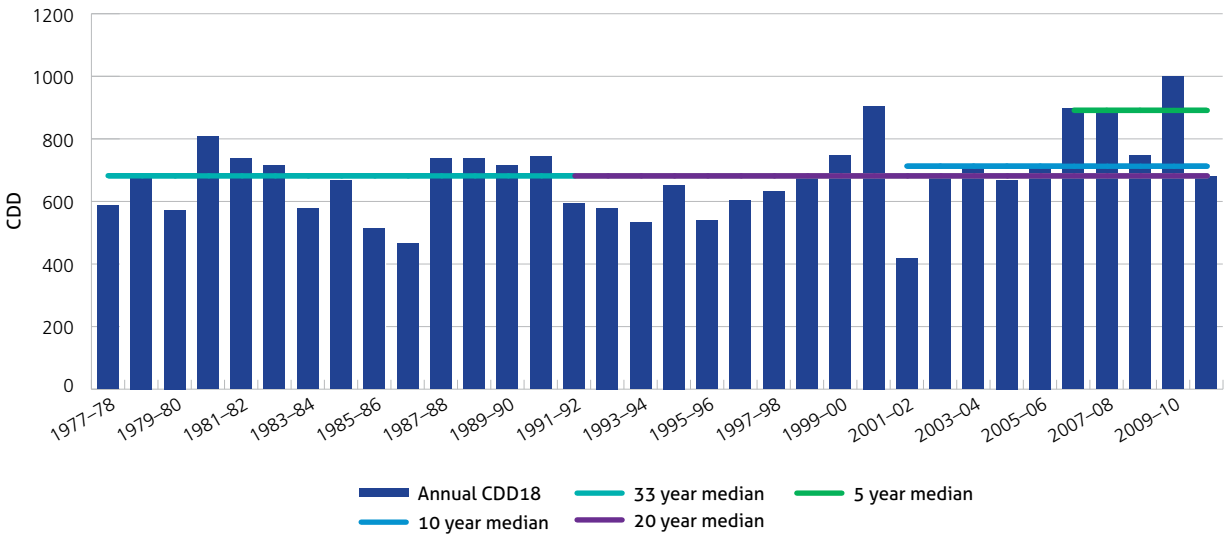
CDD outcomes in any individual year can vary by as much as 45% from the median over the longer term (33 years), and introduce significant variation in forecast water use. For example, if a 5-year median were used, CDDs would increase from 682 to 891, resulting in forecast water use increasing by 6.4GL.

In developing its forecast, and in the absence of statistically sound evidence to the contrary, ACIL Tasman has assumed that CDD outcomes over the forthcoming regulatory control period will return to the long-term trend. Based on this assumption, ACIL Tasman has relied upon the 33-year median CDD[95].

As weather has considerable variability and is a significant driver of water use, SA Water has undertaken further analysis to better understand the sensitivity of the forecasts developed by ACIL Tasman to various weather scenarios. This analysis is presented in section 5.1.5 of this chapter.

Sensitivity analysis indicates that if SA Water were to experience a hotter– or wetter-than-expected year, water use could exceed or fall below forecast by approximately 3.2% (5.7-5.8GL) – a variation of approximately $20 million per annum in revenue terms. Given the material impact of such variations, SA Water is proposing a form of control for direct control water services which takes this variability in demand into account.

Figure 5.7: Annual CDD18 outcome (South Australia)[96]



95 Kent Town data station offered more explanatory power than the other stations tested. However, Kent Town has only been recording weather outcomes since 1977–78.
96 ACIL Tasman, SA Water's demand forecasting, July 2012, Chapter 4.14.

Price

ACIL Tasman's analysis indicates a strong correlation between the price of water and water use by SA Water's customers (noting also that it has not been possible to determine separately the impact of price and various demand management initiatives in recent years).

The actual prices set for 2012–13 were applied by ACIL Tasman for that year, with subsequent years based on Government forward estimates of price increases around CPI.

Water restrictions

Level 3 restrictions were removed in December 2010, at which time permanent "Water Wise Measures" (Level 1 restrictions) came into effect. In developing its forecast, ACIL Tasman has assumed these Level 1 restrictions will remain unchanged through to 2015–16.

5.1.5. Forecast water use in 2012–13 to 2015–16

The total water use forecast by ACIL Tasman for each customer class and year through to 2015–16 is shown graphically in Figure 5–8, and summarised in tabular form in Table 5–7.

The price elasticity of demand calculated by ACIL Tasman, combined with the 25% nominal price increase of water in 2012–13, is forecast to result in a significant reduction in water use across all customer classes in that year. For residential customers, the forecast reduction in use is 4.0%, whereas for commercial and other non-residential customers reductions of 4.8% and 5.2% are forecast respectively.

For the years 2013–14 through to 2015–16, where price increases in line with inflation have been assumed by ACIL Tasman, water demand

Figure 5–8: Actual and forecast water use (2001–02 to 2015–16)[97]

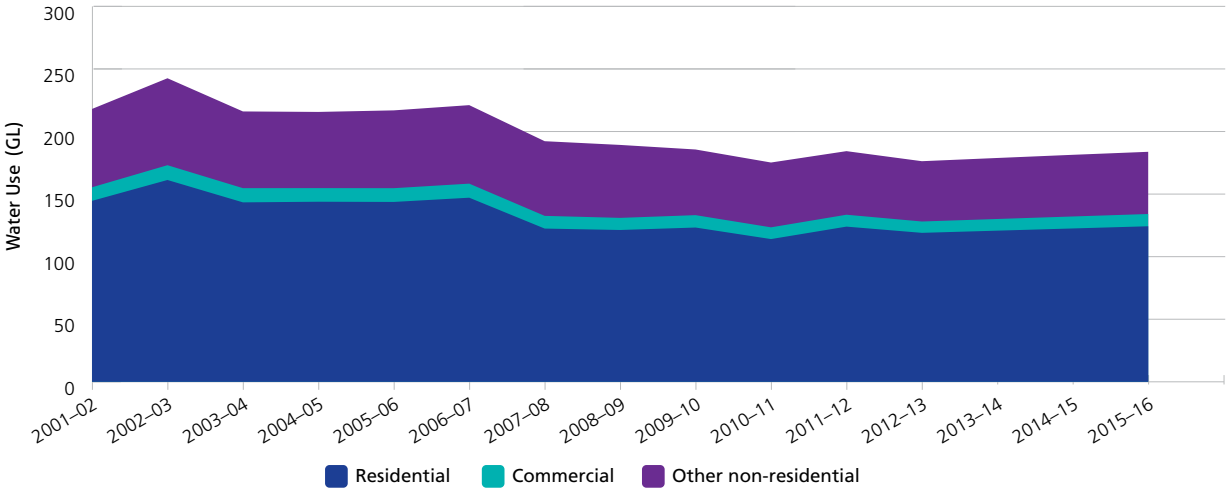


Table 5–7: Forecast water use through to 2015–16 (GL)*[98]

	2012–13	2013–14	2014–15	2015–16
Residential	119.0	120.8	122.5	124.3
Commercial	9.1	9.3	9.6	9.8
Other non-residential	48.2	48.7	49.3	49.7
Total	176.3	178.9	181.4	183.8

*Figures may not add due to rounding.

97 ACIL Tasman, SA Water's demand forecasting, July 2012, Chapter 7.
98 Ibid.

is forecast to gradually increase across each customer class as follows:

- Residential : increase of 1.5% per annum;
- Commercial: increase of 2.6% per annum; and
- Other non-residential: increase of 1.0% per annum.

Combined water use across all customer classes is forecast to grow by 1.4% per annum between 2013–14 and 2015–16.

Given the uncertainty inherent in long-term weather predictions and the volatility in various weather-related indicators in recent years (particularly the CDD indicator), ACIL Tasman undertook a sensitivity analysis to establish the impact of various weather scenarios on its forecast. The alternative scenarios considered by ACIL Tasman are shown in Table 5–8.

Table 5–8: CDD for each weather scenario[99]

	Cold weather	"Normal" weather (consistent with 33 year median)	Hot weather
CDD	534	682	866

Figure 5–9: Forecast water use with weather sensitivities[100]

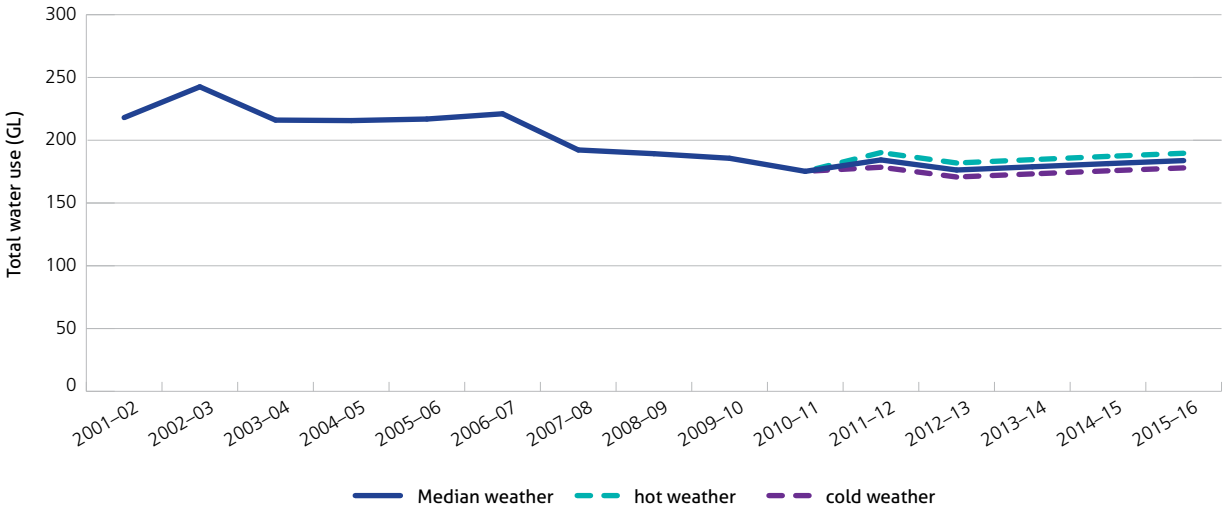


Table 5–9: Forecast water use under various weather assumptions (GL)[101]

	2012–13	2013–14	2014–15	2015–16
Forecast use: "normal"/median weather	176.2	178.9	181.4	183.8
Forecast use: hot weather	181.9	184.5	187.1	189.6
Forecast use: cold weather	170.7	173.2	175.7	178.0

99 ACIL Tasman, SA Water's demand forecasting, July 2012, Chapter 7.3.2.
100 Ibid.
101 Ibid.

Figure 5–9 illustrates the forecast water use under each weather scenario, with the results of this analysis presented in tabular format in Table 5–9.

The sensitivity analysis presented in Figure 5–9 and Table 5–9 indicates that if SA Water was to experience a hotter or wetter-than-expected year, water use in that year would either exceed or fall below ACIL Tasman's forecast by approximately 3.2% (5.7–5.8GL) – a variation of approximately $20 million per annum in revenue terms under the current tariff structure.

Given the material impact of such variations – the occurrence of which are possible given recent weather outcomes, but impossible to predict – SA Water proposes to incorporate an adjustment mechanism in the form of price control applicable to its direct control water service. The adjustment mechanism proposed by SA Water is described in detail in chapter 9 (Required Revenue and Pricing) of this Proposal.

5.2. Demand for sewerage services

5.2.1. Sewage volume in 2011–12

SA Water's sewerage services are delivered through primarily disconnected asset zones, referred to as "drainage areas" or "catchments".

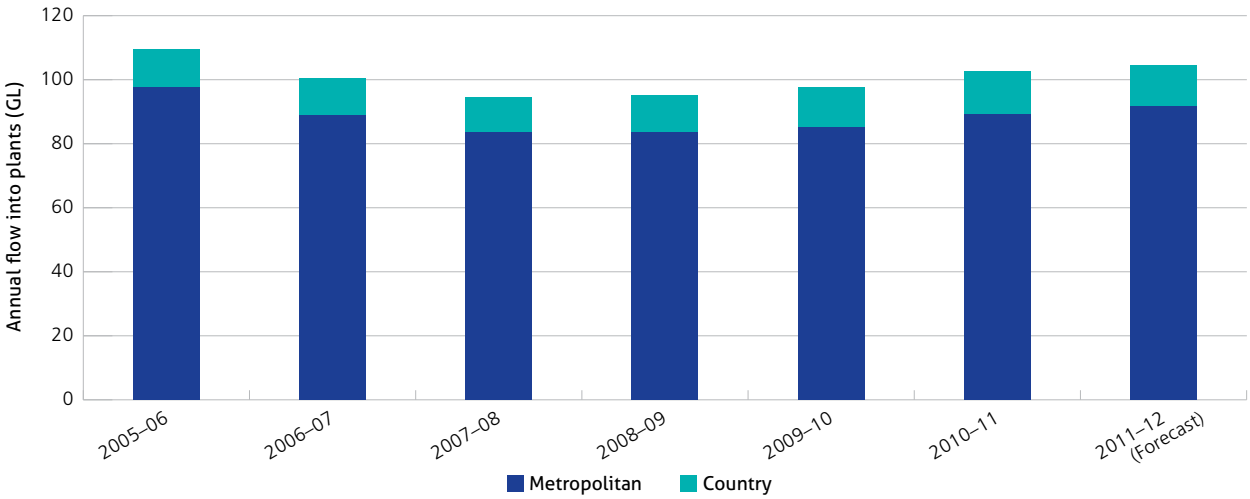
On a State-wide level, the total volume of inflows into SA Water's wastewater treatment plants decreased significantly during the years of severe drought (2006–07 to 2009–10). This was largely due to:

- Reduced groundwater infiltration to the network as the level of groundwater tables lowered; and
- A reduction in the volume of sewage flowing into the network (due to water use restrictions, changes in community behaviours, and the installation of water-efficient appliances).

Since 2009–10, total sewage volumes have increased marginally (refer Figure 5–10). Inflows to metropolitan treatment plants accounted for approximately 92GL (88%) of the total volume treated in 2011–12.

Given the disconnected nature of SA Water's sewer networks, however, total sewage volume on a State-wide level is not a factor relied upon in determining investment in infrastructure. Additionally, SA Water's long-standing practice of recovering revenue for its direct control sewerage service through property-based charges (as opposed to metered or volumetric charges) means that total sewage volume aggregated to a State-wide level is not relied upon in determining revenue and pricing requirements.

Figure 5–10: Total inflows to wastewater treatment plants – metropolitan and country



Other, local factors influencing sewage volume and quality, and the challenges facing individual wastewater treatment plants and associated networks are much more relevant in these respects, and can vary significantly in different drainage areas. While the key drivers influencing infrastructure investment – and, therefore, revenue and pricing for sewerage services – may be common in different drainage areas, the relative importance of these drivers varies.

For these reasons, this chapter focuses on the significant factors influencing sewage volume and the quality of sewage loads entering discrete treatment plants.

Attachment E.2 to this Proposal[102] details each of the metropolitan and country sewage catchments, including treatment plant capacities, sewage quality and volume of inflows in recent years.

5.2.2. Volume forecasting methodology

When forecasting volume for individual sewer systems, both annual and peak period flows are considered:

- **Annual flows:** relied upon in designing head works to ensure they can be adjusted for future capacity without interrupting service to customers, and for calculating operating costs; and
- **Peak period flows:** relied upon to ensure that infrastructure has sufficient capacity to cope with extremes, such as peak times of the day and increased flows during wet weather.

While water use – particularly indoor, residential water use – influences sewerage network inflows, the correlation between the two is not understood in sufficient detail to facilitate modelling.

In developing its sewage volume forecasts, SA Water takes into account the following:

- Historic inflows and quality into each wastewater treatment plant;
- Metered flows within the network (at a number of strategic sites);
- Historic number of connections – Government Inspection Points (GIP) – to the system;
- Proposed developments in each catchment area;
- Potential impacts on sewage volume and quality due to industrial or commercial waste inputs; and
- Forecasts of water use.

Measuring inflows

Meters at treatment plants measure the total volume of wastewater flowing into or out of each plant. Other flow meters are located throughout the network for specific operational purposes:

- To monitor flows at critical pump stations in emergency situations (such as a pipe rupture or power failure);
- To detect excessive infiltration by monitoring abnormal fluctuations in flow to three larger pumping mains within metropolitan Adelaide; and
- To monitor discharges from about 100 larger, non-residential customers.

Number of connections

At a treatment plant level, SA Water considers the number, and nature, of connections likely to contribute to plant inflows. Information relied upon by SA Water includes:

- New connection trends;
- Population and growth targets established by the State Government[103]; and
- Development proposals for specific areas.

Once this information is analysed, a volume-per-connection rate is applied to the number of wastewater connections to determine overall volume, and sewage flow forecasts (this, together with assumed peaking factors for wet weather flows, determines hydraulic capacity requirements). Additionally, the Biological Oxygen Demand (BOD) and suspended solids qualities of the sewage are established (these determine treatment capacity and process requirements).

102 SA Water, Wastewater Treatment Plants and Catchment Areas, July 2012, provided as Attachment E.2.
103 Department of Planning, Transport and Infrastructure, Plans for regional South Australia, www.sa.gov.au/planning/regionplans and The 30-Year Plan for Greater Adelaide, http://www.dplg.sa.gov.au/plan4adelaide/html/files/plan/The_30-Year_Plan_for_Greater_Adelaide.pdf.

Hydraulic versus treatment capacity

The recent Aldinga and Christies Beach wastewater treatment plant upgrades were initiated to address hydraulic and treatment capacity issues to meet anticipated population growth in the catchment. Furthermore, based on early findings of the Adelaide Coastal Waters Study[104], the 'C plant' at Christies Beach was specifically designed to address the level of nitrogen in the sewage, and ensure that treated effluent satisfied EPA requirements prior to being discharged to sea. While hydraulic capacity requirements (driven by volume forecasts) are important in driving capital investment, treatment capacity and process requirements – often driven by EPA requirements – can also have a significant influence over capital investment decisions.

Notably, environmental requirements have been the most significant driver of capital investment in wastewater treatment plant upgrades in recent years. Approximately $260 million has been invested over the past decade in accordance with Environmental Improvement Programs (EIPs) which were included as licence conditions imposed by the EPA. To date, these EIPs have typically focussed on nutrient removal either by wastewater recycling or through the installation of biological nutrient reduction systems, which are more sophisticated and expensive to operate than the simpler technologies they replace. Investment to improve odour performance has also been a component of EIPs for some wastewater treatment plants.

As a result of its Adelaide Coastal Waters Study, the EPA is in the process of establishing an Adelaide Coastal Waters Quality Improvement Plan which, in tandem with its Port Waterways Quality Improvement Plan, will guide future levels of acceptable nitrogen and phosphorous loads in discharges from coastal metropolitan treatment plants. The EPA intends to apply the principles of these Plans to SA Water's licence conditions, and SA Water anticipates that where existing treatment plants currently do not have the capability to meet the more stringent nutrient load limits, treatment plant upgrades and/or implementation of alternative methods of sewage disposal (such as discharge to land, via wastewater recycling schemes) will be required, depending on the extent that continued adverse environmental impact is observed.

At this point in time, the requirements to be imposed on SA Water through these plans are unclear and, therefore, SA Water's capital and operating expenditure proposals do not incorporate any expenditure associated with these plans. SA Water has, however, indicated it intends to rely on pass-through provisions (refer chapter 8) in the event that the EPA requires it to develop or implement such changes prior to 2016–17.

5.2.3. Forecast drivers

The key factors influencing the volume and quality of sewage flowing into SA Water's wastewater treatment plants are described in the sub-sections that follow.

New connections (population growth)

Population growth, measured by the number of new connections to the sewerage network, is the main driver of change in sewage volumes. This includes residential and non-residential urban growth, as well as infill development.

The rate of growth in the number of sewerage connections varies significantly across the State, highlighting the importance of considering plant upgrades on a catchment-by-catchment basis. While some catchments have experienced low GIP growth rates of less than 6% in the period 2005 to 2012 (e.g. Port Augusta East and West, Millicent, Port Pirie, Bolivar and Glenelg), others have experienced significant growth, including Aldinga (71%) and Myponga (79%).

104 CSIRO, The Adelaide Coastal Waters Study Final Report, Volume 1 Summary of Study Findings, November 2007.

SA Water may be required to implement significant changes to its wastewater treatment plants in response to the EPA's Adelaide Coastal Waters Study. At this stage, it is unclear what these changes may entail and, therefore, SA water has not included any capital or operating expenditure associated with such changes in this Proposal.

Infiltration

Infiltration into the sewerage network is a particular issue when the network is situated below, or almost level with, the water table – as is the case for the Port Pirie, Port Adelaide and Port Augusta East networks. It is also a greater issue where older mains are in place and stormwater infiltrates cracks and joints – an issue that is particularly evident in the Myponga catchment, where heavier rainfalls have led to an increase in sewage volume.

While every effort is made to minimise infiltration, it is estimated that infiltration accounts for up to 40% of the sewage inflow at some treatment plants. At Bolivar treatment plant, for instance, it is estimated that infiltration can reach 14ML/day[105]. At Port Pirie, infiltration is the main driver of increases in sewage volumes.

Non-residential change

Industrial and commercial growth also influences both the volume and quality of sewage flowing into networks. Local zoning and development applications are used to identify growth for long term planning purposes, with volume and quality based on existing characteristics where further information is not available about the specific developments.

Water use

Changes in community water use and installation of water efficient appliances have contributed to the decline in the volume of sewage (grey water and black water) flowing into the network in recent years. In-house rebates have encouraged installation of technology such as low-flow showerheads, water efficient washing machines, and dual flush toilet systems. Once installed, these lead to a permanent reduction in the discharge to sewer; however the relationship between these changes and wastewater inflows is not understood well enough to facilitate modelling and forecasting.

5.2.4. Forecast wastewater volumes and planning assumptions

At a State-wide level, the total volume of sewage forecast to flow into SA Water's treatment plants is expected to increase only slightly through to 2015–16, as shown in Figure 5–11.

As noted earlier, however, the aggregate volume presented in Figure 5–11 is not considered relevant for capital planning or pricing purposes. Forecast volumes and treatment requirements on a catchment-by-catchment basis are much more relevant in this respect and, as indicated in Attachment E.2 and further detailed in Chapter 6, several catchments face significant – and varied – challenges in the first regulatory period. Among these are:

The rate of growth in sewer connections varies significantly across the State, highlighting the importance of considering plant upgrades on a catchment-by-catchment basis. While some catchments have experienced lower growth in the rate of connections of less than 6% in the period 2005 to 2012 (e.g. Port Augusta East and West, Millicent, Port Pirie, Bolivar and Glenelg), others have experienced significant growth, including Aldinga (71%) and Myponga (79%).

105 Tonkin Consulting, *Long Term Plan for Greater Adelaide, Stage 2: Treatment Plant Capacity Analysis,* Infiltration Sensitivity Analysis, July 2011, page 87.

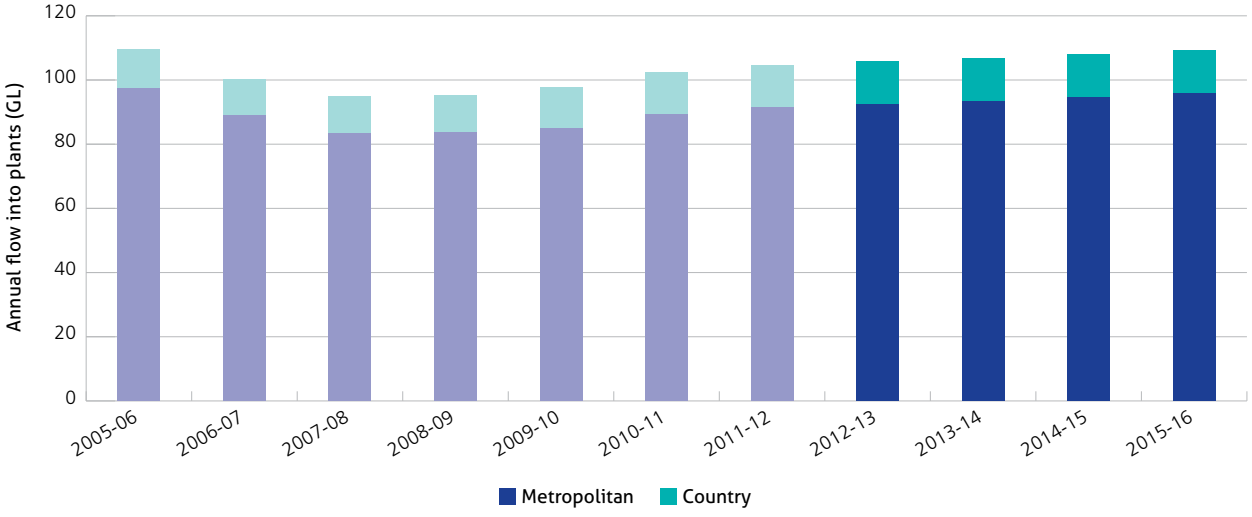
- Murray Bridge – where the treatment plant is operating well in excess of its design capacity. The projected growth for Murray Bridge (25,500 by 2038[106]) will further overload the plant. There are also issues with development encroaching on the existing plant, which has led to numerous odour complaints;
- Aldinga – where it is anticipated population growth in this catchment area will lead to the plant reaching hydraulic and biological capacity by mid-2016 (best case scenario);
- Bolivar – where significant development is expected to lead to pressures on the plant, in terms of both hydraulic and treatment processes; and
- Port Pirie – where upgrades will be required to deal with issues of performance (in recent years the plant's sequencing batch reactor has consistently exceeded its design effluent targets) and design capacity (in recent years annual average flow – including from infiltration – has exceeded design capacity).

The challenges specific to these four plants are further detailed in Attachment E.2.

Given the focus on a catchment-by-catchment approach, the forecasts for wastewater volumes and loads (quality) are derived based on a range of assumptions. The key assumptions relied upon are:

- Population growth will be consistent with State Government forecasts, including those identified in regional plans and The 30-Year Plan for Greater Adelaide;
- Economic growth/zones proposed for development and industrial closures/ developments are consistent with State Government plans, local government plans and development applications;
- Infiltration will continue, and it will be cost-prohibitive to upgrade all affected networks. The level of infiltration will be driven by water table levels and deterioration of network asset conditions. Due to the complex nature of these drivers, it is assumed infiltration will remain constant at levels experienced post-drought;
- Climatic conditions (temperature and rainfall) consistent with longer term (33 year) trends will prevail; and
- Major new non-residential customers will be required to employ an appropriate level of pre-treatment prior to disposal of wastewater to the network.

Figure 5–11: Total inflows to wastewater treatment plants – actual and forecast to 2015–16



106 Calculations for western side of Murray Bridge, based on total figures from: Department of Planning, Transport and Infrastructure, The 30-Year Plan for Greater Adelaide, February 2010, http://www.dplg.sa.gov.au/plan4adelaide/html/files/plan/The_30-Year_Plan_for_Greater_Adelaide.pdf.

Forecasts for volume and load inflows to each wastewater treatment plant are further detailed in Attachment E.2 to this Proposal. The 2010–11 inflows and design capabilities for the wastewater treatment plants are shown in Table 5–10 and Table 5–11.

Table 5–10: Metropolitan wastewater treatment plant capacities and inflows

Location	Design capacity (ML/day)	Average daily inflow 2010–11 (ML/day)	Average daily inflow 2010–11 as % of design capacity
Metropolitan			
Bolivar	165	144.39	87.5%
(& Bolivar High Salinity)	32	23.87	74.6%
Glenelg	60	48.11	80.1%
Aldinga	2.1	1.52	72.4%
Christies Beach	45	26.48	58.8%

Table 5–11: Country wastewater treatment plant capacities and inflows

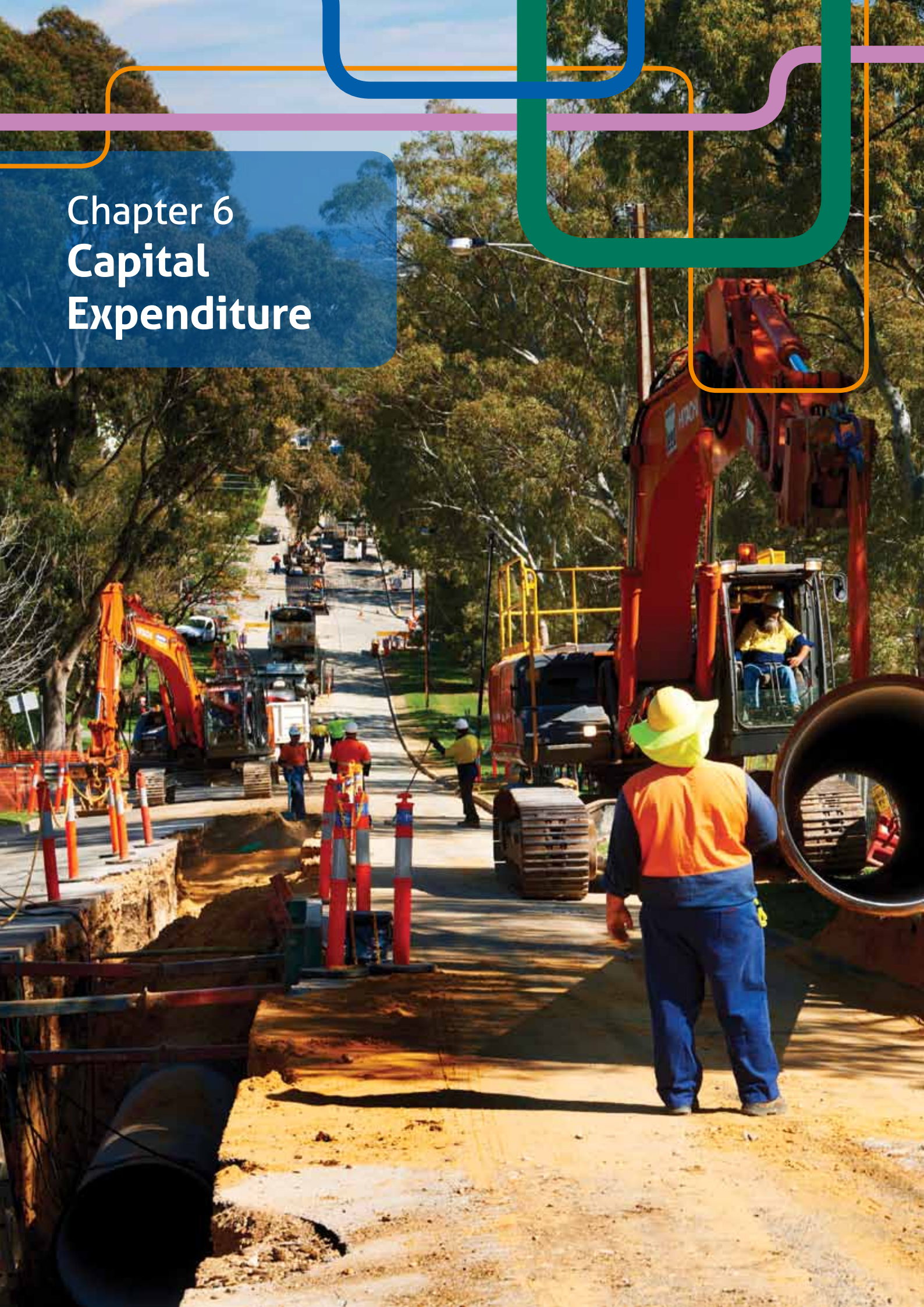
Location	Design capacity (ML/day)	Average daily inflow 2010–11 (ML/day)	Average daily inflow 2010–11 as % of design capacity[30]
Country			
Myponga	0.05	0.11	220.0%
Murray Bridge	2.12	2.56	120.8%
Gumeracha	0.13	0.14	107.7%
Angaston	0.43	0.45	104.7%
Port Pirie	4.1	4.23	103.2%
Hahndorf	1.01	0.98	97.0%
Finger Point	6.0	5.19	86.5%
Port Lincoln	4.0	3.10	77.5%
Victor Harbor	3.40	2.59	76.2%
Millicent	1.4	1.00	71.4%
Naracoorte	1.54	1.01	65.6%
Port Augusta West	1.26	0.75	59.5%
Heathfield	3.6	2.07	57.5%
Port Augusta East	2.66	1.51	56.8%
Whyalla	6.94	3.75	54.0%
Bird-in-Hand	2.4	1.15	47.9%
Mannum	0.81	0.38	46.9%
Nangwarry	0.24	0.10	41.7%
Mount Burr	0.24	0.06	25.0%

Forecasting water demand is inherently risky. Factors outside of SA Water's control and impossible to predict (e.g. temperature and rainfall variations) play a significant role in driving water use and, therefore, can have multi-million dollar impacts on revenue.

While SA Water has developed a sophisticated water demand forecasting methodology with ACIL Tasman, chapter 10 of this Proposal details SA Water's proposed adjustment mechanism to deal with the impact of significant uncertainty about, and variability in, actual water use.

In terms of sewage, longer term demand projections are necessary for each distinct catchment area. Upgrading wastewater treatment plants can require long lead times – particularly if land purchases are required – and often capital investment is needed before capacity is exceeded.

Chapter 6 of this Proposal includes more details of the capital projects relating to wastewater treatment plants proposed for this regulatory period.



Chapter 6
Capital Expenditure

Key points

- In recent years SA Water's capital expenditure has been dominated by the need to deliver extraordinary drought response initiatives – a program of works which commenced in 2007–08 and will conclude in 2014–15. This program of works includes construction of the ADP and NSIS.
- Benchmarking analysis shows that, despite the significant capital expenditure incurred by SA Water in relation to drought response initiatives, its average capital expenditure on a state-wide basis can be considered efficient relative to its peers.
- In developing its forecast of proposed capital expenditure, SA Water has undertaken formal assessment of the risks associated with varying levels of capital expenditure. The process adopted for assessing this risk aligns with SA Water's corporate risk management framework and International Standard ISO 31000 for determining risk ratings, and involved review of every single capital expenditure program and the individual projects and project portfolios within each program.
- SA Water's investment in renewal of its assets was reduced below planned levels for the period 2010–11 to 2012–13 in order to facilitate extraordinary expenditure associated with drought response initiatives. Various programs of asset renewal works and specific projects which were deferred (such as renewal of the water main beneath Marion Road) are proposed for the forthcoming regulatory control period.
- Through 2015–16, the capital expenditure proposed by SA Water features capacity upgrades required at the Murray Bridge and Aldinga wastewater treatment plants, major asset renewal works at the Bolivar wastewater treatment plant, and a major safety upgrade of the Kangaroo Creek dam.
- SA Water's flexible capital delivery and contracting models have enabled it to deliver very large, complex projects and other programs of capital works in an efficient manner. Since 2007–08, SA Water has delivered water security projects with a combined value roughly equivalent to the combined value of the new Royal Adelaide Hospital and Adelaide Oval Redevelopment. The flexibility in SA Water's capital delivery approach has proven capable of rapid resource scaling-up and down, and will enable SA Water to successfully deliver its proposed capital works.

6.1. Capital expenditure leading into the initial regulatory control period

In recent years SA Water's capital expenditure has been dominated by the need to deliver extraordinary drought response initiatives – a program of works which commenced in 2007–08 and will conclude in 2014–15. This program of works includes construction of the ADP and NSIS.

SA Water's actual and planned capital expenditure for the 7 years leading into the forthcoming regulatory control period is depicted graphically in Figure 6–1, and in tabular form in Table 6–1. Capital expenditure associated with delivery of water and sewerage services is shown separately, as is capital expenditure associated with various drought response initiatives. Capital expenditure not directly attributable to either the water or sewerage service, such as information services capital expenditure, has been allocated on a basis which reflects the proportion of capital expenditure directly attributable to each service, adjusted to exclude drought response initiatives.

Figure 6–1 shows that the capital expenditure leading into the forthcoming regulatory control period has been dominated by extraordinary expenditure required to deliver drought response initiatives – a program of works which commenced in 2007–08, and will conclude during the forthcoming regulatory control period (in 2014–15). This program of works largely comprises construction of the ADP and North South Interconnection System (NSIS).

Figure 6–1 also shows an increase in capital expenditure associated with delivery of sewerage services. During this period SA Water delivered major upgrades to its wastewater treatment plants at Christies Beach, Aldinga, Bird in Hand and Glenelg – with significant capital expenditure incurred commencing in 2008–09. Key drivers of these upgrades included EPA requirements and growth in the volume of wastewater to be treated at these plants.

Figure 6–1: SA Water's capital expenditure leading into the regulatory control period (nominal $'M to 2011–12; real, March 2012 $'M in 2012–13 excluding real cost escalation)

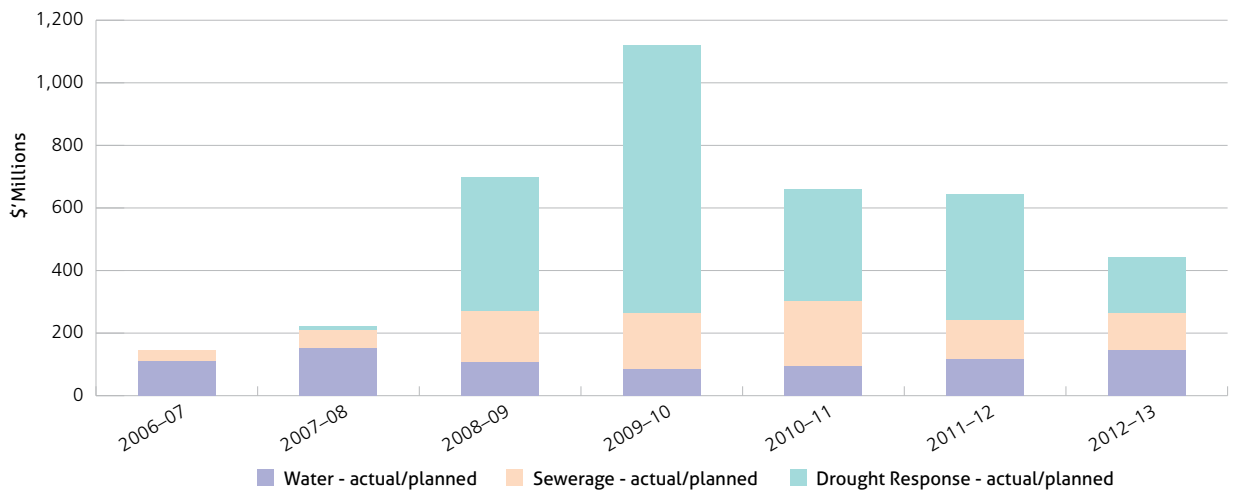


Table 6–1: SA Water's capital expenditure leading into the regulatory control period

	2006–07	2007–08	2008–09	2009–10	2010–11	2011–12	2012–13
Drought Response	-	12.2	428.9	855.8	356.2	403.4	181.9
Water	110.4	152.9	107.0	86.3	95.6	117.4	145.9
Sewerage	34.4	56.4	161.3	177.0	207.2	121.8	115.3
Total	**144.8**	**221.6**	**696.7**	**1,119.0**	**659.0**	**642.5**	**443.1**

Prior to 2012/13, nominal; 2012/13, real, March 2012, $'Millions excluding real cost escalation

Also of note in Figure 6–1 is the curtailment of capital expenditure associated with SA Water's direct control water services during the years of extraordinary expenditure in relation to drought response initiatives (2008–09 to 2010–11). The capital expenditure associated with SA Water's direct control water services (excluding drought response initiatives) is not planned to return to 2007–08 levels of approximately $153 million until 2013–14.

6.2. Benchmarking of SA Water's capital expenditure

ESCOSA's Guidance Paper indicates that SA Water should provide supporting information – such as benchmarking information – to facilitate assessment of its proposed expenditure[107], and that such benchmarking will be considered as one input in a broader assessment of the prudence and efficiency of SA Water's proposed expenditure[108].

Section 7.2 of this Proposal (Benchmarking of SA Water's operating efficiency) describes three distinct methods of benchmarking considered by SA Water, and the significant variability among Australian water utilities which materially influences each utility's expenditure. The three benchmarking methods which compare SA Water's operating and capital expenditure relative to other Australian water utilities are:

- CLD[109] analysis, where expenditure is analysed relative to a composite variable representing a utility's size;
- Partial financial indicator analysis; and
- Total Factor Productivity (TFP) analysis.

The data relied upon and the utilities included within these analyses are also detailed within section 7.2 of this Proposal.

The results of these analyses in the context of capital expenditure are presented and discussed in the sub-sections that follow. The data points for other water utilities are shown but not named, except where they are named elsewhere in publicly available reports. This is due to the fact that SA Water has not given other water utilities an opportunity to validate the results.

Benchmarking analysis shows that, despite the significant capital expenditure incurred by SA Water in relation to drought response initiatives, its average capital expenditure on a state-wide basis can be considered efficient relative to its peers.

107 ESCOSA, *Review of SA Water's Prices: 2013/14–2015/16 Guidance Paper*, Feb. 2012, p. 8.
108 Ibid, p. 13.
109 CLD is an acronym representing a composite size variable made up of: number of customers; length of network; and demand.

6.2.1. CLD analysis

Figure 6–2 shows the outcome of the CLD analysis undertaken by SA Water where the composite size variable (CLD) is plotted against total capital expenditure. The outcome shown in Figure 6–2 suggests that SA Water incurred above-trend capital expenditure relative to its peers in the period which this data represents (the 2010–11 financial year). However, this outcome needs to be considered in light of the fact that more than half of the capital expenditure incurred by SA Water in 2010–11 related to drought response initiatives – as detailed in Table 6–1.

Only one other utility included in this analysis incurred significant capital expenditure associated with construction of a desalination plant in 2010–11, being WA Water Corporation. Although the data point for WA Water Corporation is not named in Figure 6–2, SA Water considers it important to note that it is situated in a comparable position to SA Water. The desalination plants in Queensland and New South Wales were completed prior to 2010–11 and costs from the plant in Victoria were yet to be reflected in financial accounts.

Figure 6–3, presents the same CLD chart, but with capital expenditure on SA Water's ADP,

Figure 6–2: Comparative analysis of capital expenditure versus size, including desalination plants (2010–11)[110]

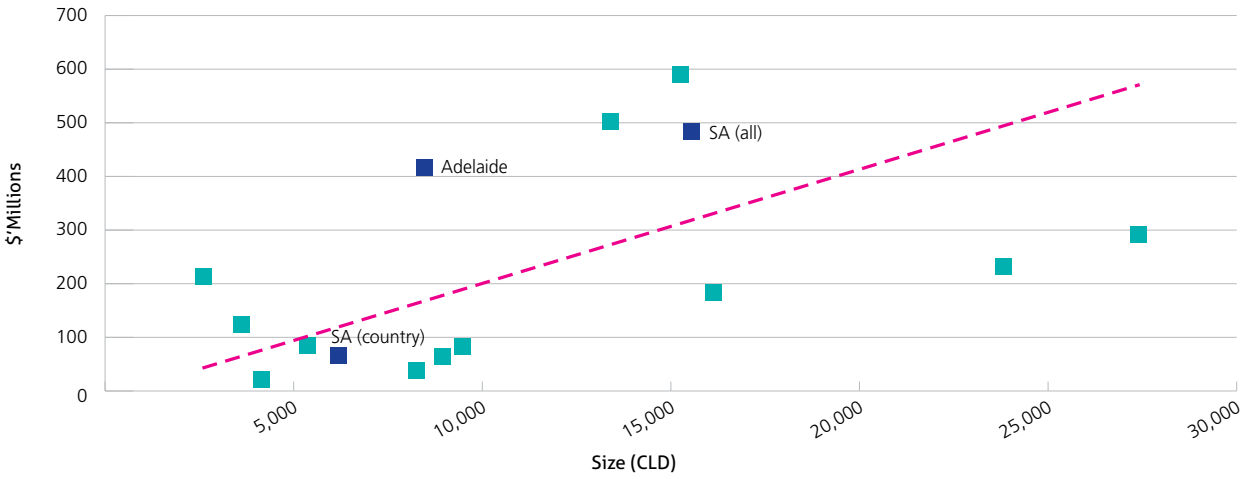
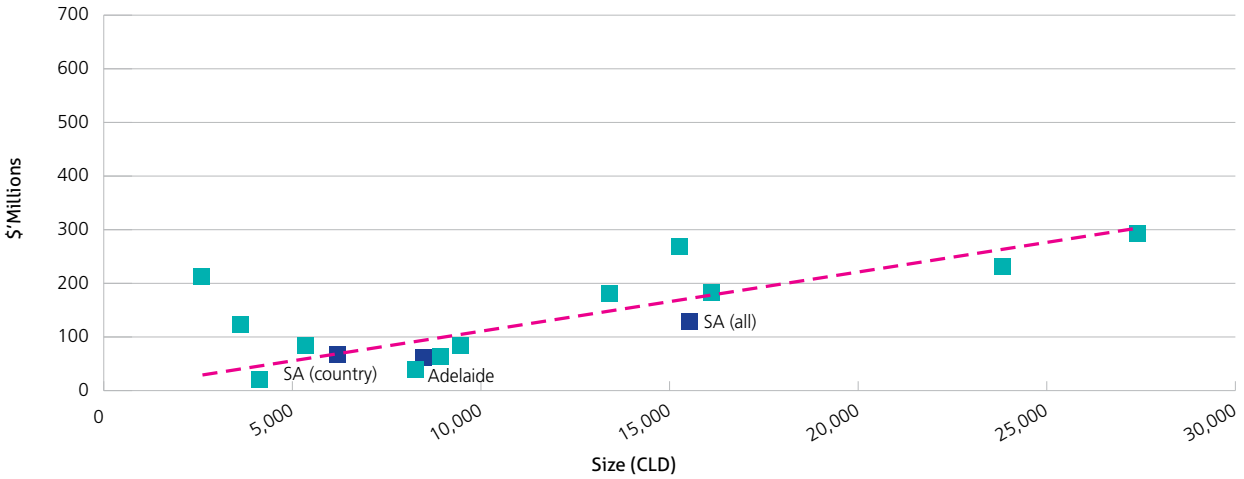


Figure 6–3: Comparative analysis of capital expenditure versus size, excluding desalination plants (2010–11)



110 Source: NWC, NPR 2010–11 and SA Water analysis

and WA Water Corporation's Southern Sea Desalination Plant excluded.

The significant difference in positioning of SA Water's data points in Figure 6–3 relative to Figure 6–2 serves to highlight the materiality of capital expenditure associated with construction of desalination plants, and the variability that exists in the capital expenditure programs of Australian water utilities from year-to-year. It also highlights the fact that effective comparison of recent capital expenditure between water utilities is difficult due to differences in timing and accounting treatment of the investment in desalination plants by the various utilities.

6.2.2. Partial financial indicator analysis

Figure 6–4 presents the combined (water and sewerage) capital expenditure per property for major water utilities in 2010–11, including capital expenditure associated with construction of desalination plants in South Australia and Western Australia. In-line with the approach taken with respect to CLD analysis, Figure 6–5 presents the same information – but excludes capital expenditure associated with construction of the ADP and WA Water Corporation's Southern Sea Desalination Plant.

Consistent with the results of the CLD analysis,

Figure 6–4: Combined capital expenditure per property, including desalination plants (2010–11)[111]

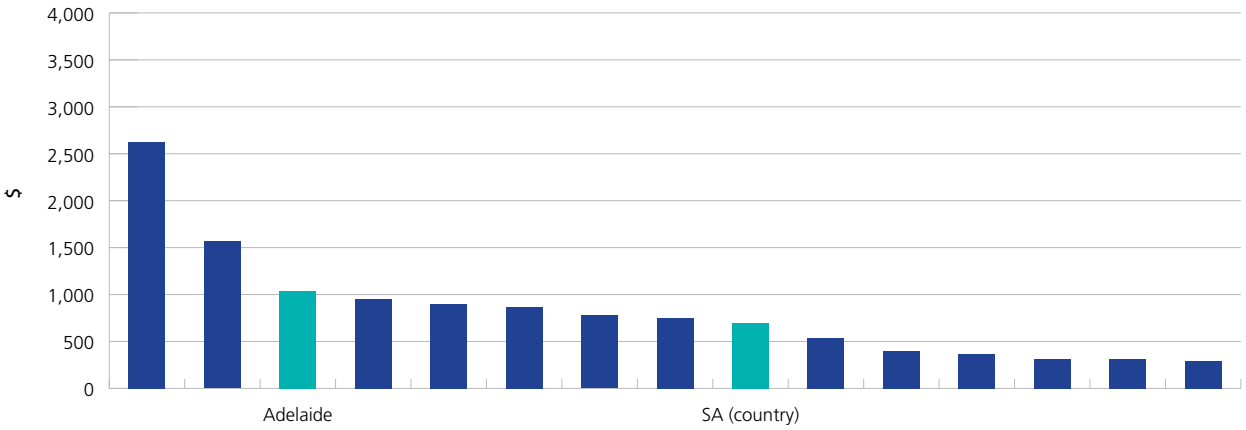
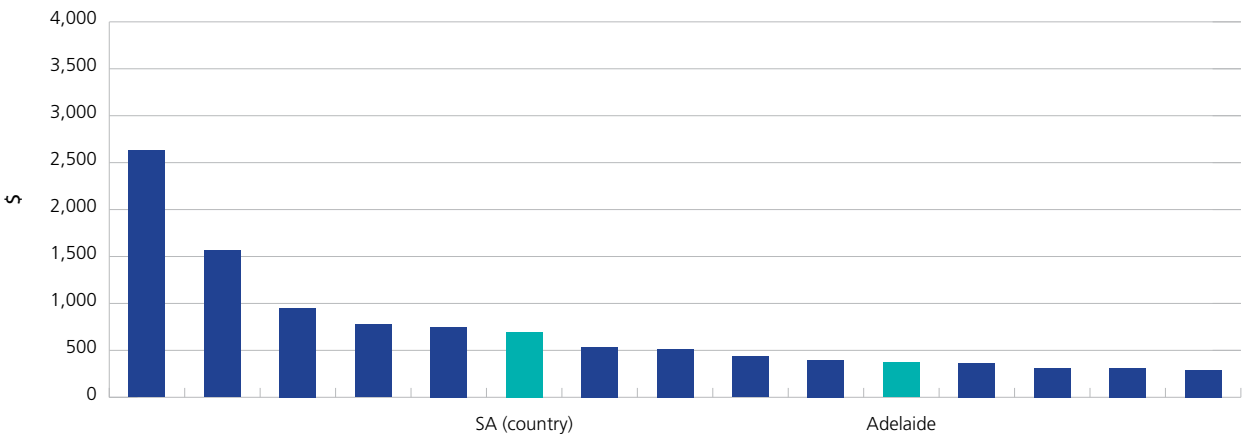


Figure 6–5: Combined capital expenditure per property, excluding desalination plants (2010–11)[112]



111 Source: NWC, NPR 2010–11: indicator F14, F15, C4 and SA Water analysis.
112 Source: NWC, NPR 2010–11 and SA Water analysis.

Figure 6–4 (where capital expenditure associated with construction of the ADP and the Southern Sea Desalination Plant is included) indicates that SA Water incurred comparatively high capital expenditure per property relative to its peers in 2010–11. Conversely, the results shown in Figure 6–5 (where capital expenditure associated with construction of the ADP and the Southern Sea Desalination Plant is excluded) indicate that SA Water incurred capital expenditure per property in-line with, or slightly below its peers.

6.2.3. Total Factor Productivity (TFP) analysis

The TFP analysis presented in section 7.7 of this Proposal was recently undertaken by the Essential Services Commission (Victoria) (ESCV) to benchmark 54 Australian water utilities, including SA Water. The ESCV's study considered capital and non-capital inputs to derive the TFP of each utility, and used this as the basis for ranking the utilities included in the study.

In publishing the results of its study, the ESCV acknowledged limitations with the data relied upon in its study, and the fact that it had made several major assumptions (including adjustments for water restrictions and differences in the degree of vertical integration). The results of the ESCV's study are reproduced in tabular form in Table 6–2 for the major Australian water utilities included in the other benchmarking analyses presented in this chapter. The study considered data through to 2009–10.

As noted in section 7.7 of this Proposal where these results are also shown, SA Water observes that its TFP ranking compares favourably with other vertically integrated water utilities servicing more than 100,000 customers on a state-wide basis, and that the ESCV acknowledges that the ranking of some utilities (including SA Water) are also influenced by expenditure associated with desalination plants.

Table 6–2: TFP for selected Australian water utilities (ESCV study, 2012)

Water utility	TFP[113]	Ranking[114]
City West Water	1.305	5
South East Water Ltd	1.177	10
Yarra Valley Water	1.144	11
Brisbane Water	1.067	15
Gold Coast Water	1.056	17
SA Water – Adelaide*	0.908	33
Barwon Water	0.877	37
Sydney Water Corporation	0.875	38
Water Corporation – Perth*	0.831	44
ACTEW*	0.789	47
Hunter Water Corporation	0.784	48

*Indicates vertically integrated utilities servicing more than 100,000 customers

113 Average of Index, Random Effects and Stochastic Frontier approaches to calculating TFP.
114 Total ranking out of 54 utilities included in the study. Only selected utilities are shown here, being major utilities included in SA Water's other benchmarking analyses presented in this chapter.

6.3. Capital expenditure development process

6.3.1. Capital governance framework

SA Water's Asset Management Policy sets in place a capital governance framework which drives the development of SA Water's capital plan. The Asset Management Policy is a Board approved policy which *"establishes the way SA Water's assets will be managed through asset stewardship that will ensure delivery of water and wastewater services in an efficient, responsive and accountable way"*. Implementation of the policy is monitored by the Board's Asset Management Committee. A copy of the policy is provided as Attachment F.1.

The capital governance framework established by SA Water involves a multi-stage review process, and is illustrated in Figure 6–6.

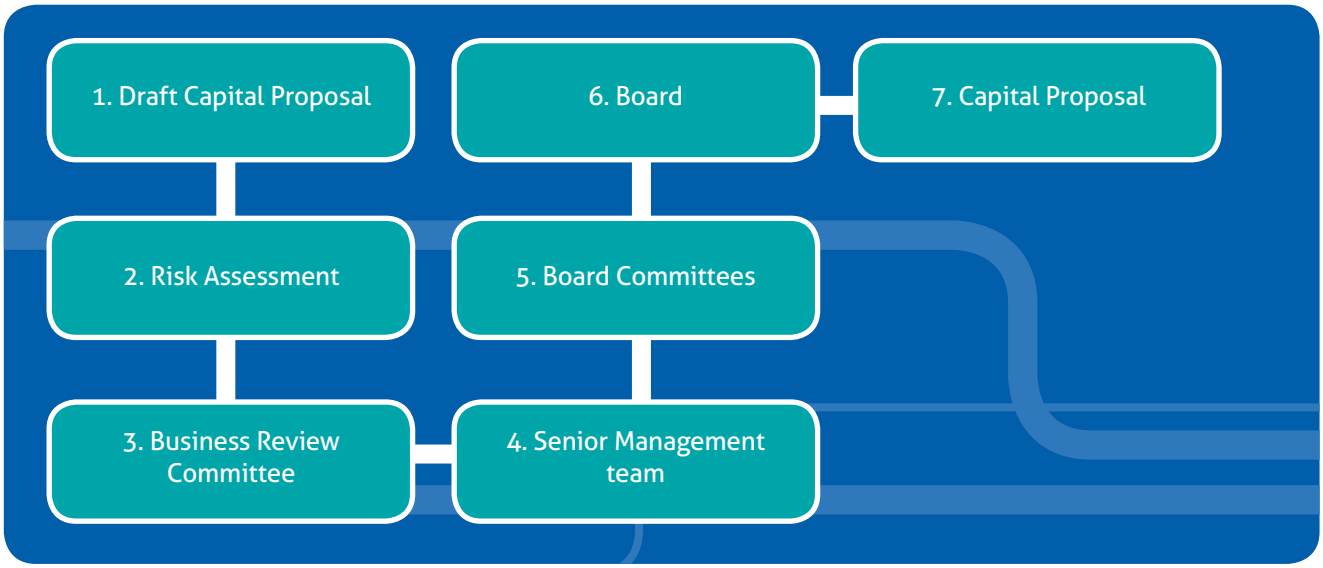
The first step in SA Water's capital governance framework involves development of a draft capital proposal. In developing the draft capital proposal, Asset Managers consult with key stakeholders across SA Water and draw upon key inputs including:

In developing its forecast of proposed capital expenditure, SA Water has undertaken formal assessment of the risks associated with varying levels of capital expenditure. The process adopted for assessing this risk aligns with SA Water's corporate risk management framework and International Standard ISO 31000 for determining risk ratings, and involved review of every single capital expenditure program and the individual projects and project portfolios within each program.

- The Asset Management Policy;
- Asset management plans;
- Details of new obligations to be met by SA Water; and
- Demand forecasts.

The second step in the capital governance framework involves formal assessment of the risks associated with varying levels of capital expenditure. The process adopted for assessing this risk aligns with the SA Water corporate risk management framework, and the International Standard ISO 31000 for determining risk ratings.

Figure 6–6: SA Water's capital governance framework



SA Water's risk management framework is also compliant with whole of SA Government directions in risk management. The process involves review of every single capital expenditure program and the individual projects and project portfolios within each program. Through structured conversations and reference to supporting data, subject matter experts:

- Identify individual projects and project portfolios for which an individual risk assessment is warranted (typically due to the nature, materiality or expenditure profile of the project or project portfolio);
- Determine what would be an appropriate "proposition" to adopt in relation to each individual project or project portfolio as the basis for the risk assessment (typically a reduction of capital expenditure in percentage or dollar terms, or deferral of some or all of the proposed expenditure); and
- Assign a "consequence" rating between 1 and 5 ("insignificant" to "catastrophic"), and a "likelihood" rating between 1 and 5 ("rare" to "almost certain") to each proposition. A standard set of consequences and likelihoods is considered via a risk assessment matrix.

The key output from this step in the capital governance framework is a qualitative and quantitative assessment of the risk associated with varying levels of capital expenditure, which is presented to a senior management committee known as the Business Review Committee (comprising the Chief Executive, Chief Financial Officer and Head of Strategy, Planning & Regulation). The plan is reviewed in detail to ensure that any overlapping/duplicate requirements are eliminated. Any capital/operating expenditure trade-offs are also identified and resolved. Similarly, any operating impacts from capital projects are also reviewed to ensure that they have been addressed in the operating plan. The committee also considers the extent of risk in terms of elements that have been excluded from the draft capital plan at the outset of the process.

A further prioritisation review from a broader business and strategic perspective is then undertaken by the full Senior Management Team (SMT).

The next step in the capital governance framework involves further consideration of the risk associated with varying levels of capital expenditure by committees of the Board, with the final step in the review process involving review and endorsement of the capital proposal by the full Board.

Through this capital governance process SA Water has aimed for the least possible capital expenditure within acceptable risk limits.

6.3.2. Structure of the capital plan

SA Water's capital plan is made up of a large number of individual capital projects and project portfolios. A categorisation hierarchy has been developed to facilitate preparation and analysis of the capital plan. This categorisation hierarchy is depicted graphically in Figure 6–7.

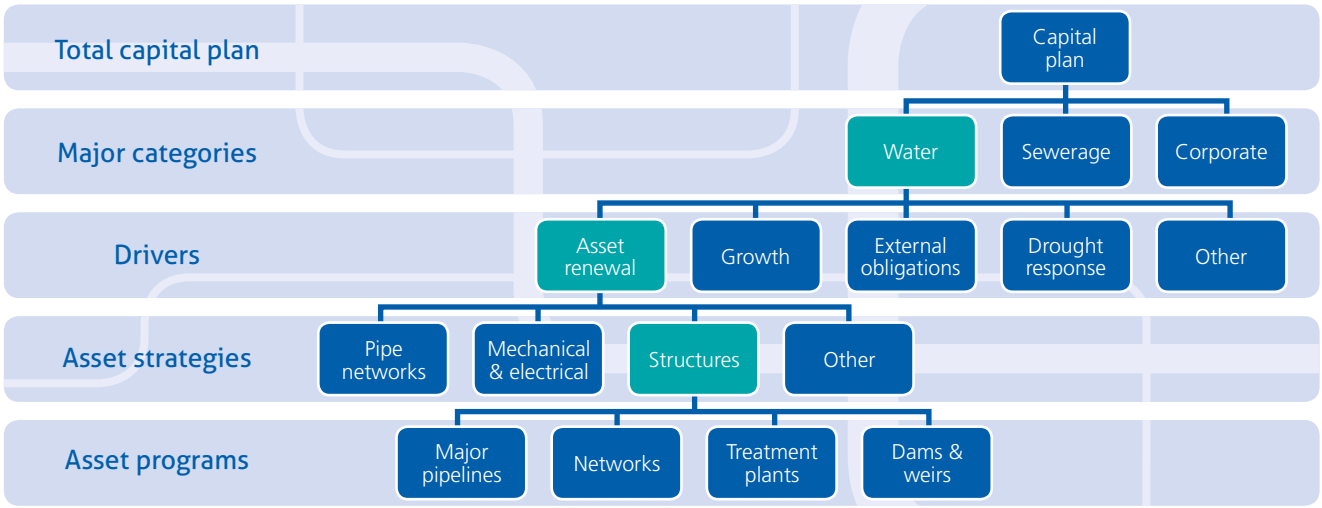
The capital plan is divided into 3 major categories:

- Water;
- Sewerage; and
- Corporate.

The water category includes infrastructure projects directly attributable to the provision of water services. Similarly, the sewerage category includes infrastructure projects directly attributable to the provision of sewerage services.

The corporate category includes projects where the expenditure is required to support delivery of services to customers, but which are not directly attributable to either water or sewerage services. The principle areas of expenditure in the corporate category are: information services projects; major and minor plant renewal; and accommodation projects.

Figure 6–7: Categorisation hierarchy of the capital plan



The next level of categorisation is based on the high level "drivers" for the capital investment. The drivers of SA Water's infrastructure expenditure are:

- **Asset renewal:** Projects driven by the need to renew existing infrastructure to maintain the reliability of the level of service to customers that is provided by that infrastructure;
- **Growth:** Projects that are required to accommodate growth in demand and ensure that the required standards of service are maintained and continue reliably to customers;
- **External obligations:** Expenditure required to meet external obligations principally related to water quality, environment and safety;
- **Drought response:** A series of initiatives driven by the need to secure the water supply for SA Water's customers; and
- **Other:** Expenditure necessary for provision of services attributable to other drivers, such as expenditure to extend systems that are used to monitor infrastructure.

A series of investment strategies (called Asset Strategies) sit below the high level driver categories. For example, the asset investment strategies that are required to accommodate growth include network growth and treatment plant growth.

At the next level are the Asset Programs. These aggregate the projects that are required to manage a particular asset class to ensure consistency and effective prioritisation for the various assets types within each class, across a range of facilities. For example, within the "Structures" Asset Strategy for water there are Asset Programs for major pipelines, networks, treatment plants and dams and weirs.

SA Water's capital expenditure requirements for the forthcoming regulatory control period are presented separately in the subsequent sections of this chapter for each of the water, sewerage and corporate categories of capital expenditure.

Each Asset Program is further detailed in other information submitted in support of this Proposal. These Asset Programs detail the objectives, scope, performance, risks, deliverables and the proposed expenditure for each Asset Program.

6.3.3. Key inputs and assumptions

Key inputs and assumptions applied in development of this program are described in detail in the following sub-sections, and include:

- Growth and demand forecasts;
- Outputs from system modelling tools;

- External obligations;
- Asset management plans; and
- Input cost escalation.

Growth and demand forecasts

SA Water develops its growth and demand forecasts for capital planning purposes by considering a broad range of information at both a macro (State-wide) and micro (regional/spatial) level.

State-wide growth and demand forecasts – such as those developed by ACIL Tasman with respect to the delivery of direct control services (presented in chapter 5 of this Proposal) – provide valuable projections of water use on a per-customer basis, and indications of State population and economic growth.

In developing regional growth and demand forecasts, SA Water engages with various planning and development bodies through which it develops an understanding of more localised factors driving infrastructure and capital investment requirements.

The Department of Planning, Transport and Infrastructure (DPTI – previously the Department of Planning and Local Government) oversees development within the metropolitan and regional areas of South Australia, and outlines the State Government's direction for land use change and development within South Australia in its Planning Strategy. This Strategy includes plans such as "The 30-Year Plan for Greater Adelaide" and the regional plans prepared by DPTI. Priority areas for development are identified in the Strategy and plans.

SA Water is also a member of the Government Planning and Coordination Committee (GPCC) – established in November 2009 as a high-level, cross-agency body charged with the timely, coordinated and efficient development of the priority areas.

Information derived from the strategies and plans developed by DPTI and the GPCC are relied upon as inputs within SA Water's planning process – to develop plans for infrastructure requirements, and to service predicted growth.

Development plans need to be amended over time to introduce changes in zoning or to reflect changes in local and State Government policy. SA Water is also consulted as a referral agency when changes to development plans are made through the development plan amendment process.

Additionally, SA Water has the opportunity (as a State Government referral agency) to review and comment upon development applications submitted by developers. A critical aspect of such reviews relates to the staging of infrastructure to service newly developed areas in an efficient manner. Various options – such as temporary works to maximise the utilisation of existing infrastructure – may be considered as an interim measure until a critical mass is achieved.

Outputs from system modelling tools

SA Water has developed a variety of system modelling tools to support infrastructure planning and operation – the outputs from which have been relied upon in development of the capital expenditure forecast detailed within this Proposal.

SA Water routinely captures data from operational networks in the field, and inputs this data into its modelling tools to ensure their ongoing alignment with the actual performance of infrastructure. Among other things, these modelling tools highlight capacity issues within operational networks and in–turn inform the development of asset management plans. Capital and non-capital solutions are considered as part of this process.

Parameters applied within these system modelling tools are aligned with WSAA guidelines.

The system modelling tools are also used to assess the impact of the growth and demand forecasts that have been developed based on the information gathered through the planning processes described above and, in-turn, to assess the infrastructure requirements to meet these forecasts.

External obligations

SA Water is subject to more than 120 Federal and State Acts, along with various other regulations, codes and industry standards or guidelines (outlined in section 2.1.3 of this Proposal) – all of which impose obligations which must be met, and which act as major inputs into the development of SA Water's asset management plans.

In particular, the target quality and reliability of SA Water's direct control water and sewerage services – outlined in Chapter 3 of this Proposal and to be expressed in SA Water's Customer Charter – influence development of SA Water's asset management plans, and capital investment.

There are specific directions and obligations placed on SA Water by other regulators which drive capital expenditure – these can be manifested in negotiated agreements with and protocols imposed by other regulators. The principal areas where such obligations have been applied to SA Water relate to water quality, environmental protection and occupational health, safety and welfare.

Additionally, where industry standards or guidelines exist (either at a national or international level), SA Water determines where it is prudent for these to be applied. An example is the application by SA Water of the ANCOLD guidelines to the management of its large dams – with changes to these guidelines giving rise to significant capital expenditure requirements leading into, during, and beyond the forthcoming regulatory control period.

Asset management plans

SA Water's Asset Management Policy (provided as Attachment F.1) establishes the way in which SA Water manages its infrastructure. The policy requires that asset planning and management occurs for SA Water's assets to deliver the required level of service by optimising risk, performance and life-cycle costs. A principle of the policy is the *"performance of assets to meet quality and service outcomes to ensure that customer and community service commitments are met"*.

To achieve this asset management principle, and in-line with urban water utility practice, SA Water conducts its asset management activities within the context of an integrated, strategic asset management system. This system combines corporate strategy, business planning, asset planning, program management, project management and financial management components, and is depicted diagrammatically in Figure 6–8.

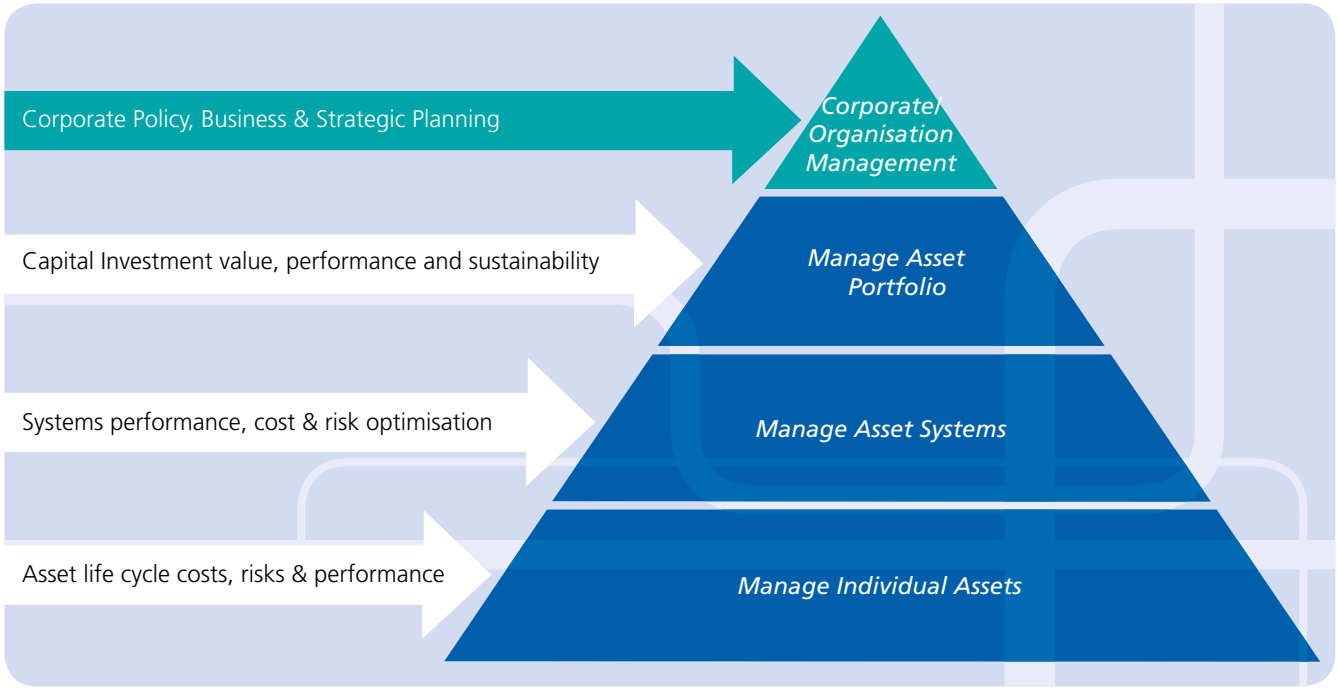
Further details regarding SA Water's strategic asset management system are provided within SA Water's top-level operational asset management document – the High Level Asset Management System (provided as Attachment F.2). This document guides the development of strategies for the various classes of assets managed by SA Water, including application of a condition-based maintenance philosophy and performance management approach.

Key outputs developed through application of SA Water's strategic asset management system which, in-turn, have been relied upon as inputs in development of this Proposal, include:

- Asset management plans covering all asset classes and facilities; and
- A consolidated capital works plan.

The asset management plans developed by SA Water are structured in a matrix format, with

Figure 6–8: SA Water's strategic asset management system



individual asset management plans developed for:

- Individual major facilities such as a water treatment plants – the vertical aspect of the matrix referred to as "Facilities Asset Management Plans"; and
- Portfolios of common assets situated at various facilities such as mechanical and electrical equipment – the horizontal aspect of the matrix referred to as "Asset Programs".

An example of this matrix structure is depicted in Table 6–3 which refers to SA Water's "structures" and "mechanical and electrical" asset strategies. The ticks in the table cells indicate the distribution of asset management plans developed for these assets.

The matrix structure adopted by SA Water ensures consistency of asset management approach and effective prioritisation of asset management resources for the various asset types managed by SA Water – for example, ensuring that mechanical and electrical equipment is managed consistently across all treatment plants.

Input cost escalation

The capital expenditure amounts included within this Proposal are expressed, in accordance with the Guidance Paper issued by ESCOSA, as:

- Nominal (money of the day) prices for all actual expenditure up to and including 2011/12; and
- Real (constant dollar) prices at March 2012 values for all other expenditure[115].

In January 2012 SA Water engaged the services of consultants Evans & Peck to review SA Water's capital plan and develop a forecast of the "real" input cost escalation that will apply to SA Water's capital expenditure for the forthcoming regulatory control period.

Evans & Peck's approach to developing its forecast of real input cost escalation involved a review of the economic outlook for South Australia, and analysis of SA Water's capital program.

Through its review of the economic outlook for South Australia, Evans & Peck concluded that *"South Australia's economic growth over the next*

115 ESCOSA, *Review of SA WATER's Prices: 2013/14 – 2015/16 Guidance Paper,* February 2012, p. 11.

Table 6–3: SA Water's matrix structure for asset management plans

		Facilities Asset Management Plans							
		Water Networks	Wastewater Networks	Bolivar WWTP	Glenelg WWTP	Happy Valley WTP	Dams	Mannum Adelaide PL	Morgan Whyalla PL
Asset Programs	Structures – Major Pipelines							✓	✓
	Structures – Networks	✓	✓						
	Structures – Treatment Plants			✓	✓	✓			
	Structures – Dams & Weirs						✓		
	Mech & Elec -Major Pipelines							✓	✓
	Mech & Elec – Treatment Plants			✓	✓	✓			
	Mech & Elec – Networks	✓	✓						

5 years is expected to stay close to its average for the past 5 years"[116] .

Evans & Peck's analysis of SA Water's capital program involved the program being consolidated into similar works types or categories. Each work category was then analysed to determine the mix of internal labour, materials and contracted services costs typically incurred in SA Water's capital projects comprising that work category. Each work category was further analysed to determine the typical profile of materials consumed in project delivery. The categories of materials established for this analysis comprised:

- Ready mixed concrete;
- Plastic and steel pipes;
- Structural steel;
- Electrical equipment; and
- Pumps.

The ADP construction project was excluded from this analysis as its magnitude had the potential to skew results, and SA Water does not consider it to be representative of the "business as usual" capital projects included within this Proposal.

Having established the typical profile of internal labour, materials and contracted services (the input cost categories) for each of the work categories comprising SA Water's capital program, Evans & Peck selected appropriate, publicly available, indices from the Australian Bureau of Statistics in order to understand the trend in cost escalation for each input cost category.

Evans & Peck then applied a statistical method of analysis (known as the "Monte Carlo method") using the index data for these input cost categories to calculate the probability of various forecasts of the cost escalation applicable to each input cost category being exceeded.

116 Evans & Peck, *SA Water Corporation Review of Indexation Rates for Capital Works associated with the Regulatory Business Proposal, 12 June 2012, p. 14. This report is provided as Attachment F.3.*

Table 6–4: Forecast of real input cost escalation provided by Evans & Peck (annual % expressed in real terms)

	2012–13	2013–14	20014–15	2015–16
Labour	1.66	1.70	1.74	1.77
Materials	1.41	1.55	1.70	1.84
Contracted Services	1.37	1.46	1.56	1.64

The report produced by Evans & Peck, which contains further details regarding its forecasting methodology, is provided as Attachment F.3 to this Proposal. The input cost escalation rates forecast by Evans & Peck through this method are summarised in Table 6–4.

Note that these escalation rates were developed through analysis of SA Water's proposed capital program, and relate to the mix of internal labour, materials and contracted services typically incurred in the types of capital projects comprising the capital program. SA Water also engaged Evans & Peck to develop a similar forecast for application to SA Water's operating expenditure, which was developed on the basis of an alternative mix of internal labour, materials and contracted services typically incurred in an operating context. This separate forecast is presented in chapter 7 (Operating Expenditure) of this Proposal.

The real input cost escalation forecast detailed in Table 6–4 has been applied to SA Water's capital expenditure forecast, the cumulative impact of which is an increase in the total capital expenditure proposed by SA Water of approximately $25 million and $24 million for water and sewerage services respectively. Note that this reflects the impact of real cost increases over and above general inflation. The impact of general inflation as indicated by the CPI has not been applied to the forecast capital costs presented in this chapter, and is addressed separately in the revenue model developed by SA Water (refer chapter 10, Required Revenue and Pricing).

6.3.4. Efficiency of SA Water's unit costs and estimates

SA Water has adopted various approaches, depending on the nature of the project (or program) and the stage of its development, to establish the estimated costs included in this Proposal.

A significant proportion of the capital expenditure associated with this Proposal is inherently repetitive. For this type of work, estimates are based on unit costs derived from similar, recent works. This is typically the case for programs of capital expenditure (project portfolios).

As an example, SA Water's capital program includes a program of works for renewal of water reticulation mains – where a portfolio of individual projects is undertaken annually. SA Water maintains a database of these projects detailing the size, length of main, material, road type and the actual project costs at completion. This database is, in-turn, relied upon to provide unit rates that are used to establish the estimated costs of the forward program of projects. This method provides a high level of confidence in the accuracy and efficiency of estimates.

Formal estimates

In accordance with SA Water's capital governance process, formal estimates are prepared for all capital projects to assist in the efficient management of the capital plan, and to inform decision making at the various stages of project

development. Four types of estimates are prepared for infrastructure projects as follows:

- ***Initial estimate***
  - Prepared as an indicative project cost for capital works planning.
  - Expected cost range –10% to +50%.
- ***Scoping estimate***
  - Prepared early in the project's development phase to determine costs for a range of options, and to facilitate comparison/rejection.
  - Expected cost range –10% to +30%.
- ***Full financial approval estimate***
  - Prepared from the concept design documentation to seek financial approval for the project.
  - Expected cost range –10% to +15%.
- ***Tender estimate***
  - Prepared from tender documentation to provide a reference for tender comparison purposes.
  - Expected cost range –10% to +10%.

The expected cost range of an estimate depends to a large extent upon the accuracy and completeness of the information available to the estimator. Hence, the expected cost range for the different types of estimates will reduce as the level of information available increases during the project's development.

All estimates include an allowance for contingencies. This allowance is intended to cover latent issues and items that cannot reasonably be quantified at the time of the estimate – such as unforeseen construction problems or site conditions, extensions of time, unfavourable market conditions and exchange rate fluctuations.

A risk provision may also be included in the estimate where, due to uncertainty regarding the concept design, it is anticipated that additional items or that large design changes (carrying significant cost impact) may be required.

The project contingency is applied as a percentage of the project construction cost for lower value projects.

For major projects, the accuracy of information available varies for each line item within the works and the percentage contingency that is applied also varies. An example of this is an estimate containing a pipe supply contract and a separate pipe laying contract. The pipe supply budget quote is usually based on clearly defined requirements – such as materials and size. This component would attract a much lower percentage contingency than the pipe laying contract – which is subject to a considerable number of unknowns such as ground conditions, weather and market factors.

The accuracy of cost estimates in this Proposal will therefore vary for each project according to its maturity when the Proposal was formulated. Typically project estimates increase in value as a project develops and the definition of the scope of the required works is refined.

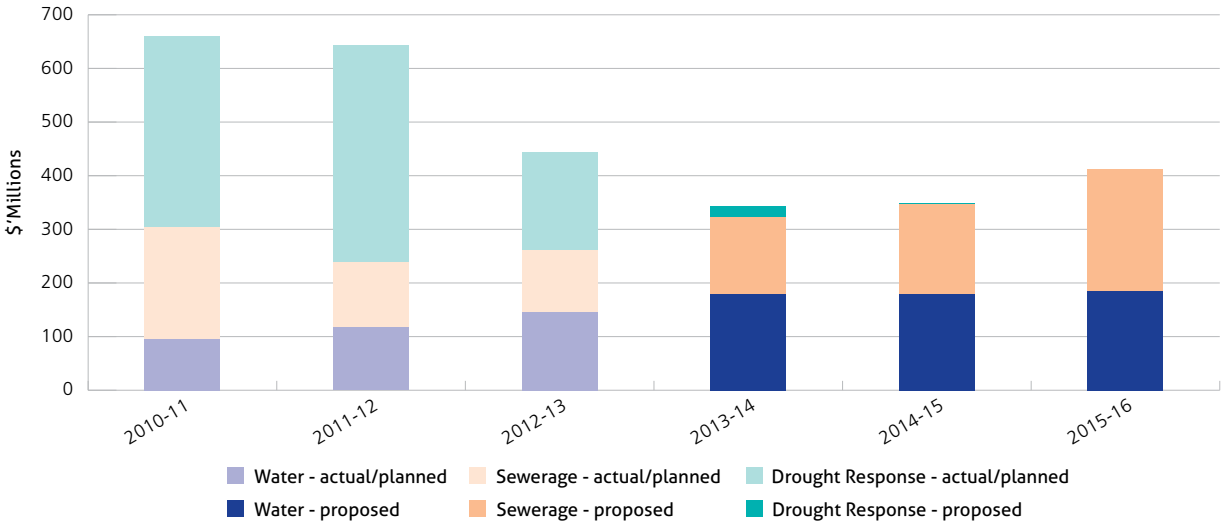
Formal estimates for larger projects are prepared by specialist estimating consultants.

Efficiency of capital expenditure

SA Water is a pioneer in the Australian water industry with respect to the competitive procurement of infrastructure operations and construction works. The competitive tendering of the operation and maintenance of SA Water's infrastructure in the Adelaide metropolitan area in 1996 was the largest and most comprehensive tendering program ever undertaken by an Australian water utility at the time. For the 3 years to 2011–12, 81% of SA Water's routine capital expenditure (excluding water security projects) was delivered through contracted services.

SA Water has established mature and effective processes for tendering of construction services, and maintains a diverse panel of service providers with the competencies required to deliver the

Figure 6–9: SA Water's proposed capital expenditure for direct control water and sewerage services (nominal $'M to 2011–12; real, March 2012 $'M from 2012–13 excluding real cost escalation)



projects comprising SA Water's capital program in an efficient manner. SA Water considers that this is evidenced by the benchmarking information presented in section 6.2 of this Proposal.

Further information regarding SA Water's project delivery model, flexible resourcing approach and performance in delivering large projects is provided in section 6.8 of this chapter (Delivery of the proposed capital expenditure program).

6.4. Overview of proposed capital expenditure

The capital expenditure proposed by SA Water for the forthcoming regulatory control period is depicted graphically in Figure 6–9, together with SA Water's forecast of the capital expenditure it will incur during the 3 years leading into this period. The capital expenditure proposed for the forthcoming regulatory control period represents the least capital expenditure which SA Water considers will enable it to remain within acceptable risk limits. Proposed corporate capital expenditure not directly attributable to either the water or sewerage service is described in section 6.7, and has been allocated to these services as described in section 6.1.

Through 2015–16, the capital expenditure proposed by SA Water features capacity upgrades required at the Murray Bridge and Aldinga wastewater treatment plants, major asset renewal works at the Bolivar wastewater treatment plant, and a major safety upgrade of the Kangaroo Creek dam.

Figure 6–9 shows that SA Water proposes to reduce significantly capital expenditure associated with drought response initiatives during the forthcoming regulatory control period. This program of works is forecast for completion in 2014–15, with only very minor capital expenditure allocated to it in that year (approximately $2 million). The step reduction in SA Water's total capital expenditure in 2013–14 relative to 2012–13 will amount to approximately $101 million (a reduction of approximately 23%).

Notwithstanding this step reduction in capital expenditure, Figure 6–9 also shows that SA Water

proposes to increase capital expenditure in relation to its direct control water and sewerage services for each of the following years of the forthcoming regulatory control period.

The inclining profile of capital expenditure proposed by SA Water reflects capacity upgrades required at the Murray Bridge and Aldinga wastewater treatment plants, major asset renewal works at the Bolivar wastewater treatment plant, and a major upgrade to the Kangaroo Creek dam. These and other features of SA Water's proposed capital expenditure are discussed in the following sections of this chapter.

6.5. Proposed infrastructure capital expenditure – direct control water services

The capital expenditure proposed by SA Water for the forthcoming regulatory control period in relation to its direct control water services is presented graphically in Figure 6–10, and in tabular form in Table 6–5. Actual capital expenditure for the 3 years leading into this period is also shown in Figure 6–10 for contextual purposes.

Figure 6–10 shows that SA Water proposes an increase in capital expenditure associated with

Figure 6–10: SA Water's proposed capital expenditure for direct control water services (nominal $'M to 2011–12; real, March 2012 $'M from 2012–13 excluding real cost escalation)

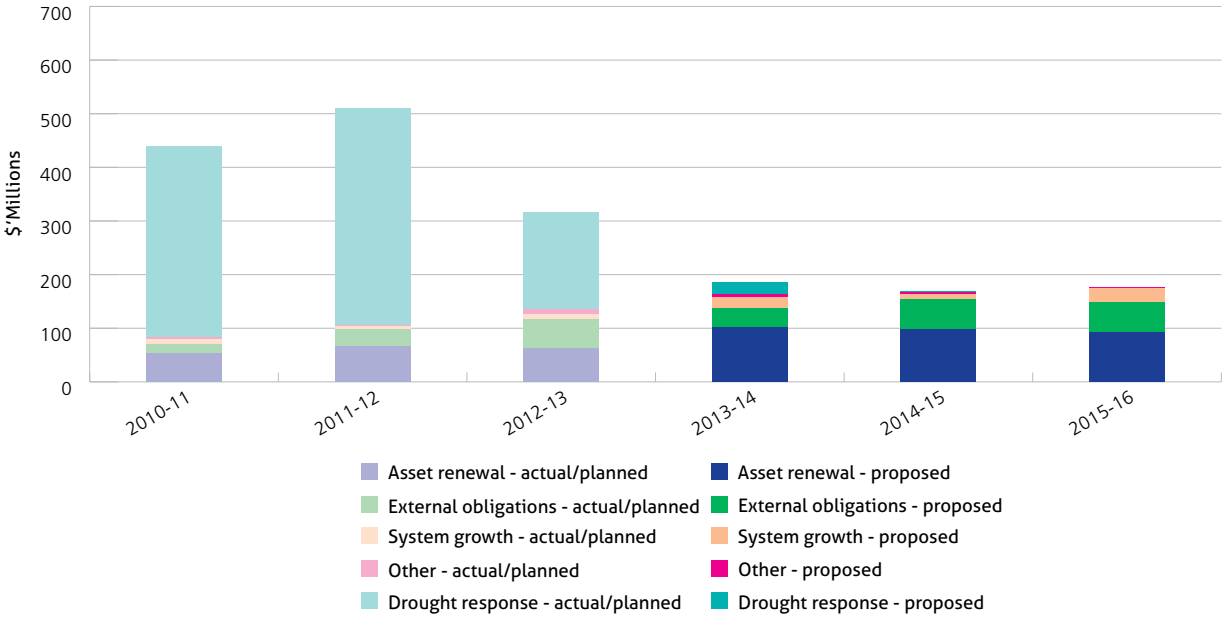


Table 6–5: SA Water's proposed capital expenditure for direct control water services

Driver	2013–14	2014–15	2015–16
Asset renewal	100.7	98.0	92.0
External obligations	35.9	56.0	57.7
System growth	20.7	9.9	25.0
Other	6.9	2.2	2.1
Drought response	21.1	2.2	-
Total	**185.4**	**168.4**	**176.9**

Real, March 2012, $'Millions excluding real cost escalation

asset renewal in 2013–14, relative to the curtailed levels incurred during the years of extraordinary investment in drought response initiatives, and a significant increase in capital expenditure required to meet various external obligations (from 2014–15) – the most significant of these obligations relates to safety of large dams.

The capital expenditure proposed by SA Water for the forthcoming regulatory control period with respect to direct control water services is described in the following sub-sections of this chapter according to the key driver of the capital expenditure.

6.5.1. Proposed capital expenditure driven by asset renewal requirements

Table 6–6 shows the capital expenditure proposed by SA Water for the forthcoming regulatory control period with respect to its direct control water services which is driven by asset renewal requirements. The profile of proposed investment declines during the regulatory control period but represents a step-change increase relative to the expenditure associated with asset renewal in the years immediately prior.

As discussed in section 6.1 of this chapter, SA Water's investment in renewal of its assets was reduced below planned levels for the period 2010–11 to 2012–13 in order to facilitate extraordinary expenditure associated with drought response initiatives. As a consequence, various programs of asset renewal works and specific projects which were deferred are proposed for the forthcoming regulatory control period.

SA Water's investment in renewal of its assets was reduced below planned levels for the period 2010–11 to 2012–13 in order to facilitate extraordinary expenditure associated with drought response initiatives. Various programs of asset renewal works and specific projects which were deferred (such as renewal of the water main beneath Marion Road) are proposed for the forthcoming regulatory control period.

The provision of a water supply service to customers over a broad geographic area of the State is inherently an asset-intensive business. As a vertically integrated water utility, SA Water manages assets spanning the full water supply chain – from catchments, dams, reservoirs and bores, through to individual connections and meters at customer properties. The length of water mains managed by SA Water exceeds 26,000 km[117].

These assets, although often long-lived, require ongoing renewal in order to continue to provide a reliable service to customers.

Table 6–6: Proposed capital expenditure driven by asset renewal requirements (direct control water services)

Asset type	2013–14	2014–15	2015–16
Pipe networks	41.5	40.9	36.7
Mechanical & electrical	23.0	21.5	18.9
Structures	22.3	16.5	16.7
Other	13.9	19.1	19.7
Total	**100.7**	**98.0**	**92.0**

Real, March 2012, $'Millions excluding real cost escalation

117 South Australian Water Corporation Annual Report for the year ending 30 June 2011, p80

SA Water's asset management plans are informed by asset attributes captured through its work management and geographic information systems. In the case of SA Water's pipe networks, these systems capture location, interruption and repair data for failures which is relied upon to prioritise capital projects and longer-term replacement requirements.

In accordance with SA Water's asset management system, prudent and efficient asset management strategies are developed and applied to asset classes. Using pipe networks as an example, the asset management strategy deemed prudent and efficient for reticulation mains (less than 375mm diameter) is "run to failure". This contrasts with the "replacement before failure" strategy deemed prudent and efficient for trunk mains (375mm and above) – where there is a much higher consequence of failure.

Renewal of pipe networks

The capital expenditure proposed for renewal of pipe networks includes provision for a large number of low value projects, and a small number of high value projects – the largest involving replacement of the trunk main beneath Marion Road.

The trunk main beneath Marion Road is a 600mm diameter, mild steel, concrete-lined trunk water main installed in 1898. Since 2007, 29 failures have been recorded along a 6.1 km length of this pipe, and condition assessments have confirmed the need to replace this section of pipe.

Renewal of mechanical and electrical equipment

The capital expenditure proposed for mechanical and electrical equipment encompasses a wide range of assets including high voltage switchboards in pump stations, pumps, instrumentation and dosing equipment. These assets have a typical useful life in the range of 15–35 years, and the capital expenditure proposed for these assets comprises a large number of low-value projects to address specific renewal requirements.

In particular, condition assessments have confirmed the requirement for replacement of certain dosing systems, switchboards, filter control equipment, valves and pumping units at water treatment plants.

A large project proposed with respect to mechanical and electrical equipment during the forthcoming regulatory control period relates to replacement of the high voltage switchboards in the pump stations on the Swan Reach to Paskeville Pipeline – planned for completion in 2013–14. Safe and reliable operation of the pump stations on this pipeline is essential to operators of these pump stations and customers situated across a very large area of the State – from the Barossa Valley through to the Yorke Peninsula. These pump stations were commissioned in 1969 and an asset audit report produced by independent consultants SKM in 2011 indicates that *"the existing switchboards and control systems at the pump stations along the Swan Reach to Paskeville Pipeline are approaching the end of their usable life"*[118].

Renewal of structures

SA Water's infrastructure comprises significant civil structures including large tanks, earth bank storages, aqueducts, dams and reservoirs. These structures represent critical points in the water supply chain, and their safe and reliable performance is essential to SA Water's operations.

In 2011–12 SA Water commenced a significant program of works involving the upgrading of the lining and covers on its earth bank storages, and

118 Sinclair Knight Merz, Swan Reach to Paskeville Pipeline Pump Stations Audit, 1 July 2011, p. 3

proposes to continue this program during the forthcoming regulatory control period. Lined and covered earth bank storages are a relatively recent innovation made possible with the development of suitable materials.

SA Water introduced such technology in 1988, and considers that it represents a low whole-of-life cost means of constructing new, large storages – or lining and covering existing earth bank storages. Lining and covering open storages in the distribution network is critical to maintaining water quality and preventing contamination.

Since the introduction of this technology at SA Water in 1988, significant improvements in the materials used for such liners and covers have improved their durability. The liners and covers that have been installed by SA Water include materials introduced at various times following their development – some of which are not achieving their expected life of 25 years and will need to be replaced during the forthcoming regulatory control period.

Other major works proposed in relation to renewal of SA Water's structures during the forthcoming regulatory control period include:

- **Replacement of three 9.09 ML, high level tanks at Minnipa:** these tanks were constructed in 1945 and are major infrastructure on the Tod-to-Ceduna water supply network. The tanks have deteriorated prematurely due to the high chloride content in the concrete, with concrete reinforcement exposed and leaks occurring due to the poor structural integrity of the tanks. It has been determined that rehabilitation will not be practical or efficient, and replacement is required; and
- **Renewal of the Hope Valley EL170 tank structure:** this is a 136 ML storage tank downstream from the Anstey Hill water treatment plant which experienced a partial roof collapse in January 2010 (following failure of a concrete roof support column). Renewal of the columns and roof structure is essential for continued safe and reliable water supply to thousands of customers in metropolitan Adelaide.

Renewal of other assets

In addition to the large portfolios of assets described in the preceding sub-sections of this chapter, SA Water manages a broad range of other assets which also require renewal to ensure their ongoing safe and reliable operation. Such assets include water meters, cathodic protection installations and SCADA equipment.

Although the capital expenditure proposed by SA Water in relation to these assets exhibits an uniform profile (refer Table 6–6), SA Water proposes to increase the capital expenditure allocated for replacement of the "TD8" 20mm domestic customer meter fleet during the forthcoming regulatory control period – during which these meters will reach the end of their effective lives. Replacement of these meters is essential for the accurate recording of customer water consumption and billing, and is regarded as an important issue by SA Water's customers.

Specifically, SA Water proposes to replace over 130,000 20mm meters as part of this renewal program during the forthcoming regulatory control period. SA Water considers replacement of these meters to be essential in maintaining SA Water's reputation, and the community's confidence in SA Water – particularly during a period when usage tariffs have increased significantly. Replacement of these meters is also required to maintain compliance with Australian standards for meter accuracy.

A major program of works proposed in relation to SCADA equipment involves replacement of obsolete remote telemetry units (RTUs) within SA Water's SCADA network. Maintenance of an effective SCADA network is essential for monitoring critical field assets such as pump stations, valves and tanks. In a review of SA Water's SCADA

network undertaken in 2008 with the assistance of consultants KEMA, replacement of these units on a 15 year cycle was deemed prudent and efficient – a renewal program which SA Water commenced prior to the forthcoming regulatory control period, and will continue into the subsequent regulatory control period.

6.5.2. Proposed capital expenditure driven by external obligations

Table 6–7 shows the capital expenditure proposed by SA Water for the forthcoming regulatory control period with respect to its direct control water services which is required to comply with external obligations, and indicates that the bulk of this expenditure is associated with obligations which relate to safety and water quality management.

Comprehensive legislative and other obligations apply to SA Water with respect to supply of water to its customers – including obligations relating to water quality, management of infrastructure, occupational health, safety and welfare, and environmental protection. Key legislation and industry guidelines applicable to delivery of SA Water's direct control water services include:

- Food Act 2001;
- Safe Drinking Water Act 2011[119];
- Australian Drinking Water Guidelines (ADWG);
- Waterworks Act 1932 (to be superseded by the Water Industry Act 2012);
- Public and Environmental Health Act 1987[120];
- Occupational Health Safety, and Welfare Act 1986;
- ANCOLD Guidelines; and
- WSAA standards.

Safety

In some cases – such as obligations relating to occupational health, safety and welfare – specific legislation exists which drives the requirement for SA Water to mitigate certain risks through capital investment. In other cases – such as obligations

Table 6–7: Proposed capital expenditure required to comply with external obligations (direct control water services)

Compliance area	2013–14	2014–15	2015–16
Safety	13.4	41.7	47.0
Water quality management	19.1	13.6	9.8
Environmental compliance	3.5	0.9	0.9
Total	**35.9**	**56.0**	**57.7**

Real, March 2012, $'Millions excluding real cost escalation

Table 6–8: Major dam safety upgrades proposed by SA Water

Dam	2013–14	2014–15	2015–16
Kangaroo Creek	4.0	35.0	35.5
Tod River	0.4	0.2	5.0
Total	**4.4**	**35.2**	**40.5**

Real, March 2012, $'Millions excluding real cost escalation

119 Not yet in effect.
120 To be progressively replaced by he Public Health Act 2011.

relating to dam safety – specific legislation does not exist in South Australia to impose obligations on SA Water, unlike the situation that exists in other States. In such cases, SA Water considers it prudent to adopt national or international industry standards where these exist.

In the example of its large dams, the Board of SA Water has endorsed the application of the ANCOLD guidelines for all aspects of its dam engineering and management. Recent changes to the ANCOLD guidelines have driven the need for major upgrades to SA Water's large dams, and SA Water proposes to undertake two such upgrades during the forthcoming regulatory period – as detailed in Table 6–8. The prioritisation of works completed to-date under the dam safety program has been made on the basis of risk. The capital expenditure associated with these upgrades dominates the safety-related capital expenditure proposed by SA Water.

The Kangaroo Creek dam is situated on the Torrens River in the Adelaide Hills, above the Adelaide metropolitan area. It is a critical part of SA Water's infrastructure, storing water for supply through the Hope Valley Reservoir and water treatment plant. The recent changes to the ANCOLD dam safety guidelines mean that this dam no longer complies with the guideline for flood capacity.

Similarly, the Tod River dam, approximately 25 km north of Port Lincoln on lower Eyre Peninsula, no longer complies with the ANCOLD guidelines with respect to flood capacity, resistance to piping and embankment stability. The first stage of the project proposed for the Tod River dam will investigate the most appropriate works to meet the ANCOLD guidelines, in conjunction with due consideration of the future of the dam. If the dam is to be retained, the safety risks will need to be managed. Water supplied from the dam is not currently suitable for supply to customers due to salinity and catchment water quality issues.

In addition to capital expenditure associated with dam safety, SA Water proposes other safety-related capital expenditure programs to comply with occupational health, safety and welfare legislation relating to:

- Infrastructure access (particularly with respect to above-ground tanks and to below-ground valve installations);
- Fire detection and evacuation systems at major installations; and
- Chemical dosing facilities.

Water quality

The key areas of capital investment proposed by SA with respect to water quality management include:

- **Cryptosporidium Program:** SA Water and SA Health reached agreement in 2006 on a performance target for *Cryptosporidium* detection in water. SA Water will commence two major filter upgrades (at Happy Valley and Hope Valley Water Treatment Plants) in 2012–13 as part of the management strategy developed in response to this agreement, with significant capital expenditure required in relation to process control upgrades at the metropolitan plants during the forthcoming regulatory control period;
- **Hawker water quality improvement:** The water currently supplied to the township of Hawker is drawn from a saline ground water aquifer via several bores. The salinity level of this water exceeds the desired levels for drinking water – necessitating capital investment to desalinate this water; and
- **Disinfection monitoring:** Provision has been made for projects to deliver water quality improvements – such as the installation of additional equipment to monitor disinfection levels at strategic locations in the distribution networks – and alterations to individual networks so that all water is disinfected at all

times, thereby ensuring that disinfection barriers against pathogenic contamination remain effective.

Environmental Compliance

The expenditure proposed by SA Water with respect to environmental compliance is required for, among other things, modification of infrastructure adjacent to the Blue Lake in the State's south-east to prevent operational discharges of treated water from entering the Blue Lake.

6.5.3. Proposed capital expenditure driven by system growth

The forecast of water demand developed by ACIL Tasman (refer chapter 5, Demand Forecasts) indicates that total water demand during the forthcoming regulatory control period will remain below the peak that occurred in 2002–03. In general terms, this means that SA Water's treatment plants and pipe networks are sized with the capacity to meet this demand. However, the demand forecast developed by ACIL Tasman – which is a macro, State-wide forecast – does not take into account regional or localised growth factors which may result in capacity constraints within parts of SA Water's water infrastructure.

Table 6–9 shows the capital expenditure proposed by SA Water for the forthcoming regulatory control period with respect to its direct control water services which is driven by system growth. The amounts shown in Table 6–9 exclude contributions towards extensions and connections by customers and new infrastructure provided by developers.

Table 6–9 shows that more than 90% of the capital expenditure proposed by SA Water which is attributed to system growth is required to upgrade or extend pipe networks. Typically, capital expenditure driven by system growth can also necessitate pump station upgrades to deliver higher flows through the existing network, or upgrades to increase treatment plant capacity. However, SA Water's proposed capital expenditure

Table 6–9: Proposed capital expenditure driven by system growth (direct control water services)

Asset category	2013–14	2014–15	2015–16
Pipe networks	20.2	8.8	25.0
Treatment plants	0.6	1.1	-
Total	**20.7**	**9.9**	**25.0**

Real, March 2012, $'Millions excluding real cost escalation

Table 6–10: Regional distribution of proposed capital expenditure driven by system growth

Region	2013–14	2014–15	2015–16
Outer metropolitan	15.6	5.2	20.9
Metropolitan	2.5	3.0	2.3
Not assigned	2.4	1.4	1.9
South East	0.3	0.3	-
Total	**20.7**	**9.9**	**25.0**

Real, March 2012, $'Millions excluding real cost escalation

for the forthcoming regulatory control period does not make major provision for such upgrades.

The regional distribution of the proposed capital expenditure is shown in Table 6–10 and indicates that capital expenditure driven by system growth is largely targetted for outer metropolitan areas (including areas such as Roseworthy, Barossa Valley, Murray Bridge, Mount Barker, the Fleurieu Peninsula, and Kangaroo Island) – where infrastructure extensions and upgrades are required to accommodate new subdivisions and dwellings. Expenditure proposed for the metropolitan area is consistent with levels required in recent years.

Table 6–10 also shows provision for capital expenditure that is not assigned to a specific region. This provision has been made to accommodate developments in country areas – such as Tumby Bay and the Yorke Peninsula – where development has either commenced, or is expected to commence during the forthcoming regulatory control period.

The expenditure proposed for the forthcoming regulatory control period is dominated by expenditure required to establish new pipe networks that service areas rezoned by the State Government for residential development – particularly at Mount Barker, where construction of major new infrastructure will commence in 2012–13. In the latter years of the forthcoming regulatory control period expenditure is proposed to address the growth in demand at Kingscote (on Kangaroo Island). The capital expenditure proposed in relation to these projects during the forthcoming regulatory control period is detailed in Table 6–11.

In December 2010, the Minister for Urban Development and Planning approved the rezoning of land adjacent to Mt Barker from rural to residential and light industrial zones, resulting in approximately 1,265 hectares of land being rezoned.

SA Water has determined that the water treatment plant servicing this area (Summit Storage Water Treatment Plant) has adequate capacity to cope with the forecast of additional demand arising as a result of the rezoning during the forthcoming regulatory control period, but that the current capacity of the water transfer system and associated pipe network does not.

Various augmentation options to accommodate the proposed future Mount Barker development's demand have been investigated and a preferred option identified. The timing of the project is driven by the requirement to be able to service the first house in the new Mount Barker development – by 1 January 2014. Connection works within the proposed new development areas will be provided by the developers.

Given the uncertainty in take–up rates within such developments, the preferred option selected by SA Water will utilise the spare capacity that exists within the current network to supply the initial phases of the new development, with major

Table 6–11: Significant projects driven by system growth

Project	2013–14	2014–15	2015–16
Mt Barker water supply scheme	12.6	1.7	17.9
Kingscote water supply upgrade	3.0	3.0	2.5
Total	**15.6**	**4.7**	**20.4**

Real, March 2012, $'Millions excluding real cost escalation

new works commencing in 2015–16 (SA Water anticipates that by this time development of the rezoned land will have progressed to a point where further system augmentation and extension requirements can be more accurately established). Cabinet and Public Works Committee approval of this project is expected by November 2012.

In recent years, growth in demand at Kingscote on Kangaroo Island has necessitated that SA Water implement contingency measures in order to meet demand – particularly during years of low rainfall. Low rainfall in 2006–07 resulted in water shortages which were met by constructing a new pipeline and pumping water from a privately owned dam into the local reservoir. This contingency measure is no longer available.

The preferred longer term option involves increasing the capacity of the reservoir and providing additional balancing storage capacity within the network. The timing of the works is dependent on the growth in demand, which is in-turn influenced by growth in customer numbers and average consumption.

The expenditure proposed by SA Water with respect to this project during the forthcoming regulatory control period involves deferral of such major works until the subsequent regulatory control period (commencing 2016–17) through smaller-scale and preparatory works in the shorter term. These works include provision of a small-scale desalination plant for emergency use, refurbishment of 2 existing tanks, investigations into increasing capacity of the local reservoir, and acquisition of land for new storage.

6.5.4. Capital expenditure attributable to other drivers

Table 6–12 shows the capital expenditure proposed by SA Water for the forthcoming regulatory control period with respect to its direct control water services which is attributable to other drivers. This expenditure is principally required for upgrading of SCADA control systems, and minor extensions to SA Water's SCADA network which will enable improved monitoring of key water assets. This technology is essential for the early detection of incidents likely to impact negatively on service to customers – such as pump faults, electrical supply failures, low tank levels and chemical dosing faults.

The elevated level of expenditure during 2013–14 is required to complete a program of standardisation of the SCADA platform at treatment plant sites including Myponga, Anstey Hill and Mount Pleasant – a program of works which commenced prior to the forthcoming regulatory control period.

Table 6–12 also shows that SA Water proposes to invest in the development of system planning tools during the forthcoming regulatory control period. These planning tools are relied upon to develop and review long term plans for

Table 6–12: Proposed capital expenditure attributable to other drivers (direct control water services)

Purpose	2013–14	2014–15	2015–16
SCADA control and extensions	5.0	1.0	1.0
System planning tools	1.9	1.1	1.1
Miscellaneous	0.1	0.1	0.1
Total	**6.9**	**2.2**	**2.2**

Real, March 2012, $'Millions excluding real cost escalation

regional infrastructure and models which guide infrastructure assessments.

6.5.5. Capital expenditure allocated to drought response initiatives

Historically, Adelaide's water supply has been drawn from two major, but separate water sources: catchments in the Mount Lofty Ranges; and the River Murray. Under "normal" weather conditions, approximately 40% of Adelaide's water supply has been sourced from the River Murray. Both of these water sources are variable and climate-dependent – particularly the catchments in the Mount Lofty Ranges. Under dry conditions it has not been uncommon for up to 90% of Adelaide's water supply to be sourced from the River Murray.

The extended drought across the Murray Darling basin catchment from 2001 to 2010 has been well documented. The drought resulted in the lowest recorded inflows into the River Murray, acting as a key driver for allocation of significant capital expenditure to secure Adelaide's water supply. This program of works will be completed in 2014–15.

Table 6–13 shows the capital expenditure allocated to these initiatives during the forthcoming regulatory control period, and represents the concluding phase of this program of works. Note that the amounts shown in Table 6–13 are expressed in nominal terms, reflecting the previously approved capital expenditure allocated to these initiatives.

The key infrastructure delivered by this program of works includes completion of construction of the:

- ADP; and
- NSIS.

6.6. Proposed infrastructure capital expenditure – direct control sewerage services

The capital expenditure proposed by SA Water for the forthcoming regulatory control period in relation to its direct control sewerage services is presented graphically in Figure 6–11, and in tabular form in Table 6–14. Actual capital expenditure for the 3 years leading into this period is also shown in Figure 6–11 for contextual purposes.

Figure 6–11 shows that SA Water proposes a significant increase in capital expenditure associated with system growth, and a relatively uniform profile of capital expenditure associated with asset renewal and compliance with external obligations. The significant increase associated with system growth reflects local factors impacting a small number of SA Water's wastewater treatment plants – specifically at Murray Bridge and Aldinga.

The capital expenditure proposed by SA Water for the forthcoming regulatory control with respect to direct control sewerage services is described in the following sub-sections of this chapter, according to the key driver of the capital expenditure.

Table 6–13: Capital expenditure allocation to drought response initiatives (direct control water services)

	2013–14	2014–15	2015–16
Allocated capital expenditure	21.1	2.2	-

Nominal $'Millions

Figure 6–11: SA Water's proposed capital expenditure for direct control sewerage services (nominal $'M to 2011–12; real, March 2012 $'M from 2011–12 excluding real cost escalation)

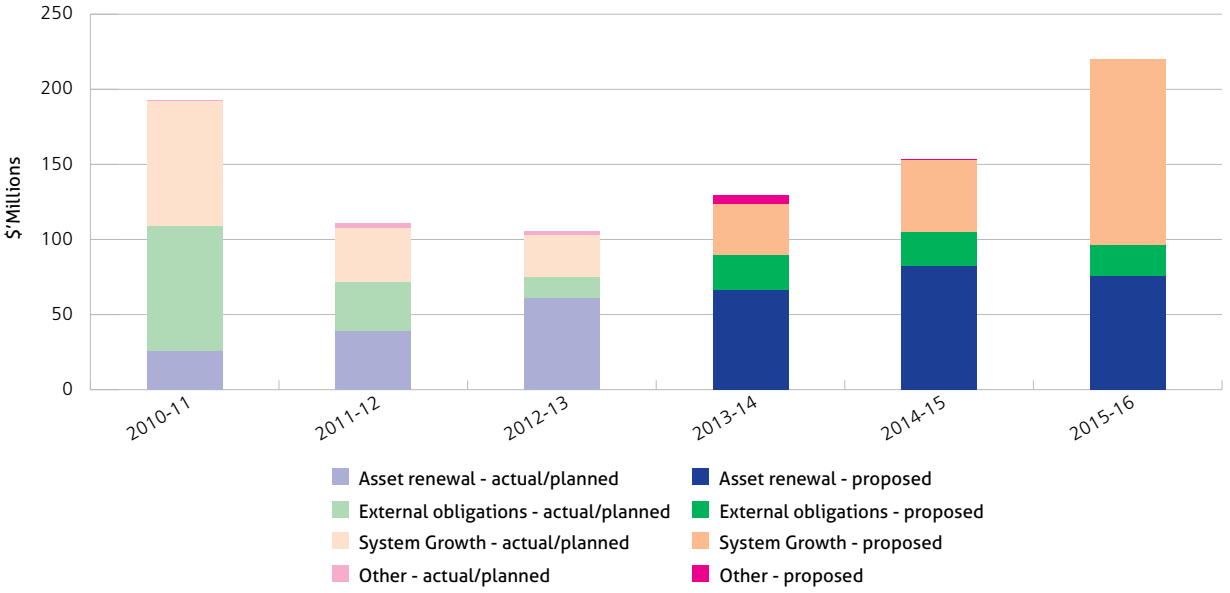


Table 6–14: SA Water's proposed capital expenditure for direct control sewerage services

Driver	2013–14	2014–15	2015–16
System growth	34.6	47.9	124.0
Asset renewal	66.1	82.0	75.7
External obligations	23.2	23.2	20.1
Other	5.4	0.4	0.4
Total	**129.2**	**153.6**	**220.2**

Real, March 2012, $'Millions excluding real cost escalation

6.6.1. Proposed capital expenditure driven by system growth

Table 6–15 shows the capital expenditure proposed by SA Water for the forthcoming regulatory control period with respect to its direct control sewerage services, which is driven by system growth and shows that approximately 80% of the total expenditure proposed with respect to direct control sewerage services is allocated to wastewater treatment plants. The amounts shown in Table 6–15 exclude contributions towards extensions and connections by customers, and new infrastructure provided by developers.

SA Water's proposed capital expenditure does not make provision for delivery of sewerage services in relation to a major new residential development at Mount Barker. SA Water considers it appropriate that any major works required in relation to this development during the forthcoming regulatory control period be dealt with as a pass through event.

Table 6–15: Proposed capital expenditure driven by system growth (direct control sewerage services)

Asset category	2013–14	2014–15	2015–16
Treatment plants	27.2	35.6	104.5
Pipe networks	7.4	12.3	19.5
Total	**34.6**	**47.9**	**124.0**

Real, March 2012, $'Millions excluding real cost escalation

Table 6–16: Significant projects driven by system growth (direct control sewerage services)

Project	2013–14	2014–15	2015–16
Murray Bridge wastewater treatment plant upgrade	8.0	19.2	80.0
Aldinga wastewater treatment plant upgrade (stage 2)	1.3	15.0	18.5
North Lefevre Peninsula diversion	-	2.0	13.7
Christies Beach wastewater treatment plant upgrade	14.4	-	-
Gawler feeder capacity increase	2.1	4.8	-
Bolivar wastewater treatment plant clarifier upgrade (stage 3)	0.5	0.5	5.0
Paterson Terrace wastewater pump station upgrade	3.0	2.8	-

Real, March 2012, $'Millions excluding real cost escalation

The process by which SA Water forecasts wastewater volume is described within chapter 5 (Demand Forecasts) of this Proposal, and highlights the disconnected nature of SA Water's wastewater drainage areas. The material presented in chapter 5 also highlights the fact that changes in wastewater volume and loading at each wastewater treatment plant can vary significantly, depending on local factors including:

- New connections (population growth);
- Infiltration of groundwater and stormwater runoff;
- Demographic change; and
- Non-residential demand changes.

Table 6–16 details the significant projects driven by system growth proposed by SA Water for the forthcoming regulatory control period with respect to direct control sewerage services.

The largest project proposed by SA Water during the forthcoming regulatory control period in relation to direct control sewerage services relates to the Murray Bridge wastewater treatment plant. This plant was commissioned in 1970 with a nominal design capacity of 12,000 equivalent population (EP), and has been considerably overloaded since 2000 (with a current EP of approximately 20,000).

The plant is located on the flood plain adjacent to the River Murray, and residential developments have encroached within very close proximity of the plant. Modifications to address odour complaints – including installation of additional aerators – were undertaken at the request of the EPA in 2006, leading to increased operating costs. Recent rezoning of land around Murray Bridge makes provision for an additional 3,000 residential lots, with a population forecast approximating 33,000 expected by 2040 as part of the State Government's 30 year plan.

SA Water considers that it is prudent and efficient to develop and implement a solution to the wastewater treatment requirements of Murray Bridge in the forthcoming regulatory control period which take into account:

- The fact that the existing plant is overloaded and operating well in excess of its design capacity;
- Residential developments have encroached to the point that dwellings have almost reached the site boundary;
- The site of the existing plant is constrained and lacks space for further extension;
- The treatment plant is situated within a flood plain, representing a significant environmental risk; and
- Significant population growth is expected.

The second-largest project proposed by SA Water with respect to its direct control sewerage services during the forthcoming regulatory control period relates to the Aldinga wastewater treatment plant. In July 2011 Tonkin Engineering completed a review of the capacity of SA Water's wastewater treatment plants for the greater Adelaide area – specifically to assess the impact of the State Government's population projections identified in the "The 30 Year Plan for Greater Adelaide"[121]. This report identified that the Aldinga plant will reach capacity in 2018[122], despite recent upgrades at the plant. Further to the report produced by Tonkin Engineering, growth in the Aldinga plant's drainage area has been examined in more detail by SA Water and shows that the plant's current hydraulic and biological treatment capacity will be exceeded by mid-2016[123].

The report produced by Tonkin Consulting also proposes major capacity upgrades of SA Water's largest wastewater treatment plant (at Bolivar) by 2026, based on hydraulic loading[124]. Preparatory works to facilitate these upgrades involve increasing the capacity of clarifiers at the plant which are restricting the plant's overall hydraulic capacity. Major construction associated with upgrade of these clarifiers is planned to commence in 2015–16, and will enable SA Water to defer subsequent major upgrades at Bolivar (with an estimated cost of approximately $320 million) by five years.

The Bolivar drainage area extends from vast areas of the Adelaide Metropolitan area through to the northern township of Gawler, where new subdivisions such as Hewitt have led to significant growth in wastewater volume. This growth has led to overloading of the existing gravity sewer main in Thomas Street which feeds to Pump Station No. 103, necessitating duplication of the network to prevent wastewater overflows – and to provide capacity for future growth. An associated project involves upgrade of the pump station at Paterson Terrace in Gawler which has also reached its capacity, and heightened the risk of wastewater overflows into the nearby South Para River if the capacity of the pump station is not increased.

Another section of the Bolivar plant's drainage area which is at capacity is the northern Lefevre Peninsula, where surcharging is occurring in the network which drains to the Ethelton pump

121 Department of Planning & Local Government, The 30-Year Plan for Greater Adelaide, , February 2010: http://www.dplg.sa.gov.au/plan4adelaide/html/files/plan/The_30-Year_Plan_for_Greater_Adelaide.pdf
122 Tonkin Consulting, Long Term Plan for Greater Adelaide, Stage 2: Treatment Plant Capacity Analysis, July 2011, p. ix.
123 SA Water, Aldinga WWTP Future Strategy, 1 July 2011
124 Tonkin Consulting, Long Term Plan for Greater Adelaide, Stage 2: Treatment Plant Capacity Analysis, July 2011, p101.

Table 6–17: Regional distribution of proposed capital expenditure driven by system growth (direct control sewerage services)

Region	2013–14	2014–15	2015–16
Outer Metropolitan	11.0	20.1	81.1
Metropolitan	22.4	27.0	39.8
Eyre	0.1	0.4	2.6
Northern	0.4	0.2	0.3
Not assigned	0.3	0.3	0.3
South East	0.4	-	-
Total	**34.6**	**47.9**	**124.0**

Real, March 2012, $'Millions excluding real cost escalation

station. Options including upgrading of the existing network and diversion of flows have been investigated, with the preferred option involving construction of a new rising main across the Port River to divert flows from the Ethelton pumping station. This diversion will provide prudent mitigation of the risk of environmental incidents from wastewater overflows as further development occurs.

The regional distribution of the proposed capital expenditure driven by system growth is summarised in Table 6–17 and reflects the fact that capital expenditure is primarily targeted for outer metropolitan areas, with significant expenditure also targeted to address specific capacity-related issues in the metropolitan area (including Aldinga, Gawler, the northern Lefevre peninsula and Christies Beach).

Mount Barker sewerage services

A major new residential development is proposed at Mount Barker and was discussed earlier in the context of direct control water services (refer 6.5.3). Although SA Water proposes to invest capital expenditure in relation to this development during the forthcoming regulatory control period with respect to direct control water services, no such investment is proposed for the forthcoming regulatory control period with respect to direct control sewerage services.

Sewerage services are currently provided to the existing Mount Barker Township by a council-operated community wastewater management scheme (CWMS), and SA Water expects that the early stages of the new development will be serviced either from the existing CWMS, or other temporary solutions.

It should be noted, however, that a new wastewater treatment plant and associated network infrastructure will be required for the full development to proceed. SA Water has engaged proponents to undertake preliminary investigations and identify the preferred solution for the development, with an option incorporating the requirements for replacement of the Murray Bridge wastewater treatment plant also under consideration.

SA Water considers that it is prudent and efficient for any significant change in scope associated with the proposed upgrade of the Murray Bridge wastewater treatment plant – or requirement to commence major works associated with direct control sewerage services in relation to the Mount Barker development during the forthcoming regulatory period – to be dealt with as a pass through event.

Table 6–18: Proposed capital expenditure driven by asset renewal requirements (direct control sewerage services)

Asset type	2013–14	2014–15	2015–16
Mechanical & electrical	30.3	35.3	23.0
Structures	19.0	21.3	24.3
Pipe Networks	8.4	11.3	11.6
Other	8.4	14.2	16.8
Total	**66.1**	**82.0**	**75.7**

Real, March 2012, $'Millions excluding real cost escalation

SA Water further considers that the general "major projects" pass through event which it has nominated in chapter 8 (Pass Through Events) is sufficient in this respect.

6.6.2. Proposed capital expenditure driven by asset renewal requirements

Table 6–18 shows the capital expenditure proposed by SA Water for the forthcoming regulatory control period with respect to its direct control sewerage services which is driven by asset renewal requirements.

SA Water operates and maintains considerable sewerage infrastructure – with over 8,700 km of sewers – the oldest of which were laid in the 1880s. The network has been constructed from three main types of material, being:

- Vitreous clay;
- Concrete; and
- Polyvinyl Chloride (PVC) – the most common material used in recently laid pipes.

Sewerage infrastructure is exposed to a much more aggressive environment than water infrastructure – particularly due to build-up of corrosive gases such as hydrogen sulphide. Despite representing a smaller asset base than that associated with delivery of direct control water services, the asset base associated with delivery of direct control sewerage services requires more intensive asset management and renewal.

Sewerage infrastructure is exposed to a highly aggressive environment due to build-up of corrosive gases such as hydrogen sulphide. Despite representing a smaller asset base than that associated with delivery of direct control water services, the asset base associated with delivery of direct control sewerage services requires more intensive asset management and renewal.

SA Water proposes to undertake a number of significant projects driven by renewal of assets with respect to its direct control sewerage services during the forthcoming regulatory control period. These projects are detailed in Table 6–19 and described in the sub-sections that follow.

Renewal of mechanical and electrical equipment

The largest portion of capital expenditure driven by asset renewal requirements with respect to direct control sewerage services during the forthcoming regulatory control period relates to mechanical and electrical equipment. Such equipment includes:

- Pumps;
- Switchboards;
- Aerators; and
- Grit removal systems.

Table 6–19: Significant projects driven by asset renewal requirements (direct control sewerage services)

Project	2013–14	2014–15	2015–16
Bolivar primary treatment structure concrete rehabilitation	2.7	9.4	10.3
Replace Hendon (Queensbury) pump station	11.4	5.7	0.1
Upgrade inlet screens at Glenelg wastewater treatment plant	1.5	6.0	10.3
Glenelg pump station mechanical and electrical renewal	2.0	5.0	1.0
SCADA RTU replacement	1.0	2.9	3.0
Lining of Bolivar high salinity wastewater treatment plant anoxic selectors	2.4	2.4	0.1
Upgrade of Port Noarlunga pump station	0.8	3.3	-
Bolivar wastewater treatment plant aeration diffuser upgrade	-	2.0	2.0
Glenelg wastewater treatment plant bioreactor rehabilitation (stage 1)	0.1	0.3	3.3

Real, March 2012, $'Millions excluding real cost escalation

The largest project associated with such assets during the forthcoming regulatory period involves upgrade of a major pump station at Hendon. The existing pumping station was originally constructed in 1935 and upgraded in 1967. The station's drainage area includes around 21,000 connections supporting a population of 40,000 to 50,000. There are 26 smaller pump stations within the network that feed the 2 main gravity sewer connections into this station. Significant issues associated with this pump station include:

- Lack of spares for the existing pumps, motors and switchboards;
- The location of switchboards within the pump station (they are installed below ground adjacent to pumps) represents a significant risk of inundation and failure in the event of a pipe burst or pump failure;
- Significant corrosion evident in the existing concrete structures (in both the wet well and dry well);
- Access is not compliant with current Australian standards, and the pump station has no emergency egress; and
- Ventilation within the dry well is limited.

Options including continued operation of the existing station, rehabilitation of the existing structure, construction of a new conventional station and construction of a new submersible station have been investigated. The preferred option that has been selected for further development involves construction of a new conventional pump station adjacent to the existing station. SA Water considers that this option has a lower risk profile and comparable cost compared to the other options.

Another major project proposed during the forthcoming regulatory control period relates to one of the two primary pump stations feeding into the Glenelg wastewater treatment plant. This

pump station is situated on the eastern banks of the Patawalonga River, and consists of seven vertical spindle electric motor-driven pumps. The station has an approximate average daily flow of 55 ML, and a peak hydraulic capacity of 100 ML/day. Reliable operation of the pump station is essential to avoidance of overflows within the network and into the adjacent river. SA Water has determined that a range of assets at this pump station require renewal during the forthcoming regulatory control period.

The switchboard at this pump station was installed in the 1950s and, despite additions and modifications in the 1960s, 1970s and early 1990s, essentially remains as the original switchboard. The switchboard is well past its expected useful life, and includes components such as main breakers and contacts that would be very difficult to replace in the event of failure. SA Water considers that it is prudent to replace the switchboard during the forthcoming regulatory control period, prior to catastrophic failure.

In addition to the switchboard at this pump station, the pumps and motors are between 40 and 60 years old, and condition assessments have confirmed the need for these to be replaced. The pumps are located in 6m deep wells that are classified as confined spaces, making access difficult and presenting significant risks. Furthermore, the under-river electricity cable from the nearby Glenelg wastewater treatment plant that provides back-up power supply can no longer transmit the power level required. An effective back up-power supply is required to reduce the risk of overflow in the event of the main power supply failing.

The renewal works proposed by SA Water in relation to this pump station will necessitate installation of temporary pumps. SA Water has determined that the most efficient upgrade option for this pump station involves concurrent replacement of the pumps, switchboard, and back-up power supply.

Other significant projects proposed during the forthcoming regulatory control period with respect to renewal of mechanical and electrical equipment include:

- **Upgrade of the aeration diffusers at the Bolivar wastewater treatment plant:** the existing diffusers are impacted by the foul air extracted from the primary treatment area and supplied to the bioreactors – thereby reducing the useful life of the diffusers, reducing the effectiveness of the treatment process and increasing electricity costs; and
- **Upgrade of the Port Noarlunga pump station:** this pump station was commissioned in 1981 and is situated adjacent to the Onkaparinga River. It is a large, conventional pump station constructed on 3 levels, with 10 other pump stations feeding into its drainage area. Condition assessments show:
  - Structural movement of the building;
  - Concrete degradation in the wet well;
  - Corrosion of the isolation sluice gates; and
  - Stairs to lower levels which do not comply with current Australian standards.

Renewal of structures

The largest project proposed by SA Water during the forthcoming regulatory control period which is driven by asset renewal requirements involves rehabilitation of the primary treatment structure at the Bolivar wastewater treatment plant. This structure – which includes the primary grit removal, pre-aeration tanks and sedimentation tanks was constructed in the 1960s and is a critical element of the treatment plant.

The structure's integrity has been severely degraded by corrosion due to sulphuric acid exposure – formed from hydrogen sulphide gas. The corrosion is exacerbated in this area where the tanks are largely covered and connected to a foul air extraction system (to minimise odour). The extent of the corrosion has affected the tanks,

adjacent walkways, tank pipe-work and valves. Sections of the walkways have been taken out of service, restricting access for maintenance. Spalling concrete is falling into the tanks, causing damage to scrapers and other equipment.

Options considered for renewal of this structure include

- Ongoing repair of the existing tanks and equipment;
- Reinstatement of the corroded concrete combined with lining of the tanks and walkways with a high density polyethylene protection system, and replacement of all corroded valves, pipe-work and steelwork within the tanks;
- Reinstatement as above and lining with a PVC corrosion protection system;
- Reinstatement as above and lining with a glass flake vinyl ester corrosion protection system; and
- Construction of 2 new vortex grit removal units utilising the existing primary grit and pre-aeration tank space, and reinstatement and lining of the primary sedimentation tanks and walkways.

The option selected for implementation by SA Water is the option involving construction of the 2 new vortex grit removal units. This option will improve the efficiency, capacity and performance of the primary treatment system, reduce the amount of hydrogen sulphide gas that is generated (due to reduced turbulence in the wastewater), has lower operating costs, provides benefits in other parts of the treatment process, and has the lowest whole-of-life cost.

Another significant project proposed with respect to the structures at the Bolivar wastewater treatment plant involves lining of the anoxic selectors in the sequencing batch reactors (at the "high salinity" section of the plant). The high salinity section of the plant was commissioned in 2004, at which time the concrete inlet chambers were lined. The next stage in the treatment process of this plant incorporates the anoxic selectors – large, concrete structures covered by concrete slabs.

Condition assessments of the plant reveal that the concrete walls above the waterline and the underside of the concrete slabs are corroding – necessitating reinstatement of the concrete and installation of protective lining to prevent continued degradation (which will ultimately lead to similar structural issues as those experienced with the primary treatment tanks in the main plant). SA Water considers that deferment of this work will ultimately result in much higher reinstatement costs in the near future.

Renewal of pipe networks

In contrast to water pipe networks, wastewater pipe networks are largely gravity-based systems where pipes are not internally pressurised. Rather than bursting, wastewater pipes experience "blockages or chokes", and may collapse if the pipe material deteriorates. Gravity sewers are usually buried at a greater depth than water mains, and hence are also more expensive to replace – meaning that asset management strategies are designed to maximise the life of the pipes.

Sewer blockages are a major cause of wastewater overflows, and can have significant environmental consequences. SA Water utilises preventive maintenance programs such as sewer cleaning at known trouble spots in its sewerage pipe networks.

Other techniques, including closed circuit television inspections (CCTV), are utilised to monitor pipe condition. This program is based on systematically reviewing older, larger concrete trunk sewer mains as the main priority, and then working through to the younger and smaller diameter mains. The CCTV inspection program grades every defect observed in accordance with the WSAA "Sewer Inspection Reporting Code of

Australia", which is then used to assign an overall condition grade for the sewer pipe.

A prioritisation model is applied to determine the priority by which wastewater mains should be rehabilitated. The model uses the condition rating generated by the CCTV inspections and combines this with an assessment of the potential consequence of failure of the main to develop a prioritisation score that is, in-turn, applied to prioritise rehabilitation works. Risk factors considered in the model include:

- Customer impact (including interruption duration and number of customers affected);
- Environmental impact;
- Cost to repair; and
- Traffic disruption.

As a result of this inspection and prioritisation process SA Water has deemed that it is prudent and efficient to allocate capital expenditure of approximately $3.5M per annum for renewal of pipe networks for the forthcoming regulatory control period. No individual major projects for renewal of sewer mains are proposed during this period.

Renewal of other assets

The largest project proposed during the forthcoming regulatory control period with respect to renewal of other assets relates to upgrade of the inlet screens at the Glenelg wastewater treatment plant. The inlet screens represent the first step in the treatment process and were installed in 1993 – some are located inside a building, others are external. The screens are a major cause of odour at the plant, which has a limited buffer zone to nearby residential and recreational properties. The screens do not have a washing system to reduce the odour and volume of the screenings prior to disposal as landfill.

The screens utilise a 16mm bar spacing which allows the passage of rags and other material. This material impacts on the subsequent stages of the treatment process – clogging pumps, pipes and heat exchangers and causing material to build up in the sludge digesters. SA Water considers it prudent and efficient to upgrade the plant and replace the existing screens with new 5mm clear opening screens, incorporating a screen washing system, in conjunction with new vortex grit removal tanks.

As is the case with respect to water infrastructure, SA Water also proposes to invest in the renewal of other assets such as cathodic protection installations and SCADA equipment during the forthcoming regulatory control period.

6.6.3. Capital expenditure driven by external obligations

Table 6–20 shows the capital expenditure proposed by SA Water for the forthcoming regulatory control period with respect to its direct control sewerage services required to comply with external obligations, and indicates that the bulk of this expenditure is associated with obligations which relate to environmental compliance and safety.

Table 6–20: Proposed capital expenditure required to comply with external obligations (direct control sewerage services)

Compliance area	2013–14	2014–15	2015–16
Environmental compliance	11.2	15.6	12.8
Safety	12.0	7.7	7.3
Total	**23.2**	**23.2**	**20.1**

Real, March 2012, $'Millions excluding real cost escalation

The operation of sewerage networks and treatment plants are activities which may lead to environmental harm if not managed and operated prudently. All of SA Water's 23 wastewater treatment plants require licences under the Environment Protection Act 1993. In the forthcoming regulatory control period, expenditure of $4 million per annum in 2014–15 and 2015–16 has been allocated for an overflow abatement program. This program is required in accordance with the Code of Practice for Wastewater Overflow Management published by the EPA which specifies, among other things, requirements for overflow abatement planning and management of an ongoing overflow abatement program[125].

Provision has also been made during the forthcoming regulatory control period for an odour management program at sewer ventilation sites. Effective ventilation of sewers and pump stations is essential to prevent acid formation and accelerated corrosion of SA Water's infrastructure. Unfortunately, venting of these gases can lead to odour complaints – particularly hydrogen sulphide gas which is extremely odorous. Installation of bio-filters at major sites has proven to be an effective odour control measure, while still allowing effective ventilation.

Capital expenditure proposed by SA Water with respect to safety-related obligations includes:

- A program to install handrails and safety grids at submersible pump stations; and
- A program to relocate wastewater pump stations from high risk locations beneath roads to more suitable sites.

6.6.4. Capital expenditure attributable to other drivers

Table 6–21 shows the capital expenditure proposed by SA Water for the forthcoming regulatory control period with respect to its direct control sewerage services which is attributable to other drivers. As is the case with water infrastructure, this capital expenditure is principally required for upgrading of SCADA control systems, and minor extensions to SA Water's SCADA network which will enable improved monitoring of key wastewater assets. This technology is essential for the early detection of incidents likely to impact negatively on service to customers, cause damage to assets or environmental harm – such as pump faults, electrical supply failures and equipment faults at pump stations and treatment plants.

The elevated level of expenditure during 2013–14 is required to complete a program of standardisation of the SCADA platform at treatment plants including Bolivar and Glenelg.

Provision has also been made for investment in the development of system planning tools during the forthcoming regulatory control period. These planning tools are relied upon by SA Water to develop and review long term plans for regional infrastructure and models which guide infrastructure assessments.

Table 6–21: Proposed capital expenditure attributable to other drivers (direct control sewerage services)

Asset strategy	2013–14	2014–15	2015–16
SCADA system extensions	5.2	-	-
Systems planning tools	0.1	0.3	0.3
Miscellaneous	0.1	0.1	0.1
Total	**5.4**	**0.4**	**0.4**

Real, March 2012, $'Millions excluding real cost escalation

125 *EPA, Code of Practice for Wastewater Overflow Management, Sept 2008.*

6.7. Capital expenditure driven by corporate support requirements

The capital expenditure proposed by SA Water for the forthcoming regulatory control period which is driven by corporate support requirements, and which is shared between direct control water and sewerage services, is presented graphically in Figure 6–12 and in tabular form in Table 6–22. Actual and planned capital expenditure for the 3 years leading into this period is also shown in Figure 6–12 for contextual purposes.

Capital expenditure driven by information services requirements

The process by which the forecast of capital expenditure driven by information services requirements was developed included four stages, and is detailed in Attachment F.4 to this Proposal. In summary, the four stages involved:

Stage 1 Strategy development:

Involving alignment of the information services strategy with the direction of the organisation, and definition of the work that needs to be completed in order to move from the current

Figure 6–12: Proposed capital expenditure driven by corporate support requirements shared between direct control water and sewerage services (nominal $'M to 2011–12; real, March 2012 $'M from 2012–13 excluding real cost escalation)

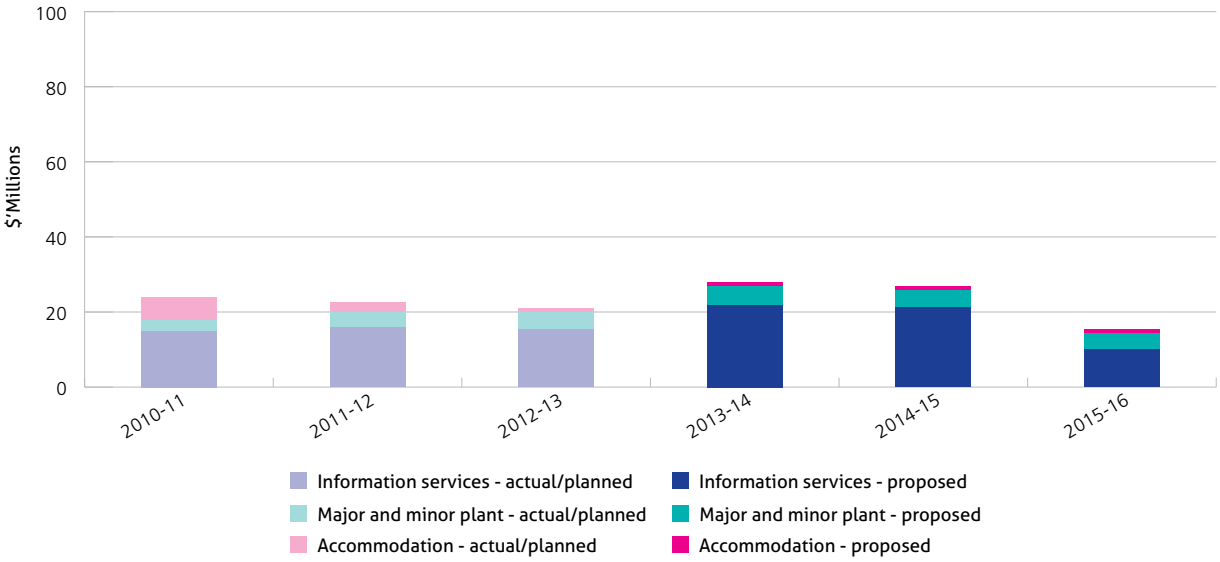


Table 6–22: Proposed capital expenditure driven by corporate support requirements (shared between direct control water and sewerage services)

Driver	2013–14	2014–15	2015–16
Information services	21.9	21.2	10.1
Major and minor plant	4.9	4.7	4.3
Accommodation	1.2	1.0	0.9
Total	**27.9**	**26.9**	**15.3**

Real, March 2012, $'Millions excluding real cost escalation

information services landscape to a future landscape that facilitates achievement of SA Water's defined strategic goals.

Stage 2 Portfolio identification:

Involving extensive consultation with business users, health checks of existing applications and infrastructure, discussion with peer water utilities and review of industry research to produce a portfolio of initiatives that either address business or information services risks, implement new functions to address business risk, or meet emerging business needs.

Stage 3 Portfolio cost estimation:

Involving the identification of initiative outcomes and completion of a base cost estimate.

Stage 4 Portfolio optimisation:

Involving refinement of the portfolio of initiatives through prioritisation, risk analysis, dependency analysis, and review in accordance with the capital governance framework described earlier in section 6.3.1 of this chapter.

This process resulted in a large portfolio of relatively minor capital initiatives (there are no individual projects included within the portfolio with an aggregate value in excess of $4 million) that are aligned with SA Water's Corporate Strategy and ensure that information services risks are addressed in a prudent and efficient manner. Table 6–23 shows the allocation of proposed capital expenditure between the key risk dimensions addressed by such expenditure.

Key initiatives within this capital proposal are summarised in Table 6–24.

As a further step in development of this proposal, SA Water engaged consultants KPMG to undertake

Table 6–23: Risk dimensions addressed by information services capital expenditure

Risk dimension	2013–14	2014–15	2015–16
Business process risk	8.1	2.9	1.1
Infrastructure risk	9.1	11.1	5.0
Business application risk	4.7	7.3	4.0
Total	**21.9**	**21.2**	**10.1**

Real, March 2012, $'Millions excluding real cost escalation

Table 6–24: Key initiatives included within the information services capital proposal

Risk dimension	Key initiatives
Business process risk	• Financial reporting capabilities; and • Migration of the corporate internet site to a new platform.
Infrastructure risk	• Desktop hardware refresh; • Data storage replacement; • Major server replacement; and • Wired network renewal.
Business application risk	• Improved asset data capture and works management; and • Regulatory and compliance reporting.

Table 6–25: Summary of key KPMG observations following review of the information services program[126]

Criteria	Key observations	Result
Forecast Development	Risk based process with extensive business consultation observed; leveraged existing IS Strategic Plan from the 2011 planning process	Prudent
Plan Content	Strong focus on infrastructure risk management; excludes business efficiency focussed initiatives that are self-funding; no major expenditure on large transformational projects is proposed; prudent refresh/ upgrade policy for desktop hardware, servers and business applications	
Delivery Processes	Highly structured and formal project management and governance processes in place; evidence of adherence to processes in past projects	
Historical Performance	Within/on budget performance for recent major projects	Efficient
Process for forecast development	Comprehensive set of factors considered; Leveraged experience of IS staff; potential for overall program to be under estimated	
Delivery processes	Highly structured and formal project management and governance processes in place	

an independent review of the prudence and efficiency of the information services program. KPMG's report is provided as Attachment F.5 to this Proposal, with a summary of the key observations made by KPMG provided in Table 6–25.

Capital expenditure driven by accommodation requirements

The expenditure proposed for the forthcoming regulatory control period with respect to accommodation makes provision for minor capital works across SA Water's portfolio of offices, depots and workshops. No major capital projects driven by accommodation requirements are proposed for the forthcoming regulatory control period. Emerging needs which will need to be addressed in subsequent regulatory control periods include upgrading of the facilities and staff accommodation at Berri and Port Lincoln.

Capital expenditure driven by major and minor plant requirements

The provision of direct control water and sewerage services inherently requires vehicles, plant and equipment for effective and efficient service delivery. SA Water's major plant fleet includes 170 heavy vehicles. SA Water's key partners such as AllWater provide their own plant and equipment independently.

The capital expenditure driven by major and minor plant requirements encompasses:

- **Heavy fleet assets:** such as tipper trucks, crane trucks and front end loader backhoes; and
- **Minor plant:** such as office, laboratory, workshop and field equipment

SA Water utilises a specialist management company, VEHTEC, to manage its major fleet.

126 KPMG, Review of Information Systems Expenditure Proposal for Regulatory Purposes, August 2012, p.5.

VEHTEC monitors utilisation, maintenance and repair costs, resale market values, equipment capability and operational requirements. This data is utilised to inform optimal life modelling and the development of the fleet replacement program. Minor plant and laboratory equipment is managed internally.

The capital expenditure proposed for the forthcoming regulatory control period is largely associated with replacement of major and minor plant depending on asset condition, operational need, criticality and maintenance and repair costs. Individual business cases are developed to support replacement or purchase of new equipment.

No provision has been made within this Proposal for expenditure on light vehicles (sedans, station sedans and utilities). This category of fleet is sourced from Fleet SA in accordance with State Government policy, and manifests itself as operating expenditure to SA Water.

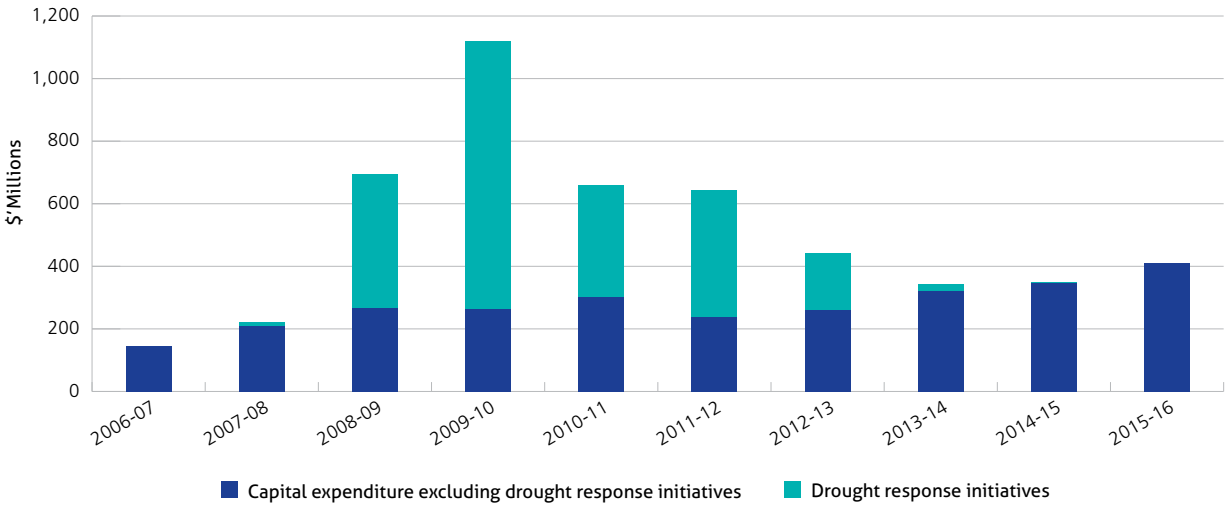
6.8. Delivery of the proposed capital expenditure program

6.8.1. SA Water's capital delivery model

SA Water has a strong record in the delivery of capital projects on time and budget, often under very difficult circumstances. SA Water's historic and proposed capital expenditure through to 2015–16 is illustrated in Figure 6–13 and highlights the dramatic spike in the level of expenditure associated with various water security initiatives.

The high value projects comprising the drought response program – being construction of the ADP and associated NSIS – have been largely delivered. Each of these iconic projects represents a major achievement in project delivery, engineering and construction, and will ensure

Figure 6–13: Total level of capital expenditure delivered and proposed by SA Water (nominal $'M to 2011–12; real, March 2012 $'M from 2012–13 excluding real cost escalation)



SA Water's flexible capital delivery and contracting models have enabled it to deliver very large, complex projects and other programs of capital works in an efficient manner. Since 2007–08, SA Water has delivered water security projects with a combined value of roughly equivalent to the combined value of the new Royal Adelaide Hospital and Adelaide Oval Redevelopment. The flexibility in SA Water's capital delivery approach has proven capable of rapid resource scaling-up and down, and will enable SA Water to successfully deliver its proposed capital works.

that future generations of South Australians are not challenged by the water security issues experienced during the recent drought. Many other lower value projects, such as the Lower Lakes Pipeline and modifications to the major pumping stations on the River Murray and the Country Water Quality Improvement Project Stage 3, have similarly been delivered efficiently and to similarly challenging timeframes.

Since 2007–08, SA Water has delivered drought response projects with a combined value roughly equivalent to the combined value of the new Royal Adelaide Hospital and Adelaide Oval Redevelopment[127].

Flexible resourcing

In order to deliver such an exceptionally large capital program, SA Water has utilised a number of strategies to facilitate flexibility in resourcing and the application of specialist expertise. Importantly, a small proportion of the total capital program is delivered using internal labour. Works delivered internally are generally undertaken in regional areas, are low in value, recurring in nature, and often associated with existing, operating assets. Typically, this includes works such as valve replacement and pump refurbishment on major pipelines, minor mechanical and electrical upgrades and new connections, short main extensions and relays in regional areas.

In the metropolitan area, the majority of the capital program is delivered through a Project Management and Procurement (PMP) contract which commenced on 1 July 2011. Under this contract, KBR provide project management, procurement and construction management services for projects between $0.5 and $11 million in total value.

The procurement process and commercial terms of this contract have been subjected to an independent review by consultants Ernst & Young who determined that:

- The process for procurement of PMP services was competitive with the least cost and strongest technical proposal selected; and
- The process followed by SA Water will lead to an efficient outcome for the PMP contract[128].

A copy of Ernst & Young's report is provided as Attachment G.1. to this Proposal.

Minor metropolitan projects less than $0.5 million in value are delivered by SA Water's metropolitan operations and maintenance contractor (AllWater). Metropolitan projects above $11 million may be delivered by SA Water or the PMP contractor, subject to an evaluation process taking into account the nature of the project, the skill requirements and resource availability. Under the terms of the contract, a team from KBR is dedicated to delivery of SA Water's capital projects on a full-time basis, and is co-located in SA Water's offices. Resources are added and withdrawn from this team in accordance with project requirements.

127 Government of South Australia, Department for Manufacturing, Innovation, Trade, Resources and Energy, *South Australian Major Developments Directory 2011/12*, November 2011.
128 Ernst & Young, Review of Major Contracts for Regulatory Purposes, August 2012, p.45.

SA Water also supplements its internal resources in both metropolitan and regional areas through supplier panels. A professional services supplier panel provides access to prequalified personnel experienced and familiar with SA Water's procedures and standards, including the Corporate Project Management Methodology (CPMM). The CPMM is a project management methodology applied consistently across projects delivered by SA Water, KBR and AllWater, the major phases of which are depicted in Figure 6–14.

SA Water maintains a series of engineering technical standards and guidelines to enable contractors to develop designs which meet SA Water's infrastructure requirements. Where possible these standards are based on industry standards developed in conjunction with the WSAA.

Separate panels for provision of construction and SCADA services provide access to contractors with the capability to deliver projects, typically in the range from $100,000 to $10 million. Panel members are engaged through a standing offer arrangement where terms and conditions have been agreed in advance. The key aspects of these terms and conditions include limitation of liability, insurance requirements, conditions of contract (AS 4300 and AS 2124) and conformance to SA Water procedures and intellectual property requirements. The panels provide a central source for the timely acquisition of the works and services required.

Larger value works, or projects which require specialist capability not offered by the panel suppliers are typically issued to the market through an open tender process, thereby ensuring that competitive pricing is obtained and suppliers have the specialist capabilities and scalability to deliver the requisite works.

Figure 6–14: SA Water's Corporate Project Management Methodology (CPMM)

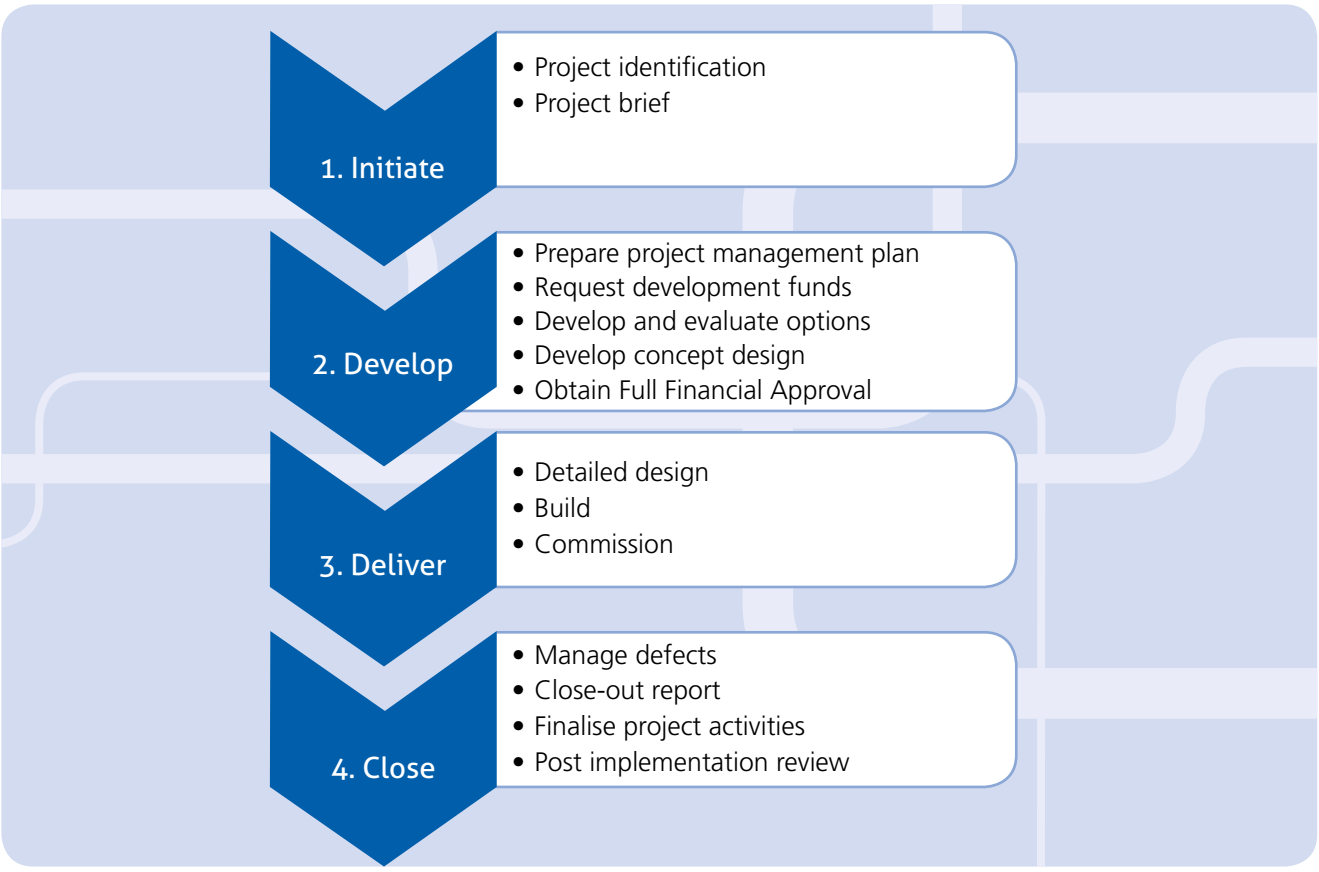
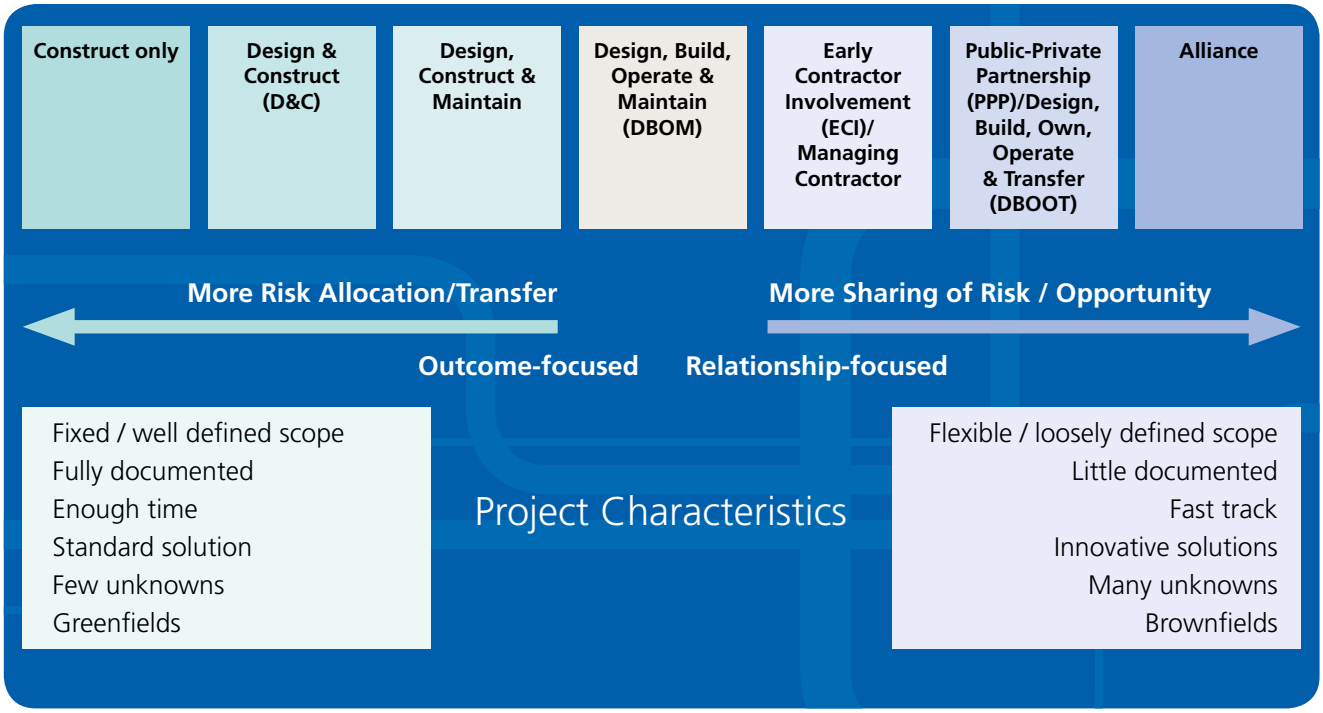


Figure 6–15: Contracting models relied upon by SA Water



Flexible contracting

SA Water relies upon a broad range of contracting models to deliver capital projects, depending on the scope, timing and complexity of each project. The contracting models relied upon by SA Water are depicted in Figure 6–15, ranging from traditional contracts for the construction of relatively low risk, well-defined projects, through to more sophisticated contracting relationships involving the design, build, ownership, operation and transfer (DBOOT) of riskier, less well-defined projects.

This flexible capital delivery and contracting approach has enabled SA Water to engage with industry partners and simultaneously deliver very large, complex projects and other extensive programs of capital works across the State in an efficient manner. The flexibility in SA Water's capital delivery approach has proven capable of rapid resource scaling-up and down, and will enable SA Water to successfully deliver its proposed capital works.

6.8.2. Review of project delivery

The Guidance Paper issued by ESCOSA[129] specifies a requirement for SA Water to review its performance in project delivery. Consistent with this requirement, SA Water has reviewed its performance in delivering 20 projects completed between 2006–07 and 2011–12. Projects included in this review have been selected based on:

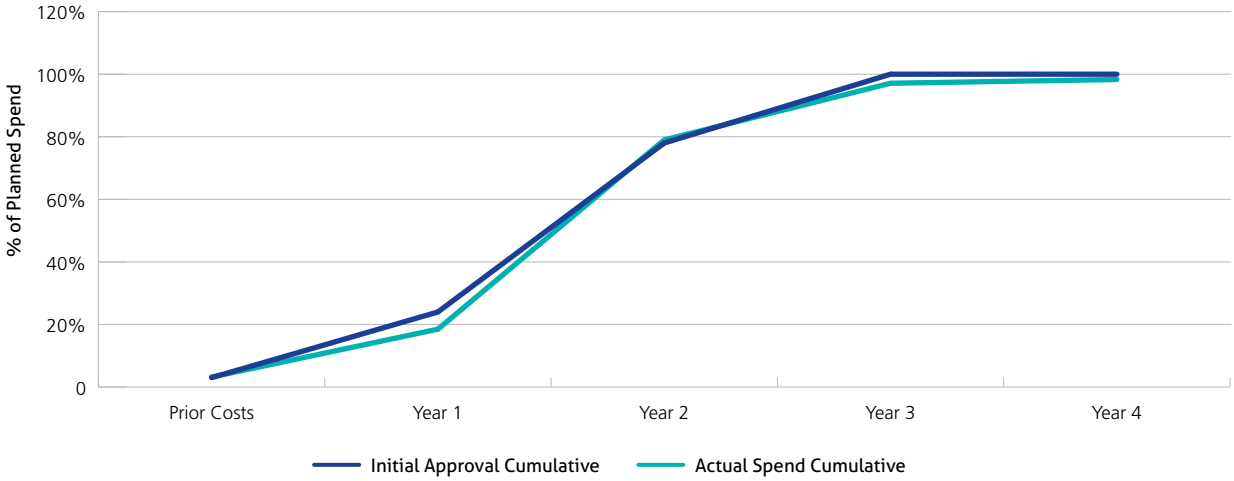
i. Total project value (projects with the largest value have been selected); and
ii. Completion date (projects with a completion date within the period have been selected).

In cases where further activity may be required, for example to manage warranty obligations during the defects liability period and to complete contractual requirements, forecast costs beyond 2011–12 have been included in the analysis.

Large projects which are yet to be completed, including construction of the ADP, the NSIS and the Christies Beach wastewater treatment plant upgrade, have not been included in the review.

129 ESCOSA, *Review of SA WATER's Prices: 2013/14 – 2015/16 Guidance Paper, February 2012, p. 12.*

Figure 6–16: SA Water's performance in delivering major projects



Each project included within the scope of this review had a total capital cost greater than $4 million, and hence required either Cabinet or Ministerial approval. The majority of these projects (18 of the 20) required referral to the Public Works Committee (PWC) following Cabinet approval. The remaining 2 were information technology projects which were within the delegated authority of the Minister and did not require referral to the PWC.

Details of the individual projects are provided in Attachment F.6 to this Proposal. These details include:

- A brief description of the project;
- The initially approved project timeframes and value;
- Details of any changes to approved project timeframes and value; and
- The actual timeframes and value in which the project was delivered.

As part of the review, the detailed data relating to the individual projects has been aggregated and is presented in Figure 6–16.

Figure 6–16 represents the planned and actual expenditure profiles of the projects selected for review, expressed in percentage terms. On the x-axis of the graph, "Year 1" represents the financial year in which approval was obtained for each project. In aggregate, 3% of the approved project expenditure is incurred prior to the year in which financial approval was obtained. This analysis is discussed in more detail in Attachment F.6. The x-axis in Figure 6–16 extends through four years, as all but a small element (2%) of the expenditure associated with these projects is incurred within four years.

The graph in Figure 6–16 shows that:

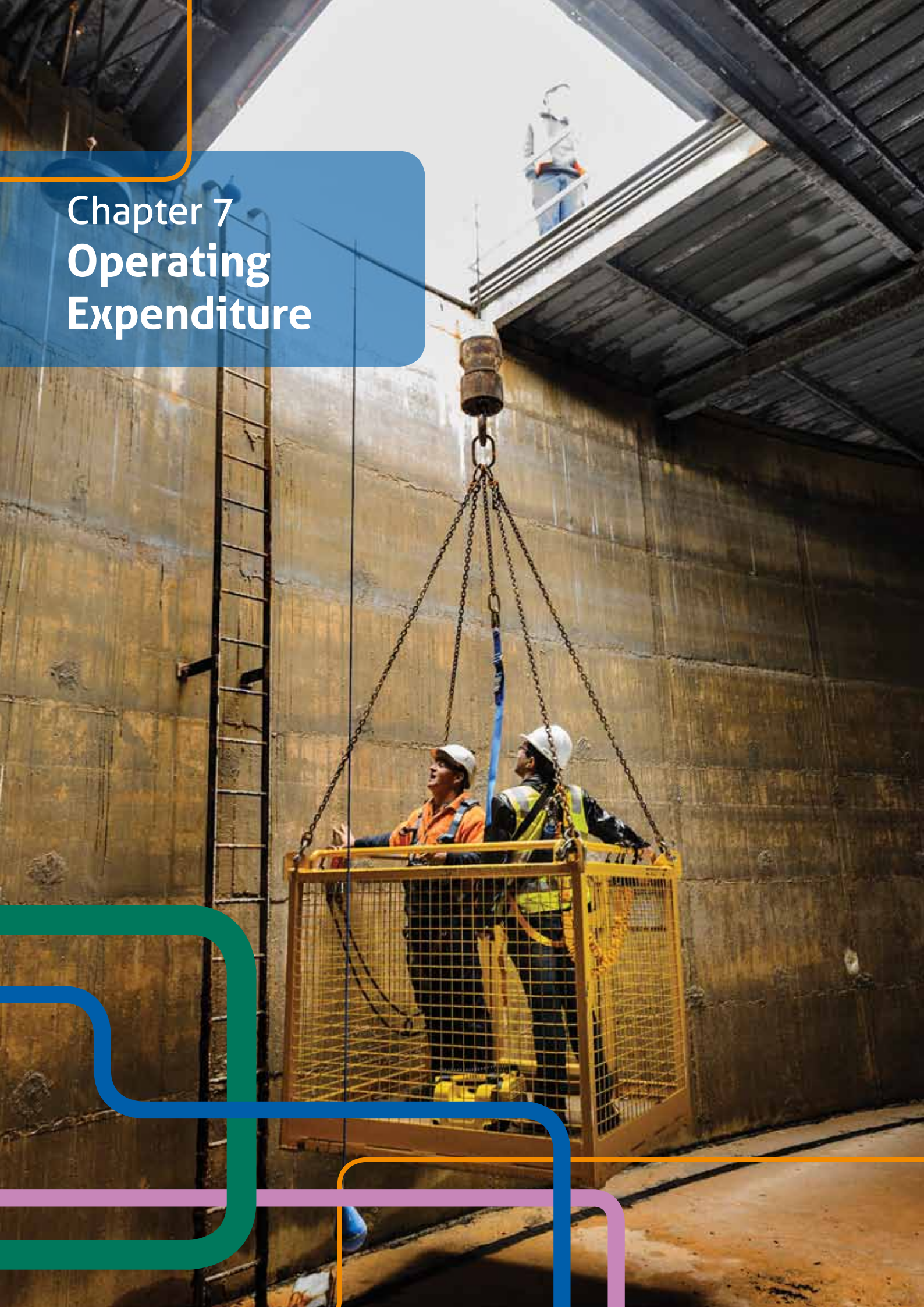
i. SA Water has delivered these significant projects in accordance with agreed project timeframes; and
ii. Final expenditure aligns within 2% of the approval estimates.

The review of each project as detailed within Attachment F.6 also highlights the challenging circumstances under which many of these major projects were delivered, often with significant time pressures from the initial planning and scoping phases through construction and commissioning.

6.8.3. Delivery of the proposed capital plan

Although the capital plan presented in this Proposal represents a significant reduction in dollar terms compared to the elevated expenditure of recent years, it nonetheless represents a large program of capital works. In fact, the average number of projects proposed per annum exceeds the average number of projects delivered per annum during the preceding five years.

The capital delivery model adopted by SA Water, detailed earlier in this chapter, is flexible enough to enable SA Water to deliver the proposed capital plan in an efficient manner – in accordance with agreed timeframes and budgets.



Chapter 7
Operating Expenditure

Key points

- SA Water's recent operating expenditure reflects a period of drought – the most severe in recorded history – during which extraordinary measures were required to safeguard South Australia's water supplies. SA Water's future operating environment will be dramatically different, but will continue to be influenced by capital investments made to secure the supply of water.
- SA Water has benchmarked its operating expenditure using three distinct methods of benchmarking to avoid flawed comparisons, and observes that it consistently benchmarks favourably. This is despite the significant challenges inherent in SA Water's operating environment which lead to materially higher operating costs – and the fact that SA Water is one of only three Australian water utilities serving more than 100,000 connections on a state-wide basis.
- The operating expenditure proposed by SA Water will enable prudent and efficient delivery of water and sewerage services consistent with the high quality of service currently provided to SA Water's customers. Significantly, SA Water proposes to reduce the operating expenditure associated with delivery of water services during the forthcoming regulatory control period reflecting, among other items, cessation of a number of rebate schemes, and the operating assumptions made by SA Water in relation to the ADP.
- The operating expenditure proposed by SA Water in relation to the ADP has been reviewed by external experts, concluding that it is prudent for SA Water to operate the plant in the various operating modes it has proposed, and that the costs forecast by SA Water are reasonable for an asset of this type.

7.1. Operating expenditure leading into the initial regulatory control period

In development of its operating expenditure forecast for direct control water and sewerage services, SA Water has adopted a "base year" approach – whereby a recent year of actual expenditure is selected as the base year, and the forecast is developed to reflect adjustments to this. The base year selected by SA Water is the 2011–12 financial year, with further discussion regarding selection of this base year and the process by which this operating expenditure forecast was developed provided later in this chapter (refer section 7.4).

Conventional regulatory practice with respect to review of operating expenditure proposals involves assessment of the operating expenditure incurred by the regulated entity during the preceding regulatory period. Given that this Proposal deals with SA Water's initial regulatory control period, Figure 7–1 presents the operating expenditure incurred by SA Water in delivery of its direct control water and sewerage services for the five years leading into the 2011–12 base year. This information provides context to SA Water's proposed operating expenditure, consistent with the historic cost data requested by ESCOSA in expenditure templates accompanying its Guidance Paper[130].

130 ESCOSA, *Review of SA Water's Prices: 2013/14–2015/16 Guidance Paper*, Feb. 2012, p. 8.

SA Water has adopted a "base year" approach in development of its operating expenditure forecast, with 2011–12 selected as the base year. Key drivers of operating expenditure for the base year – drivers which SA Water also considers relevant to the forthcoming regulatory control period – relate to reform of the South Australian water industry and the ADP.

The expenditure presented in Figure 7–1 represents two distinct time periods, with very different expenditure drivers influencing the operating expenditure during each period: expenditure incurred during a period of severe drought (2006–07 to 2008–9 inclusive); and expenditure incurred post-drought (2009–10 to 2012–13 inclusive).

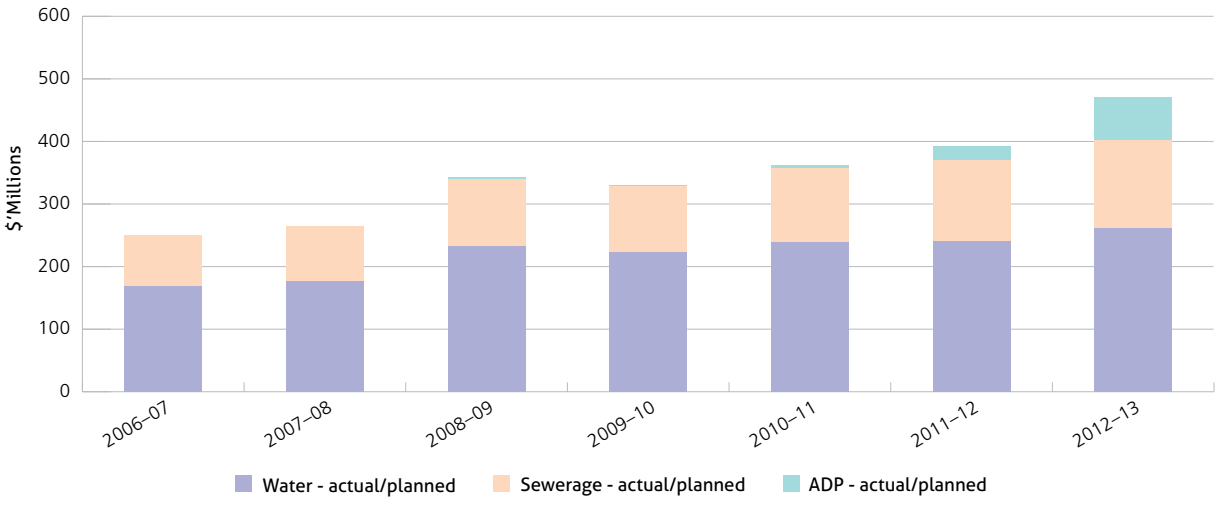
The key drivers of operating expenditure during the period of severe drought (2006–07 to 2008–09) included:

- **Enforcement of water restrictions:** various water restrictions and water conservation measures were introduced during the drought, with SA Water acting as the lead State Government agency responsible for communication and enforcement of these;
- **Processing and payment of rebates:** a broad range of rebates were introduced during the drought with the aim of encouraging more efficient water use. The arrangements introduced with respect to these rebates involved SA Water processing rebate applications and making rebate payments directly to eligible customers, with the associated costs borne as operating expenditure by SA Water; and
- **Reduced reservoir catchment:** reduced natural catchment into SA Water reservoirs necessitated additional pumping from the River Murray for SA Water to maintain supply to customers.

A number of key one-off expenditure items were incurred in the final year (2008–09) of the severe drought period which included:

- **Changes to billing arrangements:** A change to SA Water's billing arrangements was introduced necessitating a one-off ex-gratia payment to customers;
- **Debt management arrangements:** Significant debt management costs associated with the management of interest rate risk during the Global Financial Crisis were realised by SA Water in 2008-09; and

Figure 7–1: SA Water's operating expenditure leading into the initial regulatory control period[131] (direct control water and sewerage services)



131 Nominal $'millions prior to 2011–12; Real, March 2012 $'millions from 2011–12.

SA Water's recent operating expenditure reflects a period of drought – the most severe in recorded history – during which extraordinary measures were required to safeguard South Australia's water supplies. Going forward, SA Water's operating environment will be different, but will continue to be influenced by capital investments made to secure the supply of water.

- **Reduced freshwater inflows:** Reduced inflows of fresh water along the River Murray necessitated the installation of additional pumps to draw water from lower extraction points; additional water treatment, and preparatory works to construct a weir at Wellington (to safeguard against saltwater migration).

The key drivers of operating expenditure during the post-drought period (2009–10 to 2012–13) largely stemmed from capital investments delivered in response to the drought, and the introduction of various reforms to the South Australian water industry. Specifically, the key drivers of operating expenditure during the post-drought period – and which SA Water considers relevant to the forthcoming regulatory control period – include:

- **Water industry reform:** Significant reforms have been introduced to the South Australian water industry during this period, including establishment of the framework to facilitate economic regulation of SA Water. These reforms have necessitated, among other items, that SA Water pay various water planning and licence fees;
- **Carbon pricing mechanism:** The Federal Government's carbon pricing mechanism that commenced on 1 July 2012 has materially impacted both direct liabilities under the legislation and indirect costs passed on by SA Water's suppliers;
- **Real cost increases:** Many of SA Water's operating costs – including contracted services, labour, electricity and fuel costs – have been subject to real cost increases. In particular, significant increases in electricity prices have materially impacted SA Water – one of the largest consumers of electricity in South Australia; and
- **ADP and NSIS:** SA Water has incurred significant operating costs associated with the ADP, which has been producing an increasing volume of potable water since 2011, and the NSIS project scheduled for completion in 2012–13.

The above are discussed in more detail later in this chapter.

7.2. Benchmarking of SA Water's operating efficiency

The Guidance Paper issued by ESCOSA with respect to this Proposal indicates that:

> *"[the Proposal] should demonstrate that the forecast levels of expenditure are both prudent and efficient...supporting information should be provided and may include...cost benchmarking information..."*[132]

The Guidance Paper further indicates that:

> *"[ESCOSA] does not consider benchmarking alone to provide an adequate basis for determining efficient expenditure benchmarks, but intends to use benchmarking of SA Water's current and proposed expenditure relative to other water utilities as one input into its assessment."*[133]

SA Water agrees with ESCOSA's view that benchmarking provides a useful input for assessment of the prudence and efficiency of

132 ESCOSA, *Review of SA Water's Prices: 2013/14–2015/16 Guidance Paper*, Feb. 2012, p. 8.
133 Ibid, p. 13.

SA Water has benchmarked its operating expenditure using three distinct methods of benchmarking to avoid flawed comparisons, and observes that it consistently benchmarks favourably. This is despite the significant challenges inherent in SA Water's operating environment –which lead to materially higher operating costs – and the fact that SA Water is one of only three Australian water utilities serving more than 100,000 connections on a state-wide basis.

proposed expenditure, but that it does not in itself provide an adequate basis to establish efficient expenditure benchmarks.

In benchmarking of SA Water's current and proposed expenditure relative to other water utilities, SA Water believes that significant variability exists among Australian water utilities which materially influences each utility's expenditure, including the:

- Extent to which the utility is vertically integrated;
- Geography and size of area served;
- Geological conditions, which can induce pipe bursts and other operating challenges;
- Customer density and usage profiles;
- Source water availability and quality;
- Climatic conditions;
- Age, condition and structure of water and wastewater systems; and
- Obligations relating to, among other items, customer service standards, drinking water quality requirements and environmental protection.

Given this variability, SA Water has considered three distinct methods of benchmarking relative to other water utilities so as to provide a broader perspective on its operating efficiency, and to minimise the influence of limitations inherent in individual benchmarking methodologies. The three benchmarking methods considered by SA Water were:

- CLD analysis, where efficiency is analysed relative to a composite variable representing a utility's size;
- Partial financial indicator analysis; and
- Total Factor Productivity (TFP) analysis.

Each benchmarking method and outcome is described in the sub-sections that follow.

Unless otherwise stated, all data used in these benchmarking analyses has been sourced from the NWC's 2010–11 National Performance Report[134].

Each analysis is presented for individual water businesses and, where possible, at an aggregate regional and state-wide level including:

- "WA All": encompassing Perth, Albany, Bunbury, Mandurah, Kalgoorlie and Geraldton;
- "SA All": encompassing Adelaide, Mt Gambier, Whyalla and other country areas;
- "All Melbourne retailers": encompassing City West Water, Yarra Valley and South East Water; and
- "All Brisbane retailers": encompassing QUU, Unity and Gold Coast.

Bulk water entities in Brisbane (SEQ, LinkWater and SEQ Water Manager) and Melbourne (Melbourne Water) have been excluded from this analysis due to the significant structural differences between these businesses and SA Water. However, bulk water and wastewater charges incurred by the South East Queensland and Melbourne based distributors/retailers are included in their respective operating costs, as defined in the "Urban Performance Reporting Indicators and Definitions Handbook"[135].

The analyses detailed in this Proposal only disclose the data points for SA Water, except where the

134 National Water Commission, *National Performance Report 2010–11, Urban Water Utilities*, 2012.
135 See NWC (2011) "2010–11 National Performance Framework: Urban Performance Reporting Indicators and Definitions Handbook", pp.85–86.

other data points have been presented publicly in other reports. The data points for other water utilities are shown, but not named due to the fact that SA Water has not given other water utilities an opportunity to validate the results.

7.2.1. CLD Analysis

CLD analysis involves calculation of a composite "size" variable and comparison of this size variable to some other variable (typically total capital or operating expenditure). The basic intent of such analysis is to normalise the relative size of businesses, and establish the "efficient frontier" for businesses of different sizes. The composite size variable used as the basis for CLD analysis comprises the following individual size variables:

- Number of customers (C);
- Length of network (L); and
- Volume of Demand (D).

CLD analysis has been previously adopted by Wilson Cook & Co to assist the AER with its review of proposed expenditure of ACT and NSW electricity distribution network service providers[136], prior to which it was adopted by Ofgem (the UK electricity and gas market regulator). In adopting CLD analysis, Wilson Cook & Co noted that operating expenditure is typically benchmarked on a single element of the composite size variable (that is per customer, per length of network, or per volume of demand), but with the effect of limiting the number of comparable businesses in the benchmark. Given the vast differences in size of Australian water utilities, the CLD has the advantage of normalising size factors to allow for more meaningful comparisons with a wider range of utilities.

SA Water considers that CLD analysis is equally as relevant to Australian water utilities as it is to Australian and UK gas and electricity utilities, and therefore has adopted an identical approach to CLD analysis as that adopted by Ofgem and Wilson Cook & Co.

The CLD composite size variable is calculated as follows:

$$\text{Size} = C^{d}L^{e}D^{f}$$

Where:

- C = number of customers (indicated by the number of water connections);
- L = length of pipe network;
- D = volume of demand; and
- d, e, and f are weights, which SA Water has applied equally.

Once calculated via this formula, the composite size variable of each business included in the analysis is graphed against key financial variables, together with a trend line. In this way, the composite size variable acts as a standardising measure to enable more meaningful comparison of businesses with large variations in the scale of their operations. Businesses situated above the trend line exhibit above-trend financial expenditure relative to their size.

Figure 7–2 shows the outcome of the CLD analysis undertaken by SA Water where the composite size variable is plotted against total operating costs, and indicates that SA Water (Adelaide) exhibits below-trend operating expenditure. This analysis suggests that SA Water's operations for metropolitan Adelaide were efficient as at the period which this data represents (the 2010–11 financial year). Although the names of the other utilities included in this analysis are not disclosed against their respective data points, SA Water considers it important to point out that the position of the "SA All" data point is comparable to the "WA (all)" data point – Water Corporation in Perth and ACTEW in the ACT are the only other vertically integrated Australian water utilities

136 See Wilson Cook & Co, *Review of Proposed Expenditure of ACT & NSW Electricity DNSPs Volume 1—Main Report Final*, October 2008, p.18.

Figure 7–2: Comparative analysis of operating expenditure versus size (2010–11)

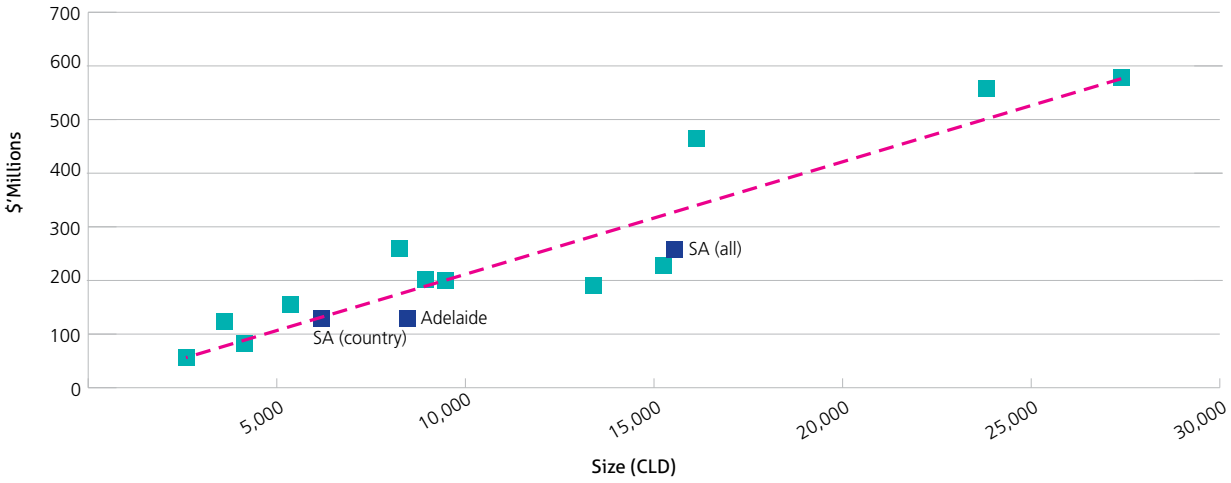
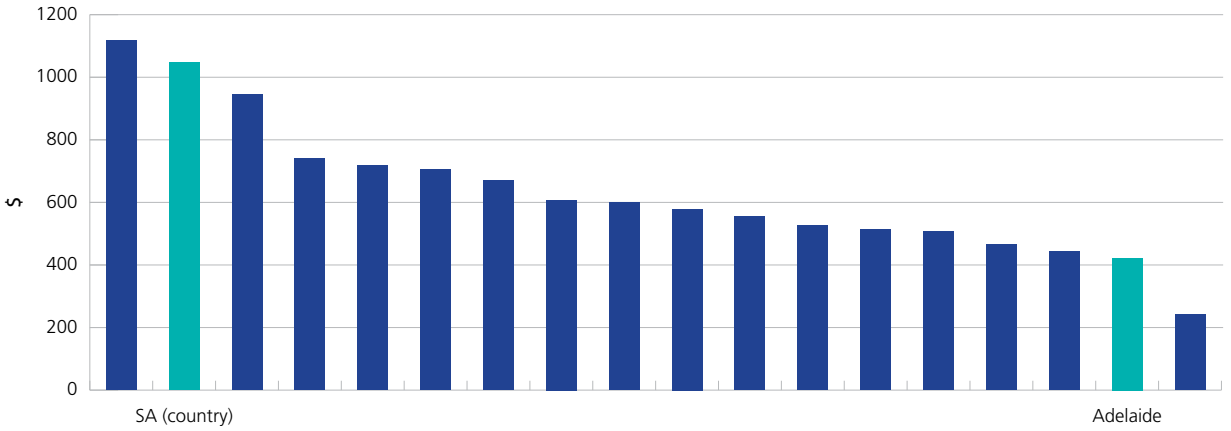


Figure 7–3: Combined operating costs per property (2010–11)

Source: NWC, NPR 2010–11: indicator F13



servicing greater than 100,000 connections, and covering a whole state or territory[137].

Figure 7–2 also shows the results for "SA Country" and "SA All". As can be seen, these groupings are plotted closer to or above the trend line, reflecting the need to perform more intensive tertiary treatment of poor quality groundwater, and the cost of pumping water to regional and remote areas of South Australia where customer density is low. Despite these factors, SA Water considers that these data points demonstrate relatively efficient operations against most of its peers.

7.2.2. Partial financial indicator analysis

Partial financial indicator analysis is the standard method of analysis relied upon by the NWC for its "National Performance Reporting" initiative. Like the CLD analysis method, the partial financial indicator analysis adopted by the NWC relies on a standardising measure (the number of connected properties) to compare costs for utilities of different sizes. In SA Water's view, this standardising method is not as effective as the composite size variable adopted for CLD analysis, but nonetheless provides another tractable

137 Australia's Urban Water Sector: Productivity Commission Inquiry Report Volume 1, No. 55, 31 August 2011.

method of benchmarking. Figure 7–3 presents the combined (water and sewerage) costs per property for major Australian water utilities.

Figure 7–3 indicates that SA Water incurs below-average operating costs per property in the Adelaide metropolitan area, whereas its operating costs in country areas are significantly higher per property relative to the majority of other Australian water utilities. As discussed in the context of the CLD analysis, this is due to the fact that SA Water operates major pipelines to pump water to regional and remote areas of South Australia, and incurs other significant operating costs to extract and treat groundwater in these areas. These materially higher operating costs, combined with the relatively small number of customers serviced in these areas, results in the unfavourable position of "SA Country" depicted in Figure 7–3.

In SA Water's view, this analysis serves to highlight the limitation of benchmarking which compares water utilities according to an individual – as opposed to composite – size variable.

As is the case with respect to the CLD analysis, SA Water also notes that the position of "SA Country" in Figure 7–3 is comparable to the position of large regional centres served by WA Water Corporation.

7.2.3. Total Factor Productivity (TFP) analysis

TFP analysis involves calculation of a "TFP" variable for each business included in the benchmarking study, and ranking of the businesses according to this variable. The TFP variable is used to explain variances in the level of output produced by each business which are not explained by variances in capital or labour inputs. Put simply, if two identical businesses employing identical quantities of labour and capital were benchmarked and one business produced twice as much output as the other, this difference would be attributed to TFP. Key drivers of TFP include the efficiency and skill of workers, and the benefit derived through use of technology.

TFP analysis has been applied recently by the ESCV to benchmark Australian water utilities, including SA Water, in a study which assumed three outputs and three inputs for each business. The outputs were:

- Number of customers supplied;
- A measure of water supplied which is quality-adjusted (for drinking water quality), and normalised for the effect of temporary water restrictions; and
- The quantity of sewage treated which is quality adjusted (for the sewage treatment level).

The inputs assumed by the ESCV study comprised:

- A measure of capital inputs, which is a function of:
  - Length of water supply and wastewater mains,
  - Proportion of water sourced from a utility's own upstream facilities and groundwater; and
  - The capacity of any desalination plant;
- An accounting-based measure of fixed asset written-down replacement cost; and
- A composite index of bulk water purchased and all other non-capital inputs.

The ESCV's study included 54 Australian water utilities and was based on data sourced from the NWC and the WSAA.

In publishing its report, the ESCV highlighted concerns about the validity of the data relied upon in its study, noting that:

> *"Care needs to be taken when interpreting the results of this analysis in light of limitations in the quality of the data set. Although the WSAA and the NWC data is the best available, it is dependent on that quality of information reported by water utilities, which may be variable"*[138]*;*

and that;

> *"The capital inputs measure is problematic, due mainly to concerns about measurement*

138 ESCV, *An analysis of the productivity of the Victorian water industry*, Staff Research Paper No. 12/1, 2012, p. 4.

error and the consistency of data between utilities. The National Water Commission (NWC) publishes data for the written-down replacement cost of fixed water supply and sewerage assets for each utility. They show wide variation in the value of assets per km of main."[139]

Despite these limitations, and although the ESCV's report is based on several major assumptions (including adjustments for differences in the vertical integration of water utilities and water restrictions), SA Water considers that it provides another valuable benchmarking indicator to be considered together with the other forms of benchmarking presented in this Proposal. The results of the ESCV's study are reproduced in tabular form in Table 7–1 for the major Australian water utilities included in the other benchmarking analyses presented in this chapter.

The ESCV's report observes that the majority of non-Victorian urban water utilities are shown to have below-average productivity, with these utilities nine per cent less efficient than the average water utility. However, the report also notes that these results may have been impacted by investment in desalination plants by some water utilities (as is true for SA Water and Water Corporation). SA Water further considers that the adjustment applied within the study to account for differences in the degree of vertical integration among the utilities is likely to be a major factor contributing to these results.

SA Water further observes that its TFP ranking compares favourably with other vertically integrated water utilities servicing more than 100,000 connections on a state-wide basis.

Table 7–1: TFP for selected Australian water utilities (ESCV study, 2012)

Water utility	TFP[140]	Ranking[141]
City West Water	1.305	5
South East Water Ltd	1.177	10
Yarra Valley Water	1.144	11
Brisbane Water	1.067	15
Gold Coast Water	1.056	17
SA Water – Adelaide*	0.908	33
Barwon Water	0.877	37
Sydney Water Corporation	0.875	38
Water Corporation – Perth*	0.831	44
ACTEW*	0.789	47
Hunter Water Corporation	0.784	48

*Serving more than 100,000 connections on a state-wide basis.

139 ESCV, *An analysis of the productivity of the Victorian water industry*, Staff Research Paper No. 12/1, 2012, p. 18.
140 Average of Index, Random Effects and Stochastic Frontier approaches to calculating TFP.
141 Total ranking out of 54 utilities included in the study. Only selected utilities are shown here, being major utilities included in SA Water's other benchmarking analyses presented in this chapter.

7.3. Overview of proposed operating expenditure

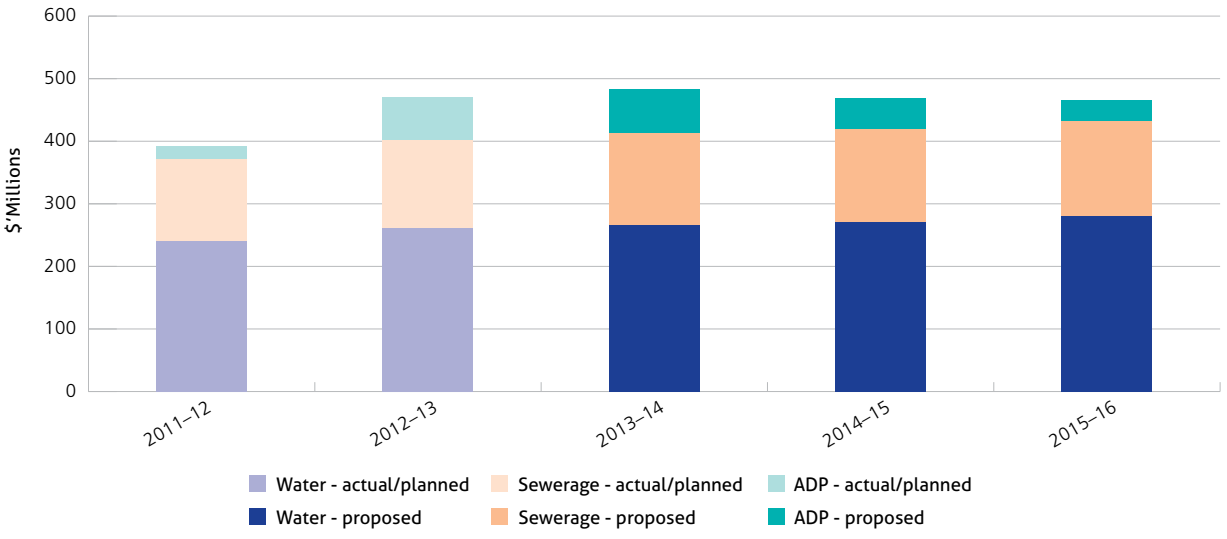
The operating expenditure proposed by SA Water for the forthcoming regulatory control period is depicted graphically in Figure 7–4, together with SA Water's forecast of the operating expenditure it will incur in the 2011–12 base year[142] and 2012–13 (the year prior to the regulatory control period). The amounts shown in Figure 7–4 are expressed in real, March 2012 dollars in accordance with ESCOSA's requirements.

It is important to note that the most significant factor driving the net increase in operating expenditure for the 2012–13 forecast year relative to the 2011–12 base year is associated with operation of the ADP. Further discussion on the operation of the ADP is provided later in this chapter (refer section 7.7).

Figure 7–4 shows that SA Water proposes a relatively flat level of operating expenditure associated with delivery of its direct control sewerage services during the forthcoming regulatory control period, and a declining level of operating expenditure associated with delivery of its direct control water services (which includes ADP-related expenditure). Among other things, the declining level of operating expenditure proposed for direct control water services reflects cessation of a number of rebate schemes, and the operating assumptions made by SA Water in relation to the ADP during the forthcoming regulatory control period.

The operating expenditure proposed by SA Water will enable prudent and efficient delivery of water and sewerage services consistent with the high quality of service currently provided to SA Water's customers. Significantly, SA Water proposes to reduce the operating expenditure associated with delivery of water services during the forthcoming regulatory control period reflecting, among other items, cessation of a number of rebate schemes, and the operating assumptions made by SA Water in relation to the ADP.

Figure 7–4: SA Water's proposed operating expenditure (direct control water and sewerage services) (real, March 2012 $M)



142 In selecting 2011–12 as its base year, SA Water has relied on a forecast of the operating expenditure it expects to incur (this forecast was produced in February 2012). The actual operating expenditure incurred by SA Water in 2011–12 will be available to ESCOSA for comparative purposes soon after SA Water submits this Proposal.

7.4. Operating expenditure forecast development process

The operating expenditure forecast presented in this Proposal was developed through a five step process as described below, and depicted graphically in Figure 7–5:

Step 1: Selection of a base year, 2011–12;

Step 2: Allocation of operating expenditure between direct control, excluded and non-regulated services;

Step 3: Further allocation of direct control operating expenditure between water and sewerage services;

Step 4: Identification of adjustments to base year operating expenditure for each year through to 2015–16; and

Step 5: Application of input cost escalators, reflecting forecast cost escalation in real terms.

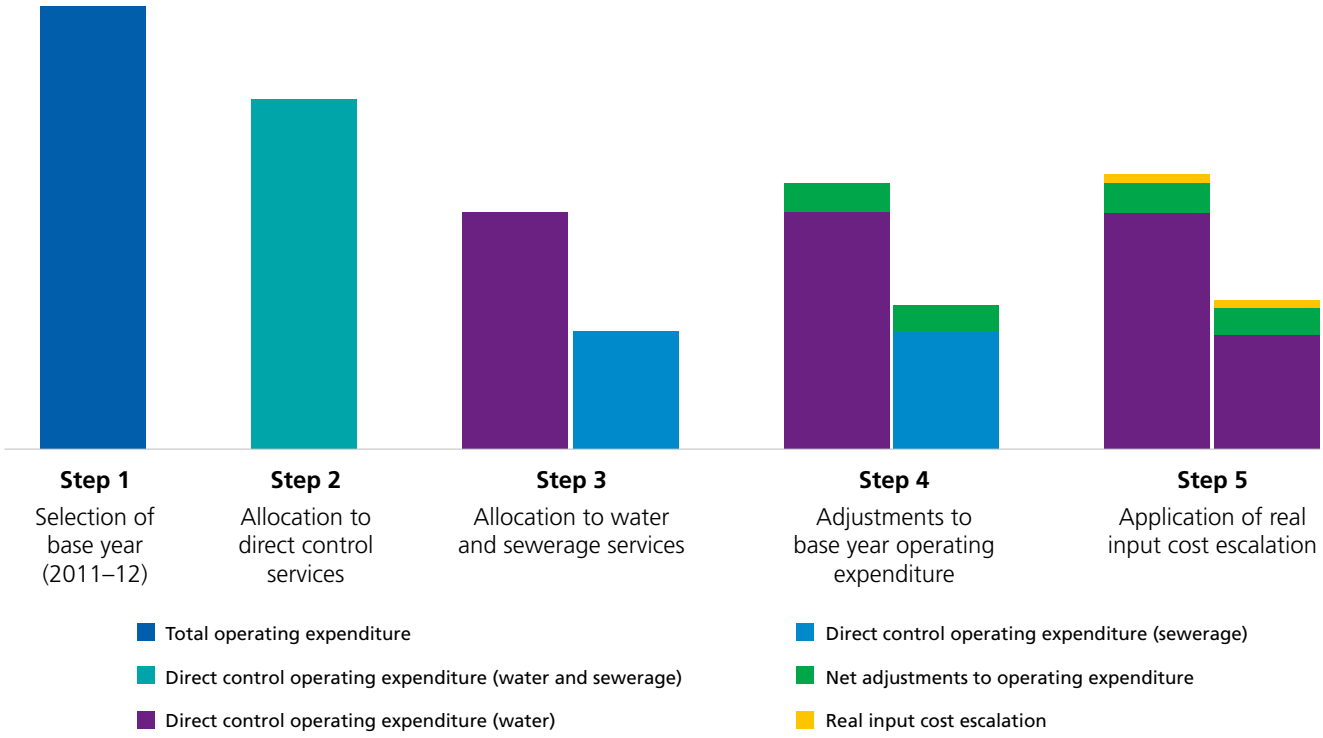
Each of these steps is described in more detail in the following sub-sections.

7.4.1. Selection of the base year

The key criterion applied by SA Water in selecting a base year was that the base year should, to the greatest extent possible, reflect the prudent and efficient operating expenditure expected to be incurred during the forthcoming regulatory period. In applying this criterion, SA Water selected 2011–12 as its base year for the following reasons:

- **Diminished influence of drought:** costs associated with severe drought abated in 2011–12, with severe drought conditions assumed not to apply during the forthcoming regulatory control period;
- **Operation of the ADP and NSIS:** SA Water began to incur significant operating costs associated with the ADP and NSIS during 2011–12, with further increases forecast for

Figure 7–5: Operating expenditure forecast development process



2012–13, reflecting the elevated operating expenditure associated with these significant assets which will persist during the forthcoming regulatory control period; and

- **Wastewater treatment plant upgrades:** SA Water commissioned major upgrades at several of its wastewater treatment plants immediately prior to July 2011, with the operating expenditure incurred at these plants in 2011–12 indicative of the operating expenditure to be incurred during the forthcoming regulatory control period.

7.4.2. Cost allocation

The method by which SA Water allocated operating expenditure between direct control, excluded and non-regulated services is described in chapter 4 (Service Classification) of this Proposal, and Attachment D.2 (Cost Allocation Method).

This cost allocation method has been subjected to an independent assurance engagement by consultants KPMG in accordance with the requirement specified by ESCOSA in its Guidance Paper, where it states that SA Water should *"have an external assurance audit carried out, reviewing its cost allocation processes, prior to providing its pricing submission to the Commission"*.[143] KPMG's assurance of this cost allocation method is provided in Attachment D.3 (Assurance of Cost Allocation Method).

7.4.3. Adjustments to base year expenditure

The process by which SA Water identified adjustments to its base year operating expenditure for the forthcoming regulatory control period revolved around SA Water's established business planning processes. The key steps in these processes involve:

- Preparation and dissemination of a "business planning package" detailing the strategic intent, key challenges and key strategies identified for the planning period;
- Identification and forecasting of key assumptions and cost drivers;
- Identification and forecasting of adjustments to operating expenditure;
- Initial management review of adjustments to operating expenditure; and
- Further management review and refinement of adjustments to operating expenditure.

The key cost drivers and assumptions identified and relied upon through these processes are detailed in the following sub-sections.

Key cost drivers

The key cost drivers identified for the forthcoming regulatory control period are:

- **Capex program impacts:** whereby operating expenditure is influenced by capital investment (a prime example is the proposed operating expenditure associated with the ADP and NSIS);
- **Asset-renewal/operating requirements:** whereby operating expenditure is influenced by the maintenance and operating requirements of existing assets (a prime example is the proposed changes to operating expenditure associated with asset condition monitoring);
- **Changes in demand:** whereby operating expenditure is influenced by changes in water use, growth in the number of customers serviced by SA Water or the volume of wastewater to be processed by SA Water (a prime example is the proposed changes to electricity consumption associated with pumping of water from the River Murray); and
- **Compliance with obligations:** whereby operating expenditure is influenced by externally imposed obligations (a prime example is the

143 ESCOSA (2012) "Review of SA Waters Prices: 2013/14 – 2015/16", p.15.

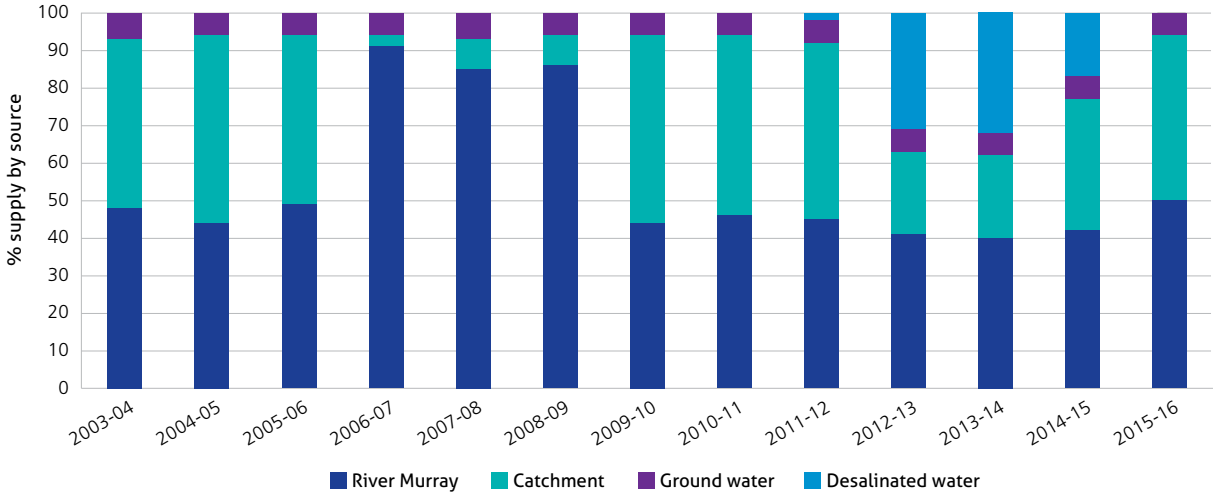
proposed changes to operating expenditure associated with the carbon pricing mechanism).

Key forecasting inputs and assumptions

The key forecasting inputs and assumptions relied upon for the forthcoming regulatory control period includes:

- **Forecast customer water usage:** water usage materially influences SA Water's operating expenditure insofar as it determines the volume of water to be pumped from the River Murray and treated at SA Water's treatment plants. The forecast of water usage relied upon in preparing SA Water's operating expenditure forecast was developed by consultants ACIL Tasman, and is detailed in chapter 5 (Demand Forecasts) of this Proposal;
- **Production plans:** in supplying water to satisfy demand, SA Water has developed a "water balance model" which considers the water expected to be available from different sources (refer Figure 7–6 which indicates the assumed mix of water available from each source) and constraints on SA Water's major pumps and pipelines. The model produces production plans for SA Water's metropolitan water treatment plants and the ADP, as well as water transfer and pumping plans which have been relied upon in preparing SA Water's operating expenditure forecast. These plans assume average weather conditions;
- **Commissioning and operation of the ADP:** the operating costs of the ADP will vary significantly during the forthcoming regulatory control period, depending on the commissioning and production requirements of the plant. The key assumptions made by SA Water with respect to commissioning and operation of the ADP are detailed in section 7.7 of this chapter, and are supplemented by a specific pass through event nominated by SA Water (refer chapter 8, Pass Through Events);
- **Impact of the carbon pricing mechanism:** in development of its operating expenditure forecast, SA Water has made a number of assumptions with respect to the impact of the Federal Government's carbon pricing mechanism for both direct liabilities and indirect costs passed on by suppliers. Key among these is an assumption that SA Water's direct liability is limited to fugitive emissions (methane and nitrous oxide) from its largest wastewater facility (Bolivar), as this is the only SA Water facility forecast to exceed the prescribed threshold of 25,000 tonnes or more of fugitive emissions

Figure 7–6: Water delivered and forecast to 2015–16 (% by source)



each financial year. SA Water is obligated to acquire and surrender eligible emission units to satisfy the emissions liability from this facility annually;

- **Operating efficiency:** SA Water's operating expenditure during the forthcoming regulatory control period will be materially influenced by its assumptions regarding water production and distribution, trade-offs between capital and operating expenditure, and decisions with respect to maintenance of assets. The key inputs and assumptions made by SA Water with respect to water production and distribution have been described earlier, with SA Water's consideration of capital and operating expenditure trade-offs described in section 7.8 of this chapter.

  One of the key decisions made by SA Water with respect to maintenance of its assets during the forthcoming regulatory control period relates to ten water treatment plants situated on the River Murray. These plants were commissioned during the recent drought by a contractor under a build-own-operate-transfer (BOOT) contract with a five year term, following which SA Water could elect to take over operation and maintenance of the plants. SA Water has determined that it can operate these plants more efficiently at a lower cost in future, and has incorporated these operating efficiencies within its operating expenditure forecast.

  Another key decision by SA Water to drive operational efficiency relates to the execution of a 10-year alliance contract to oversee the operation and maintenance of Adelaide's water and wastewater systems which commenced on 1 July 2011. The contract includes flexible mechanisms to alter and adjust the scope of services and delivery parameters, and is managed through an extensive performance management regime covering all elements of operational service delivery.

  The successful alliance partner, Allwater, was selected through a comprehensive procurement process that included a competitive process with two shortlisted proponents. A risk-based assessment of the two bids considered the technical, organisational and commercial capability of the proponents.

  The alliance model brings greater flexibility and transparency to the delivery of treatment and network services to the greater metropolitan area and it has resulted in SA Water and Allwater working closely together, collaborating on strategy and sharing skills and expertise.

  In entering into its agreement with Allwater, SA Water identified a number of strategic functions from the previous Adelaide Water Contract that were more appropriate for SA Water to separately outsource or return to SA Water. Functions returned to SA Water include Call Centre operations, Cathodic Protection, Extensions and Connections, SCADA and Strategic Asset Management.
- **Water licences:** SA Water relies heavily on its River Murray water extraction licences, with approximately 90% of its customers receiving at least some of their water from this source. For more than 150,000 people in regional areas, it is the sole source of drinking water supply. In developing its operating expenditure forecast, SA Water has assumed that it will be able to satisfy forecast water usage through its existing licences, and therefore has not incorporated any change in costs associated with its water licences in this Proposal. SA Water has, however, nominated a specific pass through event regarding water licences (refer chapter 8, Pass Through Events) as part of this Proposal;
- **Water quality:** SA Water must proactively manage water quality in major pipelines to avoid significant degradation in the quality of water

provided directly to customers off the major pipelines (prior to any treatment) and in water treatment plants which source their water from these pipelines. The most effective means of maintaining adequate water quality in the major pipelines is to periodically pump water through the pipelines to ensure water does not stagnate in the system. These pumping schedules represent an important input into SA Water's operating expenditure forecast; and

- **Environmental/Health Obligations:** There are significant regulatory requirements imposed on SA Water by various regulators including the Environment Protection Authority (EPA) and Department of Health. In particular, SA Water's wastewater operations represent prescribed activities which have the potential to cause serious environmental harm. Similarly, the potable water supplied by SA Water has the potential to cause serious health issues. SA Water has developed its operating expenditure forecast to ensure compliance is maintained with these obligations.

Expenditure Control

SA Water maintains rigorous policies and processes governing delegations and approvals to ensure operating expenditure is prudent and efficient, complies with State Government requirements and enables reliable delivery of services of a quality consistent with customer expectations and relevant standards.

Operating expenditure adjustments above $0.25 million must be supported by a business case prior to financial approval by the appropriate delegate. Business cases are required to include:

- Outcomes linked to performance and strategic targets;
- Financial costs and benefits expressed in net present value terms;
- Risk profile and risk management strategies;
- Timing of costs and outcomes; and
- Comparison with the current level of expenditure and performance targets, together with consequences of not proceeding.

Business cases are assessed against the following criteria:

- Linkage to regulatory requirements, strategic objectives, government directives and legislative requirements;
- Financial impact (including net present value acceptability, value for money and lowest whole of life total cost consistent with required levels of quality and performance); and
- Risk profile (including consideration of reputation, sustainability and community risks).

In addition, SA Water's procurement processes ensure products and services represent value for money and all contracts are managed according to the highest standards. Key objectives of SA Water's procurement methodology involve policy and process compliance and optimising commercial outcomes.

An optimal mix between internal and external service providers is maintained to ensure SA Water is a knowledgeable and experienced operator by either competitively tendering activities to external suppliers, or continual business process review.

In preparing this proposal, SA Water engaged the services of consultants Ernst & Young to conduct an independent review of the commercial efficiency of procurement and contracting delivery within SA Water. The Ernst & Young review focused on the delivery of a number of significant projects that support SA Water's ability to deliver water and sewerage services to the required performance standards. The review included:

- Selection of the preferred contracting option;
- Delivery of expressions of interest;
- Delivery of requests for proposal/tender;
- Evaluation of commercial risks from possible

terms with regard to the specific nature of the project; and
- Initial contract management of projects once commenced.

With respect to operating expenditure, Ernst & Young's review focused on:
- The ADP operations and maintenance contract (including the ADP energy contract); and
- The Metropolitan Operations and Maintenance Alliance contract.

In relation to procurement and contracting delivery for both the ADP operations and maintenance and ADP energy contracts, Ernst & Young concluded that:
- The process was consistent with market practice for similar infrastructure projects;
- The contract terms allocate risk consistent with market practice for similar infrastructure projects;
- The contracts incorporate flexibility to manage demand depending on plant utilisation and allow for termination at reduced cost at years 10 and 15; and
- The prices were competitively bid and independently benchmarked.[144]

In relation to procurement and contracting delivery of the Metropolitan Operations and Maintenance Alliance contract, Ernst & Young concluded that:
- The process was competitive;
- Direct costs, margin and corporate overhead were competitively bid and independently benchmarked;
- The least cost proposal was selected; and
- The strongest technical proposal was selected.[145]

A copy of Ernst & Young's report is provided as Attachment G.1 to this proposal.

SA Water conducts regular formal reviews of its operating expenditure across all levels of the organisation to ensure accountability and prioritisation of activities, including review of:
- Financial performance (including monthly analysis of results, forecasts and budgets);
- Accounting processes and financial policies (ensuring the integrity of the accounts and compliance with accounting standards);
- Costing practices (including product and geographic costing);
- Budget alignment with SA Water and South Australian Government requirements; and
- Debt management practices.

7.4.4. Real input cost escalation

SA Water engaged consultants Evans and Peck to provide an assessment of the cost indexation provisions applicable to its operating expenditure for the forthcoming regulatory control period. In undertaking this assessment Evans and Peck analysed SA Water's cost profile, made reference to ESCOSA requirements as published in its Guidance Paper, and referenced indices published by the ABS.

Through its analysis, Evans and Peck produced forecasts of the real cost escalation applicable to SA Water's internal labour, materials and external services[146] costs as detailed in Table 7–2. A copy of the report produced by Evans and Peck is provided as Attachment G.2.

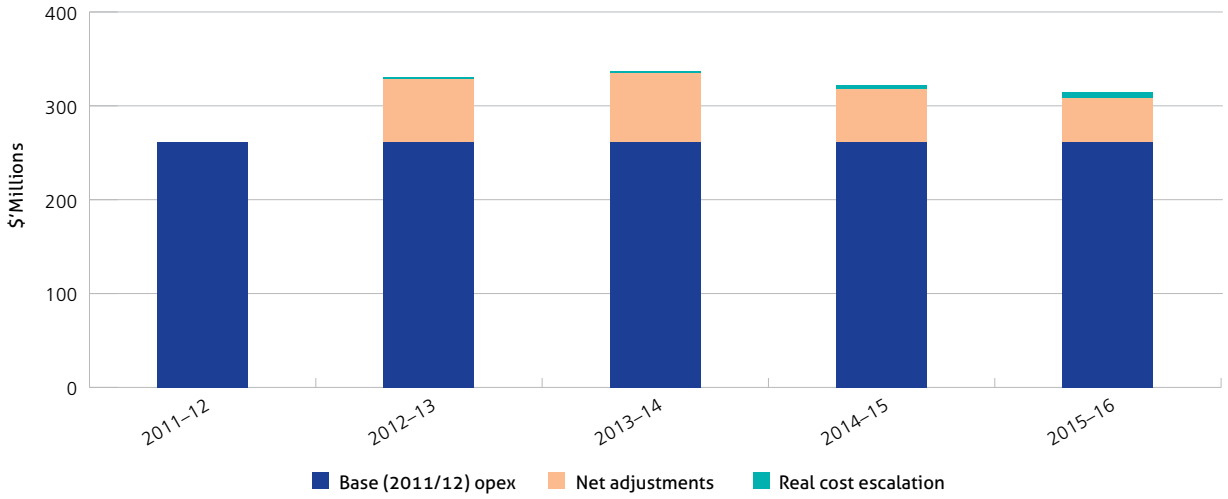
The real input cost escalation forecast detailed in Table 7–2 has been applied to SA Water's operating expenditure forecast, the cumulative impact of which is an increase in the total operating expenditure proposed by SA Water of approximately $6.5 million and $3 million for water and sewerage services respectively. Note that this reflects the impact of real cost increases over and above general inflation. The impact of general inflation as indicated by the CPI has not been applied to the forecast operating costs presented

144 Ernst & Young, Review of Major Contracts for Regulatory Purposes, 9 August 2012, p. 18
145 Ibid, p. 30
146 External services include external SA Water labour, finance services, transport and communication.

Table 7–2: Forecast of real input cost escalation developed by Evans & Peck (annual % change expressed in real terms)

Expenditure type	2012–13	2013–14	2014–15	2015–16
Labour	1.66	1.69	1.74	1.77
Materials	-2.22	-1.66	-1.1	-0.48
Contracted Services	0.18	0.27	0.38	0.48

Figure 7–7: Proposed operating expenditure (direct control water services including ADP) (real, March 2012 $M)



in this chapter, and is addressed separately in the revenue model developed by SA Water (refer Chapter 10, Required Revenue and Pricing).

SA Water has developed a series of models and assumptions to forecast electricity expenditure that includes all existing SA Water sites connected to the national electricity system. These models apply SA Water's water volume and growth assumptions. Components of SA Water's retail electricity charges are separately forecast by applying published or independently modelled cost indexation provisions for each of these components. SA Water has relied on this model to forecast electricity expenditure for the forthcoming regulatory control period.

The impact of capital works (such as the ADP) on SA Water's electricity consumption is estimated separately.

7.5. Proposed operating expenditure – direct control water services

The operating expenditure proposed by SA Water in relation to its direct control water services is presented in Figure 7–7 and indicates declining expenditure during the regulatory control period, albeit with a significant net increase in operating expenditure relative to the 2011–12 base year.

The most significant factor driving the net increase in operating expenditure relative to the 2011–12 base year is the impact of SA Water's capital expenditure program, with significant new assets incurring operating and maintenance costs – the largest of these is the ADP. Because of this influence, Figure 7–8 depicts the operating

Figure 7–8: Proposed operating expenditure (direct control water services excluding ADP) (real, March 2012 $M)

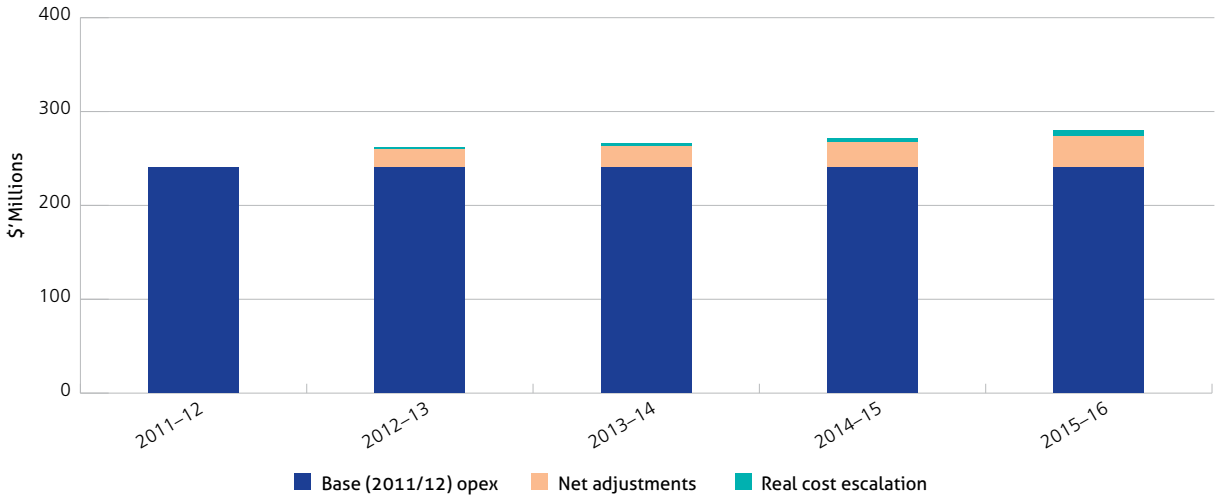


Table 7–3: Proposed operating expenditure (direct control water services excluding ADP)

	2013–14	2014–15	2015–16
Base (2011–12) opex	240.4	240.4	240.4
Net adjustments	23.0	27.0	33.8
Real cost escalation	2.7	4.3	6.2
Total	**265.9**	**271.5**	**280.2**

Real, March 2012 Millions

expenditure proposed by SA Water, but excludes expenditure associated with the ADP (which is dealt with separately in section 7.7 of this chapter). The same forecast is shown in tabular form in Table 7–3.

The net adjustments to base year expenditure shown in Figure 7–8 and Table 7–3 (excluding adjustments associated with the ADP) are further detailed in Figure 7–9 according to the driver for the adjustment, and in the sub-sections that follow.

In recent years SA Water has allocated significant resources to support quantitative, data-rich asset management decision-making. SA Water intends to further extend and develop this work, which it considers of strategic importance as ageing of critical assets places them in a higher risk category.

Figure 7–9: Net adjustments to operating expenditure (direct control water services, excluding ADP and real cost escalation) (real, March 2012)

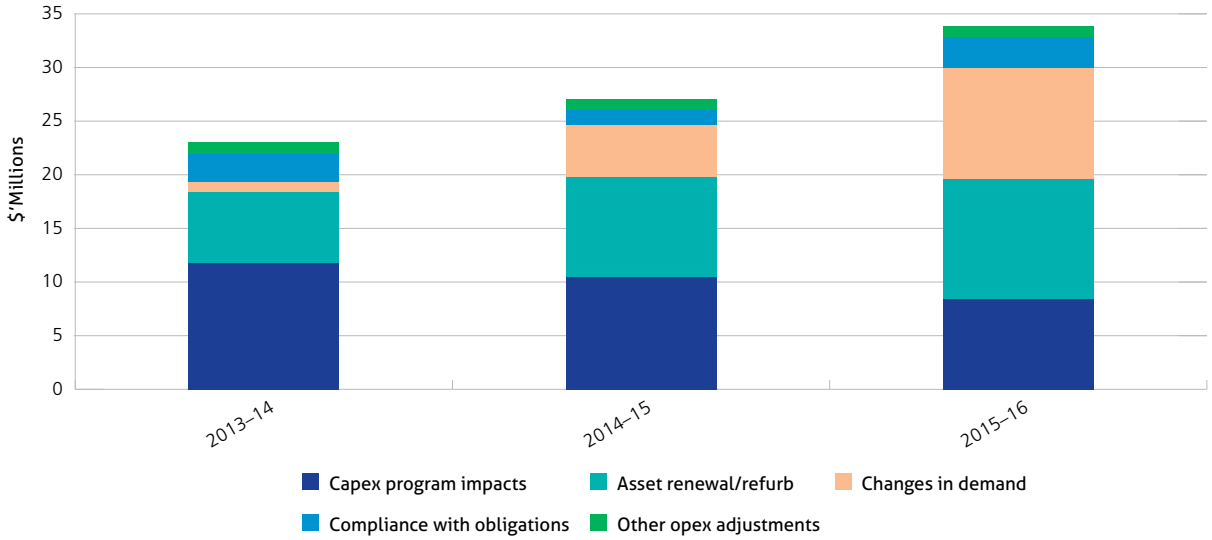


Table 7–4: Net adjustments to operating expenditure driven by capital investment, excluding ADP (direct control water services)

	2013–14	2014–15	2015–16
Net adjustment	11.8	10.5	8.4

Real, March 2012 Millions excluding real cost escalation

7.5.1. Net adjustments driven by capex program impacts

Table 7–4 shows that SA Water proposes a net increase in operating expenditure driven by capital investment during the forthcoming regulatory control period, albeit with a declining profile of annual adjustments. Although operating expenditure adjustments associated with the ADP are excluded from the amounts shown in Table 7–4, operating expenditure associated with commissioning of the NSIS, and distribution of the water produced by the ADP through the NSIS, is included. The volume of water to be produced by the ADP is forecast to decline during the regulatory control period, and is the key reason for the overall decline in operating expenditure shown in Table 7–4.

In addition to expenditure associated with the NSIS, the amounts shown in Table 7–4 reflect adjustments to operating expenditure influenced by capital investment in information systems. These investments include upgrades and replacements of existing systems, implementation of new systems and purchase of additional software licences.

7.5.2. Net adjustments driven by asset renewal/operating requirements

Table 7–5 shows that SA Water proposes a net increase in operating expenditure driven by asset renewal and operating requirements during the forthcoming regulatory control period. The profile of adjustments shown in Table 7–5 is heavily

Table 7–5: Net adjustments to operating expenditure driven by asset renewal/operating requirements (direct control water services)

	2013–14	2014–15	2015–16
Net adjustment	6.6	9.3	11.2

Real, March 2012 Millions excluding real cost escalation

Table 7–6: Net adjustments to operating expenditure driven by changes in demand (direct control water services)

	2013–14	2014–15	2015–16
Net adjustment	0.9	4.8	10.3

Real, March 2012 Millions excluding real cost escalation

influenced by the production plans developed by SA Water for its water treatment plants, which are in-turn heavily influenced by SA Water's assumptions with respect to the volume of water to be produced by the ADP during the forthcoming regulatory control period. Specifically, SA Water has assumed that the volume of water to be produced by the ADP will decline during the forthcoming regulatory control period (to a point where zero water is produced by the ADP in 2015–16), necessitating treatment of a larger volume of water at other metropolitan treatment plants.

This increase in expenditure shown in Table 7–5 is also influenced by asset renewal requirements largely (but not solely) attributed to assets within the Adelaide metropolitan area – which represent approximately 62% of SA Water's total assets. SA Water has incurred materially higher asset-related costs during the 2011–12 base year – a trend which SA Water forecasts will continue during the forthcoming regulatory control period – with greater operating expenditure required to address:

- Increasing age profile of water mains;
- More frequent and sophisticated asset condition monitoring programs; and
- Allocation of additional resources for the ongoing development of asset management plans.

During the forthcoming regulatory control period SA Water intends to further extend and develop this work in the areas of asset condition assessments and data gathering, preliminary investigations to develop future asset management strategies, asset management training and capability development, and data analysis. SA Water considers that this work is of strategic importance, and will help to facilitate prudent and efficient asset management decision-making as ageing of critical assets places them in a higher risk category.

7.5.3. Net adjustments driven by changes in demand

Table 7–6 shows that SA Water proposes a net increase in operating expenditure due to changes in demand during the forthcoming regulatory control period. As noted earlier in this chapter, SA Water engaged consultants ACIL Tasman to develop a sophisticated water demand forecasting model which was relied upon as a key input in development of SA Water's operating expenditure forecast. The methodology adopted by ACIL Tasman and the forecast produced by the model that was developed are described in detail in chapter 5 (Demand Forecasts) and Attachment E.1 (ACIL Tasman's Report). In summary, the forecast

produced by this model estimates that total annual customer water use will increase from approximately 176 GL in 2011–12 to 183 GL in 2015–16.

The component of SA Water's operating expenditure most influenced by changes in demand for water is electricity expenditure due to the requirement to pump and treat water from its source to customers – in some cases over distances exceeding 400km. During the forthcoming regulatory control period SA Water forecasts that customer water use will gradually increase, and that this increase in demand will coincide with diminishing water production from the ADP, necessitating increased pumping and treatment of water from other sources – and therefore electricity use. This is particularly true for the last year of the forthcoming regulatory control period (2015–16), during which SA Water forecasts that zero water will be produced by the ADP. Note that ADP electricity consumption is not incorporated in Table 7–6 – it is shown separately in the ADP operating expenditure described within section 7.7 of this chapter.

SA Water's pump optimisation models and control systems enable it to minimise the impact of recent electricity price increases, particularly from electricity network service provider charges (including Feed in Tariffs) and the continually increasing mandatory Renewable Energy Target (RET) charges passed on by electricity retailers to SA Water. The operating expenditure forecast detailed in this Proposal reflects this optimisation.

7.5.4. Net adjustments driven by the need to comply with obligations

Table 7–7 shows that SA Water proposes a net increase in operating expenditure to comply with various obligations during the forthcoming regulatory control period, albeit with a fluctuating profile of annual adjustments. This fluctuation is attributable to the relative timing of a number of obligations which lead to lower operating expenditure, and other obligations which lead to higher operating expenditure – specifically:

- Cessation of various drought-related rebate schemes such as the H2ome Rebate scheme and the Standalone Rainwater tank rebate (leading to lower operating expenditure);
- Transfer of certain functions from SA Water to the Office of the Technical Regulator as part of the regulatory reform of the South Australian water industry, including the introduction of a fee to be paid by SA Water to the Office of the Technical Regulator (resulting in a net reduction in SA Water's operating expenditure);
- Carbon pricing mechanism impacts, the most significant of these in relation to direct control water services is the carbon cost pass-through on electricity prices) leading to higher operating expenditure;
- Increase in the Superannuation Guarantee Rate from 9% to 12% on a gradual scale from 2013–14 to 2019–20 (leading to higher operating expenditure); and
- Various initiatives proposed by SA Water to ensure that it complies with obligations relating to public risk and occupational health and safety (leading to higher operating expenditure).

Table 7–7: Net adjustments to operating expenditure driven by the need to comply with obligations (direct control water services)

	2013–14	2014–15	2015–16
Net adjustment	2.6	1.4	2.9

Real, March 2012 Millions excluding real cost escalation

7.5.5. Other adjustments to operating expenditure

Table 7–8 shows that SA Water proposes a net increase to operating expenditure driven by other factors during the forthcoming regulatory control period. This increase comprises a variety of adjustments, including:

- A net operating cost reduction relating to a decision made by SA Water to take over the operation and maintenance of 10 water treatment plants along the River Murray, following expiry of an operation and maintenance contract with the constructor of the plants;
- Consolidation of SA Water offices within the Adelaide Central Business District to fewer sites;
- A number of various technical training initiatives; and
- Additional resources to support "hardship" customers and customer research programs.

7.6. Proposed operating expenditure – direct control sewerage services

The operating expenditure proposed by SA Water in relation to its direct control sewerage services is presented graphically in Figure 7–10 and in tabular form in Table 7–9. Figure 7–10 indicates gradually increasing expenditure during the forthcoming regulatory control period, consistent with the trend in the years leading into this period.

The most significant factor driving the net increase in operating expenditure relative to the 2011–12 base year relates to carbon pricing of fugitive emissions from SA Water's largest wastewater treatment facility (Bolivar) and indirect costs passed on by our suppliers for carbon-intensive goods and services. Asset renewal and operating requirements also act as a significant driver of the net increase in operating expenditure.

Table 7–8: Adjustments to operating expenditure driven by other factors (direct control water services)

	2013–14	2014–15	2015–16
Net adjustment	1.1	1.1	1.1

Real, March 2012 Millions excluding real cost escalation

Figure 7–10: Proposed operating expenditure (direct control sewerage services) (real, March 2012 $M)

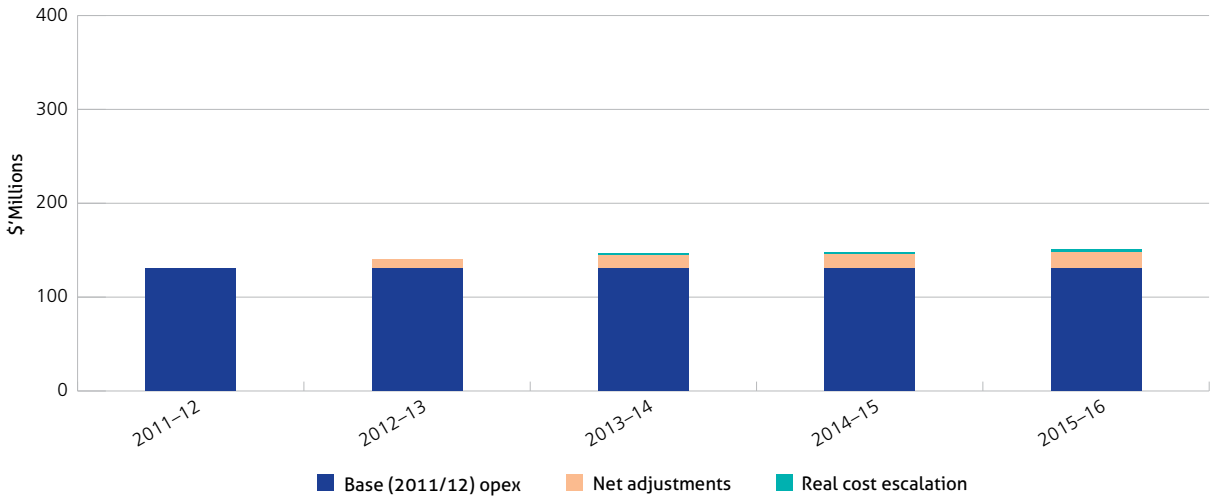
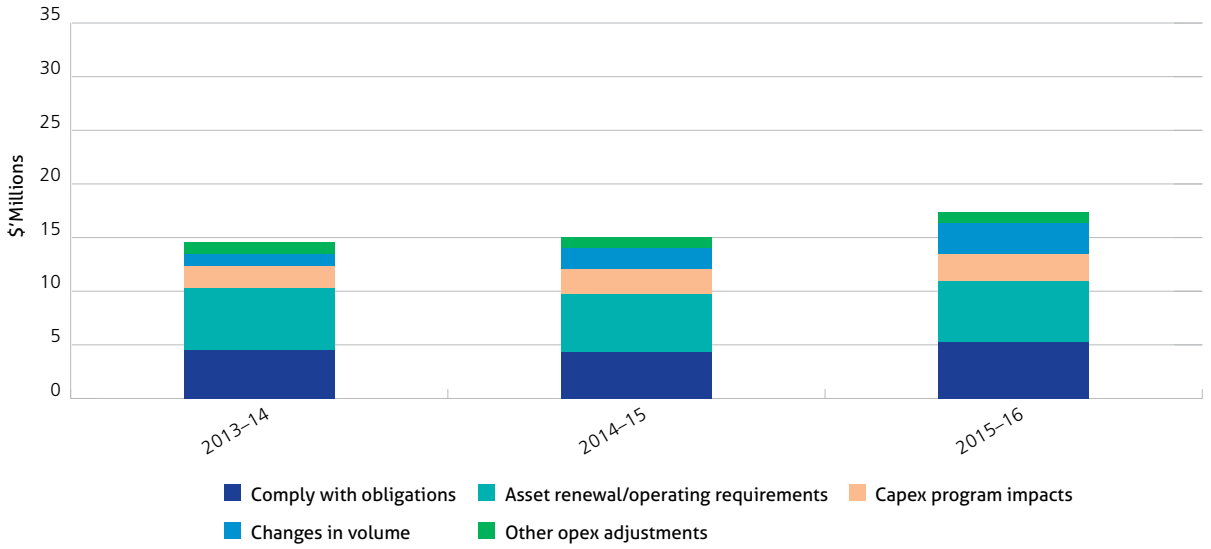


Table 7–9: Proposed operating expenditure (direct control sewerage services)

	2013–14	2014–15	2015–16
Base (2011–12) opex	130.4	130.4	130.4
Net adjustments	14.5	15.1	17.4
Real cost escalation	1.4	2.2	3.2
Total	**146.4**	**147.7**	**151.0**

Real, March 2012 Millions excluding real cost escalation

Figure 7–11: Net adjustments to operating expenditure (direct control sewerage services, excluding real cost escalation) (real, March 2012)



The net adjustments to base year expenditure shown in Figure 7–10 and Table 7–9 are further detailed in Figure 7–11 according to the driver for the adjustment, and in the sub-sections that follow.

7.6.1. Net adjustments driven by the need to comply with obligations

Table 7–10 shows that SA Water proposes a net increase in operating expenditure driven by the need to comply with various obligations during the forthcoming regulatory control period. As noted earlier, the most significant of these obligations relates to carbon pricing of fugitive emissions from the largest of SA Water's wastewater treatment facilities (Bolivar) and costs passed on by our suppliers for carbon-intensive goods and services, particularly pass-through costs on electricity. Other obligations contributing to the increase shown in Table 7–10 include changes to the Superannuation Guarantee Rate, and various initiatives proposed by SA Water to ensure that it complies with obligations relating to public risk and occupational health and safety.

The most significant factor driving the net increase in operating expenditure relative to the 2011–12 base year relates to the introduction of carbon pricing of fugitive emissions from SA Water's largest wastewater treatment facility (Bolivar).

Table 7–10: Net adjustments to operating expenditure driven by the need to comply with obligations (direct control sewerage services)

	2013–14	2014–15	2015–16
Net adjustment	4.5	4.3	5.3

Real, March 2012 Millions excluding real cost escalation

Table 7–11: Net adjustments to operating expenditure driven by asset renewal/operating requirements (direct control sewerage services)

	2013–14	2014–15	2015–16
Net adjustment	5.8	5.4	5.6

Real, March 2012 Millions excluding real cost escalation

Table 7–12: Net adjustments to operating expenditure driven by capital investment (direct control sewerage services)

	2013–14	2014–15	2015–16
Net adjustment	2.0	2.4	2.6

Real, March 2012 Millions excluding real cost escalation

7.6.2. Net adjustments driven by asset renewal/operating requirements

Table 7–11 shows that SA Water proposes a net increase in operating expenditure driven by asset renewal and operating requirements during the forthcoming regulatory control period. A significant component of this increase relates to maintenance work required on the primary sedimentation tanks at the largest of SA Water's wastewater treatment plants (Bolivar), and involves replacement of chains on the scrapers installed in these tanks.

Other significant components of the net increase shown in Table 7–11 relate to SA Water's plans to further extend and develop its work in the area of quantitative, data-rich asset management decision-making (also noted previously in relation to SA Water's direct control water services), and additional costs required for the operation and maintenance of SA Water's wastewater infrastructure.

7.6.3. Net adjustments driven by capex program impacts

Table 7–12 shows that SA Water proposes a net increase in operating expenditure driven by capital investment during the forthcoming regulatory control period. A significant component of this increase stems from major upgrades to the Bird-in-Hand and Aldinga wastewater treatment plants which have increased the operating and maintenance costs of these plants.

As was noted previously in relation to direct control water services, the increase shown in Table 7–12 also reflects adjustments to operating expenditure which are influenced by capital investment in information systems. These investments include upgrades and replacements of existing systems, implementation of new systems and purchase of additional software licences.

7.6.4. Net adjustments driven by changes in wastewater volume

Table 7–13 shows that SA Water proposes an increase in operating expenditure driven by changes in wastewater volume during the forthcoming regulatory control period. Chapter 5 of this Proposal (Demand Forecasts) details the key drivers of wastewater volume at SA Water's wastewater treatment plants, including new connections due to population growth, and infiltration of groundwater and stormwater runoff into the wastewater network. Chapter 5 of this Proposal also describes the disconnected nature of SA Water's wastewater networks, and the fact that localised factors influencing wastewater volume and quality can vary significantly in different drainage areas.

The adjustments to operating expenditure shown in Table 7–13 reflect SA Water's assessment of these localised factors, and the resultant change in wastewater volume and quality at its wastewater treatment plants. The most significant change in operating costs arising from this assessment relates to electricity use at wastewater treatment plants, and wastewater pump stations situated throughout each wastewater catchment.

Electricity price increases across the forthcoming regulatory control period have been driven by escalating network service charges and stepped increases in mandated Renewable Energy Target charges. SA Water has a long history of generating electricity from cogeneration at wastewater treatment plants with the first plants operational from the 1960's. Electricity produced in this manner is used to operate SA Water's treatment plants, and minimises electricity consumption from the national electricity system. Cogeneration coupled with SA Water's continual focus on energy use optimisation ensures that impacts of price increases are minimised.

7.6.5. Other adjustments to operating expenditure

Table 7–14 shows that SA Water proposes a net increase to operating expenditure driven by other factors during the forthcoming regulatory control period. This increase is almost identical to the increase proposed in relation to SA Water's direct control water service, and largely comprises the same list of adjustments – these adjustments applying to both water and sewerage services.

A key difference between the adjustments for water and sewerage services, however, is an adjustment relating to a decision made by SA Water to take over operation and maintenance

Table 7–13: Net adjustments to operating expenditure driven by changes in wastewater volume (direct control sewerage services)

	2013–14	2014–15	2015–16
Net adjustment	1.2	1.9	2.8

Real, March 2012 Millions excluding real cost escalation

Table 7–14: Adjustments to operating expenditure driven by other factors (direct control sewerage services)

	2013–14	2014–15	2015–16
Net adjustment	1.1	1.0	1.1

Real, March 2012 Millions excluding real cost escalation

of 10 water treatment plants along the River Murray. This adjustment relates solely to delivery of direct control water services, and leads to lower operating expenditure – offsetting other adjustments which lead to higher operating expenditure for direct control water services.

The adjustments contributing to the increase in operating expenditure in relation to direct control sewerage services include:

- Consolidation of SA Water offices within the Adelaide Central Business District to fewer sites;
- A number of various technical training initiatives; and
- Additional resources to support "hardship" customers and customer research programs.

7.7. Operating expenditure associated with the ADP

The Guidance Paper issued by ESCOSA in relation to development of this Proposal specifies that costs associated with the ADP are to be reported separately to other water services costs[147]. Consistent with this requirement, this sub-section of the Proposal details the adjustments to SA Water's operating expenditure during the forthcoming regulatory control period required to operate the ADP.

The ADP is a large seawater desalination plant employing reverse osmosis technology that is under construction at Port Stanvac, south of Adelaide, with stages entering their commissioning phase. The ADP will be used in conjunction with a range of other measures to secure long-term and climate independent sustainable water supplies for South Australia.

Once commissioned, the ADP will be capable of producing 100GL of water per annum – sufficient to fulfil approximately 50% of metropolitan Adelaide's current water requirements.

7.7.1. Procurement of the ADP

From early 2007, the State government began considering the requirement for desalination as a source of water. In late 2007, KPMG provided advice on the possible procurement options for a desalination plant for Adelaide. In 2008, the State progressed further on these options, settling on a preferred site for the plant (Port Stanvac), the body to deliver the project (SA Water), and began considering the preferred contracting model for the project – eventually settled as a Design Build Operate and Maintain (DBOM) model.

The procurement and contracting process for the ADP was overseen by an intergovernmental Steering Committee established under the SA Water Board.

In February 2009 the State government signed the contract to design and construct the ADP with the preferred bidder, a consortium called Adelaide Aqua, formed as a joint venture between Acciona Agua, McConnell Dowell and Abigroup. Operation and maintenance of the ADP will be performed by a joint venture between Acciona Agua and Trility.

The Commonwealth Government contributed $328M to the capital cost of the ADP as part of a National Partnership Agreement, and requires SA Water to "source 100 per cent of [the ADP's] energy needs from renewable sources or fully offset the carbon impact of the ADP over the life of the asset".[148]

The operating expenditure proposed by SA Water in relation to the ADP has been independently reviewed by external experts concluding that it is prudent for SA Water to operate the plant in the various operating modes it has proposed, and that the costs forecast by SA Water are reasonable for an asset of this type.

147 ESCOSA, Review of SA Water's Prices: 2013/14 –2015/16 Guidance Paper, July 2012, p.15.
148 South Australian and Commonwealth Governments, *National Partnership Agreement on Water Future: Implementation Plan for Augmentation of the Adelaide Desalination Plant (100 gigalitres per annum)*, p.3.

In September 2009, energy contracts were signed between SA Water and AGL for the provision of electricity generated from renewable sources to the ADP.

As noted earlier in this chapter, SA Water engaged consultants Ernst & Young to review the commercial efficiency of procurement and contracting delivery associated with the ADP operations and maintenance contract (including the ADP energy contract). Ernst & Young's findings (detailed in Attachment G.1 to this Proposal) include that:

- The process was consistent with market practice for similar infrastructure projects;
- The contract terms allocate risk consistent with market practice for similar infrastructure projects;
- The contracts incorporate flexibility to manage demand depending on plant utilisation and allow for termination at reduced cost at years 10 and 15; and
- The prices were competitively bid and independently benchmarked.[149]

7.7.2. Adjustments to operating expenditure associated with the ADP

Table 7–15 shows that SA Water proposes to increase net operating expenditure associated with the ADP during the forthcoming regulatory control period, albeit with a declining profile of annual adjustments. The net increase in operating expenditure proposed by SA Water reflects the fact that the ADP will transition during the forthcoming regulatory control period from its construction phase into its operation and maintenance phase, undergoing a series of tests during a "proving period" between these phases.

The adjustments shown in Table 7–15 comprise:

- **Direct, SA Water costs:** including costs associated with management of the ADP operation and maintenance contract, and operation and maintenance of communications and other IT systems;
- **Transfer pump station costs:** including costs associated with operation and maintenance of the transfer pump station and associated pipelines connecting the ADP to the water distribution network – assets which will be operated and maintained by AllWater on behalf of SA Water, and which are not included in the ADP operation and maintenance contract;
- **Payments to the Operator:** under the terms of the ADP operation and maintenance contract, payments will be due to the Operator on a monthly basis, including fixed and variable components; and
- **Energy costs:** including electricity network connection fees, charges for electricity consumed in operation of the ADP, including the TPS, and the cost of Renewable Energy Certificates (REC's) to offset the carbon impact of the ADP, thereby satisfying the requirement contained within the National Partnership Agreement that SA Water "source 100 per cent of [the ADP's] energy needs from renewable sources or fully offset the carbon impact of the ADP over the life of the asset".[150]

Table 7–15: Net adjustments to operating expenditure associated with the ADP

	2013–14	2014–15	2015–16
Net adjustment	49.7	28.6	12.9

Real, March 2012 Millions excluding real cost escalation

149 Ernst & Young, Review of Major Contracts for Regulatory Purposes, 9 August 2012, p. 18
150 South Australian and Commonwealth Governments, *National Partnership Agreement on Water Future: Implementation Plan for Augmentation of the Adelaide Desalination Plant (100 gigalitres per annum)*, p.3.

In forecasting the operating expenditure associated with the ADP during the forthcoming regulatory control period SA Water has made the following key assumptions:

- The proving period of the ADP will commence in January 2013;
- A two year proving period will be required; and
- The ADP will not be required to produce water following the two year proving period (from January 2015), through to the end of the forthcoming regulatory control period.

As noted earlier in this chapter, these assumptions are supplemented by a specific pass through event nominated by SA Water in chapter 8 of this Proposal (Pass Through Events).

Although SA Water has assumed that the ADP will not be required to produce water from January 2015 to July 2016, operating and maintenance costs associated with the plant will persist, including costs associated with:

- Cleaning and chemical preservation of membranes;
- Regular operation of mechanical equipment to prevent seizing of rotating components such as pumps, conveyors and mixers;
- Exercising of valves and penstocks;
- Purging of seawater, brine and chemicals;
- Removal of moisture build-up to ensure electrical equipment is not damaged; and
- Annual capacity tests.

7.7.3. Prudence and efficiency of ADP operating expenditure

In addition to the Ernst & Young review of the ADP operations and maintenance contract and energy contract from a commercial perspective (described earlier), SA Water engaged consultants SKM to conduct an independent technical, engineering-based assessment of the prudence and efficiency of the ADP operating expenditure proposed for the forthcoming regulatory period. This involved review of the operating expenditure proposed during, and after the proving period. SKM's report is provided as Attachment G.3 (SKM Report – ADP).

In relation to operation of the ADP during the proving period, SKM observes that "no relevant best practice documents (either national or international) are available for use as a guideline for the operation of the ADP"[151]. Later in their report, SKM state that "...the precedent from both the Gold Coast and Sydney desalination plants is to conduct a two year proving period"[152]. In this context, SKM conclude that:

- It is prudent for SA Water to perform the various tests which it intends to perform during the proving period, as these tests are required to satisfy requirements specified within the relevant contractual documents;
- It is prudent for SA Water to operate the plant during the proving period in the various operating modes proposed by SA Water; and
- It is prudent for SA Water to operate the plant for at least 12 of the 24 months which constitute the proving period, as this is necessary to comply with the monitoring obligations imposed by the EPA's licence for the ADP[153].

With respect to the efficiency of the ADP operating expenditure forecast proposed by SA Water, SKM conclude that:

- The costs forecast by SA Water are "... reasonable for an asset of this type"; and
- It may be possible to achieve all of the requirements of the proving period in less than the proposed 24 months, but that there are risks associated with such a move[154]. Furthermore, SKM note recent precedents of 24 month testing periods undertaken at the Gold Coast and Sydney desalination plants.

151 SKM, Independent Review of ADP Operating Costs to the end of FY2015/16, Rev 2, 14 June 2012, p. 30.
152 Ibid, p. 34.
153 Ibid, p. 41.
154 Ibid, p. 42

In relation to operation of the ADP after the proving period, SKM notes that "extended shutdowns are not normal for overseas seawater reverse osmosis desalination plants such as the ADP, which are baseload plants rather than drought response plants...".[155] Following this statement, SKM proceeds to describe the complex procedures involved in placing a large desalination plant such as the ADP in standby mode and the significant maintenance requirements that persist even while the plant is in standby mode.

In this context, and assuming that water supply from cheaper alternative sources is sufficient to meet demand, SKM concludes that it is prudent for SA Water to continue to operate the ADP if "...the payments due to the Operator whilst the plant is in a preserved mode exceed those payments due to the Operator whilst the ADP is in a minimum production mode"[156] (that is, if it is cheaper to operate the ADP than to have it on standby). By inference, SKM therefore considers that it is prudent for SA Water to shut down the ADP if the cost of having it on standby plus the costs of supplying water from other water sources is less than the costs to operate the ADP. As noted earlier, SA Water has assumed that the ADP will not be required to produce water following the two year proving period, through to the end of the forthcoming regulatory control period.

With respect to the efficiency of the ADP operating expenditure forecast proposed by SA Water, SKM concludes that the costs forecast by SA Water are "...reasonable for an asset of this type"[157].

The ADP will enable SA Water to reduce the volume of water to be pumped from the River Murray and treated at its conventional water treatment plants during the forthcoming regulatory control period – which SA Water has taken into account in development of its operating expenditure forecast.

7.8. Interaction of the capital and operating expenditure forecasts

In undertaking decisions concerning the prudent and efficient expenditure required to provide services to customers, it is necessary to consider the potential for trade-off of capital and operating expenditure. In developing this Proposal SA Water has given consideration to the relative costs, benefits, and risk characteristics of the options by which it can deliver direct control services. SA Water considers that the options it has selected, be they capital or operating in nature, are the most prudent and efficient of the alternatives available. Further, where capital expenditure solutions have been selected, SA Water has given consideration to the operating expenditure implications and has addressed these in its operating expenditure forecast, particularly with respect to:

- Investment in new systems, processes, plant and equipment;
- Ageing of assets; and
- Purchase versus lease of new equipment or facilities.

7.8.1. Investment in new systems, processes, plant and equipment

In recent years, the bulk of SA Water's investment in new systems, processes, plant and equipment has been driven by factors other than asset renewal or refurbishment requirements – meaning that the capital investment has generally resulted in additional assets to be operated and maintained, as opposed to the replacement or refurbishment of existing assets.

Nonetheless, SA Water has reviewed its recent and proposed investment in new systems, process,

155 SKM, *Independent Review of ADP Operating Costs to the end of FY2015/16*, Rev 2, 14 June 2012, p. 33
156 Ibid, p. 27.
157 Ibid, p. 41.

plant and equipment and identified circumstances where it will be possible to reduce the operation and maintenance costs of existing assets as a result of capital investment. This is particularly true with respect to investment in the ADP, which will enable SA Water to reduce the volume of water to be pumped from the River Murray and treated at its conventional water treatment plants during the forthcoming regulatory control period (while the ADP is undergoing its commissioning and proving tests, and producing a significant volume of water in the process).

Similarly, the NSIS, will enable the metropolitan water supply areas to be altered to distribute water across the entire metropolitan water network. This flexibility and control provides several benefits including options to shut down selected water treatment plants during low demand periods, maximise production volumes from the lowest cost plants and options to select the optimum raw water source given water quality and availability constraints. These optimisation capabilities have been reflected in the production plans relied upon by SA Water in developing the operating expenditure forecast.

Additionally, investment in new systems, processes, plant and equipment can introduce significant network constraints while assets are taken out of service to facilitate capital works. Such constraints can, in turn, materially influence operating expenditure. This is especially true where major, multi-year projects impact key assets. Such constraints are considered by the "water balance model" relied upon by SA Water to develop production plans for SA Water's metropolitan water treatment plans and the ADP, as well as water transfer and pumping plans. The output from this model has been relied upon by SA Water in development of its operating expenditure forecast.

7.8.2. Ageing of assets

As assets age, their condition deteriorates and maintenance costs generally increase, as does their risk of failure – necessitating that SA Water evaluate whether it is more prudent and efficient to replace these assets, thereby incurring capital expenditure. Where a decision is made not to implement a capital solution, this typically gives rise to additional operating expenditure associated with more frequent and extensive condition assessments, and additional maintenance costs.

In developing its capital and operating expenditure forecasts, SA Water has given consideration to the age and condition of its water and wastewater assets (including IT, Fleet and Property assets). SA Water considers that the capital and operating expenditure presented in this Proposal represents the optimal mix of capital asset replacement and enhanced condition monitoring by which cost and risk are balanced.

7.8.3. Purchase versus lease of new equipment and facilities

SA Water has given consideration to whether it is prudent and efficient to purchase new equipment and facilities, or alternatively whether the option of leasing (and thereby incurring higher operating expenditure) is more appropriate. SA Water undertakes a financial management processes requiring a financial evaluation based on discounted cash flow analysis to be performed whenever expenditure is proposed and there are competing options available with respect to financing. As a result of these analyses SA Water has determined that it is prudent and efficient to purchase the majority of its vehicles, heavy equipment, property, and IT assets – albeit with some notable exceptions relating to office facilities in the Adelaide central business district.

Chapter 8

Pass Through Events

Key points

- Regulated entities can face costs that are not foreseeable, beyond their control, or not possible to estimate accurately at the time of developing a regulatory business proposal. Pass through event mechanisms are designed to address such uncertainties.
- Pass through mechanisms mitigate the risks associated with the financial impact of events that cannot be foreseen or accurately quantified, and inclusion of costs associated with such events within a revenue allowance prior to their occurrence. This in-turn benefits customers in terms of prices, and enables the regulated entity to be compensated for the efficient costs of such events if and when they occur.
- SA Water has been guided by pass through criteria previously applied by ESCOSA, and proposes general pass through events to address changes in taxes, services standards, and other regulatory changes. SA Water also proposes general pass through events to address the possibility that it could be exposed to extraordinary events during the course of its operations, or be required to deliver previously unforeseeable major projects.
- SA Water proposes specific pass through events to address the risk that it may be required to change the operating mode of the ADP following its commissioning and proving period, and the risk that it may be required to incur significant additional costs in relation to its management of water licences.

8.1. Uncertainty in a regulatory context

ESCOSA's Final Advice considers that independent price regulation of the water sector can facilitate greater economic efficiency by:

- *Providing independent scrutiny over the costs of service delivery, to help minimise inefficient expenditure;*
- *Providing greater confidence and certainty to consumers and investors in the industry (including potential new entrants), that pricing decisions will be made subject to clear economic objectives and by providing greater transparency in the decision-making process;*
- *Addressing, in a transparent manner, any situations where revenues are insufficient to meet efficient costs, which may result in inefficient consumption decisions or threaten the ongoing viability of operations; and*
- *Ensuring that prices and price structure reflect efficient costs and provide appropriate price signals to both consumers and investors*[158].

This approach to pricing works well for costs that are within the influence or control of the regulated entity, however there are certain costs that are either beyond the control of the regulated entity, or not possible to estimate accurately at the time of developing a regulatory business proposal. Furthermore, events may arise that have material cost implications, but were not foreseeable at the time of submission.

Pass through event mechanisms are designed to address such uncertainties.

158 ESCOSA, Economic Regulation of the South Australian Water Industry, Final Advice, June 2012, p. 2.

Regulated entities can face costs that are not foreseeable, beyond their control, or not possible to estimate accurately at the time of developing a regulatory business proposal. Pass through event mechanisms are designed to address such uncertainties.

ESCOSA's Statement of Approach indicates its intention to apply pass through events for *"the passing through of specified exogenous cost items which, while identifiable in nature, are not able to be positively determined in terms of quantum at the time of making its final determination"*[159]. The Statement of Approach does not provide specific details with respect to pass through arrangements, stating that these will be assessed/defined as part of the determination of SA water's revenue requirements.

It should be noted that pass thought events can result in decreases as well as increases in the allowable costs of delivery of services to customers. These are commonly referred to as negative or positive pass through events.

This chapter describes:

- The nature and purpose of pass through events in more detail;
- The pass through events nominated by SA Water to apply during the forthcoming regulatory control period; and
- The "pass through process" proposed by SA Water.

8.2. Overview of proposed pass through events

SA Water proposes pass through events and their categorisation as follows:

General pass through events

- Change in taxes events;
- Service standards events;
- Regulatory change events;
- Extraordinary events; and
- Major projects events.

Specific pass through events

- Operation of the ADP; and
- Management of water licences.

8.3. Nature and purpose of pass through events

Pass through events are designed to address the variance to costs resulting from events that are either unforeseen, or cannot be quantified, at the time of developing a regulatory business proposal.

Allowing such events to be dealt with via pass through arrangements removes the risks associated with estimating their timing and financial impact, and the need to include costs associated with such events within this Proposal. This has a beneficial impact to customers in terms of prices, and enables SA Water to be compensated for the efficient cost associated with such events at an appropriate time.

SA Water notes the precedent adopted by ESCOSA in relation to its 2005–2010 Electricity Distribution Pricing Determination for ETSA Utilities. In that determination, ESCOSA notes in its Statement of Reasons the benefit of a pass through mechanism to consumers:

> *"... if the Commission did not treat these events as pass-throughs (with costs only to be passed-through to consumers if they are incurred), it would have needed to make some provision in the ETSA Utilities allowable costs and hence increased the distribution charges. Consumers' interests are best protected by paying for such events when they occur, rather than in anticipation of the event."*[160]

159 ESCOSA, Economic Regulation of SA Water's Revenues, Statement of Approach, July 2012, p. 28.
160 ESCOSA, 2005 – 2010 Electricity Pricing Determination, Part A – Statement of Reasons, April 2005, p. 196.

Pass through mechanisms mitigate the risks associated with the financial impact of events that cannot be foreseen or accurately quantified, and inclusion of costs associated with such events within a revenue allowance prior to their occurrence. This in-turn benefits customers in terms of prices, and enables the regulated entity to be compensated for the efficient costs of such events if and when they occur.

The Statement of Reasons also outlines that an important role of pass though events is to ensure that a utility is neither advantaged or disadvantaged through such events, noting that:

> *"...the pass-though mechanism allows for the imposition of an 'add-on' amount to tariffs, such that customers will either pay more (under a positive pass-through) or less (under a negative pass-through) for prescribed distribution services than would otherwise be the case. In other words, the financial impact of the defined unforeseen event on ETSA Utilities is required, under the EPO's regulated pass-through mechanism, to be 'economically neutral': it is to be no better or worse off due to the occurrence of that event."*[161]

SA Water proposes that a similar philosophy and approach to pass through events be applied with respect to regulation of its water and sewerage retail services.

8.4. Proposed pass through events

In the absence of specific guidance with respect to pass through event criteria, SA Water has identified those events which it considers are appropriate to be dealt with through such arrangements, giving regard to the criteria previously applied by ESCOSA for electricity price regulation.

The pass through events proposed by SA Water are addressed in two categories:

- **General pass through events** (to address unforseen events); and
- **Specific pass through events** (specific events where the cost or timing of the events cannot be determined at the time of developing this Proposal).

8.4.1. General pass through events

Within its Final Determination for the 2005–2010 Electricity Distribution Price Determination[162], ESCOSA identified the following general pass through events:

- Change in taxes events;
- Service standards events;
- Regulatory reset events;
- Extraordinary events; and
- Major projects events.

SA Water considers that these general pass through events are directly applicable to itself, and therefore proposes the following general pass through events:

- **Change in taxes events;**
- **Service standards events;**
- **Regulatory change events;**
- **Extraordinary events; and**
- **Major projects events.**

The only variation to the events previously adopted by ESCOSA is the replacement of "regulatory reset events", with "regulatory change events". The nature and purpose of each of these events as proposed by SA Water is described in detail in the following sub-sections.

161 ESCOSA, 2005 – 2010 Electricity Pricing Determination, Part A – Statement of Reasons, April 2005, p. 195.
162 ESCOSA , 2005 – 2010 Electricity Distribution Price Determination, Part B – Price Determination, p. 19.

SA Water has been guided by pass through criteria previously applied by ESCOSA, and proposes general pass through events to address changes in taxes, services standards, and other regulatory changes. SA Water also proposes general pass through events to address the possibility that it could be exposed to extraordinary events during the course of its operations, or be required to deliver previously unforeseeable major projects.

Change in taxes events

SA Water proposes that change in taxes events be defined in accordance with the definition previously adopted by ESCOSA, being:

- *A change in (or change in application or official interpretation of) a relevant tax or the way in which a relevant tax is calculated;*
- *The removal of a relevant tax; or*
- *The imposition of a relevant tax.*[163]

ESCOSA further defined a "relevant tax" as:

> *"...any tax imposed by or payable directly or indirectly to any Authority of the Commonwealth of Australia or Authority in the State of South Australia, (including a goods and services tax) and any fees and charges paid or payable to the Commission for licences under the Act, or any other membership, contributory or other charge payable to other regulatory bodies in the electricity industry, but excluding any:*
>
> *a) income tax (or State equivalent income tax), fringe benefits tax or capital gains tax;*
> *b) payroll tax;*
> *c) land tax or any other tax on the ownership or occupancy of premises;*
> *d) customs and import duties;*
> *e) municipal rates, taxes and other charges imposed by local authorities;*
> *f) stamp duty, financial institutions duty, bank accounts debits tax or similar taxes and duties;*
> *g) penalties and interest for late payments relating to any tax; or*
> *h) any tax that replaces any of the taxes referred to in (a) to (g)."*[164]

Pass through events are designed to address uncertainty and issues outside of the control of the regulated entity, and SA Water considers that any change in tax would meet this criteria – including changes to those taxes previously listed as exclusions by ESCOSA. Accordingly, SA Water proposes that the definition of a "relevant tax" be:

> ***Any tax imposed by or payable directly or indirectly to any Authority of the Commonwealth of Australia or Authority in the State of South Australia, (including a goods and services tax) and any fees and charges paid or payable to the Commission for licences under the Act, or any other membership, contributory or other charge payable to other regulatory bodies.***

As with any pass through event, a change in taxes event would occur only if it had met all of the applicable criteria, including any materiality threshold. It should also be noted that pass through events address reduction in costs as well as increases.

SA Water considers that a materiality threshold is a more effective mechanism to establish whether a change in taxes event should be approved, rather than a list of exclusions within the definition of a relevant tax.

163 ESCOSA , 2005 – 2010 Electricity Distribution Price Determination, Part B – Price Determination, p. 30.
164 Ibid.

Service standards events

In its 2005–2010 Electricity Distribution Price Determination ESCOSA defined a "service standards event" as a decision by a regulator or any other authority:

a) *Imposing a set of minimum standards... in respect of prescribed...services that are different from the set of minimum standards imposed...in respect of prescribed...services at the commencement date;*
b) *Requiring...any activity as part of prescribed...services in addition to those activities required to be undertaken as part of prescribed...services as at the commencement date; or*
c) *Substantially varying the manner...required to undertake any activity forming part of prescribed...services as at the commencement date, as a result of which...materially higher or lower costs [are incurred] in providing prescribed...services than [would have been incurred] but for that event*[165].

SA Water considers that this definition is relevant to the water industry and proposes that a similar definition be adopted in its case.

Within its Final Advice, ESCOSA specifies draft service standards to be applied to SA Water during the forthcoming regulatory control period, but states that these service standards will be subject to further review. ESCOSA further indicates that the final service standards will be implemented via a revision to the Water Retail Code, and will become effective from 1 July 2013. The final service standards will not be specified prior to submission of this Proposal.

This arrangement serves to highlight the uncertainty facing SA Water with respect to the service standards that it will be required to meet during the forthcoming regulatory control period, and which it proposes be addressed as a service standards event.

In addition to the service standards applied by ESCOSA, SA Water is subject to water quality standards regulated by the Department of Health and Ageing.

SA Water proposes to limit the scope of the service standards event to the two above-mentioned classes of service standards. SA Water proposes that changes to other regulatory obligations, such as EPA discharge licences, be dealt with as regulatory change events.

In keeping with the definition previously applied by ESCOSA, SA Water proposes the following definition of a service standards event:

A service standards event means a decision made by ESCOSA or the Department of Health and Ageing that has the effect of:

a) Imposing a set of minimum standards on SA Water in respect of direct control services that are different from the set of minimum standards imposed on SA Water in respect of direct control services at the commencement date;
b) Requiring SA Water to undertake any activity as part of direct control services in addition to those activities required to be undertaken as part of direct control services as at the commencement date; or
c) Substantially varying the manner in which SA Water is required to undertake any activity forming part of direct control services as at the commencement date, as a result of which SA Water incurs materially higher or lower costs in providing direct control services than it would have incurred but for that event.

165 ESCOSA , 2005 – 2010 Electricity Distribution Price Determination, Part B – Price Determination, April 2005, p 30 – 31.

Regulatory change events

In addition to regulatory obligations imposed by ESCOSA and the Department of Health and Ageing, SA Water is subject to regulation by a number of other bodies who can similarly impose obligations upon SA Water. The primary areas to which these apply are:

- Environmental impact;
- Health and safety;
- Financial governance; and
- Customer complaints.

Additionally, the economic regulatory framework applicable to SA Water and the South Australian water industry is still in its infancy, with a number of significant reviews expected to be undertaken by ESCOSA on behalf of the Treasurer during the forthcoming regulatory control period. Specifically, a letter from the Treasurer to ESCOSA foreshadows a public inquiry to address the:

- *Merits of alternative price structures that benefit economic efficiency and water security;*
- *Costs and benefits of:*
  - *Reforming the SA Water customer relationship (i.e. Away from the landowner and property based charges);*
  - *Smart metering; and*
  - *Scarcity pricing*
- *An approach to implementing water supply charges based on the number and size of customers' meters; and*
- *Impact of state-wide pricing.*[166]

Changes introduced as a result of such an inquiry could have a significant impact on SA Water's costs, and may involve – among other things – significant changes to customer and billing systems.

Similarly, the pending release of an Adelaide Coastal Waters Quality Improvement Plan by the EPA in response to recommendations contained within a study undertaken by the CSIRO[167] will specify targets for, among other things, reduction of nutrients and suspended sediment in treated wastewater, and other discharges to coastal waters.

Based on current information, SA Water and the EPA have agreed an approach to managing discharges from metropolitan wastewater treatment plants for the forthcoming regulatory control period which involves:

- Optimisation of key processes;
- Ongoing exploration of reuse and other innovative opportunities; and
- Research and monitoring to inform design of an appropriate and cost-effective capital investment program to be implemented in subsequent regulatory control periods.

If, however, new information comes to light which suggests that a more rapid response to the findings of the CSIRO's study is required – or a novel, low-cost nutrient reduction opportunity arises – the EPA may seek to shorten timeframes for implementation of the Adelaide Coastal Waters Quality Improvement Plan. This could necessitate that SA Water incur capital or operating expenditure that is unforseeable, and thus not quantifiable at the time of submitting this Proposal.

Consistent with the approach taken by ESCOSA in previous regulatory pricing determinations, SA Water proposes that a regulatory change event be defined as:

> **Any change in legislation, imposed government policy or regulatory standard (not covered by the definition of a service standard event) as defined below:**
>
> ***The introduction of, amendment to, or revised interpretation of:***
>
> - ***Legislation;***
> - ***Ministerial direction under the Water Industry Act 2012 and the Initial Pricing Order;***

166 Letter from the Treasurer provided within ESCOSA, Economic Regulation of the South Australian Water Industry, Final Advice, June 2012, p. 95 – 96.
167 CSIRO, Adelaide Coastal Waters Study Final Report Volume 1 Summary of Study Findings, November 2007.

- ***Government policy;***
- ***Regulations, codes, licences, guidelines and associated instrumentation; and***
- ***Industry standards or guidelines (e.g. ANCOL guidelines for dam safety).***

Extraordinary events

The nature of SA Water's business is such that it is exposed to risk arising from extraordinary events during the course of its normal operations. By their very nature, such events are unforeseeable, unpredictable and thus not quantifiable. SA Water proposes to treat such events as pass through events, the costs of which are to be recovered upon occurrence. Examples of extraordinary events which could face SA Water during the forthcoming regulatory control period include, but are not limited to:

- Water quality incidents;
- Bushfires;
- Earthquakes;
- Floods;
- Terrorism; and
- Catastrophic failure of an asset.

In this context, SA Water proposes to adopt the definition of an extraordinary event provided by ESCOSA in its last determination of electricity distribution prices[168] – adjusted to reference SA Water and its retail services:

> ***Extraordinary event means a natural or unnatural event the occurrence of which was unpredictable, unforeseen, or if foreseen could not be reasonably guarded against, as at the commencement date and substantially beyond the reasonable control of SA Water, as a result of which SA Water incurs materially higher or lower costs in providing direct control services than it would have incurred but for that event.***

SA Water further proposes that in seeking such a pass through event, it would be required to take into account any payments received through insurance and other such means.

Major projects events

It is possible that SA Water will be required to deliver major projects during the forthcoming regulatory control period that were either unforeseeable or unquantifiable at the commencement of the regulatory period, and the timing of which is beyond SA Water's control. Examples of such projects include, but are not limited to:

- Provision of services for major developments or land subdivisions (e.g. Mount Barker sewerage system);
- Purchase of land as a cost-effective means of achieving catchment management, odour management or for the planned expansion of water and sewerage systems; and
- Third party works (i.e. the residual cost associated with the diversion of mains to accommodate new developments).

As part of the management of water and sewerage infrastructure SA Water is, from time to time, required to conduct works to its infrastructure at the request of third parties – typically the Department of Planning, Transport and Infrastructure (DPTI). A key element of third party works is the relocation of water and sewerage mains to facilitate the construction of developments and infrastructure (such as the diversion of a water main to accommodate the construction of a new road).

Although SA Water is compensated for these third party works, a cost sharing agreement[169] between DPTI and SA Water means that SA Water only recovers the cost of bringing forward replacement of its infrastructure, not the full cost of the works.

168 ESCOSA, 2005 – 2010 Electricity Distribution Price Determination, Part B – Price Determination, April 2005.
169 Memorandum of Administrative Arrangements for Sharing the Costs of Alterations to SA Water Infrastructure between the Commissioner of Highways and Rail and South Australian Water Corporation, December 2011.

SA Water considers that this cost sharing arrangement appropriately allocates costs to the third party. However, third party works can involve significant cost, with SA Water having very limited control over their scope or timing.

Within the 2005–2010 Electricity Distribution Price Determination, ESCOSA considered that these events should be treated as pass through events.

SA Water therefore proposes that costs associated with the delivery of major projects be treated as pass through events where the following criteria are met:

- **The costs are not included within the price determination for the period;**
- **The events were unforeseeable or unquantifiable at commencement of the regulatory period, or the timing is beyond SA Water's control; and**
- **The materiality threshold for pass through events is met.**

8.4.2. Specific pass through events

In addition to the general pass through events described above, SA Water proposes two pass through events where a specific risk to the business has been identified, but at the time of submitting this Proposal it has not been possible to quantify any financial impact of the risk. SA Water therefore considers that these risks are best dealt with via pass through arrangements.

Operation of the ADP

One of the key assumptions relied upon by SA Water in developing its operating expenditure forecast for the forthcoming regulatory control period (refer chapter 7 of this Proposal) is that SA Water will not be required to operate the ADP following the commissioning and performance proving period. Essentially, SA Water has assumed that it will be able to operate the plant in "stand by mode" from 1 January 2015 – a move equivalent to the *"water security shut down mode"* described by IPART in its Final Determination of Sydney Water Corporation's water prices[170].

SA Water further proposes specific pass through events to address the risk that it may be required to change the operating mode of the ADP following its commissioning and proving period, and the risk that it may be required to incur significant additional costs in relation to its management of water licences.

SA Water considers this to be a prudent and efficient assumption insofar as it cannot estimate the timing or circumstances that may require further operation of the ADP during the forthcoming regulatory control period. In particular, modelling undertaken by SA Water indicates that forecast demand for its retail water service during the forthcoming regulatory control period will be satisfied through water supplied from more cost effective sources.

In making this assumption, however, SA Water is exposed to the significant risk that it may prove necessary to recommission and operate the ADP during the regulatory control period, and incur significant costs which have not been allowed for in ESCOSA's determination.

Factors that could necessitate operation of the ADP beyond the commissioning phase include:

- A water quality incident in water supplies relied upon by SA Water;
- Failure or substantial change in condition of vital water supply infrastructure requiring it be removed from service; and
- A significant variance in the availability of water

170 IPART, Review of Prices for Sydney Water Corporation's water, sewerage, stormwater drainage and other services, Water – Final Report, June 2012.

supplies and/or demand compared to that which was forecast by SA Water at the time of development of this Proposal.

SA Water therefore proposes a specific pass through event defined as:

Any change to the operational mode of the ADP once the plant has been put in standby mode that meets the materiality threshold of pass through events.

SA Water notes that a similar approach to that proposed here is proposed by the Essential Services Commission of Victoria (ESCV) in relation to the Victorian Desalination Plant[171], and was recently applied by IPART in its Final Determination of Sydney Water Corporation's water price, in which IPART states:

> *"We consider it reasonable to set our prices on the basis that SDP is in water security shutdown mode for this period and to allow the costs of SDP being in a different operational mode to be passed through to customers in the next year of the Determination period."*[172]

Given nomination of such a pass through event, SA Water considers that it is appropriate for the "trigger" of such an event to be activated independently from SA Water.

Management of water licences

The River Murray is a key source of water for SA Water, representing between 40% and 90% of total water supply. The recent drought experienced across south eastern Australia necessitated purchase of additional licences at significant cost for extraction of water from the River Murray, and played a vital role in ensuring SA Water continued to meet water demand for critical human needs. These licences came in the form of both permanent and temporary licences.

Modelling undertaken by SA Water indicates that forecast demand for its direct control water service during the forthcoming regulatory control period will be satisfied through existing licences, and therefore SA Water has not incorporated any change in costs associated with the management of its water licences in this Proposal.

SA Water is therefore exposed to the risk that it could be required to incur additional costs associated with management of its water licences which have not been incorporated within ESCOSA's determination. Such an event is not foreseeable at the time of submitting this Proposal, and therefore can not be quantified. SA Water therefore proposes a specific pass through event defined as:

Any change in costs associated with the management of its water licences that meets the materiality threshold of pass through events.

SA Water notes that a similar approach to that proposed here was recently put forward by the ESCV in its guidance paper for the 2013 price review of water utilities. In consideration of the uncertainty in management of bulk water supplies, the ESCV suggests:

> *Options for managing uncertain variable bulk water costs at the retail level include:*
>
> - *pass through approach — passing variations in costs through to retail tariffs as they are incurred; or*
> - *smoothing approach — smoothing bulk price/cost variability, for example, over the regulatory period.*[173]

SA Water considers that the pass through approach described by the ESVC is better suited to the nature of the costs associated with management of SA Water's water licences.

171 ESCV, 2013 Water Price Review – Guidance on Water Plans, October 2011.
172 IPART, Review of Prices for Sydney Water Corporation's water, sewerage, stormwater drainage and other services, Water – Final Report, June 2012.
173 ESCV, 2013 Water Price Review – Guidance on Water Plans, October 2011.

8.4.3. Process

SA Water proposes that a process for pass through events be developed based on the approach taken by ESCOSA within its 2005–2010 Electricity Distribution Price Determination, whereby:

- SA Water submits a pass through application to ESCOSA, including a detailed estimate of the cost and timing of the event;
- ESCOSA considers the prudence and efficiency of the costs estimated by SA Water and makes a determination; and
- The impact of the change in revenue requirements is included within the annual tariff adjustment for the next regulatory year.

8.4.4. Materiality threshold

The pass through events proposed by SA Water could encompass events with very minor, or very significant materiality. Rather than deal with all such events through pass through arrangements, conventional regulatory practice involves the application of materiality thresholds to ensure the efficient operation of the pass through arrangements.

In previously determining materiality thresholds for pass through events, ESCOSA has indicated that:

> *"...the Commission considers that only those pass-through events which give rise to a material change in expenditures in a given regulatory year should properly become the subject of a pass through application...Such a threshold test will ensure efficiencies".* [174]

In relation to whether this threshold should be a defined percentage, ESCOSA noted that:

> *"Whilst it would be possible to establish a more specific test than a materiality test, for example, one expressed as a percentage change in either expenditure or average revenue allowances, the Commission has formed the view that it is more appropriate to retain the existing subjective test"*[175].

SA Water proposes that the same materiality threshold be applied to the pass through events described in this Proposal.

A summary of the definitions of the pass through events nominated by SA Water is provided in Table 8–1.

174 ESCOSA, 2005 – 2010 Electricity Pricing Determination, Part A – Statement of Reasons, April 2005.
175 Ibid.

Table 8–1: Summary of pass through events proposed by SA Water

Nominated pass through event	Proposed definition
Change in taxes events	Any tax imposed by or payable directly or indirectly to any Authority of the Commonwealth of Australia or Authority in the State of South Australia (including a goods and services tax) and any fees and charges paid or payable to the Commission for licences under the Act, or in any other membership, contributory or other charge payable to other regulatory bodies.
Service standards events	A decision made by ESCOSA or the Department of Health and Ageing that has the effect of: a) Imposing a set of minimum standards on SA Water in respect of direct control services that are different from the set of minimum standards imposed on SA Water in respect of direct control services at the commencement date; b) Requiring SA Water to undertake any activity as part of direct control services in addition to those activities required to be undertaken as part of direct control services as at the commencement date; or c) Substantially varying the manner in which SA Water is required to undertake any activity forming part of direct control services as at the commencement date, as a result of which SA Water incurs materially higher or lower costs in providing direct control services than it would have incurred but for that event.
Regulatory change events	Any change in legislation, imposed government policy or regulatory standard (not covered by the definition of a service standard event) as defined below: The introduction of, amendment to or revised interpretation of: • Legislation; • Ministerial direction under the *Water Industry Act 2012* and the Initial Pricing Order; • Government policy; • Regulations, codes, licences, guidelines and associated instrumentation; and • Industry standards or guidelines (e.g. ANCOL guidelines for dam safety).
Extraordinary events	Extraordinary event means a natural or unnatural event the occurrence of which was unpredictable, unforeseen, or if foreseen could not be reasonably guarded against, as at the commencement date and substantially beyond the reasonable control of SA Water, as a result of which SA Water incurs materially higher or lower costs in providing direct control services than it would have incurred but for that event.
Major projects events	Major projects event means where: • The costs are not included within the price determination for that period; • The events were unforeseeable or unquantifiable at commencement of the regulatory period, or the timing is beyond SA Water's control; and • The materiality threshold for pass through events is met.
Operation of the ADP	Any change to the operational mode of the ADP once the plant has been put in standby mode that meets the materiality threshold for pass through events.
Management of water licences	Any change in costs associated with the management of water licences that meets the materiality threshold for pass through events.

Chapter 9
Regulatory Finance

Key points

- This Proposal details the methodology by which SA Water proposes to classify and roll forward the value of its RAB, which will be specified initially by the Treasurer in a Pricing Order (prior to ESCOSA's final determination).
- SA Water proposes to commence depreciation of newly commissioned assets at the end of the year in which they are commissioned. Applying such an approach will result in deferral of some revenue by 6 months, but will be revenue neutral over time.
- The conventional approach of deriving WACC parameters through a 20 day average of market data does not reflect how a regulated business actually finances its activities, and does not adequately address the volatility observed in financial markets in recent years. SA Water proposes that an averaging period of 180 days be adopted instead.
- SA Water supports the use of a post-tax framework, and considers that it provides a better representation of the actual costs incurred by SA Water.
- The revenue model proposed by SA Water applies a nominal Vanilla WACC, and includes a specific expenditure allowance for income tax. This necessitates that SA Water estimate the cost of corporate income tax for each year of the forthcoming regulatory control period.
- The WACC parameters proposed by SA Water – derived by applying a 180 day averaging period – result in a nominal Vanilla WACC of 7.98% (5.57% in pre-tax real terms). SA Water anticipates that the WACC ultimately applied by ESCOSA will adopt different parameter values, reflecting market conditions in early-mid 2013.

9.1 Regulatory Asset Base (RAB)

9.1.1. Purpose of the RAB

The RAB is the aggregate of the assets required to provide direct control services, and is linked to two of the "building blocks" contained within the building block equations proposed by SA Water for calculation of allowable revenue (refer Chapter 10 – Revenue and Pricing), being:

- Return **on** assets (the value of the RAB multiplied by the regulatory rate of return (WACC)); and
- Return **of** assets (the depreciation associated with the RAB).

At the time of submitting this Proposal, the initial RAB to be applied by ESCOSA has not been established pursuant to the draft IPO which prescribes at Sub-section 4.1.7.1 that:

> *The determination must adopt the initial regulated asset base for SA Water as at 1 July 2013 to be specified by the Treasurer in a subsequent pricing order.*[176]

As the RAB will be specified by the Treasurer at a later date, this chapter does not specify how the initial RAB will be calculated, or the method by which any difference between the RAB and SA Water's accounting asset values will be apportioned into asset classes. This chapter does, however, propose:

176 Draft Pricing Order issued pursuant to S35 (4) of the Act by the Treasurer, attached to ESCOSA, Economic Regulation of SA Water's Revenues, Statement of Approach, July 2012.

This Proposal details the methodology by which SA Water proposes to classify and roll forward the value of its RAB, which will be specified initially by the Treasurer in a Pricing Order (prior to ESCOSA's final determination).

1. The asset classes that will comprise SA Water's RAB;
2. How the RAB should be rolled forward over the regulatory period;
3. How regulatory depreciation should be calculated;
4. The regulatory rate of return (WACC) to apply to the RAB; and
5. How regulatory income tax should be determined.

9.1.2. Regulatory requirements

The IPO states that ESCOSA must determine allowable revenue in compliance with the NWI and, by extension, the NWI's Pricing Principles. ESCOSA's Final Advice also states that it will develop a pricing principles framework consistent with NWI Pricing Principles[177].

Principle 5 of the NWI Pricing Principles is relevant for the purpose of rolling forward the value of the RAB and states that:

> *The RAB comprising prudent new investments and legacy investments should be rolled forward each year in accordance with the following formula, which can be expressed in nominal or real terms[i]:*
>
> $$RAB_t = RAB_{(t-1)} + Capex_t - Depreciation_t - Disposals_t$$
>
> *Where:*
>
> - *RAB ($) is the Regulated Asset Base;*
> - *t is the year under consideration;*
> - *Capex ($) is prudent capital expenditure;*
> - *Depreciation ($) is regulatory depreciation; and*
> - *Disposals ($) is disposals, sales and discarded assets.*
>
> *Where assets are optimised[ii], they should not be subject to further optimisation unless there are relevant changes in market circumstances.*
>
> *Where depreciated replacement cost (DRC) or depreciated optimised replacement cost (DORC) is used as a basis for asset values, the RAB comprising new investments and legacy investments should be re-valued through an independent appraisal on a rolling basis in accordance with Accounting Policy Standards.*
>
> *Notes:*
>
> *i. When applicable, CPI or other relevant indexation factor may be used.*
>
> *ii. The RAB should be adjusted for 'unplanned' excess capacity through optimisation (that is, delivery of an equivalent service that reflects least cost planning reflecting prudent engineering and technological advancements), where 'unplanned' excess capacity is capacity which is not the result of a planned level of utilisation.*

SA Water's proposed RAB classification, depreciation and roll forward methodologies have been developed to ensure compliance with these requirements.

9.1.3. Asset classes

In its Guidance Paper, ESCOSA recognised that a key factor in developing a detailed multi-year financial model of the RAB is to determine asset classes that directly align to SA Water's capital expenditure program[178]. The asset classes that will facilitate such alignment with SA Water's capital expenditure program, and which have been agreed with ESCOSA, are presented in Table 9–1 along with a brief description of the assets comprising each class.

177 ESCOSA, Economic Regulation of the South Australian Water Industry, Final Advice, June 2012, section 3.3.1.
178 ESCOSA, Review of SA Water's Prices: 2013/14 – 2015/16, Guidance Paper, February 2012, section 5.3.

Table 9–1: Asset classes for direct control water and sewerage services

Water asset class	Description of class
Water pipes	Major pipelines and all reticulation mains
Water – other	All water assets other than pipes and the ADP (i.e. filtration plants, pumping stations, tanks, reservoirs)
ADP	All assets comprising the ADP, including onsite pumping station and transfer pipelines
Water – corporate	Assets generally of an administrative nature – typically used in delivery of water and sewerage services and allocated on the basis of the aggregate value of non–corporate water assets
Work in progress	Assets under construction but not yet commissioned, allocated to water as per SA Water's capital expenditure program

Sewerage asset class	Description of class
Sewerage pipes	All sewerage pipes
Sewerage – other	All sewerage assets other than pipes (i.e. treatment plants, pumping stations)
Sewerage – corporate	Assets generally of an administrative in nature – typically used in delivery of water and sewerage services and allocated on the basis of the aggregate value of non-corporate sewerage assets
Work in progress	Assets under construction but not yet commissioned, allocated to sewerage as per SA Water's capital expenditure program

9.1.5. Roll forward methodology

In accordance with the IPO, the initial RAB to be applied by ESCOSA as at 1 July 2013 will be specified by the Treasurer following submission of this Proposal, but prior to ESCOSA's final determination. Because of this, it is not possible to present specific RAB values for each year of the regulatory period in this Proposal. It is possible, however, to describe the methodology proposed by SA Water for rolling forward of the RAB once the initial RAB value is specified by the Treasurer.

SA Water proposes to roll forward the value of each asset class each year based on the following formula:

$$RAB_t = RAB_{(t-1)} + Capex_t - Depreciation_t - Disposals_t + ADRA_t$$

Where:

- RAB ($) is the Regulated Asset Base;
- t is the year under consideration;
- $Capex$ ($) is prudent capital expenditure;
- $Depreciation$ ($) is regulatory depreciation;
- $Disposals$ ($) is disposals, sales and discarded assets; and
- $ADRA$ ($) is an allowance to compensate for delayed return on assets timing.

SA Water proposes that allowances for depreciation and return on assets should commence at the beginning of the year after commissioning. This is discussed further in Section 9.2 of this chapter.

SA Water further proposes that an allowance be included in the RAB roll forward calculation to compensate for the loss of revenue from the deferral of return on assets by 6 months. Such an allowance will result in the same revenue outcome for SA Water over time, but will defer the revenue requirement and thus impact on customers from the new capital expenditure.

The model proposed by SA Water to facilitate the roll forward calculation applies real, not nominal, values. The model therefore implicitly assumes that asset values will be escalated separately to reflect inflation.

9.2. Depreciation

9.2.1. Straight-line depreciation

ESCOSA's Guidance Paper indicates that it considers straight-line depreciation to be a reasonable approach to depreciating assets comprising the RAB[179].

SA Water applies straight-line depreciation as part of its financial accounting regime and proposes to apply straight-line depreciation of the assets comprising its RAB for the forthcoming regulatory control period, consistent with ESCOSA's preferred approach.

9.2.2. Timing

For accounting purposes, depreciation of individual assets commences after the asset has been commissioned. As this is applied on an asset-by-asset basis, depreciation is pro-rated across the year depending on the length of time left in the financial year after the asset is commissioned.

For regulatory purposes, however, assets will not be accounted for on an individual level, but at an asset class level – making it more difficult to precisely account for when the asset is commissioned, and when depreciation should commence.

SA Water proposes to commence depreciation of newly commissioned assets at the end of the year in which they are commissioned. Applying such an approach will result in deferral of some revenue by 6 months, but will be revenue neutral over time.

In determining when to commence depreciation of new capital expenditure, SA Water has given consideration to:

1. **The relevant year to commence depreciation:** whether to commence depreciation in the year the capital expenditure is incurred, or in the year the asset is commissioned; and
2. **The relevant point in the year to commence depreciation:** whether to assume assets are commissioned and depreciation commences in the middle of the year, or at the end of the year.

The relevant year to commence depreciation

In its Guidance Paper, ESCOSA has indicated that it considers assets should only incur depreciation once they are commissioned, rather than as the capital cost is incurred over the life of the project[180]. While the majority of projects undertaken by SA Water are completed within a year, a number of significant projects proposed for the forthcoming regulatory control period will be constructed over a number of years. For example, the Murray Bridge Wastewater Treatment Plant Upgrade, Kangaroo Creek Dam Safety Investigation, and Aldinga Wastewater Treatment Plant Capacity Upgrade will all be constructed over a number of years – in some cases, extending beyond the forthcoming regulatory control period.

SA Water separately identifies capital expenditure as incurred versus as commissioned, and therefore

179 ESCOSA, Review of SA Water's Prices: 2013/14 – 2015/16, Guidance Paper, February 2012, section 5.2.
180 Ibid. Section 5.2.

proposes that depreciation be applied once assets are commissioned – consistent with the view expressed by ESCOSA in its Guidance Paper.

This methodology will result in an ongoing WIP balance representing capital expenditure that has been incurred in relation to assets not yet commissioned. While depreciation is not applied on WIP, it is included in the calculation for return on assets. As a general rule, the value of WIP is normally minor compared to the total asset base, and represents a relatively consistent proportion of the total asset base from year-to-year. However, the extraordinary nature of SA Water's capital expenditure leading into the forthcoming regulatory control period (during which significant funds have been invested in the ADP and NSIS) means that this general rule will not apply for SA Water during the early part of the forthcoming regulatory control period. Consequently, SA Water, within its capital expenditure plan, forecasts the annual WIP balance which has been incorporated in the revenue model.

The relevant point in the year to commence depreciation

There are two methods generally applied to determine the timing for commencement of depreciation within a year, being:

- That all assets are commissioned on the last day of the financial year (and hence no depreciation is applied in the year of commissioning); or
- That all depreciation is based on the mid-point of the year (and hence half a year of depreciation is applied in the year of commissioning) – reflecting an assumption that commissioning of assets is distributed evenly during the course of any given year.

The main difference between the two outcomes is that the first method delays the influence of depreciation for commissioned assets by 6 months in the building block equation.

While regulators generally apply the mid-year method, the revenue model adopted by the AER – which has been used as the basis for the revenue model developed by SA Water – applies the end of year method. This is also the method that has been applied by the South Australian Government for water pricing decisions since 2004–05.

SA Water proposes to apply the end of year method for depreciation of newly commissioned assets, consistent with both past practice for SA Water and the AER revenue model used as the basis for the model developed by SA Water. Applying this method will result in a deferral of some revenue by 6 months, but will be revenue neutral over time.

9.2.3. Asset lives

In calculating depreciation, a depreciation rate (and asset value) is required for both existing and new assets.

The depreciation rate applied to existing assets (comprising the initial RAB) represents the average remaining useful life of existing assets.

The depreciation rate applied to new assets represents the average standard useful life of new assets.

Since Corporatisation in 1996, SA Water has adopted useful lives for accounting purposes that are endorsed by engineering principles, as required by the Department of Treasury and Finance's Accounting Policy Framework, and Australian Accounting Standards.

SA Water undertakes comprehensive annual reviews of these useful lives and comparisons with interstate utilities. Asset lives and associated depreciation are audited by the South Australian Auditor General each year. This process ensures that SA Water's accounting asset values and

associated depreciation rates remain current.

SA Water proposes that the remaining and standard asset lives used for financial accounting purposes will provide the best and most reliable representation of the remaining and standard useful lives to be applied in depreciation of the RAB.

Standard useful lives have been calculated based on the standard lives of the current stock of SA Water's assets.

Table 9–2 details the remaining life of existing assets, and the standard useful life of new assets proposed by SA Water.

9.3. Weighted Average Cost of Capital (WACC)

9.3.1. Regulatory requirements

The regulatory rate of return (also referred to as the "cost of capital") is a key input into the "building block" equation of a regulated business (refer to Chapter 10 for further discussion on the building block equations proposed by SA Water). The regulatory rate of return is a measure of the opportunity cost of investment in regulated assets, and is integral in ensuring that sufficient incentive exists for ongoing investment by the regulated business.

Table 9–2: Proposed useful lives (remaining and standard, as at 30 June 2012)

Water assets	Remaining life (years)	Standard useful life (years)
Water pipes	61.1	103.1
Water non pipes	32.8	64.3
ADP	54.8	55.9
Corporate	24.3	31.9
Water class – average	46.5	80.3

Sewerage assets	Remaining life (years)	Standard useful life (years)
Sewerage pipes	65.7	107.2
Sewerage non pipes	28.3	46.7
Corporate	24.3	31.9
Sewerage class – average	42.9	69.3

In October 2011 the Treasurer sought advice from ESCOSA on an appropriate regulatory rate of return to apply to SA Water's assets. The Treasurer requested this advice to assist in development of the IPO applicable to SA Water's direct control water and sewerage services for the forthcoming regulatory control period.

ESCOSA's Final Advice (publicly released on 27 January 2012[181]) was prepared following a period of consultation on its Draft Advice (publicly released on 6 December 2011).

SA Water notes that ESCOSA's determination of WACC in its Final Advice was prepared in accordance with Section 6 of the ESC Act, which specifies that ESCOSA should:

(a) *"have as its primary objective protection of the long term interests of South Australian consumers with respect to the price, quality and reliability of essential services; and*

(b) *at the same time, have regard to the need to:*

- *promote economic efficiency; and*
- *facilitate maintenance of the financial viability of regulated industries and the incentive for long term investment; and*
- *promote consistency in regulation with other jurisdictions"*[182]

Consistent with these requirements, the appropriate regulatory rate of return should be one that is representative of an efficient water supplier, and ensures that SA Water's prices reflect efficient financing costs.

The assumptions underpinning a calculation of the rate of return may therefore differ from SA Water's actual circumstances and financing arrangements. However, the assumptions in building the rate of return should always attempt to mimic the arrangements of an efficient private sector entity,

The conventional approach of deriving WACC parameters through a 20 day average of market data does not reflect how a regulated business actually finances its activities, does not adequately address the volatility observed in financial markets in recent years, and generates unintended financial viability issues for SA Water. SA Water proposes that an averaging period of 180 days be adopted instead.

SA Water supports the use of a post-tax framework, and considers that it provides a better representation of the actual costs incurred by SA Water. SA Water proposes application of the AER post-tax revenue model which applies a Vanilla WACC to the RAB and calculates SA Water's estimated regulatory income tax cash flows.

and should change as the general structures and financial arrangements of the benchmark entities change.

9.3.2. Methodology for determining WACC

WACC calculation methodology and the revenue model

The Treasurer initially requested that ESCOSA's approach to revenue modelling should be in the form of a pre-tax real WACC. However, the IPO subsequently issued by the Treasurer did not specify whether a pre- or post-tax WACC is to be applied by ESCOSA in its determination.

SA Water supports the use of a post-tax framework as it recognises the tax position of the regulated entity based on a forecast of the actual tax

181 ESCOSA, Advice on a Regulatory Rate of Return for SA Water, Final Advice, February 2012, p. vi.
182 *Essential Services Commission Act 2002 (SA)*, section 6.

depreciation profile for the RAB, rather than embedding the corporate tax rate (currently 30%) on an economic depreciation profile. SA Water therefore considers that a post-tax framework provides a better representation of the actual costs incurred by SA Water over the forecast period.

ESCOSA's Final WACC Advice[183] presented an indicative calculation of a post-tax WACC, which applied the standard corporate tax rate (30%), rather than SA Water's actual effective tax rate – a WACC outcome that does not reflect the fact that SA Water's effective regulatory tax rate will be lower than the corporate tax rate. The actual effective tax rate for most businesses (including SA Water) is generally lower than the standard corporate tax rate, due to the impact of accelerated depreciation that is allowed for tax purposes, whereby the Australian Tax Office allows assets to be depreciated for tax purposes over a shorter period than the actual useful (or economic) life of the asset.

In its Guidance Paper, ESCOSA specified that a post-tax real WACC should be considered, consistent with a recent regulatory decision interstate[184].

SA Water considers that in adopting a post-tax framework a publicly available, well-established, transparent and thoroughly-tested regulatory revenue model should be used. The most widely used publicly available post-tax revenue model is used by the AER and has been adopted by SA Water for development of its revenue model.

The AER model applies a nominal Vanilla WACC in its approach, rather than a real post-tax WACC. A Vanilla WACC is a simple combination of the costs of debt and equity and excludes the impact of corporate income tax and imputation credits. An estimation of SA Water's regulatory income tax payments are then included in the cash flows of the pricing model, rather than being included in the WACC (as would be required in a pre-tax approach). Applying a real post-tax WACC, as proposed by ESCOSA, would necessitate development of a new model by SA Water at considerable cost, and may prove less reliable due to the fact that it has not undergone the same degree of testing as the AER model (which has been refined during the course of its application in numerous regulatory determinations, and spanning nearly a decade of regulatory scrutiny). SA Water considers that the revenue outcome should not differ between that calculated using a real post-tax WACC and that calculated using the AER model (and the vanilla WACC approach), provided SA Water's actual effective tax rate is included in the post-tax WACC.

A "Vanilla" WACC can be determined and is presented later in this Section. However, SA Water's expected effective tax rate over the regulatory period cannot be precisely determined through the AER modelling approach as part of this Proposal. The AER modelling approach calculates the effective tax rate for a forecast of the cash flows returned over a period of 55 years, based on asset inputs and other parameters. As the RAB for SA Water's direct control services will not be determined by the Treasurer until after submission of this Proposal, the proposed revenue and therefore the proposed tax forecast for the forthcoming regulatory control period cannot be detailed by SA Water in this Proposal.

Cost of debt

The cost of debt (kd) is the sum of the risk-free rate (rf) and the debt risk premium.

ESCOSA has based its determination of the debt risk premium on an entity with a target capital structure of 60% debt relative to total value, and one that issues long-term BBB rated bonds to raise its debt. This is consistent with values typically applied by ESCOSA and other regulators in the past.

The use of long-term bonds – in this case 10 years

183 ESCOSA, Economic Regulation of the South Australian Water Industry, Final Advice, June 2012, Page vi.
184 ESCOSA, Review of SA Water's Prices: 2013/14 – 2015/16, Guidance Paper, February 2012, Section 5.7.

– matches the term of the Commonwealth Government Bonds (CGBs) used to estimate the risk-free rate, and reflects the long-lived nature of water infrastructure assets. Unfortunately, very few 10-year BBB bonds are currently traded in Australia and, as a consequence, there are very few data points available to derive an appropriate debt risk premium. In light of this, ESCOSA has adopted an alternative method to estimate a 10-year BBB debt risk premium. This method uses the Bloomberg 7-year fair value curve (FVC) to determine the yield on 7-year BBB bonds, and then adds an additional premium (0.20%) to represent the additional risk associated with a longer investment period.

SA Water generally agrees with this approach and the inputs adopted by ESCOSA for the forthcoming regulatory control period, however, it should be noted that there has been a significant level of discussion by ESCOSA and others interstate regarding whether these assumptions are still relevant in the post-GFC financial environment. Both IPART[185] and Value Advisor Associates (VAA)[186] have reiterated ESCOSA's view that financial market conditions have altered significantly since 2008, and significant challenges are faced when trying to estimate an appropriate cost of debt.

Cost of Equity

The cost of equity (*ke*) as per the Capital Asset Pricing Model (CAPM) is calculated as:

$$k_e = rf + (\beta L \times MRP)$$

Where:

- k_e *is the cost of equity;*
- rf *is the risk free rate;*
- βL *is the levered or equity beta, which reflects the systematic risk of an equity; and*
- MRP *is the market risk premium (that is, the expected total market return less the risk-free rate).*

The CAPM is the most common methodology adopted to estimate the cost of capital, and has received broad application and acceptance in industry, regulatory and academic contexts.

Averaging period for the risk free rate and debt risk premium

The averaging period applied by ESCOSA in its Final Advice is presented in Table 9–3, together with the averaging period proposed by SA Water.

The general approach adopted by Australian regulators (including ESCOSA) in determining a WACC has been to apply a historical 20 day average of observable data. It is argued that this approach balances the need to provide up-to-date data with the need to remove daily volatility through an averaging period.

It is SA Water's view that there are significant shortcomings in this approach insofar as it does not reflect how a regulated business actually finances its activities, and does not adequately

Table 9–3: Comparison of averaging period parameter applied by ESCOSA and proposed by SA Water

Parameter	ESCOSA Final Advice (27 Jan 2012)	SA Water Proposal (1 Jun 2012)
Averaging period	20 days	180 days

185 IPART, Lessons from the GFC, Cost of capital after the AER's WACC Review, November 2009.
186 Value Advisor Associates Pty Ltd, Advice on Components of Regulatory Rate of Return, Final Report, November 2011, p. 9.

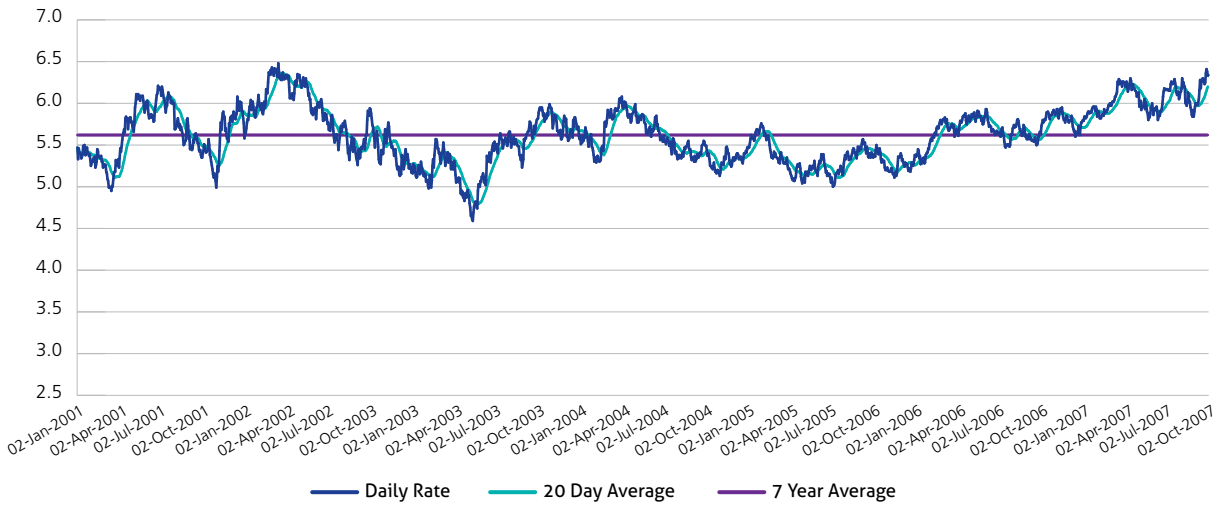
address the volatility observed in financial markets in recent years. In its recent submission to the review of Sydney Water's regulated prices[187], the NSW Government's borrowing authority (TCorp) stated that attempting to reprice or refinance all of an entity's borrowings in a 20 day window would expose Sydney Water and the NSW Government to an unacceptable level of financial risk, and would generally result in an increase in borrowing costs. In practice, finance costs for regulated businesses will be based on an average of daily market rates over a considerably longer period, possibly up to 10 years for government-owned businesses such as SA Water. Actual financing costs for SA Water may therefore differ significantly from those estimated by the assumption that existing borrowings and new debt are fully financed immediately before each regulatory period. This has the potential to generate unintended financial viability issues for SA Water.

In addition, there is the potential for significant changes to debt market conditions during the regulatory period, and the level of observable inputs at the point in time at which each regulatory determination is made. SA Water considers that the existing 20 day averaging period does not adequately take into account such variability, and that it magnifies the impact of market volatility on the WACC outcome.

SA Water further considers that these shortcomings were offset through the first decade of economic regulation in South Australia (1998-2008) by the historically low level of financial market volatility that existed up until the Global Financial Crisis in 2008. In the 7 year period from 1 January 2001 to 1 January 2008, the daily 10 year nominal Commonwealth bond rate fluctuated within a band of only 1.89%. Over that period, a 20 day average on any particular day varied by only 0.27% (average) relative to the 7 year average. The short averaging period that was applied in regulatory determinations during this period therefore provided a reasonable estimate of longer term funding costs by virtue of the low level of market volatility that existed at the time, despite the short period of observable inputs. This market data is presented graphically in Figure 9–1.

Since the global financial crisis in 2008, however, the level of volatility in financial markets has increased significantly and shows little sign of abating. Some respected financial market observers (including the Governor of the Reserve Bank of Australia[188]) have expressed a view that the current level of financial market volatility may be the norm, with the relative stability of the early 2000's being the outlier.

Figure 9–1: Commonwealth 10 Year Bond Rate – 2001–2008



187 TCorp, Submission for Sydney Water Final Determination, 24 January 2012, p. 3.
188 Speech to the Prime Minister's Economic Forum, Brisbane, 13 June 2012.

In the 4.5 year period 1 January 2008 to 31 May 2012, the daily 10 year nominal Commonwealth bond rate has fluctuated in a range of 3.86% – double that of the previous 7 year period – with the 20 day average on any particular day varying by 0.61% (average) relative to the 4.5 year average. Importantly, the daily 10 year nominal Commonwealth bond rate for the two months leading up to 31 May 2012 varied by 1.36% (average) relative to the 4.5 year average (and is currently at its lowest level since the Second World War). This more recent data is presented in Figure 9–2.

The increased volatility observed in relation to the Commonwealth 10 year bond rate is similarly observed in relation to the data used to determine the regulated debt margin component of the WACC (used in determining the cost of debt). In the 4.5 year period 1 January 2008 to 31 May 2012 the debt margin has fluctuated in a range of almost 2%, whereas the 20 day average on any particular day (the approach applied by ESCOSA in its Final WACC Advice[189]) has varied by 0.36% (refer Figure 9–3).

When this volatility is combined with the volatility and movement from the long term average in

Figure 9–2: Commonwealth 10 Year Bond Rate – 2008–2012

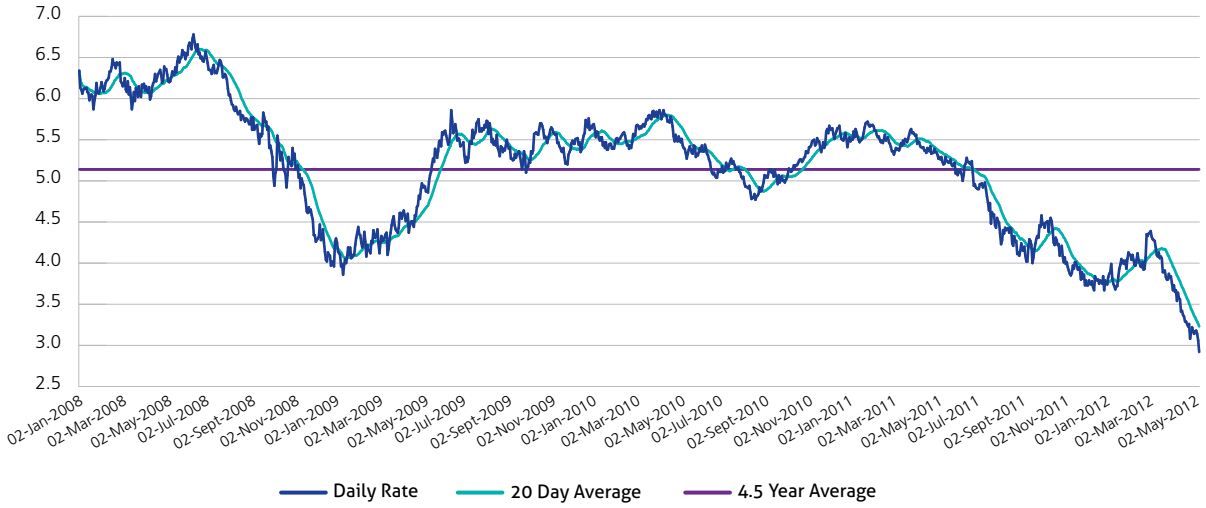
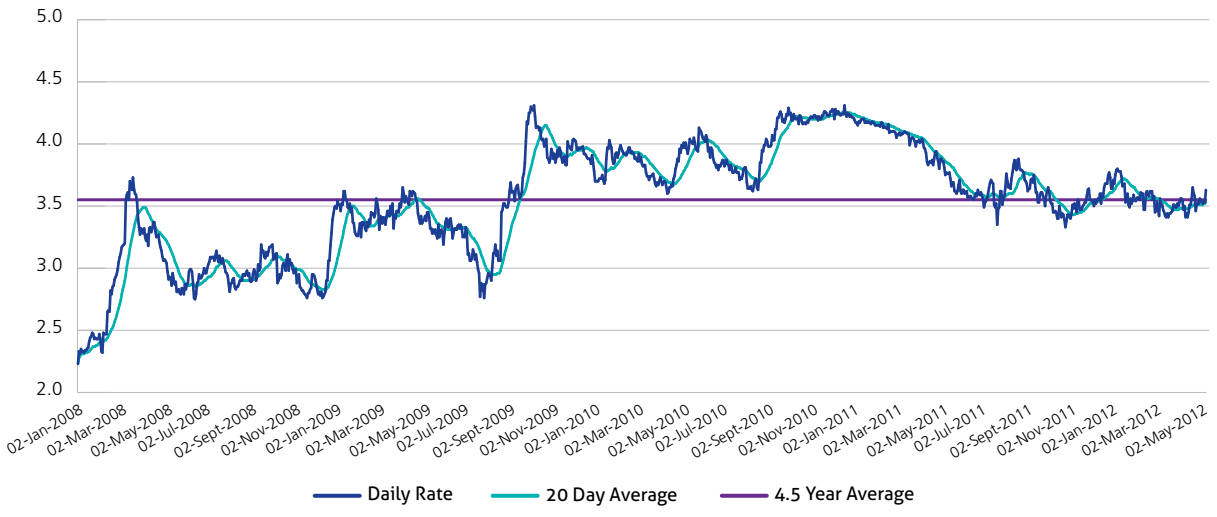


Figure 9–3: Regulatory Debt Margin – 2008–2012



189 ESCOSA, Advice on a Regulatory Rate of Return for SA Water, Final Advice, February 2012, section 4.2.

Table 9–4: WACC Calculations (Pre-tax real) for SA Water

Period of observable market inputs (business days)	Equivalent time period in months	Resultant pre-tax real WACC (average)
20 day	1 month	5.56%
60 days	3 months	5.87%
120 days	6 months	6.01%
180 days	9 months	6.18%
240 days	12 months	6.35%

the risk free rate, SA Water considers that the potential exists for a WACC outcome based on observable inputs averaged over a 20 day window to depart significantly from the long term financial requirements and circumstances of an appropriately structured and managed business.

The volatility in market-derived WACC parameters is further evident in Table 9–4, where SA Water has calculated the WACC as per the methodology used in ESCOSA's Final Advice, but with varying periods of observable market inputs ahead of the time ESCOSA used to determine the WACC in its Final Advice. A pre-tax real WACC is presented to assist in comparability with previous SA Water WACC submissions.

The shortcomings in applying a short averaging period for observable inputs is also highlighted in the AER's October 2010 regulatory decision for Victorian electricity distributors, where it noted that nominal risk free rates for three of the entities captured by the decision varied in a range of 0.57% (which impacts directly on the nominal WACC outcome), due to the different timings of the samples[190]. SA Water considers this to be a sub-optimal outcome that does not produce a comparable or equitable result.

Based on the level of financial market volatility in recent years, it is SA Water's view that the methodology previously applied to incorporate observable inputs into the regulatory WACC (specifically the 20 day averaging period) is no longer appropriate, and that a longer averaging period should be applied.

In considering a lengthening of the averaging period for observable inputs, SA Water is of the view that consideration also must be given to ensure that data remains relevant – historic data that is of a significant age may not be representative of future financing costs for the regulated entity. Therefore, it is SA Water's view that the averaging period should remain significantly shorter than the potential longer term period of 10 years (or more). Specifically, SA Water proposes that an averaging period of 180 days should be adopted, to reduce the impact on the regulatory WACC of daily and very short term market conditions.

SA Water's modelling of historic WACC outcomes indicates that extending the averaging period beyond 180 days has only a minor impact on the WACC outcome, and therefore the modelling in this chapter applies a 180 day averaging period. The 180 day averaging period is based on business days rather than calendar days, consistent with the methodology applied by ESCOSA in its Final Advice, (which applied 20 business days).

190 AER, Victorian Electricity Network Service Providers, Distribution Determination 2011–2015, October 2010, p. XL.

9.3.3. Proposed WACC parameters

Risk Free Rate

The nominal risk free rate applied by ESCOSA in its Final Advice is presented in Table 9–5, together with an updated calculation and the rate proposed by SA Water.

The risk-free rate is the rate of return at which investors are able to invest their capital without risk. The most commonly adopted proxy in Australia is the yield on long-term CGBs, which are often regarded as default risk-free securities due to the guaranteed return of capital provided by the Australian Government.

The risk-free rate is observed directly from data published by the Reserve Bank of Australia (RBA), and is used as an input to calculating the cost of equity and the cost of debt. Relative to the other WACC parameters, changes to the risk-free rate have a substantial influence on the overall rate of return. For example, holding all other parameters constant, a 1% change in the nominal risk-free rate will change the rate of return by approximately the same amount.

Regulators have generally used 10-year CGBs as a proxy to measure the risk-free rate, on the basis that a 10-year bond has the longest term to maturity of Commonwealth debt instruments and is therefore most consistent with the long life of a regulated utility's assets (which have an average life of around 60 years).

For its Final Advice, ESCOSA calculated a nominal risk-free rate of **3.79%** per annum based on a 20 day averaging period on 10 year CGB yields to 27 January 2012. As discussed earlier, due to the volatility of 10 year CGBs, SA Water suggests applying a longer averaging period (of 180 days).

The volatility in the 10 year CGB yields over the past 12 months is presented graphically in Figure 9–4.

It is SA Water's view that the risk free rate of 3.79% applied by ESCOSA does not represent the likely future risk free rate, and potentially further distances the notional assumed cost of debt from the actual cost of debt that SA Water will face in the future.

SA Water applies a portfolio methodology to manage its debt portfolio and as such is locked into fixed interest rates on long term debt acquired in past years. This prudent approach avoids the risk of not being able to refinance large maturities at a single point in time, and reduces volatility in interest costs. This also means that recent declines in bond yields do not provide any comprehensive relief on interest payments on previously acquired debt which SA Water will carry into the forthcoming regulatory control period.

SA Water considers that while 20-day averaging periods close to the decision date are often adopted by regulators to observe the regulatory cost of debt, short averaging periods make for less certain outcomes. SA Water shares the view held by the TCorp[191] that:

Table 9–5: Comparison of nominal risk free rate applied by ESCOSA and proposed by SA Water

Parameter	ESCOSA Final Advice (27 Jan 2012)	Updated Calculation (1 Jun 2012)	SA Water Proposal (1 Jun 2012)	Data Source
Averaging period	20 days	20 days	180 days	
Nominal risk free rate	3.79%	3.23%	3.93%	10-year CGBs

191 TCorp, Submission for Sydney Water Final Determination, 24 January 2012, p. 3–4.

Figure 9–4: Australian government 10 year bond yields

- Long-term averages provide a better predictor of future debt costs (as demonstrated by TCorp using data dating back to 1997); and
- The averaging period for establishing the cost of debt should be consistent with a prudent debt approach *and stable prices*.

SA Water proposes that a longer averaging period (of 180 days) be applied in order to provide a more realistic and stable risk free rate, and address concerns about the impact of the very low bond yields being currently observed. SA Water's Proposal adopts a 180 day sample period to derive a nominal risk free rate of **3.93%**.

Gearing

The gearing ratio applied by ESCOSA in its Final Advice is presented in Table 9–6, together with the ratio proposed by SA Water.

Gearing is a measure of financial leverage and is defined as the ratio of the value of debt to total capital. Gearing is used to weight the individual costs of debt and equity when formulating the overall WACC.

When determining the level of gearing used to calculate the WACC, a theoretically efficient benchmark capital structure for a BBB rated entity has historically been adopted by ESCOSA, rather than SA Water's actual financial structure. This ensures that customers are not impacted by decisions by the regulated entity regarding its financing structure.

A gearing ratio of 60% has been widely applied by other regulators, and was applied in ESCOSA's Final Advice in February 2012.

There have been numerous regulatory submissions in recent years arguing that a gearing ratio of 60% is no longer an efficient private sector benchmark due to the significant deleveraging that has been conducted by private sector corporations since the Global Financial Crisis in 2008. This assertion is supported by publicly available data.

Despite these submissions and the availability of data which supports the trend of private sector deleveraging, regulators have given weight to consistency in their regulatory decisions, and have not moved from the well-established 60% benchmark. SA Water recognises the importance of consistency in decision making by regulators and with the associated certainty. SA Water considers that it is prudent to confirm the trend in private sector deleveraging is being maintained, Consequently SA Water proposes that the **60%**

Table 9–6: Comparison of gearing ratio applied by ESCOSA and proposed by SA Water

Parameter	ESCOSA Final Advice	SA Water Proposal
Gearing ratio	60%	60%

Table 9–7: Comparison of credit rating and debt risk premium applied by ESCOSA and proposed by SA Water

Parameter	ESCOSA Final Advice (27 Jan 2012)	Updated Calculation (1 Jun 2012)	SA Water Proposal (1 Jun 2012)	Data Source
Averaging period	20 days	20 days	180 days	
Credit rating	BBB	BBB	BBB	
Debt risk premium	3.94%	3.53%	3.55%	Extrapolated Bloomberg BBB 7-year FVC

gearing ratio be retained for the forthcoming regulatory control period.

Credit rating and debt risk premium

The credit rating and debt risk premium applied by ESCOSA in its Final Advice are presented in Table 9–7, together with updated calculations and the credit rating and debt risk premium proposed by SA Water.

Businesses typically raise debt through issuing bonds, with the cost of debt depending on the costs of issuing the bonds, and the price (yield) of these bonds. The price of a bond is comprised of two components:

- The nominal risk free rate; and
- A premium that reflects the risk associated with the particular business.

The latter is a company-specific risk premium, and is otherwise referred to as a "debt margin".

ESCOSA does not apply the actual cost of debt or the actual debt margin of the regulated businesses for the calculation of the WACC. Instead, ESCOSA considers that the cost of debt for public utilities should reflect the commercial cost of debt of a well-managed privately owned business engaged in similar business activities.

SA Water considers that it is appropriate to use a 10 year debt margin to derive a 10 year bond rate for a BBB rated entity, as 10 year CGS are used to determine the risk free rate.

In recent regulatory reviews interstate it has been noted that challenges have emerged with respect to the availability of publicly traded 10 year BBB rated securities. The core issue is that the market for long dated BBB rated bonds has largely disappeared since 2008, with only 2 BBB rated companies with market traded bonds on issue. Consequently, bond yields in this peer group are significantly influenced by company-specific issues,

rather than representing general market funding costs for all BBB rated borrowers.

IPART recently conducted a review into the methodology to be adopted for determining the debt risk premium[192], giving consideration to:

- *The small number of bonds in its current sample (given the lack of trades occurring in the BBB bond market);*
- *The average term to maturity of the sample bonds being low; and*
- *The only term to maturity available for the Bloomberg BBB Fair Value Curve (FVC) is 7 years, rather than 10 years.*

A number of alternative methodologies have been suggested in recent regulatory reviews to overcome this issue, including:

- Using the Bloomberg 7 year curve and extrapolating to 10 years (proposed by Sydney Water[193]);
- Shortening the term assumption for the debt margin to 5 or 7 years (proposed by IPART[194]); and
- Including overseas (United States) 10 year BBB rated securities and converting these to Australian dollars (proposed by IPART and VAA[195]).

ESCOSA's approach to calculating the debt margin is based on 20-day averages of the fair value yield curve data obtained for BBB rated Australian corporate bonds – as derived by the Bloomberg BBB 7 year FVC. In order to align the debt risk premium with an assumed 10 year financing term, the 7 year curve is extrapolated to 10 years by adding an allowance of 20 basis points. The 20 basis point allowance is a simplified assumption and accords broadly with the observable spread in Australian 7 and 10 year securities. This practice is broadly consistent with the approach taken by IPART.

For its Final Advice, ESCOSA calculated a debt risk premium of **3.94%** per annum based on a 20 day averaging period to 27 January 2012, and a benchmark credit rating of BBB.

SA Water notes the challenges faced and different methods adopted by regulators elsewhere in estimating the debt margin, and supports ESCOSA's current practice of using the Bloomberg BBB 7 year FVC extrapolated to 10 years by adding a 20 basis point premium (in the current context).

As discussed previously, however, SA Water proposes that an averaging period of 180 days be adopted in place of the 20 days previously applied by ESCOSA. It is SA Water's view that this will adequately address the volatility currently observed in financial markets. The resultant debt risk premium proposed by SA Water is **3.55%**.

Equity beta

The equity beta applied by ESCOSA in its Final Advice is presented in Table 9–8, together with the equity beta proposed by SA Water.

The equity beta measures the riskiness of a business relative to the overall market, and can be

Table 9–8: Comparison of equity beta applied by ESCOSA and proposed by SA Water

Parameter	ESCOSA Final Advice (27 Jan 2012)	SA Water Proposal (1 Jun 2012)
Equity beta	0.80	0.80

192 IPART, Developing the Approach to Estimating the Debt Margin, Other Industries, Final Decision, April 2011, p. 3.
193 Sydney Water, Submission for Sydney Water Final Determination, January 2012, p. 266.
194 IPART, Developing the Approach to Estimating the Debt Margin, Other Industries, Final Decision, April 2011, p. 3.
195 ESCOSA, Advice on a Regulatory Rate of Return for SA Water, Final Advice, February 2012, section 4.3.

Table 9–9: Comparison of the MRP applied by ESCOSA and proposed by SA Water

Parameter	ESCOSA Final Advice (27 Jan 2012)	SA Water Proposal (1 Jun 2012)
MRP	6%	6%

estimated by observing how the return of traded securities for the business varies with the overall return of the market. It represents the systematic (market-wide) risk of an asset that cannot be avoided by holding it as part of a diversified portfolio. The equity beta does not take into account business-specific (non-systematic) risk.

The fact that no Australian regulated water businesses are listed, coupled with the desire to derive a more precise estimate, typically necessitates that the equity beta be adopted from a comparable group of businesses (a benchmark), and for this benchmark to be used as a proxy for the equity beta of the regulated business. In adopting this approach, it is common to consider comparable water businesses in foreign markets, and also comparable industries (such as electricity and gas) in Australia and overseas.

Selecting an appropriate proxy becomes particularly challenging given that, among other things, overseas-listed water utilities are not directly comparable to an efficient South Australian water utility. Given these challenges in estimation from empirical evidence, SA Water supports an approach whereby more weight is given to regulatory stability. Likewise, ESCOSA in its Final Advice gave significant weight to regulatory stability in determining an equity beta of **0.80** as the most appropriate value for an efficient benchmark water utility operating in the South Australian market.

SA Water notes the limited sample size of Australian firms available, and the recent regulatory decisions on equity beta made by IPART, ERA and AER. In the current context, SA Water agrees with ESCOSA's decision to base its equity beta advice on relevant decisions of other regulators. SA Water therefore proposes that an equity beta of **0.80** be retained for the forthcoming regulatory control period.

Market risk premium

The market risk premium (MRP) applied by ESCOSA in its Final Advice is presented in Table 9–9, together with the MRP proposed by SA Water.

The MRP represents the expected return over the risk free rate that investors would require for investing in a well-diversified portfolio of risky assets. MRP is an expected return that is not directly observable, and therefore needs to be estimated through proxies. The MRP is a forward-looking estimate and, since it cannot be directly observed, ESCOSA must estimate it using the best evidence available – typically historic data.

The MRP is included in the CAPM formula and is scaled by the value of the equity beta. Changes to the MRP can significantly influence the final rate of return – for example, a 1% change in the MRP will lead to an approximate 0.40% change in the rate of return.

Approaches to estimating the MRP are the subject of considerable debate, and a literature review suggests lack of consensus regarding the most appropriate methodology. While an MRP of 6% has been applied by regulators for some years, market

instability since the Global Financial Crisis in 2008 has led to arguments that higher MRPs may now be appropriate. As a result, regulators have relied on a number of indicators to form a judgement on a suitable MRP. In particular, regulators have considered historical estimates of the MRP, surveys of market practitioners and academics, and previous regulatory decisions. However, regulators have generally erred on the side of stability in maintaining an MRP at or around 6%.

In its Final Advice, ESCOSA noted that recent regulatory decisions had either adopted an MRP of 6%, or had proposed a range that incorporates 6% as its midpoint. Regulators have consistently accepted an MRP of 6% since it was first adopted in 1998 by the Australian Competition and Consumer Commission (ACCC), and the Victorian Office of the Regulator General. Consistent with this approach, ESCOSA's Final Advice applied an MRP of **6%**.

SA Water proposes that this MRP be retained for the forthcoming regulatory control period.

Corporate tax rate

The corporate tax rate applied by ESCOSA in its Final Advice is presented in Table 9–10, together with the corporate tax rate proposed by SA Water.

The statutory corporate tax rate has been widely adopted by regulators (including ESCOSA) as the corporate tax rate to be applied in determinations of the regulatory rate of return. ESCOSA has also applied the statutory corporate tax rate to transform the post-tax rate of return into a pre-tax regulatory rate of return.

Although SA Water, as a government-owned business, is not subject to corporate income tax, it pays "income tax equivalents" to the South Australian Government as required under National Competition Policy Guidelines. The rate of income tax equivalents is set based on the corporate income tax rate.

The Federal Government had previously announced that it intended to reduce the statutory corporate tax rate from 30 to 29% in its May 2012 Budget, however the reduction has been postponed and will be reviewed on an ongoing basis. ESCOSA adopted a prudent approach during its Final Advice and retained the **30%** statutory corporate tax rate. SA Water proposes that this be retained for the forthcoming regulatory control period.

Table 9–10: Comparison of the corporate tax rate applied by ESCOSA and proposed by SA Water

Parameter	ESCOSA Final Advice (27 Jan 2012)	SA Water Proposal (1 Jun 2012)
Corporate tax rate	30%	30%

Table 9–11: Comparison of the value for gamma applied by ESCOSA and proposed by SA Water

Parameter	ESCOSA Final Advice (27 Jan 2012)	SA Water Proposal (1 Jun 2012)
Value for gamma	0.50	0.50

Value of imputation credits (gamma)

The value for gamma applied by ESCOSA in its Final Advice is presented in Table 9–11, together with the value for gamma proposed by SA Water

Under the Australian imputation tax system, the tax on company earnings is initially collected as a 'company tax'. In return, the companies receive imputation credits which are subsequently distributed to shareholders in the form of franked dividends. Shareholders can, in turn, use the imputation credits to offset their personal tax liabilities on grossed-up dividends. Thus, the imputation tax system ensures that investors are not taxed twice on their investment returns – that is, once at the company level, and then at the personal tax level.

Imputation credits influence the rate of return on equity insofar as investors receive a tax credit from their investment, and are therefore willing to accept a lower return from the investment than if there were no tax credits attached.

The life of imputation credits has three milestones:

- Firstly, they are created when company tax is paid;
- Secondly, they are distributed when franked dividends are paid to shareholders; and
- Thirdly, they are redeemed when shareholders lodge their personal tax returns.

The value of imputation credits to investors/owners is denoted as 'gamma' within the CAPM formula, and directly influences the WACC. A high value for gamma – such as 1.0 – would reduce the return on equity (and therefore WACC) considerably.

In its Final Advice, ESCOSA acknowledged that the value of gamma has been hotly contested due to the profound impact it can have on the rate of return, with regulators typically selecting a gamma of 0.50 based largely on regulatory precedent rather than statistical studies. ESCOSA maintained a conservative approach, mindful of the importance of regulatory stability for regulated entities, and placed significant importance on previous values adopted by other Australian regulators. Accordingly, a value for gamma of **0.50** was determined by ESCOSA in its Final Advice.

SA Water is cognisant that a value of 0.50 for gamma has been broadly adopted by Australian regulators (IPART, ESC, ERA) in recent price determinations of regulated water utilities. SA Water proposes that a value for gamma of **0.50** be retained for the forthcoming regulatory control period.

Inflation forecast

The inflation forecast applied by ESCOSA in its Final Advice is presented in Table 9–12, together with an updated calculation and the inflation forecast proposed by SA Water.

Expected or implied inflation represents public expectations of current or future increases in prices. These expectations may affect how the

Table 9–12: Comparison of the value for gamma applied by ESCOSA and proposed by SA Water

Parameter	ESCOSA Final Advice (27 Jan 2012)	Updated Calculation (1 Jun 2012)	SA Water Proposal (1 Jun 2012)	Data Source
Averaging period	20 days	20 days	180 days	
Inflation forecast	2.25%	2.16%	2.28%	10 year CGB and inflation-indexed bonds

The WACC parameters proposed by SA Water – derived by applying a 180 day averaging period – result in a nominal Vanilla WACC of 7.98% (5.57% in real terms). SA Water anticipates that the WACC ultimately applied by ESCOSA will adopt different values for the risk free rate and debt margin, reflecting market conditions in early-mid 2013.

market reacts to a change in interest rates, and the expected inflation rate is used to convert a nominal WACC to a real WACC.

ESCOSA has historically used Commonwealth Government inflation-indexed bonds to derive a forecast of the inflation rate. The forecast is determined by the difference between the yields on inflation-indexed bonds and non-indexed CGBs of the same maturity, calculated using the Fisher equation. As both of these bonds are traded in the domestic bond market, an up-to-date view of the expected inflation rate over the applicable time period can be established.

Similar to the risk-free rate, the forecast inflation rate can have a considerable impact on the overall rate of return figure. Holding all other parameters constant, a change of 1% in the inflation forecast will change the rate of return by approximately 1%.

For its Final Advice, ESCOSA calculated a forecast inflation rate of **2.25%** per annum based on a 20 day averaging period to 27 January 2012.

SA Water agrees with the application of 10 year inflation-indexed bonds and the Fisher equation to calculate a forecast inflation rate in the current context. SA Water also notes that there will be a diminishing pool of these instruments due to maturing bonds not being replaced, and that the Australian government will not issue inflation-indexed bonds past the 2020 maturity series. The reliability of using these bonds as a parameter for the WACC calculation will therefore diminish commensurate with the smaller pool and reduced liquidity.

As discussed earlier, SA Water proposes that a longer averaging period of 180 days be adopted in order to provide a more stable outcome, and has proposed an inflation forecast of **2.28%** on this basis.

9.3.4. Proposed WACC

SA Water estimates that the nominal Vanilla WACC of the benchmark utility as at 1 June 2012 is 7.98%, applying a 180 day averaging period for observable inputs. Table 9–13 summarises the WACC parameters adopted by SA Water to derive this value, consistent with the discussion regarding each parameter in the preceding sub-section of this chapter.

The key driver of the movement in WACC parameters across a 180 day averaging period has been the fall in the risk-free rate (as indicated in Figure 9–5). SA Water anticipates that the WACC ultimately applied by ESCOSA and the risk free rate and debt premium from which it is derived will differ from those contained in Table 9–13, reflecting financial market conditions in early-mid 2013.

9.4. Estimated regulatory income tax

9.4.1. Regulatory requirements

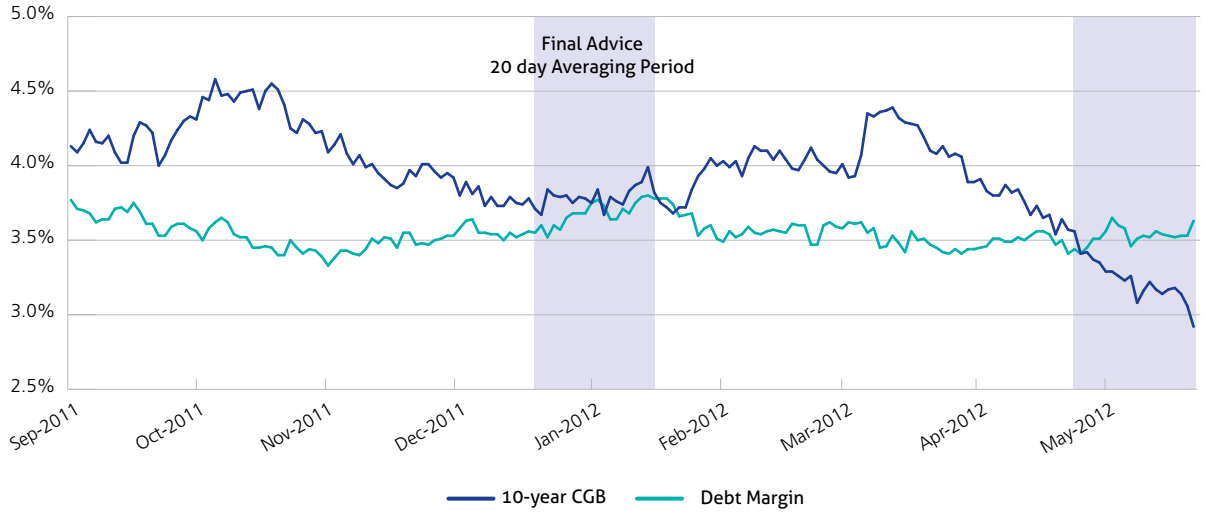
As noted earlier in this chapter, the revenue model proposed by SA Water is consistent with the post-tax nominal revenue model developed and used by the AER. This model, which is described in further detail in chapter 10 of this Proposal (Required Revenue and Pricing) includes a specific expenditure allowance for regulatory income tax, as opposed to pre-tax models which include the regulatory income tax allowance within the WACC.

Accordingly, this model requires estimation of SA Water's regulatory income tax for inclusion in the building block calculation. Regulatory income tax is calculated to represent that of a "benchmark efficient entity", rather than SA Water's actual income tax expense.

Table 9–13: Estimated WACC based on parameters proposed by SA Water

Parameter	ESCOSA Final Advice (27 Jan 2012)	Updated Calculation (1 Jun 2012)	SA Water Proposal (1 Jun 2012)	Data Source
Averaging Period	20 days	20 days	180 days	
Nominal Risk Free Rate	3.79%	3.23%	3.93%	10-year CGBs
Credit Rating	BBB	BBB	BBB	Regulatory precedent
Gearing	60%	60%	60%	Regulatory precedent
Debt margin	3.94%	3.53%	3.55%	Extrapolated Bloomberg BBB 7-year FVC
Equity Beta	0.80	0.80	0.80	Regulatory precedent
Market Risk Premium	6%	6%	6%	Regulatory precedent
Corporate Tax rate	30%	30%	30%	Statutory tax rate
Gamma	0.50	0.50	0.50	Regulatory precedent
Inflation forecast	2.25%	2.16%	2.28%	10 year CGB and inflation-indexed bonds
Nominal Vanilla WACC[196]	8.07%	7.27%	7.98%	Calculated from above
Real Vanilla WACC	5.70%	5.00%	5.57%	Calculated from above

Figure 9–5: Key WACC parameters (180 day time series) to 31 May 2012



196 ESCOSA did not publish a Vanilla WACC in its Final Advice. However, for comparison purposes a nominal and real Vanilla WACC has been calculated from the inputs published by ESCOSA.

In adopting this model, the AER requires that the estimated cost of corporate income tax be calculated for each regulatory year in accordance with the following formula:

$$ETC_t = (ETI_t \times R_t)(1 - y)$$

Where:

- ETC is the estimated cost of corporate income tax;
- t is the year under consideration;
- ETI is an estimate of the taxable income for that regulatory year that would be earned by a benchmark efficient entity as a result of the provision of the services;
- R is the expected corporate tax rate for that year; and
- y is the assumed utilisation of imputation credits (gamma).

The values which SA Water considers appropriate in the case of R_t and y were discussed earlier in this chapter (refer 9.3.3), where the values proposed by SA Water for R_t and y are:

- R (corporate tax rate) = 30%; and
- y (gamma) = 0.50.

In order to represent a benchmark efficient entity, the taxable income used for calculating regulatory income tax is derived from the assumptions used in the model for determining regulated revenue, namely:

- **Revenue:** represented by maximum allowable revenue (as per chapter 10);
- **Financing costs:** represented by the cost of debt as per the WACC calculation;
- **Operating expenditure:** as detailed in chapter 7 (Operating Expenditure); and
- **Tax depreciation:** represented by tax depreciation for a benchmark efficient entity.

Two of these elements (revenue and financing costs) are dependent on the RAB value, which will not be specified until after SA Water submits this Proposal – meaning that their value cannot be calculated by SA Water as part of this Proposal.

The revenue model proposed by SA Water applies a nominal Vanilla WACC, and includes a specific expenditure allowance for regulatory income tax. This necessitates that SA Water estimate the cost of regulatory corporate income tax for each year of the forthcoming regulatory control period.

The depreciation element is based on a tax depreciation calculation, and adopts the value of assets used for National Tax Equivalent Regime (NTER) – meaning that the value of tax depreciation can be calculated by SA Water as part of this Proposal (and is further discussed in a subsequent sub-section of this chapter).

9.4.2. Applicability of income tax to SA Water

SA Water is wholly owned by the South Australian Government and is therefore exempt from the payment of income tax. However, since 1 July 2001 SA Water has operated under the NTER pursuant to the Memorandum of Understanding on NTER between the Commonwealth of Australia, the Commissioner of Taxation and all of the States and Territories. The NTER is administered by the Australian Taxation Office, and requires that SA Water pay income tax equivalents to the South Australian Government.

SA Water calculates its actual income tax equivalent expense in accordance with AASB112 (Income Taxes), using the balance sheet liability method. The AER post tax revenue model does not incorporate this actual NTER allowance in full – rather, it generates an assumed tax expense for a benchmark efficient entity from SA Water's NTER asset base.

Values for the Regulatory Tax Asset Base (RTAB) have been based on those used in SA Water's

NTER assessments. These values have been applied as they are audited by the Auditor-General's Department and the ATO, and are readily available within SA Water's financial asset register.

There are no implications on the RTAB of any potential difference between the RAB and SA Water's asset values for financial reporting purposes.

9.4.3. Opening RTAB as at 1 July 2013

As with the RAB, the opening RTAB value will be set as at 1 July 2013. SA Water proposes that the asset values used for NTER purposes as at 30 June 2013 be used as the basis of the RTAB.

Tax asset values are recorded in SA Water's Financial Asset Register for each asset and disclosed in SA Water's income tax return for NTER purposes. To ensure consistency, SA Water proposed to apply the same asset classes to the RAB and RTAB.

Unlike the RAB, SA Water proposes that the RTAB includes assets contributed by third parties, free assets, and assets funded by Commonwealth Government grants as they are included in the tax asset base, and the associated revenues form part of the SA Water's taxable income.

RTAB values are based on historic cost (costs incurred) and do not include revaluations or increases for inflation. The RTAB is therefore significantly lower than the value of SA Water's assets for general accounting purposes.

Table 9–14 presents the relative weightings and opening RTAB by asset class for water and sewerage assets proposed by SA Water, as at 1 July 2013. The figures are based on a roll forward of tax asset values from 30 June 2012, with an estimate of changes in asset values for 2012–13.

9.4.4. Tax depreciation

Tax depreciation for each year of the regulatory period is calculated using the straight line method, applying the standard and remaining useful lives that have been determined for NTER purposes, and are based on Australian Tax Office rulings and guidelines. The remaining and standard lives for each asset class are presented in Table 9–15. As with opening tax asset values, the figures are based on a roll forward of tax asset values from 30 June 2012, with an estimate of changes in asset values for 2012–13.

Table 9–14: RTAB values and weightings as at 1 July 2013

Water assets	Weighting %	RTAB – 1 July 2013 ($'m)
Water pipes	32.51%	2,300
Water non-pipes	13.11%	927
ADP	24.31%	1,720
Corporate	1.87%	132
Water class – total	71.80%	5,080

Sewerage assets	Weighting %	RTAB – 1 July 2013 ($'m)
Sewerage pipes	19.68%	1,392
Sewerage non-pipes	7.08%	501
Corporate	1.45%	102
Sewerage class – total	28.20%	1,995

Table 9–15: Proposed useful lives (remaining and standard, as at 30 June 2012)

Water assets	Remaining life (years)	Standard useful life (years)
Water pipes	42.09	57.68
Water non-pipes	17.44	39.24
ADP	55.54	56.68
Corporate	11.28	20.73
Water class – average	33.75	48.08

Sewerage assets	Remaining life (years)	Standard useful life (years)
Sewerage pipes	36.20	51.45
Sewerage non-pipes	4.96	11.40
Corporate	11.28	20.73
Sewerage class – average	13.44	22.35

Table 9–16: RTAB roll forward to 30 June 2016 (nominal $'millions)

Water assets	2013–14 ($'m)	2014–15 ($'m)	2015–16 ($'m)
Opening RTAB	5,067	5,205	5,317
Plus net capital expenditure	287	266	256
Less regulatory tax depreciation	(149)	(154)	(159)
Closing RTAB	5,205	5,317	5,414

Sewerage assets	2013–14 ($'m)	2014–15 ($'m)	2015–16 ($'m)
Opening RTAB	2,008	2,064	2,124
Plus net capital expenditure	205	214	249
Less regulatory tax depreciation	(150)	(154)	(158)
Closing RTAB	2,064	2,124	2,215

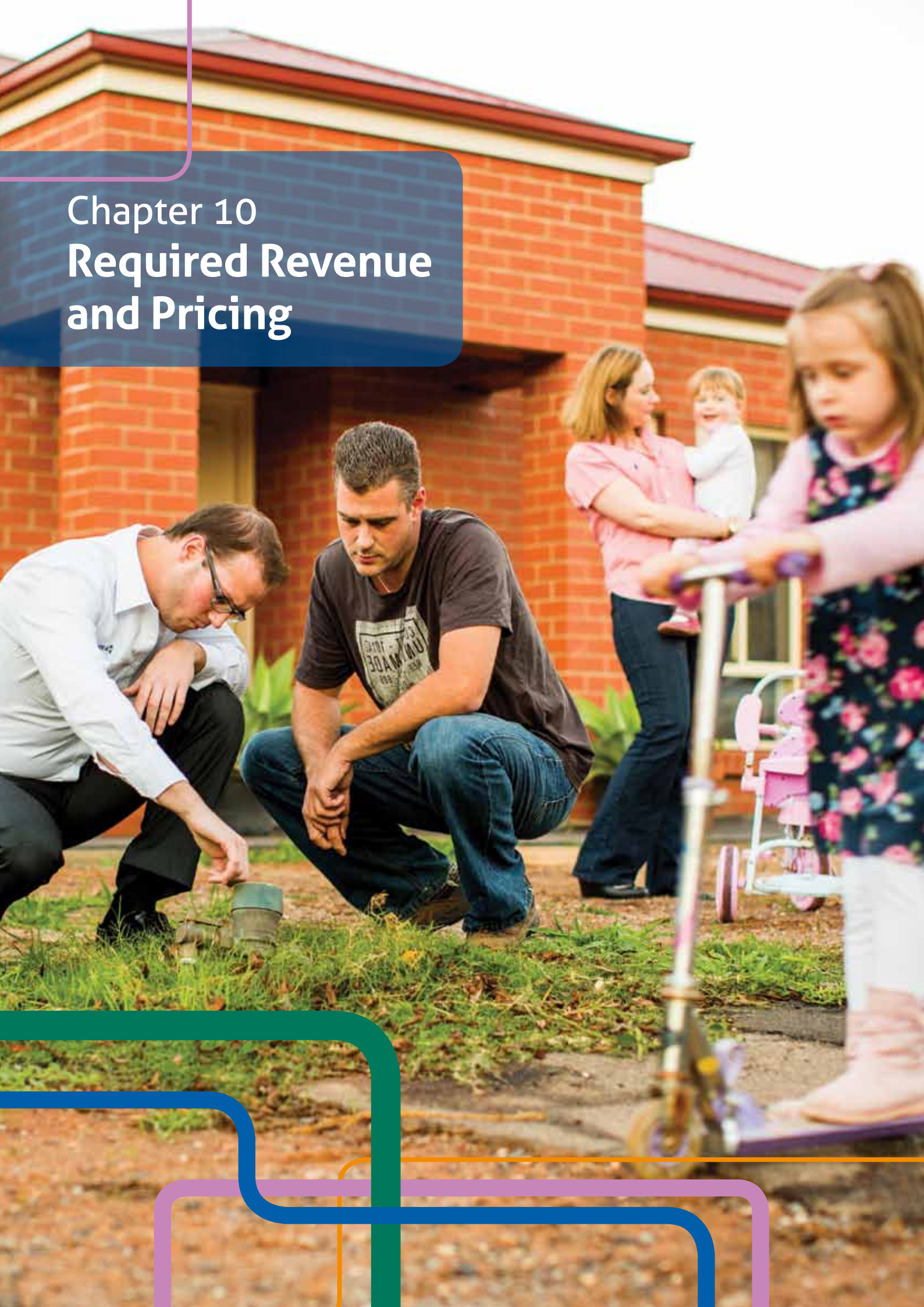
9.4.5. Roll forward of the RTAB from 1 July 2013 to 30 June 2016

SA Water proposes to roll forward the value of the RTAB in a manner consistent with that proposed for the RAB (refer section 9.1.5 of this chapter). The only differences being that contributions from third parties, free assets and Commonwealth grant funded capital expenditure are included in the roll forward calculation and, as the RTAB is used for calculating depreciation, as-commissioned assets are included in the calculation, rather than as-incurred assets.

The resultant roll forward calculations are presented in Table 9–16, with values expressed in nominal terms.

Chapter 10

Required Revenue and Pricing



Key points

- SA Water proposes a combined form of revenue and price control for its direct control water service that is fully compliant with requirements specified by the Treasurer and ESCOSA. SA Water also proposes a "banking" mechanism that will significantly reduce price volatility for customers due to variations in demand for water.
- SA Water proposes a revenue cap form of control for its direct control sewerage service without the type of banking mechanism proposed in relation to its direct control water service. SA Water considers that this form of control is best suited to this service, which is not as susceptible to changes in weather and demand – and which cannot be charged on a volume basis.
- SA Water proposes that the AER's transmission post-tax revenue model be adopted for calculation of its allowable revenue. This is a mature model that has been subjected to significant public scrutiny, and accommodates the approach preferred by ESCOSA, and the profile of capital projects typically undertaken by SA Water.
- ESCOSA's final determination is essential for the setting of SA Water's prices. SA Water will use its best endeavours to release prices for 2013–14 in June 2013, following release of ESCOSA's final determination.

10.1. Proposed forms of revenue and price control

10.1.1. Introduction

The process for determining prices of SA Water's direct control water and sewerage services involves assessment of the revenues required for prudent and efficient provision of those services. The proposed forms of revenue and price control prescribe how SA Water intends to recover those revenues, and the controls that it considers appropriate to apply in the setting of prices for those services.

10.1.2 Regulatory requirements

Clause 4.1.3 within the Draft Initial Pricing Order[197] (IPO) issued by the Treasurer stipulates that *"[ESCOSA's] determination must determine separate revenue controls for drinking water retail services and sewerage retail services"*. Clauses 4.1.4–6 within the IPO further specify:

cl 4.1.4 *In respect of each relevant service, the determination may apply either a revenue cap control, an average revenue control, or a combination of both of those forms of revenue control.*

cl 4.1.5 *The determination must not establish, or require the establishment of, a revenue control for a relevant service based on customer class or location.*

cl 4.1.6 *The determination must include a mechanism which allows for the adjustment of the allowable revenue to be derived where the Commission determines there to be a relevant and material variation between forecast and actual rates of water consumption or sewerage connections.*

197 Draft Pricing Order issued pursuant to S35 (4) of the Act by the Treasurer, Sub-clause 4.1.2, referenced within ESCOSA, Economic Regulation of SA Water's Revenues Statement of Approach, July 2012.

The following sub-sections of this chapter detail the forms of revenue and price control proposed by SA Water for its direct control water and sewerage services. The proposed forms have been developed ensuring that they are compliant with the requirements specified in the IPO, and giving careful consideration to:

- Price stability (and thus impact on customers);
- The likelihood and extent that the actual demand for direct control services could differ from forecast demand;
- The degree that costs in the provision of the services could change due to variation in assumed supply constraints and demand levels (i.e. the short run marginal costs); and
- The difference between the short run marginal costs and prices of the services.

10.1.3. Possible forms of control

In accordance with the IPO, the forms of control must be a revenue cap, an average revenue control, or a combination of both of these forms of control. These forms of control have been commonly used in the economic regulation of utilities.

A **revenue cap** limits the allowable revenue that can be recovered in each year of the regulatory control period, with prices for a year set based on the forecast sales for that year. If actual sales vary from the forecast, the prices in subsequent years are set to enable any over-recovery or under-recovery to be deducted or added to the allowable revenues. Through such price adjustments it is intended that by the end of the regulatory control period the regulated entity will have recovered the maximum allowable revenue determined by the regulator, or that a carryover mechanism will apply between regulatory control periods.

An **average revenue control** limits the average revenue per unit of sales (e.g. per kilolitre (kL) of water). The value of the average revenue control is calculated by dividing the maximum allowable revenue by the forecast sales. In its "standard" form, an average revenue control can result in significant over-recover or under-recovery of revenue due to variances in actual sales compared to those forecast.

10.1.4. Proposed form of control for water services

Impact of variations in resource supply and demand

SA Water's prudent and efficient costs of supplying water in any one year vary depending on the mix of available supply resources and demand for water. The supply options for water supply to Adelaide and the surrounding region (representing approximately two thirds of State-wide demand) are, in order of increasing operational costs:

- Natural catchment (reservoirs);
- River Murray; and
- Adelaide Desalination Plant (ADP).

SA Water's operating costs to supply water also depend on the level of demand, with higher demand requiring more water to be pumped and treated. Higher demand may also necessitate the use of a higher-cost supply resource, further increasing the cost of supply.

The availability of water from natural catchments is highly dependent on the weather, as is the level of demand. Through the use of sophisticated models[198,199] and analysis of extensive historical data, SA Water can predict the availability of water resources and likely demand for "average" weather conditions. However, variations in weather mean that it is not possible to forecast for any year within the forthcoming regulatory period the actual level of demand, nor the actual quantity of supply resources available for use.

198 The demand forecasting models developed by SA Water in conjunction with ACIL Tasman are described in chapter 5 (Demand Forecasts), and Attachment E.1.
199 Forecasting of supply source availability is described in chapter 7 (Operating Expenditure).

SA Water proposes a combined form of revenue and price control for its direct control water service that is fully compliant with requirements specified by the Treasurer and ESCOSA. SA Water also proposes a "banking" mechanism that will significantly reduce price volatility for customers due to variations in demand for water.

Analysis conducted by ACIL Tasman (detailed in Attachment E.1 to this Proposal) indicates that demand for water in any year during the forthcoming regulatory control period could vary by around 7% due to weather variability alone. Such a variation in demand means that SA Water's income from sales could vary by $30m to $40m per annum, just because of weather.

In balancing water supply and demand, SA Water's normal optimisation strategy is to pursue the least-cost supply resource first. This means that water sourced from natural catchments is used to meet demand to the greatest extent possible, while maintaining necessary supply reserves. As noted in chapter 2 (Business Context) of this Proposal, the surface-water catchment of the Mount Lofty Ranges has declined significantly over the past 10 years and is insufficient to balance water supply and demand. The ADP, being the highest-cost source of supply, represents a "peaking" plant to be relied upon by SA Water in extraordinary circumstances.

This means that, in most foreseeable circumstances, SA Water is dependent on water sourced from the River Murray as the next least-cost supply resource to balance water supply and demand. This also means that the River Murray is the most likely supply resource to meet the variation in demand over the forthcoming regulatory period. Therefore, the short run marginal cost associated with a change in demand will generally be the treatment and pumping cost for water extracted from the River Murray.

Application of an average revenue control

If an average revenue control is applied to SA Water's direct control water service, the average revenue per kL of water is forecast to be in the order of 10 times the short run marginal cost of supply from the River Murray. Accordingly, variances between actual and forecast demand for water can lead to either:

- Significant under-recovery of revenue (in which case SA Water would not recover its efficient costs); or
- Significant over-recovery of revenue (in which case the revenue collected from customers would exceed SA Water's efficient costs).

Hence, the variability in demand due to weather imposes risks on customers and on SA Water with such a form of control.

Application of a revenue cap

Alternatively, a revenue cap could be applied to SA Water's direct control services. In this case, if actual demand is lower than forecast, then SA Water's operational costs will be lower, due to less water treatment and pumping. However, SA Water would continue to receive revenue based on the original forecast, and this revenue would exceed SA Water's efficient costs. The inverse would be true where actual demand was greater than forecast. Such variations would necessitate price changes from year-to-year to enable any over-recovery or under-recovery to be deducted or added to allowable revenues, and would result in customers experiencing price instability within a regulatory control period.

Combined form of control

As discussed above, there is a high probability that actual demand for water will vary from that which has been forecast, by as much as 7%. Accordingly, SA Water considers that neither an average revenue control nor a revenue cap are appropriate forms of control to apply to its direct control water service, as they expose customers and SA Water to significant risks associated with uncontrollable variations in water demand.

As these risks cannot be effectively controlled by SA Water or its customers, SA Water proposes a form of control which combines a revenue cap and average revenue control (in this Proposal termed "combined form of control"). The combined form of control provides for the maximum allowable revenue (based on the determined forecast demand) to be amended by the marginal change in efficient operating expenditure associated with material changes in demand. Specifically, where actual demand for water is materially less than forecast, customers will retain the benefit of the lower expenditure incurred by SA Water via reductions in allowable revenue.

SA Water considers that, for the majority of foreseeable circumstances, this proposed form of control largely eliminates the risks associated with actual demand varying materially from its forecast.

SA Water further proposes that the Pass Through mechanism be used to adjust allowable revenue in the unlikely event that SA Water incurs extraordinarily high supply costs arising from the need to operate the ADP materially above forecast levels.

The combined form of control proposed by SA Water with respect to its direct control water service governs the maximum allowable revenue in accordance with the following equation which includes the proposed adjustment mechanism to reflect the marginal change in efficient operating expenditure associated with material changes in demand:

$$R_{ax} = R_{fx} + (D_{ax} - D_{fx}) \times SRMC_x$$

Where:

- R_{ax} ($) is the actual maximum allowable revenue for the supply of the actual demand in year x of the forthcoming regulatory control period;
- R_{fx} ($) is the forecast maximum allowable revenue for the supply of the forecast demand in year x of the forthcoming regulatory control period;
- D_{ax} (GL) is the actual demand for year x of the forthcoming regulatory control period;
- D_{fx} (GL) is the forecast demand for year x of the forthcoming regulatory control period; and
- $SRMC_x$ ($/kL) is the short run marginal cost of a variation in the actual demand from the forecast demand for year x of the forthcoming regulatory control period (based on the incremental operating expenditure per kL of water supplied from the River Murray in year x).

While the combined form of control proposed by SA Water effectively manages the risk of over- or under-recovery of efficient costs, SA Water recognises that some price volatility will result from the variation in consumption from one year to the next. Thus, SA Water also proposes to incorporate a banking mechanism within this combined form of control which will significantly ameliorate price volatility over the forthcoming regulatory control period. The proposed banking mechanism has the following features:

- If the actual income from sales in a year (R_{ax}) exceeds the forecast maximum allowable revenue for that year (R_{fx}) by more than 1 percent, then that excess recovery will be added to a notional "bank";
- Similarly, if the actual income from sales in a year (R_{ax}) is lower than the forecast maximum allowable revenue for year (R_{fx}) by more than 1 percent, then that deficit will be subtracted from the notional bank;

- Variations of less than 1 percent in any year will not influence the notional bank; and
- If the bank balance as at the end of the forthcoming regulatory period is positive or negative by an amount exceeding 1 percent of the aggregate forecast maximum allowable revenue for the entire regulatory control period (i.e. the sum of R_{fx} for years 2013–14 to 2015–16), this variation will be carried over into the determination for the following regulatory control period.

Worked examples detailing operation of the proposed combined form of control and banking mechanism are provided in Attachment J.1 to this Proposal.

Pass through of extraordinarily high supply costs

The combined form of control and banking mechanism proposed by SA Water largely eliminates the risks associated with actual demand varying from the forecast relied upon in setting the maximum allowable revenue. However, this combined form of control and banking mechanism will not address the risk that SA Water incurs extraordinarily high supply costs arising from the need to operate the ADP materially above forecast levels.

SA Water considers that a pass through event is the most appropriate mechanism to address this risk, the occurrence of which is unlikely, but possible. Accordingly, sub-section 8.4.3 within this Proposal specifies an "Operation of the ADP" pass through event to cater for this risk.

10.1.5. Proposed form of control for sewerage services

In evaluating the form of control to govern the maximum allowable revenue for the provision of sewerage services over the forthcoming regulatory period, SA Water has taken into account the following:

- *There is not a simple correlation between the efficient costs to provide sewerage services, and demand*. At a State-wide level, the total volume of sewage to be treated by SA Water is forecast to increase slightly over the forthcoming regulatory control period. However, as outlined in chapter 5 (Demand Forecasts) and chapter 6 (Capital expenditure), the required investment and treatment costs are not closely linked to the overall change in demand. Costs depend to a far greater extent on the rate of growth in the demand for sewerage services in specific sewage drainage areas, the nature of the sewage in those drainage areas, and the combined treatment and disposal requirements to ensure environmental compliance;
- *The efficient cost of providing sewerage services is not significantly influenced by the weather*. Although the level of infiltration into the sewerage system can increase during wet weather, efficient costs do not increase significantly – provided the system is adequately sized for such occurrence; and
- *A volume-based charging method cannot be applied to direct control sewerage services during the forthcoming regulatory control period*. The majority of customers do not have volume metering of their sewage disposal, which means that charging based on the actual volume of disposal cannot be applied.

As noted above, efficient costs to provide sewerage services are not directly related to

SA Water proposes a revenue cap form of control for its direct control sewerage service without the type of banking mechanism proposed in relation to its direct control water service. SA Water considers that this form of control is best suited to this service, which is not as susceptible to changes in weather and demand – and which cannot be charged on a volume basis.

demand, and metering of sewage disposal is not possible for the forthcoming regulatory control period. Therefore, there is not an appropriate measure of service to determine an average revenue control – preventing the application of an average revenue control for SA Water's direct control sewerage service.

As the operating expenditure to provide sewerage services is not significantly impacted by weather, SA Water considers that a revenue cap form of control is appropriate, and will enable SA Water to recover its efficient costs of providing sewerage services. Additionally, the current charging method applicable to the direct control sewerage service is such that tariffs can be set so that any over- or under-recovery of revenue is minimal. This in-turn means that the price path under a revenue cap will be reasonably stable, and the banking mechanism incorporated in the proposed combined form of control for the provision of water services is not required. Accordingly, SA Water proposes that a revenue cap form of control be applied for provision of its direct control sewerage service.

10.2. Calculation of allowable revenue

10.2.1. Revenue model

In its Statement of Approach, ESCOSA states that it *"will use a building block methodology to determine the level of revenue that SA Water will require to efficiently deliver drinking water and sewerage services to customers"*[200]. This methodology is commonly used to determine the revenue requirements of regulated utilities and, as required by the IPO, the building block methodology is compliant with the NWI Pricing Principles[201].

In general terms, the building block methodology involves calculation of the allowed revenue by summing various cost components, generally termed "building blocks". The specific method to determine each building block and the modelling to aggregate the building blocks can vary.

SA Water proposes that the AER's transmission post-tax revenue model be adopted for calculation of its allowable revenue. This is a mature model that has been subjected to significant public scrutiny, and accommodates the approach preferred by ESCOSA, and the profile of capital projects typically undertaken by SA Water.

The AER has developed two building block models for energy network service providers – one being for a distribution network service provider, and the other for a transmission network service provider. The main difference between the two models concerns the treatment of capital expenditure and associated depreciation. The distribution model is preferred where construction of assets is generally completed within a 12 month period, whereas the transmission model is preferred where construction of assets can extend beyond 12 months.

SA Water proposes that the AER's transmission post-tax revenue model[202] be adopted for calculation of the maximum allowable revenues for the provision of SA Water's direct control water and sewerage services. SA Water considers this model to be highly appropriate, as:

- ESCOSA has stated in its Guidance Paper that it intends to apply a post-tax model[203];
- The model calculates taxation costs separately based on actual tax depreciation, rather than simply applying the corporate tax rate and accounting depreciation;
- The model is publicly available, and therefore provides transparency;
- It is an established model that has been subjected to substantial public scrutiny; and

200 ESCOSA Economic Regulation of SA Water's Revenues, Statement of Approach, Jul 2012, p. 22.
201 Australian Government, Steering Group on Water Charges, National Water Initiative Pricing Principles, 2010.
202 Australian Energy Regulator, transmission post tax revenue model, version 2, http://www.aer.gov.au/node/9926.
203 ESCOSA Review of SA Water's Prices: 2013/14 – 2015/2016 Guidance paper February 2012, p. 19.

- SA Water regularly undertakes capital projects where construction of assets extends beyond 12 months (meaning that the AER's transmission model is more appropriate than the AER's distribution model).

SA Water further notes that the AER models calculate maximum allowable revenues in both real and nominal terms, enabling price paths to be forecast in nominal terms (including the expected impacts of inflation on customer prices), and in real terms (excluding the impacts of inflation and showing the underlying price trend).

10.2.2. Building blocks

The building blocks proposed by SA Water to be summed in calculating the maximum allowable revenues for the provision of direct control water and sewerage services are:

- Return on assets;
- Return of capital (regulatory depreciation);
- Operating expenditure;
- Tax; and
- Carryovers.

The following sub-sections provide overviews of these building blocks and reference the more detailed descriptions of the methods and data used to derive each building block, which are provided in preceding chapters of this Proposal.

Return on assets

The return on assets is calculated by multiplying the value of the assets required to provide direct control services (the Regulatory Asset Base, or RAB) by the regulatory rate of return.

Section 9.1 of this Proposal details the methodology by which SA Water proposes to classify and roll forward the value of the RABs required for the provision of direct control water and sewerage services. Section 9.1 also notes that the values of the drinking water and sewerage RABs at the commencement of the forthcoming regulatory period will be specified by the Treasurer in a Pricing Order to be issued following submission of this Proposal, but prior to ESCOSA's final determination.

As explained by ESCOSA in its Statement of Approach, the regulatory rate of return "*is a measure of the opportunity cost of investment in regulated assets and is integral in ensuring that there is sufficient incentive for on-going investment in relevant infrastructure*"[204]. Additionally, the NWI Pricing Principles state that "*the rate of return should be consistent with the Weighted Average Cost of Capital (WACC) and the cost of equity derived from the Capital Asset Pricing Model (CAPM)*"[205]. In its Guidance Paper, ESCOSA advises that it intends to derive the regulatory rate of return as prescribed by the NWI Principle, and indicates a preference for a post-tax real WACC[206].

As explained in section 9.3 of this Proposal, SA Water supports the application of a post-tax WACC, however it considers a nominal WACC to be preferable for the purpose of the maximum allowable revenue calculation. Sub-section 9.3.3 details SA Water's position in relation to individual WACC parameters.

Return of capital

Return of capital is also commonly referred to as "regulatory depreciation". Section 9.2 of this Proposal describes the approach proposed by SA Water to calculate regulatory depreciation, and also nominates specific asset lives. The standard useful lives and remaining useful lives of assets are used to calculate depreciation rates on an asset class basis.

204 ESCOSA Economic Regulation of SA Water's Revenues, Statement of Approach, July 2012, p. 25.
205 Australian Government, Steering Group on Water Charges, National Water Initiative Pricing Principles, Principle for the recovery of capital expenditure (Principle 1), 2010.
206 ESCOSA Review of SA Water's Prices: 2013/14 – 2015/16 Guidance Paper, February 2012, p. 18.

SA Water proposes that the depreciation of newly commissioned assets commence at the end of the year in which they are commissioned – an approach that will result in deferral of some revenue by six months, but will be revenue neutral over time.

Operating expenditure

Chapter 7 of this Proposal comprehensively sets out the operating expenditure proposed by SA Water for the prudent and efficient delivery of direct control water and sewerage services, consistent with the high quality of service SA Water's customers receive.

Tax allowance

The post tax revenue model proposed by SA Water includes a specific expenditure allowance for income tax. Chapter 9 of this Proposal provides forecasts of the Regulatory Tax Asset Bases (RTABs) for water and sewerage services over the forthcoming regulatory control period. The chapter also describes the relationship between the RTABs and the tax asset base used for SA Water's National Tax Equivalent Regime (NTER) assessments.

Carryovers

In accordance with the forms of revenue and price control proposed by SA Water for direct control water and sewerage services, it is possible that there will be an over- or under-recovery of the allowable revenue at the end of the forthcoming regulatory control period. This over- or under-recovery of revenue will need to be taken into account in determining the revenue allowances for the subsequent regulatory control period commencing 1 July 2016. As the forthcoming regulatory control period is the first regulatory control period for SA Water, no such carryover is detailed in this Proposal.

10.3. Pricing

The draft IPO issued by the Treasurer states that ESCOSA "*must only determine the revenue which may be derived from the provision of such services*" [207] (such services being direct control drinking water retail services and sewerage retail services).

ESCOSA's determination of the maximum allowable revenue which may be derived from the provision of SA Water's direct control water and sewerage services is an essential input required for the setting of prices for these services. Prices for the provision of these services can only be set once ESCOSA has finalised its determination of the maximum allowable revenue.

ESCOSA has provided key dates in relation to its revenue determination process within its Statement of Approach[208]. This timetable foreshadows 17 May 2013 as the date for release of ESCOSA's final determination on the maximum allowable revenue, with new prices based on this final determination to be made effective from 1 July 2013.

While recognising the compressed timeframe to develop prices following release of ESCOSA's final determination, SA Water will use its best endeavours to release prices for 2013–14 in June 2013.

ESCOSA's final determination is essential for the setting of SA Water's prices. SA Water will use its best endeavours to release prices for 2013–14 in June 2013, following release of ESCOSA's final determination.

207 Draft Pricing Order issued pursuant to S35 (4) of the Act by the Treasurer, Sub-clause 4.1.2, referenced within ESCOSA, Economic Regulation of SA Water's Revenues Statement of Approach, July 2012.
208 ESCOSA Economic Regulation of SA Water's Revenues, Statement of Approach, July 2012, p. 31.

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