Queensland Audit Office

Maintenance of water infrastructure assets

Report to Parliament 14 : 2012–13

Queensland Audit Office

Location	Level 14, 53 Albert Street, Brisbane Qld 4000
PO Box	15396, City East Qld 4002
Telephone	(07) 3149 6000
Email	qao@qao.qld.gov.au
Online	www.qao.qld.gov.au

© The State of Queensland. Queensland Audit Office (2013)

Copyright protects this publication except for purposes permitted by the *Copyright Act 1968*. Reproduction by whatever means is prohibited without the prior written permission of the Auditor-General of Queensland. Reference to this document is permitted only with appropriate acknowledgement.

QUEENSLAND

Prepared under Part 3 Division 3 of the *Auditor-General Act 2009*

Front cover image is an edited photograph of Queensland Parliament, taken by QAO.

ISSN 1834-1128

Queensland Audit Office

Your ref:
Our ref: 00-3757A

June 2013

The Honourable F Simpson MP
Speaker of the Legislative Assembly
Parliament House
BRISBANE QLD 4000

Dear Madam Speaker

Report to Parliament

This report is prepared under Part 3 Division 3 of the *Auditor-General Act 2009*, and is titled Maintenance of water infrastructure assets.

In accordance with s.67 of the Act, would you please arrange for the report to be tabled in the Legislative Assembly.

Yours sincerely

Andrew Greaves
Auditor-General

Queensland Audit Office
Level 14, 53 Albert Street, Brisbane Qld 4000
PO Box 15396, City East Qld 4002

Phone 07 3149 6000
Email qao@qao.qld.gov.au
Web *www.qao.qld.gov.au*

Contents

Summary

The Millennium Drought is the term used to describe the drought that occurred in south-east Queensland (and other parts of Australia) from 2001 until 2009. In response to this drought, the South East Queensland Water Grid (the grid), Australia's largest urban water security system, was set up in 2007. The $9 billion network carries harvested and manufactured water to 2.6 million people across 21 000 square kilometres. Its treatment facilities and two-way pipes are intended to guarantee water supply security, regardless of climate change and population growth.

Currently costing $76 million a month, the grid operates bulk water infrastructure assets, such as dams, weirs, water treatment plants, and pipelines. It also includes the Gold Coast Desalination Plant (GCDP) and the Western Corridor Recycled Water Scheme (WCRWS), termed the climate resilient or manufactured water assets.

Recent legislation reforms to the south-east Queensland bulk water industry saw the merger of the SEQ Water Grid Manager (the grid manager), Seqwater and LinkWater into one bulk water supply authority and the abolition of the Queensland Water Commission from 1 January 2013.

This report examines whether the grid assets are being managed and maintained effectively to contribute to a secure and sustainable water supply. It evaluates whether the strategies for the grid will meet government objectives and examines whether there is adequate monitoring and reporting on its performance.

It also reviews the systems for long term water asset maintenance, looking in detail at the cost effectiveness of the two manufactured water assets.

Conclusions

The grid assets are being managed and maintained in accordance with agreed levels of service to contribute to a secure and sustainable water supply for south-east Queensland. Asset management strategies and plans are in place or in development and reflect good practice.

The decision to develop the manufactured water assets was an appropriate response to the severe drought circumstances at the time, and they have provided water security. However, the cost-efficiency of these assets cannot be demonstrated, due to limited comparative benchmarking data and inconsistent operation of the plants in any one mode for a sustained period of time.

As no robust business case was developed for the Gold Coast Desalination Plant, the decision on the capacity of the plant did not benefit from the rigorous cost-benefit analysis that is required to be applied to such large scale investments.

For the Western Corridor Recycle Water Scheme, there was a business case that set out for decision makers the expected full costs of the scheme. Less rigour was applied to estimating potential benefits and these benefits were overstated. While this did not invalidate the case for recycled water, it meant that consideration of the water supply needed from these plants and the cost of this supply were not balanced against a realistic assessment of benefits.

The construction and operation of the manufactured water assets come also at significantly higher costs than first anticipated, which further casts doubt on their value for money. There has also since been a significant and sustained reduction in water consumption in south-east Queensland.

Apart from water security, no other expected benefits have been realised—the environmental outcomes will not be achieved and economic outcomes were not specified.

There are lessons to be learnt from this experience. Better planning may have avoided the need for such drastic and costly action, but it is acknowledged the drought was unprecedented. What however could and should have been done better, even in a time of emergency, was to have a thorough and rigorous assessment of all costs and of the social, economic and environmental benefits; in all likely modes of operation.

Asset management

The asset management strategies and plans are meeting the legislated obligations effectively and contribute to a secure and sustainable water supply.

Seqwater uses a life cycle approach to asset maintenance planning, and operates and maintains the assets in line with approved plans. Where there are third-party contracts for the operation and maintenance of grid assets, roles and responsibilities are clearly defined and contract costs are controlled and monitored effectively to ensure the required levels of service are being met.

The key elements of a performance management framework are in place, enabling a clear line of sight between planning, measuring and monitoring results and public reporting.

However, performance indicators lack definitions of time frames, quality and cost and the indicators are not focused enough on outcomes and achievement. Without specific cost effectiveness performance indicators linked to the objectives of water security, Seqwater cannot assure they are meeting those objectives.

Manufactured water assets

As a result of the 2001–2009 drought, the manufactured water assets were built to meet the short-term emergency with consideration of the long-term water supply needs. The GCDP cost $1.2 billion to build and the WCRWS cost $2.6 billion. The construction of the GCDP and WCRWS added 125 megalitres per day and initially 232 megalitres per day respectively of climate-independent water to overall capacity.

The construction of the manufactured water facilities reduced the likelihood that south-east Queensland residents would be placed under severe water use restrictions. The benefits extended to the broader economy as industries, reliant on unrestricted access to water, enjoyed greater certainty and confidence that their markets would be not affected by water restrictions in the future. A further benefit achieved was that future augmentations could be delayed due to the capacity provided by the construction of these facilities.

However, while the manufactured water assets have provided water security, this comes at significant cost. Economic, environmental and social outcomes cannot be demonstrated, as expected benefits were not determined adequately during planning, so a realistic assessment could not be carried out.

Financial assessments of the manufactured water assets undertaken in 2010 to support the optimal operating mode recommendation were deficient and no independent quality assurance of the model was considered or undertaken. While Seqwater adequately monitors and reports on the performance of the manufactured water assets, not all operating and maintenance costs, such as overheads, depreciation and financing, are incorporated. A lack of comparative benchmarking data and inconsistent operation of the plants in any one mode for a sustained period means that cost efficiency of the manufactured water assets cannot be demonstrated.

Gold Coast Desalination Plant

The GCDP is operating in hot standby mode currently with occasional production and Seqwater's models predict that demand will not require using the plant's maximum capacity before 2018. Consequently, there is further uncertainty regarding the soundness of the decision to build the plant immediately at a capacity of 125 megalitres per day rather than 55 megalitres per day as originally planned. The fixed operating cost of this plant is relatively high as a proportion of total operating costs. These costs are incurred regardless of the output and in years prior to demand reaching maximum plant capacity. However, it is positive to note that the operating and maintenance agreement with the plant operator is structured appropriately to avoid unnecessary expenses in the event of the plant being mothballed or decommissioned.

Since the GCDP started operations in September 2010, it has been operated variously at 33 per cent, 66 per cent and 100 per cent of total capacity, or in standby mode. This frequent change in operating modes, together with the limited availability of cost data for comparable plants in Australia, has prevented Seqwater from being able to establish the most efficient cost of production and has contributed to the delay in finalising the services target outturn cost. It is not possible therefore to be assured that the plant is operating at its lowest possible cost.

The Australia's Urban Water Sector inquiry, conducted by the Australian Government's Productivity Commission in 2011, estimated that the operating costs of desalination plants in Australia were likely to vary from about $500 per megalitre to $1 100 per megalitre. Based on Seqwater's projections, if the GCDP operated at full capacity, it would fall within the higher end of this range at $1 021 per megalitre. However, when production is below full capacity, as is currently the case, the plant's running costs are significantly higher than this benchmark. For example, in 2011–12, operating and maintenance costs were $4 403 per megalitre or approximately four times higher than the maximum estimated by the inquiry.

Western Corridor Recycled Water Plant

The decision to construct the WCRWS committed the state to at least $18.8 million per year in fixed costs. Even if the WCRWS is fully decommissioned, Seqwater estimates annual fixed costs of $11.3 million will be required to preserve and, if possible, extend the asset's life so it can be reactivated if required.

While operating and maintenance costs for 2011–12 were $55.45 million lower than anticipated in the 2007 business case, this was due solely to the reduced volume of recycled water produced. The reduced output meant actual costs in 2011–12 were $4 419 per megalitre, instead of the planned cost of $1 135 per megalitre at full production levels, as set out in the business case.

The Australia's Urban Water Sector inquiry provided insights into operating expense benchmarks for recycling of $860 per megalitre in Perth and $1 500 per megalitre in Melbourne. If operated at full capacity, Seqwater's projections indicate that the operating and maintenance costs of the WCRWS would be at the lower end of this range at $968 per megalitre.

Recommendations

It is recommended that Seqwater:

1. **Expand baseline data on operating and maintenance costs for benchmark reporting.**
2. **Develop performance measures for cost effectiveness.**
3. **Enhance existing performance measures to include timeliness, quality and cost.**
4. **Investigate opportunities to reduce the ongoing costs associated with the Gold Coast Desalination Plant (GCDP) and Western Corridor Recycled Water Scheme (WCRWS)—this should incorporate a net present value assessment of the whole-of remaining life costs and benefits associated with each alternative.**
5. **Include incentives for cost minimisation in contracts with plant operators and agree a long-term target operating cost at the time of engaging the operator.**

Reference to entity comments (Appendix A)

In accordance with section 64 of *the Auditor-General Act 2009*, a copy of this report was provided to the following entities with a request for comments:

- Seqwater
- Department of Energy and Water Supply.

Their views have been considered in reaching the audit conclusions and are represented to the extent relevant and warranted in preparing this report.

The full comments received are included in Appendix A of this report.

1 Context

1.1 South East Queensland Water Grid

The $9 billion South East Queensland Water Grid (the grid) is an integrated system designed to secure and manage south-east Queensland's water supplies. It comprises a network of treatment facilities and two-way pipes that move water around the region from climate-dependent sources, such as dams and rainfall and the climate-resilient sources of desalination and purified recycled water.

Most water in south-east Queensland is supplied from Wivenhoe, Somerset and North Pine dams, which are all characterised by long periods of relatively high water availability, punctuated infrequently with long periods of severe drought. Climate resilient sources are needed to maintain supply during drought periods to meet south-east Queensland social and economic needs in accordance with the government set levels of security objectives. The grid is intended to guarantee water supply security based on expected population growth and climate change and supplies water to about 2.6 million people over an area of 21 000 square kilometres.

It was built in response to the 2001–09 drought in south-east Queensland, when dam levels fell below 17 per cent, triggering the imposition of severe restrictions on water consumption. It is Australia’s largest urban water security response and is unique in its diverse projects and the short time in which they were delivered.

The grid includes:

- 12 connected dams
- 10 connected drinking water treatment plants
- three advanced water treatment plants producing purified recycled water
- one desalination plant
- 28 water reservoirs
- 22 bulk water pump stations
- more than 281km of transfer pipelines
- 535km of bulk water mains.

The Western Corridor Recycled Water Scheme (WCRWS) comprises three advanced water treatment plants at Luggage Point, Gibson Island and Bundamba. The plants purify recycled water to supply power stations and industry and to supplement the region’s drinking water supplies, if required, during water shortages. The combined capacity of the three advanced water treatment plants is 232 million litres (or 232 megalitres) per day.

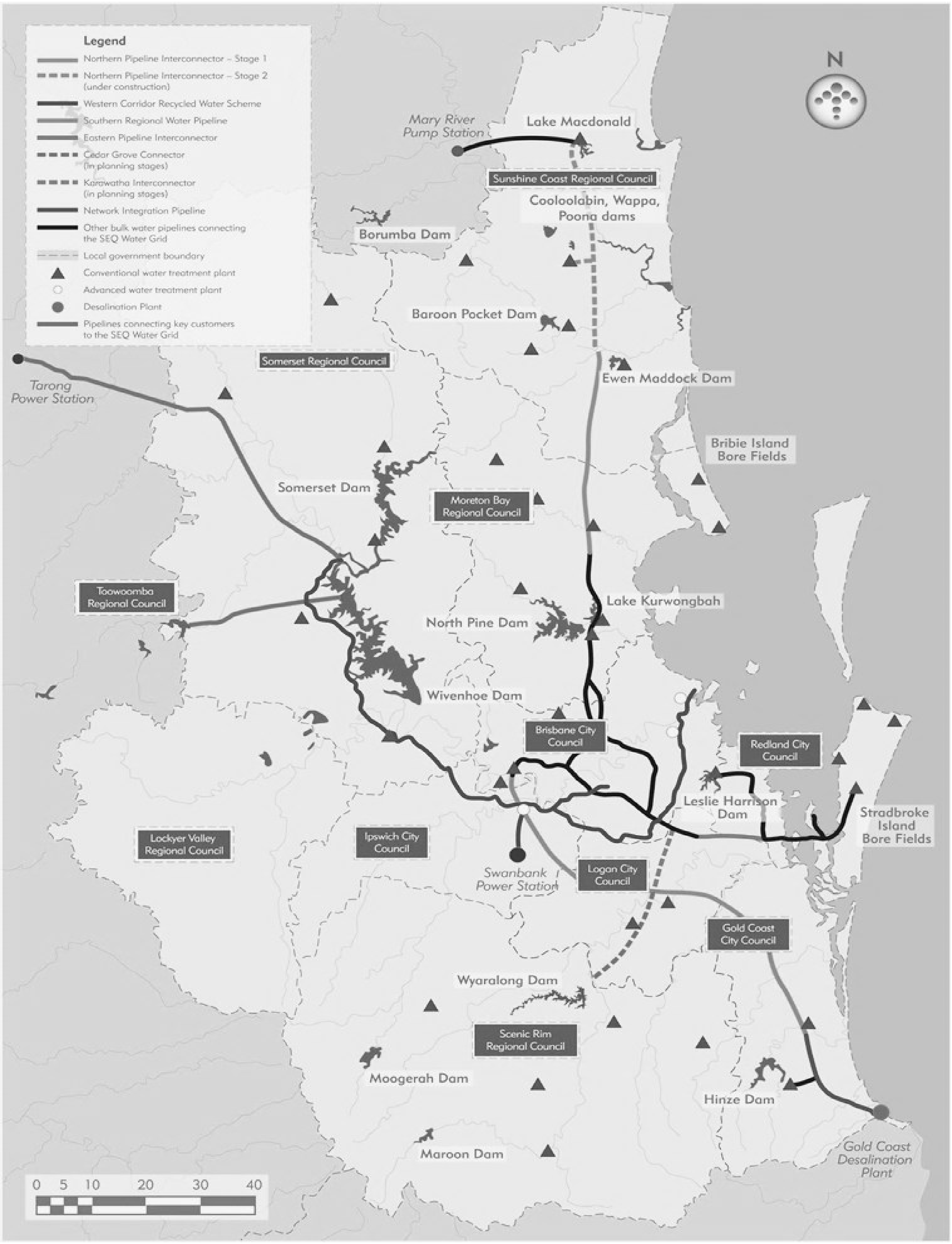
The Gold Coast Desalination Plant (GCDP), located at Tugun is a seawater reverse osmosis desalination plant which has the capability to supply 125 megalitres per day of drinking water to the grid. This capacity meets the current average daily water needs of about 700 000 people—just over one-quarter of the 2.6 million residents in south-east Queensland.

The WCRWS and GCDP are 'climate-resilient' assets, so the water generated by each does not depend on rainfall or stored water. They were planned, constructed and commissioned at the height of the drought. At present, these assets are regarded as emergency supply options only and operate well below their design capacity while sufficient climate-dependent water from dams is readily available.

In comparison, the Wivenhoe Dam built in 1984, the state's largest water store, has a supply capacity of 1 165 000 megalitres. This is more than 2 000 times the average total daily use by all south-east Queensland residents and equates to more than five years' water supply at current demand levels. It would take 24 years for the GCDP to fill the Wivenhoe Dam.

Figure 1A illustrates the interconnectedness of the various water supplies that form part of the grid.

Figure 1A
South East Queensland Water Grid



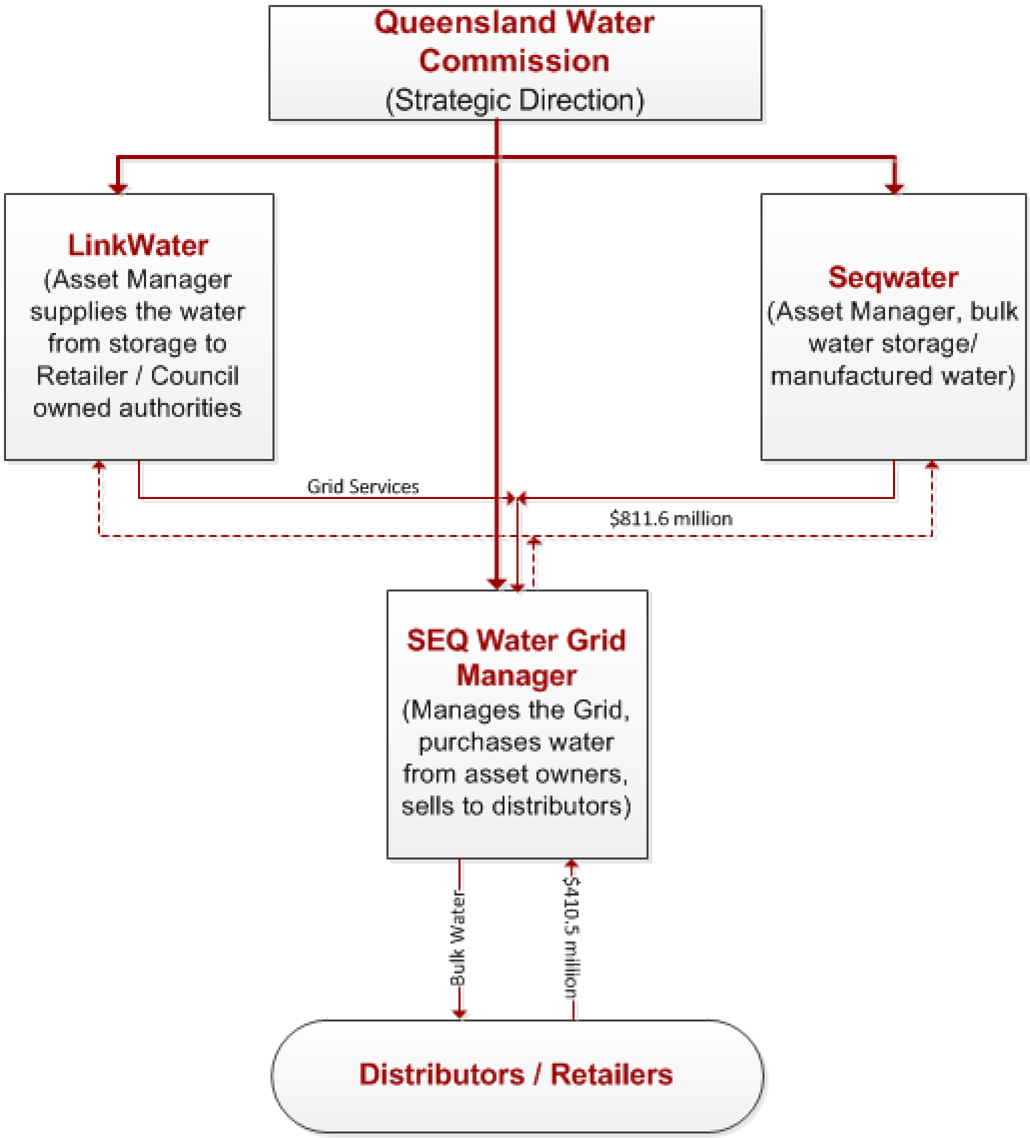
Source: Seqwater 2011

1.2 Roles and responsibilities

In 2007, the bulk water assets of 16 separate entities were transferred initially into three entities: Seqwater, LinkWater and WaterSecure. WaterSecure was a statutory body that previously managed the Western Corridor Recycled Water Scheme. WaterSecure was subsequently consolidated into Seqwater in July 2011.

Figure 1B shows the relationship between the Queensland Water Commission and the three former grid water entities to 31 December 2012. It demonstrates how the Water Commission set the strategic direction for the three grid entities and how the grid manager bought bulk water and services from Seqwater and LinkWater to sell to water retailers.

Figure 1B
Roles of key participants in the grid to 31 December 2012



Source: QAO 31 December 2012

From 1 January 2013, the grid manager, Seqwater and LinkWater were amalgamated into a single body—the South East Queensland Bulk Water Company Limited, trading as Seqwater. Seqwater also took on the water security and efficiency responsibilities performed by the Queensland Water Commission. The Department of Energy and Water Supply assumed the policy role of the Water Commission which was then abolished.

1.2.1 The Queensland Water Commission

The former Queensland Water Commission (QWC) was established in June 2006 under the *Water Act 2000* as an independent statutory body to achieve safe, secure and sustainable water supplies in south-east Queensland.

The Commission's planning and regulatory functions (including setting water restrictions) are now the responsibility of the new bulk water supply authority, Seqwater and the south-east Queensland council water businesses (distributor retailers).

1.2.2 SEQ Water Grid Manager

The former grid manager was established from July 2008 to maintain regional water security by directing water where it was needed and to ensure there was enough high quality water.

The grid manager bought water storage, treatment, production and transport from Seqwater and LinkWater, communicating its objectives and requirements through monthly grid instructions. It then sold bulk water to retailers and distributors.

The grid manager did not own assets but coordinated maintenance on the grid and monitored asset condition through the grid instructions.

1.2.3 Seqwater

Established by the *South East Queensland Water (Restructuring) Act 2007,* the earlier Seqwater managed bulk water catchment, treatment and storage and supplied water to the grid from dams, weirs, bore fields and the manufactured water assets.

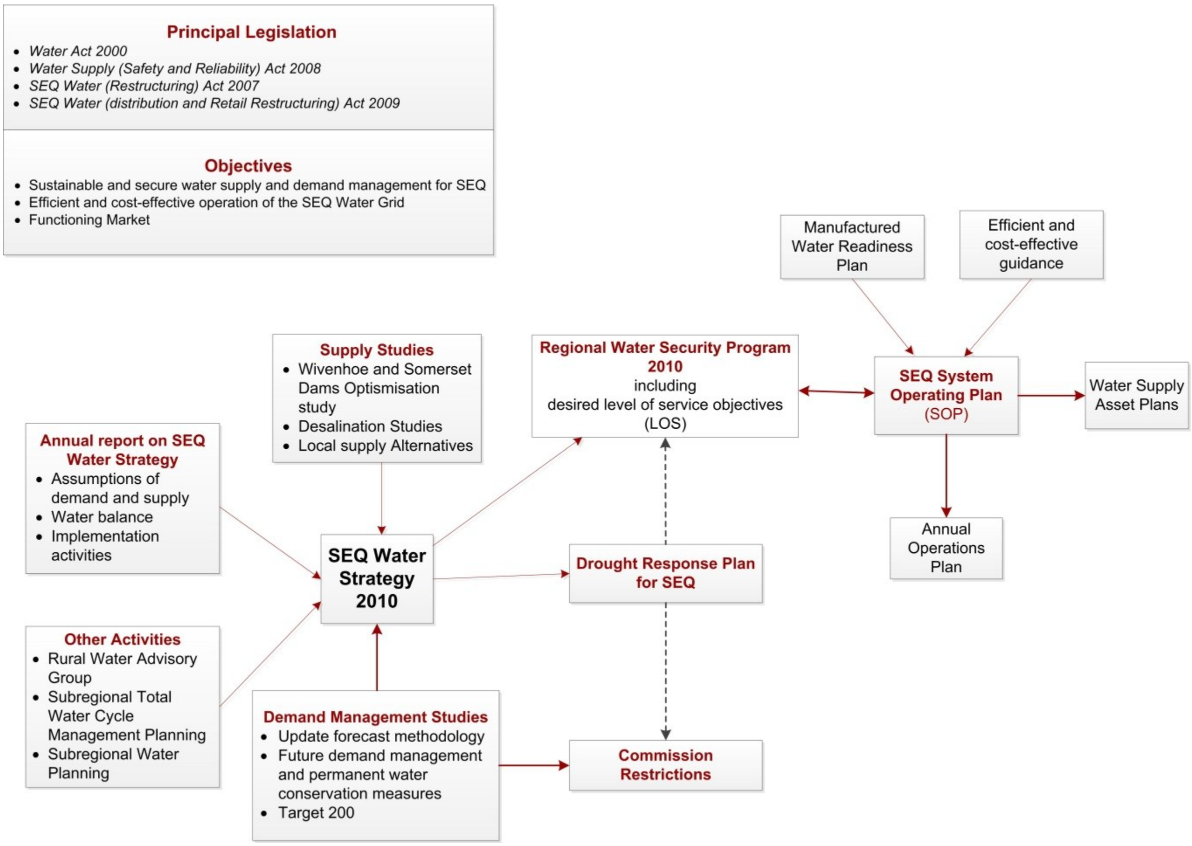
1.2.4 LinkWater

The former LinkWater commenced operations in July 2008 with the transfer of about 350 kilometres of bulk water pipelines and infrastructure from south-east Queensland councils. LinkWater was the network controller.

1.3 Regulatory environment

Figure 1C shows the relationships between legislation, strategies and plans governing the operation of the grid.

Figure 1C
Regulatory framework



Source: Queensland Water Commission

1.3.1 Principal legislation

The *Water Act 2000* outlines the requirements for water security and managing water supply and demand.

The *Water Supply (Safety and Reliability) Act 2008* provides for safe and reliable water. This Act requires water service providers to prepare drought management plans to minimise the impact on communities of water shortages caused by drought. It also requires recycled water providers to prepare a recycled water management plan for the WCRWS.

1.3.2 South East Queensland Water Strategy

In 2010, the QWC released the *South East Queensland Water Strategy* (the strategy) which is a blueprint for maintaining water security in south-east Queensland into the future. The strategy contains what is known as the water supply guarantee, the vision that:

> *'...there will be sufficient water to support a comfortable, sustainable and prosperous lifestyle while meeting the needs of urban, industrial and rural growth and the environment.'*

Section 346 of the *Water Act 2000* forms the basis of the principles guiding the strategy. Figure 1D outlines the principles that guide the strategy.

Figure 1D
Water Strategy guiding principles

Guiding principles
Water is a scarce resource to be shared across the region.
Water quality should be managed from source to end user in a way that: • ensures the health of catchments, aquifers and their ecosystems • delivers water of a quality desired by the end users at the lowest overall cost.
Water supply arrangements should maximise efficient and cost effective service delivery and the efficient use of water, such as appropriate connectivity between supply sources, in accordance with the level of service objectives.
The cost of water sources should be shared among users who benefit from them. Pricing should recognise Queensland Government commitments under intergovernmental agreements.
Regional water supply assessments should consider environmental, social and economic factors and include 'least cost planning' to ensure proper economic comparison of all supply and demand options.
Queensland Water Commission water restrictions should help to achieve the region's objectives for long-term demand management and enable the appropriate management of any significant threat to the sustainability and security of the region's water supply.
Flood mitigation and dam safety should be considered in assessments of regional water supply.

Source: Queensland Water Commission

The strategy lists the actions that the grid entities need to carry out to meet its stated goals over the next 10 years.

1.3.3 System operating plan

The QWC was responsible for developing the system operating plan which the *Water Act 2000* required to help meet level of service objectives for the region. The plan listed requirements for the grid manager, Seqwater and LinkWater.

Under the plan, the grid manager was required to prepare an annual operations plan, Seqwater to prepare a manufactured water readiness plan and both Seqwater and LinkWater to prepare a water supply asset plan.

1.3.4 Regional water security program for south-east Queensland

A revised regional water security program was made by the then Minister for Natural Resources, Mines and Energy and Minister for Trade in March 2010, based on advice from the Queensland Water Commission. It contained level of service objectives for south-east Queensland and a list of the water supply works needed to meet them.

1.3.5 Market rules

Created under the *Water Act 2000*, the south-east Queensland water market rules:

- set out roles and responsibilities of the grid participants
- detailed the requirements for issuing grid instructions
- defined how grid service providers supplied the grid manager and were paid
- defined how grid customers would buy water.

1.3.6 Grid instructions

The system operating plan required the grid manager to prepare an operating strategy that outlined how it would run the grid. Each month, the grid manager issued grid instructions to grid participants related to changes in demand and supply volumes based on the operating strategy.

1.4 Grid assets

The supply of water is capital intensive, requiring significant investment in strategic infrastructure. The combined replacement cost of the grid assets at 30 June 2012 was $6.342 billion and their carrying values were $5.498 billion. A further $2.640 billion in value of assets was transferred to Seqwater on 1 January 2013.

Figure 1E
Value of grid assets at 30 June 2012

Asset category	Replacement cost $ bn	Proportion of total (per cent)	Written down value $ bn
Dams and weirs	2.350	37	1.937
Advanced water treatment plants	1.156	18	1.042
Desalination plant	0.935	15	0.824
Water treatment plants	0.713	11	0.576
Pipelines	1.188	19	1.119
Total	**6.342**	**100**	**5.498**

Source: QAO from Seqwater annual financial statements

As well as the significant capital expenditures, a high proportion of the annual operating, maintenance and refurbishment costs of these assets are largely fixed and do not vary with the volume of water produced.

During 2011–12, around 270 000 megalitres of water were supplied from the grid at a total cost to the grid manager of $877 million; an average cost of $3 248 per megalitre. Of these costs, 95 per cent were attributable to the capital costs of construction and fixed operating charges. Production costs, which vary in proportion to the volume of water produced, averaged around $160 per megalitre.

1.4.1 Asset life cycle costs

The original capital cost of acquisition of an asset, combined with its fixed and variable annual operating costs, make up an asset's 'life cycle' costs. For the long-lived infrastructure assets that make up the grid, their fixed and variable operating costs are significant when compared to the initial capital outlays. This is particularly the case for the 'manufactured' water assets—the WCRWS and the GCDP. The cost of disposal, which may include decommissioning, dismantling and site rehabilitation, can also be significant.

Operating and disposal costs are effectively 'locked in' when an asset is acquired. By considering these costs as part of the initial investment, decision makers will be better informed about the whole-of-life implications of planning, acquiring, operating, maintaining and disposing of an asset. This is critical to informing and confirming the value for money proposition, which compares expected and realised benefits to the expected and actual total cost of ownership.

In terms of value for money analysis, rigorous life cycle costing before acquisition provides the benchmarks against which future comparisons of actual operating costs can be made while the asset is in service. This informs decisions on whether to maintain, improve or dispose of the asset; and also informs the specifications for future assets.

1.4.2 Asset management

The *Water Supply (Safety and Reliability) Act 2008* requires service providers to prepare a strategic asset management plan and an operations, maintenance and renewals strategy.

The Department of Energy and Water Supply provides guidelines that set out the minimum requirements for a service provider to consider in preparing a strategic asset management plan.

The guidelines require providers to keep their plans abreast of industry best practice. In addition, section 108(4) of the Act requires an independent professional engineer to audit the plans regularly.

The *Financial and Performance Management Standard 2009* requires each statutory body to set up an asset management system that identifies, acquires, manages, disposes of, values, records and writes off assets. The current standard also requires a review of asset performance to ensure it is meeting its purpose and that it is maintained regularly. The principles contained in the current standard are consistent with the previous requirements in place at the time the development occurred.

1.5 Audit objective, scope and method

This audit examined whether south-east Queensland's bulk water infrastructure assets are being managed and maintained effectively to contribute to a secure and sustainable water supply and to minimise the impact of future changes in demand.

We focused our attention on the climate-resilient 'manufactured water' assets as they were the most significant recent asset acquisitions; they are technically complex, non-traditional sources of water; and they have not operated to their design capacity since commissioning, which raises questions about their cost effectiveness and their maintenance.

The audit started in early 2012 and substantial work was carried out before the restructure in January 2013. The audit was stalled, pending the outcome of a request by the Minister for Energy and Water Supply in June 2012, to review all options to make the manufactured water asset plants more cost effective and to improve the return on the assets over their lives.

The audit was carried out in accordance with the *Auditor-General of Queensland Auditing Standards—September 2012*, which incorporate Australian auditing and assurance standards.

The total cost of the audit was $530 000.

1.6 Structure of the report

The report is structured as follows:

- Chapter 2 examines the effectiveness of strategic asset management of bulk water infrastructure assets.
- Chapter 3 assesses the value for money of the WCRWS and the GCDP in terms of their financial and operating performance compared with the extent to which they have realised their intended benefits.
- Appendix A contains received entity responses to the report.
- Appendix B describes the audit objectives, reasons and approach.

2 Strategic asset management

In brief

Background

The South East Queensland Water Strategy (the strategy) sets the strategic direction to achieve the government objective of securing a safe, sustainable water supply for south-east Queensland. Performance monitoring and reporting is needed to demonstrate how well this objective is met.

The *Water Supply (Safety and Reliability) Act 2008* requires service providers to prepare a strategic asset management plan and an operations, maintenance and renewals strategy.

Conclusions

The South East Queensland Water Grid (the grid) assets are being managed and maintained in accordance with agreed levels of service to contribute to a secure and sustainable water supply for south-east Queensland. However, a lack of performance information means cost effectiveness cannot be demonstrated.

Asset management strategies and plans are in place or in development and reflect good practice.

Key findings

- Strategies, plans and processes in place are generally effective in contributing to a secure and sustainable water supply.
- Roles and responsibilities are defined clearly and discharged satisfactorily through strategic and operational plans and accountability documents, such as annual reports.
- The key elements of a performance management framework are in place, enabling a clear line of sight between planning, measuring and monitoring results and public reporting.
- Asset performance indicators omit definitions, such as time frames, quality and cost, and are not focused enough on outcomes and achievements.

Recommendations

It is recommended that Seqwater:

1. **Expand baseline data on operating and maintenance costs for benchmark reporting.**
2. **Develop performance measures for cost effectiveness.**
3. **Enhance existing performance measures to include timeliness, quality and cost.**

2.1 Introduction

Effective planning for the maintenance of assets is essential for securing a reliable water supply with minimal disruptions and asset failures.

Well-planned maintenance programs will incorporate constant improvements and reviews to adapt to changes in demand. Maintenance programs will also protect the value of the assets, which are publicly owned.

We assessed the strategies and plans for maintenance of water assets against six criteria:

- there is a principal strategy that ensures a secure, sustainable water supply
- robust demand forecasting informs the long-term planning and maintenance decisions
- alternatives are evaluated when planning for strategic assets and deciding on maintenance programs
- the South East Queensland Water Grid (the grid) entities have roles and responsibilities that are defined and communicated clearly
- plans effectively translate the strategies into efficient and economical maintenance programs
- there are long-term service levels and standards that are well-defined and regularly assessed.

2.2 Conclusions

Planning processes and strategies contribute to a secure and sustainable water supply. Roles and responsibilities are defined clearly and discharged satisfactorily through strategic and operational plans and accountability documents such as annual reports.

The required levels of service in the system operating plan and grid instructions have been met. Long-term planning of maintenance and asset renewal is structured, but strategic asset management plans need updating.

Key elements of a performance management framework are in place, giving a clear line of sight between planning, measuring and monitoring results and public reporting. However, performance indicators are needed to demonstrate cost effectiveness. More baseline asset information is needed to help develop better performance indicators and targets.

2.3 South East Queensland Water Strategy

Released in July 2010, the latest South East Queensland Water Strategy (the strategy) is a 50-year planning document describing significant potential future water sources for water security. It will be reviewed on a five-year cycle aligned to the review of the *South East Queensland Regional Plan 2009–2031*, which is next due in 2014.

The former Queensland Water Commission was responsible for developing, implementing and monitoring the strategy. It provided options on regional water security to the Minister for Energy and Water Supply who determined the regional water security program, which set objectives and the programs to meet them.

The former Queensland Water Commission implemented the regional water security program through the system operating plan, a set of rules and requirements aimed at getting the desired level of service from the grid. Subsequent progress on the regional water security program is published on the Seqwater website at www.seqwater.com.au.

The Strategy contains 84 activities, capital and maintenance works and initiatives previously determined by the former Queensland Water Commission to ensure the grid met Strategy goals. Their time frames are short (17), medium (38), long-term (9) and others variously defined—annually, every five years or by a specified date (20).

While the time frames are not defined clearly, short-term and medium-term are considered to be within 10 years. As the strategy is a long-term vision, it needs to be able to adapt to changes, such as natural events or government decisions, as well as promoting operational efficiency. However, the lack of clearly-defined time frames for activities means progress is not measured meaningfully.

Implementation and monitoring of the strategy is published in an annual report. The first *South East Queensland Water Strategy Annual Report 2011* reported progress on the 84 key actions and reviewed the strategy's planning assumptions and priorities.

The requirements to maintain water infrastructure assets are articulated in the:

- south-east Queensland water market rules 2011
- system operating plan 2011
- monthly grid instructions
- grid contracts.

The asset owners translated these requirements into asset management plans and programs.

2.3.1 LinkWater

The former LinkWater's key strategic planning documentation outlined the legal requirements for asset maintenance. Its 2009 strategic asset management plan was due for revision and approval by December 2012.

LinkWater was documenting an asset management framework to ensure it could meet its legal obligations, including agreed levels of service. The framework would integrate management plans with the asset management strategy and asset governance framework.

In documenting an asset management framework, LinkWater was building a program to link service delivery, asset reliability and criticality to help maximise its assets' economic lives. It used life cycle asset maintenance that included better practice risk management principles.

Although LinkWater performed long-term asset maintenance and asset replacement cost planning, it had not finalised an asset replacement and refurbishment plan to recommend short-term activities and forecast works for the longer-term.

An external expert commissioned by LinkWater found:

- It used a predictive and preventative maintenance strategy which should be more cost effective than correcting problems after they arise.
- It used a corporate-wide risk management plan, although it needed to integrate its risk-based maintenance strategy with its maintenance management plan, with secure future cost projections.

2.3.2 Seqwater

Seqwater had sound strategic asset management practices; however, since its asset portfolio expanded in 2011, it had three separate asset management plans covering the Gold Coast Desalination Plant (GCDP), the Western Corridor Recycled Water Scheme (WCRWS) and its water storage assets.

In its ongoing monitoring role, the Queensland Competition Authority found that Seqwater did not have a complete scheduled maintenance plan and thus had limited information on the condition of the assets it inherited from previous water authorities.

As a result, Seqwater is updating its asset management in the following ways:

- an updated asset portfolio master plan will incorporate the water treatment plant assets inherited from WaterSecure that have been scored against an annual water treatment plant risk assessment
- the strategic asset management plans will be consolidated and include the manufactured water assets
- the manufactured water readiness plans (from the system operating plan) and the consolidated strategic asset management plan will drive Seqwater's strategic asset management obligations.

Seqwater's asset renewal and refurbishment program is risk-based to identify and prioritise maintenance and renewal projects. The facility asset management plans document a 10-year program of capital and operational maintenance.

2.4 Asset maintenance

We evaluated the grid assets of Seqwater and LinkWater, as the asset owners, against five criteria for good practice in planning asset maintenance:

- there are clear requirements consistent with long-term, cost effective maintenance
- the asset owners use a life cycle approach
- the asset owners run the assets according to their operational plans
- the asset owners maintain the assets according to plan and to an agreed level of service for the life of the asset
- where there are third party contracts for the operation and maintenance of assets, the roles and responsibilities are defined clearly and the relationships are managed to ensure objectives are met for Seqwater, in its dual asset owner-manager role.

2.4.1 Planned maintenance

Seqwater and LinkWater met the required levels of service in the system operating plan and grid instructions. Long-term planning of maintenance and asset renewal is structured and supported by management and maintenance plans.

The SEQ Water grid manager, LinkWater and Seqwater were generally following sound asset management coordination, strategies, programs and plans. LinkWater and Seqwater were updating and consolidating their strategic asset management plans.

LinkWater had effective asset maintenance plans, programs and monitoring processes. It used improved life cycle principles and was consolidating its maintenance strategies and plans.

Similarly, Seqwater had sound strategic asset management practices and was also updating and consolidating its asset management plans to improve cost efficiency. A Queensland Competition Authority report found that Seqwater did not have a complete scheduled maintenance plan and thus had limited information on the condition of the assets it inherited from previous water authorities.

The former grid manager required asset owners to report on the condition of their assets and any maintenance and replacement work that might affect grid operations. It tracked and coordinated asset condition through a consolidated maintenance program, but had not recorded an opinion in the grid annual operations plan on whether the program would enable contractual obligations to supply water to be met. The maintenance schedule did detail specific maintenance activities for assets and assessments of urgency ratings and effects on the grid.

Both LinkWater and Seqwater effectively monitored the performance of and payments to third party service contractors for operating and/or maintaining grid assets.

2.4.2 Model forecasting

Grid participants model forecasts for their long term planning and asset maintenance.

The grid manager previously prepared a rolling 12-month forecast that showed how the grid would operate to meet demand. The forecasts included how much water it needed from its key assets.

The grid manager modeled various demand and operating scenarios and the grid instructions issued to the bulk water entities assured that it had up to date information about the condition of grid assets. Its forecasting and modelling did not directly affect long-term asset maintenance planning.

Seqwater model up to 30 years and is developing a manufactured water asset readiness plan to assess options for each of the climate-resilient assets.

2.5 Asset performance

The audit assessed the monitoring of performance of assets and reporting against established, relevant and appropriate key performance indicators.

All entities had the key elements of a performance management framework in place for a clear line of sight between planning, measuring and monitoring results and public reporting.

The former grid manager monitored the performance of the grid and its assets with modelling, demand forecasts and projections. Key reports were used to plan for the grid and its operations and were provided to appropriate decision makers in good time.

The former grid manager submitted quarterly reports to the Queensland Water Commission on progress in meeting the requirements of the system operating plan.

The asset owners reported to the Queensland Water Commission on asset performance through the water asset supply plans and also informed the grid manager and the Department of Energy and Water Supply on asset performance.

From 1 January 2013, Seqwater reports to the Department of Energy and Water Supply.

The four entities—LinkWater, Seqwater, the grid manager and Queensland Water Commission had performance indicators in place and key performance information was provided to appropriate decision makers to inform continuous improvement.

However, performance indicators lacked definitions of time frames, quality and cost and the indicators were not focused enough on outcomes and achievements. Without specific cost effectiveness performance indicators linked to the objectives of water security, the entities could not assure they were meeting those objectives efficiently.

Although the manufactured water assets are managed according to the operating rules, the lack of specific measures means Seqwater cannot fully demonstrate that they are achieving water security cost efficiently.

The performance reporting of assets can therefore be improved by defining further performance measures and targets, particularly to demonstrate cost effectiveness. Seqwater is developing and collecting baseline asset information that will contribute to performance indicators and targets.

2.6 Recommendations

It is recommended that Seqwater:

1. **Expand baseline data on operating and maintenance costs for benchmark reporting.**
2. **Develop performance measures for cost effectiveness.**
3. **Enhance existing performance measures to include timeliness, quality and cost.**

3 Manufactured water asset performance

In brief

Background

The decision to construct the Gold Coast Desalination Plant (GCDP) and the Western Corridor Recycled Water Scheme (WCRWS) was approved and implemented in a compressed time frame, in response to severe water shortages in 2006.

Conclusions

A lack of comparative benchmarking data and inconsistent operation of the plants in any one mode for a sustained period means that the cost efficiency of the manufactured water assets cannot be demonstrated. While the manufactured water assets have provided water security, this comes at significant cost. The environmental outcomes will not be achieved and economic outcomes were not specified.

Key findings

- A robust business case was not developed for the GCDP.
- A business case was developed for the WCRWS, but was premised on the unrealistic assumption that the plant would be run at full capacity constantly.
- A non-price alliance procurement strategy was adopted for both plants, preventing assessment of whether they were constructed at the lowest possible cost. The variable unit costs incurred to produce water from the GCDP and WCRWS were more than 10 times the average for water treatment plants in Australia.
- The decisions to construct the GCDP and WCRWS resulted in significant fixed expenses being 'locked in' long-term, even if the assets were barely used.
- A comprehensive benefits-to-costs analysis and comparison of various options was not undertaken for either project.

Recommendations summary

It is recommended that Seqwater:

4. **Investigate opportunities to reduce the ongoing costs associated with the (Gold Coast Desalination Plant) GCDP and Western Corridor Recycled Water Scheme (WCRWS)—this should incorporate a net present value assessment of the whole of remaining life costs and benefits associated with each alternative.**

5. **Include incentives for cost minimisation in contracts with plant operators, and agree a long-term target operating cost at the time of engaging the operator.**

3.1 Background

In 2006, the Queensland Government used its emergency powers to implement a water supply strategy to deal with the prolonged drought in south-east Queensland. The emergency strategy included the construction of the Gold Coast Desalination Plant (GCDP) and the Western Corridor Recycled Water Scheme (WCWRS), with other measures including new dams and regional pipelines.

The emergency water supply situation developed without any contingency planning or prepared solutions available to government to address the emerging critical supply shortage from a severe and prolonged drought.

The *SEQ Regional Water Supply Strategy—Stage 1* released in September 2004 had suggested that sufficient water supplies existed to meet projected demands until 2025. This report was prepared with limited demand data and applied inconsistent methodologies in determining supply availability. The 2004 strategy did not consider a drought scenario to stress test the water supply arrangements, despite the Gold Coast region experiencing a drought and raising the potential need to construct a climate-resistant source of water supply. The 2004 strategy identified that water re-use opportunities should be explored further.

Demand trends and options were investigated as part of the *SEQ Regional Water Supply Strategy*. Based on these investigations, the *South East Queensland Regional Plan 2005–2026* included a policy that all water service providers should adopt minimum residential reticulated water consumption targets, excluding leakage and other system losses, of at least:

- 270 litres per person per day by 2010
- 250 litres per person per day by 2015
- 230 litres per person per day by 2020.

These targets were reflected in the *SEQ Regional Water Supply Strategy—Stage 1*. The draft *South East Queensland Water Strategy*, released in March 2008, sought to ensure that after the Millennium Drought, average residential consumption did not increase to more than 230 litres per person per day. Actual residential consumption since water restrictions were introduced has been about 160 litres per person per day.

In September 2005, a new strategy was released, titled *Responding to Drought in SEQ-Contingency Planning for Urban Water Supplies*, which addressed the ongoing drought and diminishing water supply levels. This report presented a scenario that water supplies may run out in less than three years, giving limited time to find additional climate-resilient water supplies. Desalination plants in Adelaide and Perth each involved an approval and construction phase of four years, extended to at least five years when the planning and procurement phases were included. In comparison, the delivery time frames for the GCDP and WCRWS were very aggressive and compressed.

Against this background, and given the significant costs involved in their construction and ongoing operations, the risk that the cost and benefit outcomes expected from the GCDP and the WCRWS would not be achieved was higher, relative to other more conventional bulk water assets. Because of this, monitoring their performance takes on an added importance.

The *Financial and Performance Management Standard 2009* requires that the performance of the GCDP and the WCRWS, as major assets, should be reviewed periodically to ensure they are meeting their purposes and that they are being operated and maintained efficiently, avoiding unnecessary costs.

To be most effective, the performance reviews of each asset require baselines of expected costs and benefits against which actual performance may be benchmarked and compared. These baselines should have been established by the business cases in which the original investment proposals were analysed, dimensioned and articulated.

Robust business cases document the merit of the investment, based on a thorough and wide-ranging analysis of whole of life costs, risks and benefits. In this way, they demonstrate to the decision makers that these manufactured water assets balanced supply and demand at the lowest expected cost.

3.2 Conclusions

The cost efficiency of the manufactured water assets under various operating modes cannot be demonstrated, due to limited comparative benchmarking data and inconsistent operation of the plants in any one mode for a sustained period of time.

The decision to develop the manufactured water assets was an appropriate response to the severe drought circumstances at the time and they have provided water security. However, this comes at a significant cost which casts doubt on their value for money. Apart from water security, no other expected benefits have been realised—the environmental outcomes will not be achieved and economic outcomes were not specified.

Of most concern is that the expected benefits were overstated. While this did not invalidate the case for manufactured water, it meant consideration of the water supply needed from these plants and the cost of this supply was not balanced against a realistic assessment of benefits.

3.3 Costs

Financial performance, in terms of actual costs compared to expected costs, is central to establishing that asset investments provide value for money.

The total costs of ownership of both the GCDP and the WCRWS include significant ongoing operations and maintenance costs, in addition to their initial capital cost of construction. All costs have significantly exceeded initial expectations, adversely affecting the value for money proposition for these assets. Rushed planning, and the procurement method chosen to deliver them, meant that achievement of lowest or 'least cost' outcomes cannot be demonstrated.

For the GCDP in particular, it is not possible to determine with sufficient reliability whether the plant was constructed at best cost, or is being operated and maintained efficiently since. This is because it did not have a formally documented business case; a non-price competitive procurement strategy was chosen to deliver it; and it has not operated to its design capacity, or consistently in any one mode, since its commissioning.

Similar circumstances apply to the WCRWS, except that it did have a business case that established benchmarks for capital and operating costs.

3.3.1 Capital costs of construction

In 2011, the Australian Government's Productivity Commission published an inquiry report into Australia’s Urban Water Sector. The inquiry benchmarked the capital costs of the GCDP and WCRWS against others in Australia. The report noted that desalination plants were an expensive option and the inquiry urged governments to seek lower-cost alternatives for water security.

The benchmarking results, summarised in Figure 3A, demonstrate that the GCDP and the WCRWS deliver their maximum design yields at a higher cost per megalitre when compared to commensurate plants.

Figure 3A
Comparison of capital costs of water supply projects

	Estimated capital costs ($m)	Yield per annum (ML)	Capital cost/ annual yield ($ per ML)
Desalination			
Gold Coast—Tugun (QLD)	**1 200**	**49 000**	**24 500**
Wonthaggi (VIC)	3 500	150 000	23 300
Kurnell (NSW)	1 890	90 000	21 000
Binningup (WA)	955	50 000	19 100
Port Stanvac (SA)	1 830	100 000	18 300
Recycling			
West Werribee recycled water (VIC)	114	3 000	38 000
Western Corridor recycled water (QLD)	**2 600**	**84 700**	**30 700**
Rosehill—Camellia (NSW)	100	7 000	14 300
St Mary's replacement follows (NSW)	250	18 000	13 900
Glenelg to Adelaide park lands (SA)	76	5 500	13 800
Wollongong water recycling (NSW)	25	7 300	3 400

Source: adapted from—Productivity in Electricity, Gas and Water: Measurement and Interpretation, Productivity Commission 2011

The clear indications are that the costs of construction of the GCDP and the WCRWS include a significant premium when compared to other similar facilities. This can be attributed both to the compressed time frames for planning, design and construction and the overheated construction sector at that time. This was explicitly recognised in the WCRWS business case, but no attempt was made to quantify the amount of this premium. The cost of the GCDP was also impacted by site characteristics resulting in unusually long intake and outlet pipelines compared to comparator desalination plants elsewhere in Australia.

The Gold Coast Desalination Plant

Detailed analysis of the financial performance of the GCDP, in terms of its capital costs of construction, is hampered by the lack of a clearly documented business case that dealt comprehensively with the supply options, their associated costs, risks and benefits.

Between 2002 and 2005, Gold Coast City Council (GCCC) undertook significant strategic planning and option selection processes to address drought security issues, as part of the development of the Gold Coast Waterfuture Strategy (GCWF).

The GCWF outlined the city's water balance and sources until 2056. The construction of a desalination plant was one component of this strategy and was the least preferred option in providing a bulk water source for the city. However, with the worsening drought situation in south east Queensland, it became the only viable alternative which met the required timeframe.

Under the *value for money framework* applying to State Government at the time, a business case was required and expected to reflect a thoroughly-documented service need, clear project objectives and accurate cost estimates, compared to the actual final cost. It is recognized that Local Government Authorities were not required to apply this framework, however best practice would have been for GCCC to follow the State Government requirements.

Neither GCCC for its proposed 55 megalitres per day plant, nor the-then Department of Water and Energy for the expanded 125 megalitres per day plant could produce such a business case.

Under the *value for money framework*, it was expected also that the assessment of the most appropriate procurement strategy would be considered as part of the business case reviewed and refined as necessary.

GCCC chose a non-price selection alliance arrangement as its procurement strategy. This model was selected on the basis that it provided a proven mechanism to deliver under a wide range of constraints including tight timeframes, immature project certainty and planning status, flexibility in access to skills and limited GCCC resources and desalination experience.

While utilisation of this procurement strategy meant that there was no direct competitive bidding tension in establishing the overall target, or expected outturn cost of the plant, GCCC did however appoint an independent project estimator to ensure the competitiveness and validity of the target outturn cost against current market conditions.

The state, on taking over responsibility for the project in late 2006 and subsequent ownership of the asset inherited these arrangements and did not seek to establish or document its own business case independently or to validate the procurement strategy.

Robust program and budget management was not evident at the preliminary decision making stages, as evidenced by the significant discrepancy between initial estimates of construction costs and the forecast target outturn cost/target operating cost determined jointly by the alliance partners.

In considering the proposition by the state to increase the capacity of the GCDP from 55 megalitres per day to at least 110 megalitres per day, the GCCC was advised in March 2006 that the 'benchmark' cost for the expanded plant was $265 million. This was consistent with previous advice to the council that the cost of the smaller 55 megalitres per day plant alone was expected to be around $130 million. Council was also advised that the intake and outlet works would cost around $65 million (50 per cent of the smaller plant cost) and that the cost of these tunnel and marine works would be unlikely to vary significantly between a plant of 55 megalitres per day and 110 megalitres per day, thereby providing economies of scale.

However, six months later, the concept design and cost estimation process by the selected alliance partners produced an initial target outturn cost estimate of $591 million for the plant and $278 million for the tunnel and marine works. This represented a variation of 163 per cent between the benchmark cost advised to the GCCC and the target outturn cost/target operating cost.

The initial 'benchmark' cost for the plant was determined from an existing design developed for the Perth Desalination Project, using comparable budgets and final tender figures for recent desalination projects. In comparison, the Perth desalination plant, which has a similar capacity to the GCDP, was reportedly built for $387 million in 18 months, following a competitive price-based tender process.

There is limited evidence of any rigor in the process to establish the initial benchmark cost; or of any later analysis or reconciliation of the target outturn cost/target operating cost developed by the alliance against the initial benchmark.

The Western Corridor Recycled Water Scheme

In contrast to the GCDP, a comprehensive business planning process was undertaken for the WCRWS over two years that involved both an options analysis and the development of a progressively updated business case that clearly set out objectives, options, full costs, expected benefits, time frames and risks.

Like the GCDP, a non-price competitive alliance procurement strategy was adopted. Unlike the GCDP, rigorous costing undertaken in the development of the business case afforded the state the opportunity to scrutinise and benchmark closely the target outturn cost/target operating cost estimates developed by the alliance partners. To some extent, this mitigated the lack of a price-competitive tender process in establishing that value for money was likely to be obtained.

The initial draft 2006 business case for the WCRWS was updated in May 2007 as part of a submission to the Australian Government to support a capital funding request for $408 million toward the second stage of the WCRWS. The updated 2007 business case contained cost estimates developed in November 2006 for the construction of the WCRWS over three years. The capital construction costs were estimated at $1.770 billion to produce a combined capacity of 212 megalitres per day. The final approved target outturn cost/target operating cost for the WCRWS of $2.493 billion and the actual outturn cost was $2.293 billion for a capacity of 232 megalitres per day.

The difference between the business case estimate and the target outturn cost/target operating cost of around 37 per cent is substantial, but significantly less than that for the GCDP. Some of the difference can be explained by the change in scale of the WCRWS. By comparison, however, the agreed cost for the additional 50 megalitres per day capacity added to the Gibson Island plant was $44 million.

For both assets, it is evident that the state paid more to construct them than it would have under a less time-critical construction path. This was explicitly acknowledged in the WCRWS business case, but not quantified for decision makers.

For both assets, the reliance on non-price competitive or ‘pure’ alliances presented a further challenge for decision makers to demonstrate that value for money was obtained objectively—that lowest cost was achieved. The business need for such pure alliance arrangements was not made in the context of either the GCDP or the WCRWS.

3.3.2 Funding costs and depreciation

As documented in Figures 3B and 3C, the construction of the GCDP and WCRWS was funded by a combination of debt, equity contributed from the State Government and grants from the Australian Government.

Figure 3B
Sources of funding for the GCDP and related annual profit and loss charges

Source of funding			Related annual profit and loss impact		
Source	$M	%	Profit and loss item	$M	% of source
Debt	582.96	60.3	Finance costs	38.2	6.6
Contributed equity	383.81	39.7			
Capital cost	966.77	100.0			
Impairment	(41.39)	(4.3)			
Adjusted gross asset value	925.38	95.7	Depreciation expense	36.5	3.9

Source: Seqwater

Figure 3C
Sources of funding for WCRWS and related annual profit and loss charges

Source of funding			Related annual profit and loss impact		
Source	$M	%	Profit and loss item	$M	% of source
Debt	1 935.7	82.6	Finance/borrowing costs	128.5	6.6
Commonwealth grants	408.0	17.4			
Capital cost	2 343.7	100.0			
Impairment	(69.5)	(3.0)			
Adjusted gross asset value	2 274.2	97.0	Depreciation expense*	71.0	3.0

*Depreciation amount excluding pipelines is $52.4M

Source: Seqwater

Total debt procured to fund the construction of the two assets was $2.518 billion, which represented 2.9 per cent of the total state sector's borrowings as at 30 June 2012. The debt is comprised of perpetual interest-only loans, which are incurring annual interest charges of $166.7 million currently—an average interest rate of 6.6 per cent.

For 2011–12, interest charges represented 54 per cent of the total operating expenses directly traceable to manufactured water assets. The payment of these interest charges, and the repayment of debt, is 'locked in', regardless of the level of production, including the scenario of decommissioning the assets.

In accordance with AASB 120 *Accounting for Government Grants and Disclosure of Government Assistance*, the Australian Government grants were recognised as unearned revenue on initial recognition and this liability is being amortised over the life of the assets against grant revenue. This partly offsets the annual depreciation expense of $71 million for the WCRWS. The annual depreciation expense for the GCDP is $36.5 million. These annual depreciation charges allocate the capital costs of construction of each major component of each asset over its expected useful life.

As well as ongoing interest and depreciation expenses, the Queensland Manufactured Water Authority recognised an impairment loss of $41.395 million for the GCDP and $69.471 million for the WCRWS in 2010–11 before the assets were transferred to Seqwater. This impairment arose because the Queensland Manufactured Water Authority assessed that the recoverable amount of the assets, on a discounted cash flow basis, was less than their carrying value as at 30 June 2011 and this required a write down of the asset's values in the books of account.

3.3.3 Operating and maintenance costs

For large scale, long-lived infrastructure, the cost of running the asset can be significant in comparison with the cost of building it. For manufactured water assets, the operating and maintenance costs over their lives are estimated to be around 40 per cent or more of total costs.

Running costs include the costs of employees to operate and maintain the plant; energy to power the plant—and in the case of desalination, this is a significant cost in its own right; and the cost of repairs and replacement of components that wear out.

Some of these running costs are effectively fixed— they do not vary with the volume of water produced—while other costs, such as power, are variable.

The Gold Coast Desalination Plant

Figure 3D compares operating and maintenance expenses between actual and original budget for 2011–12, and shows Seqwater's current best estimates of what these costs would be in 2012–13 under various options for alternative operating modes.

Figure 3D
Comparison of GCDP operating and maintenance costs under various scenarios

	2011–12 Budget	2011–12 Actual	2012–13 Estimate Option 1	2012–13 Estimate Option 2	2012–13 Estimate Option 3	2012–13 Estimate Option 4
Operating mode	Planned production averaged at around 20% of capacity	Combination of hot standby mode, and production of 33% or 66%	Standby with reduced plant capacity, but with scope to increase production to 33% within 24 hours	15% continuous production, with scope to increase to 100% within 72 hours	33% continuous production	100% continuous production
Yield (ML)	9 054	3 427	2 080	5 421	15 039	45 632
Fixed costs	14.21	11.80	13.58	13.58	14.49	18.17
Variable costs	6.16	3.29	2.36	4.57	9.89	28.41
Total ($m)	**20.37**	**15.09**	**15.94**	**18.15**	**24.38**	**46.58**
Fixed costs	1 569	3 444	6 529	2 505	962	398
Variable costs	680	959	1 135	843	657	623
Total ($/ML)	**2 249**	**4 403**	**7 664**	**3 348**	**1 619**	**1 021**
Fixed costs (%)	70	78	85	75	60	39
Variable costs (%)	30	22	15	25	40	61
Total (%)	**100**	**100**	**100**	**100**	**100**	**100**

Source: Seqwater

As illustrated in Figure 3D, the GCDP's fixed operating costs do not vary significantly, regardless of the level of production. Therefore, the original decision to construct the plant has resulted in fixed costs of greater than $11 million per year, 'locked in' for the long term—including when the plant is significantly under-used, as is the case currently. These fixed costs include employee expenses, repairs and maintenance and fixed energy charges.

Figure 3D also highlights that some costs vary in line with production levels. These variable costs include chemical treatment, waste disposal and variable energy. The GCDP’s actual variable cost of $959 per megalitre in 2011–12, and for all other levels of output modelled, is much higher than the average variable cost for non-manufactured water treatment plants, which was $67 per megalitre.

The data show also that the total average cost of production declines as output increases to 100 per cent of capacity. This demonstrates that operating economies of scale are achievable in line with plant size.

The absence of a business case for the GCDP means there is no initial benchmark against which to compare budget, actual or anticipated costs for different modes. Similarly, a services target operating cost agreement between the state and the private sector alliance partner engaged to operate the plant was not agreed before operations commenced in September 2010 and has yet to be agreed.

With no long-term budget model to facilitate a comparison with actual costs, it is not possible to perform effectively a post-implementation review of ongoing operating and maintenance costs by comparing actual expenses with an original plan.

The services target outturn cost/target operating cost are delayed because the original plans for the GCDP did not contemplate the current scenario of operating the plant in hot standby mode. As an interim solution, the plant operator submits an annual draft budget to Seqwater for its review and approval under a ‘cost plus’ model.

In 2011–12, fixed operating expenses were $2.41 million (17 per cent) below the annual budget. However, any apparent 'savings' cannot be attributed reliably or solely to greater economy or efficiency as there was no strong basis on which to frame the budget in the first place. The same holds for variable costs. While variable costs were $2.87 million (47 per cent) below budget, actual volumes produced of 3 427 megalitres were 5 627 megalitres (62 per cent) below the target output of 9 054 megalitres. This implies less efficiency or calls into question the reliability of the budgeted amounts.

The Western Corridor Recycled Water Scheme

Figure 3E compares actual operating and maintenance expenses for 2011–12 against the forecast for that year taken from the 2007 business case and Seqwater’s best estimates of direct expenses for 2012–13 under various operating modes.

Figure 3E
Comparison of WCRWS operating and maintenance costs under various scenarios

	2011–12 Actual[1]	2011–12 Forecast from 2007[2]	2012–13 Estimate[1] Option 1	2012–13 Estimate[1] Option 2	2012–13 Estimate[1] Option 3	2012–13 Estimate[1] Option 4
Operating mode	Average production of 17 ML/day	Full production of 200 ML/day with 3 plants operating	Complete shutdown with minimum maintenance	Production averaging 11 ML/day using 2 plants	Production averaging 22 ML/day using 1.5 plants	Full production of 182 ML/day with 2.5 plants operating
Yield (ML)	6 201	73 000	0	4 000	8 238	66 000
Operating and maintenance costs ($M)						
Fixed costs	22.20	28.22	11.30	18.80	22.00	25.80
Variable costs	5.20	54.63	1.00	5.00	8.00	38.00
Total ($m)	**27.40**	**82.85**	**12.30**	**23.80**	**30.00**	**63.80**
Operating and maintenance costs per megalitre produced ($/ML)						
Fixed costs	3 580	387	n/a	4 700	2 670	392
Variable costs	839	748	n/a	1 250	970	576
Total ($/ML)	**4 419**	**1 135**	**n/a**	**5 950**	**3 640**	**968**
Fixed/variable cost ration (%)						
Fixed costs (%)	81	34	92	79	73	40
Variable costs (%)	19	66	8	21	27	60
Total (%)	**100**	**100**	**100**	**100**	**100**	**100**

Notes: 1 Seqwater; 2 2007 business case

As illustrated in Figure 3E, the decision to construct the WCRWS committed the state to at least $18.8 million per year in fixed costs, unless the WCRWS is fully decommissioned. Even in this scenario, Seqwater estimates annual fixed costs of more than $11 million would be required to preserve the asset's life so that it could be reactivated if required.

While operating and maintenance costs for 2011–12 were $55.45 million lower than anticipated in the 2007 business case, this was due solely to the reduced volume of recycled water produced. Because of the reduced output, instead of achieving the planned cost of $1 135 per megalitres at full production levels as set out in the business case, actual costs in 2011–12 were $4 419 per megalitre.

The inquiry conducted by the Productivity Commission in 2011 provided insights into operating expense benchmarks for recycling of $860 per megalitre in Perth and $1 500 per megalitre in Melbourne. If operated at full capacity, Seqwater's projections indicate that the operating and maintenance costs of the WCRWS would be at the lower end of this range at $968 per megalitre.

3.3.4 Full cost of manufactured water

Figure 3F sets out the total 'annualised' capital and operating costs for the manufactured water assets; calculates the full cost per megalitre of water produced in 2011–12 and compares both to Seqwater's best estimates for 2012–13 if the assets were to be run at full capacity.

The volume of water produced from these assets for the year, 9 628 megalitres, represented only 3.6 per cent of the total water produced from the grid during the period, and 8.7 per cent of the combined capacity of the manufactured water plants.

Of the total 2011–12 costs incurred by the GCDP and WCRWS, $302.5 million (97 per cent) were fixed costs. The 2011–12 variable costs per megalitre of the GCDP and WCRWS were $959 and $834 respectively. At full production, the variable costs are estimated to average $597 per megalitre. These costs compare unfavourably to the average variable cost of water for bulk water storage treatment plants of $67 per megalitre.

The State Government is assessing options in alternative operating modes currently for the manufactured water assets. For example, analysis by Seqwater estimates that moving from the current operating regime for WCRWS to a full shutdown would lead to an estimated saving of $257.9 million over 15 years in 2012 dollars, including costs to shut down and restart. In terms of the GCDP, Seqwater estimates that a net present value saving of $29.85 million over the next five years could be obtained in capital and operating costs if the capacity of the plant was reduced temporarily to 33 per cent over that period.

Figure 3F
Annual cost per megalitre (ML) of manufactured water assets(2011–12)

	Gold Coast Desalination Plant		Western Corridor Recycled Water Scheme		Combined assets (weighted averages)	
	2011–12 Actual	Estimate @100%	2011–12 Actual	Estimate @ 100%	2011–12 Actual	Estimate @ 100%
Yield (ML)	3 427	45 632	6 201	65 700	9 628	111 332
Fixed costs ($m)						
Finance/borrowing costs	38.21	38.21	128.49	128.49	166.70	166.70
Capital cost (depreciation)	36.48	36.48	65.30	65.30	101.78	101.78
Operating and maintenance costs	11.80	18.17	22.25	25.77	34.05	43.94
	86.49	**92.86**	**216.04**	**219.56**	**302.53**	**312.42**
Variable costs ($m)						
Operating and maintenance costs	3.29	28.41	5.17	38.05	8.46	66.46
Total fixed and variable ($m)	**89.78**	**121.27**	**221.21**	**257.51**	**310.99**	**378.78**
Fixed cost per megalitre ($/ML)	25 238	2 034	34 838	3 342	31 422	2 806
Variable cost per megalitre ($/ML)	959	623	834	579	879	597
Full cost per megalitre ($/ML)	**26 198**	**2 658**	**35 673**	**3 921**	**32 301**	**3 402**

Source: Seqwater

In comparison, the business case estimates for the full cost (capital and operating) per megalitre of producing water from the WCRWS are set out in Figure 3G. There was no business case for the GCDP.

Figure 3G
WCRWS—Changes in total cost per megalitre (ML) over time

	Capacity (ML/day)	Cost ($/ML)		
Source		Capital	Operating	Total
2006 draft business case (assuming 50-year life and 6% real discount rate)	248	1 210	695	1 905
2007 final business case (assuming 50-year life and 6% real discount rate)	207	1 620	1 095	2 715
2012–13 Seqwater best estimate	180	994	971	1 965

Source: Seqwater

3.4 Benefits

Major investment decisions use a benefit to cost analysis (BCA) to calculate and compare the benefits and costs of a project, decision or policy.

The expectation of BCA analysis is that, on balance, a sufficient level of assurance is obtained during the decision making phase that the project under consideration has a positive BCA measure where expected benefits exceed expected costs. In the project evaluation stage, BCA analysis has two fundamental purposes:

- to determine if a project is a sound and justifiable investment decision on the basis that the expected benefits exceed the expected costs
- to provide a basis for comparing alternatives, to identify the project that has the greatest expected benefit to cost ratio.

A secondary step, once the project is completed, involves assessing if the actual benefits exceed actual costs to validate that the investment was justifiable and met the objectives of the investment decision.

The costs of the GCDP and WCRWS assets and comparison of expected costs to actual costs have been considered. This section of the report focuses on the intended benefits and actual or realised benefits for the GCDP and WCRWS. This benefits assessment has considered the following three major areas:

- **Social**—to assess the security of supply benefits
- **Economic**—to consider the revenues from the manufactured water assets
- **Environmental**—to assess the reduced nitrogen and phosphorus loads into Moreton Bay.

The lack of a properly formed and robust business case for the GCDP has made it difficult to determine exactly what the expected benefits were for this investment. A business case was available for the WCRWS to identify the expected benefits for this asset.

3.4.1 Social

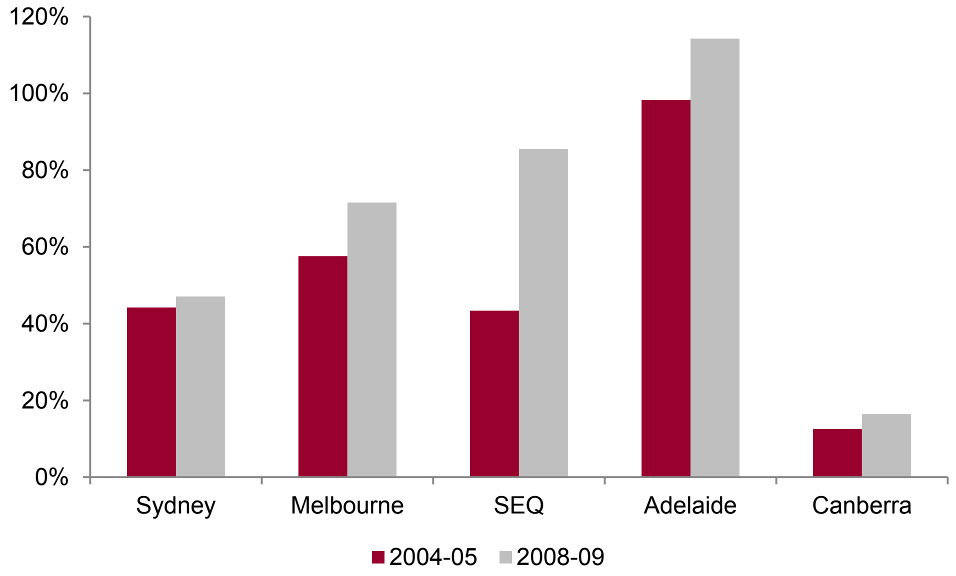
The construction of the manufactured water facilities has reduced the likelihood that south-east Queensland residents will be placed under severe water use restrictions. The benefits extend to the broader economy as industries, such as the horticulture industry, which are reliant on residents having unrestricted access to water, enjoy greater certainty and confidence that their customers and markets will be not affected by water restrictions into the future.

Seqwater's forecast that a water supply augmentation is not required until 2025, based on the current operating strategy of the GCDP and WCRWS, provides evidence that a long-term, climate-independent water supply source has been established. A further benefit that arises is that future augmentations can be delayed due to the capacity provided by the construction of these facilities.

But it is not clear that the level of security of supply provided by the GCDP and the WCRWS was prudent and appropriate. It is acknowledged that they were implemented as part of a drought response, and at that time, there were no clearly articulated water security objectives, However, with the benefit of hindsight, it can be argued that a significant investment has been made well ahead of its time which is placing significant upwards pressure on water pricing. Such an investment can be justified if the community places a high value on avoiding water restrictions, with the issue then revolving around the optimal level of security of supply to meet the community's expectation at least cost.

Figure 3H compares the security of supply across the major Australian capital cities provided by climate-resilient sources, based on actual demands with no water restrictions in place (2004–05) and for the relevant cities with some form of water restrictions in place (2008–09).

Figure 3H
Potential demand for climate-resilient water sources



Source: QAO

This comparison provides an assessment of the relative level of supply security installed in the south-east Queensland water system from climate-resilient sources, compared with interstate capital cities. The more relevant year for this comparison was the period without water restrictions (2004–05) as the installation of climate-resilient water sources would avoid or limit any water restrictions imposed. On this measure, south-east Queensland ranks above Canberra, equal to Sydney and below Melbourne and Adelaide.

Figure 3H indicates that Sydney and south-east Queensland have a lower level of supply security provided by climate-resilient water sources when compared with Melbourne and Adelaide, with Canberra having the lowest. Sydney and south-east Queensland can meet about 40 per cent of demand from climate-resilient sources, based on 2004–05 demand levels, whereas the climate-resilient water sources in Melbourne and Adelaide can meet, respectively, 58 per cent and 98 per cent of 2004–05 demand levels. Canberra is below 20 per cent in both years.

This comparison provides some comfort that the level and capacity of climate-resilient supply sources in south-east Queensland is not an anomaly compared with other cities in Australia. The analysis does not provide the answer on the optimal level of supply security to be provided by climate-resilient sources. It could be that other states, and Queensland, have been too cautious in the management of supply security and installed capacity beyond the current needs and ahead of time.

In this regard, a business case supporting the investment in the manufactured water plants would have benefited from either sensitivity or scenario analysis that included low, medium and high rainfall and water storages levels. This would have better informed the decision in determining plant capacity and the staging of the construction to install the capacity.

The Gold Coast Desalination Plant

While there is no robust business case for the GCDP, the key expected social benefit was the increase in the security of supply, both in the short-term to deal with the water supply shortages associated with the drought and to increase the long-term water supply, based on a climate-resilient source.

The construction of the GCDP has contributed positively to the security of supply levels by adding 125 megalitres per day of capacity that is not dependent on climate. This supply source has the flexibility to produce water as needed, based on the prevailing operating parameters. Commissioning issues, however, are expected to increase the operating costs and reduce the design life of the plant. This outcome affects the plant's value for money negatively as the realisable benefits are below the expected benefits.

The Water Amendment Regulation (No. 6) 2006, made under the *Water Act 2000* in August 2006, stipulated that a 125 megalitres per day desalination facility would be constructed by 30 November 2008. Due to a number of commissioning issues, this deadline was not met. These issues included an electrical safety issue that resulted in a temporary shutdown of commissioning works, excessive sea swell that delayed the flooding of the sea tunnels and a number of defects in plant components that came to light during initial commission.

The GCDP began supplying the grid on 26 February 2009 at 33 per cent capacity and reached 100 per cent production in March 2009. The plant required a shutdown period of four to five weeks in April 2009 to allow some of the defects to be rectified. Not all defects have been rectified or commercially resolved with the alliance contractor and the urgency to do so is reduced, given the restored levels of water supplies from other sources.

The four-month delay in reaching full production capacity was not as critical as had been anticipated because water supply levels had recovered to above 40 per cent by November 2008. Had the water supply situation not been alleviated due to improving water storages, with levels rising above 60 per cent by May 2009, the ongoing commissioning issues may have compromised either the plant's ability to supply full production volumes or the government's ability to resolve any issues commercially and favourably.

The creation of a long-term, climate-resilient water supply source is supported by Seqwater's forecast that a water supply augmentation is not required until 2025, based on the current operating strategy, which also includes the WCRWS.

Seqwater has forecast that, without the GCDP, the Gold Coast region would require an augmentation in 2019 to deliver peak monthly flows. This could be met by an increase in capacity in the southern regional water pipeline and costing an estimated $30 million. The construction of the GCDP has alleviated the need for that augmentation.

The GCDP has demonstrated other benefits. During the 2011 floods, it mitigated the central south-east Queensland supply risks (Brisbane) and also provides the Gold Coast region with a contingent supply if an extended outage occurs at the Mudgeeraba or Molendinar water treatment plants.

The Western Corridor Recycled Water Scheme

The WCRWS business case listed the following benefits of the project:

- meets security of supply targets specified by the 2006 Emergency Regulation under the *Water Act 2000*
- has the ability to transfer new water source to Somerset/Wivenhoe systems
- acts as a valuable long-term contingency raw water supply source
- substitutes potable water used in power generation and industrial use
- provides a new non-climate-dependent water source for use by industry and agricultural producers.

Based on these expected benefits, the key social benefit of the WCRWS was similar to the GCDP, to increase the security of supply, both in the short-term to deal with the water supply shortages associated with the drought and to increase the long-term water supply not dependent on rainfall.

The WCRWS was expected to introduce a significant water supply source that was not dependent on climate when the government invoked emergency powers under the *Water Act* to deal with the diminishing water supply situation. The Water Amendment Regulation (No. 6) 2006 stipulated a staged implementation of the WCRWS as follows:

- Stage 1A—20 megalitres per day (Bundamba A) by 31 July 2007
- Stage 1B—75 megalitres per day (Bundamba B) by 30 April 2008
- Stage 2—115 megalitres per day (Gibson Island and Luggage Point) by 31 December 2008.

The built or delivered configurations of the stages did change and some delays and commissioning issues also emerged. The recovery in water storage levels reduced the criticality of these delays and the effects on the short-term security of supply levels.

The delivered WCRWS was completed as follows:

- Stage 1A—20 megalitres per day (Bundamba A) completed in August 2007
- Stage 1B—46 megalitres per day (Bundamba B) completed in June 2008
- Stage 2—166 megalitres per day (Gibson Island and Luggage Point) completed in December 2008.

While the total capacity of the WCRWS increased from 212 megalitres per day as outlined in the business case to the constructed capacity of 232 megalitres per day, the rationale and payback for the increase in capacity was not clear. The capacity of the WCRWS was influenced by the feedwater volumes and the asset owner estimated in November 2010 that the capacity of the systems was 170 megalitres per day, based on prevailing feedwater volumes.

The Gibson Island facility has experienced significant technical issues resulting in the delay of its commissioning and what effect they may have had on the operating costs and expected life of the plant is unclear. The Gibson Island facility was shut down in December 2012 which removed 100 megalitres per day capacity and reduced the total WCRWS capacity from 232 megalitres per day to 132 megalitres per day.

The current grid operations plan is based on Luggage Point and one stage of Bundamba operating to supply up to 85 megalitres per day. Given the current demand levels require a maximum of 15 megalitres per day, it is unclear why two plants with a combined capacity of 56 megalitres per day are operating.

A limited level of substitution of potable water supplies with recycled water has occurred for power stations and industrial customers. The power stations are the only existing customers of the WCRWS. Queensland Urban Utilities has identified between 47 megalitres per day and 55 megalitres per day of potential commercial demand, yet to be realised, with about half of that estimated to be recycled water.

The target levels of substitution for power stations set in the business case was up to 197 megalitres per day with supplies to power stations peaking at 112 megalitres per day in late 2009, but this has declined to a projected 10 megalitres per day, despite being contracted to supply up to 85 megalitres per day. The demand from power stations has been affected by the closure of Tarong North and Swanbank B power stations and a reduction in water needs of Tarong and Swanbank A power stations. The WCRWS is the sole supplier to Swanbank Power Station.

The business case target of 68 megalitres per day for irrigation customers, to be supplied when water was not being supplied for urban and industrial use, has not been realised.

From the business cases, expected maximum demand totalled 197 megalitres per day, yet the constructed capacity of the plant was 232 megalitres per day. This suggests that 35 megalitres per day of capacity was not required to meet the expected maximum demand. A further issue affecting plant capacity involves the feedwater volumes which limited the assets' capacity to 170 megalitres per day in 2010.

A more prudent and cost effective approach would have involved building capacity to match the demands and the availability of feedwater volumes. Such an approach would have avoided the need to build the Gibson Island facility which is currently in shutdown mode and unlikely to be recommissioned before 2030—the WCRWS has only a five per cent cumulative probability of being fully required in 2030.

The projected demand was either unrealistically optimistic or overlooked the effects on demand resulting from high rainfall and the recovery of water supply levels. The opportunity to establish markets and customers for recycled water from the WCRWS has been problematic, as its use is not mandated for the targeted users and uptake has been very low. The low uptake of recycled water from industry and the irrigation sector has no doubt been affected by high rainfall and the associated recovery in water supply levels, which reduces the demand for recycled water, given its higher costs and perceived risks.

3.4.2 Economic

In 2011–12, an operating loss of $369.977 million ($1 372 per megalitre) was incurred by the SEQ Water Grid Manager on the sale of water to water retailers. This was because the price for bulk water is regulated, so the revenue earned from sales was less than the costs incurred. These losses were offset by borrowings which were used to fund operating costs; this meant that state debt increased by $369.977 million.

The south-east Queensland bulk water charge is the mechanism which collects the revenues associated with the supply of bulk water in south-east Queensland. The south-east Queensland bulk water charge is levied upon the water retailers—distributors and is then passed on to final water users. The bulk water price path collects revenue to fund the supply, treatment and delivery of all bulk water sources in south-east Queensland, based on certain assumptions. The structure of this price path reduces the ability to review the individual economic performance of the GCDP and the WCRWS and to assess the extent of revenue recovery achieved to date.

The Queensland Government announced a 10-year bulk water price path for south-east Queensland in 2008, based on the analysis and recommendations by the former Queensland Water Commission. The first five-year period of the price path is fixed, with the second five-year period providing indicative price increases and being subject to review. It is expected that a revised bulk water price path will apply from 1 July 2013. The price path eased the price impact of the grid for customers by adopting a concessional rate of return on newly constructed assets associated with the grid.

The bulk water price path is intended to recover efficient operating costs, capital costs (depreciation) and a return on capital. This determines a revenue requirement that is then converted to a unit price, based on forecast water usage. Some issues emerge from the price path parameters relating to the concessional rate of return and the accuracy of water use forecasts.

The concessional rate of return on newly constructed grid assets does not affect the recovery of efficient operating costs, but reduces the economic return to government on this investment via dividends, which affects the state's financial position.

A secondary issue arises around the accuracy of the water use forecasts, given the community's response to the water restrictions and conservation campaign, which resulted in water consumption of much lower levels than expected. If the water forecasts applied in the calculation of the bulk water charges are above the actual outcomes, this would result in revenue under recovery. Revenue under recovery would result in actual economic benefits not meeting the expected economic benefits.

A further issue, which has the potential to affect the economic benefits of the investment in the GCDP and WCRWS, is the $80 bulk water rebate provided to water customers in 2013. As this rebate was funded by consolidated revenue and not from cost savings in the production of bulk water, this resulted in revenue under recovery and reduced actual economic benefits of the GCDP and WCRWS.

It is expected that the review of the bulk water price path will take into account any substantial variations from the initial assumptions, based on changes to regional demand patterns and any revisions to the program. For example, in 2010 the price path was updated following the cancellation of Traveston Crossing Dam. The review will also consider factors such as population forecasts and costs of finance at the time. The comparison of forecast assumptions with actual outcomes will involve both under revenue and over revenue recovery items with the net effect indicating if the economic benefits have been realised.

3.4.3 Environmental

The Gold Coast Desalination Plant (GCDP)

The review of the GCDP did not identify any expected environmental benefits as a driver or outcome of the construction and operation of the facility. The plant does source green energy to reduce the carbon emission impact on the environment and this does come at a higher cost, which is estimated to be $0.26 per megalitre of water produced.

The Western Corridor Recycled Water Scheme (WCRWS)

Overall, the WCRWS has not realised the expected environmental benefits, predominantly due to operating at lower capacities and some doubt remains whether the nitrogen and phosphorus load reductions can be achieved.

The WCRWS business case predicted that the plant will reduce the discharge of nutrients into the Bremer and Brisbane Rivers and benefit the inshore segments of Moreton Bay. The predictions involved long-term reductions of total nitrogen of 25 per cent for the Brisbane River and to 30 per cent for the Bremer River. The modelling also predicted reductions in total phosphorus at 47 per cent and 60 per cent for the Brisbane and Bremer Rivers respectively.

As the business case was prepared on the assumption of plant capacity being maximised, based on the commissioning timetable and the availability of feedwater, comparison with actual performance is problematic as the plants never reached the projected operating capacities. The business case has presented maximum potential environmental benefits associated with nutrient reductions.

Seqwater has reported that, during peak production levels of around 110 megalitres per day—about half the full capacity—net reductions of about 80 to 90 per cent in phosphorus and about 13 per cent of nitrogen load to Moreton Bay were observed. This indicates that the phosphorus load reduction targets are realistic and achievable; however, the reduction in nitrogen loads remains in doubt as the actual outcomes are below the predicted levels, although at half-plant capacity. As the plants have never operated at full capacity and are currently operating at low capacity, the achievement of the nutrient load reductions has not been achieved.

As with the GCDP, the plant does source green energy to reduce the carbon emission impact on the environment and this does come at a higher cost, which is estimated to be $0.26 per megalitre of water produced.

3.5 Recommendations

It is recommended that Seqwater:

4. **Investigate opportunities to reduce the ongoing costs associated with the Gold Coast Desalination Plant (GCDP) and Western Corridor Recycled Water Scheme (WCRWS)—this should incorporate a net present value assessment of the whole-of-remaining life costs and benefits associated with each alternative.**
5. **Include incentives for cost minimisation in contracts with plant operators, and agree a long-term target operating cost at the time of engaging the operator.**

Appendices

Appendix A—Entity comments

Auditor-General Act 2009 (Section 64)—Comments received

Introduction

In accordance with section 64 of the *Auditor-General Act 2009,* a copy of this report was provided to Seqwater and the Department of Energy and Water Supply with a request for comment. While the Department of Energy and Water Supply provided verbal feedback on the proposed report, they advised that they would not provide a formal response.

Responsibility for the accuracy, fairness and balance of the comments rests with the heads of these agencies.

Comments received

Response provided by the Chief Executive Officer of Seqwater on 30 May 2013.

seqwater
WATER FOR LIFE

ABN 75 450 239 876

PO Box 16146 | City East Qld 4002
p +61 7 3035 5500 | **f** +61 7 3229 7926
e communications@seqwater.com.au
w www.seqwater.com.au

Our Ref: TB:LB:D13/16239

30 May 2013

Mr Andrew Greaves
Auditor-General
Queensland Audit Office
P O Box 15396
CITY EAST QLD 4002

Dear Mr Greaves

Re: Performance audit on maintenance of water infrastructure assets

Thank you for your letter dated 9 May 2013, which seeks Seqwater's comments on the proposed report on the abovementioned topic.

As detailed in the attachment to your letter, Seqwater had previously provided comments on the draft report and appreciates the actions taken by the Queensland Audit Office in updating the report.

Please find attached the completed table which summarises Seqwater's response to the five Queensland Audit Office recommendations. As indicated in the attachment, the reports recommendations are in line with Seqwater's integration priorities. For each of the recommendations, there is already work underway with the end date for completion being included in the table.

I would like to thank the Queensland Audit Office for the proactive engagement it has undertaken with Seqwater employees during the compilation of this report and subsequent findings.

If you require further any information, please do not hesitate to contact me on 07 3035 5538 or alternatively our Chief Financial Officer, Peter Scott on 07 3015 9734.

Yours sincerely

Terri Benson
Chief Executive Officer

Encl...

SOURCE STORE SUPPLY

Responses to recommendations received

Responses to recommendations provided by the Chief Executive Officer of Seqwater on 30 May 2013.

Responses to recommendations:

Recommendation	Agree / disagree	Timeframe for implementation	Additional comments
1. expand baseline data on operating and maintenance costs for benchmark reporting	Agree	June 2014	Current asset performance indicators, benchmarks and baseline information will be added to or improved with a clear focus on outcomes. In January 2013, a whole of business functional benchmark report was prepared, which was used in informing the development of the 2013/14 budget. This has contributed to a 22% reduction in operating costs from 2012/13. The merger will also ensure a whole of water cycle approach is included in these data sets from catchment to supply of treated water. This will ensure we are able to benchmark. The most cost-effective solutions across the whole water supply chain.
2. develop performance measures for cost effectiveness	Agree	June 2015	As part of the strategic planning process, a key outcome area for the organisation is focussed on business efficiency and Key Performance Indicators are currently being refined that will measure cost effectiveness from a whole of business perspective. In the area of Asset Maintenance, new and refined specifications are being developed for all core infrastructure assets as part of an Integrated Master Plan. Those specifications will provide detail about the supply required from the asset over time, and the ability to develop activity based cost measures. The specifications will be a key input to the maintenance planning process, enabling existing plans to be refined over time based on risks and performance. The Integrated Master Plan will improve planning with greater cross sector collaboration and partnerships providing the most cost effective whole of community solutions. Solutions may occur at any stage in the supply chain, from the Catchment through to the Customer.
3. enhance existing performance measures to include timeliness, quality and cost	Agree	June 2015	As outlined above, specifications are being developed for all core assets as part of an Integrated Master Plan. Those specifications will provide detail about the supply required from the asset over time. Consistent with this approach, Seqwater has announced a new structure based on a separation of asset owner, manager and operator responsibilities. Specifications will be made by the asset owner group, which will be responsible for the Integrated Master Plan. The asset manager group will be responsible for managing infrastructure to achieve those specifications as cost effectively as possible.

Responses to recommendations received

Responses to recommendations provided by the Chief Executive Officer of Seqwater on 30 May 2013.

Recommendation	Agree / disagree	Timeframe for implementation	Additional comments
4. investigate opportunities to reduce the ongoing costs associated with the GCDP and WCRWS—this should incorporate a net present value assessment of the whole of-remaining life costs and benefits associated with each alternative	Agree	"Care and Maintenance" WCWRS target June 2013 however may be delayed to December 2013 due to customer commitments. GCDP "hot standby" mode from July 2013.	Seqwater will continually review options to reduce the operating and capital costs of the bulk water supply system, including the GCDP and WCWRS. The reviews will be undertaken as part of the Water Security Program and Annual Operating Plan, as well as on an asset specific basis as appropriate. It should also be noted that the WCRWS is to be placed into a 'care and maintenance' regime during 2013-14, reducing operating costs materially.
5. include incentives for cost minimisation in contracts with plant operators and agree a long-term target operating cost at the time of engaging the operator.	Agree	August 2013 for new operation and maintenance contract and by June 2015 for other operating contracts.	Achieving operational cost savings is a key priority of Seqwater and reviewing the structure of operating contracts is already under way. Following the merger the opportunity has been taken to further reduce asset related costs by releasing a revised network operations and maintenance tender to the market with a view to improving Seqwater asset knowledge, establishing benchmark Key Performance Indicators and preparing for a more incentivised performance based contract by 2015.

Appendix B—Audit details

Audit objective

The objective of the audit was to determine whether south-east Queensland water infrastructure assets are being managed and maintained effectively to contribute to a secure and sustainable water supply.

Specifically, the audit evaluated whether there are:

- adequate strategies for planning and maintaining water infrastructure assets consistent with government objectives
- adequate arrangements in place to meet the long-term water asset maintenance requirements
- adequate monitoring and reporting of performance of key water infrastructure assets.

It also reviews the systems for long term water asset maintenance, looking in detail at the cost effectiveness of the two manufactured water assets.

Reason for the audit

In response to the drought, the Queensland Government established the South East Queensland Water Grid (the grid) which is designed to ensure a guaranteed level of security for water supply, regardless of changes in climate and demand. Major capital investments have been made in the development of the grid. The grid supplies water to a large number of people and the cost of operating the grid is significant.

Appropriate maintenance of the grid is crucial to ensure the assets are able to supply water when required. Maintenance ensures that functional and operational needs are met, the physical condition of assets is kept to a suitable standard and statutory and technical requirements are met.

At present, the Western Corridor Recycled Water Scheme and the Gold Coast Desalination Plant are operating well below capacity, following a decision by the Queensland Government to use these sources as emergency options while sufficient climate-dependent water from dams is readily available.

Performance audit approach

The audit was undertaken in accordance with the *Auditor-General of Queensland Auditing Standards—September 2012*, which incorporate Australian auditing and assurance standards.

The audit of water entities was substantially conducted between January and July 2012. In June 2012, the Minister for Energy and Water Supply requested a review of all options to make the plants more cost effective and to improve the return on the assets over their life. The audit was temporarily halted to consider the findings from the review. The report was made available to the Queensland Audit Office in November 2012.

The audit consisted of:

- interviews with key staff at Seqwater and the former Queensland Water Commission, SEQ Water Grid Manager and LinkWater
- analysis of key documents with particular attention to policies and procedures, strategies and performance measures
- analysis of key documents relating to the manufactured water assets.

Auditor-General Reports to Parliament

Tabled in 2012–13

Report number	Title of report	Date tabled in Legislative Assembly
1	Racing Queensland Limited: Audit by arrangement	July 2012
2	Follow- up of 2010 audit recommendations	October 2012
3	Tourism industry growth and development	November 2012
4	Queensland Health - eHealth	November 2012
5	Results of audits: State entities 2011–12	November 2012
6	Implementing the National Partnership Agreement on Homelessness in Queensland	February 2013
7	Results of audit: Queensland state government financial statements 2011–12	March 2013
8	Online service delivery	March 2013
9	Fraud risk management	March 2013
10	Results of audits: Local government entities 2011–12	April 2013
11	Results of audits: Education sector entities 2012	April 2013
12	Community Benefit Funds: Grant management	May 2013
13	Drink Safe Precinct trial	May 2013
14	Maintenance of water infrastructure assets	May 2013

Reports to Parliament are available at www.qao.qld.gov.au