Submission No. 008
11.1.12
25 October 2013

Submission to the State Development, Infrastructure and Industry Committee Inquiry into Queensland Audit Office Report to Parliament 14 for 2012-13

Maintenance of water infrastructure assets

Simon Warner
Chief Executive Officer
SEQ Catchments
Level 2 183 North Quay
swarner@seqcatchments.com.au
07 32114404

October 2013

Introduction

The invitation to make a submission on the report by the Queensland Audit Office into the maintenance of water infrastructure and the associated Parliamentary Inquiry by the State Development, Infrastructure and Industry Committee is welcomed by SEQ Catchments. SEQ Catchments (SEQC) is recognised as the natural resource management organisation for South East Queensland by the Australian and Queensland Governments. SEQC works with the community, the corporate sector and all levels of Government to enhance natural asset sustainability in South East Queensland. This submission will seek to add value to the work of the Committee by expanding on the audit report in relation to its key objectives in terms of 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; and

The Value of Harvested and Manufactured Water

The report by the Queensland Audit Office makes a distinction between harvested and manufactured water. While not explicitly stated harvested water is that extracted from the inland water supply catchments and treated in conventional water treatment plants such as Mt Crosby, while manufactured water is the output from the Gold Coast Desalination Plant and the Western Corridor Recycled Water Scheme. While the focus of the report is mainly on the performance of the manufactured water assets it should be recognised that these assets are a contingency supply only and that the bulk of water supplied to residents in South East Queensland is from harvested sources. The Seqwater Annual Report 2011-12 shows that more than 250,000 million litres of water was harvested from water supply catchments to provide to final users. In comparison only 3,400 million litres of desalinated water and 5,600 million litres of recycled water were produced with the all the recycled water being consumed by industrial users. Manufactured water assets contributed less than four percent of the total water output.

The report clearly shows the long-term cost of the manufactured water assets in terms of both capital and operating and maintenance costs. Excluding capital expenditure the actual cost of producing manufactured water from the Gold Coast Desalination Plant was $959 per megalitre and $834 per megalitre from the Western Corridor Recycled Water Scheme in 2011/12. In comparison the harvested water asset base which provided more than 96% of water supplied to South East Queensland produced water at an average cost of $67 per megalitre in 2011/12 or approximately one thirteenth of the price

The Asset Base of the South East Queensland Water Grid

The South East Queensland Water Grid is an integrated system designed to secure and manage water supplies in South East Queensland. Assets of the Grid include:

- 12 connected dams
- 10 connected drinking water treatment plants
- 3 advanced water treatment plants producing purified recycling water
- 1 desalination plant
- 28 water reservoirs

- 22 bulk water pump stations
- 281 km of transfer pipelines
- 535 km of bulk water mains.

The value of grid assets presented in the report is reproduced in the table below

Asset Category	**Replacement cost $bn**
Dams and weirs	2.350
Advanced water treatment plants	1.156
Desalination plant	0.935
Water treatment plants	0.713
Pipelines	1.188
Total	6.342

Manufactured water assets accounted for approximately a third of asset value yet contributed only a small percentage of water supplied to the grid. Taken together the assets related to harvested water sources are valued at more than 3 billion dollars and they currently supply more than 96% of water into the grid.

Therefore the strategies, planning and maintenance of the infrastructure supporting the harvested water assets is of far greater importance in terms of the long-term reliability and cost of water to final consumers in South East Queensland. As such the report and the inquiry should focus equally on the adequacy of the strategy, planning, maintenance, monitoring and reporting of the non-manufactured water assets.

Harvested Water Assets Criticalities

The identified harvested water assets which are critical to both the affordability and reliability of the water grid rely on the health, functionality and assimilative capacity of the water supply catchments. The quality of raw water extracted from the water supply catchments is a key determinant in the cost structure of operational and capital expenditure of the bulk water supply authority. Raw water quality dictates the type of treatment process adopted and the amount of chemical and energy inputs required to produce water to a potable standard. Major capital intensive water supply facilities such as dams and water treatment plants operate in a complex interface between rapidly changing environmental conditions and technical built asset performance. Recent incidents in South East Queensland in terms of excessive sediment in raw water, algal blooms, fish kills, aquatic weed infestations and treatment by-product generation are documentable evidence based manifestations of catchment sourced risks to the functional operation of harvested water assets. Moreover these events have impacted on water supply continuity, asset functionality and costs to final consumers.

The Queensland Audit Office Report adopts a traditional conception of water infrastructure assets identifying it as the collection of dams, weirs, reservoirs, water treatment plants and pipelines that store, treat and deliver water. Absent from this conception is any recognition of the catchment areas which collect and transport water as vital infrastructure or even an asset. The non-recognition of water supply catchments as assets within the identified grid has serious long term implications for water supply in South East Queensland. Failure to recognise the value of natural assets such as forests, riparian zones and rivers in filtering and transporting water and their intrinsic economic value to the harvested water system means that their

management and performance trajectory seldom enters mainstream decision making or budgeting.

Maintenance of Harvested Water Assets

The lack of recognition of the value provided by natural assets for the water supply system and the implications of deficient maintenance regimes can be illustrated through reference to the Mid Brisbane River and the Wivenhoe Dam.

The Mid Brisbane River extends 61km from the Wivenhoe Dam to the Mt Crosby Water Treatment Plant. The river acts as a conduit for water supply between the dam and the treatment plants which supply more than 50% of the capacity of the water grid. The Mid Brisbane River should be regarded as of the most critical assets for the successful functioning of the water grid yet is nowhere recognised as such.

The decline of the Mid Brisbane River and its Catchment because of poor management practices and lack of investment is becoming apparent. After trending gradually lower over past years in 2012 the catchment received a low F in the 2012 Healthy Waterways Report Card. High bank instability and poor riparian vegetation cover are noted along the length of the river. Several sewerage treatment plants empty into the river above the Mt Crosby Water Treatment Plants. Major water quality incidents that have impacted on the performance and reliability of the water grid such as multiple excessive sediment events (2011 and 2013) and a major algal bloom in the system (2008) can be traced back to poor environmental background conditions.

According to Seqwater costings a raw pipeline between Wivenhoe and Mt Crosby would cost more than $2 billion dollars. This provides a comparative replacement value of the bulk water connectivity service that the Mid Brisbane River provides. According to a report commissioned by the Queensland Government in 2007 the annual maintenance cost of a major pipeline is between 1 and 3% of capital construction cost (DERM 2007). This indicates that annual pipeline maintenance costs would range between $20 and $60 million dollars per annum for the Wivenhoe to Mt Crosby pipeline. In comparison there has been no significant expenditure on the maintenance of the river system itself despite it serving the same purpose, the value that it provides to the water grid and the cost of an alternative built infrastructure solution.

The Queensland Audit Report documents the importance of Wivenhoe Dam as a critical component of the grid. Wivenhoe is the largest water store and has a capacity of 1,165,000 megalitres. This is more than 2000 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 Gold Coast Desalination Plant operating at full capacity to fill the Wivehoe Dam.

Environmental decline compromises the long-term capital value of this major asset. Erosion in the Upper Brisbane Catchment above Wivenhoe Dam is extensive. In the 2011 flood event millions of cubic meters of soil were washed into the storage. The proportion of a rivers sediment load captured by a large dam can approach 100 per cent constantly decreasing its ability to store water. The Upper Brisbane has been extensively cleared and riparian zones are in poor condition. Unimpeded stock access to rivers and streams is recognised as a major cause of waterway degradation and erosion. Given that there are no other suitable large dam sites in South East Queensland that can be accessed due to cost or environmental constraints

the prudent long-term management of catchments to reduce sediment loads and maintain existing flood and water storage capacity to service the large and growing human population of South East Queensland is a required investment.

Every ton of sediment entering Wivenhoe and being trapped has a cost implication. The most recently constructed large dam in South East Queensland, Wyaralong cost $380 million to create 103,000ML of water storage capacity. Using this as a replacement value it can be concluded that each ML of storage capacity lost to sedimentation is worth $4,000. The long-term cost of loss of current water storage capacity is likely to be far greater as there are no viable dam replacement options. Alternative supply options such as desalination, water recycling and transporting water from other regions will only add to the long-term cost of water supply.

The Condition and Performance Trajectory of Catchment Assets

The majority of water supplied in South East Queensland is sourced from open catchments. That is, the majority of the area is open to public access with a variety of urban, peri-urban, recreational and agricultural pursuits being undertaken. The water authority owns some buffer land around the majority of large storages however this is a very small percentage of the total catchment area. This is in clear contrast to other major water supply areas in Australia such as Melbourne where the majority of the catchments are owned by Melbourne Water and are in pristine condition. They are fenced, heavily vegetated and closed to public access. It is therefore important that the role of private landholders in the maintenance of water quality in South East Queensland is recognised.

Water supply catchments in South East Queensland are coming under increasing pressure as the population of the region increases. Peri-urban development with small acreage properties is a defining characteristic of many of the catchments closer to urban centers. The propensity of intensively grazed smaller paddocks, weed infestation, domestic waste water treatment plants, increased fertilizer usage, farm dams, storm-water and limited landholder knowledge of appropriate catchment management all pose direct threats to water quality. In broader agricultural areas of the watersheds such as those feeding Wivenhoe, sheet, rill and stream-bank erosion and unregulated stock access to riparian areas are major threats. Demand for resources is also driving an expansion in extractive industries. The condition of water supply catchments is continuing to decline.

Adequacy of Strategies for Planning and Maintaining Water Infrastructure Assets

One of the key conclusions from the Queensland Audit Office Report is that better planning may have avoided the need for the drastic and costly action involved in the construction of the water grid and the manufactured water assets. This is an important lesson that should be implemented in relation to the management of harvested water natural assets. The declining health of natural assets in the region is impinging on both the reliability and the cost of treated water for residents and industries. Failure to recognise and address this strategic planning deficit will increase the reliance on manufactured water which is more than thirteen times more expensive. The declining health of natural infrastructure which underpins the cheapest and most plentiful cost effective source of water in South East Queensland deserves greater focus in the strategic planning and budgetary considerations of Government and the water suppliers.

The majority of the catchments are in private ownership meaning traditional models of asset investment and maintenance are not appropriate. Many of the benefits of catchment restoration are avoided long-term costs rather than immediate solutions to short term problems. For example the restoration of a riparian zone to reduce sediment movement and hence turbidity at a treatment plant off-take will take several years to establish and even longer to reach full effectiveness. There is an inbuilt degree of uncertainty in ecological restoration that is not as apparent in built infrastructure solutions. However, a riparian zone has an extended asset life so long term benefits will continue to be provided.

Significant investment has been made in the science and planning of catchment maintenance through existing natural resource management organisations and the key actions required are well understood in South East Queensland. The South East Queensland Regional Natural Management Plan has been endorsed by Federal, State and Local Governments. Lacking is any strategic approach and planning for a long-term financial model for the funding of catchment maintenance in recognition of its key role in maintaining a cost effective water supply.

A broadened and strengthened program of integrated natural asset catchment management in South East Queensland is required. In England and Wales the economic regulator of water, Ofwat has played a major role in establishing the performance framework and pricing regime that has seen more than 30 billion pounds invested in catchment improvement programs since 1989 by privatised water companies through dedicated catchment groups. This investment has been made in recognition that it is ultimately more cost effective for consumers to have the source water improved rather than relying on end of pipe solutions. Programs such as the English Catchment Sensitive Farming Initiative have been funded by the water companies.

An important lesson from the innovative source control strategies in England and Wales is that the most successful programs were those where a specific non-regulatory catchment management organisation was contracted to provide services on behalf of the water authority. In essence this allowed the water authority to improve their performance in their area of expertise while allowing another organisation to develop the relationships and programs in the catchment. A similar model should be implemented in South East Queensland.

Adequacy of Arrangements in Place to Meet Long Term Water Asset Maintenance Requirements

Responsibility for the maintenance of harvested water supply natural assets is divided between various Government Departments, Water Service Providers, Local Governments and Natural Resource Management Organisations. There is a need to value the harvested water natural assets in South East Queensland and identify the investment in maintenance that should be made. The level of this investment should reflect the cost of alternative water supply and the risk. Given that the great majority of this maintenance is to occur on private land a regulated approach should not be considered.

Recommendations

- That the Parliamentary Inquiry and the Queensland Audit Office adopt a broader definition of water grid assets to include harvested water natural assets.

- That the Parliamentary Inquiry and the Queensland Audit Office expand the scope of the Audit and Inquiry to include the maintenance of natural assets critical to the water grid.

- That the Queensland Government support the development of a long term financial model for the funding of harvested water natural asset maintenance.

- That the Queensland Government use existing non statutory catchment management arrangements to implement the maintenance of natural assets on private land.