Review of SunWater's Network Service Plans Bundaberg Cluster Final Report Queensland Competition Authority

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List of Abbreviations

AMTD	Adopted Middle Thread Distance
ARR	Asset Restoration Reserve
BOM	Business Operating Model (effective July 2008)
Capex	Capital Expenditure (also referred to as Renewals expenditure)
CNA	Converted Nominal Allocation
CPI	Consumer Price Index
DERM	Department of Environment and Resource Management
EA	Enterprise Agreement
FTE	Full Time Equivalent
GOC	Government-owned Corporation
HUFs	Hydrologic Utilisation Factors
Hummingbird	Document management system used by SunWater
IROLs	Interim Resource Operating Licence
Km	Kilometres
ML	Megalitres
NSP	Network Service Plan
Opex	Operati0onal Expenditure
ORC	Optimised Replacement Cost
QCA	Queensland Competition Authority
R&E	Refurbishment and Enhancement
R&R	Renewals and Rehabilitation
RCM	Reliability Centred Maintenance
ROLs	Resource Operating Licences
ROP	Resource Operating Plan
SAP	Enterprise Computer Software System
SAP PM	Enterprise Computer Software System /Corporate Database – Project Management Module
SCADA	Supervisory Control and Data Acquisition
SWIMS	SunWater Information Management System
ToR	Terms of Reference
WI	Work Instruction – list of required Preventive Maintenance tasks to be performed on equipment at a functional location
WAE	Water Access Entitlement (Bulk/River WSS)
WDE	Water Delivery Entitlement (Distribution Systems)
WIP	Work In Progress
WMS	Water Management System
WSS	Water Supply Scheme

Executive Summary

Aurecon was commissioned by Queensland Competition Authority ("QCA") to provide a review of SunWater's Bundaberg (Central) region Network Service Plans (NSP) for the forthcoming 2011-2016 price path. The scope of this review was to identify the level of prudency and efficiency of Opex and Capex, and cost allocation methodology to irrigators, as disclosed within the NSPs (excluding indirect and overhead costs). The schemes reviewed include:

- Barker Barambah Bulk Water Supply Scheme
- Boyne River and Tarong Bulk Water Supply Scheme
- Upper Burnett Bulk Water Supply Scheme
- Lower Mary Bulk Water Supply Scheme and Distribution System
- Bundaberg Bulk Water Supply Scheme and Distribution System

The review comprised of a number of components including extensive desktop review of information provided by SunWater in confidence, numerous meetings with SunWater and QCA staff, a field trip investigation to Bundaberg (Bundaberg Bulk Water Supply Scheme and Distribution System) and Maryborough (Lower Mary Bulk Water Supply Scheme and Distribution System) on 7th to 9th March 2011, and a second field trip to present the findings of the draft study report to irrigator stakeholders.

For each review of the Operational costs and Capital costs pertaining to above water supply schemes and distribution systems, the following tasks have been completed to provide consistency in both approach and reporting:

- Operational costs review
  - Actual and forecast assessment of operational expense items (i.e. labour segmented by preventive maintenance, corrective maintenance and operations, and electricity if relevant)
  - Actual and forecast assessment of the same above items but from an activity based expense items perspective
  - Feedback from field visit (where material)
  - Potential efficiency gains and recommendations
- Capital costs review
  - Forecast renewals expenditure
  - Examination of renewals expenditure
  - Feedback from field visit (where material)
  - Potential efficiency gains and recommendations.

Specific conclusions regarding prudency and efficiency of costs are in the respective sections for each scheme. Aurecon has also drawn conclusions and recommendations that are primarily common to all schemes.

The major limitation to this review has been the lack of precise information from SunWater within the tight study time frames. Although Aurecon found willingness from SunWater staff for the provision of information in response to our inquiries, specific difficulties encountered were:

- In-complete reports were expected (referenced for completion in 2010), but were still awaiting completion
- Difficulties retrieving trend Opex information: SunWater has employed a new Business Operating Model (BOM) and management accounting system

- Concerns regarding the accuracy of the historical cost data (particularly 2007) that was retrospectively recoded
- The capacity of the BOM to extract specific data for analysis
- The incorporation of Indirects and Overheads to all activities
- Difficulties retrieving information regarding individual assets. SunWater has developed a new electronic Asset Management System, which has greatly improved information capture and asset management, but access to all components of this system is limited to a handful of computers and personal located within the Brisbane office. Extracting specific asset information was extremely time consuming for all involved.

Aurecon suspects that SunWater underestimated the level of detail and information required for the review. This impacted SunWater’s capacity in many cases to provide the requested information within the required timeframes. As highlighted throughout the report, significant information gaps still exist, which has hindered Aurecon’s capacity to adequately assess the prudency and efficiency of all proposed Opex and Capex expenditure.

For proposed renewal expenditures,very little information regarding the specific scope of work required, materials, options assessed, or detailed costing is available. Detailed planning is generally undertaken only when proposed project falls within the next 12 month work plan. Therefore very limited information exists for most of the proposed renewal activities for 2012 to 2016, let alone for those out to 2036. Analysis of these activities was based on assigned asset lives, condition assessments undertaken to date, and a Bill of Materials.

Central to this review has been the definition of prudency and efficiency. For expenditure to be prudent there must be an identified need. That is, the expenditure must be necessary to operate and administer the particular service being priced, fulfil regulatory obligations, or provide for the renewal or rehabilitation of existing infrastructure. For expenditure to be efficient it must represent the least-cost means of providing the requisite level of service within the relevant regulatory framework.

Aurecon has found many instances (historical and proposed) in which renewal expenditure may be prudent and efficient as defined above, particularly from the perspective of the manager of the asset, but not prudent and efficient from the perspective or all the stakeholders serviced by the asset. This situation seemed more evident within the Lower Mary Distribution Scheme, which has the added complexity of being over-designed in terms of capacity (ie assets with very high capacities, utilised at very low levels, but incurring substantial on-going maintenance and substantial replacement costs).

Aurecon recommends that future scoping studies undertaken for major renewal (replacement) activities be expanded in scope to incorporate a financial/economic evaluation from an investor’s perspective. That is, the financial analysis should incorporates key parameters including usage levels, both current and latent, along with incorporating the opportunity cost of capital within the analysis.

1. Introduction

1.1 Background

Queensland Competition Authority

The QCA is an independent pricing and access regulator responsible for ensuring that specified monopoly infrastructure-based services in Queensland comply with the principles of national competition policy.

SunWater

As a Queensland Government-owned Corporation, SunWater provides a range of services including infrastructure ownership, water delivery, operation and maintenance of infrastructure and engineering consultancy services. Over the last 80 years, SunWater has built and now owns and operates $7 billion in water supply infrastructure throughout Queensland which supplies 40% of all water used commercially in Queensland, including water for irrigated agriculture, mining, power generation, industry and local government (urban use). Irrigators contribute nearly 30% of SunWater's revenue and use 81% of the water.

SunWater's water storage and distribution infrastructure includes 19 major dams, 63 weirs and barrages, 80 major pumping stations, and more than 2500 km of pipelines and open channels. The existing price paths that apply to the 22 Water Supply Schemes (WSSs) are due to expire on 30 June 2011.

The water supply schemes are supported by four regional operation centres and SunWater's head office located in Brisbane.

Ministerial Direction

The Premier and the Treasurer (the Ministers) originally directed the QCA to develop irrigation prices to apply to 22 SunWater WSSs from 1 July to 20 June 2016. An Amended Ministers' Referral Notice (the Notice) now directs the QCA to recommend irrigation prices to apply to SunWater water supply schemes from 1 October 2011 to 30 June 2016.

The Ministers' Referral Notice requires, among other things, that bulk water supply and channel prices/tariff structures are set so as to provide a revenue stream that allows SunWater to recover the prudent and efficient costs associated with:

- Operational, maintenance and administrative activities;
- Renewing and rehabilitating existing assets using a renewals annuity methodology.

These costs, along with some background supporting details, are outlined with the Network Service Plans (NSPs) for each of the WSSs. The NSPs contain SunWater's projected scheme costs and proposed allocation of costs to various scheme users.

1.2 Purpose of this consultancy

Aurecon has prepared this report in response to the QCA's requirement for independent expert advice in relation to establishing the prudency and efficiency of SunWater's proposed capital and operating costs comprising its proposed Network Service Plan (NSP) for the Bundaberg cluster of bulk water supply schemes and distribution systems. This NSP will extend from 1 July 2011 to 30 June 2016 and will cover the following:

- Barker Barambah Bulk Water Supply Scheme
- Boyne River and Tarong Bulk Water Supply Scheme
- Upper Burnett Bulk Water Supply Scheme
- Lower Mary Bulk Water Supply Scheme and Distribution System
- Bundaberg Bulk Water Supply Scheme and Distribution System

The need for the study and resulting Aurecon report emanates from the Premier and Treasurer (i.e. Ministers) having originally directed the QCA through a Ministers' Referral Notice to develop irrigation prices to apply to 22 SunWater water supply schemes including the Bundaberg cluster for the 1 July 2011 to 30 June 2016 time period. An Amended Ministers' Referral Notice (the Notice) now directs the Authority to recommend irrigation prices to apply to SunWater water supply schemes from 1 October 2011 to 30 June 2016. This Notice requires that the bulk water supply and channel price/tariff structures are set so as to provide a revenue stream that allows SunWater to recover:

- Its efficient operational, maintenance and administrative costs
- Its expenditure on renewing and rehabilitating existing assets, whether through a renewals annuity or a regulatory depreciation allowance
- A rate of return on assets valued at 1 July 2011
- After 1 July 2011, a return on prudent capital expenditure on existing assets or constructing new assets.

1.3 Purpose and requirements of the study

As part of the process of developing irrigation prices, SunWater has submitted to the QCA its NSPs, and associated supporting documents for each of the 22 water supply schemes covered by the Ministerial Direction. For some schemes SunWater has provided NSPs for both bulk and distribution water services.

Among other matters, these NSPs and supporting documents contain SunWater's estimates of the costs to be shared by irrigators and recovered in irrigation prices. Scheme service costs relevant to irrigators, comprise the following elements:

- Projected costs for operational, maintenance and administration activities for the five-year period commencing 1 July 2011; and
- Forecast expenditure for renewing and rehabilitating existing assets for the period 1 July 2011 to 30 June 2036 (i.e. a 25-year period in order to develop a 20-year rolling annuity).

The QCA's role is to review the prudency and efficiency of the irrigators' allocated expenditure for each water supply scheme.

For expenditure to be prudent there must be an identified need. That is, the expenditure must be necessary to operate and administer the particular service being priced, fulfil regulatory obligations or provide for the renewal or rehabilitation of existing infrastructure. For expenditure to be efficient it must represent the least-cost means of providing the required level of service within the relevant regulatory framework.

Accordingly, the QCA has engaged four consultancy firms to provide advice in relation to:

- The prudency and efficiency of SunWater's proposed operating costs (except Indirect and Overhead costs), and renewals and rehabilitation expenditures, and
- The appropriateness of the methodology used for the attribution of operating costs to irrigation schemes and customers.

The scope of this consultancy does not include an assessment of SunWater's Indirect and Overhead costs, or the appropriateness of their attribution, return on capital, or the methodology used to allocate renewals expenditures to individual bulk water and distribution systems, as these are subject to separate independent reviews.

Aurecon is one of four independent consultants engaged to review a designated cluster of bulk water schemes to review[1]. The cluster designated to Aurecon was Cluster 2 (Bundaberg), which included Boyne River and Tarong, Upper Burnett, Barker Barambah,

[1] Queensland Competition Authority (2011), Terms of Reference: *SunWater Water Supply Schemes 2011-2016 Price Paths: Review of SunWater's Network Service Plans (Capex& Opex)* amended 9th November 2010, page 3.

Lower Mary (River Bulk and Distribution System) and Bundaberg (River Bulk and Distribution System).

1.4 Structure of report

The report has been structured to provide the QCA with sufficient information and assessment regarding approach, and prudency and efficiency of the Bundaberg cluster of bulk water supply schemes and distribution systems. The report sections are as follows:

- Section 2 – Overview of SunWater's Network Service Plans
- Section 3 – Scope and Methodology
- Section 4 – Review of elements common across all schemes
- Section 5 to 11 – Aurecon's assessment of each of the Water Supply Schemes and Distribution Systems
- Section 12 – Conclusion and recommendations
- Section 13 - References
- Appendix A – Review of the Tier 1 report (2006 Indec review)
- Appendix B – Benchmarking

For each assessment of the above water supply schemes and distribution systems, the following sub sections have been completed to provide consistency in both approach and reporting:

- The description of the respective NSP
- Operational costs review
  - Actual and forecast assessment of operational expense items (i.e. labour segmented by preventive maintenance, corrective maintenance and operations, and electricity if relevant)
  - Actual and forecast assessment of the same above items but from an Activity based expense items perspective
  - Feedback from field visit (if applicable)
  - Potential efficiency gains and recommendations
- Capital costs review
  - Forecast renewals expenditure
  - Examination of renewals expenditure
  - Feedback from field visit (if applicable)
  - Potential efficiency gains and recommendations.

A description and assessment of each of the bulk water supply schemes and distribution systems, its operating cost program planning/generation process and its renewals forecast expenditure program planning/generation process and annuity methodology have been provided in the specific bulk water supply scheme and distribution system section of the report.

1.5 Limitations

The information and analysis presented within this report have been received from a number of sources including published reports and statistics, information gathered from field investigations, stakeholder meetings and engagements, substantial public and confidential reports and data from SunWater. Throughout the report Aurecon has rigorously referenced text and data to enable readers to validate the information for references that are available within the public domain.

It is noted that Aurecon was not in a position to verify the reliability, accuracy or completeness of the data provided by SunWater. Aurecon has attempted to highlight throughout the report instances in which the data was considered inaccurate or incomplete.

Much of the analysis was based on a desktop analysis, with only 3 days provided to attend a number of stakeholder meetings and inspect asset locations at the same time.

1.6 Acknowledgements

Aurecon would like to acknowledge the assistance provided by SunWater staff, including staff from the head office within Brisbane and regional staff members from Bundaberg. Aurecon found the advice and assistance provided by SunWater to be constructive throughout the review.

Aurecon also acknowledges the stakeholders from the irrigation community (particularly individual irrigators and representatives from grower organisations) who were able to provide valuable insights regarding scheme specific issues throughout the course of the review.

Aurecon also wishes to acknowledge the constructive dialogue obtained from staff at the QCA, and also from the other NSP consultants engaged in this review namely GHD, Arup and Halcrow.

Throughout the course of the study, a number of meetings were convened by QCA involving the NSP consultants, grower representatives and SunWater. Aurecon found these meetings very constructive in addressing the many challenges incurred during the review, and acknowledges the professional collaboration displayed by all parties.

2. Overview of SunWater's Network Service Plans[2]

2.1 Overview

Irrigation assets can be grouped into two groups namely bulk water schemes and distribution systems. Aurecon have been commissioned to assess the Central region, which includes:

- Barker Barambah Bulk Water Supply Scheme
- Boyne River and Tarong Bulk Water Supply Scheme
- Upper Burnett Bulk Water Supply Scheme
- Lower Mary Bulk Water Supply Scheme
- Lower Mary Distribution System
- Bundaberg Bulk Water Supply Scheme
- Bundaberg Distribution System

SunWater has contracts with all scheme customers which specify the services to be provided, the service standards that are required to be met and the obligations of both parties. SunWater's capacity to release water to its bulk customers is subject to:

- Resource Operations Plans and available water
- Customer WAEs and available water
- Estimates of likely demand of other customers
- Capacity of the bulk water assets
- Provisions of the Water Act 2000.

The NSPs present SunWater's projected scheme operating costs and forecast renewal expenditure for the 2012-2016 price path. The NSP also highlights actual operating and renewal expenditure from the current price path (2006-2011) with the values for 2011 being projections.

2.2 SunWater's Service Framework and Obligations

The following provides a brief overview of SunWater's service framework and obligations under this framework. Service obligations between SunWater and its customers are governed by:

- Customers' water entitlements
- Contracts between SunWater and its customers
- Obligations specified under state water planning instruments (e.g. a Resource Operations Licence -ROP)

SunWater service obligations are as follows:

- SunWater provides bulk water, water channel (network) services and water drainage services

[2] Note that contents of this section have been primarily sourced from GHD, *Report for Review of SunWater's Network Service Plans, Toowoomba Cluster*, March 2011. Throughout the course of the project GHD have generally provided analysis to the NSP consultants. Note that Aurecon have modified the text throughout, and takes responsibility for the material presented.

- SunWater is obliged to supply available water to customers in accordance with their entitlements at a given point in time.

Bulk Water

SunWater as a bulk water service provider is obliged to store and deliver water to a customer, in accordance with the customer's water entitlements. The customer's water entitlements are not the responsibility of SunWater; however SunWater can only supply water to water entitlement holders. SunWater is obliged to abide by the conditions set out in the associated ROP including:

- Operating conditions for water storages (e.g. minimum storage levels, environmental release rules
- and constraints on rates of release;
- Water sharing rules (such as announced allocation or continuous sharing rules);
- Environmental monitoring and reporting requirements; and
- Recording and reporting water use by entitlement holders.

Water Channel (Network) Services

For Water Channel Networks, SunWater's obligations are as follows:

- SunWater is obliged to divert and deliver available water to a customers offtake, where water entitlements are measured
- SunWater is obliged to account for distribution losses in the channel system so customers' water allocation is delivered to their offtake.

In networks when water demand exceeds supply, SunWater may ration water supply in accordance with flow rate limitations or on a roster.

Qualifications to the Obligations

The following are qualifications to obligations:

- SunWater is not obliged to manage customers' demand-supply requirements – customers are responsible for determining their own requirements, procuring needed water rights themselves;
- SunWater is not obliged to undertake water supply planning, to set or manage water supply Levels of Service or respond to supply shortages;
- SunWater is not obliged to recover water supply planning or drought mitigation costs (as it should not incur them) – customers are responsible for managing supply risks;
- SunWater is not obliged to control water quality or treat water to a specified quality (however ROP operating requirements may seek to optimise water quality to the benefit of the environment, but not customers); and
- SunWater is not obligated to take account of future water demands from the network or plan augmentation for future demands (although SunWater may enter a commercial arrangement with existing or new users to undertake this planning).

2.3 Operating Cost Program Planning and Generation Process

SunWater utilises a through planning process to plan, program and generate Direct Operational Costs. The work is managed in the SAP software system and tasks are assigned through work orders. Time and cost are captured in the SAP software system. The SAP software system has the delegations and authorities built into the process to maintain governance requirements. A team member schedules the work program and is tasked with the responsibility of managing the work requirement within the restricted resource pool of internal and contract resources.

Work tasks are driven predominately by the compliance requirements specified in the Resource Operating Licence (ROL) and Resource Operating Plan (ROP). Additionally, the SAP software system generates Preventative Maintenance Programs (planned activity) that reflect the requirements of SunWater Asset Management Policy. All of these tasks form work orders that are scheduled and assigned to resources.

Budget and risk constraints are considered as the program is developed. High risk work is completed as a priority, while low risk work may not be completed in as timely a manner as SunWater would prefer.

Corrective Maintenance (reactive activity) costs are captured via the SAP software system work order process. These costs are by their very nature unpredictable. However SunWater has historical information of Corrective Maintenance costs and have made a valid estimation of the likely costs for Corrective Maintenance going forward.

The Network Service Plan Operational Costs are derived from the planned and responsive activities for the period of the price path (see Section 4 for more details regarding the methodologies employed by SunWater for Opex cost forecasting).

2.4 Renewals Forecast Expenditure Program Planning and Generation Process

SunWater uses an Asset Management Approach to renewals forecast program planning. Their approach is "…to manage our assets in a sustainable manner to meet SunWater's business objectives of safeguarding asset integrity and ensuring continuing asset serviceability"[3]. Their policy and procedures are set out in a series of Asset Management documents and managed through the SAP software system. The Asset Management System is based on a defined asset hierarchy which includes a decomposition of the assets by scheme, asset attribute details including useful life and replacement values, condition appraisals and risk assessments. The SAP software also includes maintenance planning modules which forecast recurrent refurbishment works needed to maintain the assets functionality.

The renewals forecasts in the NSPs are generated from an annual program of projects from SAP. These projects are based on the prediction of when assets need to be replaced, forecast refurbishment works generated from condition appraisals, planned maintenance tasks where the activity frequency exceeds twelve months, and studies to investigate problems with the infrastructure, systems or required for legislative compliance (e.g. public and dam safety).

For replacement assets, the forecast costs in the annuity program are based on the replacement value of the current asset (held in SAP Asset Register). Refurbishment costs, planned maintenance and studies cost estimates are calculated using a Bill of Materials method (bottom up estimate). The estimates are calculated at current value and escalated by 2.5% per annum.

Renewals projects beyond 12 months (2012) are approximate costs (usually based on costs incurred for similar projects recently undertaken, or estimated replacement value), which have not been subjected to detailed management scrutiny or engineering options assessment. Current projects (2011) are more likely to have more comprehensive scoping and cost

[3] Source: SunWater *Asset Management Policy*, Standard No:Am.01, Revision 1 (April 2004)

estimates prepared. Option analysis, engineering designs and detailed cost estimates are completed for the more complex and high value projects. Once a project has been approved to proceed, the procurement processes as detailed in SunWater's "Purchasing Guide, Aug 2010" and "Delegations Policy and Delegations Matrixes, 27/10/2010" are followed. Each project goes through a series of 10 Project Management steps which include approvals, planning, purchasing, construction/purchasing, completion and project close-out.

2.5 Renewals Annuity Methodology

SunWater is proposing a 20 year rolling annuity for the ongoing accounting for renewals expenditure. As such, SunWater accounts for the balance of these annuity transactions through an Asset Restoration Reserve (ARR). In the NSPs SunWater presents the ARR and renewals expenditure for the whole scheme, not just those charges attributable to the irrigation sector.

Under the rolling annuity approach SunWater forecasts the renewals expenditure required for the next 20 years. The present value of this expenditure is calculated and then deducted from the opening balance (ARR). This net present value is then annuitised to calculate the income required to cover these capital costs.

This process is followed for each year of the price path. The annuity is calculated in the dollar value for each respective year and then deflated at the end to present the annuity in 2011 dollars for the purpose of the NSP. This deflation then allows the annuity to be indexed at a later date. More details regarding the renewals annuity methodology is presented within Section 4.

3. Scope and Methodology

3.1 Approach for assessing proposed OPEX information

Data sufficiency

The summary Operations information presented within the NSP for each bulk water supply scheme and distribution system provides high level information only covering key activities and annual expense item totals. There is a very limited amount of supporting statements or data to assist stakeholders to interpret the Operating information, or to understand the drivers of change.

In order to gain a better understanding of the main Operating activities and associated annual costs presented within the NSP, SunWater provided a number of additional reports, databases, and technical assistance as requested. The provision of this information was the basis for this report.

However upon examination of the provided information and subsequent analysis, Aurecon discovered additional information gaps that restricted our capacity in a number of cases to validate the prudency and efficiency of the Operating costs presented within the NSP. Aurecon has noted these information gaps throughout the report.

Assessment of whether SunWater's policies and procedures for incurrence and assignment of Opex meet required service standards and represent good industry practice

SunWater provided a number of internal reports and briefings illustrating the policies and procedures incurred for the assignment of Operating costs to individual schemes. The internal briefings provided by SunWater provided specific scheme examples demonstrating how individual Operating activities are rigorously planned where possible at the asset level, an overview of the formal approval process, the subsequent delegation of the Operating activity to the region for implementation, and finally an overview of the administrative processes capacity to allocate the correct expense item to the relevant asset, activity type and scheme.

Subsequent to this internal review, Aurecon undertook a field trip review of the Bundaberg Bulk Water Supply Scheme (WSS) and Distribution System and Lower Mary River Bulk WSS) and the Distribution System over the 7 - 9 March 2011. At a number of asset locations, Aurecon interrogated specific Operating expenditure activities including Operations, and Preventive/Corrective maintenance (particularly weed control activities and auditing/ monitoring activities across a range of bulk and distribution asset locations).

From the specific examples investigated within the field trip, Aurecon observed that the Operating activities undertaken were structured in accordance with protocols and policies as disclosed within varying supporting SunWater documents and manuals. Aurecon also investigated the supporting frameworks that warranted these Operating activities which included asset condition reports, dam safety audits, and various consultancy and technical reports prepared by internal and external experts/engineering consultancy firms.

Aurecon also noted that although rigorous procedures and protocols were in place for the planning of most Operating activities, in reality implementation did not always followed as planned, with events such as floods and droughts, unexpected wear and tear, breakdowns, etc, either bringing forward or delaying a number of planned activities. Aurecon noted a high degree of regional input by regional SunWater staff in terms of the timing of implementing certain activities, and that in past years substantial errors occurred with the recording of data and expenses (see Section 4 for more detail).

3.2 Approach for assessing proposed renewals and rehabilitation expenditures and renewals annuity methodology

Data sufficiency

Although Aurecon was provided with substantial databases describing both historical (for the current price path) and forecast Capex, the extent of this information was limited in terms of information contained. The forecast renewal database provided was detail in many instances, in that it disaggregated renewal activities to the sub-asset level for assets such as pumps (differentiating overhaul activities by also listing the major pump components such as bearings to be replaced at an expense of $1,000), but in other cases such as replacing the common control at Woongarra Pump Station for $2.433 million in 2032, no additional breakdown of this activity is provided.

Based on the Capex information provided for each of the Central region schemes, Aurecon undertook a desktop review collating the renewal activity (asset) against the scheme asset list as disclosed within various Resource Operation Plans (ROPs) and Interim Resource Operating Licence (IROLs). Only one renewal activity fell outside this ($72,000 expense for Bucca Weir within Bundaberg Distribution, for which additional information was sought).

Aurecon identified a number of renewal activities (historical and forecast) for additional investigation, which formed the basis for a subsequent information request. In many cases, sufficient information was provided to make a preliminary judgement on the prudency and efficiency of that expenditure item. Due to asset management practices employed, substantial detail and documentation exists substantiating major historical expenditures, but limited information exists for forecast expenditures (particularly beyond 12 months).

Aurecon noted that the database provided by SunWater's itemising historical Capex between 2007 to 2011, provided insufficient expenditure items to allow Aurecon to validate the actual annual renewal expenditure totals presented within the NSPs. It should be noted that the NSP consultants requested the database only contain expenditure items over $10,000, which may indicate that for a number of schemes a substantial number of renewal expenditures were below $10,000 between 2007 and 2010.

Assessment of whether SunWater's policies and procedures for incurrence and assignment of CAPEX meet required service standards and represent good industry practice

Aurecon undertook a review of SunWater's renewals planning process. SunWater's Asset Management Planning Methodology Paper (October 2010) provides a constructive overview of the methodology employed.

SunWater provided the consultants with an in-house briefing demonstrating how Asset Management Planning is implemented via the corporate SAP system, in-particularly:

- SAP-PM Asset Register – Electronic asset database detailing each individual asset and its characteristics
- SAP-PM - Maintenance Planning – Electronic database management system used to project detailed maintenance schedules and task lists for routine preventive maintenance programs
- SAP WMS – Electronic customised work management and planning system

Aurecon noted that the implementation of this Asset Management Planning system utilising the SAP management software is relatively new. The internal presentation provided by SunWater provided in-depth overview of the SAP components, and working examples of the management of specific assets as handled by the SAP systems.

Subsequent to this internal review, Aurecon undertook a field trip review of the Bundaberg Bulk Water Supply Scheme and Distribution System and Lower Mary River Bulk Water Supply Scheme and Distribution System. The field trip undertaken by Aurecon on the 7th to the 9th March 2011 incorporated a selected number of specific assets and locations for investigation that was pre-approved by the QCA. Due to resource constraints, the field investigation was limited to examining a limited number of assets located within the Bundaberg and Lower Mary area. At each of these site inspections, a significant amount of renewals expenditure was either recently spent (2010-2011), or was proposed for expenditure (2012-2016). The sites and assets chosen included a cross-section across both the bulk and distribution schemes, and involved a diverse range of assets classes and renewal expenditures. Note that the objective was to physically examine a selected sample of assets, to review the prudency and efficiency of expenditures at these assets, and also to validate the implementation of procedures and processes as advocated by SunWater's policies (disclosed in various SunWater reports and submissions).

The field investigation highlighted that SunWater employed an extensive program of regular inspections and audits for condition assessments that were effectively captured and recorded within the SAP management system. Of interest were the linkages between these field assessments and the asset planning process managed by the planning team in Brisbane.

Aurecon also noted that for significant expense items on major assets such as pumps, pump control panels, repairs to weirs and dams, that a rigorous review process was undertaken as follows:

- Need identification**:** Inspection reports and/or condition reports highlighting the need for either refurbishment or replacement
- Examination of the options: Usually an external expert engineering report is commissioned to substantial the need for work, review alternative options available for refurbishment or replacement, and identify the optimum outcome that meets current and future service requirements at least cost
- Internal review and approval process**:** Includes assessment of the external expert report and findings, and developing in-house the planning, budgeting (invitation of quotes from contractors where possible), programming, developing a works program that defines project timeframes, and identifying the project/activity specifications (and preliminary design drawings where appropriate)
- A public tendering process for major cost activities: Seeking private contractor interest in undertaking the activity as specified, and selecting the winning bid
- Appointment of the successful tender and engagement of activity works: For most activities SunWater appoint a staff member to project manage and supervise
- Project closure: SunWater undertake a final inspection review and report, make final payment provided the works satisfies the works order, closing of the project within the internal management systems, and updating the SAP records.

To establish the prudency and efficiency of forecast renewal expenditure, Aurecon examined in detail (information available) a sample of assets across the Bundaberg and Lower Mary Bulk WSSs and Distribution System, and undertook a desktop review of additional proposed renewal activities across all schemes within the Central region.

4. Common Elements across all schemes

There are a number of elements pertaining to SunWater's processes and activities in preparing NSPs that are generally common to all schemes in the Central Region cluster. These common elements are identified below.

4.1 Operating costs

Operating costs expenditure is the most significant cost component for all schemes, and has risen over the current pricing path (2007-2010) for a number of operational activities in NSPs.

As noted in the NSPs, SunWater has developed Operating Costs expenditure forecasts using:

- a bottom-up approach
- assessing the tasks required
- identifying the most efficient method of doing the work[4]

Annual Operating Costs expenditure comprises of the following four key activities which are the output services delivered by SunWater (with the exception of Electricity):

- Operations (which includes Customer Management, Workplace Health and Safety, Environmental Management, Water Management, Scheme Management, Dam Safety, Schedule and Delivery, Metering and Facilities Management)
- Preventive Maintenance (which includes Condition Monitoring, Servicing and Weed Control)
- Corrective Maintenance (which includes Scheduled Corrective Maintenance and Emergency Maintenance)
- Electricity (which includes- the costs of energy purchased and consumed).s

Revenue Offsets (ie Other Charges and Fees, Land Leases and Termination Fees) that are received by SunWater from each scheme are also included in the calculation of Operating Costs. These Revenue Offsets are acknowledged, but do not have any relevance to this review.

To deliver these output services (with the exception of Electricity), SunWater has incurred input costs defined as Labour, Materials, Contractors, Other, Indirects and Overheads.

A report by SunWater (undated) titled *Service Delivery Paper,* provides additional insights into SunWater's approach to developing the Operating Costs budget for each of the schemes for 2011-2016. Much of the following discussion was obtained from this SunWater report.

SunWater statess that the NSP budgets are based on an "average year", which is challenging when workflow is never constant when operating and maintaining water supply and distribution schemes. Some of the factors driving annual variation include:

- Climatic and seasonal variation (drought, floods, hot, dry, rain etc),
- Volume and clarity of water in storage
- Water demand by customers
- Age of assets, and period since refurbished or replaced
- Class of asset[5].

[4] Source: SunWater NSP, within Section 4.2.1 for all schemes.
[5] Source: SunWater (undated) Service Delivery Paper, Page 3

For example, the recent hot and wet summer in the 2010/11 season resulted in a high amount of aquatic weed growth in channels, and a relative high need for slashing along access roads and channels. In addition, the floods of 2010/11 across the region would have activated the Emergency Action Plans for a number of storage (requiring 24 hour surveillance at major storages/dams during flood events) which were not required for the preceding 4 years.

Also during the preceding 4 dry years period, a number of storages at low levels would have allowed access to equipment which is normally under water to carry out inspections, paintings, repairs, replacements, etc.

In order to derive at a forecast Operating Costs budget which is based on an *average* year, SunWater has averaged costs from the preceding 4 years (excluding spurious costs). SunWater statess that exceptions to this are for known changes in costs to certain inputs such as Acrolein (aquatic weed control), plant hire, contractors etc, and also Preventive Maintenance in which adjustments have been made in line with the Parsons Brinkerhoff report and costing. SunWater also state that the forecast costing within the NSPs include the savings identified through the SLFI review[6] in 2009[7].

Aurecon notes that the methodology employed of determining forecasts by averaging preceding years cost data is the most appropriate, particularly with modifications for cost out-liners (one-off events unlikely to be repeated) and appropriate modification to cost items undergoing price changes. Attempts to develop a budget, based on perceived requirements during a normal year would potentially be more subjective and open to criticism. However, Aurecon notes the following matters using SunWater's approach of averaging costs over preceding years:

- *Determining the appropriate years to average.* SunWater has used the preceding 4 years[8]. Considering the nature of seasonal conditions in which droughts may run for several years, the use of data over a longer time span may be more appropriate to average out over dry and wet years
- *Changes in technologies and approaches (eg. marketing of alternative chemicals for aquatic weed control) continually evolve.* Although SunWater states that in addition to averaging, subsequent modifications are made for perceived future cost changes, Aurecon notes that the most recent year (2010) is likely to include improvements in delivery compared to costs encountered for that service delivery in 2007. In addition, the reliability and validity of recent data (2010) is likely to be higher than older data (eg 2007). Hence, Aurecon believes that averaging of historic years should also include the allocation of a weighting coefficient to each year that results in the more recent years being accorded a higher significance[9].
- *The recording and maintenance of historical cost data in a format that is reliable (see discussion below) and provides opportunities in the future for interrogation and reclassification.* As noted during this review, 2007 was a transition year in which SunWater's previous internal cost accounting model was removed and a new model developed and implemented in 2008. Unfortunately, due to the retro-fitting of 2007 data into the new model, substantial errors with 2007 data were noted, thereby questioning the validity of incorporating 2007 data for the purposes of averaging.
- *Documenting the key calculations employed, including ignoring spurious costs, and modifications made to the averaging process.* Throughout the course of this review,

[6] The SLFI (Smarter, Lighter, Faster) management review was undertaken internally by SunWater during 2009, and consisted a review of all key corporate groups including Strategy/Public Affairs, ICT, Finance, Legal, Human Resources, Asset Solutions, Procurement, and the service delivery structures within each region. The internal review made a number of recommendations including internal reorganising and rationalisation of certain services and positions, adoption of technologies, and set proposed cost saving targets for each group going forward

[7] Source: SunWater (undated) Service Delivery Paper, Page 2

[8] Note that in a response to questions raised by Aurecon in an email dated 8th June, SunWater hase indicated forecasts for certain operations activities was based on preceding 5 years of data.

[9] Aurecon also notes that applying weighting coefficient to historical data also contains shortcomings. For instance, if the 2010/11 cost data was employed as the most recent, it would contain a higher then *normal* weed control costs, and by placing a higher weight upon the 2010/11 cost data for averaging calculations, will incorrectly skew weed control costs higher than would be expected on average.

Aurecon encountered difficulties replicating cost forecasts for particular Operating Costs activities, even when following the methodology as prescribed by SunWater.

- *A number of activities are periodic in nature*. Aurecon has found certain activities, such as Workplace Health &Safety costs occurring only in 2007 and 2010 only. Hence, an alternative approach to estimating this activity may be warranted for the next price path rather than relying on cost data for two years.
- *Emergence of new activities*. Metering costs for many schemes have emerged since 2008, and risen each year as the number of meters installed increases. Therefore, an alternative methodology to averaging the preceding 4 years would be required.

Based on the issues raised within the points above, Aurecon generally supports in principle the historical averaging methodology adopted by SunWater for Operating Costs forecasting, but notes that improvements to the averaging methodology, such as extending the averaging time period, may be possible and easily implementable to deliver more defensible and accurate forecast estimates.

Aurecon views the greatest challenge to SunWater's methodology for the development of Operating Cost forecasts for 2011-2016 to be the reliability and validity of the historical data used. SunWater acknowledges that its own review of historical data revealed "*a number of incorrect booking of costs against the wrong activity. These errors include but are not limited to:*

- *Non routine activities included in routine costs*
- *Metering costs included under the Customer Management activity*
- *Work booked to the wrong Activity Type (eg Operations instead of Preventive Maintenance)*
- *Work booked to the wrong Cost Type (eg Contract Slashing booked to Plant and Equipment instead of Contractors)*
- *Some indirect and overhead costs included in direct costs*"[10]

SuWater states that it has reviewed the data identifying possible errors, and making subsequent adjustments to counter the errors during its NSP (2011-2016) budgeting process. Importantly going forward, SunWater statess that it will implement a number of measures to improve the accuracy of costing work to the correct activity by:

- Reviewing the cost activity definitions
- Training staff
- Ongoing audits of costing to identify errors[11]

Despite the lack of documentation from SunWater highlighting the actual calculations conducted for a number of Operating Costs activities, Aurecon has attempted to validate the prudency and efficiency of forecast Operating Costs l expenditure by:

- Examining historical expenditure in detail (2007 to 2010), and verifying the definition of that service. In some cases, such as Metering, Aurecon sought from SunWater an indication of the number of meters read as a means of justifying the level of expenditure
- Identifying unexpected changes in historical expenses, taking into account water usage within the scheme. In some schemes, certain operational activities seemed to be correlated to water usage, but this relationship was not consistent across all schemes
- Sought explanation from SunWater to explain substantial variations for historical years

[10] SunWater note (Undated), Time Data Activities, Page 1
[11] SunWater note (Undated), Time Data Activities, Page 1

- Sought from SunWater detailed cost breakdowns for all activities.

Unfortunately, for a number of operational activities Aurecon was not able to gain sufficient detail from SunWater to explain every unexpected variation. Then again, the intention of this review was not an audit, but an investigation of methodologies and sampled activities to gain sufficient confidence to validate forecast expenditures.

Within this report (Sections 5 to 11), Aurecon highlights specifically where it received sufficient information to validate the prudency and efficiency of forecast Operating Costs. In those instances where it could not validate costs from the SunWater data, Aurecon has provided reasons to this effect.

The following sections provide specific details of Operating Costs by expenditure that is common across all schemes investigated within the Central Region.

4.1.1 Operations

Operations activities for the schemes are largely identified within the scheme Operation Manual[12]. A number of these Operations activities are directly related to irrigators such as Customer Management with other activities s such as Scheme Management (ROP, ROLs & IROLs) and dam safety (Water Act 2000) residing with SunWater in response to Government regulatory requirements. Key activities defined within Operations are:

- *Customer Management*: Customer interfacing and enquiries, billing and account management, and water trading activities.
- *Workplace Health & Safety:* SunWater has a dedicated workplace, health and safety group to ensure compliance with legislative requirements throughout all workplaces. As such the group conducts regular safety audits and reviews of work practices, and ensure that SunWater staff undertake regular training.
- *Environmental Management*: Development of weed control plans, assessing impacts downstream of drains, and activities associated with environmental permits (normally undertaken by regional based environmental officer); liaison and coordination with relevant Government agencies and environmental regulators on site-specific issues.
- *Water Management*: Activities related with announcement of water allocations, water quality monitoring and sampling, Blue-Green algae management, SDL readings, shoreline inspections, monitoring of groundwater levels and salinity levels, bore measurements and preparation of data for NRMW and SunWater.
- *Scheme Management*: Preparation and provision of reports and statistics for clients, including meetings with clients reviewing contract progress/performance, energy management including the review of electricity consumption tariffs and accounts, land and property management including legal advice, O&M Manual development, Scheme Strategies, OMS plans, Facility Contingency Plans and Emergency Action Plans (EAP) for all facilities other than dams, System Leakage Management Plans (SLMPs), insurance costs, rates and land taxes.
- *Dam Safety*: For referable water storages under the Water Act 2000, SunWater is required to have a comprehensive safety management program in place comprising policies, procedures and investigations to minimise the risk of dam failure. Routine dam safety inspections are carried out monthly which include the monitoring of embankments, piezometers, seepage and general condition of the storages as defined in the dam surveillance specification; also significant compliance issues in relation to documenting, recording and reporting on dam safety[13].

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[12] SunWater, *Barker Barambah Water Supply Scheme, Scheme Operation Manual*, document un-dated.

[13] Source: *Barker Barambah Bulk WSS NSP*, (2012-2016) January 2011, Page 23.

- *Schedule/Deliver*: Scheduling, releasing, operation of pump stations and SCADA, System surveillance including monitoring of water entitlement and observation of and reporting of any breaches, flood operations preparation, water harvesting, ROP compliance of water levels and flows and reporting of water information.
- *Metering:* Costs incurred with the reading of customer water meters.
- *Facility Management*: Costs predominantly incurred with maintaining recreational facilities.
- *Other*: Accounting for costs that were not able to be allocated to the listed activities above, and the recording of one-off transaction costs. This was more evident for 2007 when cost data was retro-fitted into the new management cost accounting structure in 2008.

For each of the Operations activities listed above, SunWater provided historical costing for 2007 to 2010. In addition, for each activity an over view of input costs (Labour, Materials, Contractors, Other, Indirects and Overheads) was provided. As indicted earlier, SunWater has adopted an approach of averaging the preceding four years (with modifications to account for spurious cost items, or cost items projected to fluctuate over and above CPI); hence the significance placed within this report examining the historical data.

Although this review identified a number of issues pertaining to a number of the sub-activities listed above under Operations, the issue of Meter reading has been consistently raised by stakeholders (for which SunWater has provided a comprehensive response). The following discussion examines the need for quarterly meter reading by SunWater.

Metering

Stakeholders have raised the concerns regarding the cost of reading meters, and whether there are more cost effective strategies to avoid reading these meters each quarter by SunWater staff[14].

As stated within the NSPs, irrigators have the opportunity to enter their own meter readings on line in order to obtain up to date information regarding water usage and availability. However, SunWater will not allow this on-line registration of meter readings to replace quarterly meter readings by SunWater staff. The following discussions seek to examine in further details the requirement and justification for quarterly meter readings by SunWater staff.

A review of the Burnett Basin ROP highlighted the regulatory need for Resource Operations Licence (ROL) Holders (i.e. SunWater) to provide to the Department of Environment & Resource Management (DERM) the following reports for each scheme[15] [16]:

- Quarterly reports
- Annual reports for the previous water year
- Operational reports
- Emergency reports.

SunWater is required to submit a quarterly report to the Chief Executive (DERM) after the end of each quarter containing the following information[17]:

- Verified stream flow, storage inflow and water level

[14] Note that stakeholders at a regional meeting with Aurecon inquired regarding the feasibility of having the electricity meter readers also read water meters on behalf of SunWater. SunWater has advised that while water meters are co-located at pump sites, on-farm electricity meters are likely to be many and dispersed across the farm, and that the timing for management reporting of meter readings for water and electricity may not match up, and water meters may be read ad hoc for water management reasons (eg. drought management) (information provided from SunWater via email dated 27th July 2011).

[15] Schemes covered within the Burnett Basin ROP include: Bundaberg Water Supply Scheme, Upper Burnett Water Supply Scheme, Barker Barambah Water Supply Scheme, and Boyne River and Tarong Water Supply Scheme.

[16] Source: Burnett Basin ROP, Attachment 4.1G, Page 137.

[17] Source: Burnett Basin ROP, Attachment 4.1G, Page 137.

- Releases from storages
- Water diversions
- Water quality
- A summary of bank condition monitoring carried out in (reporting of any bank slumping).

Clearly there is a regulatory requirement for SunWater as the ROL holder to report quarterly on meter readings to the regulator. Supplying data both on metered take and 'water entitled to be taken' gives the regulator the ability to check if people have overused their available water throughout the water year[18].

Given the extent of temporary trading within a number of water supply schemes, SunWater statess that reliable meter data is essential for two reasons;

- *to ensure individual customers to not breach water use limits*
- *to ensure that SunWater complies with maximum take provisions which are set by river reach in some schemes[19]*.

At stakeholder meetings, particularly for the Lower Mary, the issue of reading sleeper meters on a quarterly basis was raised. Within the Lower Mary Bulk Scheme, stakeholders indicated that a large number of “sleepers” existed. SunWater has indicated that temporary transferring arrangements now allow “sleepers” to trade water, and as such SunWater is required to verify that “sleepers” incurred zero water usage.

SunWater also highlighted the need to maintain reliable water usage data after inflows are received to storages. In these circumstances a prompt review of announced allocations against validated water usage information ensures customers are allowed continued access to water.

SunWater has provided the following issues associated with customers reading their own water meters[20]:

- *From past experience, there will always be a considerable percentage of customers who fail to read their water meters and notify SunWater of the meter reading in a timely manner if at all. Where meter readings are not provided there will be a considerable administrative cost in contacting the customer or making alternative arrangements to get the meter reading;*
- *There is a high probability of mistakes by the customer in reading the meter and when providing the meter reading to SunWater;*
- *Customers may not provide the correct information to SunWater (eg name, meter offtake number and meter reading, requiring SunWater to follow up with the customer);*
- *Some customers read the water meters to their advantage (ie add more or less use depending on the product being utilised eg during water harvesting events);*
- *An increase in instances of unauthorized use/meter tampering as SunWater staff are not patrolling the river and or channel systems to deter theft;*
- *Inaccurate meter reading by customers could lead to them taking more water than entitled resulting in a breach of contract, remedy processes being applied and SunWater being in breach of ROL;*
- *Customers are less likely to keep the meter site safe and accessible if SunWater staff are not inspecting water meters quarterly;*
- *Revenue cannot be assured with customers reading their own meters (eg correct meter reading, meter reading on time, broken down meters identified, theft of water discouraged etc);*

[18] Explanatory note provided by SunWater to Aurecon via email, regarding Customer Meter reading, dated 23 June 2011.
[19] Explanatory note provided by SunWater to Aurecon via email, regarding Customer Meter reading, dated 23 June 2011.
[20] Explanatory note provided by SunWater to Aurecon via email, regarding Customer Meter reading, dated 23 June 2011.

- *Increase in administration costs associated with contacting customers when meter readings have not been given or where the incorrect information has been given to SunWater;*
- *Customers generally will not report meter failures.*

The advantages of SunWater reading the water meters include:

- *Meter reading carried out in a timely manner;*
- *Less probability of meter reading mistakes;*
- *SunWater staff check to ensure the water meter is working;*
- *Accurate meter reading data is required for announced allocation determinations; Accurate water use data is essential for the correct approvals of temporary transfers and customers water balance;*
- *SunWater staff monitor the distribution network for faults and damage to infrastructure while meter reading;*
- *Revenue accuracy is improved when SunWater reads the water meters including correct meter reading, meter reading on time, broken meters identified, theft of water discouraged etc.*

Based on the reasoning provided by SunWater above, detailing issues associated with customers reading their own meters, the advantages of engaging SunWater staff to read meters and the immediate absence of technology to remotely read meters, Aurecon support the continuation of the existing practise employed by SunWater. It is noted that SunWater policy is for only one staff member input for meter reading.

However, Aurecon advocate that the annual costs associated with meter readings (i.e SunWater labour costs and traveling expenses) be provided to irrigators at regional scheme briefing/meeting chaired by SunWater. In addition to the scheme costs incurred for meter reading, SunWater may be able to provide additional analysis including average cost incurred per meter per reading, and also raise operational issues encountered by SunWater staff reading meters. Meetings between SunWater operational staff and irrigators may provide the forums and information necessary for identifying improvements and efficiencies in the meter reading process.

4.1.2 Preventive Maintenance

SunWater has defined Preventive Maintenance as activities related to the ongoing operational performance and service capacity of physical assets as close as possible to designed standards. SunWater[21] states that Preventive Maintenance is cyclical in nature with a typical interval of 12 months or less, and includes the following key output activities:

- Condition monitoring; the inspection of assets to determine preventive maintenance *requirements*
- Servicing; planned maintenance activities normally expected to be carried out routinely

A review of SunWater's reporting system also revealed that Weed Control was also a key output activity associated with Preventive Maintenance to which costs were assigned. Details of the sub activities, data used and methodology employed by SunWater to forecast Preventive Maintenance costs are provided below.

Condition Monitoring and Servicing

SunWater engaged Parsons Brinkerhoff[22] to review SunWater's Preventive Maintenance activities with the exception of Weed Control. It should be noted that the Parsons Brinkerhoff study did not audit SunWater's existing maintenance plans and/or Work Instructions (WI) which would have identified opportunities to optimise the existing program, rather than develop a new one from scratch.

[21] SunWater, *Barker Barambah Bulk WSS NSP,* (2012-2016) January 2011, page 28.
[22] Parsons Brinckerhoff (2010) Provision of Services for Costing SunWater's Work Instructions.

The Parsons Brinkerhoff research study methodology included:

- Review of all WI documents for each scheme from Hummingbird (SunWater's document management system) and from SunWater's current maintenance plan from SAP PM
- Development of an Excel cost template capturing all relevant activities including total man-hours and costs for each activity/location/region.
- Interviewing SunWater staff at each regional office to ensure validity and accuracy of the information captured and of the Excel cost template. Some of the specific information sought at these regional meetings included[23]:
    - Average time undertaken for each specified activity
    - Number and type of personnel allocated to each task
    - Identifying seasonal and site specific variations
    - Identifying travel component for each activity
    - Identifying opportunities to bundle activities
    - Recording spare parts/consumables used
    - Identifying maintenance activities that were undocumented / unscheduled for future actioning
- Circulating the cost template (post regional meetings and modifications) to regional staff and management for validation

The Parsons Brinkerhoff study identified a number of issues relating to the historical cost data for Preventive Maintenance including[24]:

- There was a large number of system tools employed to track and schedule PM activities which varied in sophistication and efficacy across regions
- Incorrect booking of hours, or coding of work by field staff, creating inaccuracies in the SAP PM database
- Examples of operational work incorrectly coded to maintenance activities
- Examples of information within SAP difficult to interpret and not reflecting actual activities taking place

The Parsons Brinkerhoff study identified that approximately 60% of planned Preventive Maintenance activities had no supporting work instructions, but SunWater was undertaking steps to address this. Inconsistencies were also discovered between the Hummingbird database and SAP, and inconsistencies for the maintenance frequency for the same asset type at different locations.

Of concern raised by SunWater's regional staff was the shortage of resources to complete tasks, defined as budget and skilled labour shortages, and the priority of project work for resources over Preventive Maintenance work within some regions. As a result, significant portions of Preventive Maintenance work was being delayed, deferred or not undertaken at all.

As a result, the forecast costs identified by Parsons Brinkerhoff for Preventive Maintenance (Condition Monitoring and Servicing sub activity) were far higher than the average of the preceding four years recorded by SunWater. Based on its analysis, Parsons Brinkerhoff estimated that Preventive Maintenance activities across the Central region as a whole were historically underspent by 9% in allocated expenditure.

[23] Parsons Brinckerhoff (2010) Provision of Services for Costing SunWater's Work Instructions, Page 8.
[24] Parsons Brinckerhoff (2010) Provision of Services for Costing SunWater's Work Instructions, Page 11.

The Parsons Brinkerhoff study made a number of recommendations, most of which are related to SunWater's management practices and operational procedures. However, the following two recommendations are of specific interest to this pricing review[25]:

- There is a need to audit SunWater's maintenance plans and work instructions, and associated labour inputs and unit costs, and include a review of sub-contracted maintenance activity
- A detailed examination of Corrective Maintenance practices and costs needs to be undertaken to identify the optimum mix of activities between Preventive and Corrective Maintenance for each scheme and adopting a Reliability Centred Maintenance (RCM) approach to formulating maintenance activity requirements.

An analysis of Parsons Brinkerhoff forecast of required Preventive Maintenance expenditures is provided for each of the schemes within Section 5 to 11 of this report.

Weed Control[26]

Weed control is a significant problem across many bulk and distribution systems, requiring a range of response actions including chemical (including expensive Acrolein injections for aquatic weed control) and mechanical (slashing, brush cutting, and raking). SunWater staff usually undertake the specialist activities including Acrolein injections (channel weed control) and burning, while general activities including slashing are undertaken by contractors. Note that contracts for services such as weed control (slashing) are usually set for a three year period, and market tested when due for renewal.

As highlighted through Sections 5 to 11 within this report, Weed Control costs varied substantially across schemes, and also between years. Generally wet summer seasons (particularly the recent 2010/11 season) result in extensive weed growth on land and within channels, resulting in high amounts of Weed Control expenditure in contrast to dry seasons in which expenditure may be minimum (or even zero in some schemes).

Summary Preventive Maintenance

SunWater provided forecast of Preventive Maintenance costs disaggregated by inputs including Labour, Materials, Contractors, Other, Indirects and Overheads. However, it did not provide a disaggregation of Preventive Maintenance cost forecast by output activity (Condition Monitoring, Servicing and Weed Control), limiting Aurecon's capacity to assess the prudency and efficiency of forecast costs. As such, Aurecon was not able to validate the extent to which SunWater accepted the work of Parsons Brinkerhoff study, and if SunWater has made modifications to the prescribed work program developed by Parsons Brinkerhoff.

4.1.3 Corrective Maintenance

SunWater describess Corrective Maintenance as an unexpected failure requiring reactive corrective maintenance response. Two main types of activities:

- Emergency breakdown maintenance, requiring immediate action to restore normal operation or supply to customer to meet a regulatory obligation
- Non-emergency maintenance, activities no requiring immediate response but scheduled in advance of the planned maintenance cycle.[27]

SunWater's forecast of Corrective Maintenance expenditure is based on averaging the preceding four years from 2007 to 2010, with outliner year costs omitted from the analysis. This approach is commonly adopted by other water utilities, and Aurecon supports the adopted methodology. However, Aurecon recommends that additional information and analysis is provided in subsequent cost and pricing reviews, so that forecasts are readily

[25] Parsons Brinckerhoff (2010) Provision of Services for Costing SunWater's Work Instructions, Page 23.
[26] Aurecon wishes to acknowledge Halcrow Report (2011) *Biloela Water Supply Scheme: Review of Price Paths 2011 2016*, Pages 23 to 24, from which Aurecon has sourced some of the information presented within this section.
[27] SunWater, *Barker Barambah WSS NSP,* (2012-2016) January 2011, Page 29.

validated by external stakeholders (and the selection of outliner year costs identified and verified).

One of the recommendations from the Parsons Brinkerhoff (Work Instructions) study was the adoption of a Reliability Centred Maintenance (RCM) approach to determining the optimal mix of work instructions for Preventive and Corrective Maintenance. Before adopting a RCM framework for each scheme, SunWater is required to undertake a detailed audit and review of existing Preventive and Corrective Maintenance activities, which is yet to be completed. Although the Parsons Brinkerhoff study indicates that the adoption of a RCM initiative to optimise Preventive Maintenance activities would potentially improve required activity frequency, no indication of the amount of expenditure savings are indicated.

4.1.4 Electricity

Electricity costs are predominantly related to the operation of pump stations, hence costs are more apparent within the distribution systems. For bulk systems, electricity costs are also apparent for:

- Bulk schemes which require water to be pumped from a storage to supplement a different stream, as is the case for Barker Barambah (Redgate Relift)
- Schemes which have major storages (dams) with public access, requiring lighting of roads and recreational facilities

SunWater’s paper *Background Paper, QCA Review of Irrigation Prices, Electricity costs* (February 2010) provides an overview of SunWater’s approach to forecasting electricity costs, along with an overview of management practices currently undertaken to minimise scheme costs.

Note that within the NSPs (particularly distribution systems for Bundaberg and Lower Mary), substantial electricity costs (scheme aggregated) are presented. The aggregated electricity cost forecast is not used in water pricing calculations as it is not possible to forecast the exact amount of water to be pumped for the fore coming price path. Rather, it is the unit cost of pumping (in $/ML delivered to the customers off-take) that is used to form the consumption charge. This unit charge is influenced by[28]:

- the interactions between pattern and timing of water use and tariff structure
- storage levels
- actual distribution losses as a proportion of delivered water, which varies from year to year depending on water use
- the efficiency of each pump, and life-cycle stage.

Due to the variables above, SunWater has utilised historic data on total electricity costs divided by the volume of water delivered to customers to arrive at an average cost per ML delivered for the scheme (2009/2010 dollars). This cost per ML in 2009/10 dollars was increased by 13.29% (actual percentage increase for Franchise Tariffs between 2009/10 to 2010/11), to arrive at an estimate cost for 2010/11 (then CPI going forward in the price path).

Key elements regarding forecast pumping costs (electricity) include[29]:

- that electricity prices will increase with CPI
- volumes pumped to be forecast based on projected water use volumes
- reconciliations of forecast versus actual costs to be maintained
- price adjustment made for the next price path to account for any overs or unders incurred within the current price path 2012 to 2016.

[28] SunWater, *Background paper, QCA review of irrigation prices, Electricity costs, (*February 2010).
[29] SunWater, *Bundaberg Distribution System NSP,* (2012-2016) January 2011, Page 27.

In terms of reducing energy consumption, and prices paid for energy, SunWater also highlight a number of measures that are/were undertaken including[30]:

- the selection of franchise tariffs as opposed to purchasing electricity from the contestable marketplace[31]
- the use of off peak pumping where possible, particularly where balancing storages are used
- condition monitoring and maintenance to regularly test pump efficiency, and investigate opportunities for pump improvements (overhauls)
- infrastructure modifications where possible, such as development of additional balancing storages, replacement of old pumping units with more efficient modern pumps
- participation within the Australian Government's Energy Efficiency Opportunities programs which encourages opportunities for SunWater to identify cost effective energy savings.

In 2010 SunWater undertook an extensive review of its network to identify opportunities to save on energy consumption. An internal paper, *Energy Management Program Plan* (October 2010) identified 107 specific opportunities for energy savings incorporating potential initiatives for specific assets as well as organisational wide initiatives.

A number of energy savings opportunities were raised for the Central region, including[32]:

- engaging operations personnel to review operational issues with the Isis irrigation System pump stations, to identify and document potential efficiency opportunities
- investigate and address issues with Don Beattie Pump Station
- improve customer metering accuracy within the Isis irrigation system channels to improve channel operation and better quantification of system losses
- re-examine the optimal start & stop levels for the Isis irrigation balancing storage, to optimise the use of the balancing storage and associated pump stations
- review current operation of the Isis irrigation system channels and storages to identify operational strategies to minimise the occurrence of channel overflows or excessive draw-downs
- examine the effectiveness of non-return values on the Isis irrigation systems pump stations, to avoid pumping the same water twice
- facilitate trade of water out of Childers section of the Isis irrigation system, to reduce the requirement to operate the Childers half of the Quart Pot pump station
- convert the two rising main surge tanks to one way tanks on the Gooburrum pump station, which will reduce surging in the rising main and improve pumping efficiency.

As part of the energy management plan, SunWater has set a target of reducing its energy consumption by 5% by 2014/15[33].

[30] SunWater, *Background paper, QCA review of irrigation prices, Electricity costs, (*February 2010).
[31] Note that Aurecon was informed that SunWater recently modelled its historical electricity consumption utilising both franchise and contestable market tariffs. Aurecon sought to examine the modelling via QCA, but was not provided a copy of the analysis at the time of this final report.
[32] SunWater, *Energy Management Program Plan,* (October 2010), Internal Draft Confidential Document, Pages 39 & 40.
[33] SunWater, *Energy Management Program Plan,* (October 2010), Internal Draft Confidential Document, Page 13.

4.1.5 Labour

Labour is a critical input, and major cost component associated with SunWater's operations. Due to the highly variable nature of workload requirements, it is also very difficult to accurately forecast required labour needs and plan accordingly.

However, SunWater statess that a significant proportion of its service delivery workload is consistent from year to year including[34]:

- Operations
- Preventive Maintenance
- Planned Corrective Maintenance

At the same time, SunWater also highlight non-routine workloads that vary each year, and include:

- Additional operational activities created by seasonal conditions
- Non-predicative Corrective Maintenance
- Emergency or breakdown maintenance
- R&E (Refurbishment and Enhancement)

In response to labour demands for routine and non-routine workload activities, SunWater has developed a workforce strategy that includes[35]:

- using permanent SunWater staff to carry out core activities
- using temporary, casual and contracted staff to meet peak work loads
- multi-skilling operational staff enable them to undertake a range of tasks including operations and maintenance activities
- outsourcing non-core activities
- using tenders/contractors to complete large capital works

During the field investigation, Aurecon was able to observe a number of the above workforce strategies employed across the Bundaberg region, including:

- the use of contractors for weed control (slashing) at a number of balancing storages, and along a number of channels
- the engagement of contractors via a tendering process, for major renewal activities. Senior SunWater operational staff maintained a supervisory role for a number of these activities
- the management and operation of the recreational facilities at the Fred Haigh Dam outsourced to a private contractor (kiosk operation, and maintenance of grounds around recreational facilities).

At the visit to SunWater's Bundaberg regional office, Aurecon was provided with a copy of a timesheet completed by an employee (requirement for all SunWater employees on a weekly basis). The timesheets highlight the time allocated by each employee to a specific activity and location, providing the mechanism for direct labour to be allocated to specific activities within each scheme.

SunWater acknowledges that historically there were coding issues with the timesheets which led to incorrect labour costs allocated to particularly activities. This was also identified by the Parsons Brinkerhoff (Work Instructions 2010) study as a major issue, comprising the accuracy of historical cost data (which is the basis used for forecasting many operational labour costs).

[34] SunWater (un-dated) Service Deliver Paper, Page 1 of 5.
[35] SunWater (un-dated) Service Deliver Paper, Page 2 of 5.

The magnitude of the recording errors is unknown at this stage as an audit has not been undertaken by SunWater.

The following analysis presented within the Halcrow (2011) report highlights the assumptions adopted by SunWater in estimating labour expenditure associated with maintenance activities.

- "*SunWater's existing FTE (Full Time Equivalent) resource pool will remain unchanged over the price path period*
- *SunWater has assumed the 'available days' in any given year by excluding weekends, public holidays, annual leave and allowance for sick leave.*
- *'Available hours' (or 'capacity') is calculated taking into account the hours worked each day (some staff work a 7.25 hours day, whereas others work a 7.6 hour day).*
- *SunWater applied a utilisation ratio to the estimate of 'available hours'. Applying a utilisation ratio excludes labour costs associated with training and administrative time. This is the time available to be billed directly to schemes or to indirect activities.*
- *SunWater then applied a ratio of 'billable hours', which excludes labour costs associated with indirect activities. This is the time available to be billed to specific schemes. The billing target for SunnWater is 68 percent although this varies for different staff[36]. For example, for its Asset Management team, the ratio adopted was 80 percent; for operations staff, the ratio is well over 90 percent. Time is booked via 'service contracts' to each bulk water supply scheme and distribution scheme.*
- *SunWater has used the Enterprise Agreement (EA) rates for forecasting increases in labour expenditure. Where more than one rate for a position exists, SunWater indicated that it took the average wage rate. Halcrow has been provided with a copy of the EA and of the wage rates. While it has not been possible to confirm the calculations of average wage rates from the information provided to this review, Halcrow has reviewed extracts of SunWater's resource forecasting tool, and confirmed that it uses average wage rates to develop labour expenditure forecasts.*
- *Statutory on-costs covering leave loading, superannuation, long service levy, payroll tax and workers compensation have been applied at 22 percent.*

SunWater noted that it charges a profit on labour expenditure for its commercial contracts, however, profit is not charged in irrigation areas. Halcrow has reviewed extracts of SunWater's resource planning tool, used to develop labour forecasts, and confirms that profit has not been charged to irrigation schemes." [37]

Examination of SunWater labour charge rates

A number of stakeholders have expressed an interest regarding the hourly charge out rates for SunWater labour. Labour costs are a major cost item across all activities including Preventive and Corrective Maintenance, and also Operations activities. Significant SunWater labour costs are also incurred for most renewal activities.

As highlighted earlier, each SunWater staff member via the timesheet is able to apportion his time towards a specific activity and scheme. A wide array of SunWater staff will provide input to particular schemes including administrative, operational (including electrician and fitter & turners undertaking maintenance activities), professional (engineers undertaking asset audits and assessments) and managerial (staff and project supervisory, and stakeholder engagement). Each of these staff incurs a different charge-out rate to a scheme.

The following analysis examines the charge-out costs (irrigation schemes) incurred for SunWater electricians, which represents a major component of SunWater's operational workforce for the Central region.

[36] SunWater (un-dated) Service Deliver Paper, Page 3 of 5.

[37] Halcrow Report (2011) *Biloela Water Supply Scheme: Review of Price Paths 2011 2016*, Pages 28 & 29.

The Parsons Brinkerhoff [38] study provided detailed spreadsheets for each scheme detailing the required labour investment and cost to effectively meet all the Work Instructions (Preventive Maintenance) tasks. Table 4-1 below highlights the hourly charge rates used by Parsons Brinckerhoff (2010) within their study, which provides an insight into SunWater labour hourly charge rates for 2010. SunWater[39] has indicated that its electricians are commonly engaged at the SW4 and SW5 pay levels, which indicates a direct labour charge to the schemes of $41 to $46 per hour.

Table 4-1. Hourly labour charge-out costs for SunWater staff in 2010 (irrigation schemes)

SunWater band[1]	Hourly charge rate[2]
SW3	$ 37.00
SW4	$ 41.00
SW5	$ 46.00

[1] Note that SunWater has pay scales within the SW Band that ranges from 1 through to 10.
[2] Aurecon understands that this includes statutory on-costs of 22% covering leave loading, superannuation, long service levy, payroll tax and workers compensation.
Source: Parsons Brinckerhoff (2010) *Provision of Services for Costing SunWater's Work Instructions*, Attached Excel Spreadsheets

For each hour recorded by an Electrician at a pay level of SW5, the scheme would be charged $46 in direct labour cost (includes on costs associated with the employee). Substantial overheads are also charged based on each dollar charge of labour incurred at a rate of approximately 98% averaged over the last 5 years (but this allocation of overheads is currently under investigation by another consultancy, and therefore not addressed here).

The publication by Rawlinsons *Australian Construction Handbook* (2010 version, 28th edition) is a comprehensive book listing unit rates for construction activities, including market wage rates and hourly charges for trade services across all major capital cities. Table 4-2 below provides an overview of quoted hourly charges for Brisbane (2010) as a means of comparison.

Table 4-2. Wage Rates for Brisbane[1]

	Av. Tender (Costing) Rate Inc. Overheads and Profit	Av. Contract Charge-Out rate Inc. Overheads and Profit
Plumber/Drainer	66.00 – 73.00	77.00 – 86.00
Sheet Metalworker – Class 1	73.00 – 77.00	85.00 – 91.00
- Class 2	67.00 – 72.00	78.00 – 82.00
Electrician	77.00 – 82.00	90.00 – 94.00
Building Trade – Labourer		
Group 1	63.00 – 68.00	74.00 – 80.00
Group 2	62.00 – 67.00	72.00 – 77.00
Group 3	61.00 – 66.00	71.00 – 76.00
Group 4	60.00 – 65.00	70.00 – 76.00

[1] These rates are market rates for commercial projects.
Source: Rawlinson 2010, Rawlinsons Australian Construction Handbook, 28th Edition.

The rates quoted above in Table 4-2, include Overheads and Profit. Discussions undertaken by Aurecon with several civil engineering contractors indicated that the rate of which Overheads and Profits are applied varies considerably between firms, and within projects tendered for (ie. larger projects with longer contracted periods would encourage a slightly

[38] Parsons Brinckerhoff (2010) Provision of Services for Costing SunWater's Work Instructions, Consultancy Report
[39] Email from SunWater to Aurecon dated 20th July 2011

lower overhead and profit surcharge), and the supporting services provided to the employee (office, vehicles, equipment, etc). Aurecon estimatess that the range of Overheads and Profit applied for Contract Charge Out rate is 50 to 60% for construction projects in Brisbane. Based on a 50 to 60% Overhead/Profit surcharge, then the calculated contract rate (less Overhead and Profit surcharge) of construction related Electricians in Brisbane is in the range of $36.00 to $47.00 per hour.

As highlighted above, SunWater's electricians at the SW4 and SW5 pay levels have a direct labour charge to the schemes of $41 to $46 per hour. From the comparative analysis presented above using the commercial rates quoted from Rawlinson (2010) for commercial construction related Electricians in Brisbane, the direct hourly charge out rates of SunWater electricians are comparable, reflecting an appropriate contract charge-out rate used by SunWater for commercial electricians.

Electrician Award Rates

Aurecon presents the following general information regarding labour employment costs for Electricians. This information is focussed on wages and salaries and not on charge out rates that have components of profit and on costs. Stakeholders have raised with Aurecon the issue of Award rates and the correlation between these Award rates and the charge-out rates applied by SunWater.

The National Electrical Power Industry Award 2010 stipulates that the minimum weekly wage for a Level 6[40] (Technical Grade 6) electrical worker is $829 for a 37.5 hourr week, equating to $22.10 per hour[41] direct labour cost to employers (equates to $26.96 per hour after incorporating 22% on-costs). It is noted that there is no linkage between the classification level described here (National Electrical Power Industry Award 2010) and that for SunWater's classification band (SW band) that is used across all staff (covering all trades and occupations).

Aurecon also notes that the competition for electricians within Central Queensland is high from the mining sector, who offers substantially higher salaries to attract skilled electricians, particularly for those already working regionally and containing experience working with large utility assets and high voltage systems. To retain skilled staff that have working knowledge of SunWater's procedures and assets, SunWater requires to pay above the minimum award rate.

Attracting and retaining qualified Electricians in an open market place against the mining sector, SunWater's management have identified the need to offer salaries within the SW 4 and 5 level. This is above the prescribed minimum award rate, but well below that offered by the mining sector. Aurecon notes, that a number of major mining projects proposed for the Central region (particularly the Liquefied Natural Gas plant at Curtis Island, Gladstone), will increase the difficulties (and costs) of attracting and retaining qualified Electricians within SunWater.

4.1.6 Summary observations for Operating Costs expenditure

Aurecon noted that SunWater's management recording system was effective in recording and assigning direct costing for operational activities to relevant schemes. It was also noted that in many areas the provision of services by SunWater staff has declined in recent years, with external contractors engaged more regularly to provide services and products. This has been more pronounced with expenditures related to asset renewals activities, but is also becoming more evident with maintenance related activities.

[40] Note that the Award starts at Level 1 ($563/week) which is classified as Administrative Grade 1. Levels 1 to 4 are graded as Administrative, while Levels 5 to 11 are classed as Professional/Manager/Specialist, with the minimum award weekly wage for Level 11 being $1,148. Note that Aurecon has utilised Level 6 for this analysis, when in fact some of its Electricians are likely to be at higher and lower levels.

[41] Note that the national award advocates a 25% loading to cover paid annual leave, paid personal/carer leave, and paid public holiday leave.

At the regional level, it was obvious that a number of management strategies are employed to maintain the current provision of services with less funding. The more obvious strategies within the Central region that encompass the Bundaberg cluster included a reduction in staff numbers over the years, the relocation of smaller regional offices to low cost sites outside township business centres, the increased usage of private contractors, and the creation of SunWater operational working teams that were more likely to be centrally based (Bundaberg) with increased mobility to service all schemes within the Central region. Although a number of these operational strategies have either been introduced (or are in process of being introduced), it was difficult to identify the extent to which these cost savings will materialise over the next price path from July 2011 to 30 June 2016.

In all schemes Aurecon noted the significant increases in Operations related expenses (particularly the direct labour component) between 2007 and 2010. In some cases (Bundaberg Bulk, Bundaberg Distribution, Boyne River and Tarong Bulk, Barker Barambah Bulk, and the Lower Mary River Bulk), this was directly linked to substantially higher water usage levels within the schemes or the emergence of new mandatory activities such as metering and dam safety. Significant problems exit with the historical dataset (particularly 2007) due to a range of issues including the adopting of a new cost accounting system (BOM), and incorrect allocation of time and expenses (eg. Preventive Maintenance).

Aurecon have made recommendations to the prudency and efficiency of proposed operational expenditure (2012-2016) where sufficient information and explanation was provided. Throughout the report Aurecon has highlighted activities and expenses in which insufficient information was provided to allow the validation (or rejection) of proposed expenditure.

4.2 Capex expenditure

4.2.1 Overview of the renewals annuity program and methodology

SunWater hase developed a forecast renewal expenditure program for each scheme over a 25 year period, consisting of an initial 5 year pricing path forecast for the period 2012 to 2016 plus 20 years thereafter to 2036. SunWater statess that "*The forecast for the initial 5-year period is based on a detailed assessment of asset condition and risk of failure. Forecasts beyond 5 years are based on broader estimates of asset life using engineering estimates and standard replacement rules.*"[42]

SunWater's paper, *QCA Review of Irigation Prices, Renewals Annuity, Background Paper* (January 2010) provides an overview of SunWater's methodology. The paper provides a high level overview of the accounting approach utilised by SunWater to calculate renewal balances, and examines the key issues for the calculation of the annuity, and the approach adopted by SunWater.

To account for ongoing renewal expenditure and annuity income for each scheme, SunWater has established an Asset Restoration Reserve (ARR) account.

SunWater also provided to the QCA and the NSP consultants a confidential internal working paper *QCA Review of Irrigation Prices, Renewals Annuity Calculation, INTERNAL WORKING PAPER*, January 2011. This paper highlights the processes employed in unbundling the initial balances (bulk and distribution), highlights ARR inflows and outflows, and confirms the methodology employed calculating scheme ARR balances (versus irrigation sector only ARR balance).

The following section examines key components of SunWater's Renewal Annuity methodology.

Opening ARR balance 1 July 2006

The opening ARR balance as at July 2006 has a substantial bearing upon the ARR balance for July 2011. For some schemes, such as the Lower Mary Distribution, a significant negative ARR balance in July 2006 has over the past 5 years attracted significant interest charges at 9.689% per annum. As a result, the 2011 ARR balance has increased to a concerning

[42] SunWater, Barker Barambah Water Supply Scheme NSP, (2012-2016) January 2011, Page 30.

amount. On the other hand, a number of schemes had a positive ARR balance as at 1st July 2006, and have attracted since then a relatively high amount of interest income.

The consultants were advised by the QCA that the July 2006 ARR balances were to be accepted as correct.

Unbundling the 2006 ARR balance

Within the Central region, unbundling of the 2006 ARR balances was required for the Lower Mary and Bundaberg. SunWater acknowledges that "*Ideally, renewals balances would be unbundled by re-creating the transactions at a disaggregated level from the commencement of the renewals annuities in 2000. However, SunWater does not have the data spanning back to 2000 that would enable it to do this*."[43]

SunWater statess that a number of options were investigated for splitting balances between bulk and distribution, including proportional water use, water access entitlements, asset values and lower bound costs. SunWater further states that these methods did not closely relate to the renewal expenditure nor income for either bulk water or distribution.

Instead, SunWater adopted an approach based on proportional renewal expenditures for bulk water and distribution. The approach involved calculating the present value of renewal expenditures between July 2006 and June 2010, and calculating the present value of forecast renewal expenditures between July 2010 and 2035. The ARR balances were then split proportional to the Present Value (PV) of the expenditure in both bulk water and distribution. Table 4-3 highlights the outcomes for the Central region.

Table 4-3. Split of opening ARR balances (irrigation sector) for the central region

	Bulk Water		Distribution	
	Present value of renewals spend 2007 – 2035 ($'000)	%	Present value of renewals spend 2007 – 2035 ($'000)	%
Bundaberg	5,379	22%	19,113	78%
Lower Mary	344	9%	3,594	91%

[1]Source: SunWater, QCA review of irrigation prices, Renewals annuity calculation, INTERNAL WORKING PAPER, January 2011, Page 8.

Aurecon endorses the methodology employed by SunWater that is based on proportioning past and future renewal expenditures between bulk and distribution as the most appropriate, considering that it was not possible to disaggregate renewal income and expenditure between 2000 and 2006.

Interest on ARR balances

Interest is applied to annual annuity balances to reflect the actual financial position when re-setting the annuity at the subsequent pricing period, and to also ensure that the renewals annuity income and expenditures balances to $0 over the annuity period[44].

An interest pre-tax rate of 9.689%[45] is applied to both positive and negative balances each year. Obviously schemes with negative annuity balances would support the use of a substantially lower interest charge, while those with positive balances would be content with the current rate of 9.689% applied. The interest rates charged by commercial banks have been provided below for comparison purposes:

- 6.25% for term deposits over 12 months for amounts over $5,000

[43] SunWater, QCA review of irrigation prices, Renewals annuity calculation, INTERNAL WORKING PAPER, January 2011, Page 6.
[44] SunWater, QCA review of irrigation prices, Renewals annuity, Background Paper, January 2011, Page 5.
[45] The 9.689% is equivalent in pre-tax nominal terms to the WACC that is used to calculate the renewals annuity (12.11%).

- 9.19% for Business Overdraft, and 8.64% for fully drawn loan Variable rate (non-residential security)[46]

Note that interest rates have varied substantially in recent years in response to the Global Financial Crisis (GFC), and the subsequent strengthening of the Australian economy.

Aurecon supports the use of a constant interest rate for application to annual annuity balances, both positive and negative. Although interest rates will fluctuate substantially in response to evolving economic conditions, Aurecon notes that the current rate of 9.689% is on the high side in comparison to long term financing rates offered by commercial banks.

Discount rate

SunWater has identified a nominal Weighted Average Cost of Capital (WACC) of 12.11%. This translates to an equivalent real rate of 9.38% based on inflation of 2.5%, in discounting the renewals expenditure and calculating the annuity[47].

Of interest is that within another SunWater Paper, *QCA Review of Irrigation Prices, Renewals Annuity, Background Paper* (January 2010), a discount rate of 11.25% is advocated, and an equivalent real rate of 8.54% based on inflation assumption of 2.5%.

Aurecon supports the use of the WACC 12.11% to discount future annuity expenses, which is a relatively high rate. The use of a relatively high discount rate increases the financial significance of short term activities at the expense of longer term activities. As the reliability of short term forecast events is much more certain than those over the longer term, a higher discount rate (as currently employed by SunWater) provides a better outcome by assigning a higher value to short term forecast activities.

Forecasting period

Since 2000 SunWater has used a 30 year rolling annuity (30 years plus the 5 year forecast price path) for the renewals annuity calculation. SunWater now propose to retain the rolling annuity approach, but reduce the scope to a 20 year horizon (20 years plus 5 year price path forecast). SunWater's justification for a reduced rolling annuity period is:

- that the scope for errors increases with very long term forecasts of renewal expenditures, and reducing the scope will improve the reliability
- 20 year horizon is also consistent with the planning horizon adopted by the QCA for price setting for the Gladstone Area Water Board[48].

Through the course of this study, Aurecon noted that a number of schemes were beginning to incur substantial renewal expenditures within the 2030 to 2036 period, associated with channel/distribution network refurbishments and replacements. Many of these major renewal investments are inter-generational with operational life spans of 50 to 80 or more years. Aurecon advocates that the use of the previous 30 year rolling annuity be retained for the following reasons:

- provides stakeholders (irrigators) with greater insights regarding the longer term scheme requirements, and a greater understanding of specific assets and asset lives (provided detailed asset information is also provided as part of the process)
- provides farmers with more information and assurance when undertaking inter-generational planning of family operations
- alleviates some stakeholder comments that the implementation of a 20 year rolling annuity for certain schemes was able to avoid major spiked expenditures between 2037 and 2046, thereby reducing the annual annuity payment for this price path(but potentially lead to a major price hike for the subsequent price path in 2017-2022
- provides additional expense information (2037 to 2041 if adopted for this price path) when examining individual scheme/asset viability

[46] Sourced from the Internet, Heritage Building Society 20th July 2011

[47] SunWater, QCA review of irrigation prices, Renewals annuity calculation, INTERNAL WORKING PAPER, January 2011, Page 18.

[48] SunWater, QCA review of irrigation prices, Renewals annuity, Background Paper, January 2011, Page 10.

- The use of the existing discount rate (12.11%) heavily discounts the financial significance of the long term activities.

Customer involvement in renewal expenditure

Customer involvement with renewal expenditure has been raised at a number of stakeholder meetings, warranting additional commentary. SunWater's paper *Supplementary Background Paper, QCA Review of Irrigation Prices, Customer Involvement in Renewals Expenditure* (February 2010) provides an overview of its position, past experiences with stakeholder groups (Tier 1 Group), and experiences to date regarding information provision to customers.

In terms of customer involvement, there are two levels. The first is the provision of information about renewal projects, while the second is the customer involvement in the decision making.

In terms of the provision of detailed renewal project information to stakeholders, SunWater states that "i*n the past, SunWater has provided more detailed, written information to these groups, and to irrigators individually, through scheme annual reports or newsletters mailed to customers. This annual reporting to individual customers was discontinued in 2005, amidst informal feedback to SunWater that those reports were not of value."*[49]

Stakeholders have expressed concerns, particularly within the Lower Mary, that they have had no information or communication regarding the renewal program during the current price path and are dismayed to see the ARR balance for the Distribution Network over this period grow from a deficit of ($888,000) in 2006 to a deficit of ($1.454 million) in 2012.

This report alone provides substantial detail regarding proposed renewal expenditure (asset level) out to 2036. Aurecon advocates that the SunWater re-examine avenues to communicate opportunities that disclose proposed scheme renewal programs to stakeholders. Aurecon noted the intention of the regional SunWater manager for the Central region to engage more proactively with stakeholders which presents an option.

In terms of decision making for renewal expenditure, SunWater statess that "t*he 2006 / 2011 price paths were developed under a negotiate-arbitrate model, whereby SunWater presented its costs to irrigator representatives for review. These representatives (i.e. the Tier 1 Working Group) engaged external consultants to review the proposed renewals expenditure program. Ultimately, irrigator representatives and SunWater jointly established renewals projections that feed into a cost recovery target for each bulk water scheme and distribution system. Under the negotiate-arbitrate model, a third party would arbitrate disputes if matters could not be resolved between the parties."*[50]

For the current price path review, the QCA has been appointed to review the prudency and efficiency of SunWater's expenditure proposals and recommend tariffs, replacing the function previously undertaken by the Tier 1 Group which reviewed proposed renewal expenditures. It should be noted that Aurecon's review of the prudency and efficiency of forecast renewal expenditure is based on a review of the methodology and investigation of sampled assets, and not an audit of all proposed expenditure activities. This approach has been established by the QCA.

Under the new arrangement with QCA appointed to review costs, SunWater sees no need for stakeholder engagement for the development of renewals programs. SunWater statess "*that it has control over decisions for the renewals program, and accepts that it is accountable for these decisions in terms of the service or compliance outcomes, and the efficiency of the expenditure through regulatory reviews of expenditure*."[51]

[49] SunWater (February 2010), Supplementary background paper, QCA review of irrigation prices, Customer involvement in renewals expenditure, Page 4.
[50] SunWater (February 2010), Supplementary background paper, QCA review of irrigation prices, Customer involvement in renewals expenditure, Page 3.
[51] SunWater (February 2010), *Supplementary background paper, QCA review of irrigation prices, Customer involvement in renewals expenditure*, Page 3.

Aurecon recommends that an additional avenue for engagement of stakeholders be provided that allows stakeholders to view the process and analysis undertaken by SunWater to validate the renewals expenditure.

Instances in which irrigator stakeholders object to either historic activities undertaken, or proposed activities to be undertaken, should be referred for review by an external expert party. If the external party finds in favour of the irrigator stakeholders, then SunWater is to bare the renewal expense and cost of the review of the expert review. However, if the external expert review finds in favour of SunWater, then the cost of the renewal, along with the external expert review to be charged to the scheme's annuity account.

4.2.2 Summary observations of the renewals program

Aurecon noted SunWater's extensive asset management methodologies that define for each asset a defined program of preventive maintenance schedules, and a refurbishment and renewal program. Aurecon noted SunWater's extensive auditing and monitoring programs coupled with a multi-criteria risk assessment framework, was effective for reviewing and updating standard asset life and to prioritise works in an effective way that preserves the assets functionality and meeting the targeted levels of service.

Based on a review of a number of sampled historic and forecast renewal projects, Aurecon found that:

- Many proposed renewal projects were delayed in the previous price path, more than likely due to combination of limited funding, emergence of higher priority renewal activities (unplanned), and reassessed effective working lives (e.g. extended drought for several years delaying wear and tear upon the asset, and therefore delaying the need for refurbishment and/or replacement)
- SunWater actively pursues opportunities to extent the operational life of assets where possible in order to delay costly replacements. Through the employment of an asset monitoring process, SunWater is able to closely monitor asset condition to better plan refurbishments and replacements
- For some renewal activities, there may be a change in the proposed scope of works from a refurbishments to a replacements, or vice versa
- It is apparent that only when a proposed renewal activity falls within the next 12 month period are detailed investigations and costing undertaken
- Cost projections for a number of forecast renewal activities (beyond 12 months) are based on past experiences for similar works, or the prescribed asset replacement valuation assigned on the Bill of Materials
- One of the proposed renewal expenditures was assigned an incorrect asset life, resulting in an earlier proposed replacement than required. SunWater has indicated that this mistake has been amended, but highlights that a more rigorous assessment (audit) of renewal activities may be warranted.

Aurecon noted that environmental conditions (seasonal conditions) are the most significant factor on asset usage and asset condition, and the subsequent need for maintenance and renewal activities. Aurecon acknowledges that predicting these externalities (environmental conditions) is difficult within the short term (3 months), let alone the short to medium term (1 to 5 years).

Aurecon have made recommendations to the prudency and efficiency of a number of renewal expenditure activities based on information gathered, site inspections, and analysis undertaken.

Aurecon have also makes the following recommendations relevant to all of the schemes regarding the asset renewal program.

1. Need to audit historical renewal expenditures

Aurecon recommends that:

- A comprehensive itemised inventory of renewal expenditure items is sourced from SunWater, so that 100% of the stated annual renewal expenditure can be validated
- That an audit is undertaken of all activities that substantially exceeded the Board budget, and those without a Board budget be audited, and reasons obtained for variations.

2. Need to undertake additional financial and economic analysis within scoping studies

Aurecon recommends that all scoping studies undertaken for major renewal activities need to incorporate a financial/economic evaluation from an investor's perspective. That is, a financial analysis is undertaken that examines and captures all parameters including:

- the capital investment costs including initial scoping & background investigations are fully captured in the scoping analysis, along with the indirect/overhead costs likely to be allocated to the activity
- on-going direct operational costs including maintenance, and for mechanical assets cost of energy/electricity (including direct and indirect/overhead costs allocated to the activity)
- on-going annual opportunity cost of capital incorporated during the working life of the asset, defined as the annual interest charge of the total initial capital investment
- incorporating incomes in terms of operational efficiencies gained

Aurecon recommends that the financial analysis also incorporate usage rates (ML per annum at the asset utilised/delivered). Considering the variable nature of water demand and supply reliability, long-term historical water usage data should be used to determine alternative water use scenarios (sensitivity analysis) for evaluation. Financial analysis is to consider costs at both the total project level, but also disaggregated for evaluation on a per ML basis.

3. Provision of detailed asset renewal information to irrigator stakeholders

Aurecon noted that irrigator stakeholders were lacking basic background information pertaining to both historical and forecast renewals expenditure for the scheme. This report has provided a level of historical renewal expenditure, and also provided additional detail regarding forecast renewal expenditure.

4. Annual engagement with irrigator stakeholders regarding forecast renewals

Aurecon also supports an annual engagement of irrigator stakeholders for proposed renewal expenditures. Noting that SunWater has developed a sophisticated asset management system that has been utilised to project renewal activities out to 2046, Aurecon noted that historically a number of renewal activities were unexpected, or deviated substantially from what the Board main have approved only 12 months earlier. Hence, Aurecon suggest that stakeholders are engaged on an annual basis at the minimum.

Aurecon recommends that the stakeholder engagement process being viewed as an opportunity to inform. SunWater is given the opportunity to:

- explain past 12 months of renewal activities (particularly unplanned events), and highlight the process undertaken, scoping analysis completed, and breakdown of costs incurred, and report outcomes achieved (completion report)
- discuss planned activities for the next 12 months, rationale for, proposed budget, scoping of alternative actions, and project management process to be employed.

Upon presentation of this information, irrigator stakeholders may be able to provide constructive inputs towards SunWater. Aurecon does not see these engagements as opportunities for stakeholders to endorse individual expenses, but an opportunity to review specific renewal expense items and an opportunity to review the process and analysis undertaken by SunWater to validate the expense.

Instances in which irrigator stakeholders object to either historic activities undertaken, or proposed activities to be undertaken, should be referred for review by an external expert party. If the external party finds in favour of the irrigator stakeholders, then SunWater is to bare the renewal expense and cost of the review of the expert review. However, if the external expert review finds in favour of SunWater, then the cost of the renewal, along with the external expert review to be charged to the scheme's annuity account.

An agreement between SunWater and the scheme's irrigator stakeholders would be required beforehand (tem plate) that covers for the fore coming price path:

- the terms of reference for the any external expert review to be undertaken
- agreement on processes employed by SunWater for the engagement of the external expert
- minimum qualifications required to be held by the external expert in order to effectively current out such assignments

4.3 Cost escalation factors

In order to produce the cost forecasts presented within the NSPs, SunWater was required to make a number of assumptions regarding the prices of key product and service inputs going forward. SunWater's general approach has been to use 2.5%, being the mid-point target range for the Consumer Price Index (CPI) as set by the Reserve Bank of Australia. However, SunWater has adopted an alternative escalation rate (see rationale in proceeding section) for the following[52]:

- Labour at 4% per annum until 2012, and then by 2.5% for 2013 to 2016
- Materials and contractors at 4% per annum

These escalation factors have been applied in the development of both projected operating costs and renewal expenditures for 2011 to 2016. SunWater's document*, Background Paper, Cost Forecasting Assumptions* (January 2011) provides discussion and analysis supporting the use of alternative escalation rates for both Labour and Materials and Contractors.

A recent paper prepared for the QCA by PricewaterhouseCoopers (PwC)[53] examined the issue of cost escalation methodologies, stating that escalation factors should reflect anticipated increases as reliably as possible. Key escalation methodologies highlighted within the PwC report included:

- Consumer Price Index (CPI)
- Labour Price Index (LPI) and Wage Price Index (WPI)
- Producer Price Index (PPI)
- Composite indices
- Industry or commodity-specific indices

The PwC report also provided an insightful overview of the escalation methodologies employed by rural water sector providers and other utilities. As highlighted by Table 4-4 below a number of rural water sector providers uses CPI to index annual tariff (while several others do not use any escalation factors at all).

[52] SunWater (January 2011), Background paper, Cost forecasting assumptions, Pages 2 to 4 .

[53] PricewaterhouseCoopers (September 2010), Pricing Principles and Tariff Structures for SunWater's Water Supply Schemes, Issues Paper prepared for the Queensland Competition Authority, Pages 53 & 54.

Table 4-4. Price indexation factors utilised by rural water sector

Jurisdiction	Business	Index	Rationale
Queensland	GAWB	CPI (Brisbane All Groups)	Ruling was made by an independent regulator (QCA) CPI is readily available, timely and not subject to revision and is commonly used in commercial contracts for the purpose of price escalation.
NSW	State Water	CPI (All capital cities)	Ruling was made by an independent regulator (IPART). This approach was adopted on the basis that 'no individual inflation measure satisfies all the criteria of an ideal inflation factor for industry price determinations, though CPI is for most applications considered to be the simplest option with the advantages of relative timeliness and a high level of credibility and familiarity to the public. IPART's regulatory price path for State Water does not increase on the basis of inflation alone. In many instances, prices will escalate at a higher rate due to other factors (e.g. starting prices, degree of cost recovery, etc).
	Murrumbidgee Irrigation	n/a	Prices are set by business, and are not subject to regulatory review. MIL does not apply any indexation for its prices. Prices are set annually by MIL's Board of Directors, taking into consideration relevant costs.
Victoria	Southern Rural Water	n/a	SRW does not apply any indexation for its prices. Prices are set annually by SRW.
South Australia	Central Irrigation Trust	n/a	Prices are set by business and are not subject to regulatory review. Prices are not indexed rather they are set based on forecasted costs. CIT signs 3 year contracts with their supplier which sets prices over that period. Renegotiation of contracts will usually result in an increase in costs which is passed onto customers. Recovery also allows for the periodic replacement of assets as required.
	Renmark Irrigation Trust	N/a	Prices are set by business, and are not subject to regulatory review Prices are set according to the needs of the budget. Recent changes in legislation and jumps in electricity prices have meant that above CPI increases were necessary in during the 2008-09 and 2009-10 years. Prices were not raised at all during the 2006-07 and 2007-08 years in order to assist irrigators through tough times. RIT seek to restrict price rises to CPI in coming years and in order to provide assistance to irrigators making plans for the future.
Western Australia	Harvey Water	CPI	Prices are set by business, and are not subject to regulatory review. CPI is used for indexation purposes by Harvey Water on the basis that this index is easily identifiable and their members are familiar with index as a measure of underlying inflation.

Source: PricewaterhouseCoopers (September 2010), Pricing Principles and Tariff Structures for SunWater's Water Supply Schemes, Issues Paper prepared for the Queensland Competition Authority, Pages 55 & 56.

The following section seeks to examine in more detail SunWater's use of escalation factors for Labour and Materials and Contractors.

4.3.1 Labour

SunWater is locked in an Enterprise Bargaining Agreement with its staff which has an allowance for annual wage increases (in nominal terms) of 4% until June 2012. It is likely that a subsequent Enterprise Bargaining Agreement will seek to at least match CPI post June 2012.

For 2013 to 2016 labour costs are projected to escalate in line with CPI. Note that the labour cost disclosed within each of the NSPs relates only to that required for Operations, Preventive Maintenance and Corrective Maintenance activities. The additional labour expense is incurred for renewal activities. Table 4-5 below provides an overview of scheme labour costs (presented within latter sections of this report), along with breakdown of labour costs by activity.

Table 4-5. Breakdown of scheme labour costs by output activity

Scheme	Scheme Labour cost projection for 2011	% breakdown of 2011 scheme labour cost		
		Corrective Maintenance	Preventive Maintenance	Operations[1]
Barker Barambah	$176,000	7.4%	18.9%	73.7%
Boyne River & Tarong	$97,000	6.2%	29.9	63.9%
Lower Mary Bulk	$87,000	2.3%	27.6%	70.1%
Lower Mary Distribution	$199,000	20.5%	42.5%	37.0%
Upper Burnett	$190,000	4.7%	22.6%	72.6%
Bundaberg Bulk	$287,000	9.1%	33.6%	57.3%
Bundaberg Distribution	$1.426 m	19.1%	33.3%	47.5%

[1]Within all schemes, the majority of labour costs associated with Operations are incurred within the Central region (only a small proportion linked to services provided from Brisbane).

As highlighted by Table 4-5 above, proposed labour costs by output activity are highly variable between schemes. A large proportion of the labour input for Corrective, Preventive Maintenance, and Operations activities would involve staff with trade skills and qualifications.

Figure 4-1 below provides an indication of wage cost escalation for the Mining, Construction and Utility sector (Australia, private sector) against that of CPI. A significant proportion of SunWater's operational workforce includes engineers, electricians, and fitter and turners. These skills are also highly sought after within the construction sector, and more importantly the mining sector.

As highlighted in Figure 4-1 since 2004 annual wage cost escalation for the Mining, Construction and Utility sector has exceeded that of CPI by a substantial margin. During the field trip, the regional SunWater manager indicated the difficulty sourcing and retaining trade qualified staff, when the mining sector was paying substantially higher wages. Professional and trade vacancies throughout regional and coastal communities within Queensland continue to rise rapidly as a number of new mines develop, existing mines expand, and infrastructure (railways and ports) is progressively been developed.

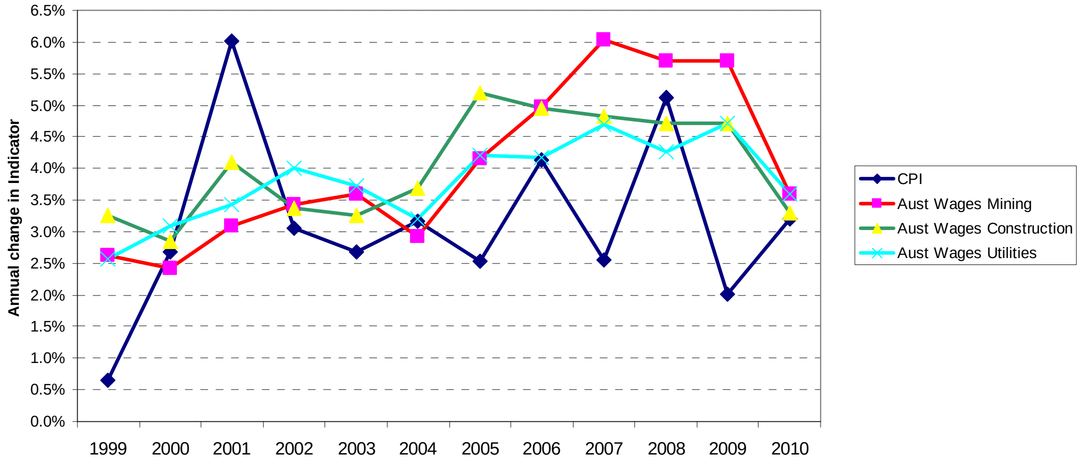

Figure 4-1 Overview of escalation rates for labour against CPI[54]

Considering the rate of wage cost escalation since 2004 (Figure 4-1 above), and the significant amount of on-going developments within the mining sector for the foreseeable future, Aurecon views SunWater's proposed labour cost escalation for 2013 to 2016 (pegged) to CPI as most likely to understate the movement in labour costs during this period of skilled and trade qualified staff.

4.3.2 Materials and contractors

SunWater proposess to use a use 4% cost escalation for materials and contractors[55]. This escalation value is substantially higher than CPI. SunWater statess that materials are direct costs associated with Operations, Corrective and Preventive Maintenance activities, and include pipes, fittings, concrete, chemicals, plant and equipment hire, contractor costs, etc[56]. In developing its rationale for adopting an escalation rate over and above CPI, SunWater has drawn upon two recent regulatory precedents (see Table 4-6 below).

Table 4-6. Summary of regulatory precedents reviewed by SunWater

Precedents	SunWater observations[1]
QR Network	In its 2009 Draft Access Undertaking, QR Network proposed to index its maintenance costs by a specially constructed index rather than CPI on the basis that it better reflected input price changes in central Queensland. SunWater also quote QCA related observation in this case *"The authority does not believe that the proposal to escalate costs by an index other than CPI is extraordinary"*

[54] Aurecon calculations based on raw data as follows:
CPI calculated using ABS Cat No. 6401.0, CPI (Consumer Price Index), All Groups, Brisbane, Tables 1 & 2.
Mining, Construction and Utilities (Electricity, Gas, Water and Waste) calculated using ABS Cat No. 6345.0, Labour Price Index, Australia, Ordinary Hourly Rates of Pay Excluding Bonuses, Sector by Industry, Table 5A.
Mining
[55] Note that SunWater provide detailed discussion for the use of a 4% escalation factor, provided as *Attachment 1. Materials and Contractor Costs Forecasts, Background Paper Cost Forecasting assumptions* (January 2011), pages 5 to 10.
[56] SunWater (January 2011), *Background paper, Cost forecasting assumptions*, Page 4.

Gladstone Area Water Board (GAWB)	SunWater also noted that the QCA rejected GAWB's proposal to escalate its operations, maintenance and chemical costs based on three year (2007-2009) historical averages for specific producer price indexes. SunWater notes QCA's observation that "*more attention needed to be given to a more appropriate forward looking approach in determining the escalations for operations, maintenance and chemical costs*".

[1]Statements sourced from SunWater (January 2011), *Background paper, Cost Forecasting assumptions*, Pages 5 & 6.

In developing a cost escalation rate above that of CPI, SunWater provides an overview or related forecast and historic data. In relation to available cost forecast information, SunWater references Macromonitor's Australian Construction Cost Trends 2010 report highlighting that:

- construction costs are forecast to grow by 4.5% in 2010, above 5% in 2011 and at around 6% in 2012, and
- engineering construction costs are forecast to escalate at 4.9% in 2010/11 and 6% in 2011/12[57]

The Macromonitor report also states that while Queensland will be exposed to strong growth in construction costs in the short to medium term, it anticipates that there will be a slowdown in construction works around the middle of the decade (2014/15) resulting in a reduction in cost escalation rates.

In relation to historical cost data, SunWater provide a review of a number of relevant comparator indexes (averaged for the June quarters between 2000 and 2010) including:

- Manufacturing Division index, positive growth of 3.5%
- Basic Chemicals index, negative growth of 4.0%
- Cement products (Brisbane) index, positive growth of 3.0%
- Machinery and equipment index, negative growth of 0.1%
- Brisbane's CPI index over the same period of +3.4%[58].

Figure 4-2 below highlights quarterly percentage change in prices for a number of construction/manufacturing goods commonly utilised by SunWater, plotted against the CPI for Brisbane all Groups. Aurecon has examined the period between March 2005 and March 2011.

[57] SunWater (January 2011), *Background paper, Cost forecasting assumptions*, Page 7.
[58] SunWater (January 2011), *Background paper, Cost forecasting assumptions*, Page 8.

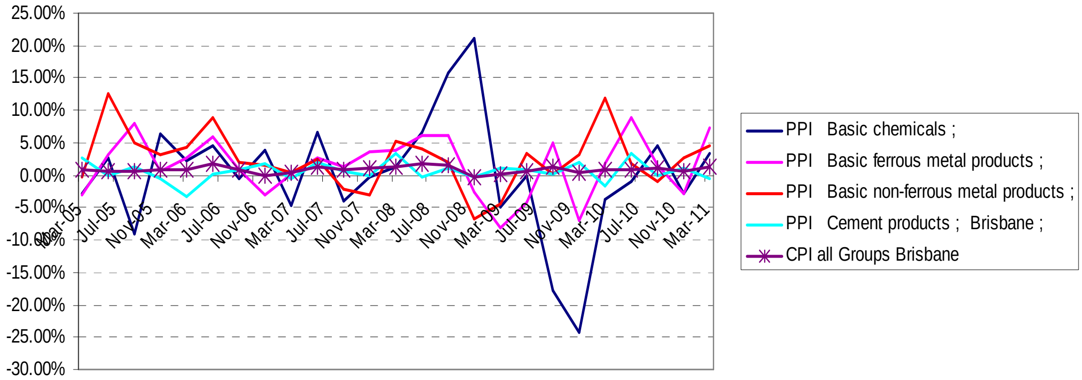

Figure 4.2. Overview of quarterly percentage change for escalation rates for PPI for key construction materials against CPI for all Groups Brisbane[59]

Figure 4-2 above highlights two critical findings:

- The prices for most of these products has escalated above the CPI rate, with the noticeable exception of Basic Chemicals
- The prices for these products vary substantially more than CPI.

SunWater also provides a review of construction related activity levels as an indicator of construction material cost movements. Specifically, SunWater examine in detail non-residential construction activity which conforms most closely to services and products linked to SunWater's activities. SunWater found that over the past seven years:

- Value of non-residential work approved but not commenced recorded annual compound growth of 24.2%
- Value of non-residential work in the pipeline recording a rate of 22.9%[60]

SunWater concluded that the indexes for value of non-residential work grew over the past seven years, with the exception of 2009/10 (linked to the GFC). SunWater anticipates that strong growth will occur again from 2011 onwards, particularly in Queensland and Western Australia.

Based on recent assessments undertaken by Aurecon and the private and public sectors involved in mining projects and infrastructure, Aurecon supports SunWater's assertion that non-residential construction within Queensland will grow strongly in the short to medium term.

It should also be noted that the various price indices analysed and presented within this report relate to national and state economies. Consumer and producer price indices are generally not available for regional centres. However, Rawlinsons[61] provides an indication of differences in regional costs highlighting the following regional Building Indices (Brisbane being 100):

- Bundaberg 107
- Rockhampton 103
- Gladstone 107
- Toowoomba 103

[59] Aurecon calculations based on raw data obtained from ABS as follows:
CPI calculated using ABS Cat No. 6401.0, CPI (Consumer Price Index), All Groups, Brisbane, Tables 1 & 2.
PPI calculated using ABS Cat No. 6427.0, Producer Price Indexes
- Cement Products, Brisbane (Table 16 & 17)
- Basic Chemical (Table 12 & 13)
- Basic ferrous metal product (Table 12 & 13)
- Basic non-ferrous metal product (Table 12 & 13)

[60] SunWater (January 2011), *Background paper, Cost forecasting assumptions*, Page 9.
[61] Rawlinsons, *Australian Construction Handbook*, 2010, Edition 28, Pages 24-26.

In view of the information and analysis provided above, Aurecon views the use of an escalation rate of 4% (nominal terms) over the 2011 to 2016 period, as most representative of likely future price movements for both Materials, and Contractors.

4.4 Allocation of Capex and Opex to customer groups within Bulk/River Water Supply Schemes

Capex

Currently SunWater allocates capital costs (renewal annuities) to Medium priority WAE based on the Converted Nominal Allocation (CNA) methodology. SunWater statess that "*medium priority WAE generally consume a lower proportion of storage capacity than implied by the CNA*."[62] As such, SunWater proposess to allocate renewal annuities to Medium priority WAE based on the HUFs (Hydrologic Utilisation Factors) methodology.

Table 4-7 below highlights the exposure of Medium priority WAE under the various allocation methodologies proposed. For the Upper Burnett and the Lower Mary there is a significant % reduction exposure to renewal annuity moving from CNA to HUF allocation methodology. Note that for the Boyne River and Tarong WSS, there is a zero renewal annuity proposed going forward (due to a substantive positive renewals balance), and therefore there are no financial implications within this scheme. Irrigators within the Barker Barambah and Bundaberg bulk schemes will also see a lower percentage allocation of renewal annuity under a HUF allocation system.

Table 4-7. Medium priority shares of costs expressed as CNA, HUF and WAE (Central region only)

Scheme	Medium priority (CNA) %	Medium priority (HUF) %	Medium priority (% of all WAE) %
Barker Barambah	85%	75%	96%
Boyne River & Tarong	13%	9%	26%
Bundaberg Bulk	84%	82%	90%
Lower Mary Bulk	89%	42%	95%
Upper Burnett	90%	18%	95%

Source: SunWater (January 2011), *QCA review of irrigation prices, Supplementary submission, Bulk water price differentiation,* Pages 9 & 10.

Aurecon support SunWater's proposal to adopt the HUF allocation methodology for renewal annuities as it:

- more closely resembles the storage capacity taken by WAE of different priorities
- results in a lower allocation of costs to irrigators.

Opex

Medium priority WAE (Water Access Entitlements) are allocated a lower proportion of operating costs than high priority upon a per ML basis. SunWater statess that "*this proportion was determined using converted nominal allocation (CNA) factors for each scheme to arrive at an equivalent amount of medium priority WAE for the scheme as a whole.*"[63]

SunWater is now proposing to allocate operating costs equally (1:1 basis) per unit of nominal WAE upon the premise that operating costs are fixed, and that every WAE has the same impact on operating costs regardless of being high or medium priority. SunWater also argue

[62] SunWater (February 2011), *QCA review of irrigation prices: Supplementary submission Bulk water price differentiation*

[63] SunWater (February 2011), *QCA review of irrigation prices: Supplementary submission Bulk water price differentiation*, Page 11.

that in terms of operations there is no service quality differential between High and Medium priority WAE.
Support for changing the operating cost allocation methodology was also supported by the Tier 1 working group which recommended:

"*Tier 1 has accepted the methodology used in the current price review to allocate scheme lower bound costs to water allocations of different priority based on estimated water entitlement conversion factors. However, Tier 1 recommends that this approach be reviewed for the next price path*."[64]

Aurecon does not view the above Tier 1 recommendation as support for change, but rather a recommendation to investigate alternative allocation approaches. The following papers provide additional insights:

- SunWater (January 2011), *QCA review of irrigation prices, Supplementary submission, Bulk water price differentiation*
- SunWater (January 2011), *QCA review of irrigation prices, Pricing principles and tariff structures, SunWater submission*
- SunWater (January 2011), *Background paper, QCA review of irrigation prices, Centralised costs*
- SunWater (January 2011), *Review of irrigation prices, Pricing principles and tariff structures*, SunWater submission

When examining operating cost allocation methodologies, it is critical to understand the nature of the costs involved, and the factors that influence their incurrence. SunWater provides a useful overview of the key operating activities typically incurred for each of the schemes (Table 4-8 below).

Table 4-8. Overview of SunWater Operating Activities

Element	Item	Activity
Service Provision	Water delivery	Releasing water to meet customer demand, and other license requirements, flow surveillance, metering etc.
	Customer service and account management	Manage account transactions, billing, customer enquiries etc.
Compliance	Resource operations licence	Administer water sharing rules, water quality monitoring, flow and quality reporting, flow event management etc
	Dam safety	Routine dam safety inspections and audits, regulatory reporting
	Environmental management	Manage environmental risks, implement mitigation measures and reporting procedures (eg fish death)
	Land management	Weed and pest control, managing access and trespass, rates and land tax
	Workplace health and safety	Implement appropriate procedures / work practices. Conduct audits and reviews

[64] Indec, *Statewide Irrigation pricing Working Group, Tier 1 Report, April 2006.*

Element	Item	Activity
	Financial reporting and taxation	Comply with statutory reporting requirements, tax reporting, GST compliance, debt management etc
Other	Corporate	Human resource management, procurement, legal services, CEO and board, IT etc,

Source: SunWater (January 2011), *QCA review of irrigation prices, Supplementary submission, Bulk water price differentiation,* Page 7

SunWater statess that operating costs are not affected by the type of WAE within a scheme, and are incurred regardless of the proportion of High and Medium priority WAE[65]. SunWater also offer the following observations to support its cost allocation change:

- Incremental costs of increasing water from storages is negligible, and in times of severe shortage the intensity of operational effort is often increased in relation to medium priority WAE, as best use is made of limited supplies for medium priority (eg through pumping dead storage or taking measures to minimise river transmission losses)
- customers' water accounts must be managed in the same way regardless of WAE priority.
- Resource Operations Licenses require that water use is accounted for periodically (eg quarterly) regardless of availability or mix of priority WAE within each scheme.
- Routine dam safety inspections are asset specific regardless of the type or mix of WAE supplied from that dam.
- Environmental, land and Workplace Health and Safety activities relate to the nature of the asset, and bears no relationship to the type or the mix of WAE in a particular scheme.
- Corporate costs, including financial reporting and taxation obligations are unrelated to the type or mix of WAE held at water supply schemes[66].

While acknowledging moving from a CNA cost allocation methodology for operating costs to WAE (equal proportions 1:1) will incur higher operating costs for irrigators, SunWater suggest that this will be offset to a large degree by its proposal to also change the allocation methodology for renewals annuity (discussed above, moving from CNA to HUFs).

By adopting its proposed allocation methodology state-wide, SunWater has calculated a 2.5% net increase in costs being assigned to Medium Priority (using 2011/12 as the reference point)[67]. However, for the schemes within the Central region with the obvious exception of the Upper Burnett which will see a significant reduction in irrigator cost allocations, total costs will rise well above the 2.5% quoted for the state as highlighted below in Table 4-9.

[65] SunWater (February 2011), QCA review of irrigation prices: Supplementary submission Bulk water price differentiation, Page 7.
[66] SunWater (February 2011), QCA review of irrigation prices: Supplementary submission Bulk water price differentiation, Pages 7 & 8.
[67] SunWater (February 2011), QCA review of irrigation prices: Supplementary submission Bulk water price differentiation, Page 10.

Table 4-9. Impact of changes for Bulk/River WSS customers as a result of cost allocation changes (Central region only)

Scheme	Scheme Opex	Scheme Renewal Annuity	MP Share (CNA)	MP Share (SunWater's proposed approach)	Difference ($)	Difference (%)
Barker Barambah	$691,000	$273,000	$820,944	$868,110	$47,166	5.7%
Boyne River & Tarong	$351,000	$-	$43,962	$92,523	$48,561	110.5%
Bundaberg Bulk	$1,056,000	$640,000	$1,418,682	$1,471,897	$53,215	3.8%
Lower Mary Bulk	$273,000	$2,000	$243,949	$259,524	$15,575	6.4%
Upper Burnett	$673,000	$190,000	$779,755	$666,820	($112,935)	(14.5%)

Source: SunWater (January 2011), *QCA review of irrigation prices, Supplementary submission, Bulk water price differentiation,* Pages 10 & 11.

In percentage terms, the proposed changes in scheme cost allocations for the Boyne River and Tarong Bulk scheme for which the will result in an increase of $48,561 or 110.5%, almost double the existing allocation. Although holding 11,598ML of WAE, irrigators within the Boyne River and Tarong scheme, these irrigators have had less than 5,000ML per annum over the last 5 years (i.e. 2006 to 2010) due to low water storages while High priority users along the the Tarong pipeline continued to receive their allocation entitlement. A proposal to now double the cost allocation to these irrigators will lead a number to divest from their irrigation practices and investments.

Aurecon does not challenge SunWater's proposition that general operating costs are generally fixed regardless of the type and mix of priority users within a scheme, and in essence total scheme operating costs will not change in response to any future changes in the mix of priority users.

However, Aurecon views the proposed allocation methodology for operating costs using WAE as one dimensional and un-reflective of service/product delivery. In recent years it was clearly evident that for many schemes throughout the Central region, water deliveries to Medium priority customers were greatly impacted in contrast to High priority deliveries. For many Medium priority customers, allocations in dry years were negligible in comparison to deliveries to High priority customers highlighting the essence and significance of water reliability. Within many schemes, High priority customers are virtually guaranteed supply of allocation annually, whereas in recent years Medium priority customers received comparatively little allocation.

Aurecon recommends that operating costs should be more equitably allocated under the general principal of the *user pay* notion, in which a greater share of operating costs is allocated to the beneficiaries of higher water usage on an annual basis. Clearly, High priority customers are disproportional greater beneficiaries of water usage on an annual basis over time, and correspondingly should proportional pay a higher share of scheme costs in contrast to Medium priority WAE holders.

Through the course of the study, Aurecon identified a number of additional drivers that do not support SunWater's proposed allocation methodology including:

- providing a financial enticement for certain Medium priority WAE holders to convert to High in order to reduce their annual operating cost exposure. High cost irrigators, particularly those within horticulture would be financially better off converting from Medium to High priority (within any real change in annual water use).
- the potential conversion of significant quantities of Medium priority to High within any one scheme will have negative financial ramifications for the remaining Medium priority entitlement holders who will become exposed to a much higher proportion of total scheme operating costs. It has been highlighted that there are intentions of converting 2,000ML of Medium priority entitlements within the Barker Barambah and Boyne River. Due to the size of these schemes, there are financial impacts if 2,000ML of Medium priority allocation is made for the remaining Medium priority entitlement holders (see analysis below).

- For some schemes, operating costs are increasing in absolute terms between price paths at a far higher rate than proposed renewal expenditures. The analysis by SunWater pertained to a single reference year (i.e. 2011/12), and if operating costs were to increase at a higher rate than renewal expenditure in future, then a higher proportion of total scheme costs will be transferred to holders of Medium priority WAE.

Therefore, Aurecon does not support the move by SunWater to allocate operating costs in equal proportion to WAE. Aurecon recommends that the existing operating cost allocation methodology utilising CNA be retained, as it more closely follows the user pay principles that have been more commonly endorsed by stakeholders. As highlighted by the Tier 1 group, investigations should continue to examine alternative allocation methodologies that not only better capture allocation/usage by priority customers, but also examine more specifically the incurrence of specific operating costs against possible linkages with water usage and by priority group over time.

4.5 Allocation of Capex and Opex to customer groups within Distribution Systems

Capex & Opex

Within the Central region, there are two distribution schemes, Bundaberg and the Lower Mary. As highlighted below in Table 4-10, there is only a small allocation of High priority WDE within the Lower Mary (held by SunWater for losses), while within Bundaberg a significantly higher amount of High priority WDE exist (both customer held and SunWater).

Table 4-10. Overview of water allocations for Distribution systems within the Central region

Scheme	Medium priority WDE (ML)	High priority WDE (ML)	Total WDE (ML)
Lower Mary[1]			
Customer held	9,952		
SunWater held (distribution losses)	4,588	324	
Total WDE	14,540	324	14,864
Bundaberg[2]			
Customer held	149,522	1,781	
SunWater held (distribution losses)	25,440	16,080	
Total WDE	174,962	17,861	192,823

[1]Raw data sourced from: SunWater, *Lower Mary Distribution System NSP (2012-2016), January 2011*, Page 14.
[2]Raw data sourced from: SunWater, *Bundaberg Distribution System NSP,* (2012-2016) January 2011, Page 14.

The significance of any changes in cost allocation methodologies will clearly be more pronounced in terms of additional cost impositions to irrigators)within the larger Bundaberg Distribution System and also have significance for the Lower Mary on a lesser scale.

Aurecon's only reference to SunWater's proposed cost allocation methodology for Distribution systems was a brief discussion presented within a paper by SunWater (January 2011), *Review of Irrigation Prices, Pricing Principles and Tariff Structures*, SunWater submission (Page 15).

Within this report, SunWater statess that tariffs (costs) should relate to a system's capacity, and costs assigned to customers based on their share of this capacity[68]. Hence, SunWater is proposing that costs (Capex and Opex) are allocated equally (1:1) based on Water Delivery Entitlements (WDE).

Aurecon views the proposed allocation methodology for operating costs using equal proportions WDE (1:1) as one dimensional and un-reflective of service/product delivery. In recent years it was clearly evident that for many schemes throughout the Central region that water deliveries to Medium priority customers was greatly impacted in contrast to High priority deliveries.

As such, Aurecon advocate an allocation methodology that captures the customer's actual utilisation of the infrastructure, rather than the customers assigned capacity to access the system based on equal WDE. As such, Aurecon recommends that the existing cost allocation methodology utilising CNA be retained, as it more closely follows the user pay principles more commonly endorsed by stakeholders.

4.6 Benchmarking

Aurecon's investigation failed to identify any opportunities to introduce performance parameters which would allow comparative benchmarking across schemes on an equitable basis. The variance between schemes in terms of yield capacity and reliability, nature of customer base, asset age and structure made it unrealistic to compare schemes within the Central region, let alone against interstate schemes.

Aurecon did find that the financial accounting system presented difficulties for comparative analysis. A recent change in the structure of SunWater's management accounting system in 2010, resulted in difficulties in comparing recent expenses with those prior to 2010.

Aurecon notes the publication (2010) of the National Performance Report 2008-2009, which highlights a number of performance measures for all the schemes within the Central region.

An overview of Benchmarking, utilising the National Performance Report 2008-2009 report, is provided within Appendix B.

There is an opportunity to review what additional appropriate external financial benchmarking (other than those already published) parameters may be beneficial in the review of SunWater's NSP, and determine if SunWater's management accounting system is capable of supplying the required benchmarking information.

[68] SunWater (January 2011), *Review of irrigation prices, Pricing principles and tariff structures*, SunWater submission, Page 15.

5. Assessment of Barker Barambah Bulk Water Supply Scheme

5.1 Scheme Description

The Barker Barambah Bulk Water Supply Scheme (WSS) is one of the 5 Water Supply Schemes within the Burnett Basin as highlighted below in Figure 5-1. It is located near the town of Murgon, incorporating water storage assets on Barker Creek and Barambah Creek.

The Barker Barambah Water Supply Scheme was designed to not only provide drought relief to the existing farmland, but to also allow for an increase in the area under irrigation and enable a greater variety of crops to be grown. The original purpose for the irrigation was to service crops for the dairy industry, such as Lucerne and other pasture, as well as grain and field crops[69].

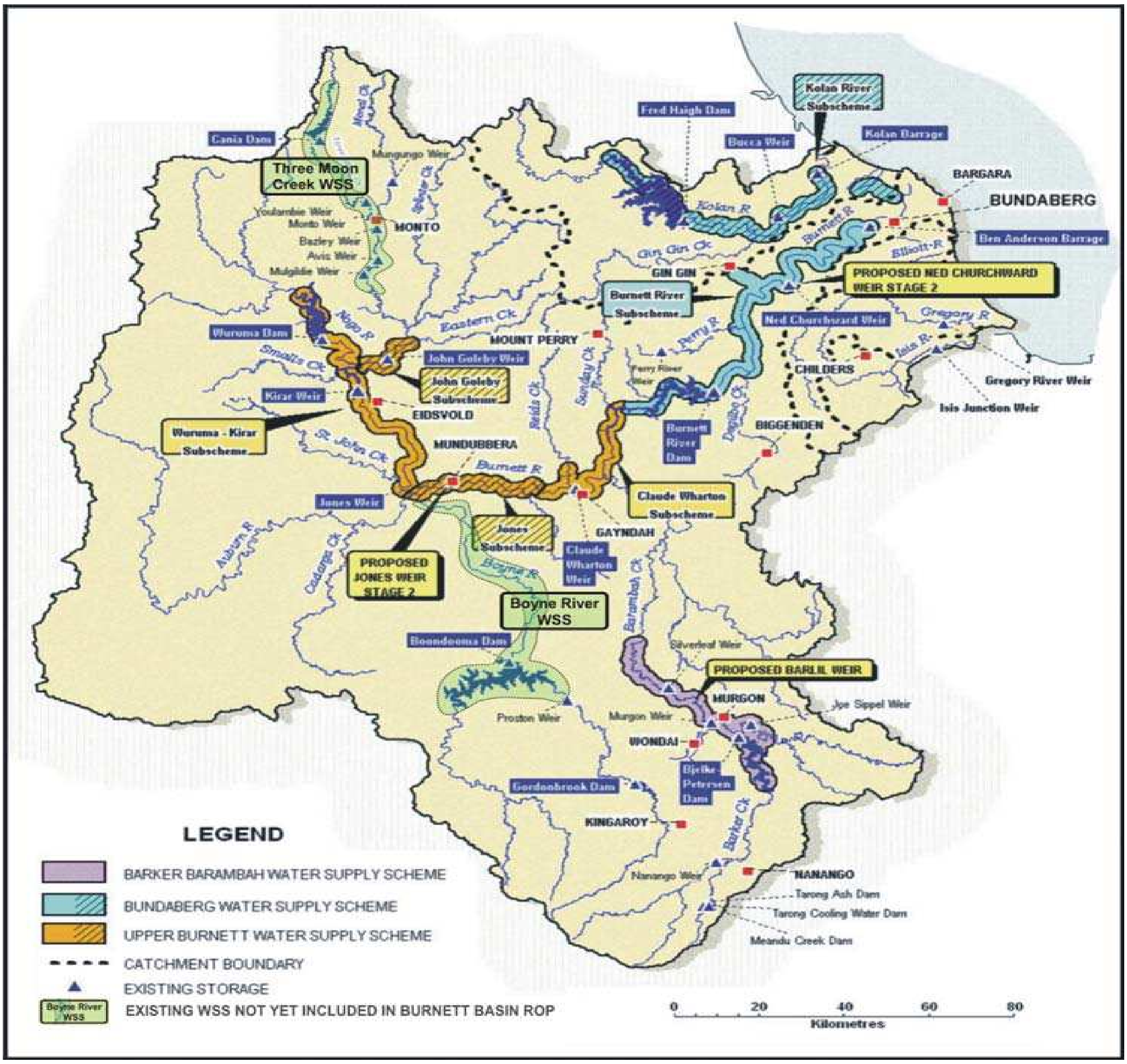

Figure 5-1 Burnett River Basin Water Supply Schemes[70]

[69] SunWater, *Barker Barambah Water Supply Scheme – Scheme Operation Manual*, page 16, un-dated report.
[70] SunWater, *Barker Barambah Water Supply Scheme – Scheme Operation Manual*, page 16, un-dated report.

The Barker Barambah Bulk Water Supply Scheme (WSS) has a total of 161 customers comprising of 32,079 ML of medium priority WAE and 2,236 ML of high priority WAE.

The scheme supplies water to:

- irrigators within the farming areas of Redgate, Murgon and Mondure
- supplement the town water supply for the townships of Murgon, Wondai, Byee and Cherbourg
- industrial purposes[71]

The Burnett Basin Resource Operation Plan (ROP) sets the regulatory framework for the management of water within this scheme. Local management of the scheme is managed from SunWater's regional office at Bundaberg.

Under the ROP, SunWater has obligations to manage and operate the following assets:

- Bjelke Petersen Dam is situated on the Barker River 1.3 km upstream from its junction with the Barambah Creek. It is a referrable dam, which holds 134,900 ML when full. The dam consists of an earth and rock fill wall, consisting of a Saddle wall and a Main wall with the spillway located on the left abutment. The main wall is 540 m wide, while the spillway is 80m wide[72].
- Joe Sippel Weir on Barambah Creek is located on Barambah Creek. It consist of a cascading concrete wall, and holds 710 ML when full[73].
- Silverleaf Weir is located on Barambah Creek. The weir is a timber piled, earth and rock structure and holds 620 ML when full[74].
- Redgate Diversion Pipeline is a 6.2km, 900mm diameter reinforced concrete, rubber ring jointed pipeline that transfers water from Bjelke-Petersen Dam to Joe Sippel Weir. The pipeline has a design capacity of 34.5 ML/day. Although a gravity pipeline, a pumping unit is installed on a regulated outlet at Bjelke Petersen Dam value house for when the dam level is too low to generate an adequate gravity flow[75].
- Upper Redgate Relift Pipeline and Pump Station services customers in the upper Redgate area. To do so, water must be pumped from Joe Sippel weir to the Francis Weir and then released. The design capacity of the Upper Redgate relift pipeline is 10 ML/day[76].

5.2 Scheme management

The Interim Resource Operations Licence (IROL) sets the regulatory framework for the management of water within this scheme. Management of the scheme is managed from SunWater's regional office at Bundaberg, whilst day-to-day operations are supervised from SunWater's Boondooma Dam office/workshop (and small relocatable office located at Bjelke Petersen Dam).

SunWater has five operational staff primarily located at the Boondooma Dam office/workshop, however these staff also service the Lower Burnett and the Boyne River system.

At times, SunWater staff from other locations within the Central region will be utilised for scheme specific activities for the Barker Barambah WSS, particularly from the Bundaberg Depot which is the main office for the Central region, and also houses a storage workshop. Key staff resources at the Bundaberg office include:

[71] SunWater (2011), Scheme information http://SunWater.com.au/scheme accessed 25th April 2011
[72] SunWater, *Barker Barambah Water Supply Scheme – Scheme Operation Manual*, page 23, un-dated report.
[73] SunWater, *Barker Barambah WSS NSP,* (2012-2016) January 2011, Page 36
[74] SunWater, *Barker Barambah WSS NSP,* (2012-2016) January 2011, Page 36
[75] SunWater, *Barker Barambah WSS NSP,* (2012-2016) January 2011, Page 37
[76] SunWater, *Barker Barambah WSS NSP,* (2012-2016) January 2011, Page 37

- Regional Operations Manager & Service Manager
- 3 working teams of two electricians (also assist Biloela)
- 2 working teams of two fitter & turners (also assist Biloela)
- 9 operational staff located at Bundaberg and Gin Gin (operate primarily Bundaberg Bulk and Distribution systems)
- 8 Technical officers and Schedulers (for Central region including Biloela)
- 2 Administrative staff (for Central region)

Other SunWater staff resources at other Central region locations:

- 2 staff located within the Upper Burnett, one officer working from home at Mundubbera, and one officer working from the office/workshop at Wuruma Dam
- 2 staff located at Maryborough depot

SunWater advised that in recent years there has been an on-going management strategy to relocate positions (as vacancies arise) from the smaller centres to Bundaberg. As highlighted above, small mobile working teams located at Bundaberg service all schemes across the central region.

5.3 Summary Opex and Capex information from the NSP

The Barker Barambah Bulk WSS has a total of 161 customers comprising of 32,079 ML of medium priority WAE and 2,236 ML of high priority WAE. SunWater proposess to allocate 98% (based on WAE proportions) of the operating expenses and 75% (based on the Headworks Utilisation Factor) of the renewals annuity cost to medium priority WAE holders. Aurecon's calculation of WAE suggests that using WAE allocation methodology as proposed by SunWater, then 93.5% of operating expenses are to be allocated to medium priority customers.

The NSP for the Barker Barambah Bulk WSS proposes that the efficient operating costs for the scheme for the coming 5 year regulatory period average $710,000 per annum. This represents a 13.4% increase over the current price path average of $626,000 per annum.

A significant proportion of operating costs are influenced by water delivery and utilisations levels. In the current price path (2007 – 2011), it is clearly evident that water utilisation has been disproportional low due to the on-going drought over much of this period. It is also acknowledged that the 2010/11 summer season has ensured that all weirs and dams are full, providing the start of the next price path in 2012 with 100% allocation in the first year.

Stakeholders have expressed interest examining the projected lower bound operating costs for the scheme as projected within the 2005/06 Irrigation Price Review by Indec Consulting[77]. However, SunWater advise that a direct comparison between the Tier 1 projected 2005/06 lower bound operating cost against actual expenditure as presented within the NSP for 2007 to 2011 is not feasible as;

> *the Tier 1 tables for "scheme lower bound cost" include only the irrigation share of the costs, and that grossing up the costs is problematic*[78]

[77] Statewide Irrigation Pricing Working Group, *SunWater Irrigation Price Review 2005-06 Tier 1 Report*, April 2006, Table 5.22, page 54.
[78] Email from SunWater to the QCA, dated 23rd February 2011.

Not withstanding these limitations, Aurecon have examined the projected LBC values for 2006-2011 provided within the Tier 1 report against the costs presented within the NSPs (See Appendix A).

Projected renewal annuity spend over the five year period to 2016 is $818,000, which is marginally higher than the $787,000 spent over the preceding 5 year period. However, due to a negative annuity starting balance of $813,000 in 2012 and projected expenditure items out to 2036, a total of $1,354,000 is sought for the 2012 to 2016 price path.

The following sections examine Opex and Capex in more detail.

5.4 Operational costs review

An overview of required operational activities for the scheme is identified within the *Barker Barambah Water Supply Scheme – Scheme Operation Manual*[79]. The manual provides in detail an overview of the scheme structure, compliance requirements, overview of scheme operations activity requirements, and references for collecting and reporting scheme data.

For each scheme SunWater has utilised the Scheme Operation Manual as a key input towards the formulation of Maintenance Schedule and Operations Manual for individual assets/facilities across the scheme, as highlighted below within Figure 5-2.

In the case of the Barker Barambah WSS, an operations manuals/maintenance schedule only exists for Bjelke Petersen Dam, however additional facility manuals will be developed in conjunction with the implementation of SunWater's Facility Review Program as required and funds become available[80].

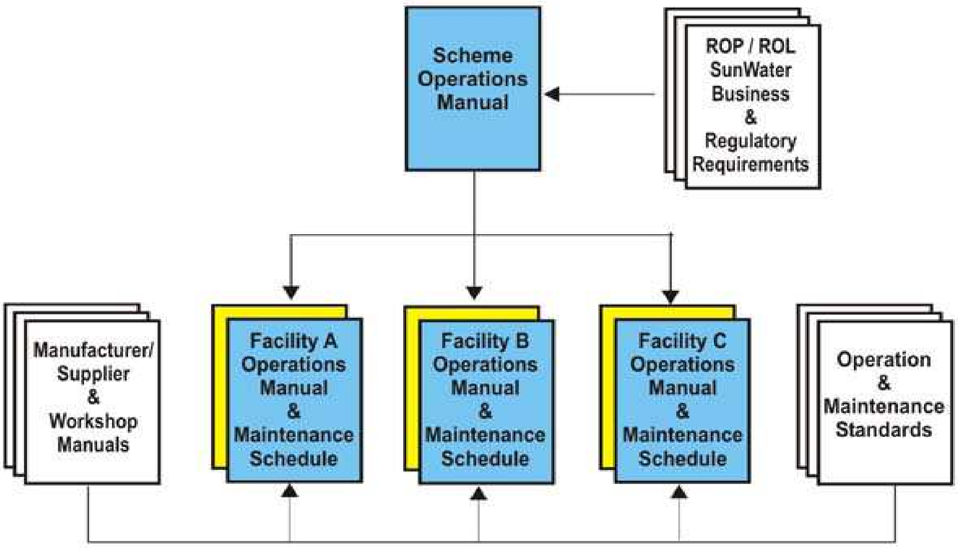

Figure 5-2*. Overview of the linkages between Scheme and individual facility Operations Manual*[81]

[79] SunWater, *Barker Barambah Water Supply Scheme, Scheme Operation Manual*, document un-dated.
[80] SunWater, *Barker Barambah Water Supply Scheme – Scheme Operation Manual*, page 14, un-dated report
[81]SunWater, *Barker Barambah Water Supply Scheme – Scheme Operation Manual*, page 13, un-dated report.

5.4.1 Overview

Within the NSP, SunWater has presented Operational costs by type, and also by activity. For the Barker Barambah Bulk WSS there are costs also incurred for the recreational facilities at the Bjelke Petersen Dam.

As such, Aurecon has undertaken a review of Operational costs by investigating in detail:

- key location expenses for the recreational facilities at Bjelke Petersen Dam
- expenditure items of Labour and Electricity, and
- key expenditure activities of Operations, Preventive Maintenance and Corrective Maintenance.

Although not consistently obvious across all, a number of Operational cost items and activities do vary to certain degrees accordingly to water usage levels. As indicated below (Figure 5-3) annual water usage fluctuated substantially within the Barker Barambah Bulk WSS. The highest annual water usage (between 2003 and 2010) occurred in 2003 in which approximately 25,500ML was utilised.

For the purposes of incorporating water usage into this cost analysis, Aurecon has indexed annual water usage for 2007 to 2010 period against the 2003 water usage level as follows:

- Approximately 4% in 2007
- Approximately 14% in 2008
- Approximately 29% in 2009
- Approximately 7% in 2010

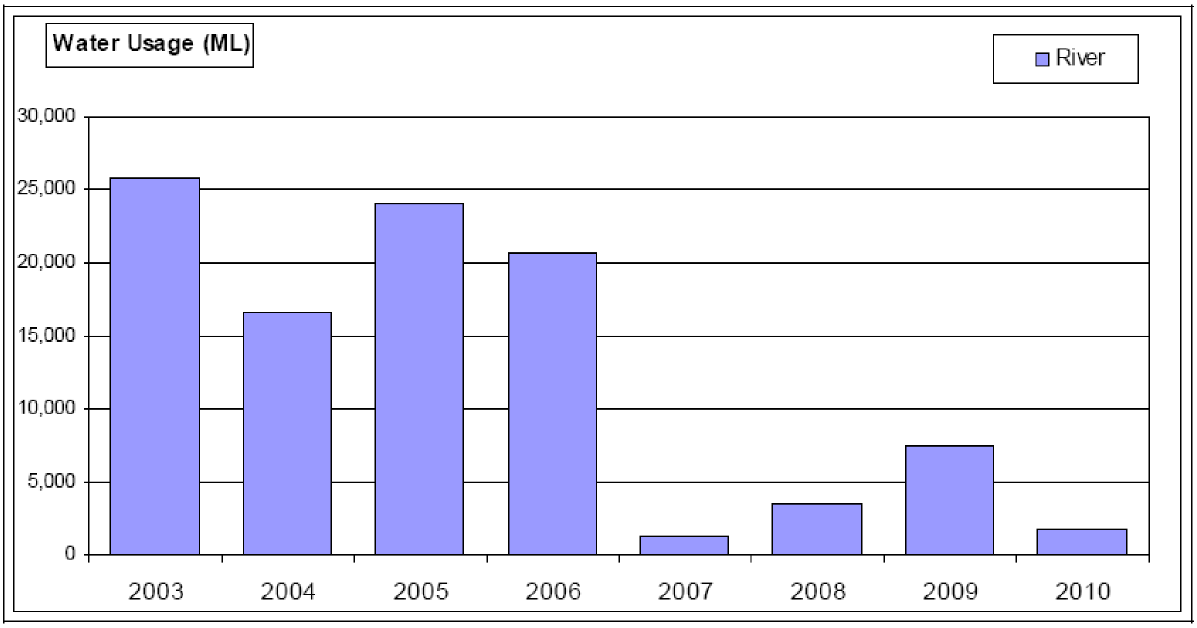

Figure 5-3 Water Usage for Barker Barambah Bulk WSS[82]

The key observation for this scheme is the fact that water utilisation for the current price path to date (2007 to 2010) has been impacted by drought and a lack of water reserves, resulting in less than 5,000ML of water per annum for 3 out of 4 years.

It is noted that with the exceptional wet season in 2010/2011, storages across this region have been filled. Aurecon was not provided with any information regarding likely water usage in 2011.

[82] Source: *Barker Barambah WSS NSP, (*2012-2016) January 2011, Page 14

As indicated below in Figure 5-4, “Operating” costs for the scheme do appear to follow the trend (but not same percentage change) of actual water usage rates. In 2008 “Operating” costs decreased as water usage decreased, and in 2009 when water usage increased marginally costs continued to decrease.

Of interest is the comparison between 2007 and 2010 as follows:

- 2007: water usage approximately 1,000ML (4% of 2003 level) where Total “Operating” costs were $498,000
- 2010: water usage approximately 1,800ML (7% of 2003 level) where Total “Operating” costs were $622,000 (increase of 25%).

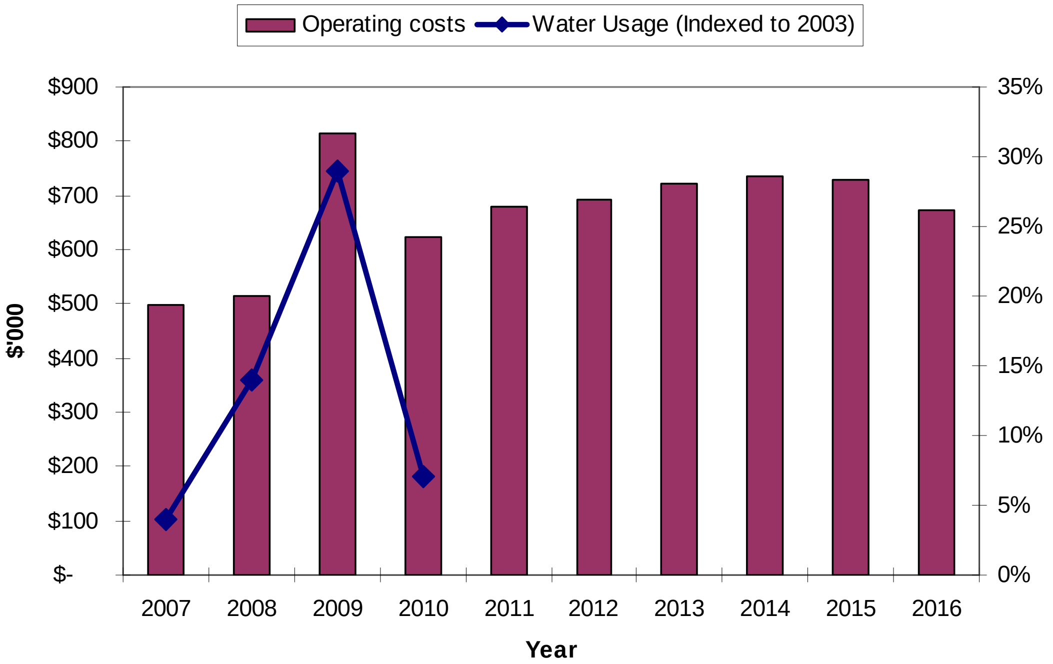

Figure 5-4 Comparison of “Operating” costs against water usage (indexed to water usage in 2006) for Barker Barambah Bulk WSS[83]

In 2011, “Operating” costs are projected to increase by 19% from 2010. Of interest would be scheme costs in delivering over 20,000ML per annum (as it did in 2003, 2005 and 2006).

The key cost component of “Operating” cost across the period from 2007 to 2016 is clearly “Operations” costs as highlighted below Figure 5-5.

[83] Raw data sourced from *Barker Barambah WSS NSP, (*2012-2016) January 2011, Pages 7 and 14.

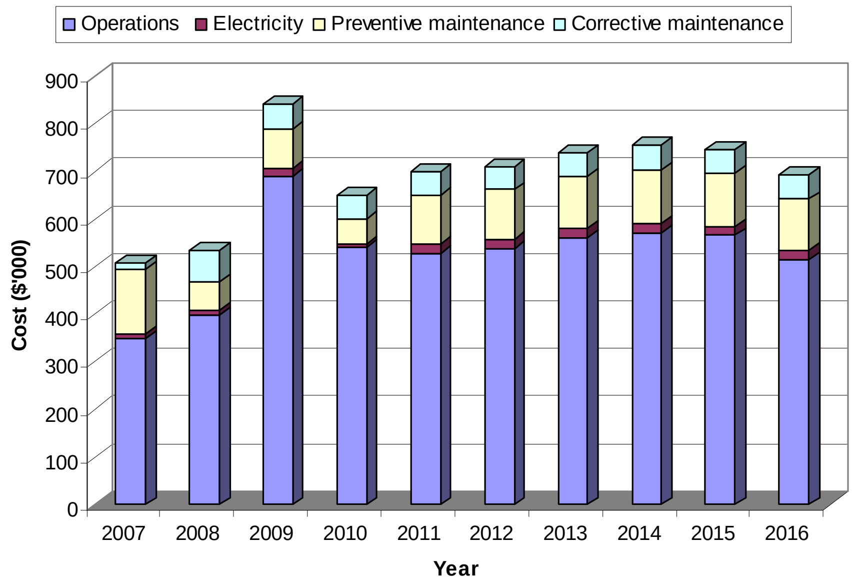

Figure 5-5 Breakdown of Operating costs for Barker Barambah Bulk WSS 2007 to 2016[84]

The following sections examine in more detail operational expense items and activities.

5.4.2 Location expense items

Under planning and regulation requirements SunWater is obliged to provide public access to key bulk storages such as the Bjelke Petersen Dam. This often involves facilities including parks and roads. SunWater continually seeks to minimise the cost of providing such facilities by transferring the management (and cost) to private operators of local government.

The recreational facilities at the Bjelke Petersen Dam are operated and maintained by local government on behalf of SunWater[85]:

- $33,000 in 2007
- $32,000 in 2008
- $11,000 in 2009
- $26,000 in 2010[86]

Figure 5-6 below provides an overview of operational expenditure for the facilities at the Bjelke Petersen Dam. Clearly, the main cost expense incurred at the facility are “Direct”, which in this case involves paying the Regional Council as contractors to actually do the maintenance work. This aligns with SunWater’s management aim of outsourcing on-ground activities to external contractors where possible. Note that the costs for 2012 to 2016 are identical to those presented in Figure 5-6 for 2011.

[84] Raw data sourced from *Barker Barambah WSS NSP, (*2012-2016) January 2011, Page 7.
[85] However the regional SunWater manager indicated that he was in negotiations with the new South Burnett Regional council regarding the transfer of these costs from SunWater.
[86] Source: SunWater spreadsheet “*Copy of Extract LBC data conversion to sub activity.xls*”.

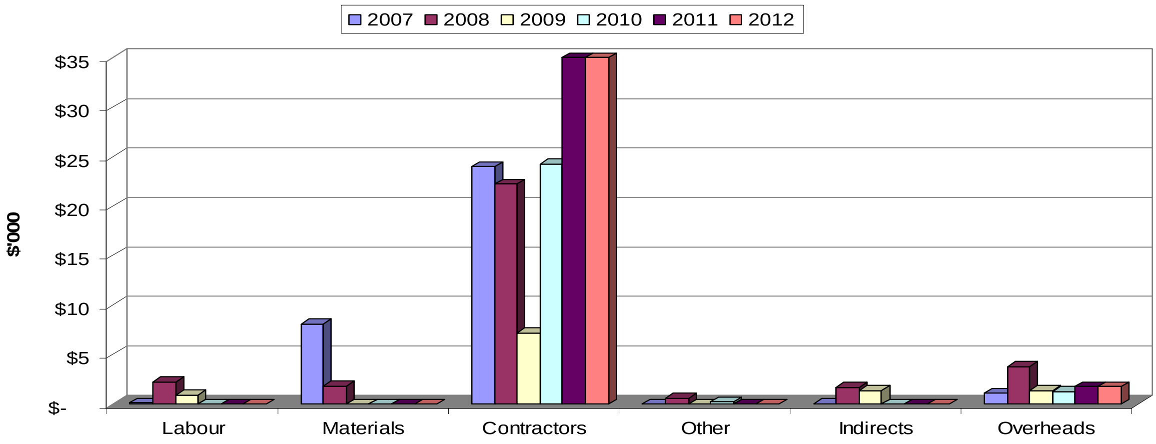

Figure 5-6 Operating costs for recreation facilities at Bjelke Petersen Dam 2007 to 2012[87]

The projected costs of maintaining the facilities going forward are illustrated in Table 5-1. Note that these expenses are incorporated into the operations and maintenance expenditure. In 2012 there is an additional expense item of $34,000 projected for the Reform of Access Road to D/S wall at Bjelke Petersen Dam (incorporated as a renewal expense item).

Table 5-1 Projected recreational facility costs for Barker Barambah Bulk WSS 2012 to 2016

Real dollars, $'000	Financial Year				
	2012	**2013**	**2014**	**2015**	**2016**
Recreational Facility Cost	71	37	37	37	42

Source: *Barker Barambah WSS NSP,* (2012-2016) January 2011, Page 26

5.4.3 Operational Expense items

5.4.4 Labour costs

Projected "Labour" costs for the Barker Barambah Bulk WSS are significant as highlighted below in Table 5-2. "Labour" as a proportion of "Total Operating costs" has historically varied from 21.5% in 2009 to 25.5% in 2007.

[87] Raw data sourced from SunWater spreadsheet "*Rec Facilities NSP estimates Barker and Upper Burnett.xls*", & from SunWater spreadsheet "*Copy of Extract LBC data conversion to sub activity.xls*".

Table 5-2 "Labour" costs and "Total Operating" costs for Barker Barambah Bulk WSS

($'000)	Actuals				Forecast	Price Path				
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Labour[1]	127	119	175	148	176	179	181	181	181	181
Annual change		-6.3%	47.1%	-15.4%	18.9%	1.7%	1.1%	0.0%	0.0%	0.0%
Change since 2007		-6.3%	37.8%	16.5%	38.6%	40.9%	42.5%	42.5%	42.5%	42.5%
Total Operating costs	498	514	815	622	680	691	722	736	728	673
Labour as % of Total Operating costs	25.5%	23.1%	21.5%	23.8%	25.8%	25.9%	25.1%	24.6%	24.9%	26.9%

[1]Source*: Barker Barambah WSS NSP*, (2012-2016) January 2011, Page 7.

Note that the average annual "Labour" cost (historical) between 2007 and 2010 was $142,000 per annum. The projected "Labour" cost in 2011 of $176,000 represents an increase of approximately 24%.

Figure 5-7 below provides an overview of water usage levels against "Labour" costs. There is a minor observable correlation between "Labour" costs and water usage rates within the scheme, with the exception of 2008 when water usage actually increased but "Labour" cost declined. However, it should be noted that usage was a very low levels.

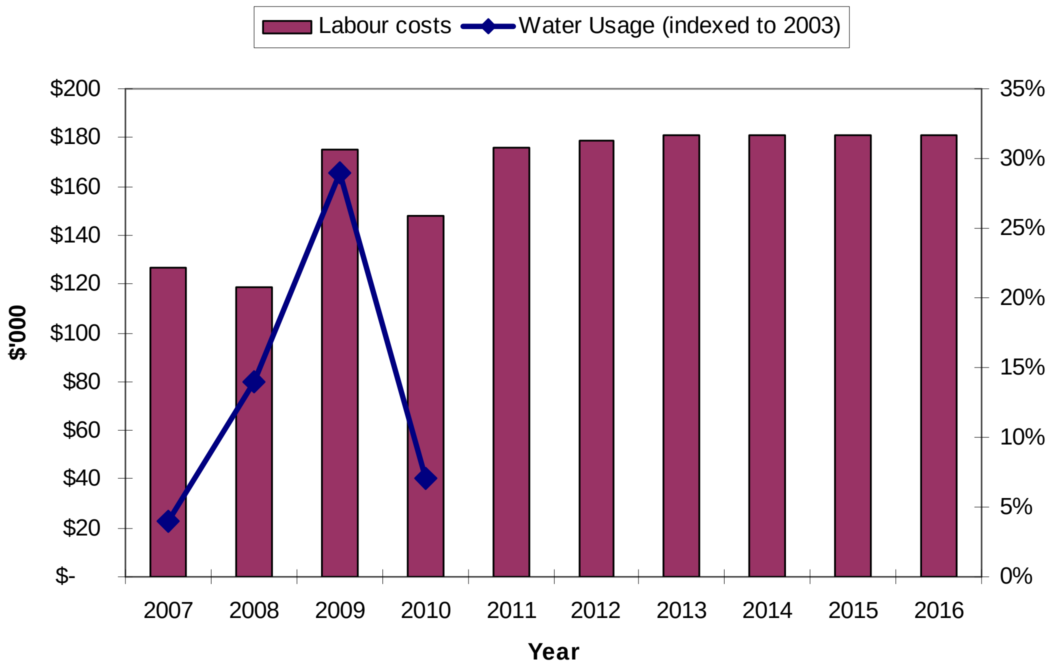

Figure 5-7. Comparison of "Labour" costs against water usage (indexed against 2003) for Barker Barambah Bulk WSS[88]

The following seeks to examine in more detail the components that make up the "Labour" costs presented within Table 5-2 above, and examine in detail (where data is available) changes in historical labour components.

[88] Raw data sourced from *Barker Barambah WSS NSP, (*2012-2016) January 2011, Pages 7 and 14

"Labour" costs in 2011 are forecast to be $176,000 (Table 5-2). As highlighted below in Figure 5-8, activities related to "Operations" account for 73.7% of the total labour cost, followed by labour required for "Preventive Maintenance" (18.9%) and "Corrective Maintenance" (7.4%).

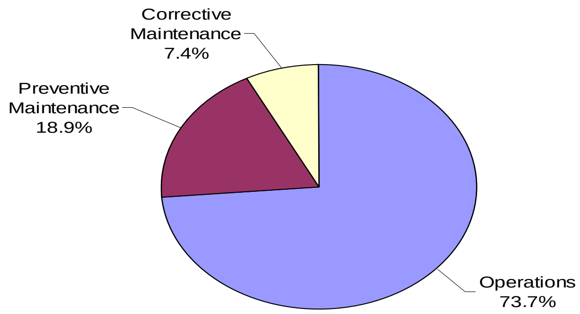

Figure 5-8 Breakdown of "Labour" costs by output activity for Barker Barambah Bulk WSS in 2011[89]

As illustrated in Figure 5-8 above, "Operations" related activities accounted for 73.7% of all forecast labour expenses for the Barker Barambah Bulk WSS in 2011. Figure 5-9 below provides additional information regarding the composition of labour costs associated with "Operations" activities.

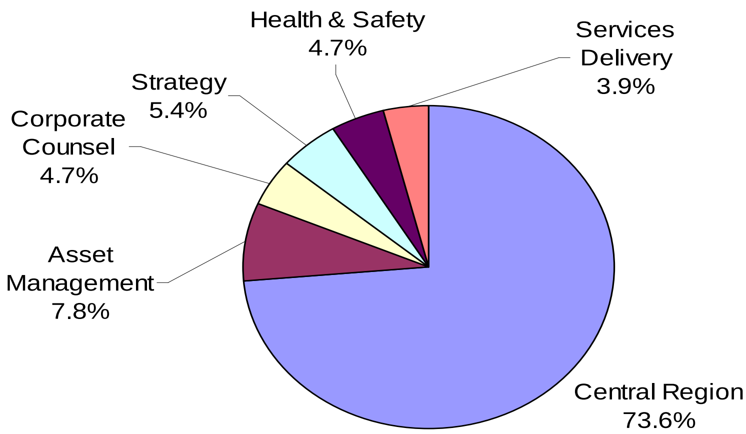

Figure 5-9 Breakdown of "Operations" labour costs for Barker Barambah Bulk WSS in 2011[90]

As illustrated within Figure 5-9 above, approximately three-quarters of the projected "Operations" labour costs in 2011 are from staff within the Central region, whilst the remainder of labour costs are sourced from outside the Central region (predominantly Brisbane, but may also include SunWater staff from other regional centres).

As stated within the NSP, Operations activities include "*releasing water, reading meters, repairs and issues such as meeting SunWater's obligation under the ROP / ROL, workplace health and safety, dam safety, environmental management and land management legislation*."[91]

[89] Raw data sourced from SunWater spreadsheet "*Copy of Extract LBC data conversion to sub activity.xls*".
[90] Raw data sourced from SunWater spreadsheet "*Copy of Extract LBC data conversion to sub activity.xls*".
[91] Source*: Barker Barambah WSS NSP*, (2012-2016) January 2011, Page 19

Whist the information presented in Figures 5-8 and 5-9 provide useful insights into the expected “Labour” costs for 2011, of considerable interest are the historical labour costs and what made these up. Figures 5-10 and 5-11 below provide partial insights into labour costs between 2007 and 2011.

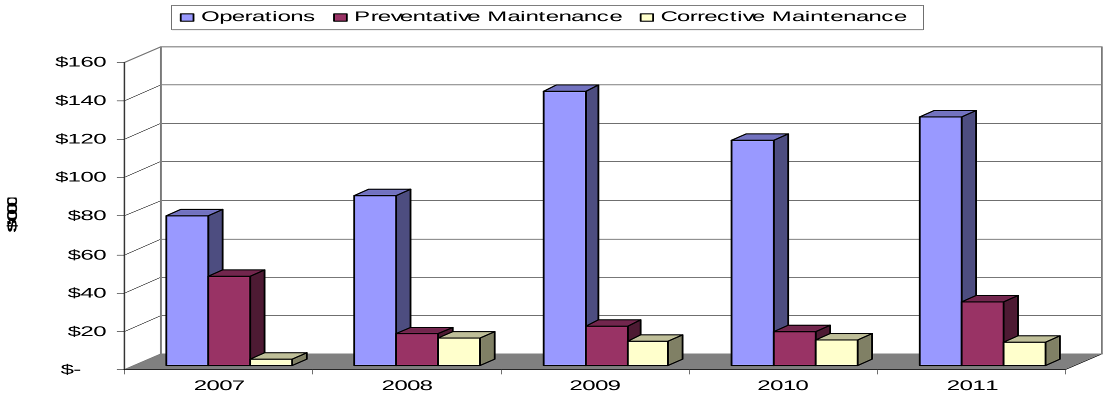

Figure 5-10 Breakdown of “Labour” costs for Barker Barambah Bulk WSS between 2007 and 2011[92]

As indicated in Figure 5-10 above, labour costs associated with “Preventive” and “Corrective Maintenance” were minor in comparison to “Operations” between 2008 and 2011. As illustrated, “Operations” labour costs have risen considerably over the years, and it is useful to examine 2007 and 2010 in which water usage were similar:

- 2007 water usage approximately 1,000ML (4% of 2003 level), “Operations” labour costs of $78,000
- 2010 water usage approximately 1,800ML (7% of 2003 level), “Operations” labour costs of $117,000 (increase of 50%)

This report seeks to examine the drivers behind these historic cost increases, and evaluate the prudency and effectiveness of proposed cost structure for 2012 – 2016.

Also of interest was that “Preventive Maintenance” costs spiked in 2007, yet water usage in 2007 was only approximately 4% of 2003 water usage level. As indicated in Figure 5-11 below, there was a one-off cost in 2007 for “Service” related activities.

[92] Historical data extracted from SunWater spreadsheet *“Extract LBC data Conversion extra activity detail and preventive main split.xls”,* forecast expenditure data from SunWater *“IM Central -610.03.PSV.xls”*

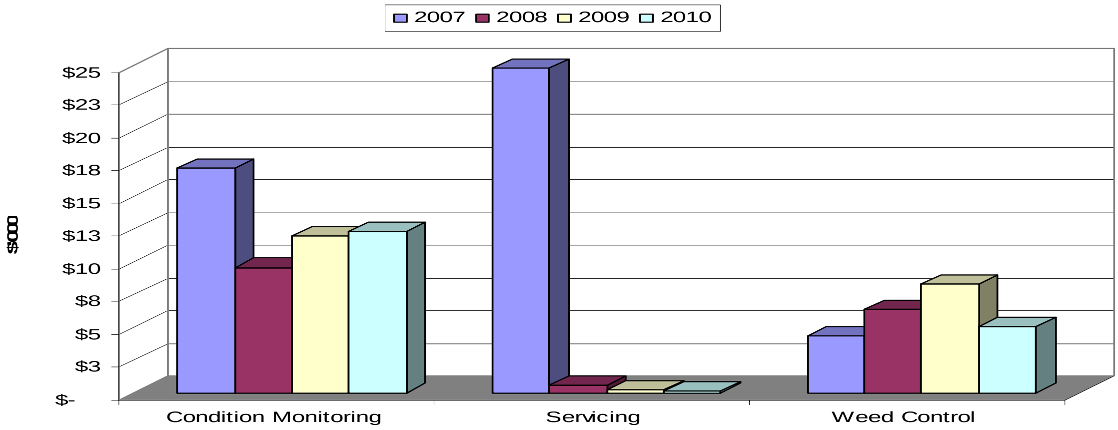

Figure 5-11 Breakdown of "Preventive Maintenance" labour costs for Barker Barambah Bulk WSS between 2007 and 2010[93]

Labour is examined in more detail within the following sections.

5.4.5 Electricity costs

As indicated below in Table 5-3, "Electricity" costs for Barker Barambah Bulk WSS are minor in comparison to other costs. However, as forecast total "Electricity" costs are projected to rise, the following analysis is presented.

Although as a proportion of "Total Operating" costs, "Electricity" has varied from 1.1% in 2010 to 2.2% in 2007. As indicated earlier, water usage in 2010 was only approximately 7% (of 2003), hence the low consumption of "Electricity" ($7,000). In 2009, water usage was up to 35% (of 2003), possibly explaining why "Electricity" costs more than doubled to $16,000.

Table 5-3 "Electricity" costs and "Total Operating" costs for Barker Barambah Bulk WSS

($'000)	Actuals				Forecast	Price path				
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Electricity[1]	11	10	16	7	19	19	19	19	19	19
Annual Change		-9.1%	60.0%	-56.3%	171.4%	0.0%	0.0%	0.0%	0.0%	0.0%
Change since 2007		-9.1%	45.5%	-36.4%	72.7%	72.7%	72.7%	72.7%	72.7%	72.7%
Total Operating costs[1]	498	514	815	622	680	691	722	736	728	673
Electricity as a % of Total Operating Costs	(2.2%)	(1.9%)	(2.0%)	(1.1%)	(2.8%)	(2.7%)	(2.6%)	(2.6%)	(2.6%)	(2.8%)

[1]Source: *Barker Barambah WSS NSP,* (2012-2016) January 2011, Page 7.

To a large degree, "Electricity" costs would be expected to correlate closely with water usage rates. As highlighted below in Figure 5-12, there seems to be a direct relationship between water usage rates and "Electricity" costs incurred for the scheme.

[93] Raw data sourced from SunWater spreadsheet *"Extract LBC data Conversion extra activity detail and preventive main split.xls".*

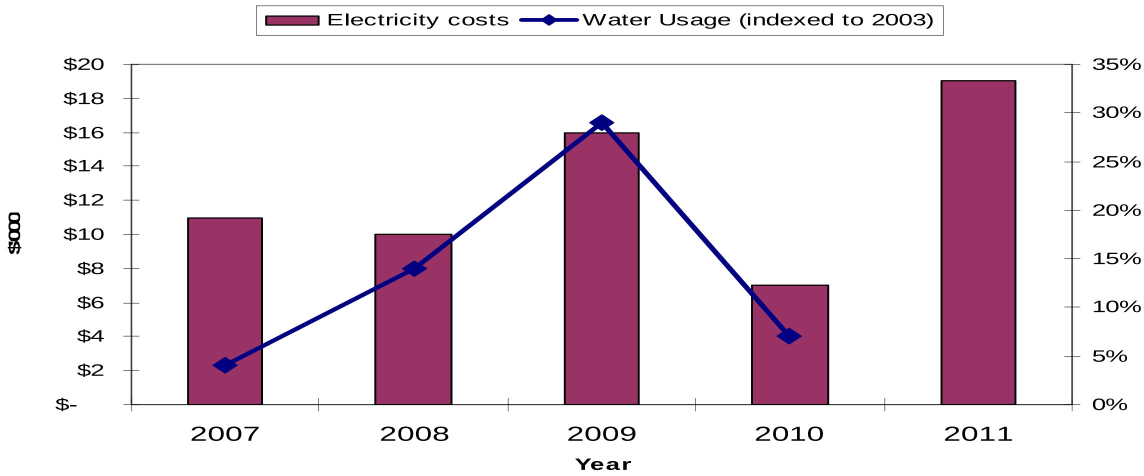

Figure 5-12. Comparison of "Electricity" costs against water usage (indexed to water usage in 2003) for Barker Barambah Bulk WSS[94]

Note that Electricity costs are a variable component of pricing, and therefore customers will only pay electricity costs directly associated with water delivered (as opposed to projected).

Aurecon forwarded to SunWater the questions regarding electricity costs, and if it was possible to get disaggregated "Electricity" costs for 2009. Based on the information provided by SunWater[95]:

- 0.8% "Electricity" cost for Joe Sipple Weir
- 55.9% Value House & TWS
- 44.3% for Upper Redgate Relift Pump Station.

5.4.6 Activity based expense items

The following sections examine scheme Operating Costs from an activity perspective as follows:

- Operations
- Preventive Maintenance
- Corrective Maintenance

5.4.7 Operations costs

Operational activities for the scheme are largely identified within the scheme Operation Manual[96]. SunWater has provided a breakdown of "Operations" costs by both sub-activities and cost input. The following analysis begins by examining cost inputs.

Projected "Operations" costs for the Barker Barambah Bulk WSS are significant as highlighted below in Table 5-4. As a proportion of total Operating Costs, Operations costs have varied considerably from 70% in 2007 to 87% in 2010.

[94] Raw data sourced from *Barker Barambah WSS NSP, (*2012-2016) January 2011, Pages 7 and 14.
[95] Source: SunWater email dated 30th June 2011.
[96] SunWater, *Barker Barambah Water Supply Scheme, Scheme Operation Manual*, document un-dated.

Table 5-4 Operations costs and Total Operating Costs for Barker Barambah Bulk WSS

($'000)	Actuals				Forecast	Price path				
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Labour[1]	78	88	142	117	130	131	131	131	132	131
Materials[1]	9	7	5	2	3	3	3	3	3	3
Contractors[1]	31	28	17	35	41	41	42	42	43	5
Other[1]	105	103	155	149	108	113	112	112	112	112
Total Direct Costs	**223**	**226**	**320**	**304**	**282**	**288**	**288**	**288**	**290**	**251**
Indirects[1]	38	66	207	102	113	288	288	288	290	251
Overheads[1]	87	106	163	134	134	112	129	137	130	122
Total Operations[2]	**348**	**398**	**689**	**540**	**529**	**535**	**554**	**563**	**559**	**506**
Annual change		14.4%	73.2%	-21.7%	-2.1%	1.1%	3.6%	1.6%	-0.7%	-9.5%
Change since 2007		14.4%	98.1%	55.2%	52.0%	53.7%	59.2%	61.8%	60.6%	45.4%
Total Operating costs[3]	498	514	815	622	680	691	722	736	728	673
Operations as % of Total Operating costs	**69.9%**	**77.4%**	**84.6%**	**86.8%**	**77.8%**	**77.4%**	**76.7%**	**76.5%**	**76.8%**	**75.2%**

[1]Source: Historical data extracted from SunWater spreadsheet *"Extract LBC data Conversion extra activity detail and preventive main split.xls"*, forecast expenditure data from SunWater *"IM Central -610.03.PSV.xls"*.
[2]Note that there are minor differences between the data reported within the table and that reported within the NSP due to rounding.
[3]Source: *Barker Barambah WSS NSP*, (2012-2016) January 2011, Page 7.

Of concern has been the growth of Operation costs particularly in 2009. Figure 5-13 compares "Operations" costs against water usage rates for the historic years of 2007 to 2010, and also highlights projected "Operations costs" for the next price path.

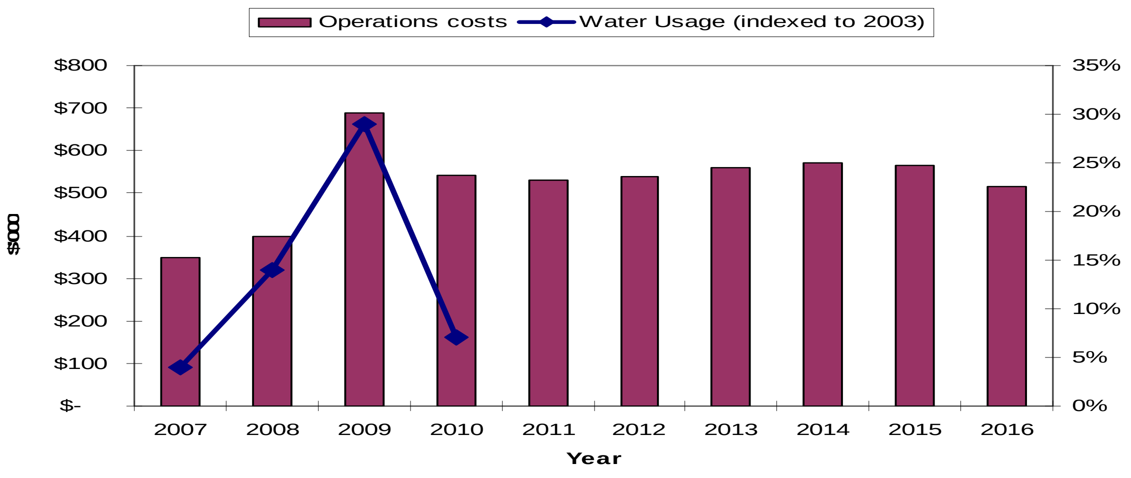

Figure 5-13 Comparison of "Operations" costs against water usage (indexed against 2003) for Barker Barambah Bulk WSS[97]

[97] Raw data sourced from *Barker Barambah WSS NSP, (*2012-2016) January 2011, Pages 7 and 14.

Figure 5-13 above highlights that there is a noticeable relationship between water usage and annual “Operations” costs, with both peaking in 2009.

Of concern is examining the changes in cost structure between the years of 2007 and 2010 as follows:

- 2007 water usage approximately 1,000ML (4% of 2003 level),”Operations” costs of $348,000
- 2010 water usage approximately 1,800ML (7% of 2003 level), “Operations” costs of $541,000 (increase of 55%).

Both 2007 and 2010 delivered similarly low volumes of irrigation water, yet “Operations” costs were 50% higher in 2010.

The following sections seeks to examine in more detail the components that make up the “Operations” costs, and examine where data is available changes in cost components.

As indicated in Table 5-4 above, “Operations” costs for 2011 are projected to be $529,000. As illustrated below in Figure 5-14, “Overheads” and “Indirects” represents almost half of the annual total cost. Other significant components are “Labour” at 24.6% (which was examined earlier), and “Other” at 20.4%.

Cost items included within “Other” include insurance costs (75% of total “Other” costs, costing $75,000 in 2011), Land Tax (13% or $14,000), Local Authority Rates (6.5% or $7,000), and other local administrative costs including telephone, etc.

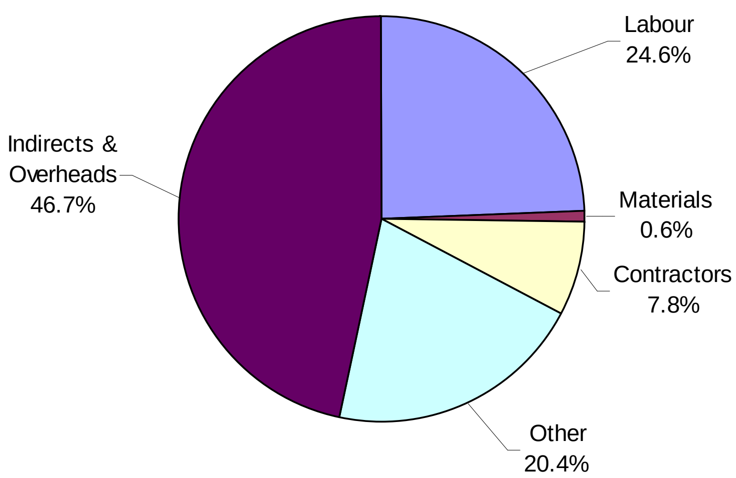

Figure 5-14. Breakdown of input costs towards “Operations” for Barker Barambah Bulk WSS in 2011[98]

The following analysis seeks to examine in detail the input cost components of “Operations” costs, and where possible identify cost item increases (and possible causes). Figure 5-15 below provides a breakdown of the key input costs components of “Operations” costs.

[98] Raw data sourced from SunWater Spreadsheet *“IM Central -610.03.PSV.xls”.*

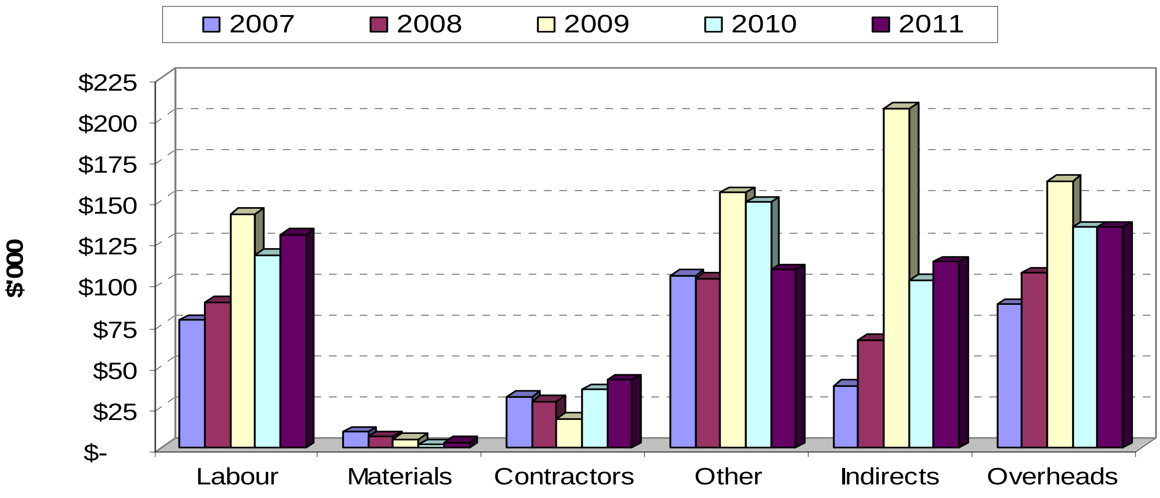

Figure 5-15 Breakdown of "Operations" costs for Barker Barambah Bulk WSS for 2007 - 2011[99]

The scope of this consultancy was to examine the direct costs only, which in this case are "Labour", "Materials", "Contractors" and "Other".

"Labour" costs increased substantially in 2009 (along with water use in that year), and this will be investigated in further detail below. The other noticeable increase is "Other" in 2009 and 2010, but these return to 2007/08 levels for the forecast period.

The following section seeks to examine in more detail "Operations" costs, by examining the sub activities (outputs) recorded under "Operations" (see Section 4 for a definition of each sub activity).

SunWater adopted a new Business Operating Model and management accounting system in 2009/10. SunWater has acknowledged that during the process of re-categorising historical data, a number of activity expense items may have been in-correctly coded, particularly for 2007. Therefore the degree of accuracy for certain sub-activities' costs in 2007 (and 2008 to a lesser extent) is questionable.

A breakdown of historical "Operations" expenditure by sub-activities is highlighted below in Table 5-5 and Figure 5-16.

Table 5-5. Breakdown of historical "Operations" expenditure by activity for Barker Barambah Bulk WSS

Real dollars, $'000	Financial Year			
	2007	2008	2009	2010
Customer Management	14	-	-	29
Workplace H&S	3	0	0	5
Environmental Management	25	4	1	7
Water Management	-	27	46	33
Scheme Management	98	107	215	249
Dam Safety	9	20	54	49
Schedule /Deliver	159	166	306	99
Metering	2	41	56	43

[99] Raw data sourced from SunWater spreadsheets *"Extract LBC data Conversion extra activity detail and preventive main split.xls"*, and *"IM Central -610.03.PSV.xls"*.

Real dollars, $'000	Financial Year			
Facility Management	33	32	11	26
Other	4	- 1	0	0

Source*: SunWater spreadsheet ""Copy of Extract LBC data conversion to sub activity.xls"*

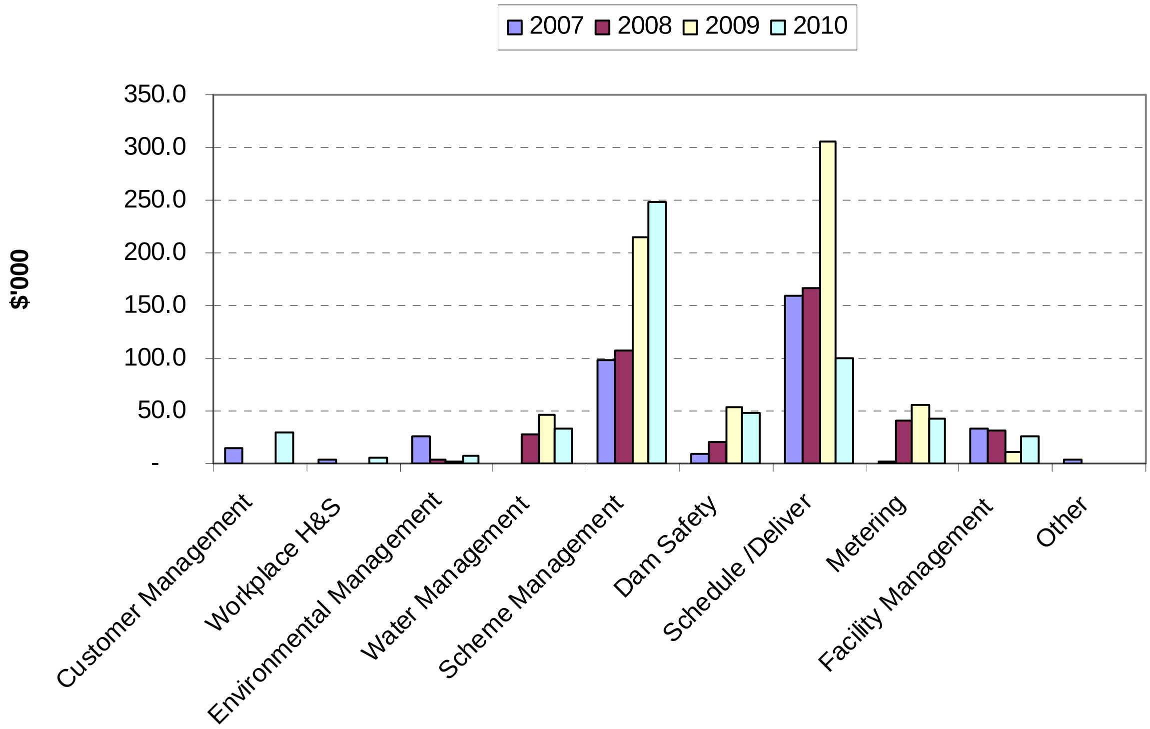

Figure 5-16 Overview of disaggregated historical "Operations" expenditure for Barker Barambah Bulk WSS[100]

Customer Management

"Customer Management" includes interfacing and enquiries from customers, billing and account management, and water trading activities.

Of interest is the fact that costs were only incurred for 2007 and 2010. As indicated earlier in Figure 5-13 water usage between 2007 and 2010 was very low, and 2007 and 2010 were in fact much lower than 2008 and 2009. Hence there was a diverse relationship between water usage and costs incurred for "Customer Management" for this scheme.

As illustrated below in Figure 5-17 "Labour" was the most significant direct cost for both 2007 and 2010. A negative value for "Materials" is recorded for 2007 ($3,000), but Aurecon suspects this to be an abnormality associated with the re-categorising of historical data for the new business model.

[100] Raw data sourced from SunWater spreadsheet ""*Copy of Extract LBC data conversion to sub activity.xls*".

Due to the overhead cost allocation model, significant “Indirects” and “Overheads” are added as a result. For 2010, “Labour” costs represented 35% of total costs incurred for “Customer Management”.

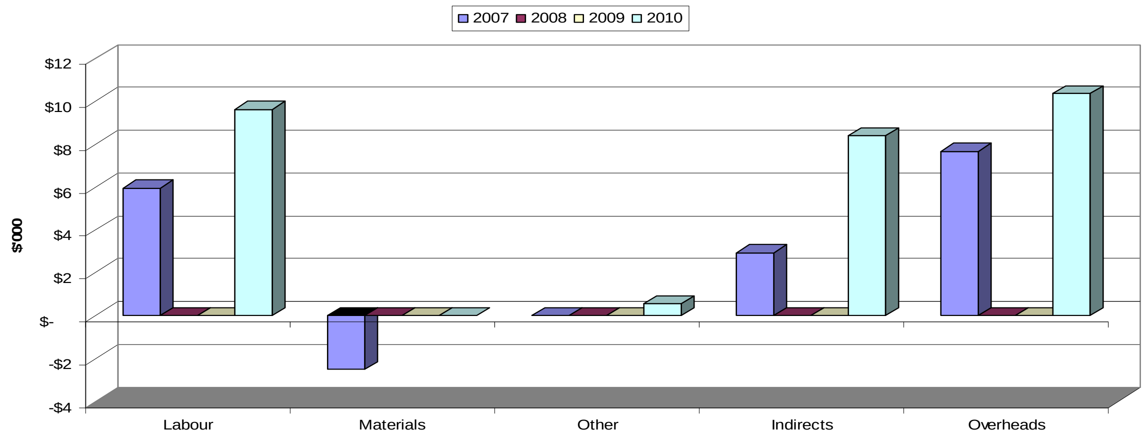

Figure 5-17 Overview of disaggregated “Customer Management” expenditure for Barker Barambah Bulk WSS[101]

Aurecon forwarded the following questions to SunWater, and received the following responses[102].

- Why costs for Labour only occurred in 2007 and 2010. Assume no input/activities in 2008 & 2009?

“These costs are attributable directly to the service contract and will be varied from year to year depending upon the nature of customer enquiries.”

- What level are Labour costs forecast for 2011?

“The forecast cost is based on 5 years average and taking into account the SunWater Enterprise Agreement”

- Assume that the “Materials” costs for 2007 are due to problems with retro-fitting of 2007 data into the new business model?

  “*Yes”*

Workplace Health and Safety

As indicated earlier, SunWater has a dedicated Workplace H & S group to ensure compliance with legislative requirements throughout all workplaces. As such the group conducts regular safety audits and reviews of work practices, and ensures SunWater staff undertake regular training.

Across many schemes, Workplace H & S costs were recorded for 2007 and 2010, which may have correlated with significant training and safety workshops held within those years.

Due to the overhead cost allocation model, significant “Indirects” and “Overheads” are added as a result. For 2010, “Labour” costs represented 31.5% of total costs incurred for “Workplace H&S”.

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[101] Raw data sourced from SunWater spreadsheet “*Copy of Extract LBC data conversion to sub activity.xls*”.
[102] SunWater responses are sourced from email dated 30th June 2011

Aurecon forwarded the following questions to SunWater, and received the following responses[103].

- Why costs were only recorded for 2007 and 2010

"These costs are attributable directly to the service contracts and the threshold is 4 hours over a period (weeks, month)."

- At what level are Labour costs forecast for 2011?

"The forecast cost is based on 5 years average and taking into account SunWater Enterprise Agreement"

Environmental Management

Environmental Management includes the development of weed control plans, assessing impacts downstream of drains, and activities associated with environmental permits (normally undertaken by regional based environmental officer), liaison and coordination with relevant Government agencies and environmental regulators on site-specific issues.

As illustrated above in Figure 5-16 and Table 5-5, a significant expense incurred in 2007. Aurecon notes that labour costs for weed control for 2007 (Figure 5-11) did not spike, thereby suggesting a weak linkage between "Environmental Management" (predominantly management time recorded for the development of weed control plans) and actual weed control costs incurred within "Preventive Maintenance" (assuming that the 2007 data is correct).

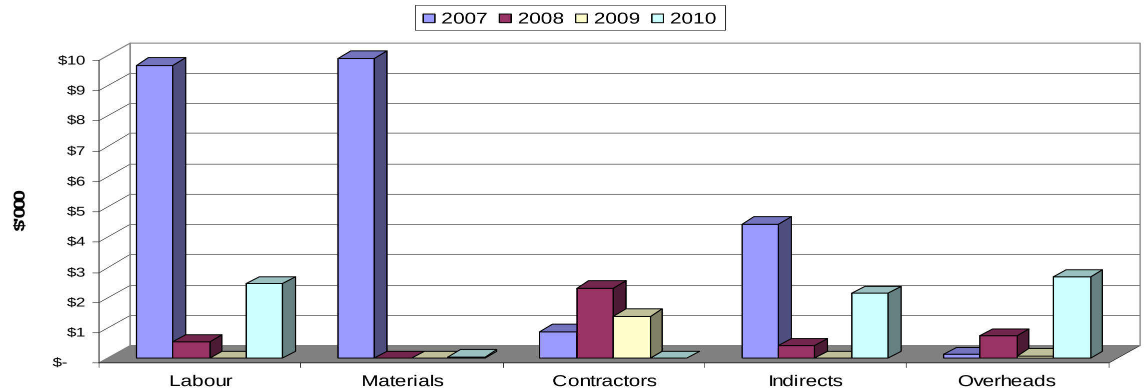

Figure 5-18 Overview of disaggregated "Environmental Management" expenditure for Barker Barambah Bulk WSS[104]

As highlighted above within Figure 5-18, a significant "Labour" cost was incurred in 2007 and a substantially smaller expense in 2010. There was a one-off expense in 2007 for "Materials", whilst "Contractors" were also engaged between 2007 and 2009 at an expense below $2,000 per annum.

Aurecon forwarded the following questions to SunWater, and received the following responses[105].

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[103] SunWater responses are sourced from email dated 30th June 2011

[104] Raw data sourced from SunWater spreadsheet "*Copy of Extract LBC data conversion to sub activity.xls*".

[105] SunWater responses are sourced from email dated 30th June 2011

- Why costs were significant only for 2007, and minor expense in 2009 (linked with Weed Control activities?)

"2007 was a transition year in which the previous internal trade model was removed and the new BOM model developed and implemented in 2008. This transition period and changes are causing difficulties in comparability across time"

- Why significant Material expenses was only recorded in 2007? Coding error?

"2007 was a transition year in which the previous internal trade model was removed and the new BOM model developed and implemented in 2008. This transition period and changes are causing difficulties in comparability across time."

- What are contractors engaged for?

"Contractor engaged for Water Quality Monitoring"

- At what level are Labour costs forecast for 2011?

"The forecast cost is based on 5 years average and taking into account SunWater Enterprise Agreement"

Water Management

Water Management includes activities related with announcement of water allocations, water quality monitoring and sampling, Blue-Green algae management, SDL readings, shoreline inspections, monitoring of groundwater levels and salinity levels, bore measurements and preparation of data for NRMW and SunWater.

As illustrated above in Figure 5-19 no expense was incurred in 2007 (actual high water usage year), but costs increased substantially between 2008 and 2010. Figure 5-19 below highlights that "Labour" was the most significant direct cost at $9,000 to $12,000 per annum, which based on the overhead cost model attracted significant "Indirects" and "Overheads".

Figure 5-19 also highlights that "Contractors" became more significant as a cost in 2009 and 2010.

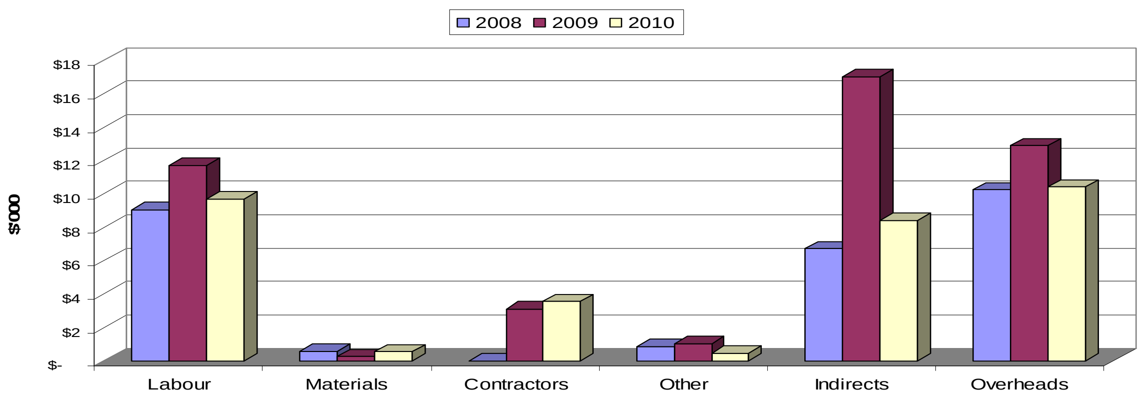

Figure 5-19 Overview of disaggregated "Water Management" expenditure for Barker Barambah Bulk WSS[106]

Aurecon forwarded the following questions to SunWater, and received the following responses[107].

[106] Raw data sourced from SunWater spreadsheet "*Copy of Extract LBC data conversion to sub activity.xls*".

- Why was no expense incurred in 2007?

"2007 was a transition year in which the previous internal trade model was removed and the new BOM model developed and implemented in 2008. This transition period and changes are causing difficulties in comparability across time"

- Why are contractors used? and is the rising trend continuing in 2011?

"Contractors are used for water monitoring charges (also in the environment activity).

The 5 years average water monitoring charges are using to forecast 2011."

Scheme Management

Scheme Management includes the preparation and provision of reports and statistics for clients, including meetings with clients reviewing contract progress/performance, energy management including the review of electricity consumption tariffs and accounts, land and property management including legal advice, O & M Manual development, Scheme Strategies, OMS plans, Facility Contingency Plans and Emergency Action Plans (EAP) for all facilities other than dams, System Leakage Management Plans (SLMPs), insurance costs, rates and land taxes.

Aurecon notes the substantial increase in "Scheme Management" costs from $98,000 in 2007 to $249,000 in 2010 (Table 5-5 above). As highlighted by Figure 5-20 below, no "Labour" expense was recorded under "Scheme Management" in 2007 and 2008, indicating that either no activities related to "Scheme Management" were undertaken over this period, or that these activity costs were assigned to another expenditure items such as "Schedule/Deliver".

Significant on-going costs have been recorded from 2007 for "Other", which predominantly includes Local Government rates, land taxes and Insurance. Costs jumped from approximately $90,000 in 2007 and 2008, to approximately $140,000 in 2009 and 2010.

Figure 5-20 Overview of disaggregated "Scheme Management" expenditure for Barker Barambah Bulk WSS[108]

Figure 5-20 above highlights that "Labour" costs have risen in 2009 and 2010, which also drove "Indirects" and "Overheads" to rise. In 2010 the $32,300 in "Labour" expenses attracted a total of over $70,000 in "Indirects" and "Overheads", resulting in $103,000 in "Labour" linked

[107] SunWater responses are sourced from email dated 30th June 2011
[108] Raw data sourced from SunWater spreadsheet "*Copy of Extract LBC data conversion to sub activity.xls*".

expenses. This is quite significant considering that no "Labour" linked expenses were recorded for 2009 and 2010.

Aurecon forwarded the following questions to SunWater, and received the following responses[109].

- Why no Labour expense incurred in 2007 and 2008?

"2007 was a transition year in which the previous internal trade model was removed and the new BOM model developed and implemented in 2008. This transition period and changes are causing difficulties in comparability across time"

- Why "Other" costs jumped substantially from 2007/08 to 2009/10

"Other costs related to insurance $116,000, land tax $12,000 and overhead $6,000."

- What is the trend for 2011+

"The forecast cost is based on 5 years average and taking into account SunWater Enterprise Agreement"

Dam Safety

The Bjelke-Petersen Dam is classified as a referable dam under the *Water Act 2000*. As such, SunWater is required to have a comprehensive safety management program in place comprising policies, procedures and investigations to minimise the risk of dam failure. Routine dam safety inspections are carried out monthly, which include the monitoring of embankments, piezometers, seepage and general condition of the storages as defined in the dam surveillance specification.

As highlighted in Table 5-5 and Figure 5-16, Dam Safety costs have risen sharply in recent years from $9,000 in 2007 to approximately $50,000 in 2009 and 2010.

Figure 5-21 below highlights that "Labour" was the most significant direct cost and increasing rapidly from $4,000 in 2007 to $16,000 in 2010, a four-fold increase. Due to the overhead cost allocation model, significant "Indirects" and "Overheads" are also added. In 2010, the $16,000 in Labour costs also attracted $31,000 in overheads to the scheme.

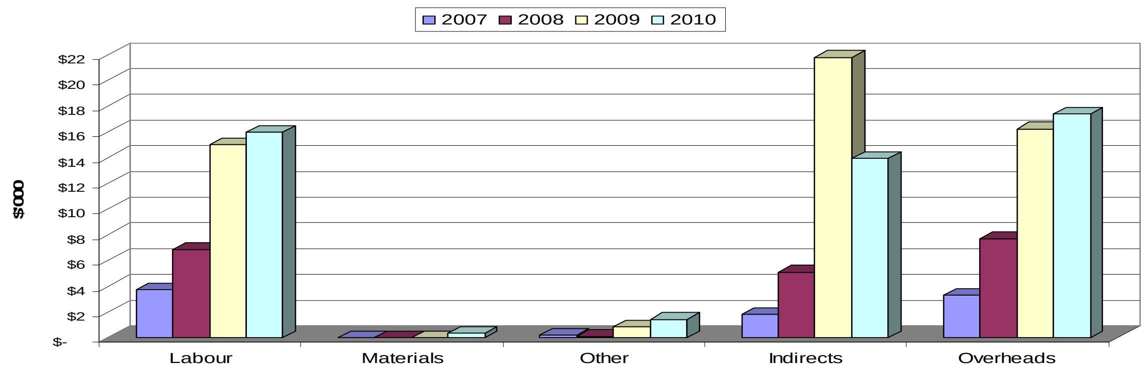

Figure 5-21 Overview of disaggregated "Dam Safety" expenditure for Barker Barambah Bulk WSS[110]

Aurecon forwarded the following questions to SunWater, and received the following responses[111].

[109] SunWater responses are sourced from email dated 30th June 2011
[110] Raw data sourced from SunWater spreadsheet "*Copy of Extract LBC data conversion to sub activity.xls*".

- Why Labour costs rose 4 fold between 2007 and 2010

"Labour costs included one-off jobs - Comprehensive Risk Assessment."

- Are Monthly Weir Safety Inspections included here?

"Yes"

- Are what level are costs forecast for 2011?

"The forecast cost is based on 5 years average and taking into account SunWater Enterprise Agreement, but excluding weir and dam inspections (move to Preventative Mtnce"

Schedule/Deliver

Schedule/Deliver includes scheduling, releasing, operation of pump stations and SCADA, System surveillance including monitoring of water entitlement and observation of and reporting of any breaches, flood operations preparation, water harvesting, ROP compliance of water levels and flows and reporting of water information.

As indicated above in Figure 5-16 "Schedule/Deliver" was by far the largest output activity in terms of expense between 2007 and 2009. Of interest is the substantial decline in "Schedule/Deliver" costs in 2010.

Figure 5-22 below highlights that "Labour" was the most significant direct cost. Of interest is that Labour costs decreased from $84,000 in 2009 to $31,000 in 2010.

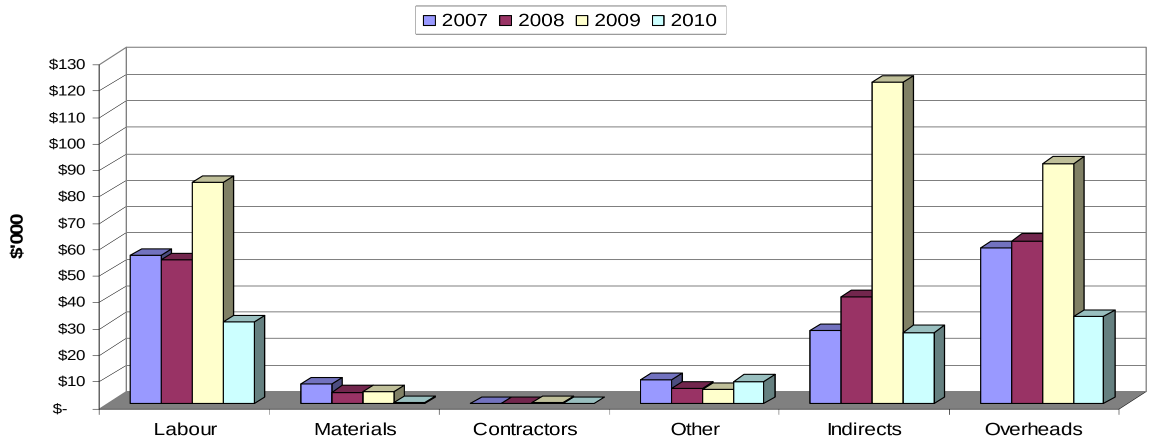

Figure 5-22. Overview of disaggregated "Schedule/Deliver" expenditure for Barker Barambah Bulk WSS[112]

Due to the overhead cost allocation model, significant "Indirects" and "Overheads" are also added. In 2010, the $31,000 in Labour costs also attracted $60,000 in overheads towards the scheme.

Aurecon forwarded the following questions to SunWater, and received the following responses[113].

- What level are costs forecast for 2011 considering that water usage has been so low between 2007 and 2010?

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[111] SunWater responses are sourced from email dated 30th June 2011

[112] Raw data sourced from SunWater spreadsheet "*Copy of Extract LBC data conversion to sub activity.xls*".

[113] SunWater responses are sourced from email dated 30th June 2011

"The forecast cost is based on 5 years average and taking into account SunWater Enterprise Agreement."

Metering

Metering costs have also risen since 2008 with the introduction of meters, at a cost of approximately $41,000 to $56,000 per annum (Table 5-5 above). The Barker Barambah has a total of 161 customers[114].

SunWater has advised that a total of 218 meters were read in 2010 by SunWater staff on a quarterly basis. As highlighted below in Figure 5-23, approximately 34% of the total recorded costs are actual direct labour costs, with the remainder mainly being "Indirects" and "Overheads". Between 2008 and 2010 approximately $14,000 to $16,000 per annum was incurred for labour costs.

In comparison, the Boyne River and Tarong WSS has 172 meters, and only recorded $6,000 "Metering" expense in 2010. Clearly, there is a large variation in metering costs that is correlated to distance travelled per meter, meter access, etc across schemes, and therefore little value in comparing the costs incurred between schemes.

As illustrated in Figure 5-23 below, a substantial negative cost was incurred for Materials, offset by Overheads. Aurecon suspects that this abnormality in cost recording is due most likely to the process of re-categorising historical data (some costs may have been in-correctly coded) particularly for 2007 (subsequently confirmed by SunWater via email dated 30th June 2011).

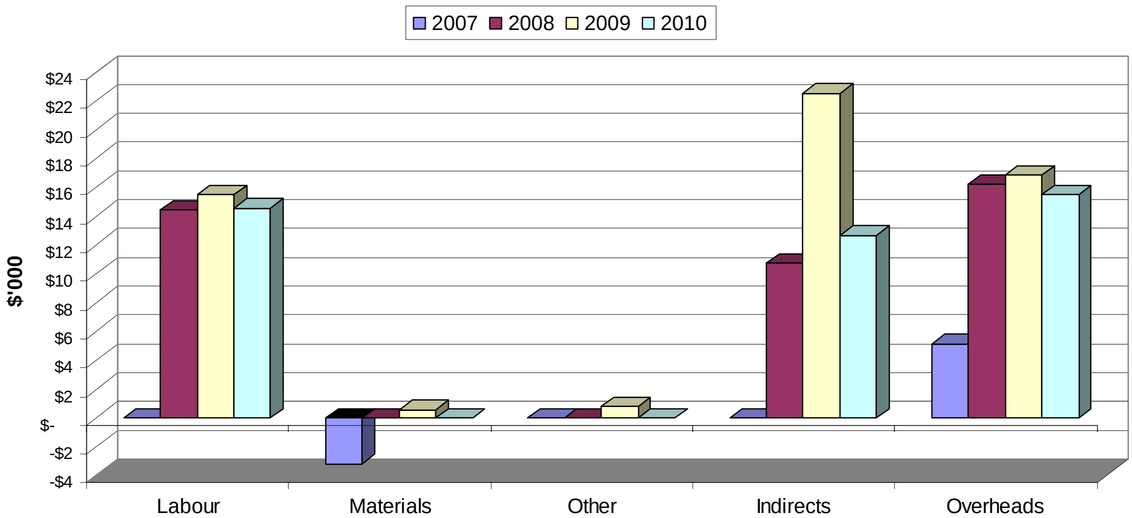

Figure 5-23 Overview of disaggregated "Metering" expenditure for Barker Barambah Bulk WSS[115]

Stakeholders have raised the issue that there are more cost effective strategies to avoid reading these meters each quarter by SunWater staff.

Aurecon notes that "*Customers can also enter their own meter readings into SunWaterOnline to obtain up-to-date information about water use and availability*[116]."

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[114] Source: SunWater *Barker Barambah Bulk WSS NSP*, (2012-2016) January 2011, page 13.

[115] Raw data sourced from SunWater spreadsheet "*Copy of Extract LBC data conversion to sub activity.xls*".

[116] Source: SunWater *Barker Barambah WSS NSP*, (2012-2016) January 2011, page 16.

Aurecon forwarded the following questions to SunWater, and received the following responses[117] and/or with cross referencing to earlier sections of this report:

- The 2007 negative Materials cost a coding error?

"2007 was a transition year in which the previous internal trade model was removed and the new BOM model developed and implemented in 2008. This transition period and changes are causing difficulties in comparability across time"

- Other options for meter reading of sleepers?

See Section 4 which provides SunWater's views regarding meter reading which is common across all schemes

- Incentives/opportunities for users to read and record their own meters on line (mentioned in the NSP that customers can also enter their own meter readings online?).

See Section 4 which provides SunWater's views regarding meter reading which is common across all schemes

- Also seeking information regarding the number of meters installed since 2009, and read in 2010.

"*There were 218 meters read in 2010. One meter has been installed since 2009"*

As indicated above, only one additional meter has been installed since 2009. As indicated within Table 5-5, Metering costs actually decreased by $43,000 in 2010 compared to $56,000 in 2009 possibly indicating that SunWater is identifying substantial labour efficiencies in reading meters (as statutory requirement to read all meters on a quarterly basis).

Facility Management

Facility Management costs are directly related to the maintenance of recreational facilities at Bjelke Petersen dam. See Section 5.4.2 for more details.

Prudency and Efficiency of Operations Expenditure

As highlighted within Table 5-4, direct costs for Operations expenditure has increased from $223,000 in 2007 to $304,000 in 2010 (proposed expenditure for 2011 at $282,000). SunWaterstate that the 2011 costs were estimated based on the average of the preceding 4/5 years, which should therefore equate to $268,000 (based on the information presented within this report).

Sunwater advised that a number of weir safety inspections costs that were previously recorded under Dam Safety, are now incorporated to Preventive Maintenance activity for the forecast price path. Three activities are identified totalling $4,500 (direct labour expense) are most likely to have been reallocated from Dam Safety to Preventive Maintenance (2011-2016) (thereby reducing Dam Safety and Operations costs by $4,500).

The provision of disaggregated historical activity data for "Operations" by SunWater provided substantial insights, and identified substantial activities and issues requiring additional information and explanation from SunWater. As highlighted throughout this section, SunWater has provided responses to additional questions, which in most cases provided valid information.

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[117] SunWater responses are sourced from email dated 30th June 2011.

However, SunWater was not able to provide 2011 cost estimates for the sub-activities, which Aurecon views as critical in verifying the prudency and efficiency of these costs. Aurecon recommends that to verify the prudency and efficiency of 2011 expenditure, the following information and analysis is required:

- that 2011 cost estimates for sub-activities be released and examined to ensure compliance with SunWater's averaging methodology (preceding 4/5 years)
- that cost estimates for metering be examined and projected based on 2010 costs (assuming that it represents improved efficiencies reading meters, as costs are lower than the preceding years)
- that the Dam Safety forecast 2011 costs is reduced by $4,500 to account for the transfer of activities to Preventive Maintenance.

Due to the above data limitations, Aurecon was unable to validate the prudency and efficiency of "Operations" costs.

5.4.8 Preventive Maintenance costs

SunWater has defined "Preventive Maintenance" as activities related to the ongoing operational performance and service capacity of physical assets as close as possible to designed standards. SunWater[118] states that "Preventive Maintenance" is cyclical in nature with a typical interval of 12 months or less, and includes the following key output activities:

- Condition monitoring; the inspection of assets to determine preventive maintenance requirements
- Servicing; planned maintenance activities normally expected to be carried out routinely

A review of SunWater's reporting system also revealed that "Weed Control" was also a key output activity associated with "Preventive Maintenance", to which costs were assigned. As indicated earlier within Figure 5-11 "Weed Control" costs were significant in terms of labour input. Considering that it is a bulk river system, weed control costs would expect to be minimal, with the possible exception of land based weed control around the bulk assets and access roads.

Projected "Preventive Maintenance" costs for the Barker Barambah Bulk WSS are highlighted below in Table 5-6. As a proportion of "Total Operating" costs, "Preventive Maintenance" costs have varied considerably from 10.2% in 2009 to 27.3% in 2007.

Table 5-6. "Preventive Maintenance" costs and "Total Operating" costs for Barker Barambah Bulk WSS

($'000)	Actuals				Forecast	Price path				
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Preventive Maintenance[1]	136	61	83	54	103	104	110	112	111	108
Annual change		-55.1%	36.1%	-34.9%	90.7%	1.0%	5.8%	1.8%	-0.9%	-2.7%
Change since 2007		-55.1%	-39.0%	-60.3%	-24.3%	-23.5%	-19.1%	-17.6%	-18.4%	-20.6%
Total Operating Costs[1]	498	514	815	622	680	691	722	736	728	673

[118] SunWater, *Barker Barambah Bulk WSS NSP,* (2012-2016) January 2011, page 28.

($'000)	Actuals				Forecast	Price path				
Preventive M as % of Total Operating costs	27.3%	11.9%	10.2%	8.7%	15.1%	15.1%	15.2%	15.2%	15.2%	16.0%

[1]*Source: Barker Barambah Bulk WSS NSP,* (2012-2016) January 2011, Page 6.

As indicated earlier, SunWater's deployment of a new Business Operating Model and management accounting system required the retrospective transfer of cost data for 2007 and 2008. A recent review[119] found that costs that should have been coded to refurbishment, were coded as "Preventive Maintenance", resulting in many schemes incurring a spike in "Preventive Maintenance" costs in 2007. As indicated above in Table 5-6 costs for the scheme were up in 2007, and therefore the spike in 2007 costs in Table 5-6 above should be viewed as possibly incorporating additional expense items over and above those for "Preventive Maintenance".

"Preventive Maintenance" costs may be expected to follow water usage to some degree. As indicated below in Figure 5-24 there does not seem to be a consistent correlation between costs and water usage as 2007 recorded only 4% (of 2003 levels) water usage yet "Preventive Maintenance" costs peaked in that year.

However, for 2008 to 2010 annual cost movements followed the movement of water usage.

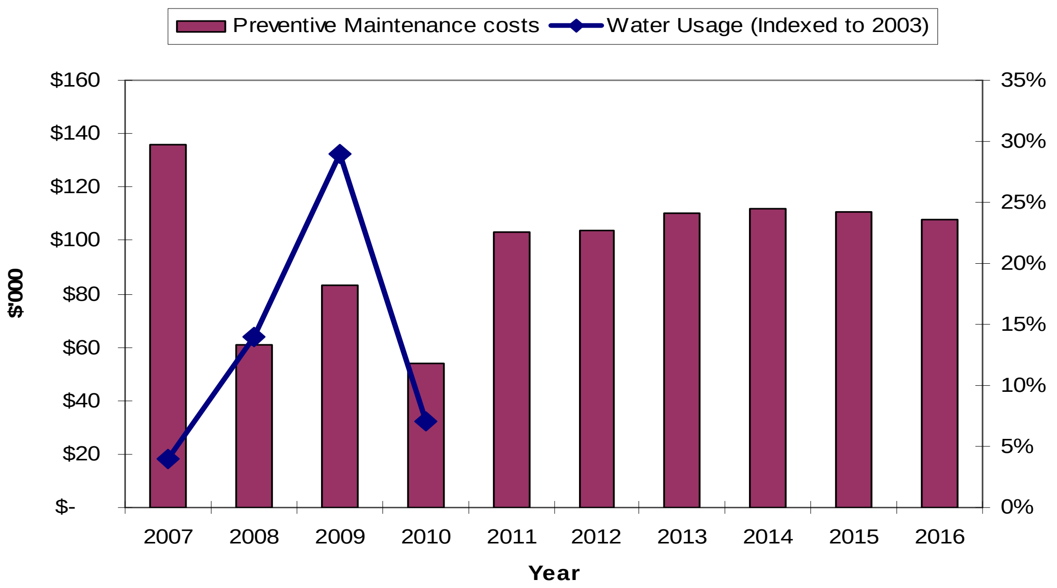

Figure 5-24. Comparison of "Preventive Maintenance" costs against water usage (indexed against 2003) for Barker Barambah Bulk WSS[120]

The following seeks to examine in more detail the components that make up the "Preventive Maintenance" costs presented within Table 5-6 above, and examine (data available) where changes have occurred.

As illustrated below in Figure 5-25, "Overheads" and "Indirects" represents 60% of the projected total cost in 2011. Other significant components are "Labour" at 32.0% (which was examined earlier), and "Materials" at 4.0%. Note that the proposed cost structure for 2011 is used as the basis for 2012 -2016, with costs for each inputs indexed.

[119] Parsons Brinkerhoff, *Provision of Services for Costing SunWater's Work Instructions*, October 2010, page 13.
[120] Raw data sourced from *Barker Barambah WSS NSP, (*2012-2016) January 2011, Pages 7 and 14.

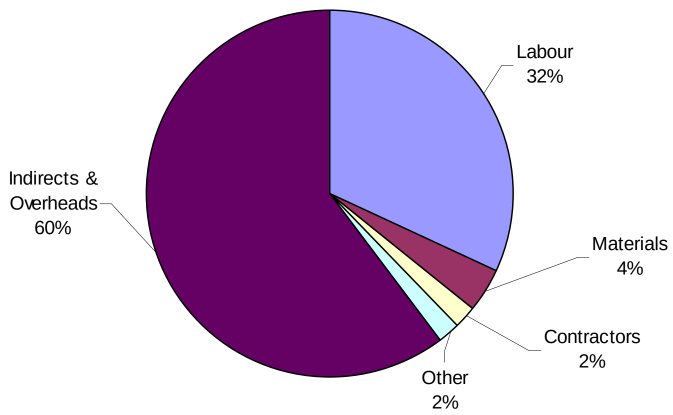

Figure 5-25. Breakdown of cost inputs for "Preventive Maintenance" within Barker Barambah Bulk WSS in 2011[121]

Figure 5-26 below provides a breakdown of the key cost input components for "Preventive Maintenance" between 2007 and 2011.

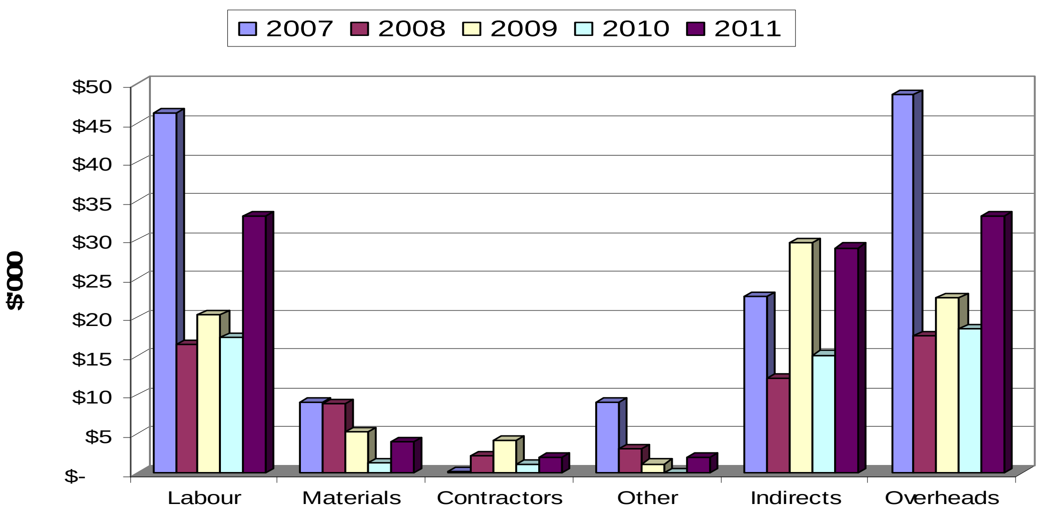

Figure 5-26. Breakdown of cost inputs towards "Preventive Maintenance" for Barker Barambah Bulk WSS 2007 – 2011[122]

As indicated earlier, Aurecon questions the accuracy of the 2007 data as presented above in Figure 5-26. Therefore, more emphasis is placed on actual costs recorded for the 2008 to 2010 period. Note that the 2011 projected cost forms the cost basis for the next price path (2012-2016) (subject to inflation indexation).

As indicated in Figure 5-26 "Overheads" are allocated almost in direct proportion to that of "Labour", while "Indirects" seem to be apportioned on a different basis, but also significant. The scope of this consultancy was to examine the direct costs, which in this case are "Labour", "Materials", "Contractors" and "Other".

Figure 5-26 highlights that SunWater has projected a lower cost going forward (2011) for "Materials" and "Contractors" over the annual average incurred for 2008 to 2011. For the cost

[121] Raw data extracted from SunWater spreadsheet *"IM Central -610.03.PSV.xls"*.
[122] Raw data extracted from SunWater spreadsheets *"IM Central -610.03.PSV.xls"* and *"Extract LBC data Conversion extra activity detail and preventive main split.xls*".

input item “Other”, SunWater projects a cost of $2,000 in 2011 versus the annual average incurred for 2008 to 2010 of $1,500.

Clearly the cost of “Labour” at $33,000 in 2011 is well above that incurred for 2008 to 2010 (average of $18,100). The analysis below seeks to examine the validity of this proposed cost increase.

SunWater also provided the NSP consultants with a breakdown of historical “Preventive Maintenance” costs by output activity, which is defined earlier as “Condition Monitoring”, “Servicing” and “Weed Control”. As indicated below in Figure 5-27, “Servicing” costs were approximately $70,000 in 2007 only, but have since incurred expenses of less than $3,000 per annum. As noted earlier, the retrospective transfer of cost data for 2007 into the new business model incorrectly coded many activities.

As a bulk river system, “Weed Control” would be related to on-land weed control activities, particularly around the storage structures (Bjelke Petersen Dam, Joe Sippel Weir and Silverleaf Weir) and access roads. As indicated below in Figure 5-27 “Weed Control” costs have varied from approximately $15,000 (2010) to $33,000 (2009).

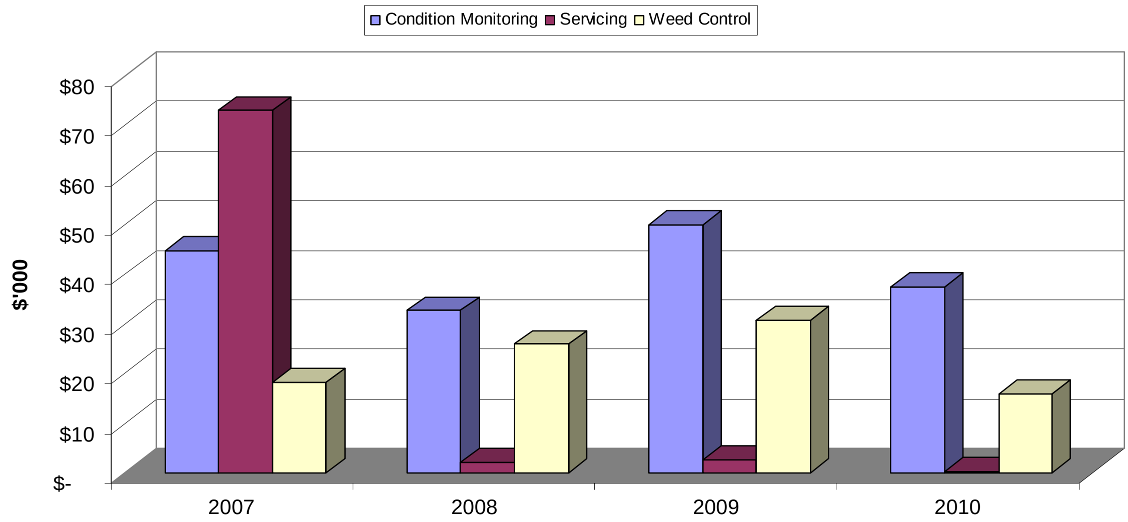

Figure 5-27. Breakdown of output activities under “Preventive Maintenance” for Barker Barambah Bulk WSS[123]

Aurecon notes that “”Labour” is the main direct cost within “Weed Control”, and in 2010 was $5,000 in total. Between 2007 and 2010, “Labour” costs for “Weed Control” has varied between $4,000 and $8,000 per annum, averaging $6,000 per annum (Figure 5-28).

123 Raw data extracted from SunWater spreadsheet *“Extract LBC data Conversion extra activity detail and preventive main split.xls*”.

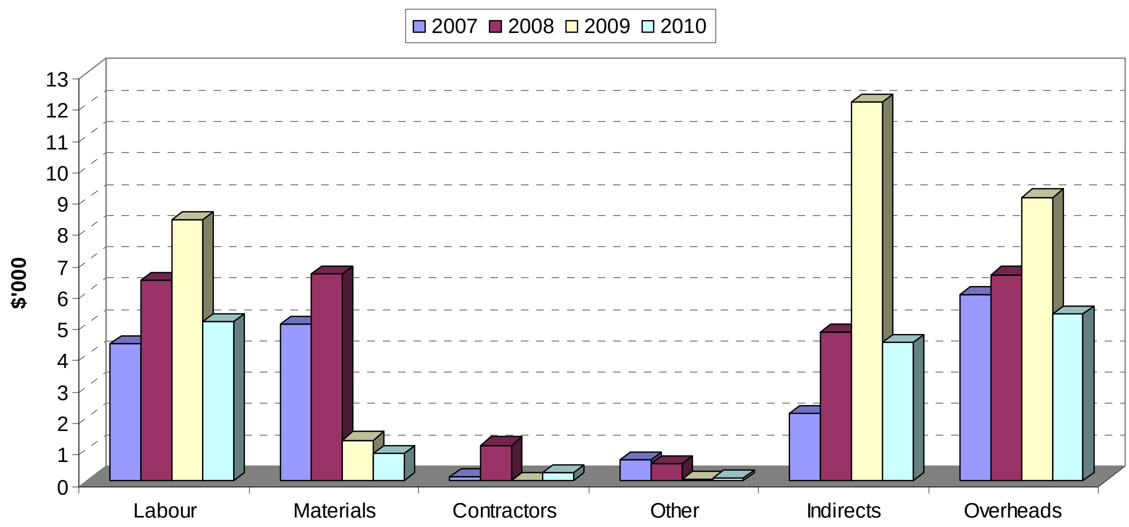

Figure 5-28. Breakdown of input costs towards "Weed Control" for Barker Barambah Bulk WSS 2007-2010[124]

Unfortunately SunWater has not provided a breakdown of costs for 2011 onwards by output activity as illustrated above in Figure 5-25.

Validating the forecast Preventive Maintenance costs for 2011-2016

As indicated earlier within Table 5-6, forecast "Preventive Maintenance" costs for 2011 is $103,000, of which 32% (Figure 5-25) or $33,000 is in "Labour" costs. The following analysis seeks to examine the prudency and efficiency of the proposed $33,000 "Labour" expense in 2011.

SunWater has developed Operation and Maintenance manuals for the scheme, which details the maintenance activities to be undertaken for "Condition Monitoring" and "Servicing", along with frequency. A recent review by Parsons Brinkerhoff (2010A) examined each of the individual activities specified within SunWater's Operation and Maintenance manual for the Barker Barambah WSS, and validated the proposed activities and frequency prescribed. The Parsons Brinkerhoff (2010A) report also quantified the required man hours input required for each activity along with cost based on SunWater's internal hourly rates.

Of importance is the fact that the Parsons Brinkerhoff (2010A) study identified the following new activities that were not previously listed as "Preventive Maintenance" activities (but recorded under "Dam Safety", "Operations") for the Barker Barambah Bulk WSS (Table 5-7).

Table 5-7. New "Preventive Maintenance" activities not previous recorded within the system for Barker Barambah Bulk WSS

Activity	Annual Hours	Labour cost
Bjelke Petersen Dam - Monthly Dam Safety Inspection	40	$ 1,480
Silverleaf - Monthly Weir Safety Inspection	40	$ 1,480
Joe Sippel - Monthly Weir Safety Inspection	40	$ 1,480
Barker/Barambah Gauging Stations 12M Condition Monitoring	64	$ 2,368
TOTAL New Activities	**184 hrs**	**$6,808**

Source: Parsons Brinkerhoff, "Provision of Services for Costing SunWater's Work Instructions" (2010A), working appendices Spreadsheets.

[124] Raw data extracted from SunWater spreadsheet *"Extract LBC data Conversion extra activity detail and preventive main split.xls*".

Aurecon notes that the Parsons Brinkerhoff (2010A) report identified the need for monthly inspections for both the Silverleaf and Joe Sippel Weirs (Table 5-7), yet also notes that within "Operations", a cost allocation of approximately $50,000 was incurred in 2009 and 2010 under "Dam Safety". SunWater has confirmed that these activities were previously recorded under Dam Safety, but for the forecast price path have been transferred to "Preventive Maintenance".

Table 5-8 highlights the key findings from the Parsons Brinkerhoff (2010A) study.

Table 5-8. Required labour input for "Preventive Maintenance" for Barker Barambah Bulk WSS

Year	Hours	Direct annual labour cost	% of 2011 hours
2007	486*	$26,887	89%
2008	275	$9,130	50%
2009	302	$11,226	55%
2010	324	$12,046	59%
Average 2007 - 2010	346	$14,822	63%
Proposed for 2011	**546**	$30,019	

Source: Parsons Brinkerhoff, "Provision of Services for Costing SunWater's Work Instructions" (2010A), working appendices Spreadsheets
*May include substantial error due to retro-fitting of historical data into the new business model

According to the Parsons Brinkerhoff (2010A) report, to complete all the prescribed and required "Preventive Maintenance" activities ("Condition Monitoring" and "Servicing" only, ignoring "Weed Control") requires an annual input of 546 hours or a direct annual labour cost of $30,019 (Table 5-8). This includes the 184 hours of new activities highlighted above in Table 5-7.

As indicated above within Table 5-8, SunWater has incurred between 275 and 486 hours of labour input between 2008 and 2010, with 2009 and 2010 incurring approximately 300 hours each. Aurecon's view for required labour input budgeted for "Preventive Maintenance" ("Condition Monitoring" and "Servicing") is as follows:

- 324 hours, being the hours actually invested in 2010, plus
- 184 hours for additional activities (see Table 5-7)

The sum total being 530 hours. This is comparable to the 546 hours recommended by the Parsons Brinkerhoff study for 2011, and therefore Aurecon recommends that that a ceiling of 546 hours of labour input is set for the scheme. Costing "Preventive Maintenance" labour at $45 per hour[125], then the labour cost for 546 hours is $23,850 per annum. Note that SunWater incurred hourly labour cost was $37.18 in 2010, and Parsons Brinkerhoff analysis equates to an average hourly charge of $54.97 per hour (although Parsons Brinkerhoff undertook an extensive investigation itemising each activity and the required staff increment level), possibly indicating that SunWater has previously utilised staff at lower salary/technical increment levels to undertake the majority of tasks.

Costing of labour input towards "Weed Control" is also required. The following labour expense for Weed Control was identified[126]:

- $4,000 in 2007
- $6,000 in 2008

[125] Based on using the latest financial cost incurred, ie. 2010 data in Table 5-7, dividing total labour cost of $12,046 by total hours of 324 equals $37.18/hr, allowing minor allowance for higher level staff and rounding up to $45.00hr. Aurecon note that the Parsons Brinkerhoff (2010) analysis recommended 546 hrs for an annual labour cost of $30,019, equating to $55.00/hr. The difference between the hourly labour expense incurred for 2010, versus the projected hourly rate by Parsons Brinkerhoff (2010) is most likely due to assumptions of using more senior SunWater staff at higher pay/cost increment.

[126] Raw data sourced from SunWater spreadsheet "*Copy of Extract LBC data conversion to sub activity.xls*".

- $8,000 in 2009
- $5,000 in 2010

The annual average for 2007 to 2010 is $6,000, and Aurecon suggests that an allowance of 10% is added to this, equating to $6,600.

Aurecon's desktop analysis would suggest that a prudent and efficient level of expenditure for "Preventive Maintenance" labour be $30,450 ($23,850 for "Condition Monitoring" and "Servicing" and $6,600 for "Weed Control"). As SunWater has forecast $33,000 in Labour expenses (less than 10% variance from Aurecon's calculation[127]), Aurecon views that SunWater's proposed direct costs of "Preventive Maintenance" as prudent and efficient.

5.4.9 Corrective Maintenance costs

SunWater describess "Corrective Maintenance" as an unexpected failure requiring reactive corrective maintenance response. Two main types of activities:

- Emergency breakdown maintenance, requiring immediate action to restore normal operation or supply to customer to meet a regulatory obligation
- Non-emergency maintenance, activities no requiring immediate response but scheduled in advance of the planned maintenance cycle.[128]

Projected "Corrective Maintenance" costs (including both emergency and non-emergency maintenance) for the Barker Barambah Bulk WSS are highlighted below in Table 5-9. As a proportion of "Total Operating" costs, "Corrective Maintenance" costs have varied from 2.8% in 2007 to 12.6% in 2008.

Table 5-9. "Corrective Maintenance" costs and "Total Operating" costs for Barker Barambah Bulk WSS

($'000)	Actuals				Forecast	Price path				
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Corrective Maintenance[1]	14	65	54	48	48	48	51	52	51	50
Annual change		364.3%	-16.9%	-11.1%	0.0%	0.0%	6.3%	2.0%	-1.9%	-2.0%
Change since 2007		364.3%	285.7%	242.9%	242.9%	242.9%	264.3%	271.4%	264.3%	257.1%
Total Operating Costs	498	514	815	622	680	691	722	736	728	673
Corrective M as % of Total Operating costs	2.8%	12.6%	6.6%	7.7%	7.1%	7.0%	7.1%	7.1%	7.0%	7.4%

[1]*Source: Barker Barambah WSS NSP,* (2012-2016) January 2011, Page 6.

Aurecon notes that costs in 2007 (Table 5-9 above) were substantially less than the subsequent 3 years. As indicated earlier, SunWater's deployment of a new Business Operating Model and management accounting system required the retrospective transfer of cost data for 2007 and 2008. A recent review[129] found that costs that should have been coded to refurbishment, were coded as "Preventive Maintenance", resulting in many schemes including Barker Barambah incurred a spike in "Preventive Maintenance" costs in 2007. There

[127] The variance in costs likely to be attributed to SunWater accepting the higher hourly charges recommended by the Parsons Brinkerhoff (2010A) study. As with other schemes Aurecon supports an audit of the 2010 labour input to identify the discrepancy in hourly charges in 2010 against the recommended 2011 rates, however notes that the administrative costs in doing so may out weight the identification of efficiencies ($2,550).

[128] SunWater, *Barker Barambah WSS NSP,* (2012-2016) January 2011, Page 29.

[129] Parsons Brinkerhoff (2010A), *Provision of Services for Costing SunWater's Work Instructions*, October 2010, page 13.

is a strong possibility that some activity costs for 2007 recorded for “Preventive Maintenance”, may actually have been “Corrective Maintenance”, and therefore the accuracy of the 2007 value is questionable.

For some schemes “Corrective Maintenance” costs have followed water usage levels. As indicated below in Figure 5-29 there does not seem to be a strong correlation between water usage and costs. Note that the recorded water usage rates for 2007 to 2010 in Figure 5-29 below are for very low deliveries of water.

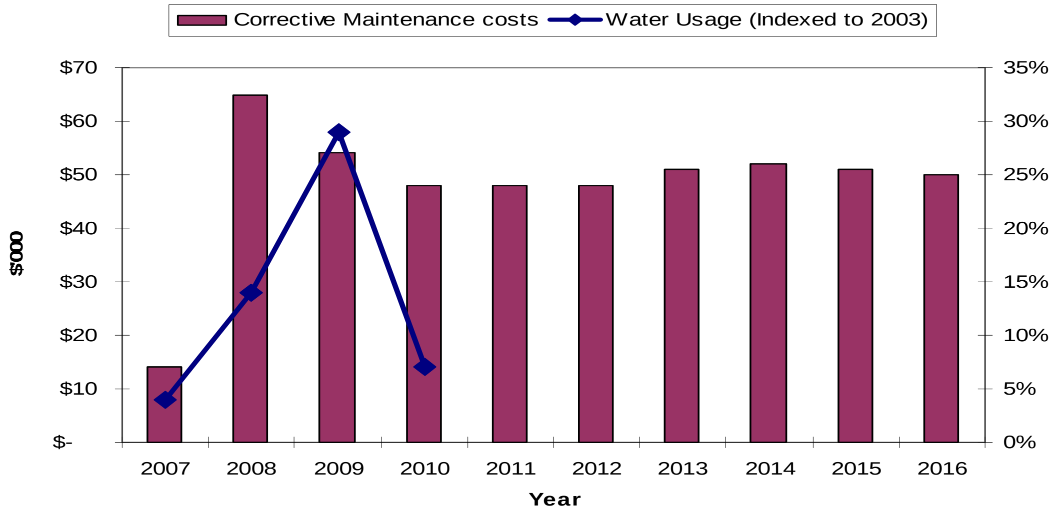

Figure 5-2928. Comparison of “Corrective Maintenance” costs against water usage (indexed against 2003) for Barker Barambah Bulk WSS[130]

The following sections seeks to examine in more detail the components that make up the “Corrective Maintenance” costs presented within Table 5-9 above, and examine in detail where data is available and where changes have occurred.

As illustrated below in Figure 5-30, “Overheads” and “Indirects” represents half of the projected total cost in 2011. Other significant components are “Labour” at 27.0%, “Materials” at 10.4%, “Contractors” and “Other” both at 6.3% each.

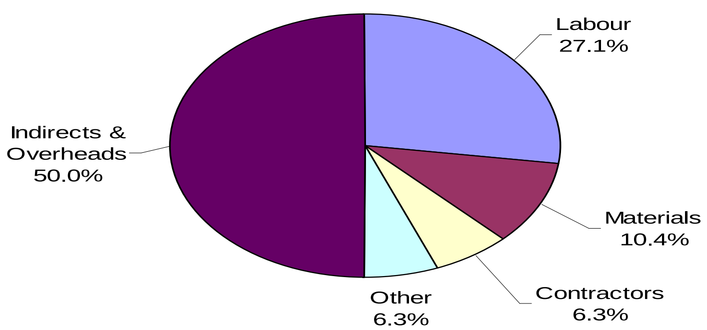

Figure 5-30. Breakdown of cost inputs towards “Corrective Maintenance” for Barker Barambah Bulk WSS in 2011[131]

Figure 5-31 below provides a breakdown of the key input cost components for “Corrective Maintenance” between 2007 and 2011.

[130] Raw data sourced from *Barker Barambah WSS NSP, (*2012-2016) January 2011, Pages 6 and 14.
[131] Raw data extracted from SunWater spreadsheet *“IM Central -610.03.PSV.xls”.*

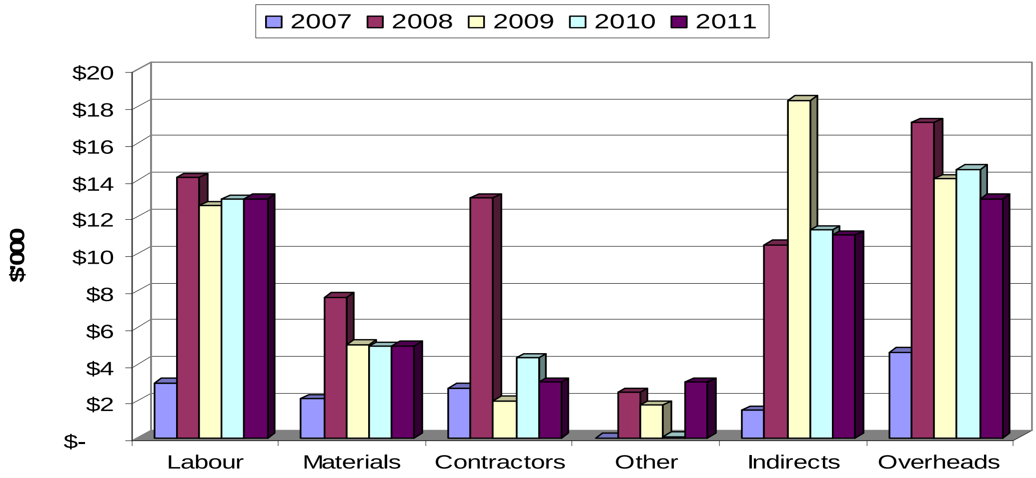

Figure 5-31. Breakdown of cost inputs towards "Corrective Maintenance" for Barker Barambah Bulk WSS 2007 – 2011[132]

As indicated earlier, Aurecon questions the accuracy of the 2007 data as presented above in Figure 5-31 and therefore only refers to the historical data presented for 2008 to 2010. Note that the 2011 projected cost forms the cost basis for the next price path (subject to inflation indexation).

Aurecon queried if the 2007 data is grossly under-reported due to the coding of historical data into the new business model? SunWater confirmed this within its reply[133] stating that:

"2007 was a transition year in which the previous internal trade model was removed and the new BOM model developed and implemented in 2008. This transition period and changes are causing difficulties in comparability across time

The overall service contract costs should be correct but the individual activity costs varied."

The scope of this consultancy was to examine the direct costs, which in this case are "Labour", "Materials", "Contractors" and "Other". As indicated in Figure 5-31, "Labour" is clearly the main direct cost for 2008-2011 at $12,000 to $14,000 per annum. Note that for 2011, SunWater has forecast "Labour" costs at $13,000, which is in line with the average cost incurred between 2008 and 2010 of $13,200.

Similarly, "Materials" are projected at $5,000 for 2011, whereas the average cost incurred for 2008 to 2010 has been $6,000.

There was a one-off spike in "Contractor" costs in 2008 of over $12,000, but for the past 3 years Contractor costs vary from $2,000 to $4,000 per annum. "Contractor" costs are projected at $3,000 in 2011, versus the average of $6,500 incurred for 2008 to 2010.

SunWater is projecting "Other" costs to be $3,000 in 2011, which is double the annual average of $1,400 for 2008 to 2010. Aurecon notes that the majority of this is for Heavy Plant (under Plant Equipment and Vehicles).

Aurecon notes that it is difficult to forecast "Corrective Maintenance" costs. SunWater's approach to use historical expenditure as the basis for forecasting is commonly utilised by other water utilities. Ignoring the cost recorded for 2007, then the annual average direct cost incurred between 2008 and 2010 is $27,000. For the forecast period starting at 2011, SunWater projects "Corrective Maintenance" direct costs at $24,000. From the review of historical cost inputs, and assuming that activities to date have been correctly implemented

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[132] Raw data extracted from SunWater spreadsheets *"Extract LBC data Conversion extra activity detail and preventive main split.xls"* and *"IM Central -610.03.PSV.xls".*
[133] SunWater email dated 30th June 2011.

and captured[134], Aurecon views proposed “Corrective Maintenance” costs as prudent and efficient.

Total Maintenance expenditure

SunWater has indicated its intention to move to a reliability maintenance approach (RCM), which is a rick based process that can assist in providing the optimal mix of “Preventive” and “Corrective Maintenance”. Table 5-10 below highlights the direct costs attributed to “Corrective” and “Preventive Maintenance”, and also indicates that “Total Maintenance” costs in 2011 are 12.0% lower than that recorded for 2007. As previously indicated, concerns have been raised regarding the accuracy of the data for both “Preventive” and “Corrective” Maintenance in 2007.

Table 5-10. “Total Maintenance” costs for Barker Barambah Bulk WSS

Direct Expenditure ($’000)	Actuals				Forecast	Price Path				
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Preventive Maintenance	65	31	31	20	41	43	44	46	47	48
Corrective Maintenance	8	37	21	22	23	24	25	25	26	27
Total Maintenance	**73**	**68**	**53**	**42**	**64**	**66**	**69**	**71**	**73**	**75**
Annual change		-6.2%	-22.8%	-19.3%	50.6%	4.0%	4.0%	2.9%	2.9%	2.9%
Change since 2007		-6.2%	-27.6%	-41.6%	-12.0%	-8.5%	-4.9%	-2.1%	0.7%	3.7%
Preventive maintenance %	89.3%	45.2%	59.2%	47.3%	64.3%	64.3%	64.3%	64.2%	64.1%	64.0%
Corrective maintenance %	10.7%	54.8%	40.8%	52.7%	35.7%	35.7%	35.7%	35.8%	35.9%	36.0%

[1]Source: Raw data extracted from SunWater spreadsheets *“IM Central -610.03.PSV.xls”* and *“Extract LBC data Conversion extra activity detail and preventive main split.xls*”.

Although not stated at this time, it is highly likely that SunWater will identify an optimal ratio of (Preventive: Corrective) maintenance expenditure based on the RCM approach, which may be different to the 64%:36% projected above.

5.4.10 Scheme specific issues

QCA has requested that Aurecon investigate the implications imposed on irrigators from the potential conversion of 2,000ML of Medium priority WAE to High priority. An analysis has been undertaken using SunWater’s proposed new allocation methodology for operational expenditure (1:1 on WAE basis). It should be noted that SunWater also proposes changes to the allocation methodology of renewal expenditure resulting in a higher proportional been allocated to High priority, which partially offsets the higher Operational cost allocation to Medium priority [135].

Aurecon has e been advised that the conversion ratios for both schemes are confidential. Notwithstanding, based on discussion with various stakeholders regarding schemes across

[134] Note that Aurecon was not able to audit or validate each “Corrective Maintenance” activity incurred within the scope of this study.
[135] Further details of SunWater’s calculations and assumptions is provided within its paper (Feb 2010) QCA review of irrigation prices, Supplementary submission, Bulk water price differentiation, Pages 6-11.

the state, Aurecon has e adopted the use of two conversion ratios (Medium:High of 3:1 and 2:1) for this analysis.

For the Barker Barambah Bulk scheme, Operating Costs for 2011 are proposed at $680,000, of which there are 161 customers comprising 32,079 ML of Medium priority WAE and 2,236 ML of High priority WAE[136], indicating a total of 34,315 ML of WAE[137].

Table 5-11. Operating cost implications per NML of converting Medium priority WAE within the Barker Barambah Bulk WSS

	Change in WAE	Post Conversion Balance WAE	Operating cost per ML[1]
Currently			
Medium Priority	-	32,079 ML	
High Priority	-	2,236 ML	
Total WAE		34,315 ML	$20.14[2]
Conversion 2:1			
Medium Priority	- 2000 ML	30,079 ML	
High Priority	+ 1000 ML	3,236 ML	
Total WAE		33,315 ML	$20.41[3]
Conversion 3:1			
Medium Priority	- 2000 ML	30,079 ML	
High Priority	+ 667 ML	2,903 ML	
Total WAE		32,982 ML	$20.62[4]

[1]Note that the Operating cost per ML is the same for Medium, as it is for High, under the proposed 1:1 WAE cost allocation methodology.
[2]Note that this was calculated by dividing the proposed scheme Operating cost of $680,000 by 34,315 ML of WAE (ignoring possibly other allocations including free water).
[3]Note that this was calculated by dividing the proposed scheme Operating cost of $680,000 by 33,315 ML of WAE (ignoring possibly other allocations including free water).
[4]Note that this was calculated by dividing the proposed scheme Operating cost of $680,000 by 32,982 ML of WAE (ignoring possibly other allocations including free water).

As highlighted by Table 5-11 above, there will be a modest annual financial cost for irrigators if 2000 ML Medium priority WAE is converted under 2:1 conversion rate, increasing Operating Costs per WAE from $20.14 per ML to $20.41 per ML, an increase of 1.3%. However, of greater interest are the financial benefits for the party converting the allocation, as highlighted below in Table 5-12.

Table 5-12. Annual costs for the hypothetical owner of 2000 ML of medium priority water

	Pre conversion (Medium WAE)	Post Conversion at 2:1 (High WAE)	Post Conversion at 3:1 (High WAE)
Currently			
WAE allocation	2000 ML	1,000 ML	667 ML
Operating cost allocation per ML[1]	$19.82	$20.41	$20.62
Total annual Operational cost exposure	$39,640	$20,410	$13,753

[1]As calculated above in Table 5-11.

[136] *Barker Barambah Bulk WSS NSP,* (2012-2016) January 2011, Pages 7 & 13.
[137] Note that it does not include any free allocations that may exist.

The hypothetical customer that is able to covert 2000 ML of Medium priority WAE to High priority WAE at a ratio of 2:1 is able to reduce his annual exposure to Operating Costs from $39,640 to $20,410[138].

Hence, this produces a market signal for Medium priority WAE holders to convert to High Priority which is more likely to be pursued by high cost irrigators including horticulturists.

5.4.11 Feedback from field visits

Aurecon did not undertake a field visit to the Barker Barambah Bulk WSS. However, the substantially stakeholder feedback obtained from the Bundaberg and Lower Mary field visits regarding the NSPs are also relevant to this scheme.

5.4.12 Potential efficiency gains and recommendations

The following points are made in relation to Opex:

- On-going re-structuring of the SunWater workforce (and equipment) for the Central region, involving regional office relocations and restructuring of both administrative and operational staff is occurring. However, it was difficult to observe where any of these cost savings emerge.
- "Operations" is a main cost. Aurecon has submitted a substantial number of questions to SunWater seeking additional information and transaction clarity, and received responses. However, Aurecon has insufficient information to review the prudency and efficiency of forecast expenditure. Aurecon recommends that the 2011 forecasts for Operations sub-activities be examined (and supporting calculations), with particular attention paid to forecast Metering and Dam Safety cost estimates. Aurecon notes that total Operations expenditure is approximately 7% higher than the average of the preceding 4 years (and also accounting for the transfer of $4,500 costs from "Dam Safety" to "Preventive Maintenance")
- Aurecon views that direct costs for "Preventive Maintenance" are prudent and efficient based on the analysis undertaken examining "Labour" costs. A possible reduction in costs of less than $3,000 may be possible auditing 2010 activities, but the costs involved would out weight any savings achieved.
- Based on the historical data provided by SunWater, and comparative analysis of historical expenses against forecast costs for 2011 (2012 to 2016), Aurecon views proposed "Corrective Maintenance" direct costs for the scheme as being prudent and efficient.

5.5 Capital costs review

SunWater has developed a rolling renewal annuity program that runs for a forecast 25 year period. The forecast for the initial 5 year period is based on a detailed assessment of asset condition and risk of failure, whilst forecasts beyond 5 years are based on broader estimates of asset life using engineering estimates and standard replacement rules[139].

SunWater also state that: *Renewals expenditure refers to works intended to maintain the ongoing performance and service capacity of the assets or, if this is no longer possible or economical, to replace the asset with a modern equivalent*. (SunWater, *Barker Barambah Bulk WSS NSP*, page 31).

In relation to the Barker Barambah Bulk WSS, renewal expenditure is limited to

[138] Note that changes in the renewal cost allocation methodology will expose him to higher renewal costs on a per ML (WAE) basis, but is likely to still be in a more favourable financial position.
[139] SunWater, *Barker Barambah Bulk WSS NSP*, (2012-2016) January 2011, Page 30.

- Bjelke Petersen Dam
- Joe Sippel Weir
- Silverleaf Weir
- Redgate Diversion Pipeline
- Upper Redgate Relift

The following section provides an overview of renewal expenditure for the current price path (2007-2011) and forecast price path (2012-2016).

5.5.1 Review of historical renewal expenditure

Over the current price path period (2007 – 2011) annual renewals expenditure as presented by the NSP has been between $124,000 and $185,000 (Table 5-13). The sum total expenditure over this period is $787,000, for a mean annual average of $157,400.

Table 5-13. Historical renewals expenditure for Barker Barambah Bulk WSS

nominal dollars $'000	Financial Year					
	2007	2008	2009	2010	2011	Sum total 2007-2011
Actual renewal spent[1]	144	185	124	161	173	787
LBC target expenditure[2]	190	107	94	66	105	55
Difference ($'000)	-46	78	30	95	68	225
Difference (%) from LBC target	-24.2%	72.9%	31.9%	143.9%	64.8%	40.0%

[1]Source: *Barker Barambah Bulk WSS NSP,* (2012-2016) January 2011, Page 6.
[2]Source: SunWater spreadsheet, *"Compare R&E Spend to Annuity 2007_2011.xls".*

Of concern has been the substantial variation between Actual renewal spent and LBC target expenditure. As noted above in Table 5-13, for the years 2008 to 2011 the actual spent has exceeded the LBC target by a substantial amount, and for the entire price path (2007-2011) actual spend has exceeded the LBC target by 40%.

Due to the very nature of the assets, it is very unlikely that an asset management plan will ever have the capacity to predict all possible renewal expenses in advance, particularly as you go further out in time.

SunWater was not been able to provide a detailed list of renewals projects that it intended to deliver over the current price path 2007 to 2011 (that would have formulated the LBC target expenditure). SunWater did provide an Excel database containing breakdown of historical renewals expenditure for the period 2007 to 2011 (actual expenditures up until 15th February 2011) for all projects greater than $10,000 in value (Table 5-12 below). However, there were a number of limitations to the database including:

- No indication of the Board approved budget for all projects in 2007
- Additional columns of "Revised Budget", and "Approved" along with "Board Budget" for 2008, 2009, 2010. In most cases, The amount recorded for an activity under "Revised Budget" equalled "Approved", and also "Yearly Total" (actual spend for that year). Highlighted the dynamic nature of the project budget management as the scope of works/activities changed
- Totals include Indirect and Overhead costs, and any proposed changes in allocation methods will impact renewal activity costs

- Many projects would run over several financial years, in which Board Approved budget only appeared in the first year, and not subsequent. Difficultly linking activities across years, due to the nature of the database provided
- The summation of annual totals within the database, did not equate with stated renewals expenditure for the scheme (see Table 5-15 below).

Table 5-14. Itemised historic renewals expenditure for Barker Barambah Bulk WSS

Description	Start Date	Year	Spent	Status
Upper Redgate Road and Signage Mtce	1/07/2006	2007	$7,450	Closed
Joe Sipple Weir Inspection	1/07/2006	2007	$8,395	Closed
Silverleaf Weir Inspection	1/07/2006	2007	$10,231	Closed
Replace 6 Air Valves on the Redgate Pipeline	13/02/2007	2007	$14,343	Closed
BBA Meter Replacement	1/07/2006	2007	$35,723	Closed
TOTAL for 2007			**$76,142**	
Silverleaf Weir: Study into installation of walkway & Screens on outlet structure	-	2008	$2,362	Closed
Upper Redgate: Replace Electrical controls & Cabling	-	2008	$35,179	Closed
BP Dam: Study: Dam 5 yearly dam safety inspection	-	2008	$54,391	Closed
TOTAL for 2008			**$91,932**	
Bjelke-Petersen Dam CRA Revision	1/06/2009	2009	$10,512	Closed
Replace Deteriorated Timber Items (as per 2006 Comp. Insp. Report 6.4a, 6.4b) - Silverleaf Weir	1/10/2008	2009	$11,085	Practical
Replace Discharge Valve - Joe Sippel Weir	1/03/2009	2009	$14,702	Closed
Design Reconfiguration of Inlet Screen (Drafting Documentation and Costing) - Outlet Works - Silverleaf Weir	1/09/2008	2009	$17,459	Deferred
Repair to Redgate diversion pipeline	7/05/2009	2009	$18,016	Closed
Repair Left Embankment Toe and Reinstate Rock Mattress - Joe Sippel Weir	1/10/2008	2009	$20,779	Practical
TOTAL for 2009			**$92,553**	
2010/11 - Headworks Project Planning and Scoping	1/04/2010	2010	$ -	Released
Construct Washdown Bay - BP Dam Compound	1/02/2010	2010	$1,454	Closed
Peer Review Comprehensive Risk Assessment - Bjelke-Petersen Dam	1/05/2010	2010	$28,357	WIP
Install Handrail to Outlet Valve - Joe Sippel Weir	1/10/2009	2010	$4,444	WIP
Repair Concrete Works - Silverleaf Weir (as per 2006 Insp Rep Rec 6.1a, 6.4c & 6.4d)	1/04/2010	2010	$50,889	WIP
Modify Stairway to Float Well - Gauging Stations - Barambah at Ficks Crossing & Stonelands	1/09/2009	2010	$39,281	Financial
Options Analysis for Long-term Weir Maintenance/Replace Strategy - Silverleaf Weir	1/02/2010	2010	$30,936	WIP

Description	Start Date	Year	Spent	Status
TOTAL for 2010			**$155,361**	
Conduct 10 Yearly Crane Inspection - Hydraulic Winch - Inlet Tower - Bjelke Petersen Dam	1/07/2010	2011	$7,917	WIP
Conduct 10 Yearly Crane Inspection - 3.2T Hoist on Inlet Tower - Bjelke Petersen Dam	1/07/2010	2011	$8,329	WIP
Conduct 10 Yearly Winch Inspection - Upper Redgate Pump Station	1/07/2010	2011	$8,855	WIP
SUPPLY / INSTALL SAFETY BUOYS	9/09/2010	2011	$22,629	Released
Conduct 10 Yearly Crane Inspection - Monorail Hoist - Bjelke Petersen Dam	1/07/2010	2011	$29,405	WIP
TOTAL for 2010 up until 15th Feb 2011			**$77,135**	

Source: SunWater spreadsheet "*2007-2011 PROJECTS.xls*"

Of the renewal expense items listed above in Table 5-14 for 2010, the following observations are made from the desktop review of data:

- 1 project did not have a Board approved budget, amounting to $28,357 in expenditure for that year (Peer review Comprehensive Risk Assessment)
- 1 project exceeded Board Approved Budget by a substantial amount, with Board budget amounting to $38,055, while actual expenditure totalled $50,889
- remaining 5 projects (which incurred actual expenditure) were underspend (however a number were incomplete in that year, recorded as Work In Progress (WIP)

Aurecon notes that there are differences between the stated annual renewal expenditure stated within the NSP, and the annual totals calculated by Aurecon based on the itemised database provided by SunWater as highlighted in Table 5 -15 below. Aurecon notes that the discrepancy may possibly be due to one or more of the following:

- A significant amount of renewal projects were below $10,000 in value. Note that the consultants requested expenditure items valued at only $10,000 and above
- Additional adjustments and renewal transactions are allocated.

Table 5-105. Difference between itemised renewals expenditure and NSP totals for Barker Barambah Bulk WSS

Year	NSP stated expenditure[1] (A)	Itemised expenditure (Table 5-10) (B)	Difference ($) (B-A)	Difference (%) (B-A)
2007	$144,000	$76,142	-$67,858	-47.1%
2008	$185,000	$103,073	-$81,927	-44.3%
2009	$124,000	$92,553	-$31,447	-25.4%
2010	$161,000	$155,361	-$5,639	-3.5%
2011	$173,000	$77,135*	-$95,865	-55.4%

[1]Source: *Barker Barambah Bulk WSS NSP,* (2012-2016) January 2011, Page 6
*Progressive total up till 15th February 2011

5.5.2 Forecast renewals expenditure

As indicated within the NSP, there are significant renewal expenditures proposed for the Barker Barambah Bulk WSS (particularly in 2012), and that there is considerable variance in proposed annual expenditures (Figure 5-32).

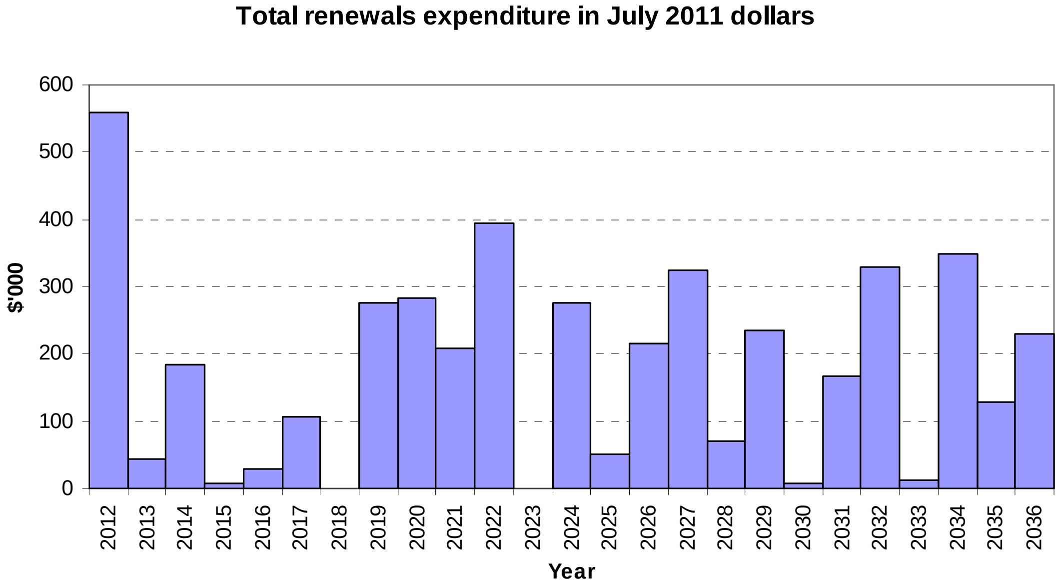

Figure 5-3229. Proposed annual renewals expenditure for Barker Barambah Bulk WSS 2012 to 2036[140]

A total of $367,000 is proposed for the Silverleaf Weir in 2012 (Table 5-16), predominantly for the manufacture/installation of the inlet structure, but also includes refurbishment of rock pitching, and costs for a 5 year Dam Comprehensive Inspection.

The summary total renewals expenditure for 2012 to 2016 is $818,000, or an annual average of $163,600 (compared to the annual average of $157,400 for the 2007 to 2011 period).

Table 5-16. Forecast renewals expenditure for Barker Barambah Bulk WSS 2012 to 2016

Real dollars, $'000	Financial year				
	2012	2013	2014	2015	2016
Barker Barambah River Dist	103				
Bjelke-Petersen Dam	77		184	6	14
Joe Sippel Weir	12				
Redgate Diversion Pipeline					12
Silverleaf Weir	367	42			
Upper Redgate Pump Station					2
Cost estimate for renewals program	**558**	**42**	**184**	**6**	**28**

[1]Source: *Barker Barambah Bulk WSS NSP,* (2012-2016) January 2011, Page 31.

Although the vast majority of expenses highlighted above in Table 5-16 relate to the refurbishment/ overhaul/replacement of assets, there also are significant costs associated with auditing including a cost of $105,000 in 2014 for a 5 year comprehensive Inspection of the Bjelke Petersen Dam.

[140] Raw data extracted from SunWater spreadsheet "*NSP Projects Central V4.xls*".

Table 5-17 below provides detailed description of proposed renewal expenditures for 2012 to 2016.

Table 5-17. Detailed review of forecast renewals expenditure for Barker Barambah Bulk WSS 2012 to 2016

ID No.	Year	SunWater Description	Cost per activity ($'000)
Barker Barambah River Distribution			
F1	2012 & 15 yearly thereafter	Replace Gstn Recorder	34
F2	2012 & 15 yearly thereafter	Replace Recorder	69
Bjelke-Petersen Dam			
F3	2012	Reform access road to D/S Wall	34
F4	2016 & 10 yearly thereafter	5Y Crane Inspection - as per AS2550	9
F5	2014	Construct earth drain - D/S Rec 3.2(a)	20
F6	2014	Construct earth drain - D/S Rec. 6.2a	22
F7	2012	Localised patching of Concrete - 2010D/S	8
F8	2015	Refurbish Hydraulics - low use, pumps, motors	6
F9	2014 & 2034	Refurbish trashracks	36
F10	2016 & 2031	Refurbish pump, going to split functional locations	5
F11	2012	Remove vegetation from discharge channel	12
F12	2012	Safe Operation of Inlet Tower Ladders.	24
F13	2014 & 5 yearly thereafter	Study: 5yr Dam Comprehensive Inspection (by 1 Dec 2013)	105
Joe Sippel Weir			
F14	2012 & 5 yearly thereafter	Study: 5yr Dam Comprehensive Inspection	12
Redgate Diversion Pipeline			
F15	2016 & 2029	Refurbish SO - overhaul/replace valve, refurbish metalwork & pwks - consider rationalisation - RED 0004	6
F16	2016 & 2029	Refurbish SO - overhaul/replace valve, refurbish metalwork & pwks - consider rationalisation _scour 0003	6
Silverleaf Weir			
F17	2012	Manufacture/Install Inlet structure	337
F18	2012	Refurbish Rock Pitching, Silverleaf Weir	12
F19	2013	Review drawings: produce a full set of 'As-builts'; prepare full asset hierarchy(Comp Insp Report 4b	42
F20	2012 & 5 yearly thereafter	Study: 5yr Dam Comprehensive Inspection	18
Upper Redgate Pump Station			
F21	2016 & 10 yearly thereafter	5yr Winch Inspection - as per AS2550	2

Source: SunWater Database, "*NSP Projects Central V4.xls*".

Table 5-17 above provides details for specific renewal expenditures proposed for 2012 to 2016, and an indication if a recurring expense occurs between 2017 and 2036. Table 5-18 below highlights additional expenditure activities above $10,000 in costs proposed for 2017 to 2036 (that were not captured as expense items in Table 5.17 above).

Table 5-18. Review of forecast renewals expenditure over $10,000 for Barker Barambah Bulk WSS 2017 to 2036

ID No.	Year	SunWater Description	Cost per activity ($'000)
Bjelke-Petersen Dam			
F22	2021 & 10 yearly thereafter	10 Yr Crane Inspection	119
F23	2026	Refurbish Baulks 2003 Dam Safety Inspection Recommendation 6.2a - patch paint & anodes - Moved out in March 04 by PB - Was R/1002	36
F24	2025	Refurbish Bgte - Repaint & seal - MS fabricated plug	18
F25	2034	Refurbish fill and drain line pipework - internal & external paint	12
F26	2035	Refurbish Fill and Drain Line Valves - replace if required. 2005 DS Rec. Page 16	30
F27	2017 & 8 yearly thereafter	Refurbish hoist - ropes & painting	12
F28	2027	Refurbish Metal Work - handrails & barriers (gal)	60
F29	2027 & 2032	Refurbish Metalwork - access ladders, platforms, rails etc	60
F30	2022	Refurbish Outlet Pipe - repaint exposed part	31
F31	2031	Refurbish Regulating Valve No.1	23
F32	2027	Refurbish Valve - 751 cone patch painting -Refer dam safety report from 2003 recommendation 8.3a	30
F33	2026	Refurbish Valve - including hydraulic actuation (completed over 2 years)	90
F34	2022	Replace Cables & Cableways	327
F35	2021	Replace Electrical Installations	11
F36	2032	Replace Hydraulic Switchgear System	194
F37	2017	Replace Hydraulic Winch	14
F38	2028	Replace Marker Buoys	39
F39	2026	Replace Picnic Shelter	35
F40	2021	Replace Public Toilet Block	37
F41	2034	Replace Sump Pump	11
F42	2020	Replace SwitchBoard No.1 Embk Distrib.	30
F43	2020	Replace SwitchBoard No.2 Outlet Wks	162
F44	2020	Replace SwitchBoard No.3 Control Con.	43
F45	2020	Replace SwitchBoard No.4 Hydraulic	38
F46	2020	Replace SwitchBoard No.5 Inlet Tower	11
F47	2027	Replace Town Water Supply Pump 1	37

ID No.	Year	SunWater Description	Cost per activity ($'000)
F48	2024	Replace Town Water Supply Pump 2	37
F49	2035	Replace Trashracks	87
F50	2034	Replace Water Level Recorder	153
F51	2024	Study: 20yr Dam Safety Review (by 1 Dec 2023)	121
F52	2017	Study: Options analysis into replacement of all SwitchBoards scheduled in 2020	15
F53	2021	Study: Review need for replacement of cables and cableways in 2021	12
Bjelke-Petersen Water treatment plant			
F54	2017	Replace Water Treatment Plant	12
Joe Sippel Weir			
F55	2034	Refurbish Pipe (450)	24
Redgate Diversion Pipeline			
F56	2017	Replace Air Valve, 100Mm	14
F57	2029	Replace Scour Outlet 1256.03M	30
F58	2029	Replace Scour Outlet 321.76M	30
F59	2029	Replace Scour Outlet 3522.19M	30
F60	2029	Replace Scour Outlet 4700.19M	30
F61	2036	Replace Structure, 100Mm Air Valve	196
F62	2026	Replace Valve, 600Mm Butf And Electric Actuator	62
F63	2032	Study: Condition assessment to determine condition and future refurbishment program (with operator)	12
Upper Redgate Pump Station			
F64	2021 & 10 yearly thereafter	10 Yr Winch Inspection	22
F65	2032	Replace Cable	12
F66	2032	Replace Control	20
F67	2025	Replace Motor, 55Kw Elec Weg	13

Source: SunWater Database, "*NSP Projects Central V4.xls*".

Aurecon selected a handful of renewal projects from the above tables for additional desktop analysis. To assess the prudency and efficiency of these forecast renewal expenditures, Aurecon requested from SunWater:

- Indication of the Asset life assigned, or condition reports, options reports, or asset management plans that demonstrated the need for renewal expenditure
- Bill of Materials that scoped the project identifying the quantities of input materials
- Unit charge rates used for costing purposes (Bill of Materials in most cases)

In response to Aurecon's request, SunWater provided information for the following two renewal activities.

Silverleaf Weir – 09BBAo5 Manufacture/Install inlet structure (2012) - $337,000

SunWater has indicated that the assigned asset life is 80 years, and was built in the 1940's. The existing large outlet is a 1000mm diameter MSCL pipe bedded on reinforced concrete, and the outlet is controlled by an Orton Burns stainless steel slide gate mounted on the downstream end of the seals[141]

SunWater has indicated that "*the inlet structure requires replacing as the current structure is no longer safe to access, has lost the inlet screen through corrosion and has a gate with a upstream sealing face so that water leaks around the edges of the gate*."[142]

Aurecon was provided with an engineering report[143] which examined the proposed works, including detailed engineering plans of the work to be undertaken, and a cost schedule for the works to be done. Aurecon's review of the unit charge rates for key inputs were commercial comparable. Aurecon also notes that an allowance of approximately 15% for input materials and equipment was incorporated into the costing, which is common practice on major projects. The costing undertaken for the 2009 report estimated a project total cost of $457,200, of which $287,200 was identified as direct costs.

Note that SunWater advises that the initial cost of $460,000 was amended after the scope of works upon which it was based was changed (refer to H'bird Doc 833870). However, SunWater has not provided a copy of the revised scope of works and costing.

Based on a desktop review of the material presented, Aurecon views the proposed expenditure as prudent (in terms of timing) and efficient (based on appropriate planning of inputs, costing of inputs, and costing of project implementation). Aurecon views the scoping of the initial works program prepared in 2009 to be detailed, and the costing including unit rates adopted as efficent. Aurecon was not provided with the documents supporting the change in work's scope, or details of the revised costing.

Bjelke Petersen Dam – replace cables, cableways (2022) - $327,000

Review of the SAP extracts indicates that an asset life of 35 years is assigned, and that the cables have been in existence since 1986 (indicating a need for replacement in 2021/22). The 35 year frequency is consistent with SunWater's adopted asset lives.

The SAP records provided indicate that a scoping study is planned in 2021 at a cost of $10,000 to review the need for replacement of cables and cableways. Depending on the outcomes of this study, the replacement project may be pushed out by a couple of years.

SunWater also provided an extensive Bill of Materials for the proposed replacement works, along with forecast unit rates for inputs (predominately cable and cable conduit). The Bill of Materials provided was based upon a pre-2000 valuation (mainly 1997). SunWater has used the Cardno (2008)[144] study to inflate all Bill of Materials for Electrical assets to a 2008 valuation by using an indexation of 2.13. Aurecon has reviewed the stated unit rates (2008 Bill of Materials valuation) for a number of listed items against commercial rates obtained, finding that the unit rates used by SunWater was generally comparable.

Considering the number of proposed high voltage cable replacements activities proposed across a number of schemes, Aurecon recommends that SunWater update the unit rates for key inputs (larger diameter cable types for 35mm diameter and above, and Cable Conduit HD PVC) by requesting updated quotes from current commercial market suppliers.

[141] SunWater (2009), Final Report, Silverleaf Weir Outlet Upgrade report, File 09-003192, Page 3.
[142] SunWater email dated 1st August 2011
[143] SunWater (2009), Final Report, Silverleaf Weir Outlet Upgrade report, File 09-003192
[144] Cardno (June 2008) Asset Valuation, Final Report SunWater, Job No. 3601-58

Aurecon notes that an expenditure of $327,000 has been assigned for this task in 2022. Note that Aurecon has not been provided with a breakdown but assume it is based on the indexed Bill of Materials, project management fees, possibly a percentage for contingency costs (to cover over-runs for material cost inputs and contractor expenses), and possibly other Overheads.

Based upon a desktop review of the information provided, Aurecon views that the proposed renewal activity is prudent in terms of timing. Aurecon also notes that SunWater has planned a scoping study in advance to examine the feasibility of extending the asset life. Aurecon views the proposed direct expenditure (as highlighted within the Bill of Materials) as efficient, based on the comparative analysis undertaken of the unit charge rates used for key material inputs.

5.5.3 Renewals annuity balances

The Barker Barambah Bulk WSS has a substantial negative balance of minus $833,000 in 2012[145]. Stakeholders have expressed substantial concern in relation to the calculation of this opening balance for 2012. SunWater has provided Aurecon with an internal working paper[146] which illustrates:

- Opening Balance at 1 July 2006 was minus $384,000 for the Barker Barambah (irrigation sector).
- Identified annual annuity incomes and expenses specifically for the Bulk Scheme for 2007 to 2011
- Identified that the closing balance for 30 June 2011 for the Bulk Scheme is minus $694,000 (irrigation sector balance). Incorporating an uplift factor of 1.2 for whole of scheme, the opening balance for 1 July 2011 is minus $833,000.
- Applied an interest rate of 9.689% (pre-tax nominal) on annual balances

Utilising this information presented above, Aurecon has modelled the stated expenses and income for 2007 to 2011, incorporating the stated 2007 annuity starting balance and annual interest of 9.689%. Aurecon arrived at a closing balance of minus $694,000 as stated within the SunWater paper.

As indicated below within Figure 5-33, the scheme incurred significant annual interest charges in 2007, which continued to increase each year as annuity income was insufficient in all years (except 2009) to cover the annual annuity expenses alone (let alone make a contribution towards the annual interest charge). As a result, the negative annuity balance has ballooned as highlighted below in Figure 5-32.

Aurecon estimates that the scheme incurred approximately minus $235,000 in interest charges over the entire 2007 to 2011 period.

[145]Source: *Barker Barambah Bulk WSS NSP,* (2012-2016) January 2011, Page 33.
[146] Source: SunWater, *Renewals annuity calculation, INTERNAL WORKING PAPER*, January 2011

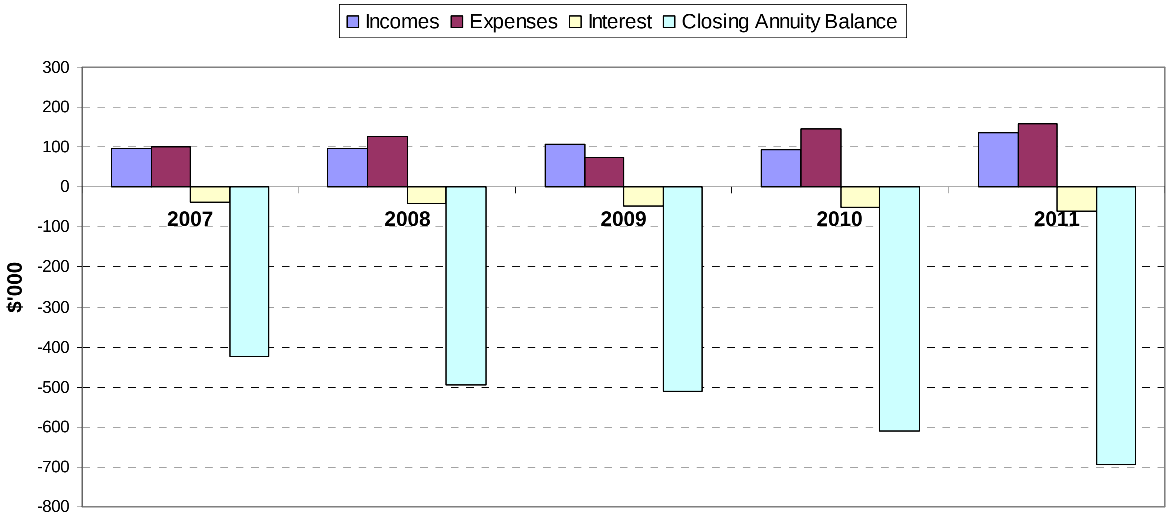

Figure 5-33. Calculated annual renewal balance for Barker Barambah Bulk WSS 2007 to 2011

Figure 5-33 also highlights that annual annuity income was significantly less than expenses overall for the 2007 to 2011 period (except for 2009). The sum total of annuity income for 2007 to 2011 was $530,000, while renewal expenses totalled $605,000, resulting in a shortfall of $75,000. Adding the shortfall of $75,000, plus the interest charge over the period of $235,000 equates to minus $310,000 (added to the starting 2007 balance of minus $384,000 equals the closing balance of minus $694,000).

The following examines the annuity balance going forward. As indicated in Figure 5-34 below, the annuity balance is projected to remain positive until 2035. Note that Figure 5-34 shows that the rolling annuity in 2012 is approximately $1.2 million, and relates to the end of year balance for 2012.

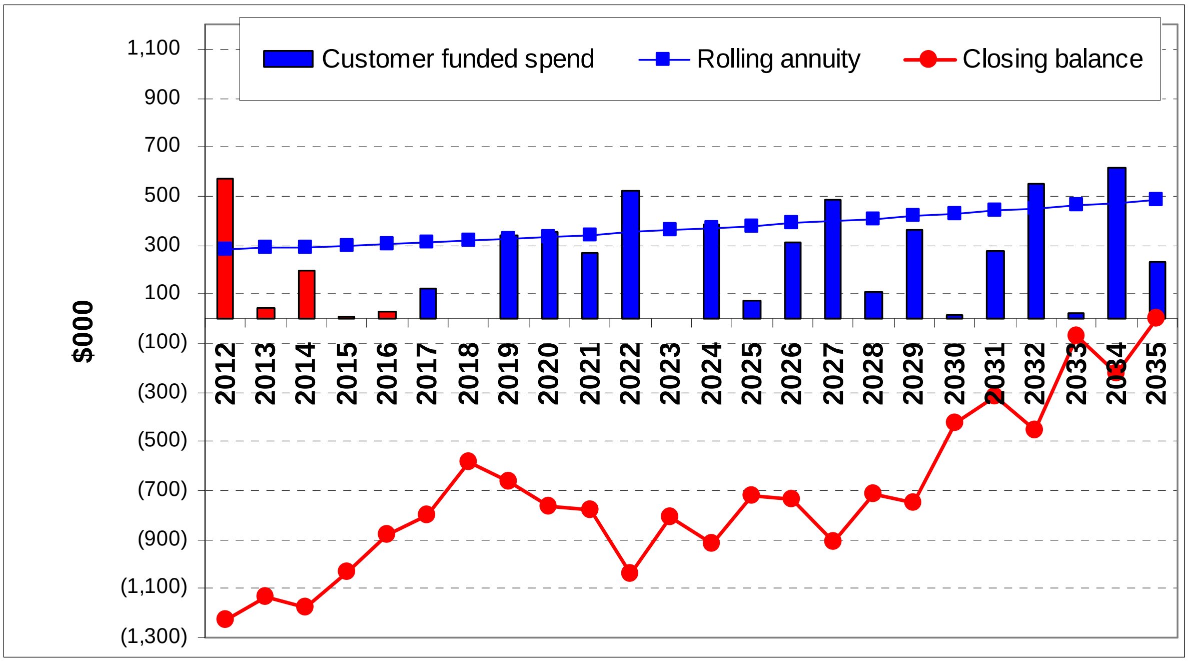

Figure 5-34. Renewals annuity balances for Barker Barambah Bulk WSS 2012 to 2036[147]

[147] Source: SunWater spreadsheet, *"Annuity charts – V610 03.xls*"

Applying SunWater's prescribed real rate of interest of 9.689% upon the starting annuity balance in 2012 of ($813,000), implies an annual interest charge of approximately ($77,000) in the first year alone.

As indicated above, the proposed renewal expenditures for 2012 to 2017 is $163,600 per annum. As a result of the substantive negative balance in 2012, and significant future expenses within the scheme, the annual annuity charge is significantly higher at $258,000 to $274,000 (Table 5-19).

Table 5-19. Renewals annuity charge for Barker Barambah Bulk WSS 2012 to 2016

Real dollars, $'000	Financial Year				
	2012	**2013**	**2014**	**2015**	**2016**
Renewal annuity charge	273	274	269	270	268

[1]Source: *Barker Barambah Bulk WSS NSP,* (2012-2016) January 2011, Page 32.

5.5.4 Feedback from field visits

Aurecon did not undertake a field visit to the Barker Barambah Bulk WSS. However, the substantially stakeholder feedback obtained from the Bundaberg and Lower Mary field visits regarding the NSPs are also relevant to this scheme.

5.5.5 Summary of findings on renewals expenditure

Historical Renewal Expenditure

SunWater was not able to provide to this review the proposed renewal programme as developed in 2006 for the current price path. However, as highlighted earlier SunWater's actual expenditure on renewals over the 2007-2011 period was 40% over the proposed LBC target expenditure (noting that the data for 2011 is incomplete).

A closer examination of the 2010 data (itemised renewal expenditures) revealed that one (1) renewal activity did not have a Board approved budget, and only one project had exceeded the Board approved budget by a substantial amount. The remaining projects were under budget, but a number of these were not completed in 2010 and recorded as WIP. As indicated earlier, the itemised database provided by SunWater, accounted for 96% of total recorded annual renewal expenditure for 2010.

Due to the inability to undertake an field investigation and difficulties obtaining data from SunWater within limited timeframes, Aurecon was only able to undertake a desktop review of the historical renewal expenditure items. Aurecon found through its detailed field investigation at Bundaberg and the Lower Mary the processes engaged (i.e. identification of need through condition assessments, timing, scoping, and tendering for the engagement of external contractors) indicated a structured and efficient process. However, substantial Indirect and Overhead costs were also incorporated, which greatly distorted the perceived value for money outcome achieved for the activity. Where variations were made to renewal activity budgets, substantiated reasoning and justification was found for these projects.

Considering that the itemised listing of renewal expenditure provided by SunWater accounted for approximately 50% to 60% of stated annual expenditure for 2007, 2008 and 2011, Aurecon recommends that an additional request is made to SunWater to provide a comprehensive itemised inventory of renewal expenditure items, so that 100% of the stated annual cost can be validated. In addition, Aurecon recommends that an audit be undertaken for all projects without Board approved budgets, or that have substantially exceeded the Board approved budget, be examined in more detail.

Forecast Renewal Expenditure

Aurecon notes that SunWater has delayed a number of low risk routine renewal activities where possible, such as 5 yearly Winch Inspections which are projected at 10 yearly intervals.

Aurecon undertook a desktop review of two major proposed renewal projects for the Barker Barambah Bulk WSS, and found that

- Silverleaf Weir (Manufacture/Install inlet structure in 2012 for $337,000) where Aurecon views the proposed expenditure as prudent (in terms of timing) and efficient (based on appropriate planning of inputs, costing of inputs, and costing of project implementation).
- Bjelke Petersen Dam (replace cables, cableways in 2022 for $327,000) where Aurecon views the proposed expenditure as prudent and efficient.

6. Assessment of Boyne River and Tarong Water Supply Scheme

6.1 Scheme Description

The Boyne River and Tarong Water Supply Scheme (WSS) is one of the 5 Water Supply Schemes within the Burnett Basin has highlighted below in Figure 6-1. It is centred on the Boyne River and extends from the upstream extent of Lake Boondooma to the river's confluence with the Burnett River. The scheme was established in the early 1980s with the construction of Boondooma Dam. Its primary purpose was to supply cooling water for Tarong Power Station, and its secondary purpose was to supply landholders along Lake Boondooma and along the Boyne River downstream of Boondooma Dam[148].

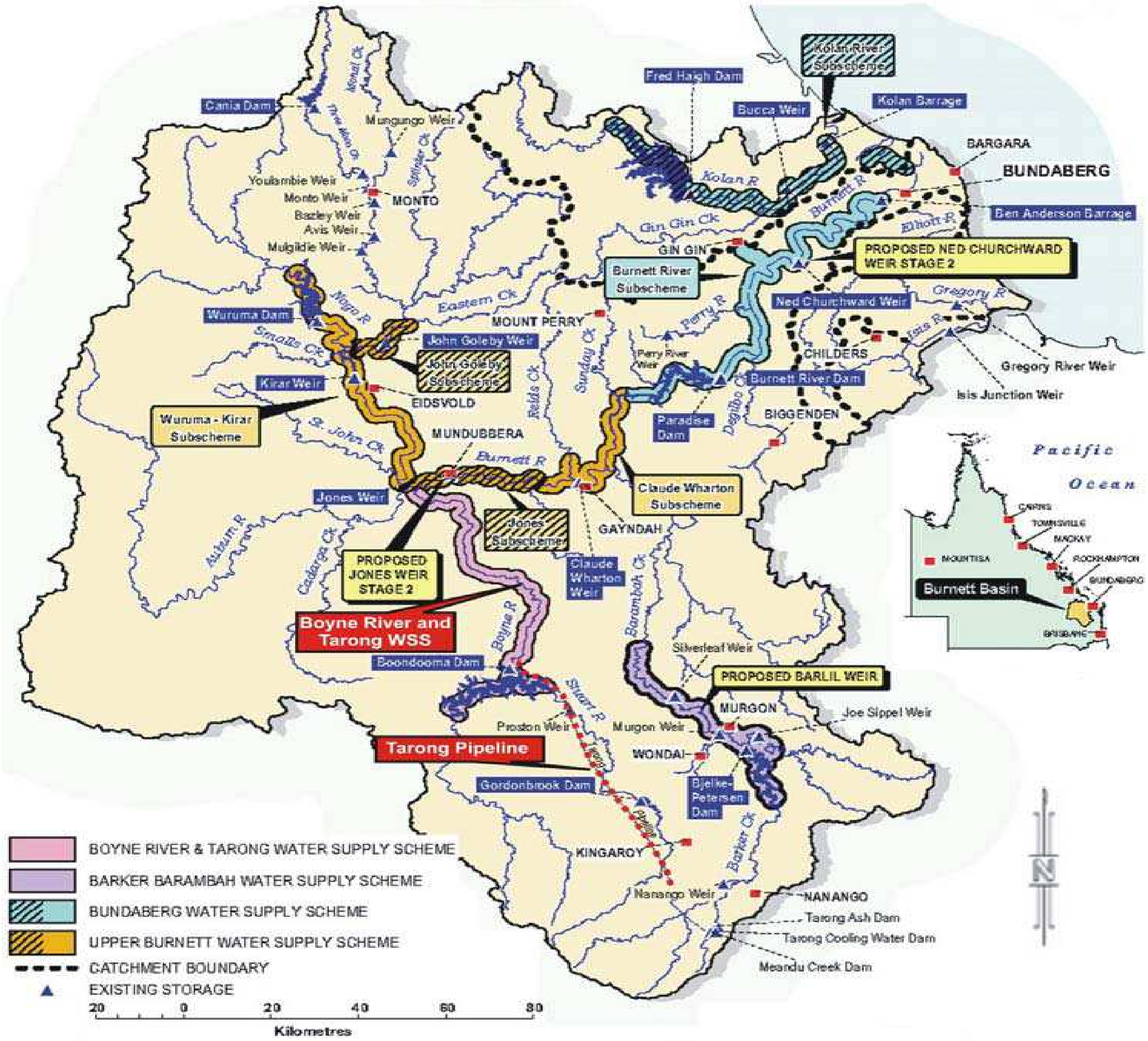

Figure 6-1 **Burnett River Basin Water Supply Schemes[149]**

[148] SunWater, *Boyne River and Tarong Water Supply Scheme – Scheme Operation Manual*, page 17, un-dated report.
[149] SunWater, *Boyne River and Tarong Water Supply Scheme – Scheme Operation Manual*, page 15, un-dated report.

The Boyne River and Tarong WSS has a total of 155 bulk customers comprising of 11,589 ML of medium priority WAE and 33,210 ML of high priority WAE. The scheme supplies water to[150]:

- Tarong Power Station, high priority water drawing water from Boondooma Dam via pipeline.
- Urban, irrigation, stock and domestic water users who draw from the dam or river (medium priority allocation).

The Burnett Basin Resource Operation Plan (ROP) sets the regulatory framework for the management of water within this scheme. Local management of the scheme is managed from SunWater's regional office at Bundaberg.

Under the ROP, SunWater has obligations to manage and operate Boondooma Dam, which is located on the Boyne River, just downstream of the junction with the Stuart River, 18km northwest of Proston. The dam has two rockfill concrete-faced main wall sections, with the largest section straddling Boyne River and the smaller one straddles Sandy Creek. Boondooma Dam has a storage capacity of 204,200ML. The dam's outlet discharges into a diversion tunnel that supplies both the Tarong Pipeline and the Boyne River outlet[151].

6.2 Scheme Management

The Interim Resource Operations Licence (IROL) sets the regulatory framework for the management of water within this scheme. Management of the scheme is managed from SunWater's regional office at Bundaberg, whilst day-to-day operations are supervised from SunWater's Boondooma Dam office/workshop (and small relocatable office located at Bjelke Petersen Dam).

SunWater has five operational staff primarily located at the Boondooma Dam office/workshop, however these staff also service the Lower Burnett and the Boyne River system.

At times, SunWater staff from other locations within the Central region will be utilised for scheme specific activities for the Boyne River and Tarong WSS, particularly from the Bundaberg Depot which is the main office for the Central region, and also houses a storage workshop. Key staff resources at the Bundaberg office include:

- Regional Operations Manager & Service Manager
- 3 working teams of two electricians (also assist Biloela)
- 2 working teams of two fitter & turners (also assist Biloela)
- 9 operational staff located at Bundaberg and Gin Gin (operate primarily Bundaberg Bulk and Distribution systems)
- 8 Technical officers and Schedulers (for Central region including Biloela)
- 2 Administrative staff (for Central region)

Other SunWater staff resources at other Central region locations:

- 2 staff located within the Upper Burnett, one officer working from home at Mundubbera, and one officer working from the office/workshop at Wuruma Dam
- 2 staff located at Maryborough depot

SunWater advised that in recent years there has been an on-going management strategy to relocate positions (as vacancies arise) from the smaller centres to Bundaberg. As highlighted above, small mobile working teams located at Bundaberg service all schemes across the central region.

[150] SunWater (2011), Scheme information http://SunWater.com.au/schemes accessed 25th April 2011
[151] Source: *Boyne River and Tarong WSS NSP,* (2012-2016) January 2011, Page 34

6.3 Summary Opex and Capex information from the NSP

The Boyne River and Tarong WSS has a total of 155 bulk customers comprising of 11,589 ML of medium priority WAE and 33,210 ML of high priority WAE. SunWater proposess to allocate 26% (based on WAE proportions) of the operating expenses and 9% (based on the Headworks Utilisation Factor) of the renewals annuity cost to medium priority WAE holders.

The NSP for the Boyne River and Tarong WSS proposes that the efficient operating costs for the scheme for the coming 5 year regulatory period average $365,000 per annum. This represents a 14.8% increase over the current price path average of $318,000 per annum.

A significant proportion of operating costs are influenced by water delivery and utilisations levels. In the current price path (2007 – 2011), it is clearly evident that water utilisation has been low due to the on-going drought over much of this period. It is also acknowledged that the 2010/11 summer season has ensured that all weirs and dams are full, providing the start of the next price path in 2012 with 100% allocation in the first year.

Stakeholders have expressed interest examining the projected lower bound operating costs for the scheme as projected within the 2005/06 Irrigation Price Review by Indec Consulting[152]. However, SunWater advise that a direct comparison between the Tier 1 projected 2005/06 lower bound operating cost against actual expenditure as presented within the NSP for 2007 to 2011 is not feasible as;

> *the Tier 1 tables for "scheme lower bound cost" include only the irrigation share of the costs, and that grossing up the costs is problematic*[153]

Not withstanding these limitations, Aurecon have examined the projected LBC values for 2006-2011 provided within the Tier 1 report against the costs presented within the NSP's (See Appendix A).

The projected renewal annuity spend over the five year period to 2016 is $526,000, which is lower than the $709,000 spent over the preceding 5 year period. Due to a substantive positive annuity starting balance of $1.1 million in 2012, a total charge for renewal annuity of -$5,000 is sought for the 2012 to 2016 price path.

The following sections examine Opex (operational costs) and Capex (renewals expenditure) in more detail.

6.4 Operational costs review

An overview of required operational activities for the scheme is identified within the *Boyne River and Tarong Water Supply Scheme – Scheme Operation Manual*[154]. The manual provides in detail an overview of the scheme structure, compliance requirements, overview of scheme operations activity requirements, and references for collecting and reporting scheme data.

For each scheme SunWater has utilised the Scheme Operation Manual as a key input towards the formulation of Maintenance Schedule and Operations Manual for individual assets/facilities across the scheme, as highlighted below within Figure 6-2.

[152] Statewide Irrigation Pricing Working Group, *SunWater Irrigation Price Review 2005-06 Tier 1 Report*, April 2006, Table 5.22, page 54.
[153] Email from SunWater to the QCA, dated 23rd February 2011.
[154] SunWater, *Boyne River and Tarong Water Supply Scheme – Scheme Operation Manual*, un-dated report.

In the case of the Boyne River and Tarong WSS, two Operational Facility O & M Manuals exist, one for Boondooma Dam and one for the Tarong Pipeline. A series of designs and construction documents also support the scheme operations manual[155].

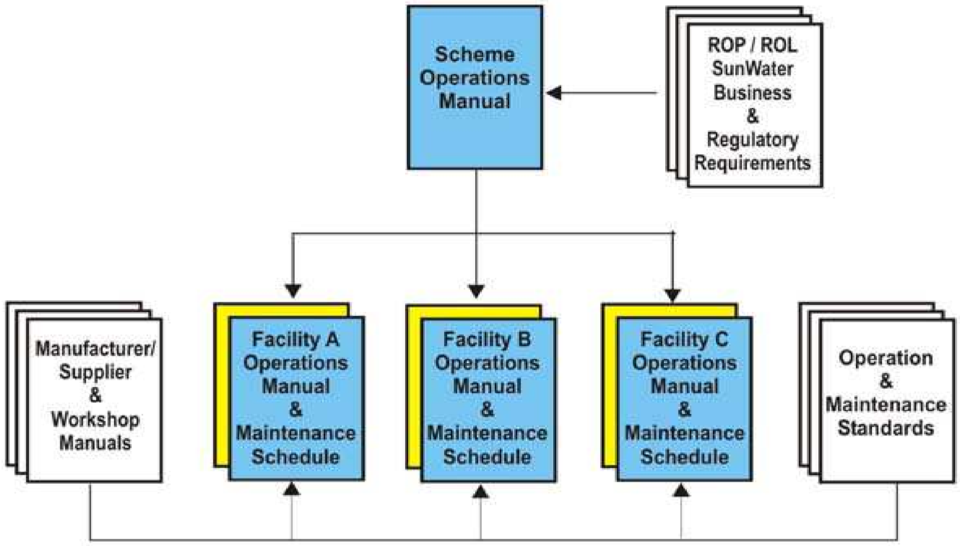

Figure 6-2*.* Overview of the linkages between Scheme and individual facility Operations Manual[156]

6.4.1 Overview

Within the NSP, SunWater has presented Operational costs by type, and also by activity. As such, Aurecon has undertaken a review of Operational costs by investigating in detail key expenditure items of “Labour”, and key expenditure activities of “Operations”, “Preventive Maintenance” and “Corrective Maintenance”.

Although not consistently obvious across all, many Operational cost items and activities vary accordingly to water usage levels. As indicated below (Figure 6.3) annual water usage fluctuated substantially within the Boyne River and Tarong Bulk WSS. The highest annual water usage (including River, Pipeline and Network Losses between 2003 and 2010) occurred in 2004 in which approximately 28,500ML was utilised.

For the purposes of incorporating water usage into this cost analysis, Aurecon has indexed annual water usage for 2007 to 2010 period against the 2004 water usage level as follows:

- Approximately 75% in 2007
- Approximately 39% in 2008
- Approximately 56% in 2009
- Approximately 60% in 2010

[155] SunWater, *Boyne River and Tarong Water Supply Scheme – Scheme Operation Manual*, page 13, un-dated report.
[156] SunWater, *Boyne River and Tarong Water Supply Scheme – Scheme Operation Manual*, page 13, un-dated report.

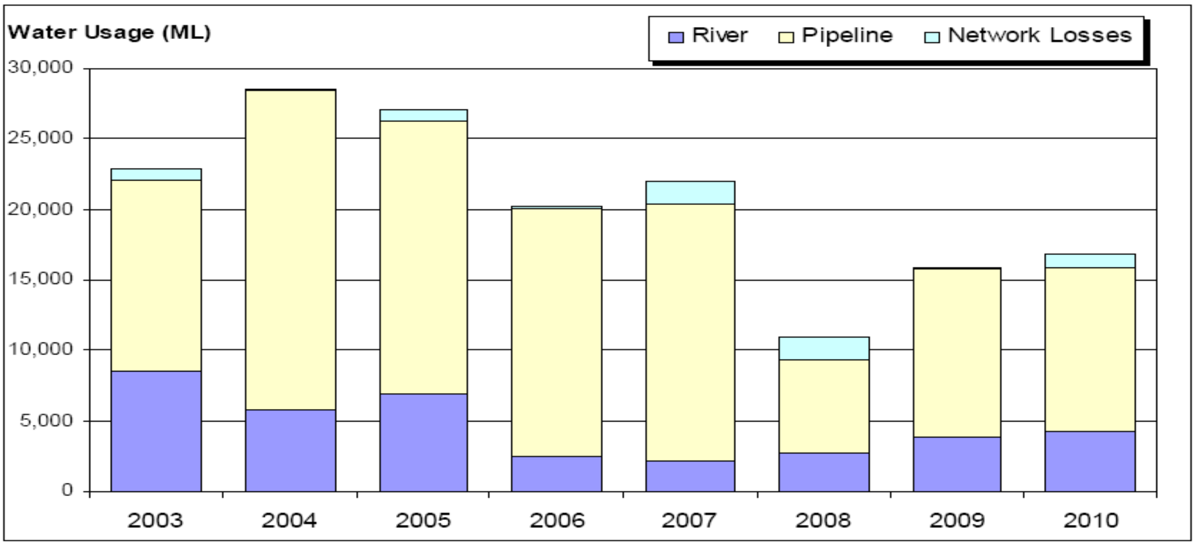

Figure 6-3. Water usage for Boyne River and Tarong WSS[157]

The key observation for this scheme is the fact that water utilisation for the current price path to date (2007 to 2010) has been impacted by drought and a lack of water reserves, resulting in generally less River usage than the preceding period of 2003-2006.

Note that with the exceptional wet season in 2010/2011, storages across this region have been filled. Aurecon was not provided with any information regarding likely water usage in 2011.

Figure 6-4 below compares water usage against “Operating” costs which declined sharply from 2007 to 2008 as water usage levels declined. As water usage increased from 2008 to 2010, so too has “Operating” costs.

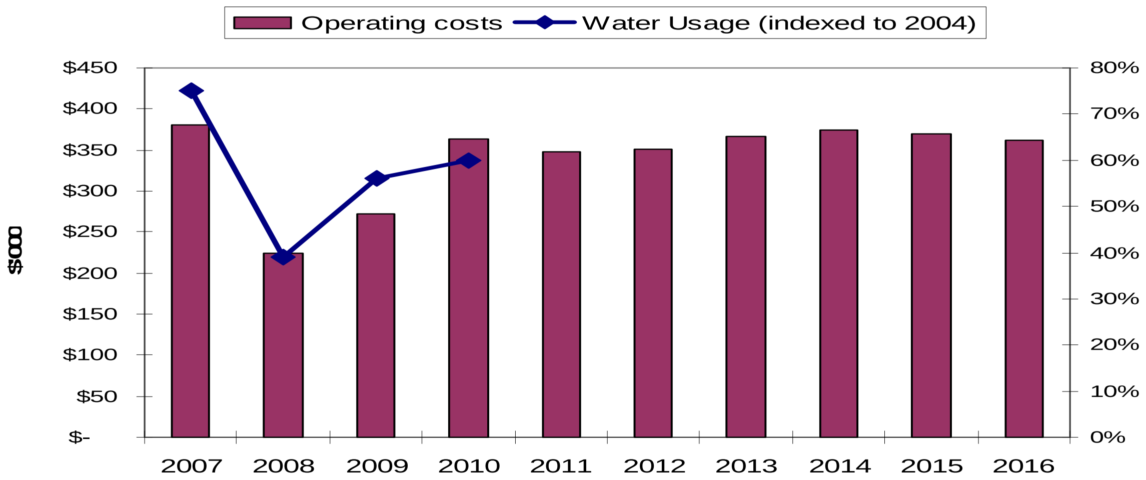

Figure 6-4. Comparison of “Operating” costs against water usage (indexed against 2004) for Boyne River and Tarong Bulk WSS[158]

In 2011 “Operating” costs are forecast to decline slightly from 2010, however Aurecon have no insights into anticipated water usage rates, nor an indication of comparisons with 2010.

The key cost component of “Operating” cost across the period from 2007 to 2016 is clearly “Operations” costs (Figure 6-5), which is examined in more detail within this report.

[157] Source: Boyne River and Tarong WSS NSP, (2012-2016) January 2011, Page 14.
[158] Raw data sourced from *Boyne River and Tarong WSS NSP, (*2012-2016) January 2011, Pages 6 and 14.

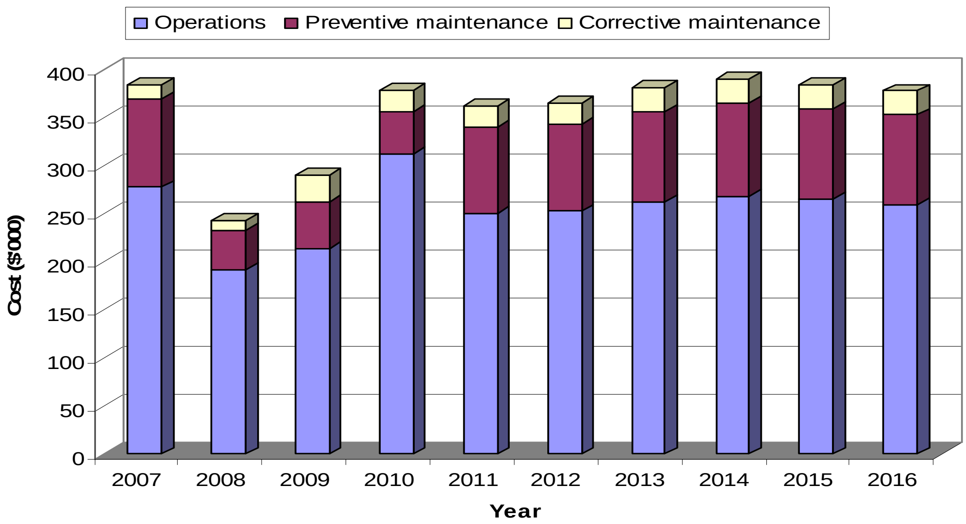

Figure 6-5. Breakdown of "Operating" costs for Boyne River and Tarong WSS 2007 to 2016[159]

The following sections examine in more detail operational expense items and activities.

6.4.2 Operational Expense Items

Labour costs

Projected "Labour" costs for the Boyne River and Tarong WSS are significant as highlighted below in Table 6-1. "Labour" as a proportion of "Total Operating" costs have historically varied from 15.1% in 2008 to 24.2% in 2010, but of concern has been the growth of "Labour" costs in absolute terms since 2008.

Table 6-1. "Labour" costs and "Total Operating" costs for Boyne River and Tarong WSS

($'000)	Actuals				Forecast	Price Path				
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Labour[1]	70	34	56	88	97	100	100	100	100	100
Annual change		-51.4%	64.7%	57.1%	10.2%	3.1%	0.0%	0.0%	0.0%	0.0%
Change since 2007		-51.4%	-20.0%	25.7%	38.6%	42.9%	42.9%	42.9%	42.9%	42.9%
Total Operating costs[1]	381	224	272	364	348	351	367	375	370	362
Labour as % of Total Operating costs	18.4%	15.1%	20.6%	24.2%	27.9%	28.5%	27.2%	26.7%	27.0%	27.6%

[1]*Source: Boyne River and Tarong WSS NSP,* (2012-2016) January 2011, Page 7.

The average annual "Labour" cost (historical) over the 2007 to 2010 period was $62,000. The projected Labour cost in 2011 of $97,000 represents an increase of over 55% over the annual average for 2007 to 2010.

[159] Raw data sourced from *Boyne River and Tarong WSS NSP,* (2012-2016) January 2011, Page 6

Figure 6-6 below provides an overview of water usage levels against "Labour" costs. There is an observable correlation between "Labour" costs and water usage rates within the scheme. Note that "Labour" costs are forecast to rise in 2011.

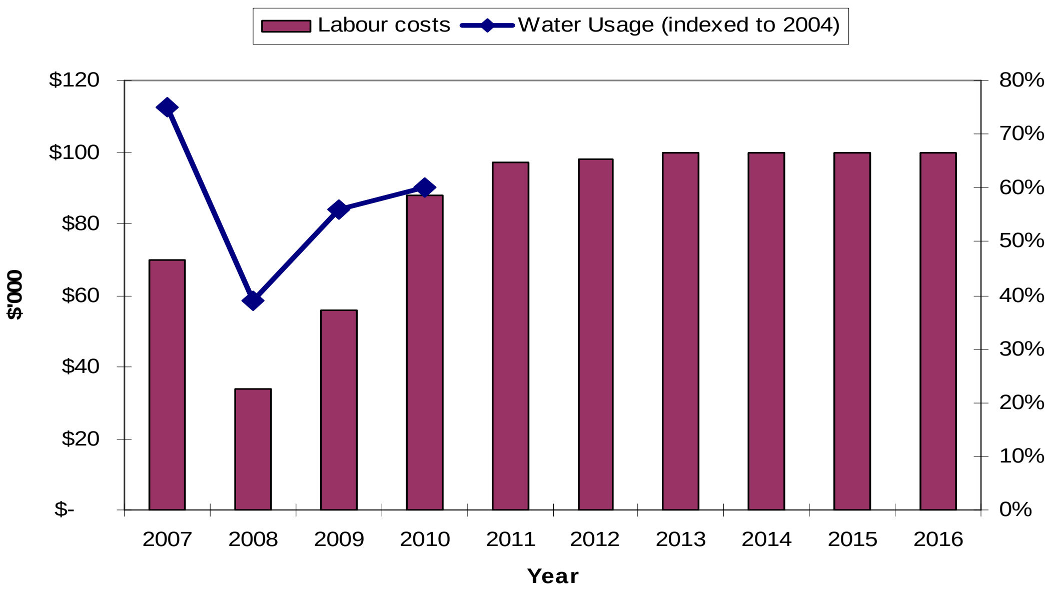

Figure 6-6 Comparison of "Labour" costs against water usage (indexed against 2004) for Boyne River and Tarong Bulk WSS[160]

The following sections seeks to examine in more detail the components that make up the "Labour" costs presented within Table 6-1 above, and examine in detail (data available) changes in historical labour components.

"Labour" costs in 2011 are forecast to be $97,000 (Table 6-1). As highlighted below in Figure 6-7, activities related to "Operations" account for 63.9% of the total "Labour" cost, followed by labour required for "Preventive Maintenance" (29.9%) and "Corrective Maintenance" (6.2%).

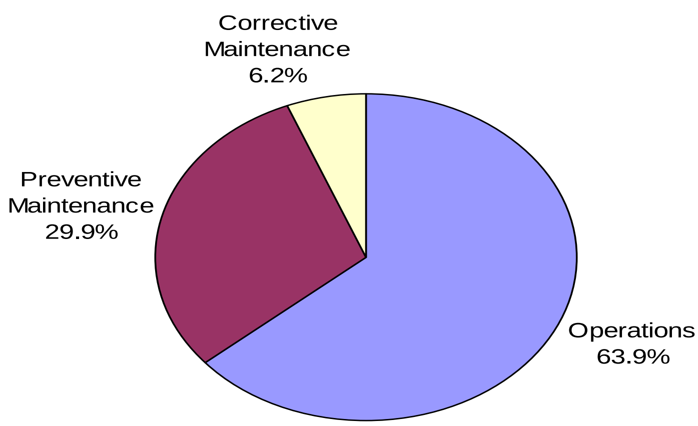

Figure 6-7. Breakdown of "Labour" costs by output activity for Boyne River and Tarong WSS in 2011[161]

[160] Raw data sourced from *Boyne River and Tarong WSS NSP, (*2012-2016) January 2011, Pages 7 and 14.

[161] Raw data sourced from SunWater Spreadsheet "*IM Central – 610.03 PSV.xls*"

As illustrated in Figure 6-7 above, “Operations” related activities accounted for 63.9% of all forecast “Labour” expenses for the Boyne River and Tarong WSS in 2011. Figure 6-8 below provides additional information regarding the composition of labour costs associated with “Operations” activities.

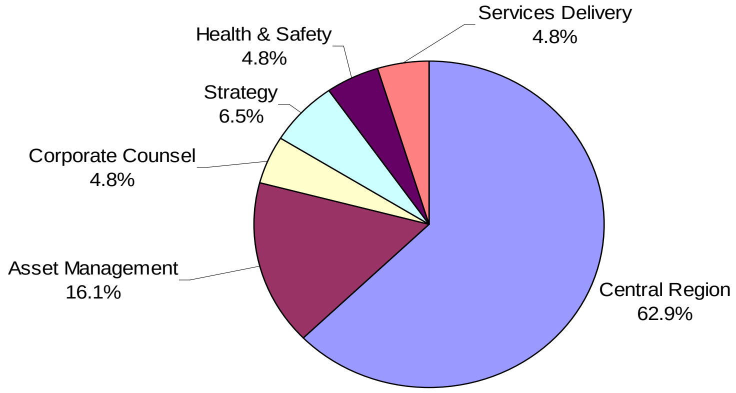

Figure 6-8. Breakdown of “Operations” labour costs for Boyne River and Tarong WSS in 2011[162]

As illustrated by Figure 6-8 above, approximately 63% of the projected “Operations” labour costs in 2011 are from staff within the Central region, whilst the remainder of labour costs are sourced from outside the Central region (predominantly Brisbane, but may also include SunWater staff from other regional centres) providing specific services of *Asset management, Corporate Counsel, Service Delivery, Health & Safety* and *Strategy*.

Whist the information presented in Figures 6-7 and 6-8 above provide useful insights into the expected “Labour” costs for 2011, of considerable interest are the historical labour costs and what made these up. Figures 6-9 and 6-10 below provide partial insights into “Labour” costs between 2006 and 2011.

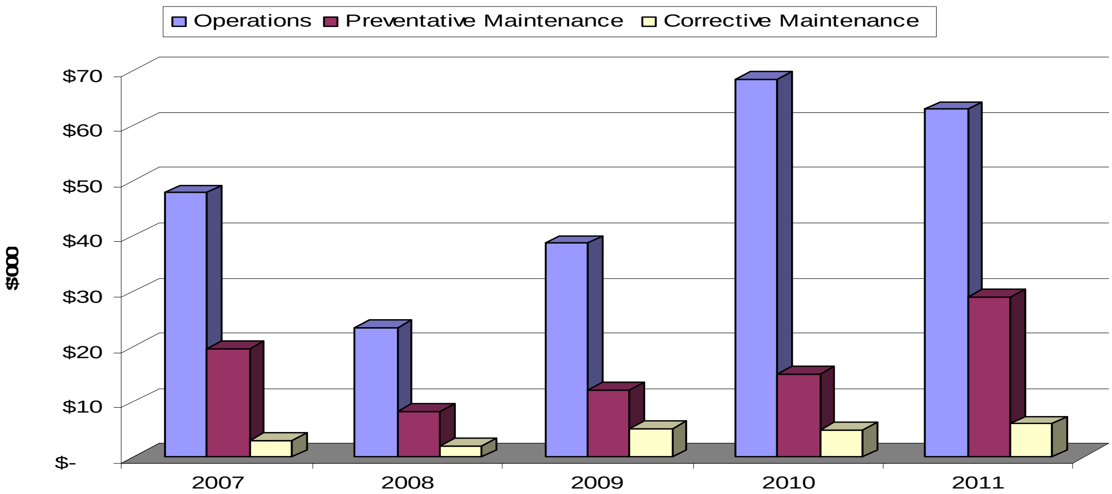

Figure 6-9. Breakdown of “Labour” costs for Boyne River and Tarong WSS between 2007 and 2011[163]

As indicated in Figure 6-9 above, “Labour” costs across all three categories troughed in 2008, which correlates with a trough in water usage by all in the scheme.

162 Raw data sourced from SunWater Spreadsheet “*IM Central – 610.03 PSV.xls*”

163 Source: Historical data extracted from SunWater spreadsheet “Extract LBC data Conversion extra activity detail and preventive main split.xls”, forecast expenditure data from SunWater “IM Central -610.03.PSV.xls”.

Figure 6-9 also highlights that “Labour” costs associated with “Preventive” and “Corrective Maintenance” were minor in comparison to “Operations”. “Operations” labour costs have risen substantially since 2008 (approximately $20,000) to over $60,000 in 2010 and 2011. “Preventive Maintenance” labour costs illustrate a bell shaped curve, which correlates to some degree with the pattern of total water usage for the scheme.

Figure 6-10 below provides more detailed information regarding “Preventive Maintenance” labour costs. “Condition Monitoring” and “Weed Control” have both trended upwards between 2007 and 2010, and labour costs associated with “Servicing” spiked in 2007[164].

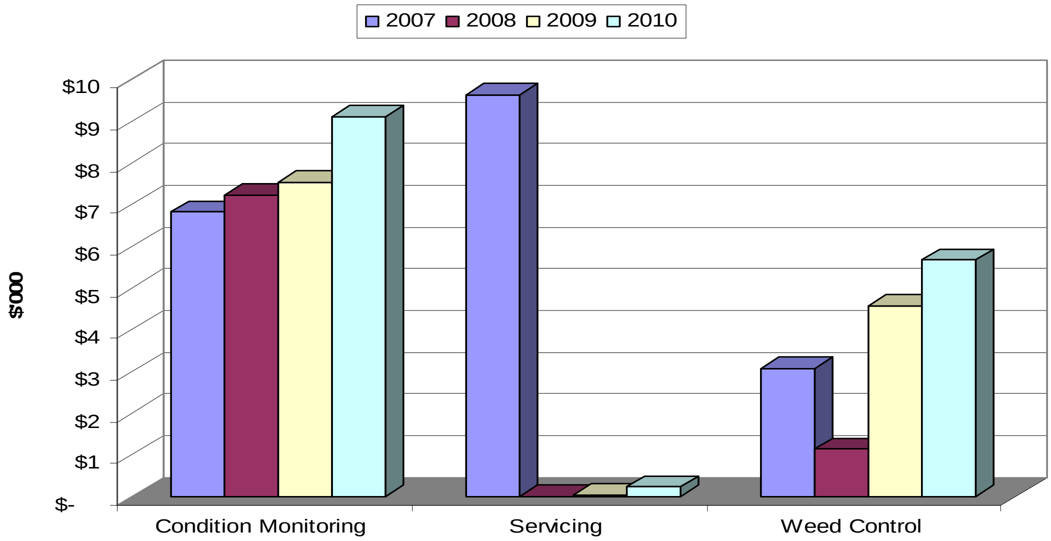

Figure 6-10. Breakdown of “Preventive Maintenance” labour costs for Boyne River and Tarong WSS between 2007 and 2010[165]

“Labour” is examined in more detail within the following sections.

6.4.3 Activity based expense items

The following sections examine scheme operational costs from an activity perspective as follows:

- Operations
- Preventive Maintenance
- Corrective Maintenance

[164] Aurecon suspects that this may be an abnormality due to the retro-fitting of historical data into the new Business Operating Model.
[165] Raw data sourced from SunWater spreadsheet “Extract LBC data Conversion extra activity detail and preventive main split.xls”.

6.4.4 Operations costs

Operational activities for the scheme are largely identified within the scheme Operation Manual[166]. SunWater has provided a breakdown of "Operations" costs by both sub-activities and cost input. The following analysis begins by examining cost inputs.

Projected "Operations" costs for the Boyne River and Tarong WSS are significant as highlighted below in Table 6-2. As a proportion of "Total Operating" costs, "Operations" costs historically have varied from 73.0% in 2007 to 86.9% in 2008.

Table 6-2 "Operations" costs and "Total Operating" costs for Boyne River and Tarong WSS

($'000)	Actuals				Forecast	Price Path				
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Labour[1]	48	24	39	68	63	63	63	63	63	63
Materials[1]	0	5	2	1	3	3	3	3	3	3
Contractors[1]	3	7	10	4	3	3	3	3	3	3
Other[1]	79	88	65	102	64	63	63	63	63	63
Total Direct costs	130	124	116	175	133	132	132	132	132	132
Indirects[1]	106	38	53	59	54	54	62	66	63	59
Overheads[1]	43	31	45	78	65	65	66	66	67	65
Total Operations[2]	279	193	214	312	252	251	260	264	262	256
Annual Change		-30.8%	10.9%	45.8%	-19.2%	-0.4%	3.6%	1.5%	-0.8%	-2.3%
Change since 2007		-30.8%	-23.3%	11.8%	-9.7%	-10.0%	-6.8%	-5.4%	-6.1%	-8.2%
Total Operating costs[3]	381	224	272	364	348	351	367	375	370	362
Operations as % of Total Operating costs	73.2%	86.2%	78.7%	85.7%	72.4%	71.5%	70.8%	70.4%	70.8%	70.7%

[1]Source: Historical data extracted from SunWater spreadsheet *"Extract LBC data Conversion extra activity detail and preventive main split.xls",* forecast expenditure data from SunWater spreadsheet *"IM Central -610.03.PSV.xls",*
[2]Note that there are minor differences between the data reported within the table and that reported within the NSP due to rounding.
[3]Source: *Boyne River and Tarong WSS NSP*, (2012-2016) January 2011, Page 7.

Of interest is the fluctuation in "Operation" costs in recent years, as highlighted below in Figure 6.11. However, "Operations" costs rose substantially in 2010 yet water usage actually stayed at the same level, raising questions as to the driver in this cost rise.

[166] SunWater, *Boyne River and Tarong Water Supply Scheme, Scheme Operation Manual*, document un-dated.

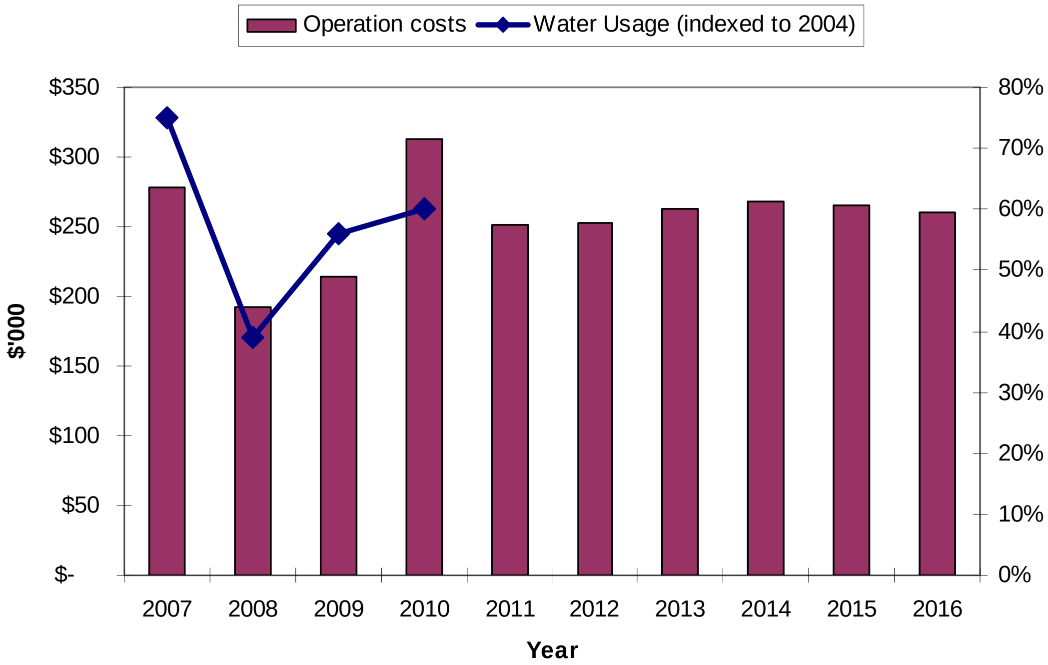

Figure 6-11. Comparison of "Operations" costs against water usage (indexed against 2004) for Boyne River and Tarong WSS[167]

Aurecon has not been provided with any indications regarding likely water usage rates for 2011, although the extremely wet season experienced in 2010/11 is likely to result in a lower rate than for 2010. As indicated in Figure 6-11 above "Operations" costs in 2011 are projected to be lower than that of 2010 and lower than 2007 costs.

The following sections seeks to examine in more detail the components that make up the "Operations" costs presented within Table 6-2 above, and examine in detail (where data is available) changes in historical cost components.

As illustrated in Table 6-2 above, "Operations" costs for 2011 are projected to be $251,000, and forecast to increase slightly between 2012 and 2016 in real terms (over and above inflation).

As illustrated below in Figure 6-12, "Overheads" and "Indirects" collectively make up 47.4% of the projected total cost in 2011. Other significant components are "Labour" at 25.1% (which was examined earlier), and "Other" at 25.5%.

Cost items included within "Other" include insurance costs (80% of total "Other" costs, costing $51,000 in 2011), Local Authority Rates (14% or $9,000), and other local administrative costs including telephone, etc.

[167] Raw data sourced from *Boyne River and Tarong WSS NSP*, (2012-2016) January 2011, Pages 6 and 14.

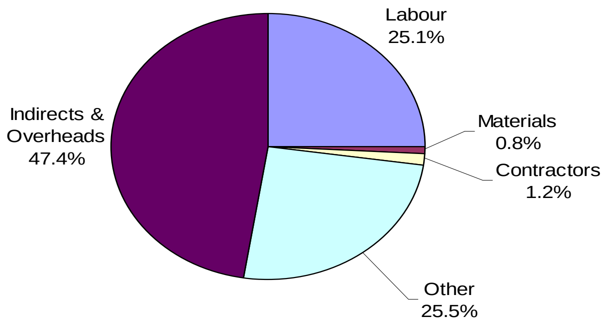

Figure 6-12. Breakdown of input costs towards "Operations" for Boyne River and Tarong WSS in 2011[168]

The following analysis seeks to examine in detail the historical components of "Operations" costs, and where possible identify cost item increases (and possible causes). Figure 6-13 below provides a breakdown of the key input cost components for "Operations" costs (note raw data presented in Table 6-2).

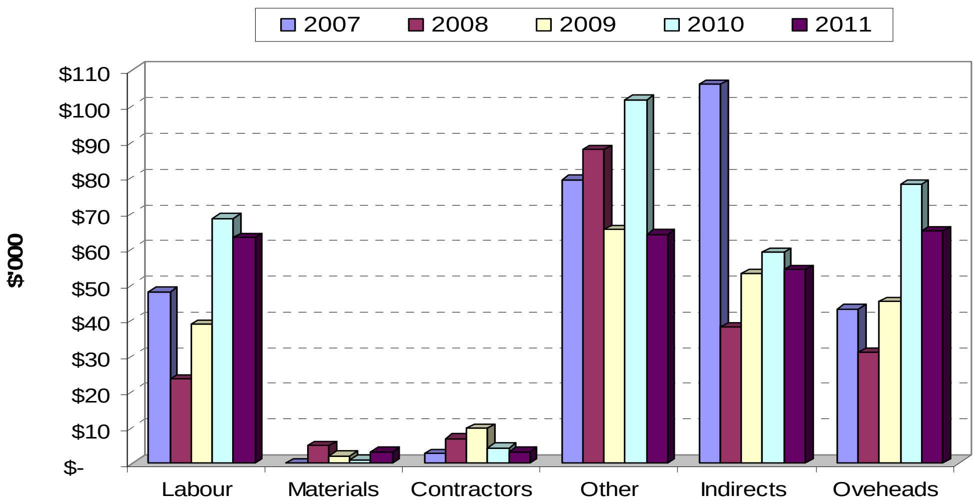

Figure 6-13. Breakdown of "Operations" costs for Boyne River and Tarong WSS for 2007 - 2011[169]

The scope of this consultancy was to examine the direct costs, which in this case are "Labour", "Materials", "Contractors" and "Other".

As indicated earlier, "Labour" costs have increased substantially from 2008 to 2010 yet water usage actually remained static between 2009 and 2010. The other noticeable cost increases are "Other" in 2010. As indicated earlier, insurance and local rates made up most of the costs for "Other" in 2011, and it is unlikely that either of these changed substantially in 2010.

The following section seeks to examine in more detail "Operations" costs, by examining the sub activities (outputs) recorded under "Operations" (see Section 4 for a definition of each sub activity).

[168] Raw data extracted from SunWater spreadsheet *"IM Central -610.03.PSV.xls".*
[169] Raw data extracted from SunWater spreadsheets *"Extract LBC data Conversion extra activity detail and preventive main split.xls"* and *"IM Central -610.03.PSV.xls".*

As indicated in earlier sections, SunWater adopted a new Business Operating Model and management accounting system in 2009/10. SunWater has acknowledged that during the process of re-categorising historical data, a number of activity expense items may have been in-correctly coded, particularly for 2007. Therefore the degree of accuracy for certain sub-activities in 2007 and 2008 to a lesser extent is questionable.

A breakdown of historical "Operations" expenditure by sub-activities is highlighted below in Table 6-3 & Figure 6-14.

Table 6-3. Breakdown of historical "Operations" expenditure for Boyne River and Tarong WSS

Real dollars, $'000	Financial Year			
	2007	**2008**	**2009**	**2010**
Customer Management	8	7	6	10
Workplace H&S	-	-	-	3
Environmental Management	22	2	-	11
Water Management	0	43	34	26
Scheme Management	109	92	106	168
Dam Safety	17	15	20	23
Schedule /Deliver	123	33	40	65
Metering	-	-	2	6
Facility Management	-	-	6	-
Other	-	-	-	-

Source: SunWater spreadsheet "*Copy of Extract LBC data conversion to sub activity.xls*".

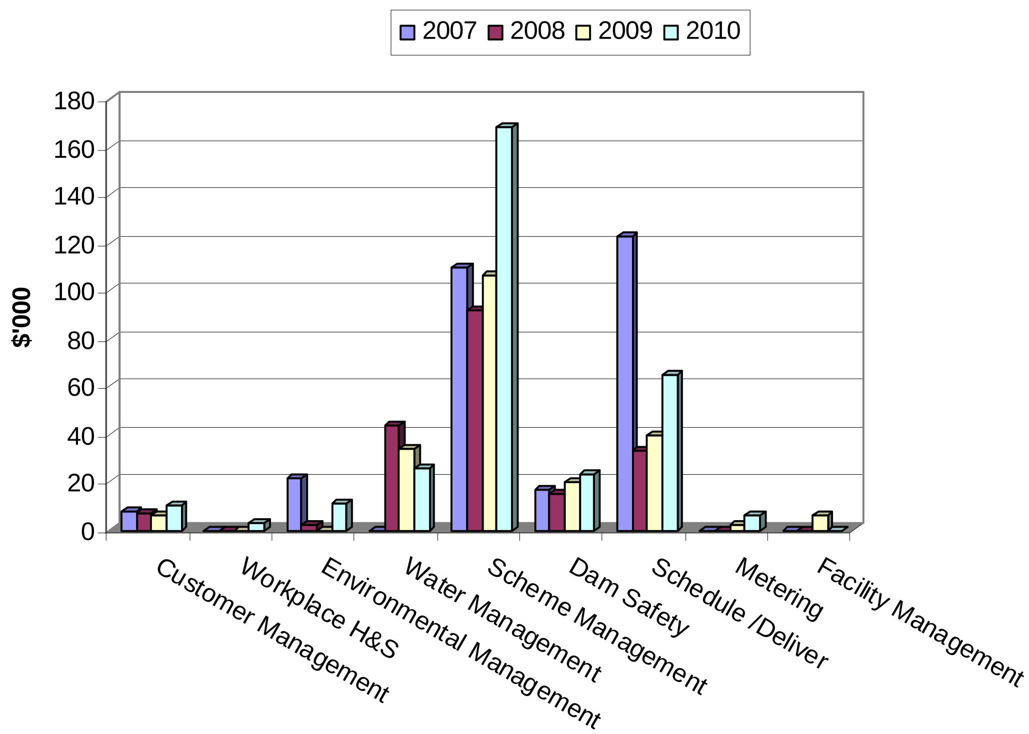

Figure 6-14. Overview of disaggregated historical operations expenditure for Boyne River and Tarong WSS[170]

Customer Management

As indicated earlier, “Customer Management” includes interfacing and enquiries from customers, billing and account management and water trading activities.

As illustrated below in Figure 6-14 “Labour” was the most significant direct cost between 2007 and 2010. Of interest is the fact that total “Operations” costs spiked in 2010 (Figure 6-11), and as indicated below in Figure 6-15 “Labour” costs for “Customer Management” practically doubled from 2009 to 2010, yet water usage barely changed between 2009 and 2010 (Figure 6-11).

Due to the overhead cost allocation model, significant “Indirects” and “Overheads” are added as a result. For 2010, “Labour” costs represented 33.5% of total costs incurred for “Customer Management”.

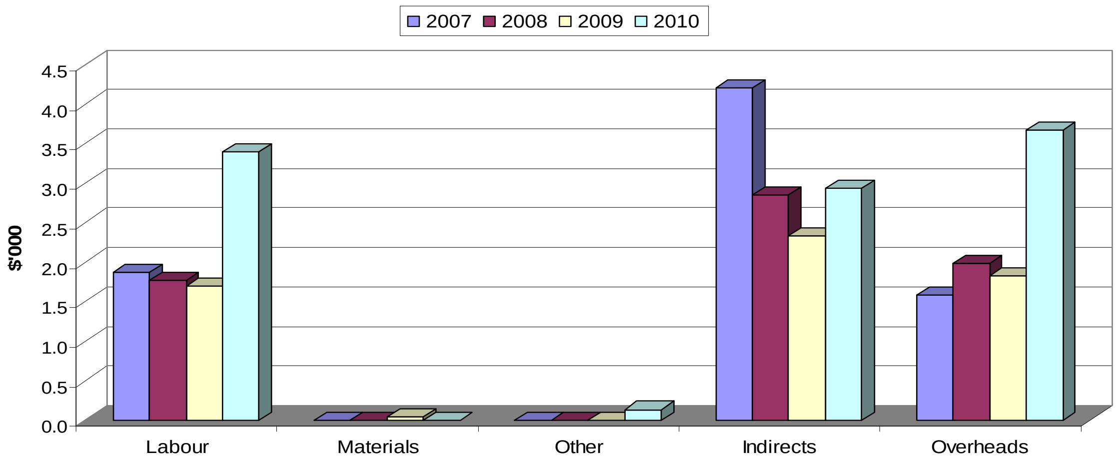

Figure 6-15. Overview of disaggregated “Customer Management” expenditure for Boyne River and Tarong WSS[171]

Aurecon forwarded the following questions to SunWater, and received the following responses[172].

- Why costs for Labour spiked in 2010

“These costs are attributable directly to the service contract and will be varied from year to year depended upon the nature of customer enquiries”

- What level are Labour costs forecast for 2011?

“The forecast cost is based on 5 years average and taking into account SunWater Enterprise Agreement”

Workplace H&S

As indicated earlier, SunWater has a dedicated workplace, health and safety group to ensure compliance with legislative requirements throughout all workplaces. As such the group conducts regular safety audits and reviews of work practices, and ensure SunWater staff undertake regular training.

[170] Raw data extracted from SunWater spreadsheet *“”Copy of Extract LBC data conversion to sub activity.xls”.*
[171] Raw data sourced from SunWater spreadsheet “*Copy of Extract LBC data conversion to sub activity.xls*”.
[172] SunWater responses are sourced from email dated 30th June 2011

As indicated above in Table 6-3, a cost of $3,000 was recorded only in 2010, comprising of $1,000 in direct labour costs and $2,000 in “Indirects” and “Overheads”.

Aurecon forwarded the following questions to SunWater, and received the following responses[173].

- Why costs were only recorded for 2010

“These costs are attributable directly to the service contracts and the threshold is 4 hours over a period (weeks, month).”

- At what level are costs forecast for 2011?

“The forecast cost is based on 5 years average and taking into account SunWater Enterprise Agreement”

Environmental Management

“Environmental Management” includes the development of weed control plans, assessing impacts downstream of drains, and activities associated with environmental permits (normally undertaken by regional based environmental officer), liaison and coordination with relevant Government agencies and environmental regulators on site-specific issues.

As illustrated above in Figure 6-14 and Table 6-3, an expense was incurred in 2007. Note that labour costs for weed control for 2007 (Figure 6-10) did not spike, thereby suggesting a weak linkage between “Environmental Management” (includes management time recorded for the development of weed control plans) and actual weed control costs incurred within “Preventive Maintenance” (assuming that the 2007 data is correct).

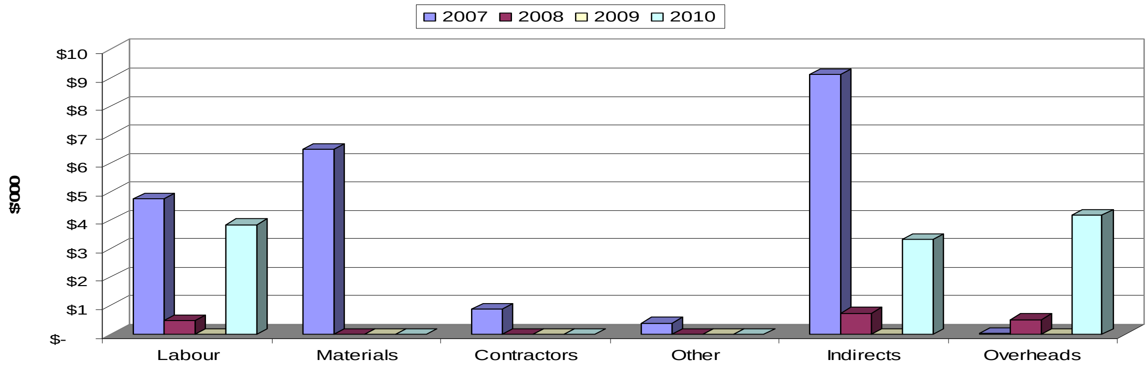

Figure 6-16. Overview of disaggregated “Environmental Management” expenditure for Boyne River and Tarong WSS[174]

As highlighted above within Figure 6-16, a significant “Labour” cost was incurred in 2007 and in 2010. There was a substantial one-off expense in 2007 for “Materials”, far greater than “Labour” costs incurred.

A one-off expense for “Contractors” was incurred in 2007, amounting to approximately $1,000.

Aurecon forwarded the following questions to SunWater, and received the following responses[175].

- Why significant labour costs for 2007 and 2010

“2007 was a transition year in which the previous internal trade model was removed and the new BOM model developed and implemented in 2008. This transition period and changes are causing difficulties in comparability across time”

[173] SunWater responses are sourced from email dated 30th June 2011

[174] Raw data sourced from SunWater spreadsheet “*Copy of Extract LBC data conversion to sub activity.xls*”.

[175] SunWater responses are sourced from email dated 30th June 2011

- Why significant $6k Material expenses were only recorded in 2007? Coding error?

"2007 was a transition year in which the previous internal trade model was removed and the new BOM model developed and implemented in 2008. This transition period and changes are causing difficulties in comparability across time"

- At what level are Labour costs forecast for 2011?

"The forecast cost is based on 5 years average and taking into account SunWater Enterprise Agreement"

Water Management

"Water Management" includes activities related with announcement of water allocations, water quality monitoring and sampling, Blue-Green algae management, SDL readings, shoreline inspections, Monitoring of groundwater levels and salinity levels, bore measurements and preparation of data for NRMW and SunWater.

As illustrated above in Figure 6-14 no expense was incurred in 2007 (actual high water usage year). However, as illustrated below in Figure 6-17 a significant negative expense for "Materials" offset the costs incurred for "Other" and "Overheads" in 2007.

However, Figure 6-17 also highlights that in 2008, significant direct costs emerged for "Labour", "Contractors" and to a lesser degree "Materials". Of interest is the fact that "Labour" costs spiked in 2008 at approximately $10,000, but have declined to $7,000 by 2010. Significant "Indirects" and "Overheads" are incurred due to the allocation model employed by SunWater.

Figure 6-17 also highlights that "Contractors" were engaged between 2008 and 2010 at an annual cost between $2,000 and $4,000.

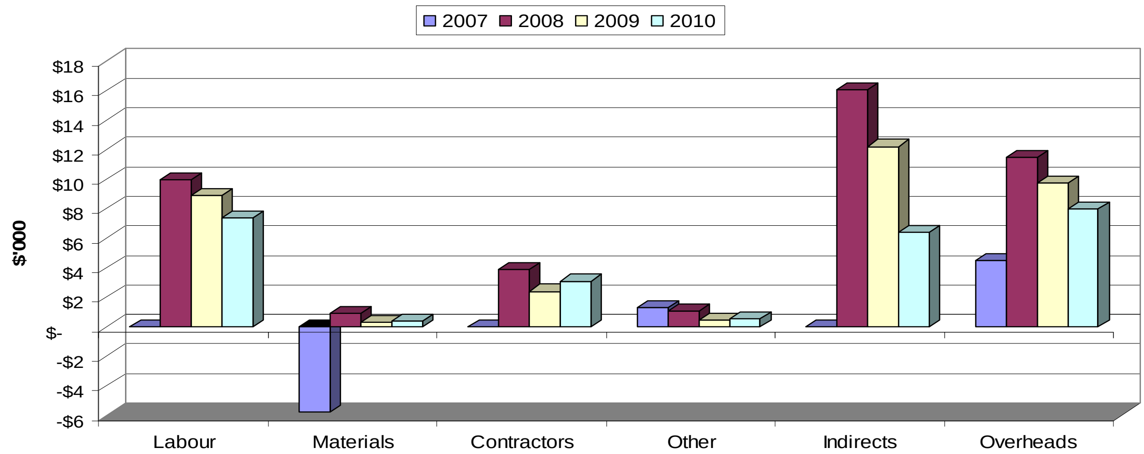

Figure 6-17. Overview of disaggregated "Water Management" expenditure for Boyne River and Tarong WSS[176]

Aurecon forwarded the following questions to SunWater, and received the following responses[177].

- Why no expense occurred in 2007?

"2007 was a transition year in which the previous internal trade model was removed and the new BOM model developed and implemented in 2008. This transition period and changes are causing difficulties in comparability across time"

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176 Raw data sourced from SunWater spreadsheet "*Copy of Extract LBC data conversion to sub activity.xls*".

177 SunWater responses are sourced from email dated 30th June 2011

- Labour costs declining 2008 to 2010, why?

"These costs are attributable directly to the service contract and will be varied from year to year depended upon the requirements at the time."

- Negative Materials costs in 2007 and possible coding error?

"2007 was a transition year in which the previous internal trade model was removed and the new BOM model developed and implemented in 2008. This transition period and changes are causing difficulties in comparability across time"

- What services are delivered by contractors

"Water monitoring charges are services delivered by contractors"

- What is the basis of costs in 2011?

"The forecast cost is based on 5 years average and taking into account SunWater Enterprise Agreement"

Scheme Management

"Scheme Management" includes the preparation and provision of reports and statistics for clients, including meetings with clients reviewing contract progress/performance, energy management including the review of electricity consumption tariffs and accounts, land and property management including legal advice, O&M Manual development, Scheme Strategies, OMS plans, Facility Contingency Plans and Emergency Action Plans (EAP) for all facilities other than dams, System Leakage Management Plans (SLMPs), insurance costs, rates and land taxes.

Aurecon notes the increase in "Scheme Management" costs from $109,000 in 2007 to $168,000 in 2010 (Table 6-3 above). As highlighted by Figure 6-18 below, no "Labour" expense was recorded under "Scheme Management" in 2008, indicating that no activities related to "Scheme Management" were undertaken in that year. However, "Labour" costs more than double going from 2009 to 2010.

Significant on-going costs have been recorded for "Other", which predominantly includes Local Government rates, land taxes and Insurance. Costs have fluctuated from $60,000 in 2009 to approximately $90,000 in 2010, which is uncharacteristic for these cost expenses.

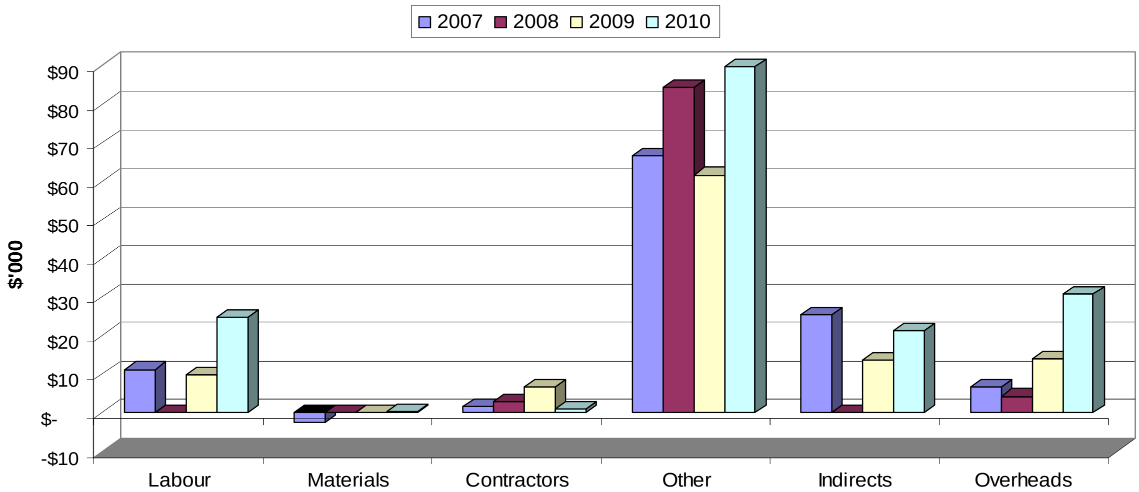

Figure 6-18. Overview of disaggregated "Scheme Management" expenditure for Boyne River and Tarong WSS[178]

[178] Raw data sourced from SunWater spreadsheet "*Copy of Extract LBC data conversion to sub activity.xls*".

Aurecon forwarded the following questions to SunWater, and received the following responses[179].

- Why no Labour expense in 2008?

"Minimum works required in 2008 to keep to service contract going."

- Why does Labour expense double from 2009 to 2010?

"The labour costs are attributable directly to the service contract and will be varied from year to year depended upon the requirements at the time."

- Why have "Other" costs increases varied substantially between 2007 to 2010, generally constant in terms of rates, insurance, etc??

"Other costs related to insurance $77k and $4k for overhead costs"

- What is the trend for 2011+

"The forecast cost is based on 5 years average and taking into account SunWater Enterprise Agreement"

Dam Safety

The Boondooma Dam is classified as a referable dam under the *Water Act 2000*[180]. SunWater is therefore required to have a comprehensive safety management program in place comprising policies, procedures and investigations to minimise the risk of dam failure. Routine dam safety inspections are carried out monthly, which include the monitoring of embankments, piezometers, seepage and general condition of the storages as defined in the dam surveillance specification.

As highlighted in Table 6-3 and Figure 6-14, "Dam Safety" costs have risen in recent years from $17,000 in 2007 to $23,000 in 2010.

Figure 6-19 below highlights that "Labour" was the main direct cost and increased from approximately $4,000 in 2007 to $8,000 in 2010, a two-fold increase. Due to the overhead cost allocation model, significant "Overheads" are also added. In 2010, the $8,000 in Labour costs also attracted $15,000 in "Indirects" and "Overheads" to the scheme.

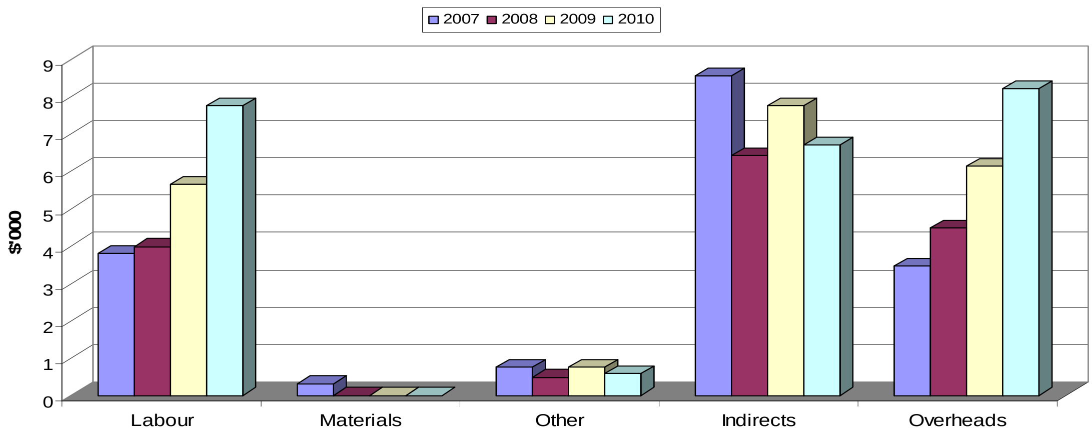

Figure 6-19. Overview of disaggregated "Dam Safety" expenditure for Boyne River and Tarong WSS[181]

Aurecon forwarded the following questions to SunWater, and received the following responses[182].

[179] SunWater responses are sourced from email dated 30th June 2011
[180] Boyne River and Tarong Water Supply Scheme NSP (2012-2016), January 2011, Page 23.
[181] Raw data sourced from SunWater spreadsheet "*Copy of Extract LBC data conversion to sub activity.xls*".

- Why Labour costs rose twofold between 2007/08 and 2010

"The 2010 costs included one-off jobs – 5 year dam safety inspection and 5 year review EAP."

- Are what level are costs forecast for 2011?

"The forecast cost is based on 5 years average and taking into account SunWater Enterprise Agreement"

- Are Monthly Dam Safety Inspections included here?

"Yes, but not in the new Price Path (move to Preventative Maintenance)"

Schedule/Deliver

"Schedule/Deliver" includes scheduling, releasing, operation of pump stations and SCADA, System surveillance including monitoring of water entitlement and observation of and reporting of any breaches, flood operations preparation, water harvesting, ROP compliance of water levels and flows and reporting of water information.

As indicated above in Figure 6-14 "Schedule/Deliver" was the second largest output activity in terms of expense between 2007 and 2010. The spike in Schedule/Deliver costs in 2007 was the result of a major expense incurred for "Indirects" in that year (Figure 6-20 below). As indicated throughout the report, the accuracy of the 2007 data is questionable.

Figure 6-20 also highlights that "Labour" was the main direct cost, which spiked in 2007 at $26,000. In 2008, Labour costs drop substantially to $7,000, before increasing again to $10,000 in 2009 and $18,000 in 2010.

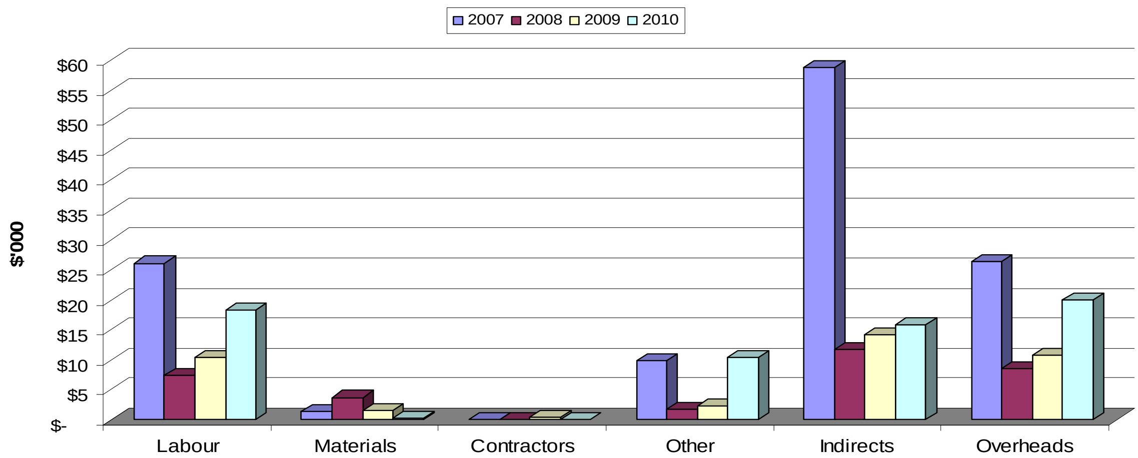

Figure 6-20. Overview of disaggregated "Schedule/Deliver" expenditure for Boyne River and Tarong WSS[183]

Due to the overhead cost allocation model, significant "Indirects" and "Overheads" are also added. In 2010, the $18,000 in Labour costs also attracted $36,000 in "Indirects" and "Overheads" towards the scheme.

Aurecon forwarded the following questions to SunWater and received the following responses[184].

- Indication of the accuracy of Labour costs in 2007 and impacted by cost coding?

[182] SunWater responses are sourced from email dated 30th June 2011

[183] Raw data sourced from SunWater spreadsheet "*Copy of Extract LBC data conversion to sub activity.xls*".

[184] SunWater responses are sourced from email dated 30th June 2011

"2007 was a transition year in which the previous internal trade model was removed and the new BOM model developed and implemented in 2008. This transition period and changes are causing difficulties in comparability across time"

- An overview/definition of what "Other" is?

"The other costs mainly included telephone and facsimile costs used solely for the service contract."

- At what level are costs forecast for 2011 considering that water usage has been so low between 2007 and 2010

"The forecast cost is based on 5 years average and taking into account SunWater Enterprise Agreement"

Metering

"Metering" costs have also risen since 2009 with the introduction of meters, at a cost of approximately $2,000 in 2009 and a cost of $6,000 in 2010 (Table 6-3 above). The Boyne River and Tarong WSS has a total of 155 bulk customers[185].

SunWater has advised that a total of 172 meters were read on a quarterly basis in 2010. Approximately 34% of the total recorded costs are actual direct labour costs, with the remainder being "Indirects" and "Overheads". In 2009, Labour costs for Metering was $1,000, and in 2010 Labour costs increased to $2,000.

In comparison, the neighbouring Barker Barambah Bulk WSS has a total of 219 meters incurring a cost of $43,000 in "Metering" costs in 2010. Clearly, there is a large variation in metering costs (correlated to distance travelled per meter, meter access, etc) across schemes, and therefore little value in comparing the costs incurred between schemes.

Stakeholders have raised the issue that there is more cost effective strategies to avoid reading these meter each quarter by SunWater staff.

Aurecon notes that "*Customers can also enter their own meter readings into SunWaterOnline to obtain up-to-date information about water use and availability*[186]."

Aurecon forwarded the following questions to SunWater, and received the following responses[187].

- Other options for meter reading of sleepers?

  See Section 4, which provides SunWater's views regarding meter reading which is common across all schemes

- Incentives/opportunities for users to read and record their own meters on line (mentioned in the NSP that customers can also enter their own meter readings online?).

  See Section 4, which provides SunWater's views regarding meter reading which is common across all schemes

- Also seeking information regarding the number of meters installed since 2009, and read in 2010.

  "*There were 172 meters read in 2010 and 1 meter have been installed since 2009"*

As indicated above, only one additional meter has been installed since 2009. As indicated within Table 6-3, Metering costs were only $2,000 in 2009 and $6,000 in 2010.

[185] Source: SunWater *Boyne River and Tarong WSS NSP*, (2012-2016) January 2011, page 14.
[186] Source: SunWater *Boyne River and Tarong WSS NSP*, (2012-2016) January 2011, page 16.
[187] SunWater responses are sourced from email dated 30th June 2011

Facility Management

“Facility Management” costs are directly related to the maintenance of recreational facilities at Boondooma Dam. As indicated in Table 6-3, a one-off expense of $6,000 was incurred in 2009, consisting of $2,000 in labour and $4,000 in “Indirects” and “Overheads”.

Aurecon forwarded the following question to SunWater and received the following response[188].

- What is the $6,000 expense in 2009 being a one-off expense, related to SunWater’s mobile office at the dam?

  “The expense in 2009 related to one-off install safety Billboard and Ramp Stencil.”

Prudency and Efficiency of Operations Expenditure

As highlighted within Table 6-2, direct costs for Operations expenditure has increased from $130,000 in 2007 to $175,000 in 2010 (proposed expenditure for 2011 at $133,000). The average of the preceding 4 years equates to $136,000 based on the information presented within this report which correlates approximately with SunWater statesd 2011 costs.

Sunwater advised that weir safety inspections costs that were previously recorded under Dam Safety are now allocated to Preventive Maintenance activity for the forecast price path. One activity, *Boondooma Dam - Monthly Dam Safety Inspection,* is identified at a cost of $1,850 (direct labour) and hence this cost should be reallocated from Dam Safety to Preventive Maintenance, thereby reducing Dam Safety & Operations costs by $1,850.

The provision of disaggregated historical activity data for “Operations” by SunWater provided substantial insights, and identified substantial activities and issues requiring additional information and explanation from SunWater. As highlighted throughout this section, SunWater has provided responses to additional questions which in most cases provided valid information.

However, SunWater was not able to provide 2011 cost estimates for the sub-activities which Aurecon views as critical in verifying the prudency and efficiency of these costs. Aurecon recommends that to verify the prudency and efficiency of 2011 expenditure, the following information and analysis is required:

- that 2011 cost estimates for sub-activities be released and examined to ensure compliance with SunWater’s averaging methodology (preceding 4/5 years)
- that cost estimates for metering be examined and projected based on 2010 costs (assuming that it represents improved efficiencies reading meters, and if it reflects the fact that all meters were read in 2010)
- that the Dam Safety forecast 2011 costs is reduced by $1,850 to account for the transfer of activities to Preventive Maintenance.

Due to the above data limitations, Aurecon was unable to validate fully the prudency and efficiency of “Operations” costs.

6.4.5 Preventive Maintenance costs

SunWater has defined “Preventive Maintenance” as activities related to the ongoing operational performance and service capacity of physical assets as close as possible to designed standards. SunWater[189] states that “Preventive maintenance” is cyclical in nature with a typical interval of 12 months or less, and includes the following key output activities:

[188] SunWater responses are sourced from email dated 30th June 2011
[189] SunWater, *Barker Barambah Bulk WSS NSP,* (2012-2016) January 2011, page 28.

- Condition monitoring; the inspection of assets to determine preventive maintenance requirements
- Servicing; planned maintenance activities normally expected to be carried out routinely

A review of SunWater's reporting system also revealed that "Weed Control" was also a key output activity associated with "Preventive Maintenance", to which costs were assigned. As indicated earlier within Figure 6-10 "Weed Control" costs were significant in terms of labour input. Considering that it is a bulk river system, weed control costs would expect to be minimal, with the possible exception of land based weed control around the bulk assets and access roads.

Projected "Preventive Maintenance" costs for the Boyne River and Tarong WSS are highlighted below in Table 6-4. As a proportion of "Total Operating" costs, "Preventive Maintenance" costs have varied from 12.1% in 2010 to 24.1% in 2007.

Table 6-4. "Preventive Maintenance" costs and "Total Operating" costs for Boyne River and Tarong WSS

($'000)	Actuals				Forecast	Price Path				
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Preventive Maintenance[1]	92	41	49	44	89	90	94	97	95	93
Annual change		-55.4%	19.5%	-10.2%	102.3%	1.1%	4.4%	3.2%	-2.1%	-2.1%
Change since 2007		-55.4%	-46.7%	-52.2%	-3.3%	-2.2%	2.2%	5.4%	3.3%	1.1%
Total Operating costs[1]	381	224	272	364	348	351	367	375	370	362
Preventive M as % of Total Operating cost	24.1%	18.3%	18.0%	12.1%	25.6%	25.6%	25.6%	25.9%	25.7%	25.7%

[1]*Source: Boyne River and Tarong WSS NSP*, (2012-2016) January 2011, Page 6.

As indicated earlier, SunWater's deployment of a new Business Operating Model and management accounting system required the retrospective transfer of cost data for 2007 and 2008. A recent review[190] found that costs that should have been coded to refurbishment, were coded as "Preventive Maintenance", resulting in many schemes incurring a spike in "Preventive Maintenance" costs in 2007. As indicated above in Table 6-4 (Figure 6-21 below) costs for the scheme were up significantly in 2007, and therefore Aurecon has omitted the use of 2007 data in any trend analysis for "Preventive Maintenance".

Some stakeholders advocated an interest in examining historical "Preventive Maintenance" costs against water usage. As indicated below in Figure 6-21, there does not seem to be a direct correlation between costs and water usage. Note that Aurecon has no information pertaining to water usage in 2011; however stakeholder feedback from other schemes within the Central region indicates that the wet season in 2010/11 has resulted in significantly reduced water demand and usage by irrigators in comparison to 2010 season. It is further noted that costs in 2011 are projected to more than double those of 2010.

[190] Parsons Brinkerhoff (2010A), *Provision of Services for Costing SunWater's Work Instructions*, October 2010, page 13.

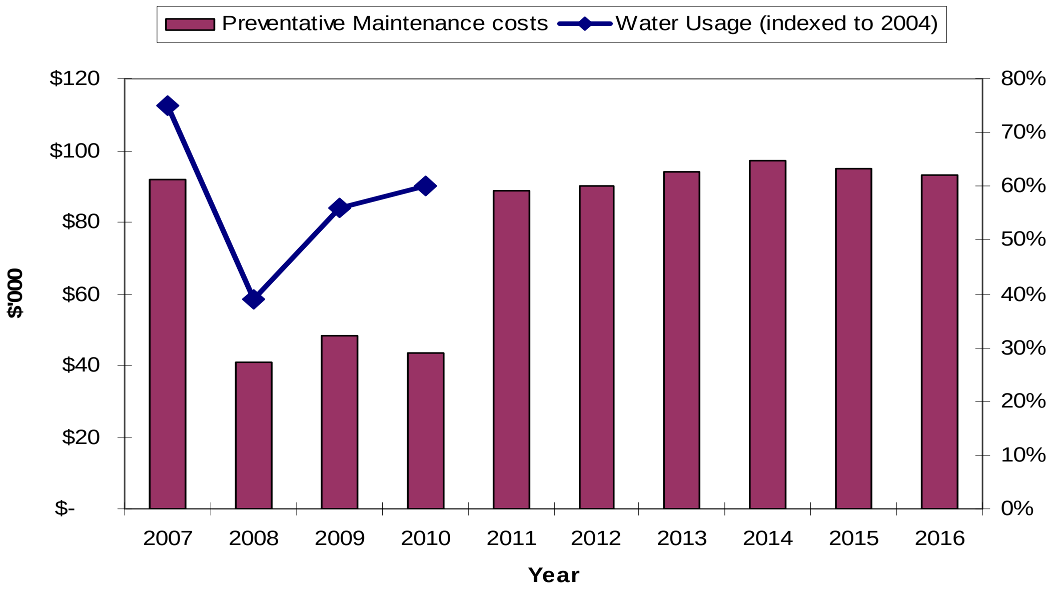

Figure 6-21. Comparison of "Preventive Maintenance" costs against water usage (indexed against 2004) for Boyne River and Tarong WSS[191]

The following sections seeks to examine in more detail the components that make up the "Preventive Maintenance" costs presented within Table 6-4 above, and examine the data available where changes have occurred.

As illustrated below in Figure 6-22, "Indirects" and "Overheads" represents 60.7% of the projected total cost in 2011. Other significant components are "Labour" at 32.6% (which was examined earlier), "Materials" at 3.4%, and "Other" at 2.2%.

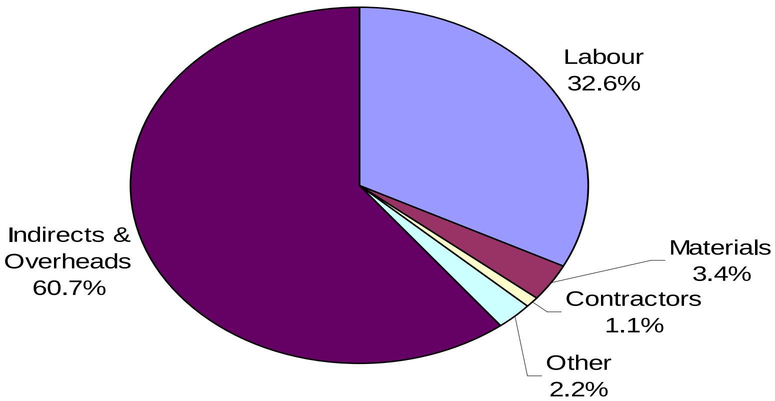

Figure 6-22. Breakdown of cost inputs for "Preventive Maintenance" within Boyne River and Tarong WSS in 2011[192]

Figure 6-23 below provides a breakdown of the key cost input components for "Preventive Maintenance" between 2007 and 2011.

[191] Raw data extracted from *Boyne River and Tarong WSS NSP*, (2012-2016) January 2011, Pages 6 and 14.
[192] Raw data extracted from SunWater spreadsheet *"IM Central -610.03.PSV.xls",*

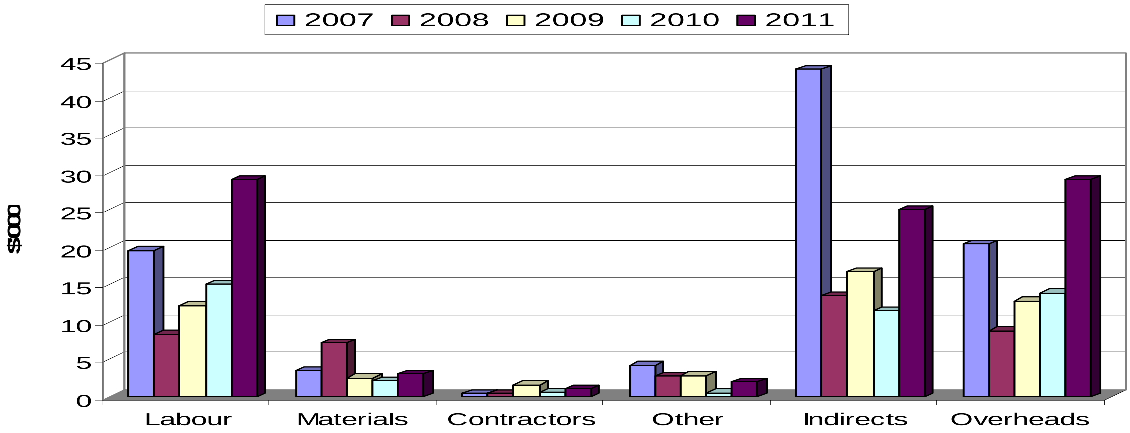

Figure 6-23. Breakdown of cost inputs towards "Preventive Maintenance" for Boyne River and Tarong WSS 2007 - 2011[193]

As indicated earlier, Aurecon questions the accuracy of the 2007 data as presented above in Figure 6-23, particularly in the case of "Preventive Maintenance" and "Corrective Maintenance". Therefore, more emphasis is placed on actual costs recorded for the 2008 to 2010 period. Note that the 2011 projected cost forms the cost basis for the next price path (2012-2016) subject to inflation indexation.

As indicated in Figure 6-23 "Overheads" are allocated almost in direct proportion to that of "Labour", while "Indirects" seem to be apportioned on a different basis, but are also very significant. The scope of this consultancy was to examine the direct costs, which in this case are "Labour", "Materials", "Contractors" and "Other".

Of the direct costs, "Labour" is the main cost item and increasing significantly in recent years. Ignoring the 2007 data, then the average annual "Labour" expense between 2008 and 2010 is $12,000, yet SunWater is projecting a cost estimate of $29,000 for 2011. The analysis below seeks to examine "Labour" expenditure in detail.

SunWater also provided the NSP consultants with a breakdown of historical "Preventive Maintenance" costs by output activity, which is defined earlier as "Condition Monitoring", "Servicing" and "Weed Control". As indicated below in Figure 6-24, "Servicing" costs were significant at approximately $45,000 in 2007 only, but have since incurred expense less than $1,000 per annum. As noted earlier, the retrospective transfer of cost data for 2007 into the new business model incorrectly coded many activities.

As a bulk river system, "Weed Control" would be related to on-land weed control activities, particularly around Boondooma Dam and access roads. As indicated below in Figure 6-24 "Weed Control" costs have varied from approximately $7,000 (2008) to $16,000 (2009).

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[193] Raw data extracted from SunWater spreadsheets *"IM Central -610.03.PSV.xls"* and *"Extract LBC data Conversion extra activity detail and preventive main split.xls*".

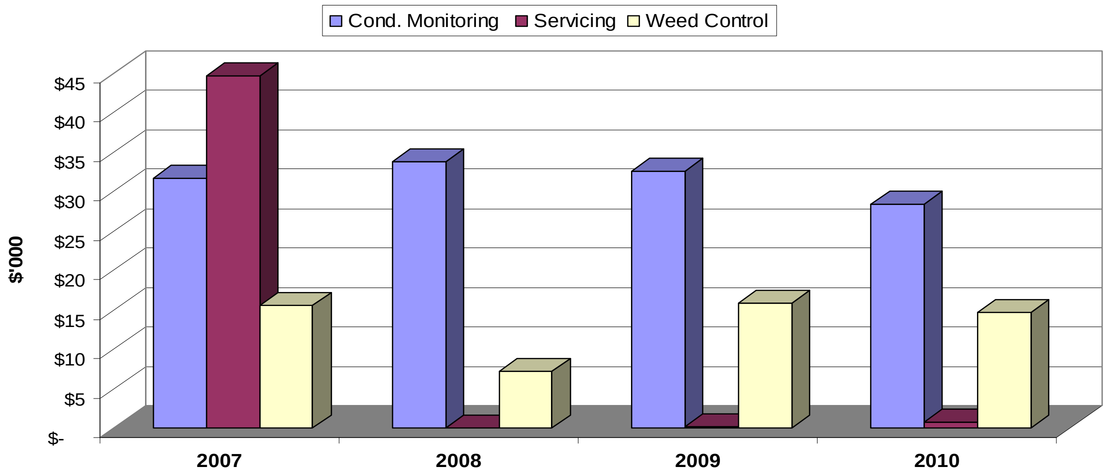

Figure 6-24. Breakdown of output activities under "Preventive Maintenance" for Boyne River and Tarong WSS[194]

Note that "Labour" is the main direct cost within "Weed Control", and in 2010 was $6,000 in total. Between 2007 and 2010, "Labour" costs for "Weed Control" has varied between $1,000 and $6,000 per annum, averaging $4,000 per annum (Figure 6-25).

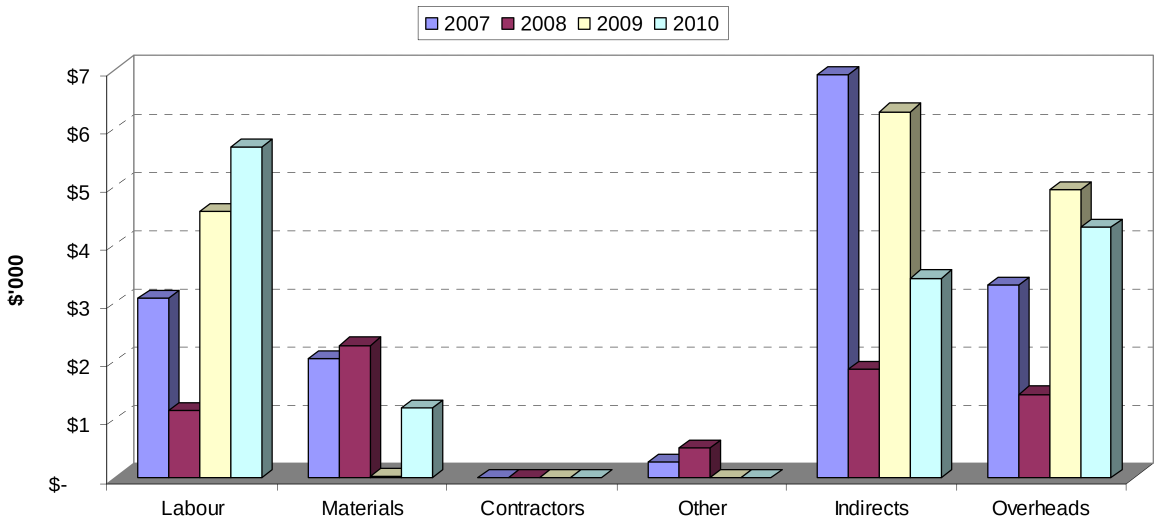

Figure 6-25. Breakdown of input costs towards "Weed Control" for Boyne River and Tarong WSS 2007-2010[195]

Unfortunately SunWater has not provided a breakdown of costs for 2011 onwards by output activity as illustrated above in Figure 6-24.

Validating the forecast Preventive Maintenance costs for 2011-2016

As indicated earlier within Table 6-4, forecast "Preventive Maintenance" costs for 2011 is $89,000, of which 32.6% (Figure 6-22) or $29,000 is in "Labour" costs. The following analysis seeks to examine the prudency and efficiency of the proposed $29,000 "Labour" expense.

[194] Raw data extracted from SunWater spreadsheet *"Extract LBC data Conversion extra activity detail and preventive main split.xls*".
[195] Raw data extracted from SunWater spreadsheet *"Extract LBC data Conversion extra activity detail and preventive main split.xls*".

SunWater has developed Operation and Maintenance manuals for the scheme, which detail the maintenance activities to be undertaken for "Condition Monitoring" and "Servicing", along with frequency. A recent review by Parsons Brinkerhoff (2010A) examined each of the individual activities specified within SunWater's Operation and Maintenance manual for the Boyne River and Tarong WSS, and validated the proposed activities and frequency prescribed. The Parsons Brinkerhoff (2010A) report also quantified the required man hours input required for each activity along with cost based on SunWater's internal hourly rates.

Of importance is the fact that the Parsons Brinkerhoff (2010A) study identified the following new activities that were not previously recorded as "Preventive Maintenance" activities (Table 6-5).

Table 6-5. New "Preventive Maintenance" activities not previous recorded within the system for Boyne River and Tarong WSS

Activity	Annual Hours	Labour cost
Boondooma Dam - Monthly Dam Safety Inspection	50	$ 1,850
Boondooma Valve House - Calibration	16	$ 656
TOTAL New Activities	**66 hrs**	**$2,506**

Source: Parsons Brinkerhoff, "Provision of Services for Costing SunWater's Work Instructions" (2010A), working appendices Spreadsheets.

Aurecon notes that the Parsons Brinkerhoff (2010A) report identified the need for monthly inspections for Boondooma Dam (Table 6-5), yet also notes that within "Operations" a cost allocation of approximately $23,000 was incurred in 2010 under "Dam Safety". SunWater has confirmed that the Dam Safety Inspection were previously recorded under Dam Safety, but for the forecast price path have been transferred to "Preventive Maintenance". Table 6-5 also highlights the need for calibrating the Boondooma Dam Valve House, requiring 16 hours at a cost of $656 in 2011.

Table 6-6 below highlights the key findings from the Parsons Brinkerhoff (2010A) study. It also highlights the recommended hours for SunWater for labour input (2011) against historic labour input by SunWater staff.

Table 6-6. Required labour input for "Preventive Maintenance" for Boyne River and Tarong WSS

Year	Hours	Direct annual labour cost	% of 2011 hours
2007*	299*	$14,340	61%
2008	199	$6,496	40%
2009	194	$7,030	40%
2010	206	$7,863	42%
Average 2007 - 2010	224	$8,932	46%
Proposed for 2011	**491**	$27,314	

Source: Parsons Brinkerhoff, "Provision of Services for Costing SunWater's Work Instructions" (2010A), working appendices Spreadsheets

*May include substantial error due to retro-fitting of historical data into the new business model

According to the Parsons Brinkerhoff report (2010A), to complete all the prescribed and required "Preventive Maintenance" activities (i.e. "Condition Monitoring" and "Servicing" only, ignoring "Weed Control") requires an annual input of 491 hours or a direct annual labour cost of $27,314 (Table 6-6).

As indicated above in Table 6-6, SunWater has incurred between 299 and 206 hours of labour input between 2007 and 2010 (noting that the 2007 input of 299 hours as potentially incorrect) resulting in average input of 224 hours per annum. In addition to the SunWater hours incurred is the need to incorporate the new activities amounting to an additional 66 hours.

Aurecon does not question the validity of the Parsons Brinkerhoff (2010A) study, and its recommendation for 491 annual hours of input. However, Aurecon suggests that prior to accepting the Parsons Brinkerhoff (2010A) recommendation, that an audit of historical activities (particularly 2010) is undertaken to identify if all activities were previously undertaken, and if coding errors resulted in these costs been allocated to other activities.

In the interim, Aurecon suggests that s that 290 hours labour input be budgeted for "Preventive Maintenance" ("Condition Monitoring" and "Servicing"), comprised of:

- 224 hours, being the average for 2007 to 2010, and
- 66 hours for additional "Condition Monitoring" activity (Table 6-5)

Costing "Preventive Maintenance" labour at $45 per hour[196] results in the labour cost for 290 hours or $13,500 per annum. Note that SunWater incurred hourly labour cost of $38.16 in 2010, and the Parsons Brinkerhoff (2010A) analysis equates to an average hourly charge of $55.63 per hour (although Parsons Brinkerhoff undertook an extensive investigation itemising each activity required and staff increment level). This possibly indicates that SunWater has previously utilised staff at lower salary/technical increment levels to undertake the majority of tasks (note the suggested audit of 2010 may also example the differences between what technical staffing levels were actually deployed in 2010, against recommended rates for 2011).

Costing of labour input towards "Weed Control" is also required. The following labour expense for Weed Control was identified[197]:

- $3,100 in 2007
- $1,100 in 2008
- $4,600 in 2009
- $5,700 in 2010

The annual average for 2007 to 2010 is $3,600. Aurecon recommends that "Labour" for "Weed Control" be based on the average for 2007 to 2010 plus 10%, equating to $4,200.

Aurecon recommends that the total budgeted cost for "Preventive Maintenance" labour be initially set at $17,700 ($13,500 for "Condition Monitoring" and "Servicing" and $4,200 for "Weed Control"). This is a reduction from the $29,000 currently projected for 2011, and will also reduce the allocation of "Indirects" and "Overheads" based on the existing allocation methodology that SunWater has adopted.

6.4.6 Corrective Maintenance costs

SunWater describess "Corrective Maintenance" as an unexpected failure requiring reactive corrective maintenance response. Two main types of activities:

- Emergency breakdown maintenance, requiring immediate action to restore normal operation or supply to customer to meet a regulatory obligation
- Non-emergency maintenance, activities no requiring immediate response but scheduled in advance of the planned maintenance cycle[198]

Projected "Corrective Maintenance" costs (including both emergency and non-emergency maintenance) for the Boyne River and Tarong WSS are highlighted below in Table 6-7. As a

[196] Based on using the latest financial cost incurred, ie. 2010 data in Table 6-6, dividing total labour cost of $7,863 by total hours of 206 equals $38.17/hr, Aurecon have then added approximately 20% to account for inflation from 2009/2010 year and salary increments for SunWater field staff and propose $45.00hr. Aurecon note that the Parsons Brinkerhoff (2010A) analysis recommended 546 hrs for an annual labour cost of $30,019, equating to $55.00/hr. The difference between the hourly labour expense incurred for 2010, versus the projected hourly rate by Parsons Brinkerhoff (2010) is most likely due to assumptions of using more senior SunWater staff at higher pay/cost increment.
[197] Raw data sourced from SunWater spreadsheet "*Copy of Extract LBC data conversion to sub activity.xls*".
[198] SunWater, *Boyne River and Tarong WSS NSP,* (2012-2016) January 2011, page 28.

proportion of "Total Operating" costs, "Corrective Maintenance" costs vary from 3.9% in 2007 to 9.9% in 2009.

Table 6-7. "Corrective Maintenance" costs and "Total Operating" costs for Boyne River and Tarong WSS

($'000)	Actuals				Forecast	Price Path				
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Corrective Maintenance[1]	15	10	27	22	23	23	25	25	25	25
Annual change		-33.3%	170.0%	-18.5%	4.5%	0.0%	8.7%	0.0%	0.0%	0.0%
Change since 2007		-33.3%	80.0%	46.7%	53.3%	53.3%	66.7%	66.7%	66.7%	66.7%
Total Operating costs	381	224	272	364	348	351	367	375	370	362
Corrective M as % of Total Operating cost	3.9%	4.5%	9.9%	6.0%	6.6%	6.6%	6.8%	6.7%	6.8%	6.9%

[1]Source: *Boyne River and Tarong WSS NSP,* (2012-2016), January 2011, Page 6.

For some schemes "Corrective Maintenance" costs have followed water usage levels. As indicated below in Figure 6-26 there seems to be a partial correlation between water usage and costs for some years. However, this relationship does not occur between 2009 and 2010 in which costs declined yet water usage increased slightly.

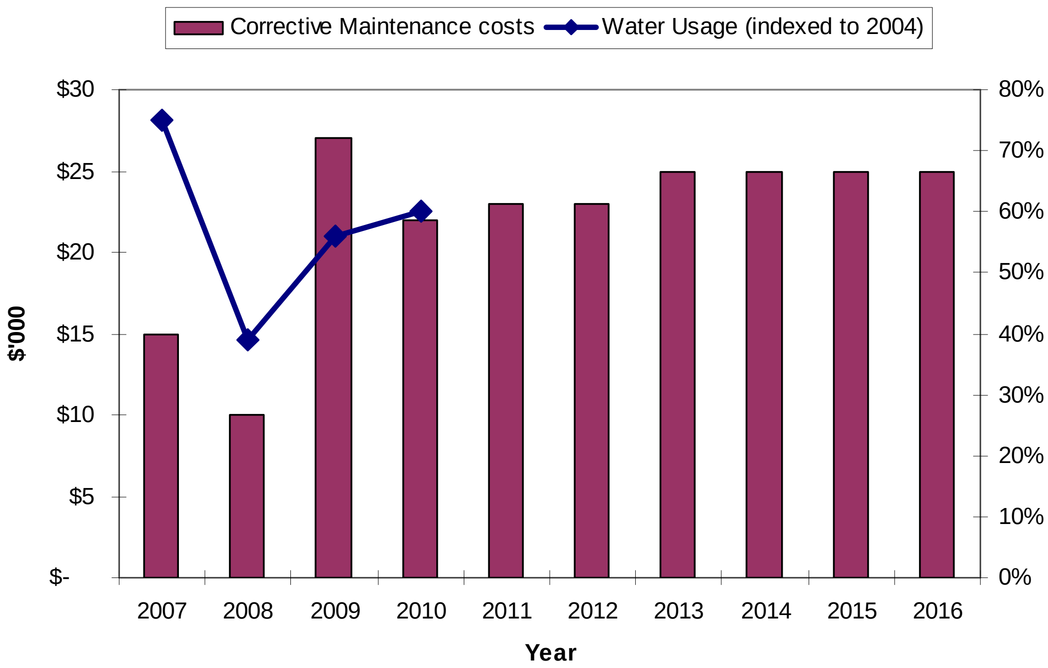

Figure 6-26. Comparison of "Corrective Maintenance" costs against water usage (indexed against 2004) for Boyne River and Tarong WSS[199]

The following sections seeks to examine in more detail the components that make up the "Corrective Maintenance" costs presented within Table 6-7, and examine in detail (data available) where changes have occurred.

[199] Raw data sourced from *Boyne River and Tarong WSS NSP,* (2012-2016), January 2011, Pages 6 and 14.

As illustrated below in Figure 6-27, “Overheads” and “Indirects” account for 47.8% of the projected total cost in 2011. Other significant components are “Labour” at 26.1%, “Materials” at 21.7%, and “Contractors” at 4.3%.

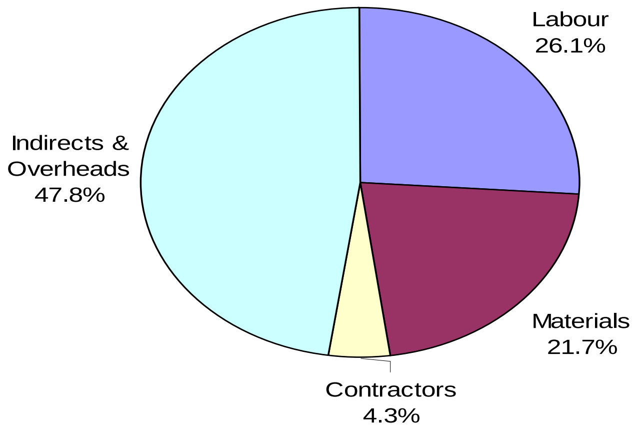

Figure 6-27. Breakdown of cost inputs towards “Corrective Maintenance” for Boyne River and Tarong WSS in 2011[200]

Figure 6-28 below provides a breakdown of the key cost input components of “Corrective Maintenance” between 2007 and 2011.

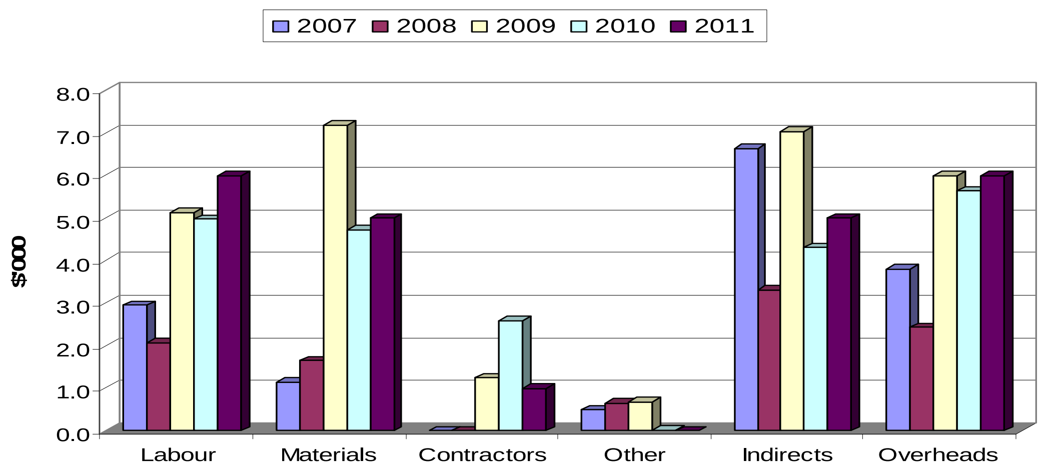

Figure 6-28. Breakdown of cost inputs towards “Corrective Maintenance” for Boyne River and Tarong WSS over 2007 to 2011[201]

It is noted that the projected cost for 2011 forms the basis for the next price path (2012-2016) (subject to inflation indexation). The scope of this consultancy was to examine the direct costs, which in this case are “Labour”, “Materials”, “Contractors” and “Other”.

As illustrated in Figure 6-28 above “Labour” costs have risen substantially from $2,000 to $3,000 in 2007/08 to $5,000 in 2009/10. In 2011, “Labour” costs are projected to increase further to $6,000, a 20% increase over the previous 2 years. The average “Labour” cost for 2007 to 2010 is $3,800 per annum, yet SunWater is proposing “Labour” costs of $6,000 in 2011.

[200] Raw data extracted from SunWater spreadsheet *“IM Central -610.03.PSV.xls”.*
[201] Raw data extracted from SunWater spreadsheets *“Extract LBC data Conversion extra activity detail and preventive main split.xls”* and *“IM Central -610.03.PSV.xls”.*

Aurecon forwarded the following question to SunnWater and received the following response[202]:

- Any indication of the basis for the Labour cost in 2011.

"The forecast cost is based on 5 years average and taking into account SunWater Enterprise Agreement".

However, based on the data presented, Aurecon is unable to substantiate the 2011 labour cost estimate.

"Material" costs are also very significant in relative terms and in 2009 were the highest direct cost at $7,000. The average "Material" cost for 2007 to 2010 is $3,700 per annum, yet SunWater is proposing "Material" costs of $5,000 in 2011.

Contractors are also utilised for "Corrective Maintenance", incurring a cost of $2,600 in 2010. However, SunWater has projected future "Contractor" costs at less than $1,000 per annum.

The annual average direct cost incurred for "Corrective Maintenance" between 2007 and 2010 is $8,900. For the forecast period starting at 2011, SunWater project "Corrective Maintenance" direct costs at $12,000, which represents an increase of approximately 50%.

Aurecon notes that it is difficult to forecast "Corrective Maintenance" costs. SunWater's approach to use historical expenditure as the basis for forecasting is commonly utilised by other water utilities. The historical average annual direct expense incurred (2007-2010) was $9,000, yet SunWater has projected 2011 at $12,000 (33% higher). Aurecon suspects that SunWater has only averaged the two most recent years (2009 and 2010 at an average at $13,000) in order to arrive at its forecast for 2011 of $12,000, or utilised the 4 year average and added expenses ($3,000) that it expects to incur for the next price path (note that Aurecon do not have information at hand to validate either of these propositions).

Aurecon question the justification for not using the preceding 4 year average. As such, Aurecon recommends that additional clarification and information be provided before accepting the prudency and efficiency of the 2011 cost estimates.

Total Maintenance expenditure

SunWater has indicated its intention to move to a reliability maintenance approach (RCM), which is a rick based process that can assist in providing the optimal mix of "Preventive" and "Corrective Maintenance". Table 6-8 below highlights the direct costs attributed to "Corrective" and "Preventive Maintenance", and also indicates that "Total Maintenance" costs in 2011 are 48.5% higher than that recorded for 2007. As previously indicated, concerns have been raised regarding the accuracy of the data for "Preventive Maintenance" in 2007.

[202] Sunwater email dated 30th June 2011.

Table 6-8. "Total Maintenance" costs for Boyne River and Tarong WSS

Direct Expenditure ($'000)	Actuals				Forecast	Price Path				
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Preventive Maintenance	28	19	19	18	35	37	38	39	40	41
Corrective Maintenance	5	4	14	12	13	13	14	14	15	15
Total Maintenance	**32**	**23**	**33**	**31**	**48**	**50**	**52**	**53**	**55**	**56**
Annual change		-28.4%	44.4%	-8.1%	56.3%	4.0%	4.0%	2.9%	2.9%	2.9%
Change since 2007		-28.4%	3.3%	-5.0%	48.5%	54.4%	60.6%	65.3%	70.1%	75.1%
Preventive maintenance %	85.8%	81.1%	57.2%	59.8%	73.4%	73.4%	73.4%	73.3%	73.2%	73.1%
Corrective maintenance %	14.2%	18.9%	42.8%	40.2%	26.6%	26.6%	26.6%	26.7%	26.8%	26.9%

[1]Source: Raw data extracted from SunWater spreadsheets *"IM Central -610.03.PSV.xls"* and *"Extract LBC data Conversion extra activity detail and preventive main split.xls*".

Although not stated at this time, it is highly likely that SunWater will identify an optimal ratio mix of (Preventive: Corrective) maintenance expenditure based on the RCM approach, which may be different to the 73%:27% projected above.

6.4.7 Scheme specific issues

Implications of converting 2,000ML of Medium priority Water to High priority

QCA has requested that Aurecon investigate the implications imposed on irrigators from the potential conversion of 2,000ML of Medium priority WAE to High priority. An analysis has been undertaken using SunWater's proposed new allocation methodology for operational expenditure (1:1 on WAE basis). It should be noted that SunWater also proposes changes to the allocation methodology of renewal expenditure resulting in a higher proportional been allocated to High priority, which partially offsets the higher Operational cost allocation to Medium priority [203].

Aurecon has been advised that the conversion ratios for both schemes are confidential. Notwithstanding, based on discussion with various stakeholders regarding schemes across the state, Aurecon has e adopted the use of two conversion ratios (Medium:High of 3:1 and 2:1) for this analysis.

For the Boyne River and Tarong Bulk scheme, Operating Costs for 2011 are proposed at $348,000, of which there are 155 bulk customers comprising 11,589 ML of Medium priority WAE and 33,210 ML of High priority WAE[204], indicating a total of 44,799 ML of WAE[205].

[203] Further details of SunWater's calculations and assumptions is provided within its paper (Feb 2010) QCA review of irrigation prices, Supplementary submission, Bulk water price differentiation, Pages 6-11.
[204] *Boyne River and Tarong Bulk WSS NSP,* (2012-2016) January 2011, Pages 7 & 14.
[205] Note that it does not include any free allocations that may exist.

Table 6-9. Operating cost implications per ML of converting Medium priority WAE within the Boyne River and Tarong Bulk WSS

	Change in WAE	Post Conversion Balance WAE	Operating cost per ML[1]
Currently			
Medium Priority	-	11,589 ML	
High Priority	-	33,210 ML	
Total WAE		44,799 ML	$7.77[2]
Conversion 2:1			
Medium Priority	- 2000 ML	9,589 ML	
High Priority	+ 1000 ML	34,210 ML	
Total WAE		43,799 ML	$7.95[3]
Conversion 3:1			
Medium Priority	- 2000 ML	9,589 ML	
High Priority	+ 667 ML	33,877 ML	
Total WAE		43,466 ML	$8.01[4]

[1]Note that the Operating cost per ML is the same for Medium, as it is for High, under the proposed 1:1 WAE cost allocation methodology.
[2]Note that this was calculated by dividing the proposed scheme Operating cost of $348,000 by 44,799 ML of WAE (ignoring possibly other allocations including free water).
[3]Note that this was calculated by dividing the proposed scheme Operating cost of $348,000 by 43,799 ML of WAE (ignoring possibly other allocations including free water).
[4]Note that this was calculated by dividing the proposed scheme Operating cost of $348,000 by 43,466 ML of WAE (ignoring possibly other allocations including free water).

As highlighted by Table 6-9 above, there will be a modest annual financial cost for irrigators if 2,000 ML Medium priority WAE are converted using a 2:1 conversion rate, increasing Operating Costs per WAE from $7.77 per ML to $7.95 per ML, an increase of 2.3%. The financial benefits for the party converting the allocation are highlighted below in Table 6-10.

Table 6-10. Annual costs for the hypothetical owner of 2000 ML of medium priority water

	Pre conversion (Medium WAE)	Post Conversion at 2:1 (High WAE)	Post Conversion at 3:1 (High WAE)
Currently			
WAE allocation	2000 ML	1,000 ML	667 ML
Operating cost allocation per ML[1]	$7.77	$7.95	$8.01
Total annual Operational cost exposure	$15,540	$7,950	$5,342

[1]As calculated above in Table 6-9.

The hypothetical Boyne River and Tarong scheme customer that is able to covert 2,000 ML of Medium priority WAE to High priority WAE at a ratio of 2:1 reduces their annual exposure to Operating Costs from $15,540 to $7,950[206].

This annual reduction produces a market signal for Medium priority WAE holders to convert to High Priority which is more likely to be pursued by high cost irrigators.

[206] Note that changes in the renewal cost allocation methodology will expose the entitlement holder to higher renewal costs on a per ML (WAE) basis, but is likely to still be in a more favourable financial position.

Allocation of operational expenditure to irrigators

See Section 4 which provides a detailed examination.

6.4.8 Feedback from field visits

Aurecon did not undertake a field visit to the Boyne River and Tarong Bulk WSS. However, the substantially stakeholder feedback obtained from the Bundaberg and Lower Mary field visits regarding the NSPs are also relevant to this scheme.

6.4.9 Potential efficiency gains and recommendations

The following points are made in relation to Opex

- On-going re-structuring of the SunWater workforce (and equipment) for the Central region, involving regional office relocations and restructuring of both administrative and operational staff is occurring. However, it was difficult to observe where any of these cost savings emerge.
- ""Operations" is a main cost. Aurecon has submitted a substantial number of questions to SunWater seeking additional information and transaction clarity, and received responses. However, Aurecon has insufficient information to review the prudency and efficiency of forecast expenditure. Aurecon recommends that the 2011 forecasts for Operations sub-activities be examined (and supporting calculations), with particular attention paid to forecast Metering and Dam Safety cost estimates. Aurecon notes that total "Operations" expenditure proposed for 2011 is approximately 1% lower than the average of the preceding 4 years (and also accounting for the transfer of $1,850 costs from "Dam Safety" to "Preventive Maintenance").
- The prudent and efficient direct "Labour" cost for "Preventive Maintenance" (2011) should be set at $17,700 (compared to $29,000 budgeted), until an audit of itemised historical activities (2010) is undertaken in order to identify what past prescribed activities have been undertaken or not, and examine the differences in hourly costs (between those incurred in 2010 against that prescribed within the Parsons Brinkerhoff (2010) report.
- Based on the historical data provided by SunWater, and the inability to validate the calculation of the 2011 expenditure using the preceding 4 years costs, Aurecon has insufficient information to fully validate the prudency and efficiency of proposed "Corrective Maintenance" direct costs. Aurecon recommends that additional clarification be provided by SunWater to substantiate the differences (and reasoning for the additional $3,000 annual expense).

6.5 Capital costs review

SunWater has developed a rolling renewal annuity program that runs for a forecast 25 year period. The forecast for the initial 5 year period is based on a detailed assessment of asset condition and risk of failure, whilst forecasts beyond 5 years are based on broader estimates of asset life using engineering estimates and standard replacement rules[207].

SunWater also state that *Renewals expenditure refers to works intended to maintain the ongoing performance and service capacity of the assets or, if this is no longer possible or economical, to replace the asset with a modern equivalent*. (SunWater, *Boyne River and Tarong WSS NSP*, (2012-2016), January 2011, page 29).

In relation to the Boyne River and Tarong WSS, renewal expenditure is limited to

[207] SunWater, *Barker Barambah Bulk WSS NSP*, (2012-2016) January 2011, Page 30.

- Boondooma Dam
- Boyne River Distribution

The following section provides an overview of renewal expenditure for the current price path (2007-2011) and forecast price path (2012-2016).

6.5.1 Review of historical renewal expenditure

Over the current price path period (2007 – 2011) annual renewals expenditure has been between $15,000 and $213,000 (Table 6-11). The sum total expenditure over this period is $709,000, for a mean annual average of $141,800.

Table 6-11. Historical renewals expenditure for the Boyne River and Tarong Bulk WSS

nominal dollars $'000	Financial Year					
	2007	2008	2009	2010	2011	Sum total 2007-2011
Actual renewal spent[1]	102	15	312	67	213	709
LBC target expenditure[2]	76	73	190	252	87	678
Difference ($'000)	26	-58	122	-185	126	31
Difference (%) from LBC target	34.2%	-79.5%	64.2%	-73.4%	144.8%	4.6%

[1]Source: *Boyne River and Tarong WSS NSP,* (2012-2016) January 2011, Page 6.
[2]Source: SunWater spreadsheet, *"Compare R&E Spend to Annuity 2007_2011.xls".*

Of concern has been the substantial variation between Actual renewal spent and LBC target expenditure. As noted above in Table 6-11, for 2007, 2009 and 2011 the actual spent has exceeded the LBC target by a substantial amount. However, over the entire price path (2007-2011) actual spend has exceeded the LBC target by only 4.6%, which is a comparatively good outcome in comparison to most other schemes.

Due to the very nature of water assets, it is very unlikely that an asset management plan will ever have the capacity to predict all possible renewal expenses in advance, particularly as you go further out in time. Table 6-11 above highlights that substantial cost reductions in expenditure were achieved in 2010, however in 2011 renewal expenditure is projected to be more than double that of LBC target.

SunWater was not been able to provide a detailed list of renewals projects that it intended to deliver over the current price path 2007 to 2011 (that would have formulated the LBC target expenditure). SunWater did provide an Excel database containing breakdown of historical renewals expenditure for the period 2007 to 2011 (actual expenditures up until 15th February 2011) for all projects greater than $10,000 in value (Table 9-12 below). However, there were a number of limitations to the database including:

- No indication of the Board approved budget for all projects in 2007
- Additional columns of "Revised Budget", and "Approved" along with "Board Budget" for 2008, 2009, 2010. In most cases, The amount recorded for an activity under "Revised Budget" equalled "Approved", and also "Yearly Total" (actual spend for that year). Highlighted the dynamic nature of the project budget management as the scope of works/activities changed
- Totals include Indirect and Overhead costs, and any proposed changes in allocation methods will impact renewal activity costs

- Many projects would run over several financial years, in which Board Approved budget only appeared in the first year, and not subsequent. Difficultly linking activities across years, due to the nature of the database provided
- The summation of annual totals within the database, did not equate with stated renewals expenditure for the scheme (see Table 6-13 below).

Table 6-12. Itemised historic renewals expenditure for Boyne River and Tarong WSS

Description	Start Date	Year	Spent	Status
Boondooma Dam Baulks Access Investigation	1/07/2006	2007	$10,755	Closed
Boondooma Dam 05 Refurb Diversion Tunnel Cement Lining	1/07/2006	2007	$6,873	Closed
BYR - O&M Manuals Study - O&M	1/07/2006	2007	$14,095	Closed
Boondooma Dam - Refurbish Trashscreens - 2004 DS Rec. 9.1b	19/02/2007	2007	$38,858	Closed
TOTAL for 2007			**$70,581**	
Boondooma Dam: WH&S Safety Buoys - Supply and installation	-	2008	$ -	Deferred
Boondooma Dam: Valve House Dehumidifier Platform (Design & Install) WH&S	-	2008	$3,735	Financial
TOTAL for 2008			**$3,735**	
Refurbish Oultet Works Dehumidifier	26/03/2009	2009	$11,052	Closed
Undertake Spillway Risk Assessment - Boondoomba Dam	1/07/2008	2009	$16,772	Closed
Vegetation to be poisoned/removed from main dam downstream embankments, groins and abutments	9/02/2009	2009	$18,216	Closed
Inspection - 5 Year Dam Safety - Boondooma Dam	1/04/2009	2009	$71,904	Closed
Refurbish Baulks - Boondooma Dam (as per 2004 5 Yearly Dam Safety Recommendations 9.2A, 9.2C, D, E, F)	1/09/2008	2009	$73,679	Closed
TOTAL for 2009			**191,623**	
2010/11 - Headworks Project Planning and Scoping	1/04/2010	2010	$ -	Released
Peer Review Comprehensive Risk Assessment - Boondoomba Dam	1/05/2010	2010	$25,625	WIP
Modify Stairway to Float Well - Gauging Station - Boyne River at Derra (WHS Issue)	1/11/2009	2010	$19,935	Closed
TOTAL for 2010			**$45,560**	
Conduct 10 Yearly Crane Inspection - Monorail Hoist – Valve house - Boondooma Dam	1/07/2010	2011	$5,852	WIP
Design Platform to Service Dehumidifier - Boondoomba Dam (WHS Issue)	1/01/2010	2011	$ -	WIP
Conduct 10 Yearly Crane Inspection - Hoist - Inlet Tower - Boondooma Dam	1/07/2010	2011	$8,036	WIP
Supply/ Install Buoys	1/07/2010	2011	$34,931	WIP

Description	Start Date	Year	Spent	Status
TOTAL for 2010 up until 15th Feb 2011			**$48,819**	

Source: SunWater spreadsheet "*2007-2011 PROJECTS.xls*"

Of the renewal expense items listed above in Table 6-12 for 2010, the following observations are made from the desktop review of data:

- Only 2 projects with expenditure for 2010
- One projects did have a Board approved budget (Peer review of Comprehensive Risk Assessment)
- The other 1 project was completed at a cost below the Board Approved Budget

Aurecon notes that there are differences between the stated annual renewal expenditure stated within the NSP, and the annual totals calculated by Aurecon based on the itemised database provided by SunWater as highlighted in Table 6-13 below. Aurecon notes that the discrepancy may possibly be due to one or more of the following:

- A significant amount of renewal projects were below $10,000 in value. Note that the consultants requested expenditure items valued at only $10,000 and above
- Additional adjustments and renewal transactions are allocated.

Table 6-13. Difference between itemised renewals expenditure and NSP totals for Boyne River and Tarong WSS

Year	NSP stated expenditure[1] (A)	Itemised expenditure (Table 6-10) (B)	Difference ($) (B-A)	Difference (%) (B-A) / (A)
2007	$102,000	$70,581	-$31,419	-30.8%
2008	$15,000	$3,735	-$11,265	-75.1%
2009	$312,000	$191,623	-$120,377	-38.6%
2010	$67,000	$45,560	-$21,440	-32.0%
2011	$213,000	$48,819*	-$164,181	-77.1%

[1]Source: *Boyne River and Tarong WSS NSP,* (2012-2016) January 2011, Page 6
*Progressive total up till 15th February 2011

6.5.2 Forecast renewals expenditure

There are significant renewal expenditures proposed for the Boyne River and Tarong WSS, and there is considerable variance in proposed annual expenditures (Figure 6-29). The substantial expenditure in 2032 relates to replacing cables and cableways, and replacing the water level recorder at Boondooma Dam.

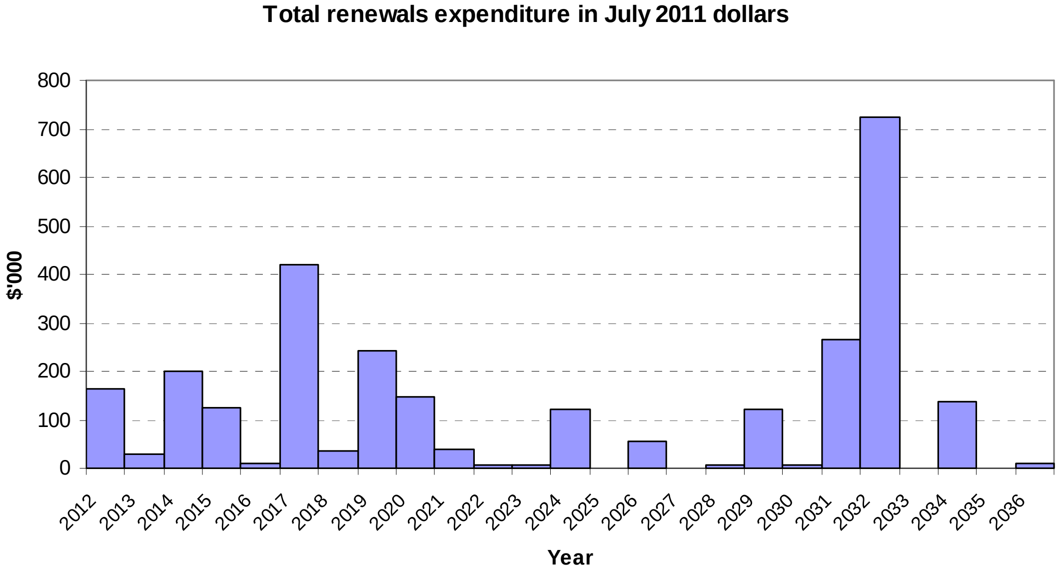

Figure 6-29. Proposed annual renewals expenditure for Boyne River and Tarong Bulk WSS 2012 to 2036[208]

As disclosed within the NSP, there are a number of significant proposed expenditures (Table 6-14). In 2012, there is a proposal to refurbish a section of the spillway floor for $90,000 (Boondooma Dam).

Table 6-14. Forecast renewals expenditure for Boyne River and Tarong Bulk WSS 2012 to 2016

Real dollars, $'000	Financial Year				
	2012	2013	2014	2015	2016
Boondooma Dam	157	30	200	124	9
Boyne River Distribution	6				
Cost estimate for renewals program	163	30	200	124	9

Source: *Boyne River and Tarong WSS NSP,* (2012-2016) January 2011, Page 30.

The summary total renewals expenditure for 2012 to 2016 is $526,000, or an annual average of $105,200 (compared to the annual average of $141,800 for the 2007 to 2011 period).

Although the vast majority of expenses highlighted above in Table 6-14 relates to the refurbishment/overhaul/replacement of assets, there also are significant costs associated with auditing including a cost of $124,000 in 2014 for a 5 year comprehensive inspection of the Boondooma Dam.

Table 6-15 below provides detailed description of proposed renewal expenditures for 2012 to 2016.

[208] Raw data extracted from SunWater spreadsheet "*NSP Projects Central V4.xls".*

Table 6-15. Detailed review of forecast renewals expenditure for Boyne River and Tarong WSS 2012 to 2016

ID No.	Year	SunWater Description	Total cost up to 2016 ($'000)
Boondooma Dam			
F1	2012	Manufacture/Install Access Platform	15
F2	2016 & 10 yearly thereafter	5Y Crane Inspection - as per AS2550	9
F3	2014	Desilt Main Diversion Conduit	49
F4	2012	Investigate Safe Operation of Decking	13
F5	2013	Investigate/design hoist Beam	9
F6	2013	Redesign gate winch mechanism	12
F7	2014 & 8 yearly thereafter	Refurbish Hoist - mech & elec refurbishment, replace rope, corrosion treatment	6
F8	2012	Refurbush section of spillway floor	90
F9	2012	refurbish: Stage2 - Repair the area of 'drummy' and cracked concrete; 2009 D/S discovered other areas requiring repair	26
F10	2014	Replace Bulkhead gate seal	22
F11	2014 & 5 yearly thereafter	Study: 5yr Dam Comprehensive Inspection (by 1 Jun 2014)	124
F12	2012	Study: detailed inspection of Joints	12
F13	2013	Study: Volume of Water indicator	9
F14	2015	Upgrade wall of Dissipator chambers	124
Boyne River Distribution			
F15	2012	Install telephone line from gauging station to Boondooma PSTN	6

Source: SunWater Database, "*NSP Projects Central V4.xls*".

Table 6-15 above provides details for specific renewal expenditures proposed for 2012 to 2016, and an indication if a recurring capital expense occurs between 2017 and 2036. Table 6-16 below highlights additional expenditure activities above $10,000 in costs proposed for 2017 to 2036 (that were not captured in Table 6-15 above).

Table 6-16. Review of forecast renewals expenditure over $10,000 for Boyne River and Tarong WSS 2017 to 2036

ID No.	Year	SunWater Description	Cost per activity ($'000)
Boondooma Dam			
F16	2021 & 2031	10Yr Crane Inspection	35
F17	2020	Refurbish Metalwork - Handrail/ ladder & 450 CICL replacement	97
F18	2026	Refurbish Pipework D/S OF Valve	11

ID No.	Year	SunWater Description	Cost per activity ($'000)
F19	2020 & 2034	Refurbish Road - 1.5km to OWKS, fill potholes, reconstruct drainage, spray seal	18
F20	2026	Refurbish Valve - 750mm dia CDV patch painting - (iron problem in water)	36
F21	2018	Refurbish: Implement Recommendation 4i) - 2004 5-Yearly Dam Safety Inspection - 4WD Crossing (See ES	36
F22	2017	Refurbish: Replacement of Sealer in upstream slope to specifications detailed in scoping project of 2012	171
F23	2020	Replace 450 Butterfly Valve - Manual	31
F24	2032	Replace Cables & Cableways	561
F25	2017	Replace Canteen	55
F26	2031	Replace Hoist-Inlet Tower	59
F27	2031	Replace Hydraulic Control System	173
F28	2017	Replace SwitchBoard-Outlet, Low Voltage	10
F29	2017	Replace Valvehouse Electrics	12
F30	2017	Replace Water Level Recorder	165
F31	2019	Study: 20yr Dam Safety Review (by 1 May 2019)	122

Source: SunWater Database, "*NSP Projects Central V4.xls".*

Aurecon selected a handful of renewal projects from the above tables for additional desktop analysis. To assess the prudency and efficiency of these forecast renewal expenditures, Aurecon requested from SunWater:

- Indication of the Asset life assigned, or condition reports, options reports, or asset management plans that demonstrated the need for renewal expenditure
- Bill of Materials that scoped the project identifying the quantities of input materials
- Unit charge rates used for costing purposes (Bill of Materials in most cases)

In response to Aurecon's request, SunWater provided information for the following renewal activities.

Boondooma Dam – replacement of sealer in upstream slope to specifications detailed in scoping project of 2012 (2017) - $171,000

SunWater has indicated that[209]:

- *Asset Life: there is no asset life for the sealer.*
- *Bill of materials: Does not exist.*
- *Unit rates: Not available*.

SunWater states that the project was identified during the 2010 annual dam safety inspection; hence the prudency is validated by a dam safety inspection.

[209] SunWater email dated 1st August 2011

As no details regarding the scope of works and/or costing has been made available by SunWater, Aurecon is unable to validate the efficiency of this renewal activity based upon a desktop review and the information at hand.

Boondooma Ddam – Replace cables and cableways (2032) - $561,000

As with all other cable and cableway installations, a 35 year asset life is assigned. The cable assets at Boondooma Dam have been in existence since 1985 indicating a replacement date of 2021/22. However, SunWater has undertaken a condition assessment that indicates that the cables are performing adequately, and therefore the decision has been made to defer their replacement by 10 years. SunWater has indicated that the works will be scheduled within the 5 year window, unless there is a change in either condition or risk to bring the works forward.

SunWater also provided an extensive Bill of Materials for the proposed replacement works, along with unit charge rates for inputs (predominately cable and cable conduit). The Bill of Materials provided was based upon a pre-2000 valuation (mainly 1997). SunWater has utilised the Cardno (2008) study[210] to index all Bill of Materials related to Electrical assets by 2.13 to inflate them to a 2008 valuation. Aurecon has reviewed the stated unit rates (2008) for a number of listed items against quoted commercial rates, finding that the unit rates adopted by SunWater was efficient. However, Aurecon encountered difficulty substantiating the unit rate costs proposed for the 150mm cable due to a lack of information (product detail).

An examination of the Bill of Materials (2008 valuation) indicated direct materials cost of $347,000 for replacement.

Aurecon notes that an expenditure of $561,000 has been assigned for this task in 2022. Note that Aurecon has not been provided with a breakdown but assume it is based on the indexed Bill of Materials, project management fees, possibly a percentage for contingency costs (to cover over-runs for material cost inputs and contractor expenses), and Overheads.

Based upon a desktop review of the information provided, Aurecon views that the proposed renewal activity is prudent in terms of timing, particularly as the proposed replacement date is well beyond the ascribed asset life.

Due to a lack of information, Aurecon was not able to validate the unit cost rate attributed to the 150mm cable replacement which represented 56% of the total direct costs for the activity. Therefore Aurecon is not in a position to validate the efficiency of the proposed unit costs for this activity.

Boondooma Dam – replace water level recorder (2017) - $165,000

The prescribed asset life for the water level recorder is 15 years. This recorder has been in existence since 1980, and condition assessments indicated that it is still functioning adequately[211]. SunWater has made a decision to defer its replacement until 2017, suggesting a possible operational life of 37 years (more than double the initial assigned asset life).

SunWater has provided a Bill of Material from the SAP records for the asset that related to 1997 valuation. Using the Cardno[212] recommended indexation rate for this equipment of 2.13, then Aurecon estimatess that the updated 2008 replacement cost is approximately $85,000.

Based on the information presented by SunWater, Aurecon views the proposed timing of the replacement activity as prudent, considering the prescribed asset life and actual operating life achieved.

Without more detailed asset information pertaining to the water level recorder, Aurecon is unable to ascertain the relative commercial replacement value based on the information at hand. As such, Aurecon is unable to evaluate the efficiency of the proposed renewal expenditure.

[210] Cardno (June 2008) Asset Valuation, Final Report SunWater, Job No. 3601-58
[211] SunWater email dated 1st August 2011.
[212] Cardno (June 2008) Asset Valuation, Final Report SunWater, Job No. 3601-58, Page 52.

6.5.3 Renewals annuity balances

The Boyne River and Tarong Bulk WSS has a substantial positive balance of $1.1 million in 2012.

Stakeholders have expressed interest in relation to the calculation of this opening balance for 2012. SunWater has provided Aurecon with an internal working paper[213] which illustrates:

- Opening Balance at 1 July 2006 was $287,000 for the Boyne River (irrigation sector).
- Identified annual annuity incomes and expenses specifically for the Bulk Scheme for 2007 to 2011
- Identified that the closing balance for 30 June 2011 for the Bulk Scheme is $578,000 (irrigation sector balance). Incorporating an uplift factor of 1.95 for whole of scheme, the opening balance for 1 July 2011 is $1,128,000.
- Applied an interest rate of 9.689% (pre-tax nominal) on annual balances

Utilising this information presented above, Aurecon have modelled the stated expenses and income for 2007 to 2011, incorporating the stated 2007 annuity starting balance and annual interest of 9.689%. Aurecon arrived at a closing balance of $578,000 (prior to uplift factor) as stated within the SunWater paper.

As indicated below within Figure 6-30, the scheme incurred significant annual interest income throughout (actually higher than annual incomes or expenses), which continued to increase each year. Aurecon estimates that the scheme gained approximately $193,000 in interest income over the entire 2007 to 2011 period.

Figure 6-30. Calculated annual renewal balance for Boyne River and Tarong WSS 2007 to 2011

Figure 6-30 also highlights that annual annuity income was significantly greater than expenses. The sum total of annuity income for 2007 to 2011 was $133,000, while renewal expenses totalled $35,000[214], resulting in a surplus of $98,000. Adding the surplus of $98,000, plus the interest income over the period of $193,000 equates to $291,000 (added to the starting 2007 balance of $287,000 equals the closing balance of $578,000).

As indicated in Figure 6-31 below, the balance is to remain positive until 2035.

[213] Source: SunWater, *Renewals annuity calculation, INTERNAL WORKING PAPER*, January 2011
[214] Note that only 6% of Renewal Expenditure is apportioned to the irrigation sector for this scheme.

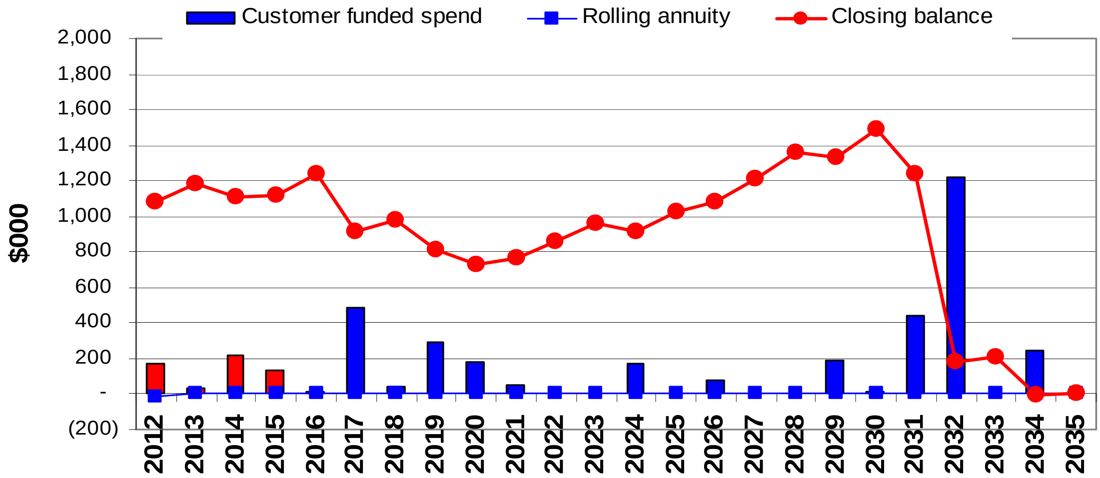

Figure 6-31. Renewals annuity balances for Boyne River and Tarong WSS 2012 to 2036[215]

Applying SunWater's prescribed real rate of interest of 9.689% upon the starting annuity balance in 2012 of $1.1 million, implies an annual interest income of approximately $106,000 in 2012.

As indicated above, the proposed average renewal expenditures for 2012 to 2017 is $105,200 per annum. As a result of the substantive positive balance in 2012, the annual annuity charge going forward is minor as highlighted below in Table 6-17.

Table 6-17. Renewals annuity charge for Boyne River and Tarong Bulk WSS 2012 to 2016

Real dollars, $'000	Financial Year				
	2012	2013	2014	2015	2016
Renewal annuity charge	-13	1	1	3	3

Source: *Boyne River and Tarong WSS NSP,* (2012-2016) January 2011, Page 31.

6.5.4 Feedback from Field Visits

Aurecon did not undertake a field visit to the Boyne River and Tarong WSS. However, the substantially stakeholder feedback obtained from the Bundaberg and Lower Mary field visits in relation to the NSPs are also relevant to this scheme.

6.5.5 Summary of findings on renewals expenditure

Historical Renewal Expenditure

SunWater was not able to provide to this review, the proposed renewal programme as developed in 2006 for the current price path. However, as highlighted earlier SunWater's actual expenditure on renewals over the 2007-2011 period was only 4.6% over the proposed LBC target expenditure (noting that the data for the 2011 financial year is incomplete), which is a comparatively good achievement in comparison to most other schemes.

A closer examination of the 2010 data (2 itemised renewal expenditures) revealed that one renewal activity did not have a Board approved budget, while the other project had been completed under the Board approved budget by a substantial amount. As indicated earlier,

[215] Source: SunWater spreadsheet, *"Annuity charts – V610 03.xls"*

the itemised database provided by SunWater accounted for 68% of total recorded annual renewal expenditure for 2010.

Due to the inability to undertake an field investigation (and difficulties obtaining data from SunWater within limited timeframes), Aurecon was only able to undertake a desktop review of the historical renewal expenditure items. Aurecon found through its detailed field investigation at Bundaberg and the Lower Mary the processes engaged (i.e. identification of need through condition assessments, timing, scoping, and tendering for the engagement of external contractors) indicated a structured and efficient process. However, substantial Indirect and Overhead costs were also incorporated, which greatly distorted the perceived value for money outcome achieved for the activity. Where variations were made to renewal activity budgets, substantiated reasoning and justification was found for these projects.

Considering that the itemised listing of renewal expenditure provided by SunWater accounted for approximately 30% to 70% of stated annual expenditure for 2007 to 2011, Aurecon recommends that an additional request is made to SunWater to provide a comprehensive itemised inventory of renewal expenditure items, so that 100% of the stated annual cost can be validated. In addition, Aurecon recommends that an audit be undertaken for all projects without Board approved budgets, or that projects that have substantially exceeded the Board approved budget be examined in more detail.

Forecast Renewal Expenditure

Aurecon undertook a desktop review of several major proposed renewal projects for the Boyne River and Tarong WSS and found that:

- For the Boondooma Dam's replacement of sealer in upstream slope to specifications detailed in scoping project of 2012 (2017) for $171,000 that no details regarding the scope of works and/or costing is available. Therefore Aurecon is unable to validate the efficiency of this renewal activity based upon a desktop review and the information at hand.
- For the Boondooma Dam replacement of cables and cableways in 2032 for $561,000, Aurecon views that the proposed renewal activity is prudent in terms of timing, particularly as the proposed replacement date is well beyond the ascribed asset life. However Aurecon was unable to validate the efficiency of the proposed expenditure due to a lack of asset information.
- For the Boondooma Dam's replacement of the water level recorder in 2017 for $165,000, Aurecon views the proposed timing of the replacement activity as prudent, considering the prescribed asset life and actual operating life achieved. However, once again Aurecon was unable to validate the efficiency of the proposed expenditure due to a lack of asset information.

7. Assessment of Lower Mary River Bulk Water Supply Scheme

7.1 Scheme Description

The Lower Mary River Bulk WSS is located near the town of Maryborough. The system is located downstream of Tiaro along the Mary River, and downstream of Teddington Weir on Tinana Creek. Teddington Weir is owned and operated by Maryborough City Council[216] (now Fraser Coast Regional Council) (Figure 7-1 below).

Figure 7-1 Mary River WSS[217]

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[216] SunWater (2011), Scheme Information http://SunWater.com.au/schemes accessed 25th April 2011.
[217] SunWater, *Lower Mary WSS – Scheme Operation Manual*, page 17, un-dated report.

The Lower Mary River Bulk Water Supply Scheme (WSS) has a total of 177 customers (of which 79 take water in the distribution network) comprising of 32,688 ML of medium priority WAE and 1,809 ML of high priority WAE[218].

The scheme supplies water to a number of customers including:

- irrigating of agricultural crops, primarily sugar cane with approximately half of the irrigators access water via the distribution network,
- customers holding stock and domestic entitlements along the river system
- urban/industrial customers (high priority) at Maryborough

Under the Interim Resource Operating Licence (IROL) SunWater has an obligation to manage and operate the Mary River and Tinana Barrages:

- Mary River Barrage is located southwest of Maryborough on the Mary River. It is a concrete-capped sheet-pile structure built in 1982. The crest is approximately 3 m above mean-tide level. It stores up to 12,000 ML @ FSL 2.9m AHD, and its main purpose is to provide a pumping pool for the Owanyilla and Copenhagen Pump Stations. The barrage's fishway was changed in 2001 into a vertical-slot type fish ladder[219].
- Tinana Barrage is located on Tinana Creek southeast of Maryborough. It also is a steel pile concrete-capped structure built in 1980. It stores up to 4,700 ML, and does not have a dedicated outlet as water can be released through the fishway. As with the Mary River Barrage, the fishway was rebuilt in 2000 replacing an earlier model that had failed to deliver[220].

Aurecon undertook a site visit of both the Lower Mary River Bulk WSS and Distribution schemes on 9th March 2011. The focus of the scheme site visit was to:

- meet with irrigation stakeholders at the Canegrowers office (Maryborough)
- Under the guidance of the regional SunWater manager, inspect a sampled number of asset locations to examine:
    - recent renewal expenditures
    - proposed renewal expenditures
    - review the nature and extent of operations and maintenance activities undertaken at that location

The following sections provide an overview of the observations and learning from the desk top review and site visit undertaken to the Lower Mary River Bulk WSS.

7.2 Scheme management

The Lower Mary River Interim Resource Operations Licence (IROL) sets the regulatory framework for the management of water within this scheme. Management of the scheme is managed from SunWater's regional office at Bundaberg, whilst day-to-day operations are supervised from SunWater's Maryborough depot.

SunWater has two operational staff located within an office at Maryborough to primarily service the Lower Mary River Bulk and Distribution. Stakeholders have expressed concern regarding SunWater's Maryborough Office facilities being excessive in terms of capacity and cost. The regional manager (SunWater) indicated that planning is underway to relocate the operational SunWater staff at Maryborough to a small depot (garage with office desk) on

[218] SunWater, *Lower Mary River Water Supply Scheme Network Service Plan*, page 13.
[219] SunWater, *Lower Mary Water Supply Scheme – Scheme Operation Manual*, page 25, un-dated report.
[220] SunWater, *Lower Mary Water Supply Scheme – Scheme Operation Manual*, page 28, un-dated report.

SunWater land at one of the Barrage locations, and subsequently disposing of the existing office in the main centre of Maryborough.

Note that the two staff members at Maryborough also undertake duties at other scheme locations within the Central region as required. The other schemes include Boyne (Bulk), Barker Barambah Bulk), Upper Burnett (Bulk) and Bundaberg (Bulk and Distribution).

At times, SunWater staff from other locations within the Central region will be utilised for scheme specific activities for the Lower Mary River Bulk Water Supply Scheme, particularly from the Bundaberg Depot which is the main office for the Central region, and also houses a storage workshop. Key staff resources at the Bundaberg office include:

- Regional Operations Manager & Service Manager
- 3 working teams of two electricians (also assist Biloela)
- 2 working teams of two fitter & turners (also assist Biloela)
- 9 operational staff located at Bundaberg and Gin Gin (operate primarily Bundaberg Bulk and Distribution systems)
- 8 Technical officers and Schedulers (for Central region including Biloela)
- 2 Administrative staff (for Central region)

Other SunWater staff resources at other Central region locations:

- 2 staff located within the Upper Burnett, one officer working from home at Mundubbera, and one officer working from the office/workshop at Wuruma Dam
- 5 staff located within the Lower Burnett (servicing the Boyne Bulk and Barker Barambah Bulk), at the main office workshop complex at Boondooma Dam, and also operating from a small relocatable office at Bjelke Petersen Dam

SunWater advised that in recent years there has been an on-going management strategy to relocate positions (as vacancies arise) from the smaller centres to Bundaberg. As highlighted above, small mobile working teams located at Bundaberg service all schemes across the central region.

7.3 Summary Opex and Capex information from the NSP

The Lower Mary River Bulk Water Supply Scheme (WSS) has a total of 177 customers (of which 79 take water in the distribution network) comprising of 32,688 ML of medium priority WAE and 1,809 ML of high priority WAE. SunWater proposess to allocate 95% (based on WAE proportions) of the operating expenses and 42% (based on the Headworks Utilisation Factor) of the renewals annuity cost to medium priority WAE holders.

The NSP for the Lower Mary River Bulk WSS proposes that the efficient operating costs for the scheme for the coming 5 year regulatory period average $286,000 per annum. This represents a substantive 17.8% increase over the current price path average of $235,000 per annum.

Stakeholders have expressed interest examining the projected lower bound operating costs for the scheme as projected within the 2005/06 Irrigation Price Review by Indec Consulting[221]. However, SunWater advise[222] that a direct comparison between the Tier 1 projected 2005/06 lower bound operating cost against actual expenditure as presented within the NSP for 2007 to 2011 is not feasible as;

- that the Tier 1 tables for “scheme lower bound cost” include only the irrigation share of the costs, and that grossing up the costs is problematic

[221] Statewide Irrigation Pricing Working Group, *SunWater Irrigation Price Review 2005-06 Tier 1 Report*, April 2006, Table 5.22, page 54.
[222] Email from SunWater to the QCA, dated 23rd February 2011.

- and that Tier 1 data is "whole of scheme', whereas SunWater has unbundled costs between bulk and distribution for the Lower Mary

Notwithstanding these limitations, Aurecon has examined the projected LBC values for 2006-2011 provided within the Tier 1 report against the costs presented within the NSP's (See Appendix A).

Projected renewal annuity spend over the five year period to 2016 is $143,000, which is substantially less than the $307,000 spent over the preceding 5 year period. Due to a positive annuity starting balance of $160,000 in 2012, a total charge for renewal annuity of $13,000 is sought for the 2012 to 2016 price path.

The following sections examine Opex (operational costs) and Capex (renewals expenditure) in more detail.

7.4 Operational costs review

An overview of required operational activities for the scheme is identified within the *Lower Mary Water Supply Scheme – Scheme Operation Manual*[223]. The manual provides in detail an overview of the scheme structure, compliance requirements, overview of scheme operations activity requirements, and references for collecting and reporting scheme data.

For each scheme SunWater has utilised the Scheme Operation Manual as a key input towards the formulation of Maintenance Schedule and Operations Manual for individual assets/facilities across the scheme, as highlighted below within Figure 7-2.

In the case of the Lower Mary River Bulk WSS, a separate operations manuals/maintenance schedule exists for both the Mary River and Tinana Creek barrages.

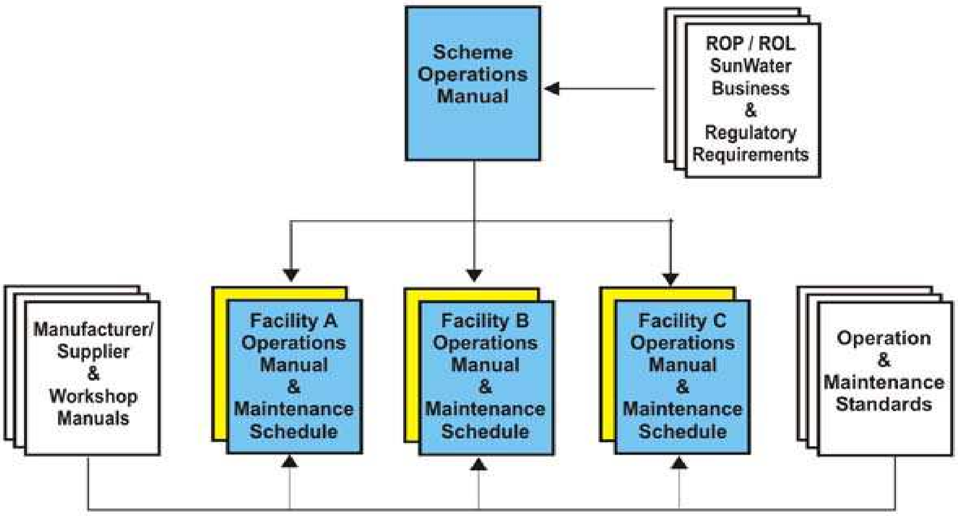

Figure 7-2. Overview of the linkages between Scheme and individual facility Operations Manual[224]

[223] SunWater, *Lower Mary Water Supply Scheme, Scheme Operation Manual*, document un-dated.
[224] SunWater, *Lower Mary Water Supply Scheme – Scheme Operation Manual*, page 13, un-dated report.

7.4.1 Overview

Within the NSP SunWater has presented “Operational” costs by type, and also by activity. As such, Aurecon has undertaken a review of “Operational” costs by investigating in detail key expenditure items of “Labour” and “Electricity”, and key expenditure activities of “Operations”, “Preventive Maintenance” and “Corrective Maintenance”.

Although not consistently obvious across all, many “Operational” cost items and activities vary accordingly to water usage levels.

As indicated below (Figure 7-3) annual water usage within the Lower Mary River Bulk WSS fluctuated substantially from year to year. The highest annual water usage occurred in 2007 in which approximately 16,300ML was utilised.

For the purposes of incorporating water usage into this cost analysis, Aurecon has indexed annual water usage for 2007 to 2010 period against the 2007 water use rate of 16,300ML (highest recorded water usage value across the 2003 to 2010 period, including Network losses) as follows:

- Approximately 100% in 2007
- Approximately 25% in 2008
- Approximately 32% in 2009
- Approximately 61% in 2010

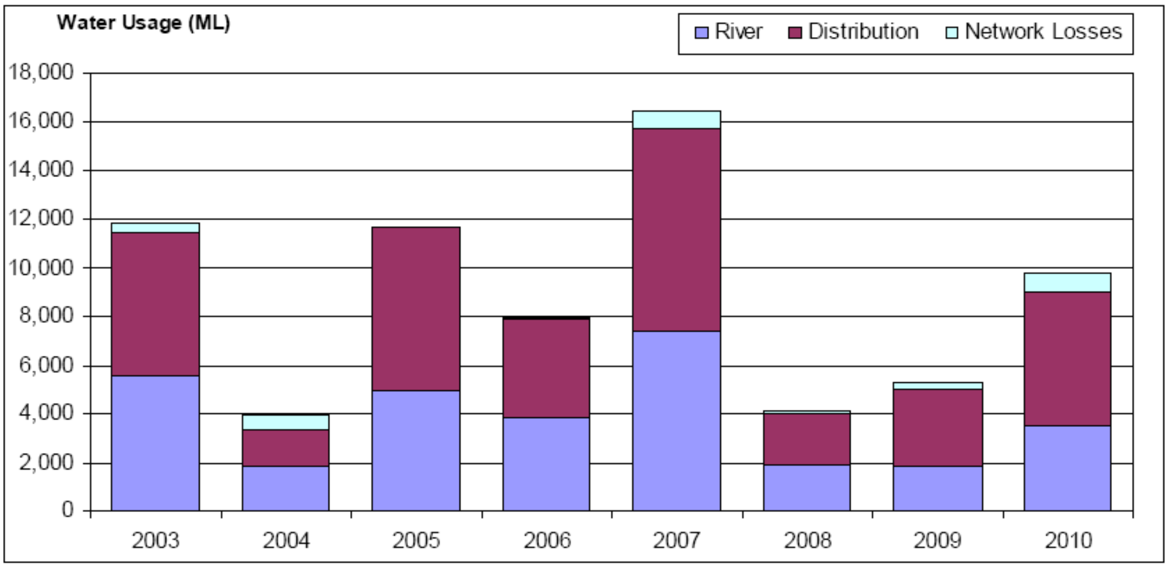

Figure 7-2*. Water usage for Lower Mary River Bulk WSS*[225]

Stakeholder feedback indicates that with the exceptional wet season experienced during the current growing season (2010/2011) is likely to result in a much lower water usage level for the scheme in 2011 (over that of 2010).

Figure 7-3 below compares water usage against “Operating” costs. “Operating” costs declined sharply from 2007 to 2008 as water usage levels declined from 100% in 2007 to 25% in 2008. However, for the following three years “Operating” costs increased at a much higher rate than water usage, and by 2010 “Operating” costs were higher than that for 2007 yet water usage in 2010 was only 61% of that in 2007.

[225] Source: SunWater, *Lower Mary River Water Supply Scheme NSP*, (2012-2016) January 2011, Page 15.

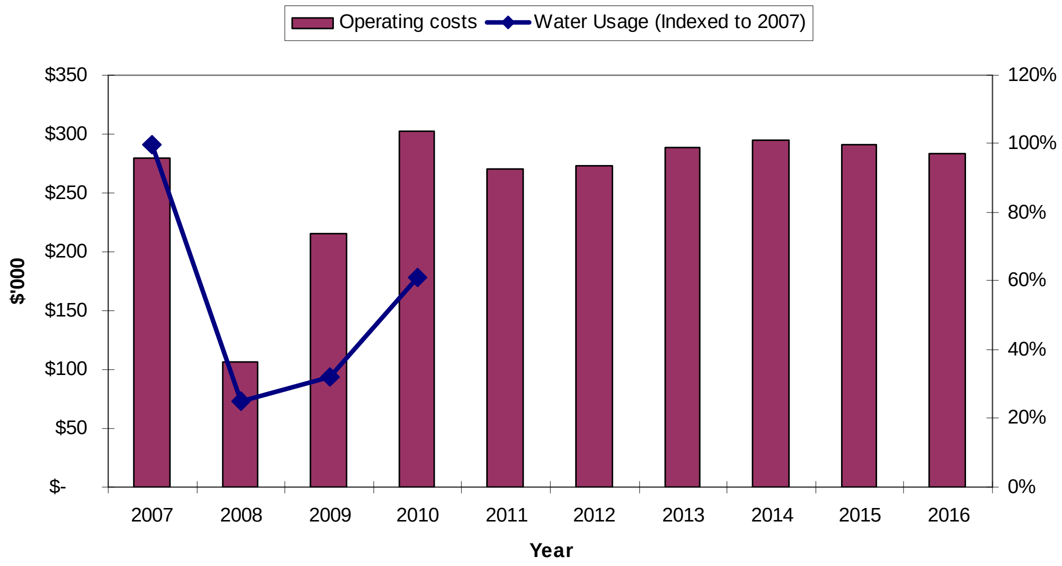

Figure 7-3. Comparison of "Operating" costs against water usage (indexed against 2007) for Lower Mary River Bulk WSS[226]

As illustrated above in Figure 7-3, "Operating" costs for 2011 are slightly lower in 2011.

The key cost component of "Operating" cost across the period from 2007 to 2016 is clearly "Operations" costs (Figure 7-3). Substantial "Electricity" costs were recorded for 2007, but seem to have been a one-off event. Aurecon forwarded the following questions to SunWater, and received the following responses[227].

- A substantial one-off "Electricity" cost are recorded for 2007.
  "*The electricity cost for 2007 includes distribution system."*
- What quantity of water was transferred across to Tinana in 2007?
  "Our records show no water was transferred to Tinana in 2007."

Aurecon notes that this "Electricity" expenditure (2007) does not impact any proposed activity expenditures for the next price path (other than to inflate the historical "Operating" scheme costs for 2007). "Preventive Maintenance" costs appear to have become quite significant from 2011 onwards.

[226] Raw data sourced from *Lower Mary River Water Supply Scheme NSP*, (2012-2016) January 2011, Pages 7 & 14.
[227] SunWater responses are sourced from email dated 30th June 2011

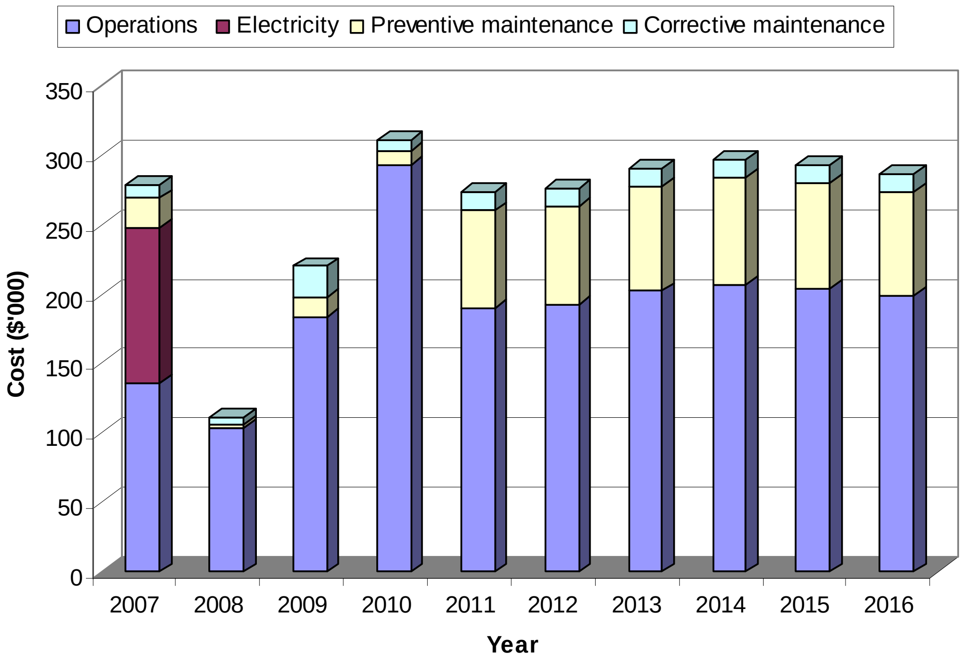

Figure 7-4. Breakdown of Operating costs for Lower Mary River Bulk WSS 2007 to 2016

The following sections examine in more detail operational expense items and activities.

7.4.2 Operational expense items

This section analyses the key operational expense item of "Labour".

7.4.3 Labour costs

Projected "Labour" costs for the Lower Mary River Bulk WSS are consistent going forward (Table 5-1). "Labour" as a proportion of "Total Operating" costs have historically varied from 13.1% in 2008 to 26.2% in 2010, but of concern has been the growth of "Labour" costs in absolute terms since 2007.

Table 7-1. Labour costs and Total Operating costs for Lower Mary River Bulk WSS

($'000)	Actuals				Forecast	Price Path				
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Labour[1]	44	14	40	79	87	88	89	89	89	89
Annual change	-	-68%	186%	98%	10%	1%	1%	-	-	-
Change since 2007	-	-68%	-9%	80%	98%	100%	103%	103%	103%	102%
Total Operating costs[1]	279	107	215	302	271	273	288	295	291	283
Labour as % of Total Operating costs	15.8%	13.1%	18.6%	26.2%	32.1%	32.2%	30.9%	30.2%	30.6%	31.5%

[1]Source: SunWater, *Lower Mary River Water Supply Scheme NSP*, (2012-2016), January 2011, page 7

The average annual "Labour" cost (historical) over the 2007 to 2010 period was $44,000. The projected Labour cost in 2011 of $87,000 represents an increase of over 97% over the annual average for 2007 to 2010.

As previously discussed, SunWater has projected rising labour costs between 2011 to 2013 by 1.5% per annum, in line with its existing Enterprise Agreement with its employees (which finishes in 2013).

As highlighted below in Figure 7-5 "Labour" costs between 2007 and 2010 seem to have followed the same direction as water usage, but of concern is that from 2008 "Labour" costs have increased at a much higher rate than the rate of water usage. In 2007 when water usage was 16,300 ML (indexed as 100% in Figure 7-5 below), "Labour" costs were $44,000. By 2010 "Labour" costs had almost doubled to $79,000 yet water usage in 2010 was only 61% of that in 2007.

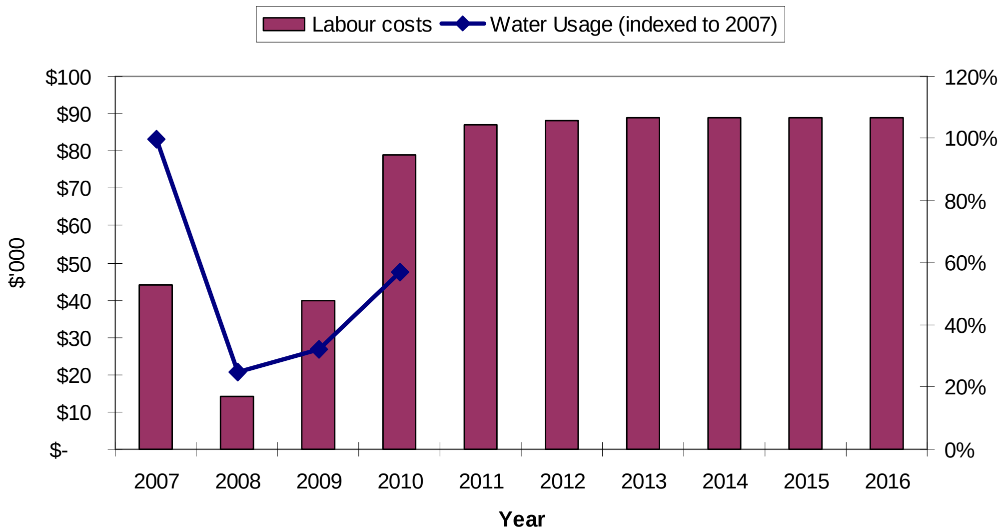

Figure 7-5. Comparison of "Labour" costs against water usage (indexed against 2007) for Lower Mary River Bulk WSS[228]

In 2011 water usage is projected to be lower than that of 2010, yet "Labour" costs are projected to increase further.

The following sections seeks to examine in more detail the components that make up the "Labour" costs presented within Table 7-1 above, and examine (data available) changes in historical labour components.

"Labour" costs in 2011 are forecast to be $87,000 (Table 7-1 above). As highlighted below in Figure 7-6, activities related to "Operations" account for over 70% of the total labour cost, followed by labour required for "Preventive Maintenance" (27.6%) and "Corrective Maintenance" (2.3%).

[228] Raw data sourced from *Lower Mary River Water Supply Scheme NSP*, (2012-2016) January 2011, Pages 7 & 14.

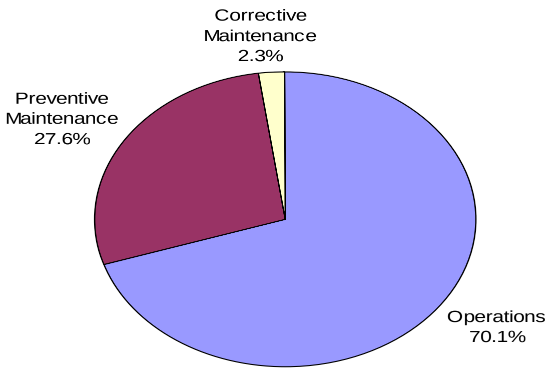

Figure 7-6. Breakdown of "Labour" costs by output activity for Lower Mary River Bulk WSS in 2011[229]

As illustrated in Figure 7-6 above, "Operations" related activities accounted for 70.1% of all forecast labour expenses for the Lower Mary River Bulk in 2011. Figure 7-7 below provides additional information regarding the composition of labour costs associated with "Operations" activities.

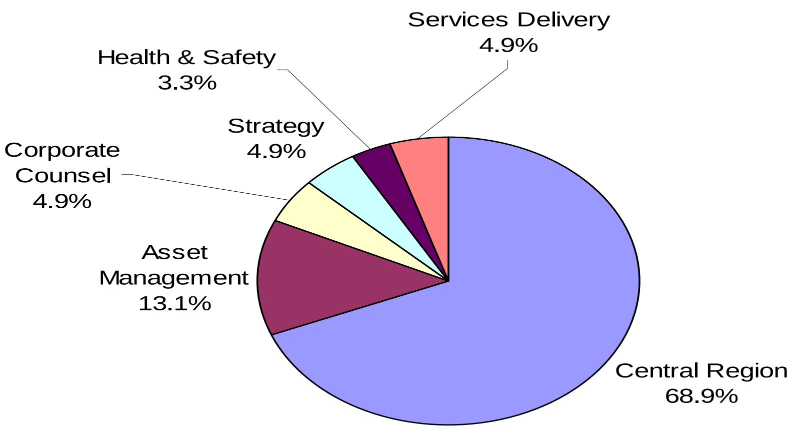

Figure 7-7. Breakdown of "Operations" labour costs for Lower Mary River Bulk WSS in 2011[230]

As illustrated by Figure 7-7 above, approximately 69% of the projected "Operations" labour costs in 2011 are from staff within the central region, whilst the remainder of labour costs are sourced from outside the Central region (predominantly Brisbane, but may also include SunWater staff from other regional centres) providing specific services of *Asset management, Corporate Counsel, Service Delivery, Health & Safety* and *Strategy*.

As stated within the NSP, "Operations" activities include "*releasing water, reading meters, repairs and issues such as meeting SunWater's obligation under the ROP / ROL, workplace health and safety, dam safety, environmental management and land management legislation*."[231]

Whist the information presented in Figures 7-6 and 7-7 above provide useful insights into the expected "Labour" costs for 2011, of considerable interest are the historical labour costs and what made these up. Figures 7-8 and 7-9 below provide partial insights into historical labour costs between 2007 and 2010.

229 Raw data sourced from SunWater Spreadsheet "*IM Central – 610.03 PSV.xls*"
230 Raw data sourced from SunWater Spreadsheet "*IM Central – 610.03 PSV.xls*"
231 Source: SunWater, *Lower Mary River Water Supply Scheme NSP*, (2012-2016), January 2011, page 19.

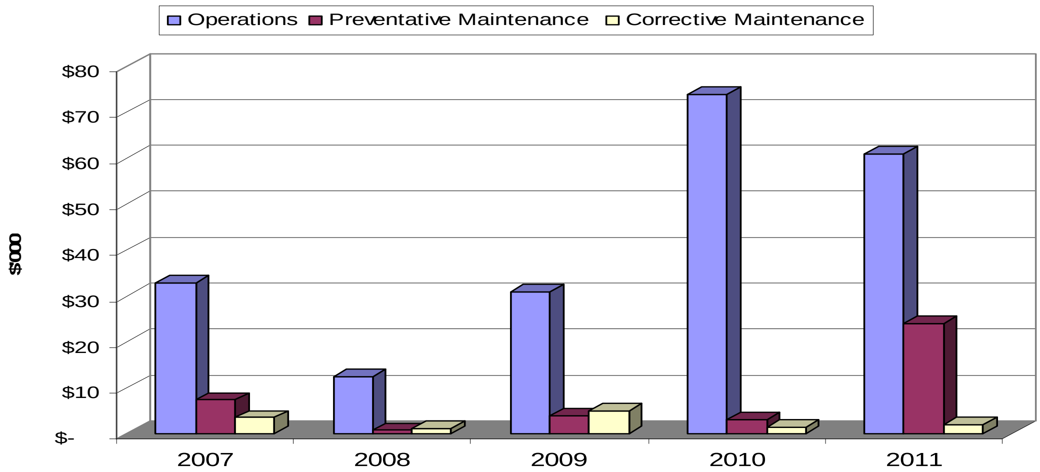

Figure 7-8. Breakdown of "Labour" costs for Lower Mary River Bulk WSS between 2007 and 2011[232]

As indicated in Figure 7-8 above, "Labour" costs across all three categories troughed in 2008, which correlates with a trough in water usage.

Figure 7-8 also highlights that "Labour" costs associated with "Preventive" and "Corrective Maintenance" were minor in comparison to "Operations". "Operations" labour costs have risen substantially since 2008 (from approximately $10,000) to over $70,000 in 2010 (before declining in 2011 to approximately $60,000).

"Preventive Maintenance" labour costs were relatively minor, but rose exponentially in 2011. Conversations with the SunWater regional manager highlighted that weed control costs across all schemes in the Central region were high in 2010/11 due to the extensive wet season experienced.

Figure 7-9 below provides more detailed information regarding historical "Preventive Maintenance" labour costs. "Condition Monitoring" is the main expense over the years, however "Weed Control costs were substantially high in 2007 (possibly corresponding to a wet summer season).

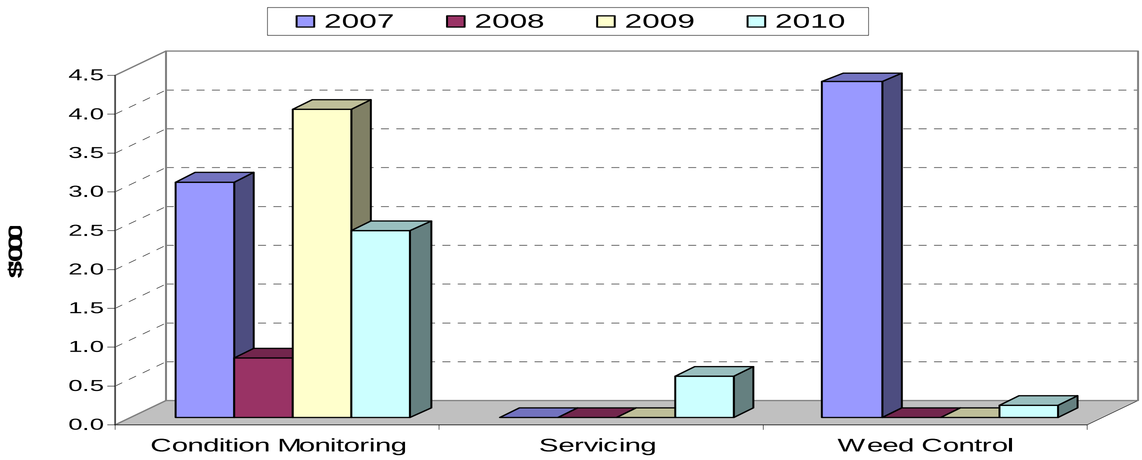

Figure 7-9. Breakdown of Preventive Maintenance Labour costs for Lower Mary River Bulk WSS between 2007 and 2010[233]

[232] Source: Historical data extracted from SunWater spreadsheet "Extract LBC data Conversion extra activity detail and preventive main split.xls", forecast expenditure data from SunWater "IM Central -610.03.PSV.xls".
[233] Raw data sourced from SunWater spreadsheet "Extract LBC data Conversion extra activity detail and preventive main split.xls".

7.4.4 Activity based expense items

The following sections examine scheme operational costs from an activity perspective as follows:

- Operations
- Preventive Maintenance
- Corrective Maintenance

7.4.5 Operations costs

Operational activities for the scheme are largely identified within the scheme Operation Manual[234]. SunWater has provided a breakdown of "Operations" costs by both sub-activities and cost input. The following analysis begins by examining cost inputs.

"Operations" costs for the Lower Mary River Bulk WSS are highlighted below in Table 7-2. As a proportion of "Total Operating" costs, "Operations" costs historically have varied from 48.7% in 2007 to 96.7% in 2010.

Table 7-2. "Operations" costs and "Total Operating" costs for Lower Mary River Bulk WSS

($'000)	Actuals				Forecast	Price Path				
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Labour[1]	33	12	31	74	61	61	61	61	61	61
Materials[1]	-	-	-	-	2	2	2	2	2	2
Contractors[1]	2	1	12	11	1	1	1	1	1	1
Other[1]	68	55	59	62	14	14	14	14	14	14
Total Direct Costs	**103**	**68**	**102**	**73**	**78**	**78**	**78**	**78**	**78**	**78**
Indirects[1]	-	18	44	64	53	52	59	63	60	57
Overheads[1]	33	17	37	81	60	60	60	61	61	60
Total Operations[2]	**136**	**103**	**183**	**292**	**191**	**190**	**197**	**202**	**199**	**195**
Annual change		-24.3%	77.7%	59.6%	-34.6%	-0.5%	3.7%	2.5%	-1.5%	-2.0%
Change since 2007		-24.3%	34.6%	114.7%	40.4%	39.7%	44.9%	48.5%	46.3%	43.4%
Total Operating costs[3]	**279**	**107**	**215**	**302**	**271**	**273**	**288**	**295**	**291**	**283**
Operations as % of Total Operating costs	48.7%	96.3%	85.1%	96.7%	70.5%	69.6%	68.4%	68.5%	68.4%	68.9%

[1]Source: Historical data extracted from SunWater spreadsheet *"Extract LBC data Conversion extra activity detail and preventive main split.xls"*, forecast expenditure data from SunWater *"IM Central -610.03.PSV.xls"*,
[2]Note that there are minor differences between the data reported within the table and that reported within the NSP due to rounding.
[3]Source: SunWater *Lower Mary River Water Supply Scheme NSP*, (2012-2016) January 2011, page 7.

[234] SunWater, *Lower Mary Water Supply Scheme, Scheme Operation Manual*, document un-dated.

'Operation" costs have increased from 2007 to 2010. In 2007, "Operations" costs were only $137,000 and water usage indexed at 100% (16,300 ML). In 2009 "Operations" costs increased to $183,000 yet water usage for the scheme was only 25% of that recorded for 2007. Similarly, "Operations" costs increased further in 2010 to $293,000 (more than double that of 2007), yet water usage is only 61% of that delivered in 2007.

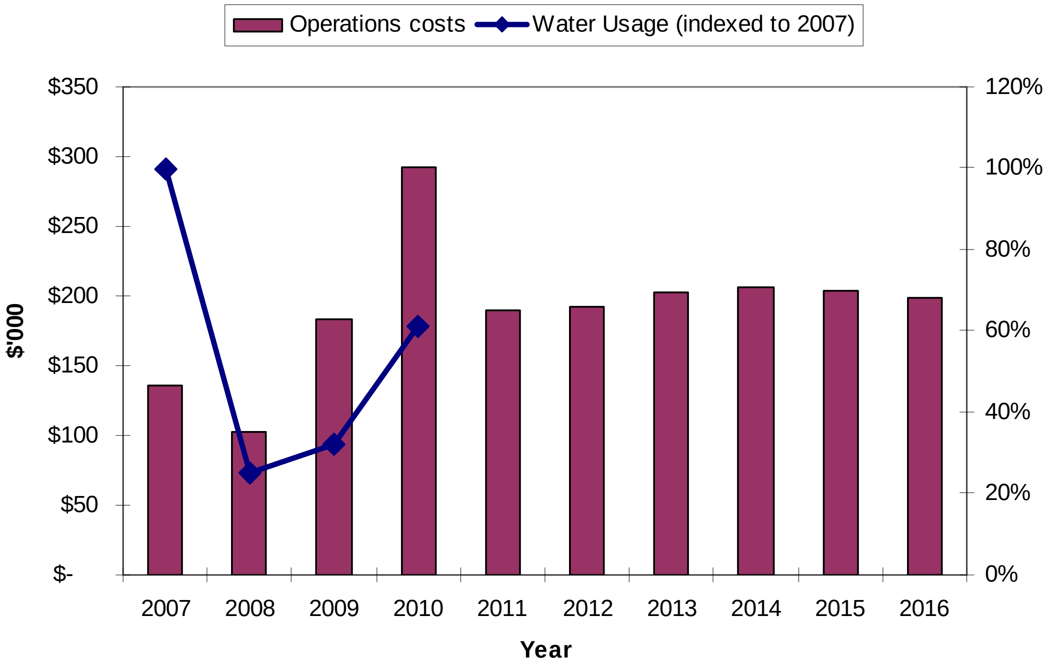

Figure 7-10. Comparison of "Operations" costs against water usage (indexed against 2007) for Lower Mary River Bulk WSS[235]

Projected water usage levels for 2011 are estimated to be much lower than in 2010. Although "Operations" costs in 2011 are projected to be substantially lower than that of 2010, they are still 40% higher than 2007 costs.

The following sections seeks to examine in more detail the components that make up the "Operations" costs and the changes in historical cost components.

As illustrated in Table 7-2 above, "Operations" costs for 2011 are projected to be $191,000. n Figure 7-11 identifies that "Overheads" and "Indirects" represents 59.5% of the total cost in 2011. Other significant components in 2011 are "Labour" at 32.1% (which was examined earlier) and "Other" at 6.8%.

Cost items included within "Other" include insurance costs (54% of total "Other" costs, $7,000 in 2011), Local Authority Rates (38%, $5,000 in 2011), and other local administrative costs including telephone, etc. By law, SunWater is required to pay Land Taxes where appropriate (not applicable to this scheme), and Local Authority Rates.

[235] Raw data sourced from *Lower Mary River Water Supply Scheme NSP*, (2012-2016) January 2011, Pages 7 & 14.

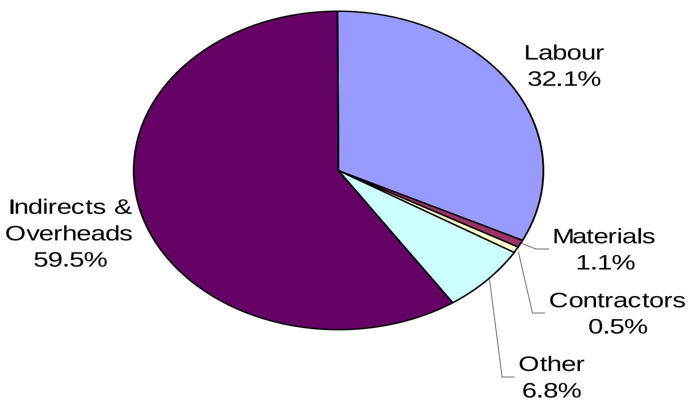

Figure 7-11. Breakdown of input cost towards "Operations" for Lower Mary River Bulk WSS in 2011[236]

The following analysis seeks to examine in detail the input cost components of "Operations" costs, and where possible identify cost item increases (and possible causes). Figure 7-12 below provides a breakdown of the key components of "Operations" costs.

Figure 7-12. Breakdown of "Operations" by cost input for the Lower Mary River Bulk WSS 2007 to 2011[237]

The scope of this consultancy was to examine the direct costs, which in this case are "Labour", "Materials", "Contractors" and "Other".

As indicated earlier, "Labour" costs increased substantially in 2010 and 2011, and are projected to remain at this level until 2016.

The other noticeable cost changes are "Other" in 2011, declining substantially from the previous years. Aurecon notes that within the Lower Mary Distribution scheme, "Other" costs (within Operations) spike considerably in 2011, leaving the possible observation that a component of insurance costs have been transferred from the Bulk scheme to the Distribution scheme.

[236] Raw data extracted from SunWater spreadsheet *"IM Central -610.03.PSV.xls".*
[237] Raw data extracted from SunWater spreadsheets *"Extract LBC data Conversion extra activity detail and preventive main split.xls"* and *"IM Central -610.03.PSV.xls".*

The following section seeks to examine in more detail “Operations” costs, by examining the sub activities (outputs) recorded under “Operations” (see Section 4 for a definition of each sub activity).

SunWater adopted a new Business Operating Model and management accounting system in 2009/10. SunWater has acknowledged that during the process of re-categorising historical data, a number may have been in-correctly coded, particularly for the 2007. Therefore the degree of accuracy for certain sub-activities in 2007 and 2008 is questionable.

A breakdown of historical “Operations” expenditure by sub-activities is highlighted below in Table 7-3 and Figure 7-13. Unfortunately, a breakdown of costs for 2011 was not provided.

Table 7-3. Breakdown of historical “Operations” expenditure for Lower Mary River Bulk WSS

Real dollars, $'000	Financial Year			
	2007	**2008**	**2009**	**2010**
Customer Management	10	-	-	13
Workplace H&S	-	-	-	3
Environmental Management	16	-	-	3
Water Management	-	27	35	25
Scheme Management	66	58	127	203
Dam Safety	-	-	1	7
Schedule /Deliver	43	-	-	25
Metering	-	18	19	13
Facility Management	-	-	-	-
Other	-	-	-	-

Source: SunWater spreadsheet *“Copy of Extract LBC data conversion to sub activity.xls”.*

Aurecon notes that no expenses were incurred for either “Facility Management” or “Other”.

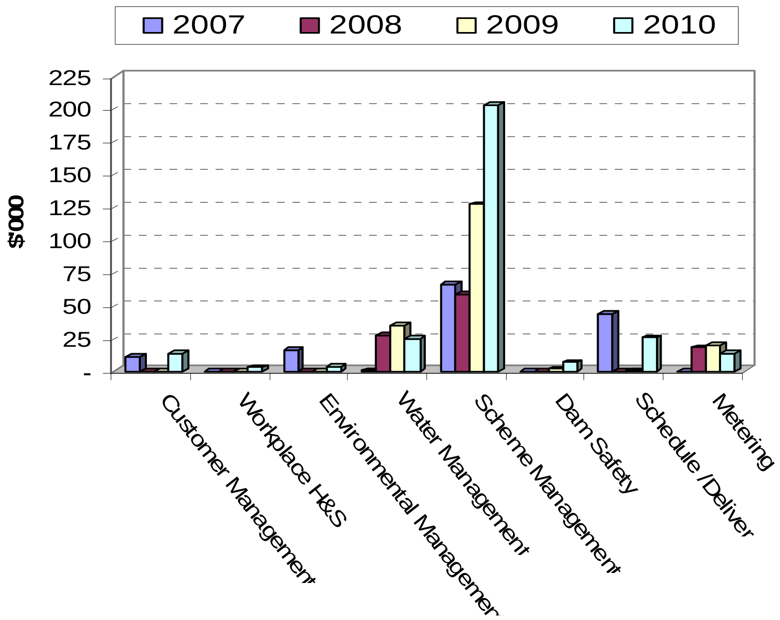

Figure 7-13. Overview of operations sub-activities for Lower Mary River Bulk WSS[238]

Customer Management

"Customer Management" includes interfacing & enquiries from customers, billing and account management, and water trading activities.

Of interest is the fact that water usage in 2008 and 2009 was only 20% to 40% of that of 2007, and correspondingly there were no costs incurred over these two years (Figure 7-13 above) indicating that this activity is highly correlated with water usage. Note that this relation is not consistent across all schemes examined within the Central region.

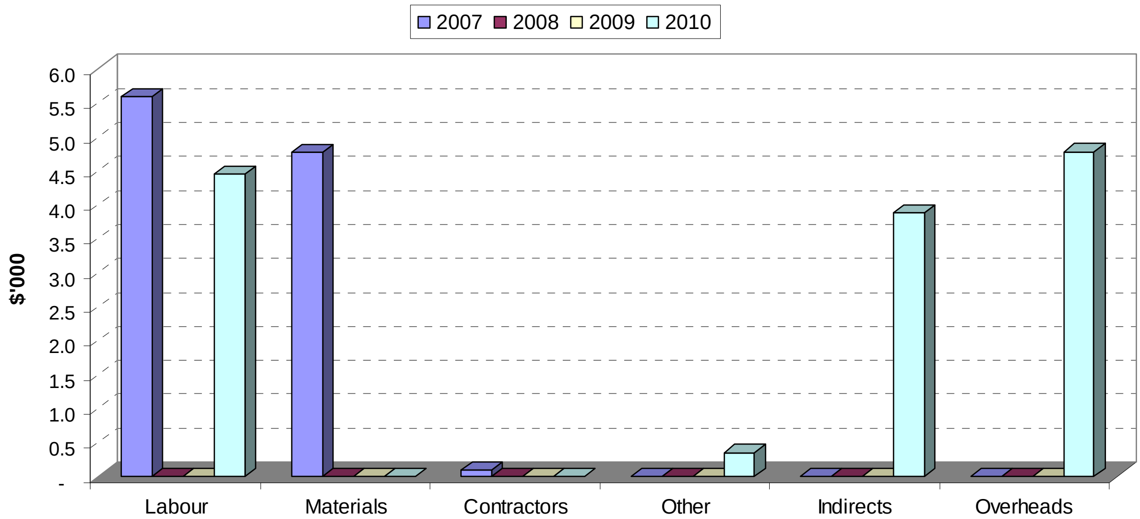

Figure 7-14. Overview of disaggregated "Customer Management" expenditure for Lower Mary River Bulk WSS[239]

Aurecon forwarded the following questions to SunWater, and received the following responses[240].

- Why no costs in 2008 & 2009?

"These costs are attributable directly to the service contract and will be varied from year to year depended upon the nature of customer enquiries"

- Is the 2007 Materials cost a coding error?

"2007 was a transition year in which the previous internal trade model was removed and the new BOM model developed and implemented in 2008. This transition period and changes are causing difficulties in comparability across time"

- What level are Labour costs forecast for 2011?

"The forecast cost is based on 5 years average and taking into account SunWater Enterprise Agreement"

[238] Raw data sourced from SunWater spreadsheet "*Copy of Extract LBC data conversion to sub activity.xls*".
[239] Raw data sourced from SunWater spreadsheet "*Copy of Extract LBC data conversion to sub activity.xls*".
[240] SunWater responses are sourced from email dated 30th June 2011

Workplace H&S

SunWater has a dedicated workplace, health and safety group to ensure compliance with legislative requirements throughout all workplaces. The group conducts regular safety audits and reviews of work practices, and ensure SunWater staff undertake regular training.

Table 7-3 identifies a cost of $3,000 was recorded only in 2010. Figure 7-15 below highlights that approximately $1,000 was incurred as a direct labour costs and $2,000 in “Indirects” and “Overheads”.

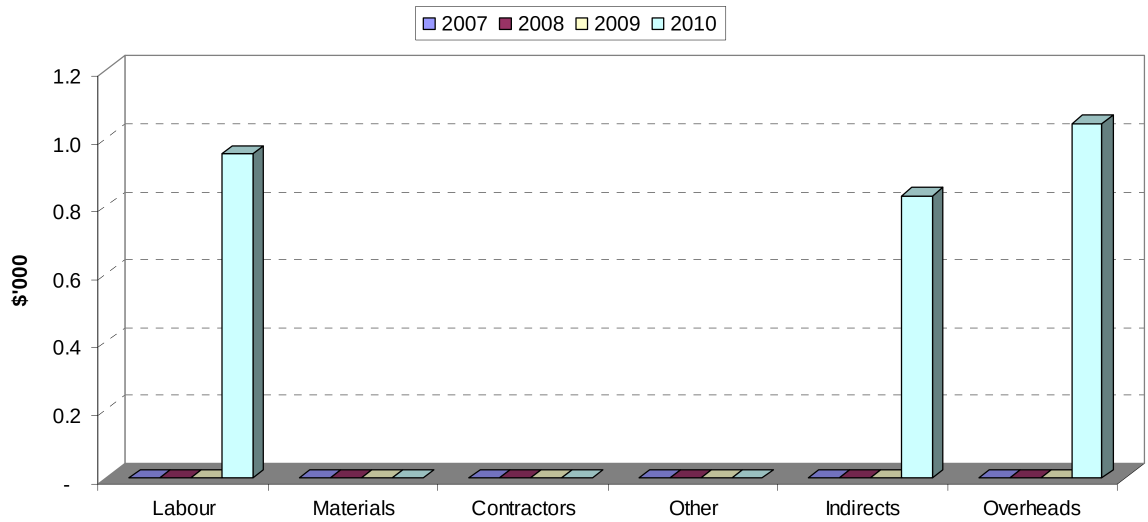

Figure 7-15. Overview of disaggregated “Workplace H&S” expenditure for Lower Mary River Bulk WSS[241]

Aurecon forwarded the following question to SunWater and received the following response[242].

- At what level are costs forecast for 2011?

“The forecast cost is based on 5 years average and taking into account SunWater Enterprise Agreement”

Environmental Management

“Environmental Management” includes the development of weed control plans, assessing impacts downstream of drains, and activities associated with environmental permits (normally undertaken by regional based environmental officer), liaison and coordination with relevant Government agencies and environmental regulators on site-specific issues.

As illustrated above in Figure 7-13, the main expense incurred was in 2007. This correlates with the one-off spike in weed control costs incurred within “Preventive Maintenance” activities (Figure 7-9), suggesting that management time was recorded for the development of weed control plans.

Figure 7-16 below highlights that significant “Materials” and “Labour” costs were incurred in 2007, while in 2010 the main direct cost was “Labour”. It also highlights “Overheads” allocation in the absence of direct “Labour” costs.

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[241] Raw data sourced from SunWater spreadsheet “*Copy of Extract LBC data conversion to sub activity.xls*”.
[242] SunWater responses are sourced from email dated 30th June 2011

Figure 7-16. Overview of disaggregated "Environmental Management" expenditure for Lower Mary River Bulk WSS[243]

Aurecon forwarded the following questions to SunWater and received the following responses[244].

- Why labour costs were only recorded for 2007, and to a lesser degree in 2010

"2007 was a transition year in which the previous internal trade model was removed and the new BOM model developed and implemented in 2008. This transition period and changes are causing difficulties in comparability across time"

- Are the positive and negative Materials costs (2007-2009) accurate, or coding errors?

"These positive and negative costs in 2007-2009, due to adjustment were made to correct the errors"

- At what level are Labour costs forecast for 2011?

"The forecast cost is based on 5 years average and taking into account SunWater Enterprise Agreement"

Water Management

"Water Management" includes activities related with announcement of water allocations, water quality monitoring and sampling, Blue-Green algae management, SDL readings, shoreline inspections, monitoring of groundwater levels and salinity levels, bore measurements and preparation of data for NRMW and SunWater.

As illustrated below in Figure 7-17 the expenses incurred in 2007 (positive and negative) result in a zero annual cost recorded to "Water Management". However costs increased substantially in 2008 and 2009. As highlighted below in Figure 7-17, "Labour" was the most significant direct cost at $7,000 to $9,000 per annum, followed by "Materials" and "Contractors".

[243] Raw data sourced from SunWater spreadsheet "*Copy of Extract LBC data conversion to sub activity.xls*".
[244] SunWater responses are sourced from email dated 30th June 2011

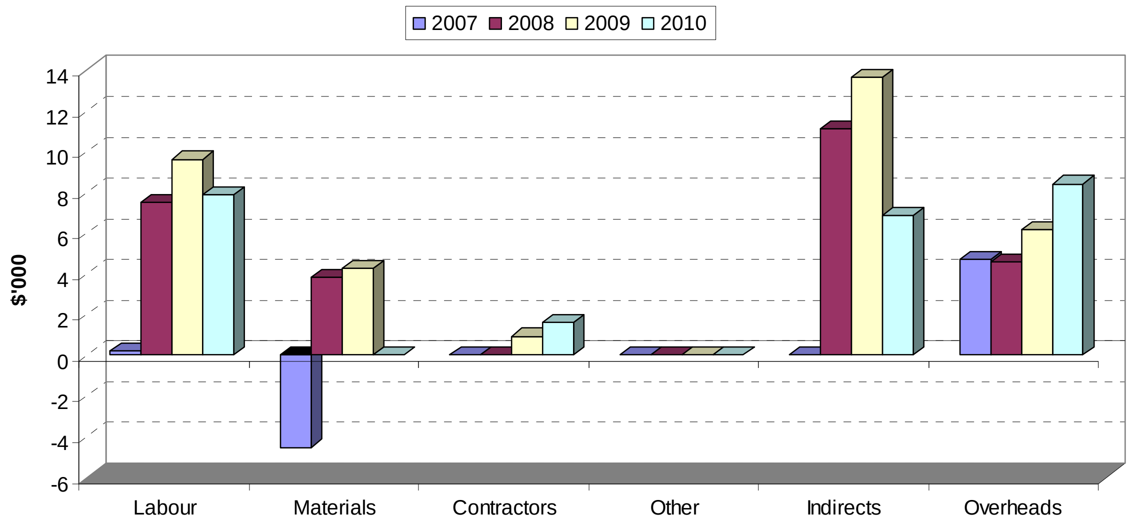


Figure 7-17. Overview of disaggregated "Water Management" expenditure for Lower Mary River Bulk WSS[245]

Aurecon forwarded the following questions to SunWater and received the following responses[246].

- No Labour costs in 2007? New activities only defined from 2008?

"2007 was a transition year in which the previous internal trade model was removed and the new BOM model developed and implemented in 2008. This transition period and changes are causing difficulties in comparability across time"

- Were "Materials" costs in 2008 and 2009 reflective of actual inputs for Water Management?

"Yes"

- Costs in 2011?

"The forecast cost is based on 5 years average and taking into account SunWater Enterprise Agreement"

Scheme Management

"Scheme Management" includes the preparation and provision of reports and statistics for clients, including meetings with clients reviewing contract progress/performance, energy management including the review of electricity consumption tariffs and accounts, land and property management including legal advice, O&M Manual development, Scheme Strategies, OMS plans, Facility Contingency Plans and Emergency Action Plans (EAP) for all facilities other than dams, System Leakage Management Plans (SLMPs), insurance costs, rates, land taxes.

Aurecon notes the substantial increase in "Scheme Management" costs in 2009 and 2010. Figure 7-18 below provides an overview of cost inputs towards "Scheme Management". As indicated below, "Other" costs (includes Local Government rates, land taxes and insurance) did not vary substantially.

245 Raw data sourced from SunWater spreadsheet "*Copy of Extract LBC data conversion to sub activity.xls*".
246 SunWater responses are sourced from email dated 30th June 2011

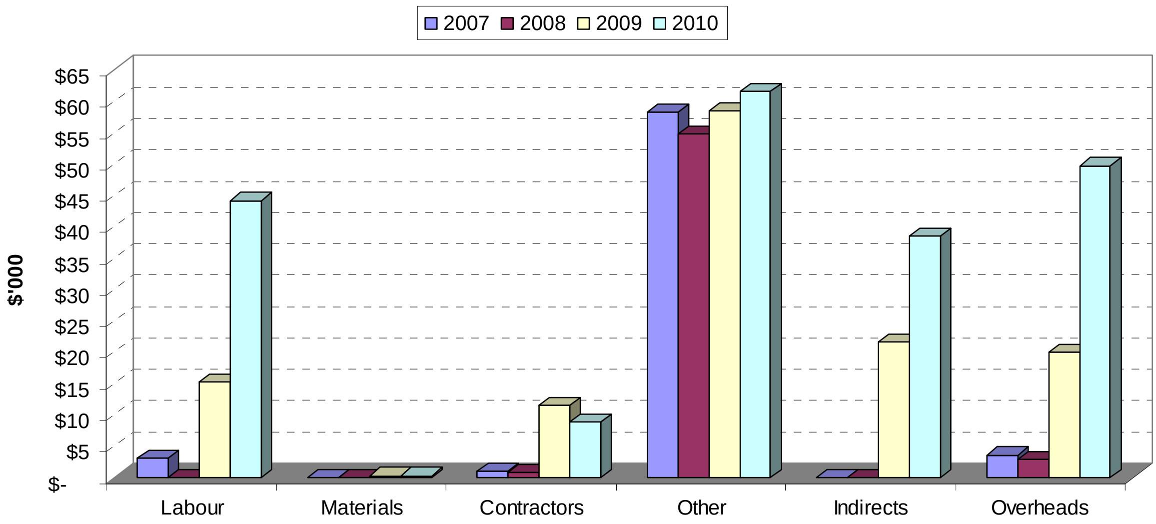


Figure 7-18. Overview of disaggregated “Scheme Management” expenditure for Lower Mary River Bulk WSS[247]

As indicated in Figure 7-18 above, “Labour” costs have risen substantially in 2009 and 2010, which also resulted in “Indirects” & “Overheads” to rise.

Aurecon forwarded the following questions to SunWater, and received the following responses[248].

- Why Labour costs disappeared in 2008, but increased substantially in 2009/2010

“Minimum works required in 2008 to keep to service contract going.”

- Have functions/activities/costs been transferred from “Schedule/Deliver” to “Scheme Management” ?

“No.”

- What is the trend for +2011

“The forecast cost is based on 5 years average and taking into account SunWater Enterprise Agreement”

Dam Safety

For referable water storages under the Water Act 2000, SunWater is required to have a comprehensive safety management program in place comprising policies, procedures and investigations to minimise the risk of dam failure. Routine dam safety inspections are carried out monthly, which include the monitoring of embankments, piezometers, seepage and general condition of the storages as defined in the dam surveillance specification. Also significant compliance issues in relation to documenting, recording and reporting on dam safety.

As highlighted in Table 7-3 and Figure 7-13 above, “Dam Safety” costs emerged at $1,000 in 2009 and $7,000 in 2010.

Figure 7-19 below highlights that “Labour” was the major direct cost at $400 in 2009 and $2,200 in 2010. Due to the overhead cost allocation model, significant “Indirects” and “Overheads” are also added. In 2010, the $2,200 in “Labour” costs also attracted $5,000 in “Indirects” and “Overheads” to the scheme.

[247] Raw data sourced from SunWater spreadsheet “*Copy of Extract LBC data conversion to sub activity.xls*”.
[248] SunWater responses are sourced from email dated 30th June 2011

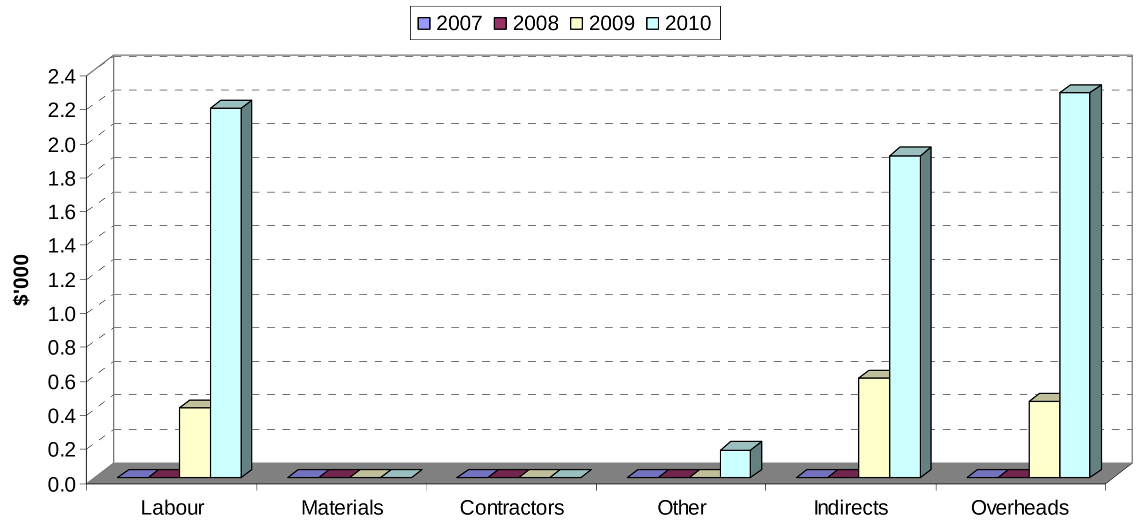


Figure 7-19. Overview of disaggregated "Dam Safety" expenditure for Lower Mary River Bulk WSS[249]

Aurecon forwarded the following questions to SunWater, and received the following responses[250].

- What are the projected costs for 2011+?

"The forecast cost is based on 2 years average and taking into account SunWater Enterprise Agreement"

- Are Monthly Weir Safety Inspections included here?

"Yes"

Schedule/Deliver

"Schedule/Deliver" includes scheduling, releasing, operation of pump stations and SCADA, system surveillance including monitoring of water entitlement and observation of and reporting of any breaches, flood operations preparation, water harvesting, ROP compliance of water levels and flows and reporting of water information.

As Figure 7-13 reveals, significant costs were only incurred in 2007 and 2010, correlating with the higher water usage years. In 2008 and 2009, virtually no costs were recorded for this activity, yet significant quantities of water were still utilised during these years.

249 Raw data sourced from SunWater spreadsheet "*Copy of Extract LBC data conversion to sub activity.xls*".
250 SunWater responses are sourced from email dated 30th June 2011

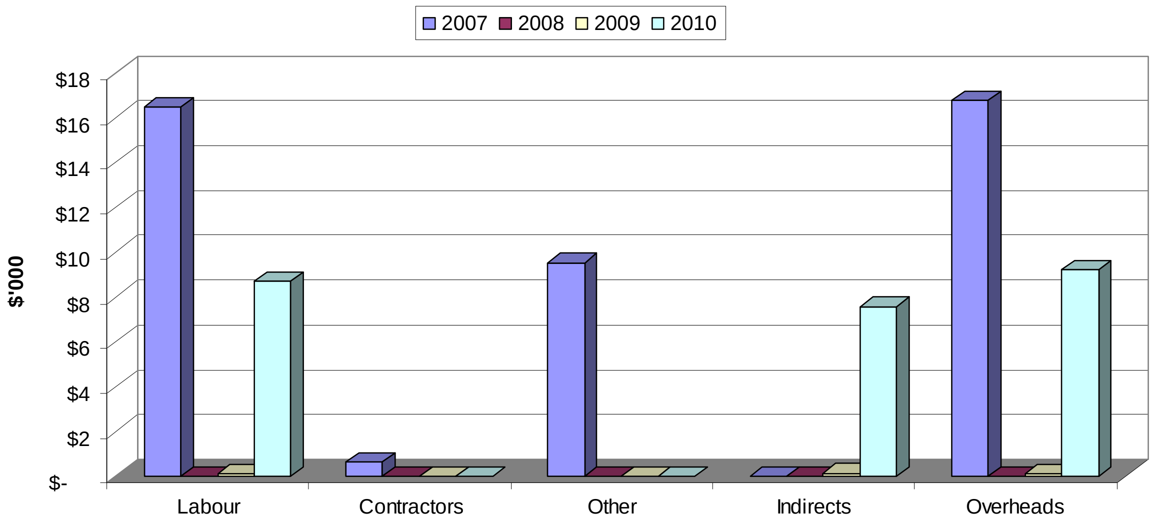


Figure 7-20. Overview of disaggregated "Schedule/Deliver" expenditure for Lower Mary River Bulk WSS[251]

As illustrated above in Figure 7-20, the main direct cost associated with "Schedule/Deliver" are "Labour", which also drives "Overheads" costs (and "Indirects" to some degree in 2010).

There is a one-off expense in 2007 related to "Other" amounting to approximately $10,000.

Aurecon forwarded the following questions to SunWater, and received the following responses[252].

- Overview of what "Other" $10,000 expense was in 2007, or is it a coding issue?

"2007 was a transition year in which the previous internal trade model was removed and the new BOM model developed and implemented in 2008. This transition period and changes are causing difficulties in comparability across time"

- Why no expense occurred in 2008 and 2009?

"Minimum works required in 2008 to keep to service contract going."

- At what level are costs forecast for 2011?

"The forecast cost is based on 2 years average and taking into account SunWater Enterprise Agreement"

Metering

"Metering" costs have also risen since 2008 with the introduction of meters, at a cost of approximately $15,000 to $20,000 per annum (Table 7-3 above). The Lower Mary has a total of 177 customers of whom 79 customers take water in the distribution network[253], indicating that 98 customers are direct bulk. SunWater has advised that a total of 121 meters were read in 2010.

The Boyne River and Tarong WSS has a total of 172 meters read on a quarterly basis in 2010, incurring a metering cost of $6,000 in 2010 while the Barker Barambah Bulk WSS has a total of 219 meters incurring a cost of $43,000 in "Metering" costs in 2010. Clearly, there is a large variation in metering costs (correlated to distance travelled per meter, meter access,

[251] Raw data sourced from SunWater spreadsheet "*Copy of Extract LBC data conversion to sub activity.xls*".
[252] SunWater responses are sourced from email dated 30th June 2011
[253] Source: SunWater *Lower Mary River Water Supply Scheme NSP*, (2012-2016) January 2011, page 13.

etc) across schemes, and therefore little value in comparing the costs incurred between schemes

As highlighted below in Figure 7-21, approximately 33% of the total recorded costs are actual direct labour costs, with the remainder being “Indirects” and “Overheads”. Hence, approximately $5,000 per annum in direct labour costs was incurred for the reading of 121 meters on a quarterly basis.

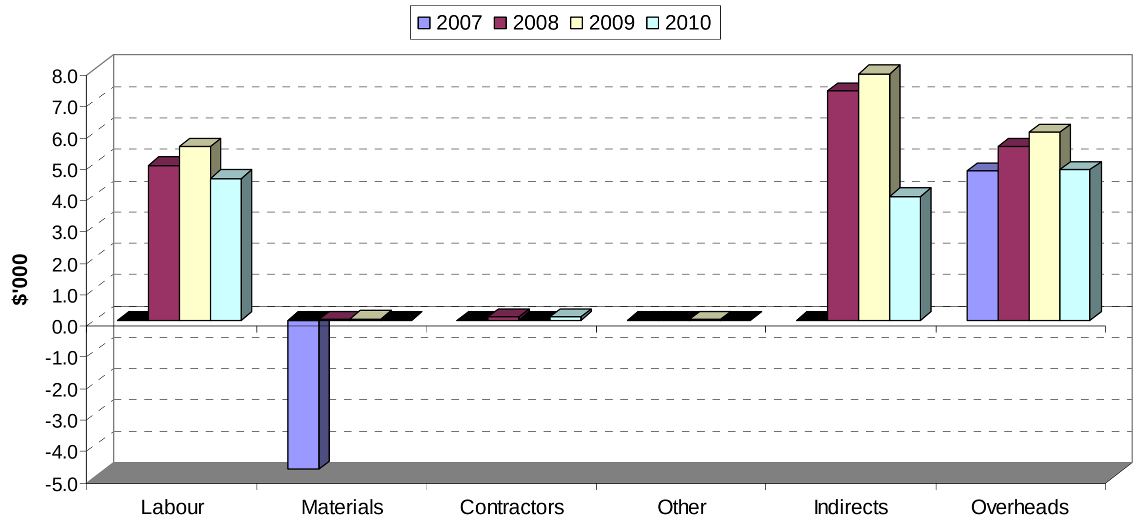


Figure 7-21. Overview of disaggregated “Metering” expenditure for Lower Mary River Bulk WSS[254]

Stakeholders have raised the issue that a number of bulk customers are currently non-users (sleepers), and are there more cost effective strategies to avoid reading these meters each quarter.

Aurecon notes that “*Customers can also enter their own meter readings into SunWaterOnline to obtain up-to-date information about water use and availability*[255].”

Aurecon forwarded the following questions to SunWater, and received the following responses[256].

- Other options for meter reading of sleepers?

  See Section 4, which provides SunWater’s views regarding meter reading which is common across all schemes

- Incentives/opportunities for users to read and record their own meters on line (mentioned in the NSP that customers can also enter their own meter readings online?).

  See Section 4, which provides SunWater’s views regarding meter reading which is common across all schemes

- Also seeking information regarding the number of meters installed since 2009, and read in 2010.

  “*There were 121 meters read in 2010. Nil meters have been installed since 2009”*

As indicated above no new meters were installed since 2009. As indicated within Table 7-3, Metering costs were $19,000 in 2009, and $13,000 in 2010 possibly indicating that SunWater is identifying substantial labour efficiencies reading meters.

[254] Raw data sourced from SunWater spreadsheet “*Copy of Extract LBC data conversion to sub activity.xls*”.
[255] Source: SunWater *Lower Mary River Water Supply Scheme NSP*, (2012-2016) January 2011, page 16.
[256] SunWater responses are sourced from email dated 30th June 2011

Prudency and Efficiency of Operations Expenditure

As highlighted within Table 7-2, direct costs for Operations expenditure has decreased from $103,000 in 2007 to $73,000 in 2010 (proposed expenditure for 2011 at $78,000). The average of the preceding 4 years equates to $86,500 (based on the information presented within this report), indicating that SunWater has forecast a lower cost for 2011 (and propose efficiency savings for the next price path).

Sunwater advised that weir safety inspections costs were previously recorded under Dam Safety, and are now incorporated to Preventive Maintenance activity for the forecast price path. Aurecon was not able to identify the cost of weir safety inspections specifically, but notes that overall “Dam Safety” expenditure was only $1,000 for 2009 and $7,000 for 2010 (which is likely to include other activities in addition to weir safety inspections).

A review of other schemes reveals that annual weir safety inspections costs vary between $1,480 and $1,850. Assuming an approximate annual costs of $1,500 per annum for each Mary and Tinana Barrage, then an approximate cost of $3,000 should be reduced from the historical average when calculating the forecast cost for 2011.

The provision of disaggregated historical activity data for “Operations” by SunWater provided substantial insights, and identified substantial activities and issues requiring additional information and explanation from SunWater. As highlighted throughout this section, SunWater has provided responses to the additional questions which in most cases provided valid explanations and information.

However, SunWater was not able to provide 2011 cost estimates for the sub-activities which Aurecon views as critical in verifying the prudency and efficiency of these costs. Aurecon recommends that to verify the prudency and efficiency of 2011 expenditure, the following information and analysis is required:

- 2011 cost estimates for sub-activities be released and examined to ensure compliance with SunWater’s averaging methodology (preceding 4/5 years)
- cost estimates for metering be examined and projected based on 2010 costs assuming that it represents improved efficiencies reading meters, and if it reflects the fact that all meters were read in 2010
- the Dam Safety forecast 2011 costs is reduced by the amount of costs transferred to Preventive Maintenance.

Due to the above data limitations, Aurecon was unable to validate the prudency and efficiency of “Operations” costs although acknowledging that SunWater is proposing a lower cost structure for the coming price path.

7.4.6 Preventive Maintenance costs

SunWater has “Preventive Maintenance” as activities related to the ongoing operational performance and service capacity of physical assets as close as possible to designed standards. SunWater[257] states that Preventive Maintenance is cyclical in nature with a typical interval of 12 months or less, and includes the following key output activities:

- Condition monitoring; the inspection of assets to determine preventive maintenance requirements
- Servicing; planned maintenance activities normally expected to be carried out routinely

A review of SunWater’s reporting system also revealed that “Weed Control” was also a key output activity associated with “Preventive Maintenance”, to which costs were assigned. As

[257] SunWater, *Lower Mary River Water Supply Scheme Network Service Plan* (2012-2016) January 2011, page 27.

indicated earlier within Figure 7-9, "Weed Control" costs were by far the main labour related expense item in 2007, but were non-existent for the subsequent three years to 2010. Considering that it is a bulk river system, weed control costs would expect to be minimal, with the possible exception of land based weed control around the bulk assets and access roads.

Projected "Preventive Maintenance" costs for the Lower Mary River Bulk WSS are highlighted below in Table 7-4. As a proportion of "Total Operating" costs, "Preventive Maintenance" costs have varied from 2.8% in 2008 to 7.5% in 2007. Of concern is the substantial rise in "Preventive Maintenance" costs in 2011 to $70,000, a rise of 233% from 2007 expenditure. In addition, the proposed expense in 2011 onwards represents a quarter of proposed "Total Operating" costs going forward.

Table 7-4. "Preventive Maintenance" costs and "Total Operating" costs for Lower Mary River Bulk WSS

($'000)	Actuals				Forecast	Price Path				
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Preventive Maintenance	21	3	14	10	70	71	75	77	76	74
Annual change		-85.7%	366.7%	-28.6%	600.0%	1.4%	5.6%	2.7%	-1.3%	-2.6%
Change since 2007		-85.7%	-33.3%	-52.4%	233.3%	238.1%	257.1%	266.7%	261.9%	252.4%
Total Operating costs	279	107	215	302	271	273	288	295	291	283
Preventive M as % of Total Operating costs	7.5%	2.8%	6.5%	3.3%	25.8%	26.0%	26.0%	26.1%	26.1%	26.2%

Source: SunWater*, Lower Mary River Water Supply Scheme NSP,* (2012-2016), January 2011 Page 7.

As indicated earlier, SunWater's deployment of a new Business Operating Model and management accounting system required the retrospective transfer of cost data for 2007 and 2008. A recent review[258] found that costs that should have been coded to refurbishment, were coded as "Preventive Maintenance", resulting in many schemes incurring a spike in "Preventive Maintenance" costs in 2007. As indicated above in Table 7-4 (Figure 7-22) costs for the scheme were up in 2007.

Some stakeholders have expressed an interest comparing historical "Preventive Maintenance" costs against water usage. As indicated below in Figure 7-22, there seems to be a correlation between costs and water usage between 2007 and 2010. However, in 2011 costs increase substantially (233% of 2007 costs) yet water usage rates is expected to be relative low.

[258] Parsons Brinkerhoff, *Provision of Services for Costing SunWater's Work Instructions*, October 2010, page 13.

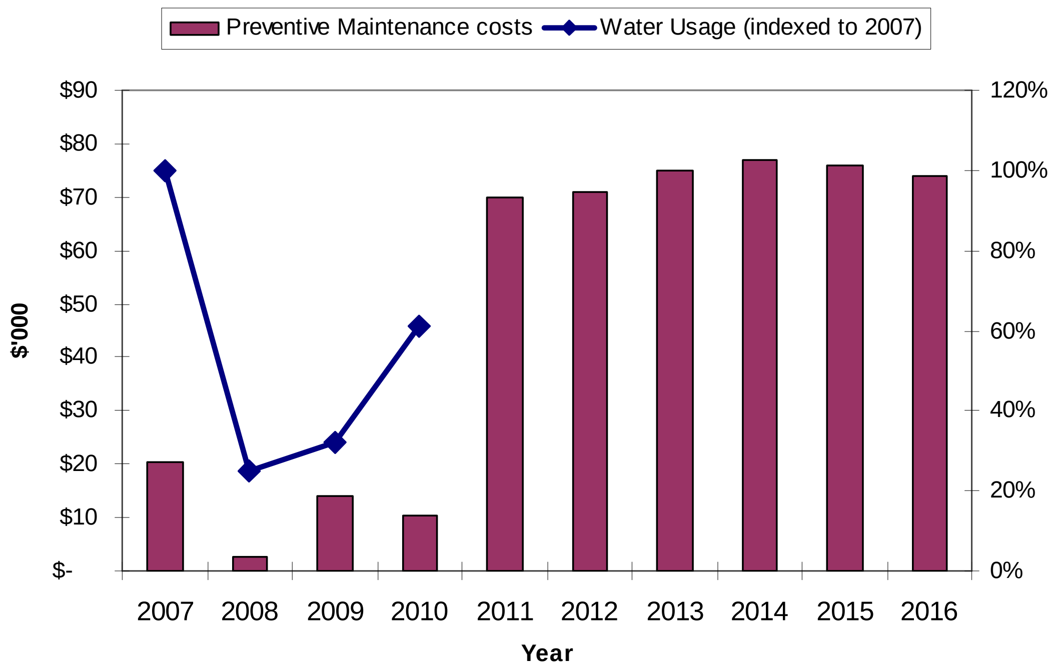


Figure 7-22. Comparison of "Preventive Maintenance" costs against water usage (indexed against 2007) for Lower Mary River Bulk WSS[259]

The following sections seeks to examine in more detail the components that make up the "Preventive Maintenance" costs presented within Table 7-4 above, and examine (data available) where changes have occurred.

As illustrated below in Figure 7-23 below, "Overheads" and "Indirects" represents 64.3% of the projected total cost in 2011. Other significant components are "Labour" at 34.3%, and "Contractors" at 1.4%.

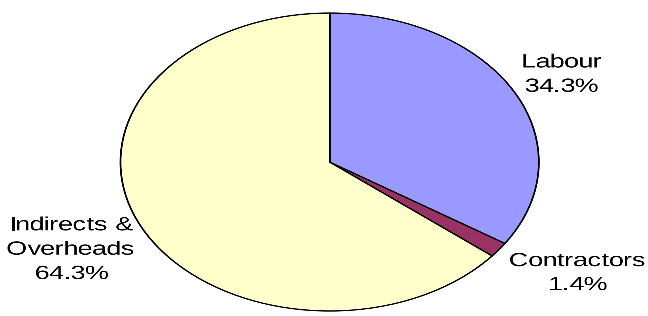


Figure 7-23. Breakdown of cost inputs towards "Preventive Maintenance" for Lower Mary River Bulk WSS in 2011[260]

The following analysis seeks to examine in detail the past and forecast components of "Preventive Maintenance" costs, and where possible identify cost item increases (and

[259] Raw data sourced from *Lower Mary River Water Supply Scheme NSP*, (2012-2016) January 2011, Pages 7 & 14.
[260] Raw data extracted from SunWater spreadsheet *"IM Central -610.03.PSV.xls",*

possible causes). Figure 7-24 below provides a breakdown of the key input cost components for “Preventive Maintenance”.

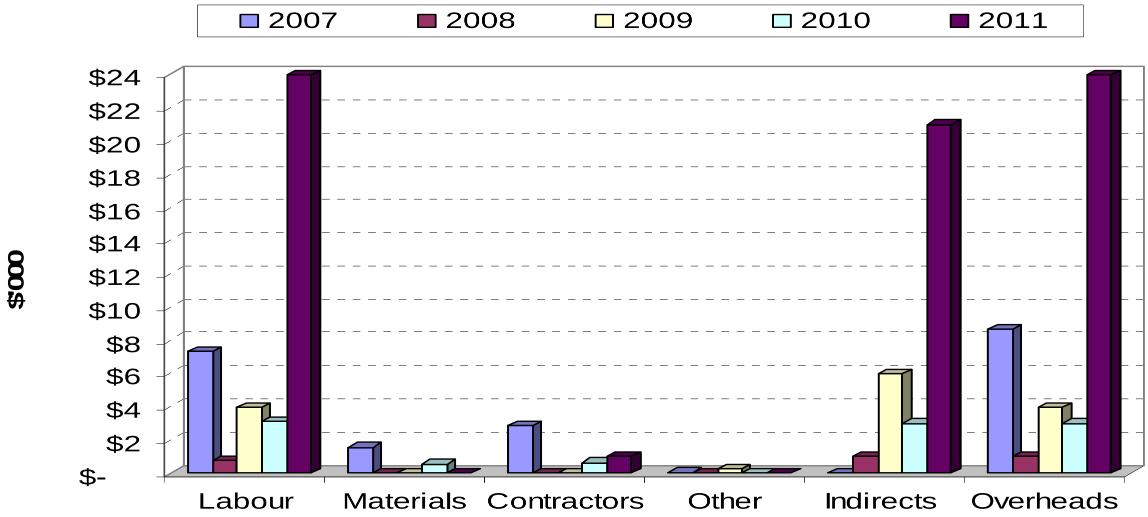


Figure 7-24. Breakdown of cost inputs towards “Preventive Maintenance” for Lower Mary River Bulk WSS 2007 – 2011[261]

The scope of this consultancy was to examine the direct costs, which in this case are “Labour”, “Materials”, “Contractors” and “Other”.

Clearly “Labour” costs have risen substantially 2011, whilst other direct costs have remained relatively flat. As “Indirects” & “Overheads” are apportioned according to direct Labour, they also increase substantially as indicated within Figure 7-24.

SunWater also provided the NSP consultants with a breakdown of historical “Preventive Maintenance” costs by output activity, which is defined earlier as “Condition Monitoring”, “Servicing” and “Weed Control”. As indicated below in Figure 7-25, “Weed Control” costs were approximately $10,000 in 2007 only. As a small ponded system incorporating two key barrages, Aurecon questions these weed control activities and if they are related to related to major on-land weed control activities around the barrages and access roads.

Figure 7-25 also highlights the highly variable nature of both “Condition Monitoring” and “Servicing” costs. Stakeholders have expressed the fact that the two barrages represents most of the assets for the scheme, and that it is hard to see where significant “Preventive Maintenance” activities are likely to occur.

[261] Raw data extracted from SunWater spreadsheets *“IM Central -610.03.PSV.xls”* and *“Extract LBC data Conversion extra activity detail and preventive main split.xls*”.

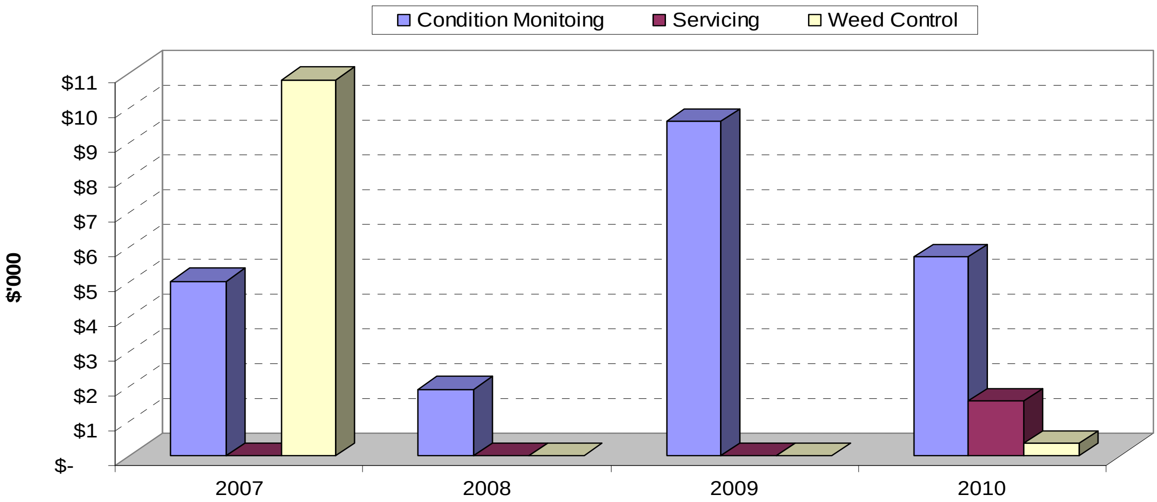


Figure 7-25. Breakdown of output activities under "Preventive Maintenance" for Lower Mary River Bulk WSS[262]

Note that "Labour" is the main direct cost within "Weed Control", and the one-off significant expense in 2007 was $4,000 in total (Figure 7-26).

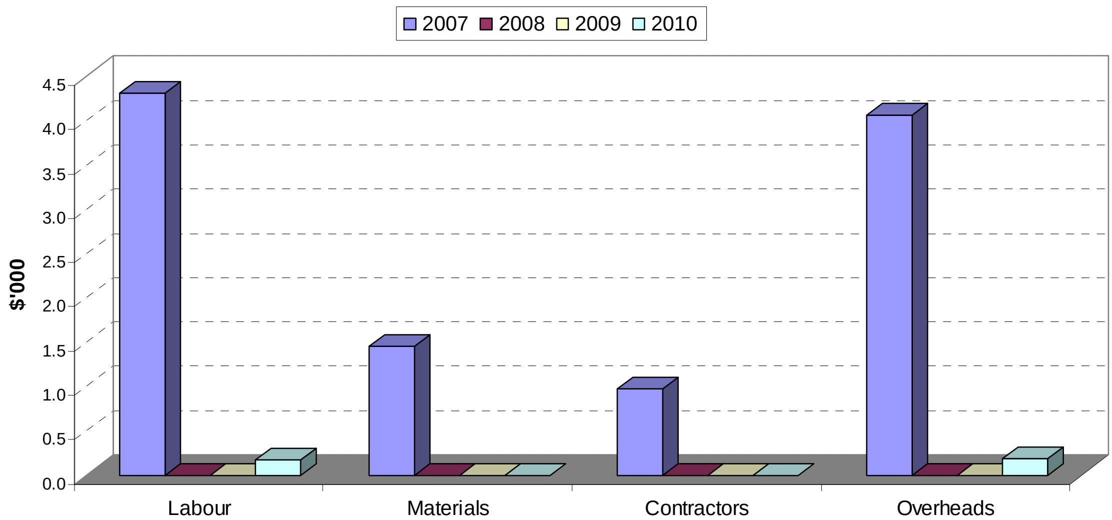


Figure 7-26. Breakdown of input costs towards "Weed Control" for Lower Mary River Bulk WSS 2007-2010[263]

Unfortunately SunWater has not provided a breakdown of costs for 2011 onwards by output activity as illustrated above in Figure 7-25.

[262] Raw data extracted from SunWater spreadsheet *"Extract LBC data Conversion extra activity detail and preventive main split.xls*".
[263] Raw data extracted from SunWater spreadsheet *"Extract LBC data Conversion extra activity detail and preventive main split.xls*".

Validating the forecast Preventive Maintenance costs for 2011-2016

As indicated earlier within Table 7-4, forecast “Preventive Maintenance” costs for 2011 is $70,000, of which 34.3% (Figure 7-23) or $24,000 is in “Labour” costs. The following analysis seeks to examine the prudency and efficiency of the proposed $24,000 “Labour” expense.

SunWater has developed Operation and Maintenance manuals for the scheme, which detail the maintenance activities to be undertaken for “Condition Monitoring” and “Servicing”, along with frequency. A recent review by Parsons Brinkerhoff (2010A) examined each of the individual activities specified within SunWater’s Operation and Maintenance manual for the Lower Mary River Bulk WSS, and validated the proposed activities and frequency prescribed. The Parsons Brinkerhoff (2010A) report also quantified the required man hours input required for each activity along with cost based on SunWater’s internal hourly rates. Of importance is the fact that the Parsons Brinkerhoff (2010A) study did not find any new required activities. Table 7-5 highlights the key findings from the Parsons Brinkerhoff (2010A) study.

Table 7-5. Required labour input for “Preventive Maintenance” for Lower Mary River Bulk WSS

Year	Hours	Direct annual labour cost	% of 2011 hours
2007	74	$2,650	13.9%
2008	23	$690	4.3%
2009	99	$3,674	18.5%
2010	72	$2,854	13.5%
Average 2007 - 2010	67	$2,467	12.5%
Proposed for 2011	**534**	**$26,574**	**100%**

Source: Parsons Brinkerhoff, “Provision of Services for Costing SunWater’s Work Instructions” (201A), working appendices Spreadsheets

According to the Parsons Brinkerhoff (2010A) report, to complete all the prescribed and required “Preventive Maintenance” activities (“Condition Monitoring” and “Servicing” only, ignoring “Weed Control”) requires an annual input of 534 hours or a direct annual labour cost of $26,574 (Table 7-5). This is slightly higher than the $24,000 total “Labour” expense proposed for 2011 by SunWater.

The Parsons Brinkerhoff (2010A) report also stated that historically a number of “Preventive Maintenance” activities were incorrectly recorded to other activities. As illustrated within Section 7.4.7 there is no corresponding increase within historical “Corrective Maintenance” costs to account for the substantial disparity.

This leaves three remaining options to account between the projected requirement of 534 hours (Table 7-5) and the historic average of 67 hours for 2007 to 2010:

- that a large number of prescribed activities were not undertaken, or
- that a large number of prescribed activities were undertaken and coded to activities other than maintenance (eg. renewals), or
- regional SunWater staff identified substantial efficiencies.

Aurecon is of the view that a combination of all the points occurred. Unfortunately, the Parsons Brinkerhoff (2010A) report does not audit historically what prescribed activities were undertaken (or not). Aurecon’s field trip and discussion with stakeholders and regional SunWater staff, and inspection of selected asset sites, did not reveal any prescribed difficulties or issues with historic “Preventive Maintenance” activities to date.

Therefore, Aurecon cannot validate the prescribed annual expense listed within the NSP for 2011 to 2016 as being prudent nor efficient with the limited information at hand. To identify the prudent and efficient costing, Aurecon recommends that an audit review the historical activities, particularly 2010 being the most recent year, against the optimised schedule developed by the Parsons Brinkerhoff (2010A) report, and quantify the disparity between actuals for 2010 and the recommendations for 2011.

In the interim, Aurecon suggests that the highest hours previously recorded be accepted, plus the estimated hours of input required for weir safety inspections (estimated at 32 hours each) and “Weed Control” requirements as follows:

- 100 hours of labour input for “Condition Monitoring” and “Servicing” based on 2009 actuals
- 64 hours of additional input for weir safety inspections
- 20 hours of labour input for “Weed Control”

With the limitation of information (audited itemised activities for 2010), Aurecon asesses that the interim prudent and efficient annual labour input for “Preventive Maintenance” be set at 184 hours.

A significant disparity also exists in costing for “Preventive Maintenance” labour. Note that SunWater incurred hourly average labour cost was $39.64 in 2010, and the Parsons Brinkerhoff (2010A) analysis equates to an average hourly charge of $49.76 per hour (although Parsons Brinkerhoff undertook an extensive investigation itemising each activity required and staff increment level), possibly indicating that SunWater has previously utilised staff at lower salary/technical increment levels to undertake the majority of tasks (note the suggested audit of 2010 may also example the differences between what technical staffing levels were actually deployed in 2010, against recommended rates for 2011). Aurecon suggests using $45 per hour[264], which suggests that the labour cost for 184 hours is $8,250 per annum.

Aurecon recommends that the total budgeted cost for “Preventive Maintenance” labour initially set at $8,250. This is a reduction from the $24,000 currently projected for 2011, and will also reduce the allocation of “Indirects” and “Overheads” based on the existing allocation methodology that SunWater has adopted.

7.4.7 Corrective Maintenance costs

SunWater describess “Corrective Maintenance” as an unexpected failure requiring reactive corrective maintenance response. Two main types of activities:

- Emergency breakdown maintenance, requiring immediate action to restore normal operation or supply to customer to meet a regulatory obligation
- Non-emergency maintenance, activities no requiring immediate response but scheduled in advance of the planned maintenance cycle[265]

SunWater’s projected “Corrective Maintenance” costs for the Lower Mary River Bulk WSS are highlighted below in Table 7-6. As a proportion of “Total Operating” costs, “Corrective Maintenance” costs vary from 2.6% in 2007 to 10.7% in 2009.

[264] Based on using the latest financial cost incurred, ie. 2010 data in Table 7-5, dividing total labour cost of $2,854 by total hours of 72 equals $39.63/hr, Aurecon have then added approximately 20% to account for inflation from 2009/2010 year and salary increments for SunWater field staff and propose $45.00hr. Aurecon note that the Parsons Brinkerhoff (2010A) analysis recommended 534 hrs for an annual labour cost of $26,574, equating to $49.76/hr. The difference between the hourly labour expense incurred for 2010, versus the projected hourly rate by Parsons Brinkerhoff (2010) is most likely due to assumptions of using more senior SunWater staff at higher pay/cost increment.

[265] SunWater, *Lower Mary River Water Supply Scheme NSP,* (2012-2016) January 2011, Page 27.

Table 7-6. "Corrective Maintenance" costs and "Total Operating" costs for Lower Mary River Bulk WSS

($'000)	Actuals				Forecast	Price Path				
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Corrective Maintenance[1]	10	5	23	8	13	13	13	13	13	13
Annual change		-50.0%	360.0%	-65.2%	62.5%	0.0%	0.0%	0.0%	0.0%	0.0%
Change since 2007		-50.0%	130.0%	-20.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%
Total Operating costs[1]	279	107	215	302	271	273	288	295	291	283
Corrective M as % of Total Operating costs	3.6%	4.7%	10.7%	2.6%	4.8%	4.8%	4.5%	4.4%	4.5%	4.6%

[1] *Source: Lower Mary River Water Supply Scheme NSP,* (2012-2016) January 2011, Page 7.

As highlighted by Table 7-6 above, "Corrective Maintenance" costs in 2011 are 30% higher than 2007. Corrective costs varied substantially from $5,000 in 2008 to $23,000 in 2009, averaging $12,000 per annum for the 2007 to 2010 period.

Figure 7-27 below plots "Corrective Maintenance" costs against historic water usage. As illustrated below there seems to be only a partial correlation between water usage and costs in some years.

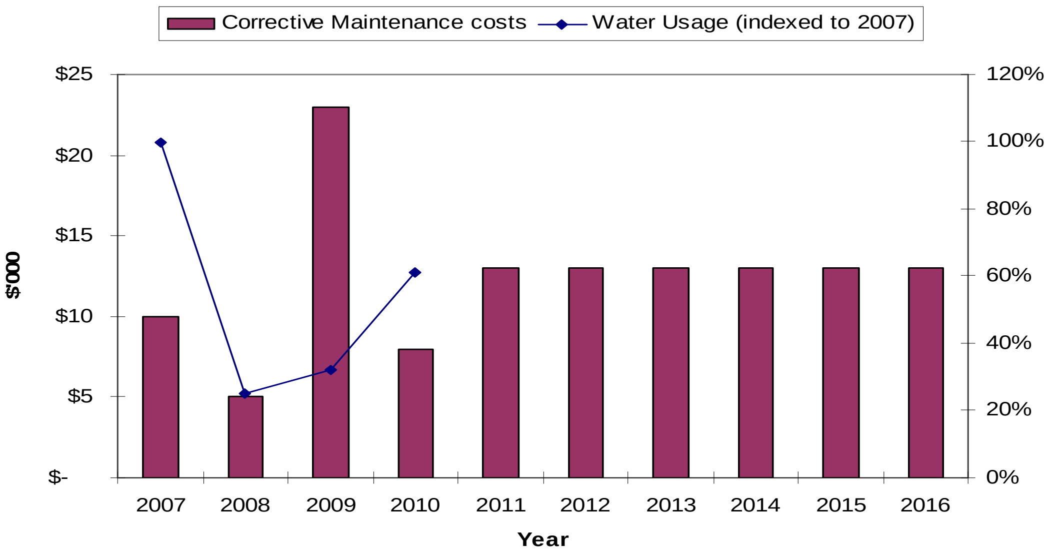


Figure 7-27. Comparison of Corrective Maintenance costs against water usage (indexed against 2007) for Lower Mary River Bulk WSS[266]

The following sections seeks to examine in more detail the components that make up the "Corrective Maintenance" costs presented within Table 7-6 above, and examine in detail (data available) where changes have occurred.

As illustrated below in Figure 7-28, "Materials" account for 38.5% of the projected total cost in 2011. Other significant components are "Overheads" and "Indirects" at 30.8%, and "Labour" and "Other" both at 15.4%.

[266] Raw data sourced from *Lower Mary River Water Supply Scheme NSP*, (2012-2016) January 2011, Pages 7 & 14.

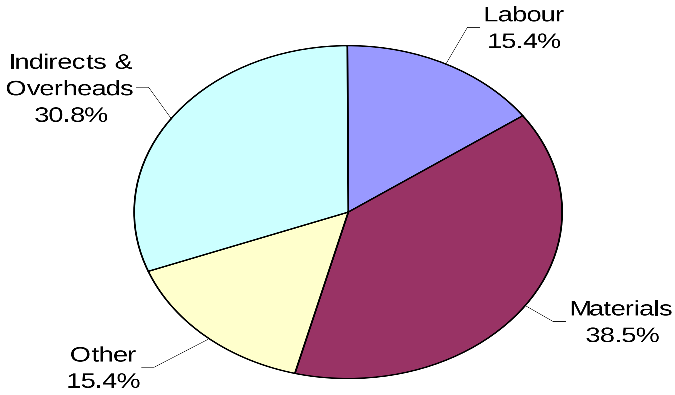


Figure 7-28. Breakdown of cost inputs towards "Corrective Maintenance" for Lower Mary River WSS in 2011[267]

Figure 7-29 below provides a breakdown of the key input cost components for "Corrective Maintenance" between 2007 and 2011.

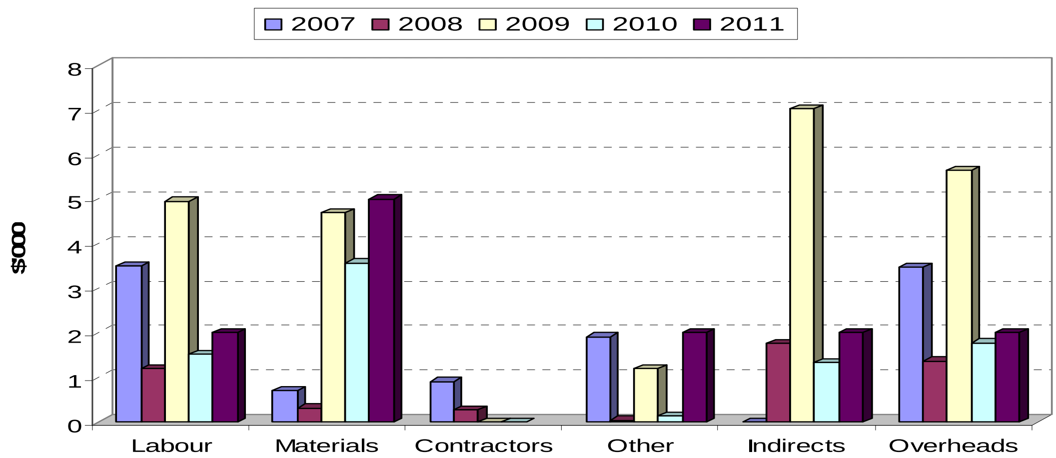


Figure 7-29. Breakdown of "Corrective Maintenance" costs for Lower Mary River WSS 2007 to 2011[268]

It is noted that the projected cost for 2011 forms the basis for the next price path (2012-2016) (subject to inflation indexation). The scope of this consultancy was to examine the direct costs which in this case are "Labour", "Materials", "Contractors" and "Other".

As illustrated in Figure 7-29 above, over the past three years (2009 to 2011) "Material" costs have risen to become the major direct cost.

Aurecon notes that "Corrective Maintenance" is the unexpected activities, and as illustrated above in Figure 7-29 and Table 7-6 are highly variable in nature. The average annual historic direct expenditure between 2007 and 2010 is $6,200 (peaking at $11,000 in direct costs for 2009), and SunWater is proposing $9,000 per annum for 2011 to 2016, an increase of 45%. Note that averaging the last two years (2009 and 2010) yields $8000, and Aurecon suspects that SunWater may have used this as the basis to arrive at the 2011 projection of $9,000 (or

[267] Raw data extracted from SunWater spreadsheet *"IM Central -610.03.PSV.xls".*

[268] Raw data extracted from SunWater spreadsheets *"Extract LBC data Conversion extra activity detail and preventive main split.xls"* and *"IM Central -610.03.PSV.xls".*

used the preceding 4 year average and added $2,800 per annum in anticipation of known costs). Aurecon recommends that SunWater provide additional information to highlight why it added a minor premium of $2,800 to the historical averaged costs from the preceding 4 years.

Aurecon notes that it is difficult to forecast “Corrective Maintenance” costs. SunWater’s general approach is to use historical expenditure as the basis for forecasting as commonly utilised by other water utilities. However, in this case, SunWater has incorporated additional costs into the calculation which Aurecon is unable to reconcile.

Without the capacity to replicate SunWater’s proposed 2011 costing, Aurecon is not in a position to validate the prudency and efficiency of proposed 2011 expenditure. Aurecon recommends that SunWater provide additional detail regarding its 2011 calculation, and reasoning for projecting an additional $2,800 per annum cost.

Total Maintenance expenditure

SunWater has indicated its intention to move to a reliability maintenance approach (RCM), which is a rick based process that can assist in providing the optimal mix of “Preventive” and “Corrective Maintenance”. Table 7-7 below highlights the direct costs attributed to “Corrective” and “Preventive Maintenance”, and also indicates that “Total Maintenance” costs in 2011 are 80.9% higher than that recorded for 2007. As previously indicated, concerns have been raised regarding the accuracy of the data for “Preventive Maintenance” in 2007.

Table 7-7. “Total Maintenance” costs for Lower Mary River Bulk WSS

Direct Expenditure ($’000)	Actuals				Forecast	Price Path				
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Preventive Maintenance	12	1	4	4	26	27	28	28	29	30
Corrective Maintenance	7	2	11	5	9	9	9	10	10	10
Total Maintenance	**19**	**3**	**15**	**10**	**34**	**35**	**37**	**38**	**39**	**40**
Annual change		-86.4%	488.2%	-36.7%	258.0%	4.0%	4.0%	2.9%	2.9%	2.9%
Change since 2007		-86.4%	-20.2%	-49.5%	80.9%	88.1%	95.6%	101.2%	107.0%	112.9%
Preventive maintenance %	62.8%	30.0%	28.1%	45.4%	75.1%	75.1%	75.1%	74.9%	74.7%	74.5%
Corrective maintenance %	37.2%	70.0%	71.9%	54.6%	24.9%	24.9%	24.9%	25.1%	25.3%	25.5%

[1]Source: Raw data extracted from SunWater spreadsheets *“IM Central -610.03.PSV.xls”* and *“Extract LBC data Conversion extra activity detail and preventive main split.xls*”.

Although not stated at this time, it is highly likely that SunWater will identify an optimal ratio of (Preventive: Corrective) maintenance expenditure based on the RCM approach, which may be different to the 75%:25% projected above.

7.4.8 Transfer of pump station and main channel costs

SunWater states that the Owanyilla Pump Station and Main Channel perform a bulk water function, for the transfer of water from the Mary River to Tinana Creek. SunWater states that hydrological modelling indicates that 27% of water transported through the channel relates to bulk water, and therefore 27% of the main channel and pump station costs should be transferred to the bulk scheme[269].

Aurecon have requested the amount of data (years) utilised for the hydrological modelling that was undertaken for this analysis, however SunWater indicated that it will provide details to QCA directly.

Table 7-8 identifies SunWater' projected costs (27%) of Owanyilla pump station and main channel (Opex and Capex) to be transferred across.

Table 7-8. Owanyilla pump station and main channel costs

Real dollars, $'000	Financial Year				
	2012	2013	2014	2015	2016
Pump station & main channel cost allocation[1]	-132	-133	-134	-135	-135

[1]Includes operating costs including electricity, and renewal expenditures associated with the pump station and main channel.
Source: SunWater, *Lower Mary River Water Supply Scheme NSP*, (2012-2016) January 2011, Page 28.

7.4.9 Potential efficiency gains and recommendations

The following points are made in relation to Opex

- On-going re-structuring of the SunWater workforce (and equipment) for the Central region, involving regional office relocations and restructuring of both administrative and operational staff is occurring. However, it was difficult to observe where any of these cost savings emerge.
- ""Operations" is a main cost. Aurecon has submitted a substantial number of questions to SunWater seeking additional information and transaction clarity, and received responses. However, Aurecon has insufficient information to review the prudency and efficiency of forecast expenditure. Aurecon recommends that the 2011 forecasts for Operations sub-activities be examined (and supporting calculations), with particular attention paid to forecast Metering and Dam Safety cost estimates. Aurecon notes that total "Operations" direct expenditure proposed for 2011 is approximately 5% lower than the average of the preceding 4 years (after also accounting for the transfer of $3,000 costs from "Dam Safety" to "Preventive Maintenance").
- The prudent and efficient direct "Labour" cost for "Preventive Maintenance" (2011) should initially be set at $8,250 compared to $29,000 budgeted. Aurecon recommends that SunWater audit proposed activities for 2011 against itemised historical activities (2010) to substantiate what past prescribed activities were not undertaken or miss-coded, and an examination of the differences in hourly costs between those incurred in 2010 against that prescribed within the Parsons Brinkerhoff (2010) report also undertaken.
- Based on the historical data provided by SunWater and the inability to validate the calculation of the 2011 expenditure using the preceding 4 years costs, Aurecon has insufficient information to validate the prudency and efficiency of proposed "Corrective Maintenance" direct costs. Aurecon recommends that additional clarification be provided by SunWater to substantiate the differences and reasoning for the additional $2,800 annual expense.

[269] SunWater, *Lower Mary River Water Supply Scheme Network Service Plan*, pages 7 & 8.

7.5 Capital costs review

SunWater has developed a rolling renewal annuity program that runs for a forecast 25 year period. The forecast for the initial 5 year period is based on a detailed assessment of asset condition and risk of failure, whilst forecasts beyond 5 years are based on broader estimates of asset life using engineering estimates and standard replacement rules[270].

SunWater also state that: *Renewals expenditure refers to works intended to maintain the ongoing performance and service capacity of the assets or, if this is no longer possible or economical, to replace the asset with a modern equivalent*. (SunWater, *Lower Mary River Water Supply Scheme NSP*, page 29).

In relation to the Lower Mary River Bulk WSS, renewal expenditure is limited to the Mary River Barrage and Tinana Creek Barrage. The following section provides an overview of renewal expenditure for the current price path (2007-2011) and forecast price path (2012-2016).

7.5.1 Review of historical renewal expenditure

Over the current price path period (2007 – 2011) annual renewals expenditure as stated by SunWater within the NSP has been between $28,000 and $112,000 (Table 7-9). The sum total expenditure over this period is $307,000, for a mean annual average of $61,400.

Table 7-9. Historical renewals expenditure for Lower Mary River Bulk WSS

nominal dollars $'000	Financial Year					
	2007	2008	2009	2010	2011	Sum total 2007-2011
Actual renewal spent[1]	57	28	29	112	81	307
LBC target expenditure[2]	49	15	-14[*]	-15[*]	20	55
Difference ($'000)	8	13	43	127	61	252
Difference (%) from LBC target	16.3%	86.7%	307.1%	846.7%	305.0%	458.2%

[1]Source: *Lower Mary River Water Supply Scheme NSP,* (2012-2016) January 2011, Page 7

[2]Source: SunWater spreadsheet, *"Compare R&E Spend to Annuity 2007_2011.xls".*

[*]Aurecon notes that the negative values may reflect the disposal of either an asset or materials associated for assets

Of concern has been the substantial variation between Actual renewal spent and LBC target expenditure. As noted above in Table 7-9, for the years 2008 to 2011 the actual spent has exceeded the LBC target by a substantial amount, and for the entire price path (2007-2011) actual spend has exceeded the LBC target by 458%.

Due to the very nature of water assets, it is very unlikely that an asset management plan will ever have the capacity to predict all possible renewal expenses in advance, particularly as you go further out in time. Table 7-9 above highlights that cost over-runs became larger as time progressed, reaching 846% in 2010.

SunWater was not been able to provide a detailed list of renewals projects that it intended to deliver over the current price path 2007 to 2011 (that would have formulated the LBC target expenditure). However, SunWater did provide an Excel database containing breakdown of historical renewals expenditure for the period 2007 to 2011 (actual expenditures up until 15th February 2011) for all projects greater than $10,000 in value (Table 7-10 below). However, there were a number of limitations to the database including:

[270] SunWater, *Lower Mary River Water Supply Scheme NSP*, (2012-2016) January 2011, Page 29.

- No indication of the Board approved budget for all projects in 2007
- Additional columns of "Revised Budget", and "Approved" along with "Board Budget" for 2008, 2009, 2010. In most cases, The amount recorded for an activity under "Revised Budget" equalled "Approved", and also "Yearly Total" (actual spend for that year). Highlighted the dynamic nature of the project budget management as the scope of works/activities changed
- Totals include Indirect and Overhead costs, and any proposed changes in allocation methods will impact renewal activity costs
- Many projects would run over several financial years, in which Board Approved budget only appeared in the first year, and not subsequent. Difficultly linking activities across years, due to the nature of the database provided
- The summation of annual totals within the database, did not equate with stated renewals expenditure for the scheme (see Table 7-11 below).

Table 7-10. Itemised historic renewals expenditure for Lower Mary River Bulk WSS

Description	Start Date	Year	Spent	Status
Tinana Upgrade Meter Installs	1/07/2006	2007	$24,893	Closed
Lower Mary Meter Replace	1/07/2006	2007	$25,312	Closed
TOTAL for 2007		**2007**	**$50,205**	
Install Marker Buoys – Mary Barrage	1/02/2007	2008	$0	Deferred
TOTAL for 2008			**$0**	
Teddington Weir Diversion Pipeline – Metering Investigation	14/10/2008	2009	$12,990	Closed
Install Marker Buoys – Mary Barrage	1/02/2009	2009	$17,084	Final review
TOTAL for 2009			**$30,074**	
Replace damaged aluminium covers (grates over the fishway bays?)	19/08/2009	2010	$6,671	Financial
Replace Joint Filler and Sealant - Tinana Barrage (as per 2005 5Y Insp Rec 7)	1/10/2009	2010	$14,937	WIP
Install Safety Buoys - Tinana Barrage	1/09/2009	2010	$12,985	WIP
Repair Protection Works and Concrete Crest and Replace Joint Filler and Sealer on Crest - Mary Barrage (as per 2005 5Y Insp)	1/10/2009	2010	$65,989	WIP
TOTAL for 2010			**$100,582**	
Install Safety Buoys - Tinana Barrage	1/09/2009	2011	$3,980	WIP
Replace DICL Pipe - Mary Barrage	1/10/2009	2011	$0	Released
Replace Slide Gate Operating Mechanism - Fish Ladder - Tinana Barrage	1/07/2010	2011	$5,586	WIP
TOTAL for 2010 up until 15th Feb 2011			**$9,566**	

Source: SunWater spreadsheet "*2007-2011 PROJECTS.xls*"

Of the renewal expense items listed above in Table 7-10 for 2010, the following observations are made from the desktop review of data:

- Only 4 projects with expenditure for 2010
- One project did have a Board approved budget (Replace damaged aluminium covers)
- The remaining 3 projects expenditure for 2010 was below Board approved budget, but all 3 projects were incomplete (WIP).

As highlighted below in section 7.5.3, Aurecon review of the expense incurred for the installation of the marker buoys at the Mary River as prudent and efficient.

Unfortunately, conditions at the time of the field trip made it impossible to examine the works undertaken in 2010 involving the repair protection works and concrete crest on the Mary River barrage.

Aurecon notes that there are differences between the stated annual renewal expenditure stated within the NSP, and the annual totals calculated by Aurecon based on the itemised database provided by SunWater as highlighted in Table 7-11 below. Aurecon notes that the discrepancy may possibly be due to one or more of the following:

- A significant amount of renewal projects were below $10,000 in value. Note that the consultants requested expenditure items valued at only $10,000 and above
- Additional adjustments and renewal transactions are allocated.

Table 7-11. Difference between itemised renewals expenditure and NSP totals for Lower Mary River Bulk WSS

Year	NSP stated expenditure[1] (A)	Itemised expenditure (Table 7-10) (B)	Difference ($) (B-A)	Difference (%) (B-A) / (A)
2007	$57,000	$50,205	-$6,795	-11.9%
2008	$28,000	$0	-$28,000	-100.0%
2009	$29,000	$30,074	$1,074	3.7%
2010	$112,000	$100,582	-$11,418	-10.2%
2011	$81,000	$9,566*	-$71,434	-88.2%

[1]Source: *Lower Mary River Bulk WSS NSP,* (2012-2016) January 2011, Page 7
*Progressive total up till 15th February 2011

7.5.2 Forecast renewals expenditure

There are significant renewal expenditures proposed for the Lower Mary River Bulk WSS and there is considerable variance in proposed annual expenditures (Figure 7-30).

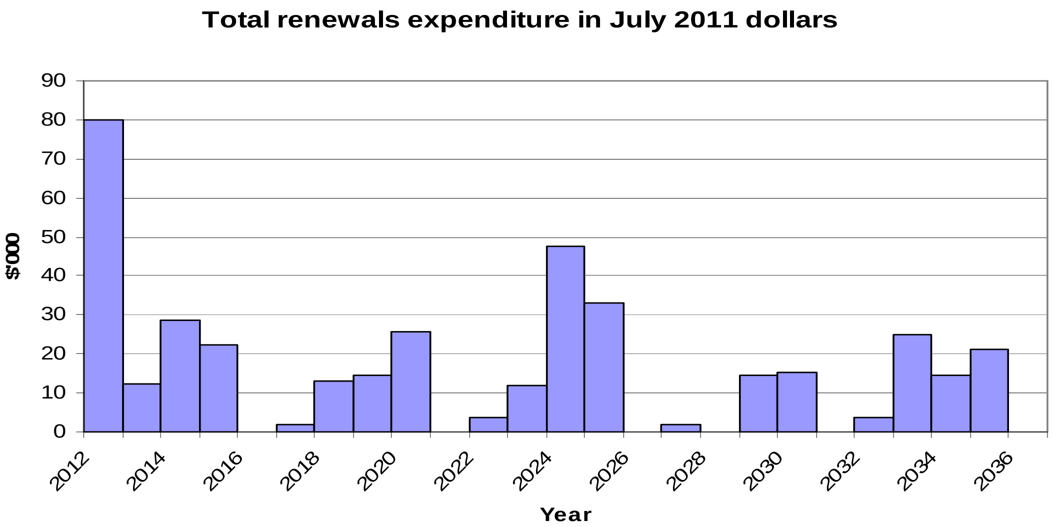


Figure 7-30. Proposed annual renewals expenditure for Lower Mary River Bulk WSS 2012 to 2036[271]

As disclosed within the NSP, there are a number of significant proposed expenditures for the next price path (Table 7-12 below). The summary total renewals expenditure for 2012 to 2016 is $143,000, or an annual average of $28,600 (compared to the annual average of $61,400 for the 2007 to 2011 period).

Table 7-12. Forecast renewals expenditure for Lower Mary River Bulk WSS 2012 to 2016

Real dollars, $'000	Financial Year				
	2012	2013	2014	2015	2016
Mary Barrage	21		14	8	
Tinana Barrage	59	12	15		
Cost estimate for renewals program	80	12	29	22	0

Source: *Lower Mary River WSS NSP,* (2012-2016) January 2011, Page 30.

Table 7-12 below provides detailed description of proposed renewal expenditures items for 2012 to 2016.

Table 7-13. Detailed review of forecast renewals expenditure for Lower Mary River Bulk WSS 2012 to 2016

ID No.	Year	SunWater Description	Total cost up to 2016 ($'000)
Mary Barrage			
F1	2012	June 2005 5 Yearly Barrage Inspection - Recomm 13: Replace grating (Design done in 2010)	21
F2	2012 & 10 yearly thereafter	10Y Crane Inspection - as per AS2550	4
F3	2014	Blast and paint fish way baffle supports	14

[271] Source: SunWater Database, "*NSP Projects Central V4.xls*".

ID No.	Year	SunWater Description	Total cost up to 2016 ($'000)
F4	2015 & 5 yearly thereafter	5 Year Dam Safety Inspection	8
Tinana Barrage			
F5	2012	Skin rock protection -D/S Left Bank	59
F6	2013 & 10 yearly thereafter	Maintain access road to Tinana barrage	12
F7	2014 & 5 yearly thereafter	Refurbish: Regular Maintenance concrete skin over barrage protection works (Confirm with condition assessment 2012/2013)	15
F8	2015 & 10 yearly thereafter	Refurbish Fencing	6
F9	2015 & 5 yearly thereafter	5 Year Dam Safety Inspection	8

Source: SunWater Database, "*NSP Projects Central V4.xls".*

Table 7-15 above provides details for specific renewal expenditures proposed for 2012 to 2016, and an indication if a recurring expense occurs between 2017 and 2036. Note that Aurecon undertook a site inspection and review of Item F5, the proposed Skin Rock protection at the Tinana barrage (see Section 7.5.3 below), and based on limited costing information assesses that the expenditure as prudent and efficient.

Aurecon's review of dam Inspection costs across a number of schemes finds that the proposed 5 year dam safety inspections for Mary River Barrage and Tinana barrage (Items F4 and F9 from Table 7-15) as prudent and efficient.

Table 7-14 below highlights additional expenditure activities above $10,000 in costs proposed for 2017 to 2036 (that were not captured as expense items for 2012 to 2016 in Table 7-15 above).

Table 7-7. Review of forecast renewals expenditure over $10,000 for Lower Mary River Bulk WSS 2017 to 2036

ID No.	Year	SunWater Description	Cost per activity ($'000)
Lower Mary River Distribution			
F10	2018 & 2033	Replace Gauging Equipment	13
Mary Barrage			
F11	2024	Replace Buoys (4 off), Safety Buoyage Systems	26
Tinana Barrage			
F12	2020	Replace Slide Gate Outlet	10
F13	2025	Change Out Gate - replace control gate as required	12

Source: SunWater Database, "*NSP Projects Central V4.xls*".

Aurecon notes that the replacement of the marker buoys at the Mary barrage is projected for 2024 at a cost of $26,000, which is an increase from the $18,000 spent in 2009. As recently highlighted with the floods washing away two buoys, the projected life expectancy of these assets may be difficult to project. Note that SunWater will be seeking to replace the lost marker buoys via an insurance claim.

7.5.3 Examination of renewals expenditure

As indicated earlier, Aurecon inspected a number of assets during the field trip. For the Lower Mary River Bulk WSS, Aurecon inspected both the Mary River Barrage and the Tinana Barrage. Due to the high water flow levels at the time of the field visits, Aurecon was not able to view either the works and /or assets at the Mary River Barrage. Hence, the discussion below relates to observations made regarding renewals expenditure at Tinana Barrage.

Tinana Barrage
At the Tinana Barrage, there is a proposal to undertake repair works as follows:
2012: Skin Rock protection, left hand side, $59,000

At the site inspection, Aurecon observed that some erosion had occurred due to recent floods. Aurecon also noticed that substantial bank repair works had been undertaken in recent years, but an examination of the database provided by SunWater did not identify recent expenditures for 2007 to 2011 (under asset renewals expenditure). Aurecon also noted that:

- Condition assessment during the 2010 dam safety inspection identified the need to poor concrete over the rock protection at Tinana Barrage to stabilise the existing rocks.
- SunWater was undertaking a risk adverse approach, investing in preventive measures such as extending the rock protection bank at the barrage, rather than potentially incurring significant repairs work that may occur from future significant flood events.

Key points:
- That the proposed work program and adoption of a risk averse approach appeared justified (prudent) given that there was evidence of minor damage resulting from the recent flooding.
- That the proposed works budget of $59,000 was significant. However, a detailed costing for the works project was not completed, and as such Aurecon was unable to evaluate the effectiveness of the proposed expenditure. However, based on other works which may incur up to 50% in Indirect and Overhead costs, and the scope of concreting required both upstream and downstream of the existing concreted pad area identified during the site inspection, Aurecon views the costs for the project as efficient.
- As encountered with other renewals program costing, a significant component of the budget is for the engagement of external contractors for the actual works, but also significant internal indirect and overhead costs are incorporated into the costing.

Mary River Barrage
1. Repair Protection Works and Concrete Crest and Replace Joint Filler and Sealer on Crest, undertaken in 2010 at a cost of $65,989
At the site inspection the barrage was overflowing, making it impossible to view the work completed. As such, Aurecon cannot offer any observation regarding the work undertaken; however Aurecon noted that a condition audit recommended the need for the works (validating the timing of the work).

2. Install Marker Buoys near the barrage, at a cost of $17,084 in 2009.
The requirement for the marker buoys are a mandatory requirement at the barrage location. The installation of the marker buoys are undertaken by external contactors.

The site visit (2011) revealed that two of the recently installed marker buoys were missing as a result of the recent floods. The regional SunWater manager indicated that the cost of replacing the missing marker bouys will initially be sought via the Insurance Policy, and as at this time, had no indication if the claim for flood damage was successful.
Aurecon observed that the need for the installation of the marker buoys (prudent), and the total cost of $17,084 as efficient when examining the cost for installation of marker buoys are other water impoundments.

7.5.4 Renewals annuity balances

The Lower Mary River Bulk WSS has a substantial positive balance of $160,000 in 2012[272]. Stakeholders have expressed substantial interest in relation to the calculation of this opening balance for 2012.

SunWater has provided Aurecon with an internal working paper[273] which illustrates:

- Opening Balance at 1 July 2006 was ($973,000) for the Mary River (irrigation sector), and through a process of apportionment have allocated 9% of this starting balance to Bulk Scheme ($85,000)
- Identified annual annuity incomes and expenses specifically for the Bulk Scheme for 2007 to 2011
- Identified that the closing balance for 30 June 2011 for the Bulk Scheme is $98,000 (irrigation sector balance). Incorporating an uplift factor for whole of scheme, the opening balance is $164,000
- Applied an interest rate of 9.689% (pre-tax nominal) on annual balances

Utilising this information presented above, Aurecon have modelled the stated expenses and income for 2007 to 2011, incorporating the stated 2007 annuity starting balance and annual interest of 9.689%. Aurecon arrived at a closing balance of $98,000 as stated within the SunWater paper.

As indicated below within Figure 7-31, the scheme incurred annual interest charges for 2007 to 2009, but then gained interest income for 2010 and 2011. Aurecon estimates that the scheme incurred approximately ($7,000) in interest charges over the entire 2007 to 2011 period.

[272]Source: *Lower Mary River Water Supply Scheme NSP (2012-2016),* January 2011, Page 30.

[273] Source: SunWater, *Renewals annuity calculation, INTERNAL WORKING PAPER*, January 2011

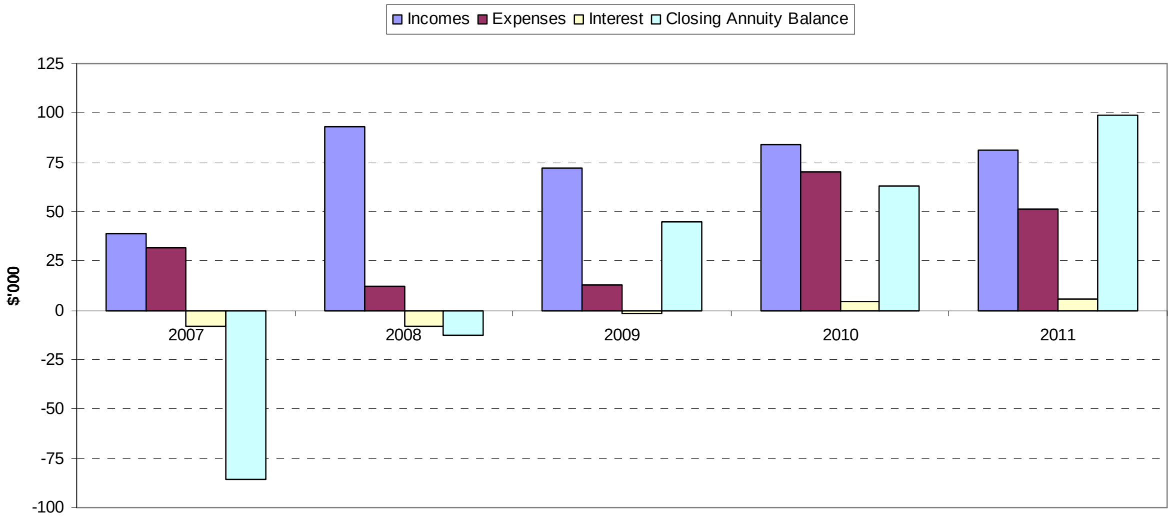


Figure 7-31. Calculated annual renewal balance for Lower Mary River Bulk WSS 2007 to 2011

Figure 7-31 also highlights that income was significantly greater than expenses for 2008 and 2009, which resulted in transforming the annuity balance moving from a substantial negative balance to a positive balance by the end of 2009.

As indicated in Figure 7-32 below, the annuity balance is projected to remain positive until 2035.

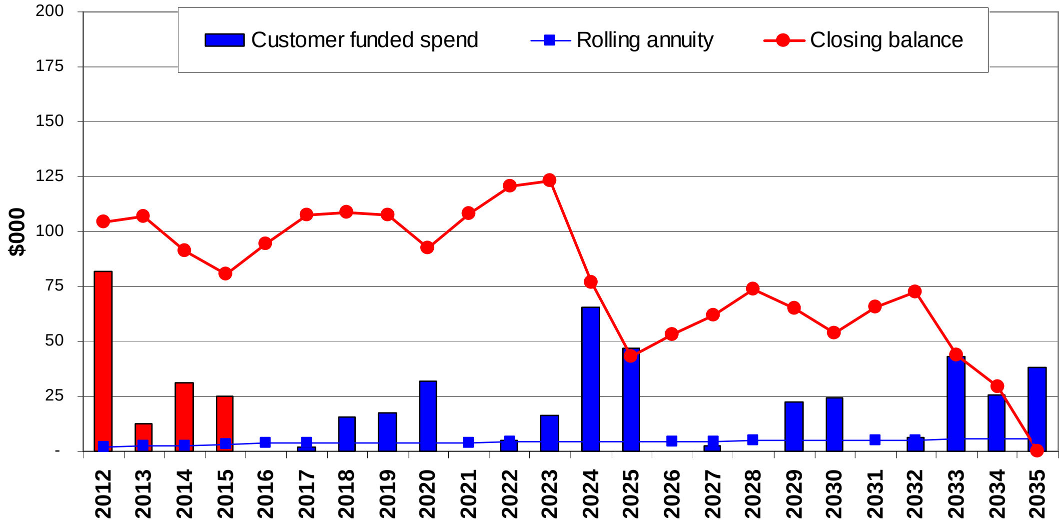


Figure 7-32. Renewals annuity balances for Lower Mary River Bulk WSS 2012 to 2036 (nominal terms)[274]

Applying SunWater's prescribed rate of interest of 9.689% upon the starting 2012 annuity balance in of $160,000, implies an annual interest income of approximately $15,500 in 2012.

As indicated above, the proposed average renewal expenditures for 2012 to 2017 is $28,600 per annum. As a result of the substantive positive balance in 2012 (accrues interest income), and the expenses proposed, the annual annuity charge going forward is minor as shown below in Table 7-15.

[274] Source: SunWater spreadsheet, *"Annuity charts – V610 03.xls*"

Table 7-15. Renewals annuity charge for Lower Mary River Bulk WSS 2012 to 2016

Real dollars, $'000	Financial Year				
	2012	2013	2014	2015	2016
Renewal annuity charge	2	2	3	3	3

Source: *Lower Mary River Water Supply Scheme NSP (2012-2016),* January 2011, Page 30.

7.5.5 Feedback from field visits

In terms of general feedback for the Lower Mary, see notes in Section 5.2.4

In relation to renewals expenditure, the following two statements from stakeholders are of particular relevance.
Stakeholders would consider comprising the Level of Customer Service

- Will consider a lower of standard if it delivers a substantial lowering of scheme costs.
- Stakeholders stated that there has not been any consultation with SunWater for a number of years in relation to Asset Management plans and projects.

7.5.6 Summary of findings on renewals expenditure

Historical Renewal Expenditure

SunWater was not able to provide to this review the proposed renewal programme as developed in 2006 for the current price path. However, as highlighted earlier SunWater's actual expenditure on renewals over the 2007-2011 period was 458% higher than the proposed LBC target expenditure (noting that the data for the 2011 financial year is incomplete).

Aurecon's site visit of the barrages and examination of recent works found that the renewal activities investigated were prudent and efficient. Aurecon also found that the processes engaged (identification of need through condition assessments, timing, scoping, and tendering for the engagement of external contractors) indicated a structured and efficient process. However, substantial Indirect and Overhead costs were also incorporated which greatly distorted the perceived value for money outcome achieved for the activity.

Aurecon notes that the itemised listing of renewal expenditure provided by SunWater did not account correlate with stated annual expenditures, particularly for 2008 and 2011. Aurecon recommends that an additional request is made to SunWater to provide a comprehensive itemised inventory of renewal expenditure items, so that 100% of the stated annual cost can be validated.

Forecast Renewal Expenditure

To assess the prudency and efficiency of forecast renewal activities, Aurecon examined proposed works at both barrages. Aurecon identified a well-documented process (condition assessments, audits, external expert reviews etc) that substantiated the timing or need for expenditure, particularly for assets incurring renewal expenditure within 2012-2014, and therefore prudency was well validated.

Unfortunately, no detailed scoping or budgeting was available for the proposed activities examined, as it is only undertaken when the activity falls within a 12 month planning schedule. Aurecon also noted via its field investigation that renewal expenditure activities also incurred substantial Indirects and Overheads costs.

Aurecon examined a number of renewal activities for prudency and efficiency, and found:

- Tinana Barrage (2012 Skin Rock protection, left hand side, $59,000) for which Aurecon viewsed that the proposed renewal activity was prudent. Although detailed costing was un-available, Aurecon viewsed the proposed costs as efficient assuming that direct costs potentially only accounted for 50% of the budget, and the scope of works visible during the site inspection was substantial.
- Installation of Marker Buoys near the Mary River Barrage at a cost of $17,084 in 2009 for which Aurecon found that the renewal activity was prudent (mandatory requirement) and efficient.

8. Assessment of Lower Mary Distribution System

8.1 Scheme Description

The Lower Mary Distribution System is located downstream of Tiaro along the Mary River, and downstream of Teddington Weir on Tinana Creek. Teddington Weir is owned and operated by Maryborough City Council[275] (now Fraser Coast Regional Council) (Figure 8-1).

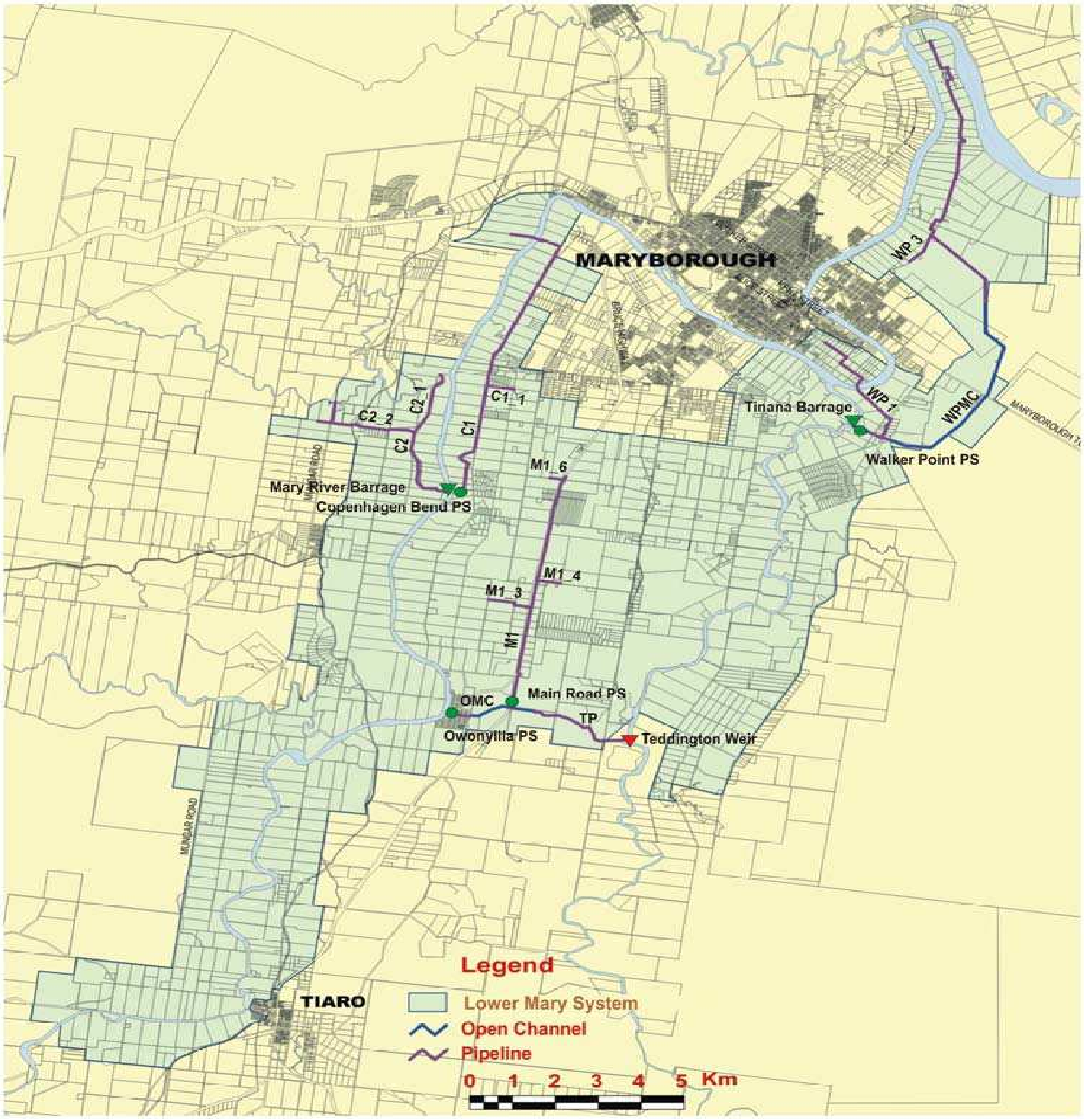


Figure 7-1 Mary River System[276]

[275] SunWater (2011), Scheme information http://SunWater.com.au/scheme accessed 25th April 2011.
[276] SunWater, *Lower Mary WSS – Scheme Operation Manual*, page 22, un-dated report.

The Lower Mary Distribution System has a total of 79 customers comprising of 9,952 ML of medium priority WAE, while SunWater holds 4,588ML of medium priority WAE and 324 ML of high priority WAE.

The scheme supplies water predominantly to irrigators of agricultural crops, primarily sugar cane.

The Interim Resource Operations Licence (IROL) sets the regulatory framework for the management of water within this scheme. Local management of the scheme is managed from SunWater's regional office at Bundaberg.

The Lower Mary Distribution System is located near the town of Maryborough. Under contractual obligations to customers SunWater has obligations to manage and operate the following assets:

- Lower Mary Distribution Network including Owanyilla Channel, Teddington Diversion Pipeline, Copenhagen Bend Pipeline and Walker Point Pipeline.
- Copenhagen Bend Pump Station lifts water from the Mary Barrage into the Copenhagen Balancing Storage. In turn, the storage supplies 7.6km of pipeline on the left bank and 9km of pipeline along the right bank of the Mary River Barrage. The pump station has a wet well cast into the riverbank covered with steel grates and fitted with trash racks. Two equally sized submersible pumps with a capacity of 65 ML per day[277].
- Main Roads Pump Station uses water from the Owanyilla channel to supply farms within the Glenorchy area. The station is an open air pump station consisting of two equally sized double suction centrifugal pumps with a total capacity of 62 ML per day[278].
- Owanyilla Pump Station is located approximately 7 km upstream of the Mary River Barrage. Its purpose is to supply water for the Main Road relift system and to supplement Tinana Barrage when it is down to minimum operating level due to a lack of inflows. The Owanyilla Pump Station consists of a 12m reinforced concrete dry well topped with a control building accessed by a bridge from the riverbank. It houses two electrically driven centrifugal pumps that together can supply 243 ML per day[279].
- Walker Point Pump Station is located just upstream of the Tinana Barrage, consisting of a wet well and 2 screened inlet pipes. The pump station has two submersible pumps with provision for a third. The pumps have a capacity of 75 ML per day[280].

Aurecon undertook a site visit of both the Lower Mary River Bulk WSS and Distribution schemes on 9th March 2011. The focus of the scheme site visit was to:

- meet with irrigation stakeholders at the Canegrowers office (Maryborough)
- Under the guidance of the regional SunWater manager, inspect a sampled number of asset locations to examine:
  - recent renewal expenditures
  - proposed renewal expenditures
  - review the nature and extent of operations and maintenance activities undertaken at that location

[277] SunWater, *Lower Mary Water Supply Scheme – Scheme Operation Manual*, page 26, un-dated report.
[278] SunWater, *Lower Mary Water Supply Scheme – Scheme Operation Manual*, page 24, un-dated report.
[279] SunWater, *Lower Mary Water Supply Scheme – Scheme Operation Manual*, page 23, un-dated report.
[280] SunWater, *Lower Mary Water Supply Scheme – Scheme Operation Manual*, page 29, un-dated report

The following sections provide an overview of the observations and learning from the desk top review and site visit undertaken to the Lower Mary Distribution System.

8.2 Scheme management

The Interim Resource Operations Licence (IROL) sets the regulatory framework for the management of water within this scheme. Management of the scheme is managed from SunWater's regional office at Bundaberg, whilst day-to-day operations are supervised from SunWater's Maryborough depot.

SunWater has two operational staff located within an office at Maryborough to primarily service the Lower Mary River Bulk and Distribution scheme. Stakeholders have expressed concern regarding SunWater's Maryborough Office facilities being excessive in terms of capacity and cost. The regional manager (SunWater) indicated that planning is underway to relocate the operational SunWater staff at Maryborough to a small depot (garage with office desk) on SunWater land at one of the Barrage locations, and subsequently disposing of the existing office in the main centre of Maryborough.

Note that the two staff members at Maryborough also undertake duties at other scheme locations within the Central region as required. The other schemes include Boyne (Bulk), Barker Barambah Bulk), Upper Burnett (Bulk) and Bundaberg (Bulk and Distribution).

At times, SunWater staff from other locations within the Central region will be utilised for scheme specific activities for the Lower Mary River Bulk Water Supply Scheme, particularly from the Bundaberg Depot which is the main office for the Central region, and also houses a storage workshop. Key staff resources at the Bundaberg office include:

- *Regional Operations Manager & Service Manager*
- *3 working teams of two electricians (also assist Biloela)*
- *2 working teams of two fitter & turners (also assist Biloela)*
- *9 operational staff located at Bundaberg and Gin Gin (operate primarily Bundaberg Bulk and Distribution systems)*
- *8 Technical officers and Schedulers (for Central region including Biloela)*
- *2 Administrative staff (for Central region)*

Other SunWater staff resources at other Central region locations:

- 2 staff located within the Upper Burnett, one officer working from home at Mundubbera, and one officer working from the office/workshop at Wuruma Dam
- 5 staff located within the Lower Burnett (servicing the Boyne Bulk and Barker Barambah Bulk), at the main office workshop complex at Boondooma Dam, and also operating from a small relocatable office at Bjelke Petersen Dam

SunWater advised that in recent years there has been an on-going management strategy to relocate positions (as vacancies arise) from the smaller centres to Bundaberg. As highlighted above, small mobile working teams located at Bundaberg service all schemes across the central region.

8.3 Summary Opex and Capex information from the NSP

The Lower Mary Distribution System has a total of 79 customers comprising of 9,952 ML of medium priority WAE, while SunWater holds 4,588ML of medium priority WAE and 324 ML of high priority WAE for distribution losses.

The NSP for the Lower Mary Distribution System proposes that the efficient operating costs for the scheme for the coming 5 year regulatory period average $770,000 per annum. This represents a substantive 28.1% increase over the current price path average of $601,000 per annum.

Stakeholders have expressed interest examining the projected lower bound operating costs for the scheme as projected within the 2005/06 Irrigation Price Review by Indec Consulting[281]. However, SunWater advise[282] that a direct comparison between the Tier 1 projected 2005/06 lower bound operating cost against actual expenditure as presented within the NSP for 2007 to 2011 is not feasible as;

- that the Tier 1 tables for “scheme lower bound cost” include only the irrigation share of the costs, and that grossing up the costs is problematic
- and that Tier 1 data is “whole of scheme’, whereas SunWater has unbundled costs between bulk and distribution for the Lower Mary

Not withstanding these limitations, Aurecon have examined the projected LBC values for 2006-2011 provided within the Tier 1 report against the costs presented within the NSP’s (See Appendix A).

Projected renewal annuity spend over the five year period to 2016 is $991,000, which is substantially less than the $1,401,000 spent over the preceding 5 year period. Due to a substantive negative annuity starting balance of -$1.4 million in 2012, a total charge for renewal annuity of $2.7 million is sought for the 2012 to 2016 price path.

The following sections examine Opex and Capex in more detail.

8.4 Operational cost review

An overview of required operational activities for the scheme is identified within the *Lower Mary Water Supply Scheme – Scheme Operation Manual*[283]. The manual provides in detail an overview of the scheme structure, compliance requirements, overview of scheme operations activity requirements, and references for collecting and reporting scheme data.

For each scheme SunWater has utilised the Scheme Operation Manual as a key input towards the formulation of Maintenance Schedule and Operations Manual for individual assets/facilities across the scheme, as highlighted below within Figure 8-2.

[281] Statewide Irrigation Pricing Working Group, *SunWater Irrigation Price Review 2005-06 Tier 1 Report*, April 2006, Table 5.22, page 54.
[282] Email from SunWater to the QCA, dated 23rd February 2011.
[283] SunWater, *Lower Mary Water Supply Scheme, Scheme Operation Manual*, document un-dated.

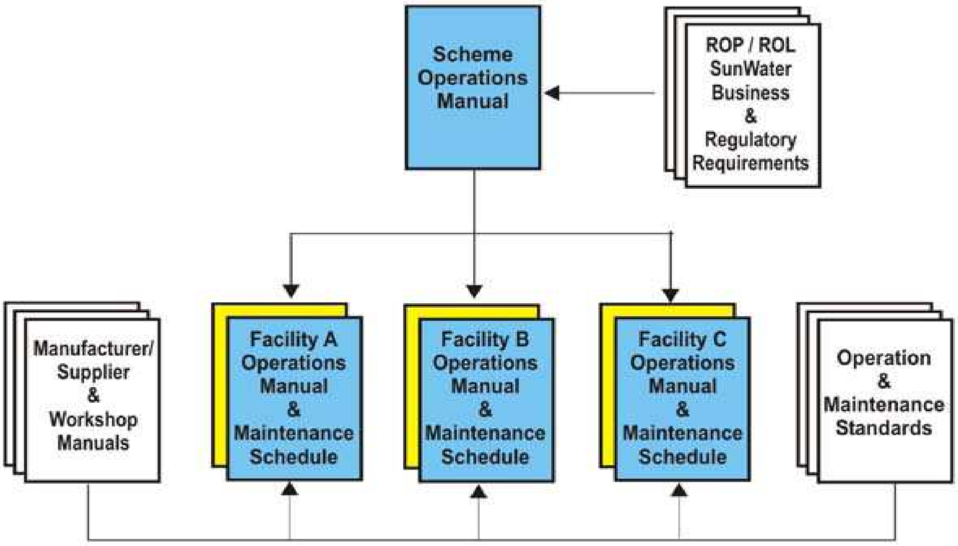


Figure 8-2*.* Overview of the linkages between Scheme and individual facility Operations Manual[284]

8.4.1 Overview

Within the NSP SunWater has presented Operational costs by type, and also by activity. As such, Aurecon has undertaken a review of Operational costs by investigating in detail key expenditure items of “Labour” and “Electricity”, and key expenditure activities of “Operations”, “Preventive Maintenance” and “Corrective Maintenance”.

Although not consistently obvious across all, many Operational cost items and activities vary accordingly to water usage levels.

As indicated below (Figure 8-3) annual water usage within the Lower Mary Distribution system fluctuated substantially from year to year. The highest annual water usage occurred in 2007 in which approximately 9,000 ML was utilised.

For the purposes of incorporating water usage into this cost analysis, Aurecon has indexed annual water usage for 2007 to 2010 period against the 2007 water use rate of 9,000 ML (highest recorded water usage value across the 2003 to 2010 period including Network losses) as follows:

- Approximately 100% in 2007
- Approximately 25% in 2008
- Approximately 38% in 2009
- Approximately 70% in 2010

[284] SunWater, *Barker Barambah Water Supply Scheme – Scheme Operation Manual*, page 13, un-dated report.

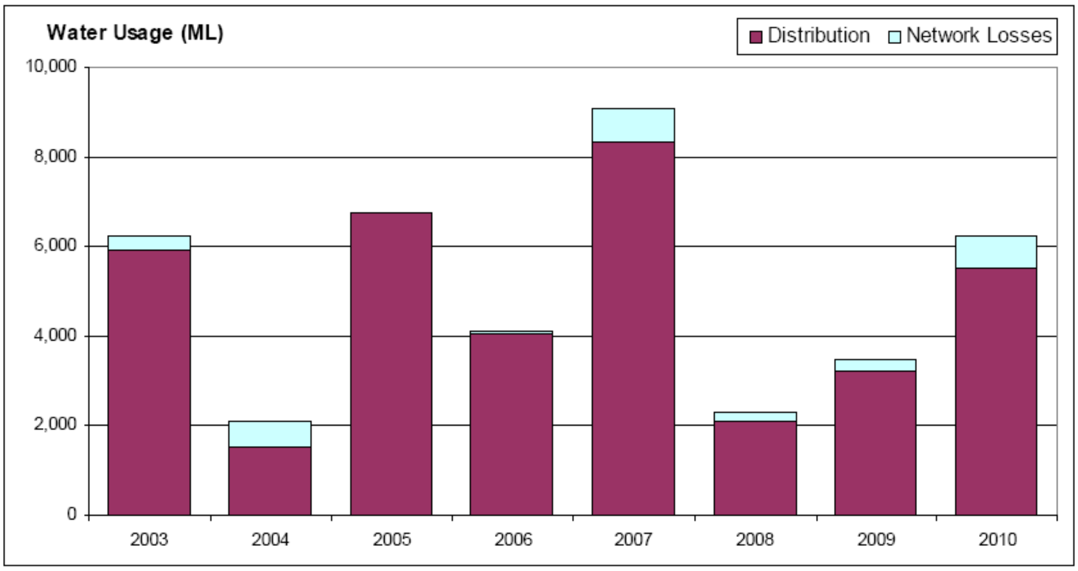


Figure 8-3. Water usage for Lower Mary Distribution System[285]

Stakeholder feedback indicated that with the exceptional wet season currently experienced (2010/2011) water usage is likely to be much lower for the scheme in comparison to that of 2010.

As indicated below in Figure 8-4, "Operating" costs for the scheme do not appear to be correlated with actual water usage rates. In 2008 "Operating" costs increased, yet water usage decreased by 75%, indicating that there are no links between water usage and "Operating" costs for this scheme.

Also of concern is the fact that "Operating" costs in 2010 and 2011 are approximately 94% higher than in 2007.

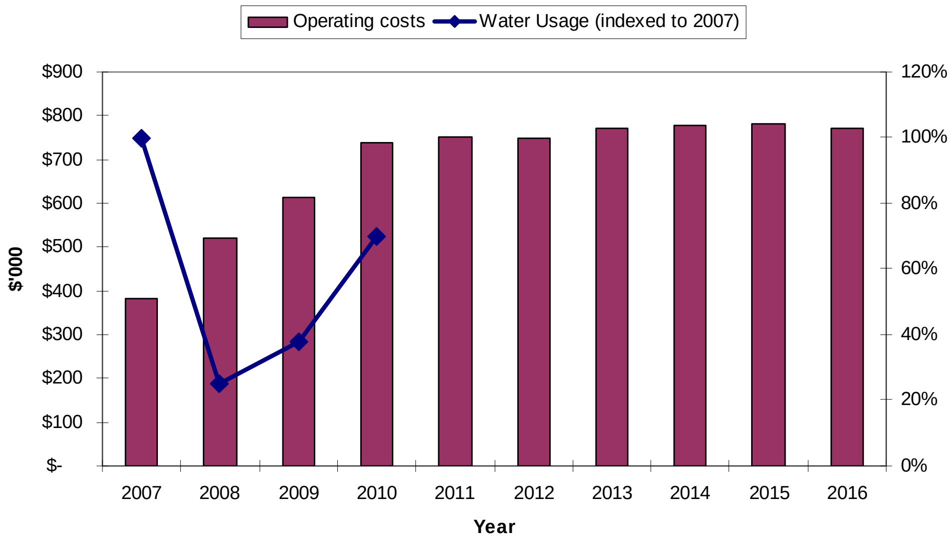


Figure 8-4. Comparison of "Operating" costs against water usage (indexed against 2007) for Lower Mary Distribution System[286]

[285] Source, *Lower Mary Distribution System NSP,* (2012-2016) January 2011, Page 15.
[286] Raw data sourced from *Lower Mary Distribution System NSP,* (2012-2016) January 2011, Pages 7 & 15.

The key cost component of “Operating” cost across the period from 2007 to 2016 is clearly “Operations” costs and “Preventive Maintenance” (Figure 8-5).

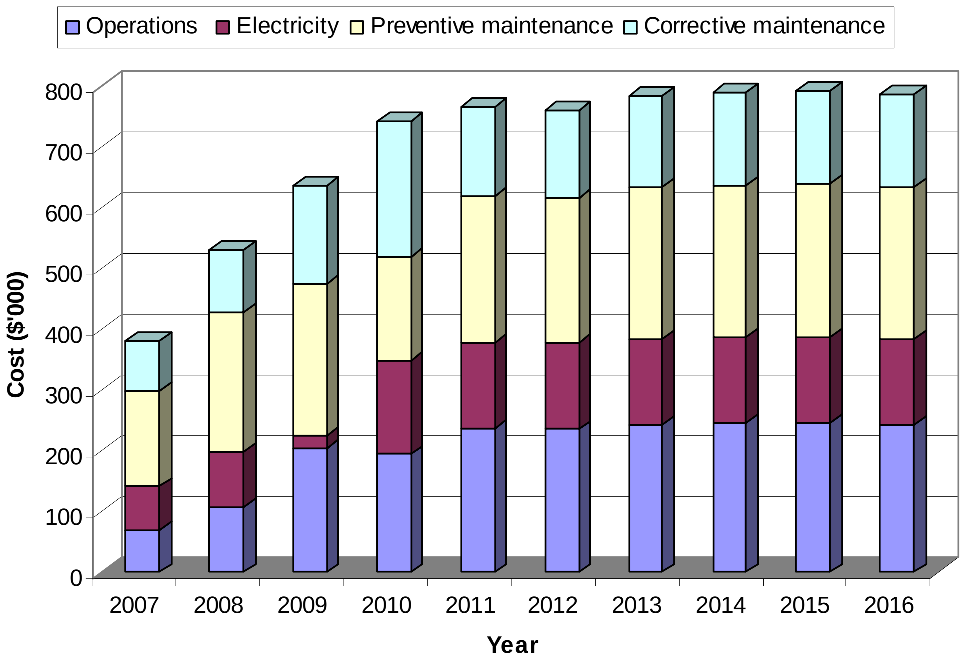


Figure 8-5. Breakdown of “Operating” costs for Lower Mary Distribution System 2007 to 2016

The following sections examine in more detail operational expense items and activities.

8.4.2 Operational Expense Items

This section analyses the key operational expense items of “Labour” and “Electricity”.

8.4.3 Labour costs

Projected “Labour” costs for the Lower Mary Distribution System are significant as highlighted below in Table 8-1. “Labour” as a proportion of “Total Operating” costs have historically varied from 20.1% in 2008 to 25.8% in 2009, but of concern has been the growth of “Labour” costs in absolute terms since 2007 (risen over 155% by 2011).

Table 8-1. “Labour” costs and “Total Operating” costs for Lower Mary Distribution System

($’000)	Actuals				Forecast	Price Path				
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Labour[1]	78	106	158	184	199	202	205	205	205	205
Annual change		35.9%	49.1%	16.5%	8.2%	1.5%	1.5%	0.0%	0.0%	0.0%
Change since 2007		35.9%	102.6%	135.9%	155.1%	159.0%	162.8%	162.8%	162.8%	162.8%
Total Operating costs[1]	381	520	613	737	753	747	771	777	780	773
Labour as % of Total Operating costs	20.1%	20.4%	25.8%	25.0%	26.4%	27.0%	26.6%	26.4%	26.3%	26.5%

[1]Source: *Lower Mary Distribution System NSP,* (2012-2016) January 2011, page 7

As highlighted above in Table 8-1, “Labour” costs have increased by 155.1% between 2007 and 2011. The average annual “Labour” cost (historical) over the 2007 to 2010 period was $131,000. The projected Labour cost in 2011 of $199,000 represents an increase of over 52% over the annual average for 2007 to 2010.

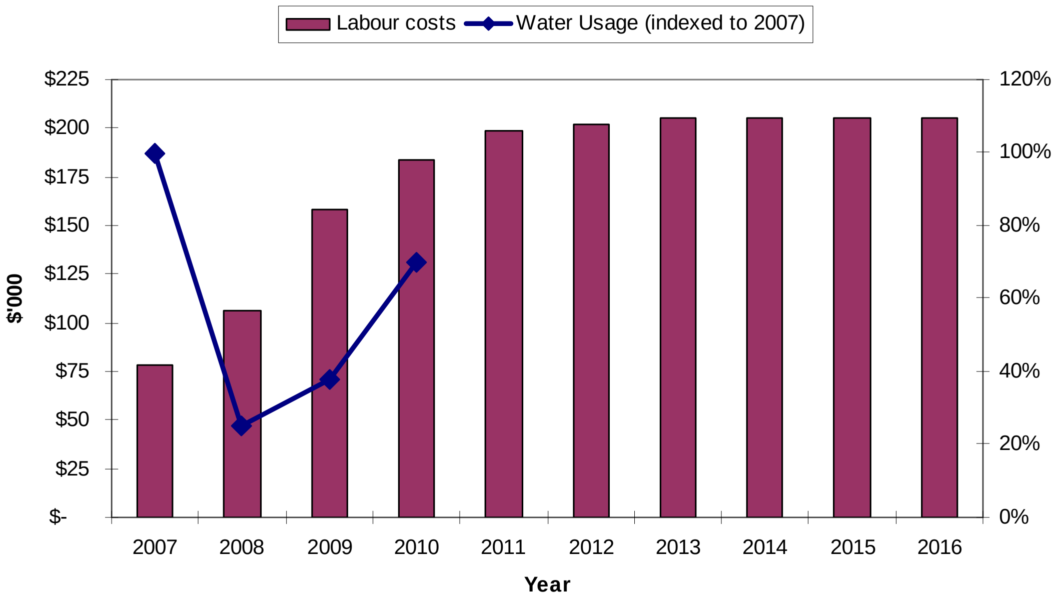


Figure 8-6. Comparison of “Labour” costs against water usage (indexed against 2007) for Lower Mary Distribution System[287]

As highlighted above in Figure 8-6 “Labour” costs were not influenced by water usage rates within the scheme in 2007 and 2008, which raises a number of questions relating to the nature and extent of “Labour” allocated to this scheme for costing. In 2011, water usage is projected to be much lower than in 2010, yet “Labour” costs are projected to be higher.

The following sections seeks to examine in more detail the components that make up the “Labour” costs presented within Table 8-1 above, and examine in detail (where data is available) changes in historical labour components.

“Labour” costs in 2011 are forecast to be $199,000 (Table 8-1). As highlighted below in Figure 8-7, labour activities related to “Preventive Maintenance” (42.5%) are projected to account for the bulk of scheme “Labour” costs in 2011. “Operations” are projected to account for a further 37%, followed by labour required for “Corrective Maintenance” (20.5%).

[287] Raw data sourced from *Lower Mary Distribution System NSP,* (2012-2016) January 2011, Pages 7 & 15.

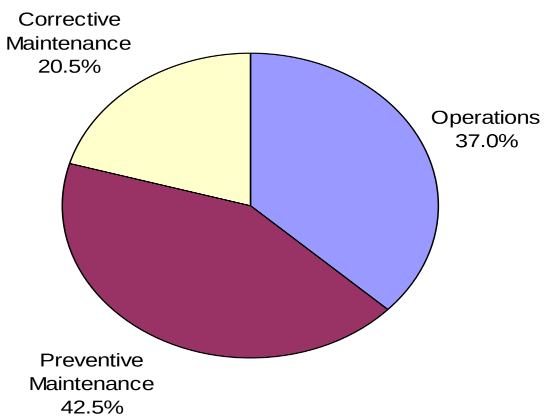


Figure 8-7. Breakdown of "Labour" by output activity for Lower Mary Distribution System in 2011[288]

As illustrated in Figure 8-7 above, "Operations" related activities accounted for a significant amount (37%) of forecast "Labour" expenses for the Lower Mary Distribution in 2011. Figure 8-8 below provides additional information regarding the composition of labour costs associated with "Operations" activities.

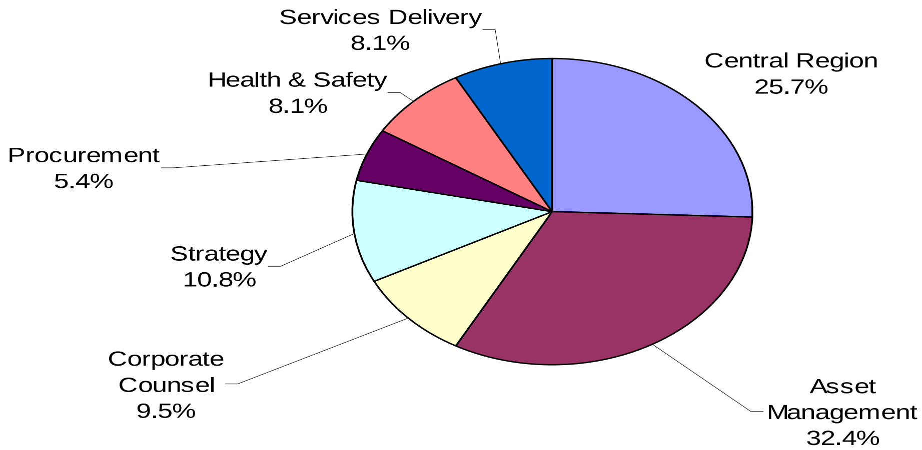


Figure 8-8. Breakdown of "Operations" labour costs for Lower Mary Distribution System in 2011[289]

As illustrated by Figure 8-8 above, approximately 26% of the projected "Operations" labour costs in 2011 are from staff within the Central region, whilst the remainder of labour costs are sourced from outside the Central region (predominantly Brisbane, but may also include SunWater staff from other regional centres) providing specific services of Asset management, Corporate Counsel, Service Delivery, Health & Safety and Strategy.

Whist the information presented in Figures 8-7 and 8-8 above provide useful insights into the expected "Labour" costs for 2011, of considerable interest are the historical "Labour" costs and what made these up. Figures 8-9 and 8-10 below provide partial insights into "Labour" costs between 2007 and 2011.

288 Raw data sourced from SunWater Spreadsheet "*IM Central – 610.03 PSV.xls*"
289 Raw data sourced from SunWater Spreadsheet "*IM Central – 610.03 PSV.xls*"

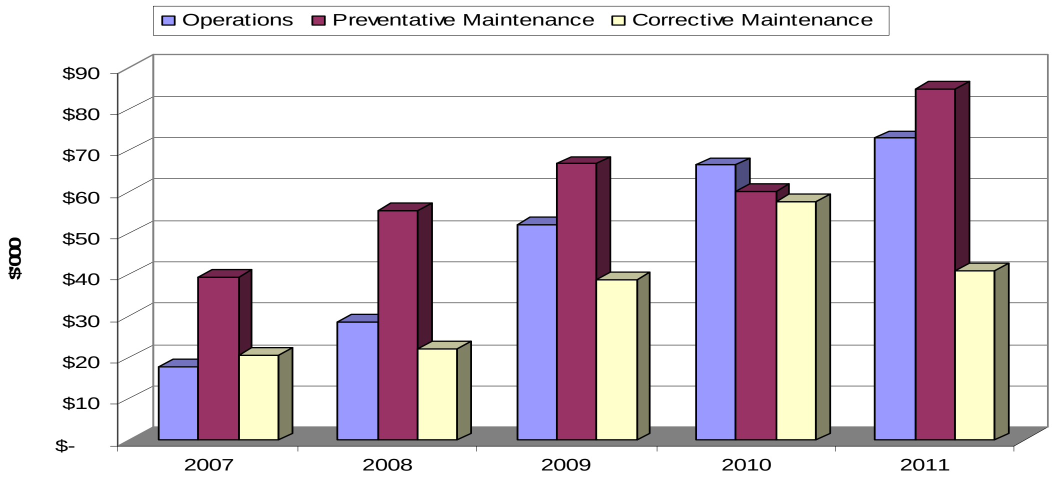


Figure 8-9. Breakdown of "Labour" costs for Lower Mary Distribution System between 2007 and 2011[290]

As indicated in Figure 8-9 above, labour costs across all three categories have increased substantially each year since 2007, and that the major labour cost in 2011 was "Preventive Maintenance" (although "Operations" were the main cost in 2010). In 2007 (100% water usage indexed to that year) labour costs for "Preventive Maintenance" were only approximately $40,000, yet by 2011 they have more than doubled to approximately $85,000.

Figure 8-9 also highlights that labour costs associated with "Corrective Maintenance" also increased substantially (almost tripled) from 2007 to 2010.

Figure 8-10 below provides more detailed information regarding historical "Preventive Maintenance" labour costs. "Condition Monitoring" has been the main expense, however "Weed Control" costs rose consistently since 2007, even in 2008 and 2009 when water usage declined substantially.

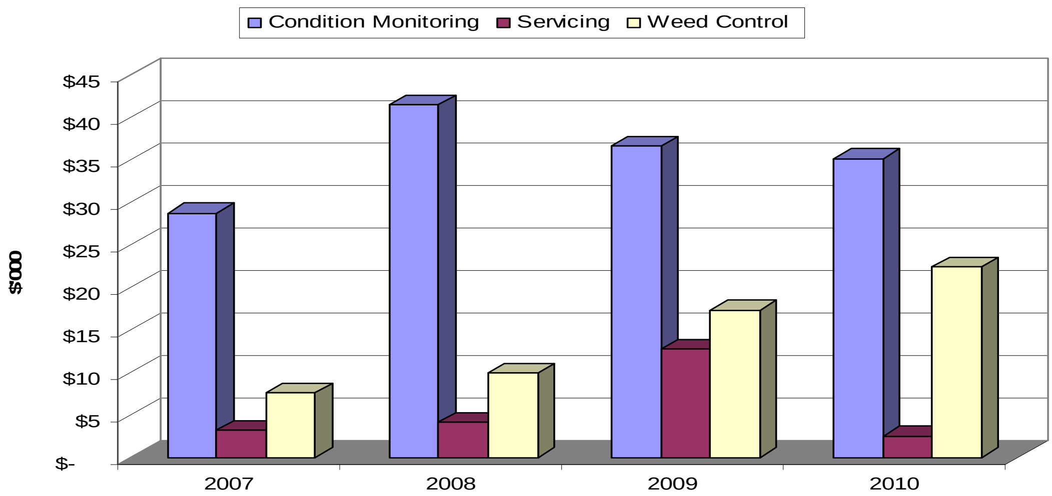


Figure 8-10. Breakdown of "Preventive Maintenance" labour costs for Lower Mary Distribution System between 2007 and 2010[291]

The following sections will examine "Labour" in more detail within the relevant activities.

[290] Source: Historical data extracted from SunWater spreadsheet "Extract LBC data Conversion extra activity detail and preventive main split.xls", forecast expenditure data from SunWater "IM Central -610.03.PSV.xls".
[291] Raw data sourced from SunWater spreadsheet "Extract LBC data Conversion extra activity detail and preventive main split.xls".

8.4.4 Electricity costs

As indicated below in Table 8-2, "Electricity" costs for Lower Mary Distribution System are significant. As a proportion of "Total Operating" costs, "Electricity" costs have historically varied from 3.6% in 2009 to 20.9% in 2010.

Table 8-2. "Electricity" costs and "Total Operating" costs for Lower Mary Distribution System

($'000)	Actuals				Forecast	Price Path				
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Electricity[1]	73	91	22	154	142	142	142	142	142	142
Annual change		24.7%	-75.8%	600.0%	-7.8%	0.0%	0.0%	0.0%	0.0%	0.0%
Change since 2007		24.7%	-69.9%	111.0%	94.5%	94.5%	94.5%	94.5%	94.5%	94.5%
Total Operating costs[1]	381	520	613	737	753	747	771	777	780	773
Electricity as a % of Total Operating costs	(19.2%)	(17.5%)	(3.6%)	(20.9%)	(18.9%)	(19.0%)	(18.4%)	(18.3%)	(18.2%)	(18.4%)

[1]Source: *Lower Mary Distribution System NSP* (2012-2016), January 2011, Page 7.

To a large degree, "Electricity" costs would be expected to correlate closely with water usage rates. As highlighted below in Figure 8-11, it is difficult to identify a relationship between water usage rates and "Electricity" costs incurred for the scheme.

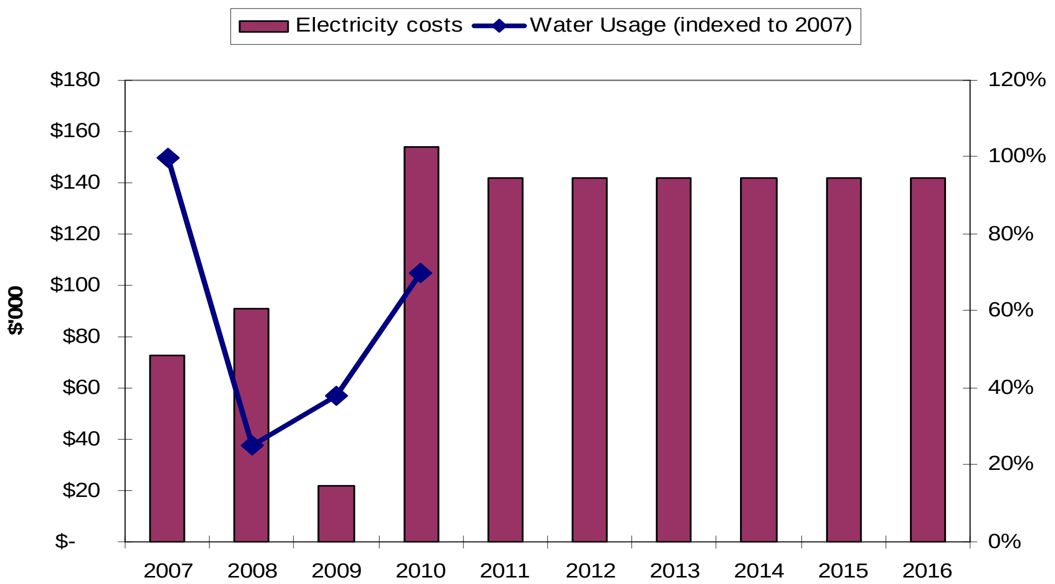


Figure 8-11. Comparison of "Electricity" costs against water usage (indexed to water usage in 2007) for Lower Mary Distribution System[292]

Of interest is the fact that "Electricity" costs in 2010 at $154,000 were more than twice that for 2007 ($73,000), yet water usage for 2010 was only 70% of that of 2007 (however "Electricity" costs have risen substantially over this period).

Note that Electricity costs are a variable component of pricing, and therefore customers will only pay electricity costs directly associated with water delivered (and not the cost presented

[292] Raw data sourced from *Lower Mary Distribution System NSP,* (2012-2016) January 2011, Pages 7 & 15.

within the NSP). The uncertainty in electricity costs relates to the projected cost per ML going forward (indexed to CPI).

Initial feedback from some irrigation stakeholders within the Lower Mary have indicated that irrigation use in 2011 is well down on 2010 levels, and therefore the “Electricity” costs for 2011 will be much lower than that illustrated in Figure 8-11 above.

In response to Aurecon’s question regarding pumping station consumption of electricity, SunWater providing the following breakdown regarding electricity costs[293]:

- 13.7% Copenhagen Bend Pumpstation
- 12.0% Main Roads Pumpstation
- 35.6% Walker Point Pumpstation
- 38.7% Owanyilla Pumpstation

8.4.5 Activity based expense items

The following sections examine scheme operational costs from an activity perspective as follows:

- Operations
- Preventive Maintenance
- Corrective Maintenance

8.4.6 Operations costs

Operational activities for the scheme are largely identified within the scheme Operation Manual[294]. SunWater has provided a breakdown of Operations costs by both sub-activities and cost input. The following analysis begins by examining cost inputs.

Projected “Operations” costs for the Lower Mary Distribution System are significant as highlighted below in Table 8-3. As a proportion of “Total Operating” costs, historical “Operations” costs have varied from 18.8% in 2007 to 33.3% in 2010.

Table 8-3. “Operations” costs and “Total Operating” costs for Lower Mary Distribution System

($’000)	Actuals				Forecast	Price Path				
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Labour[1]	18	29	52	66	73	74	75	75	75	75
Materials[1]	-	-	1	-	1	1	1	1	1	1
Contractors[1]	-	-	28	10	-	-	-	-	-	-
Other[1]	1	6	8	10	50	49	49	49	49	49
Total Direct Costs	**19**	**35**	**89**	**86**	**124**	**124**	**125**	**125**	**125**	**125**
Indirects[1]	22	40	58	37	39	34	40	41	41	40
Overheads[1]	26	32	58	71	74	75	75	76	77	75
Total Operations[2]	**67**	**107**	**205**	**194**	**237**	**233**	**240**	**242**	**243**	**240**

[293] SunWater email dated 30th June 2011.
[294] SunWater, *Lower Mary Water Supply Scheme, Scheme Operation Manual*, document un-dated.

($'000)	Actuals				Forecast	Price Path				
Annual change		59.7%	91.6%	-5.4%	22.2%	-1.7%	3.0%	0.8%	0.4%	-1.2%
Change since 2007		59.7%	206.0%	189.6%	253.7%	247.8%	258.2%	261.2%	262.7%	258.2%
Total Operating costs[3]	381	520	613	737	753	747	771	777	780	773
Operations as % of Total Operating costs	17.6%	20.6%	33.4%	26.3%	31.5%	31.2%	31.1%	31.1%	31.2%	31.0%

[1]Source: Historical data extracted from SunWater spreadsheet *"Extract LBC data Conversion extra activity detail and preventive main split.xls",* forecast expenditure data from SunWater *"IM Central -610.03.PSV.xls",*
[2]Note that there are minor differences between the data reported within the table and that reported within the NSP due to rounding.
[3]Source: SunWater *Lower Mary River Water Supply Scheme NSP*, (2012-2016) January 2011, page 7.

As highlighted above in Table 8-3, costs have increased by 253% between 2007 and 2011.

Of concern is the substantial rise in "Operation" costs from 2007. In 2007, Operations costs were only $67,000 and water usage indexed at 100%. In 2008 "Operations" costs increased to $107,000 yet water usage for the scheme was only 25% of that recorded for 2007. Similarly, "Operations" costs increase further in 2009 to $205,000 (more than double that of 2007), yet water usage is only 38% of that delivered in 2007.

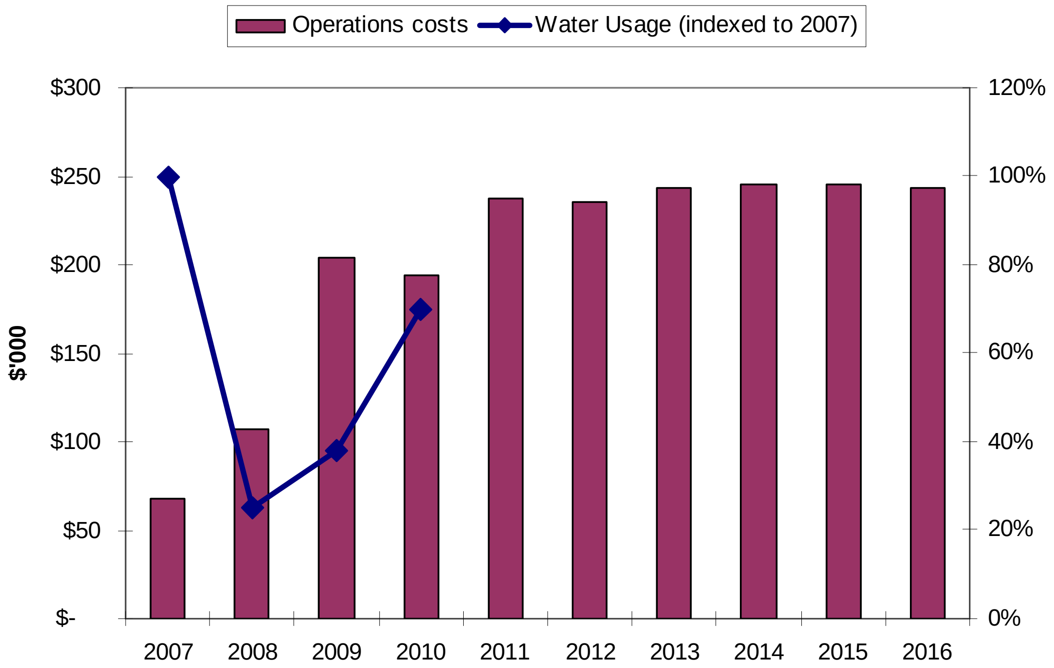


Figure 8-12. Comparison of "Operations" costs against water usage (indexed against 2007) for Lower Mary Distribution System[295]

As indicated in Figure 8-12 above "Operations" costs in 2011 are projected to rise further to $237,000, yet water usage levels for 2011 are projected to be lower than that for 2010.

The following sections seeks to examine in more detail the components that make up the "Operations" costs presented within Table 8-3 above, and examine (where data is available) changes in historical cost components.

[295] Raw data sourced from *Lower Mary Distribution System NSP,* (2012-2016) January 2011, Pages 7 & 15.

As illustrated in Table 8-3 above, “Operations” costs for 2011 are projected to be $237,000. As illustrated below in Figure 8-13 below, “Overheads” and “Indirects” represents 47.7% of the annual cost. Other significant components are “Labour” at 30.8% and “Other” at 21.1%.

Cost items included within “Other” include insurance costs (82% of total “Other” costs in 2011, costing $41,000), Local Authority Rates (14%, $7,000 in 2011), and other local administrative costs including telephone, etc. By Law, SunWater is required to pay Land Taxes where appropriate (not applicable to this scheme), and Local Authority Rates.

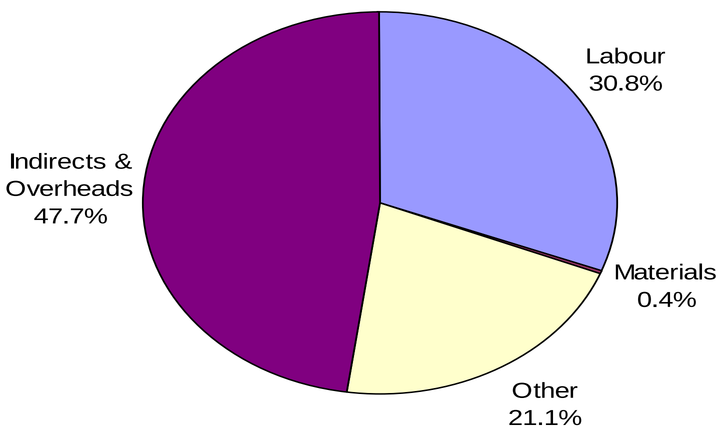


Figure 8-13. Breakdown of cost inputs towards “Operations” for Lower Mary Distribution System in 2011[296]

The following analysis seeks to examine in detail the historical components of “Operations” costs, and where possible identify cost item increases (and possible causes). Figure 8-14 below provides a breakdown of the key components of “Operations” costs.

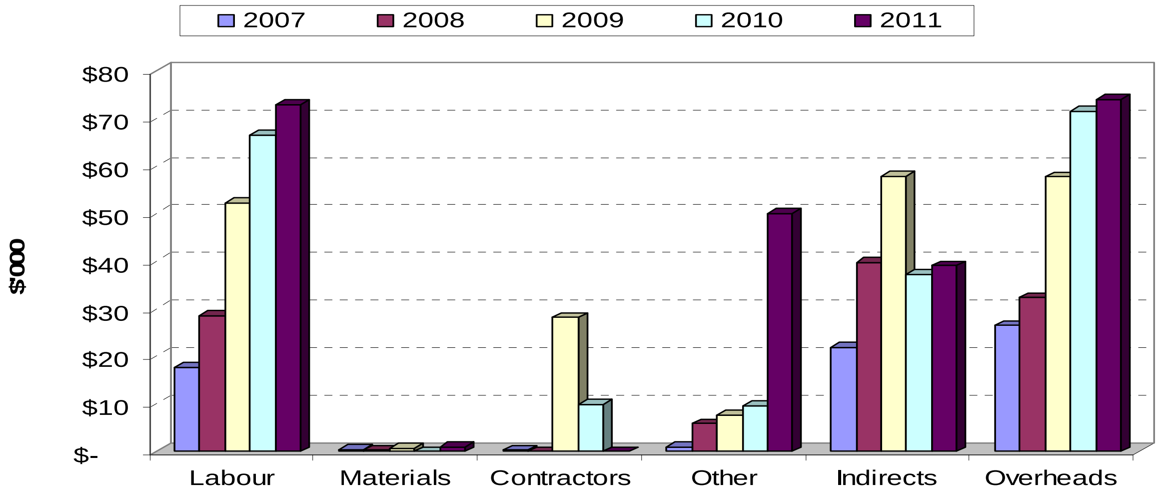


Figure 8-14. Breakdown of cost inputs towards “Operations” for Lower Mary Distribution System 2007 - 2011[297]

296 Raw data extracted from SunWater spreadsheet *“IM Central -610.03.PSV.xls”.*
297 Raw data extracted from SunWater spreadsheets *“Extract LBC data Conversion extra activity detail and preventive main split.xls”* and *“IM Central -610.03.PSV.xls”.*

The scope of this consultancy was to examine the direct costs, which in this case are “Labour”, “Materials”, “Contractors” and “Other”.

As illustrated above in Figure 8-14, labour costs associated with “Operation” activities have increased substantially from 2007. These will be examined in more detail below.

The other noticeable cost changes are “Other” in 2011 which rose substantially. Insurance makes up 82% of “Other” in 2011, and hence the spike in cost is likely to be attributable to a change in Insurance costs (note that Insurance costs were not part of the scope of this consultancy). Aurecon has observed that the corresponding cost of “Other” within the Lower Mary Bulk scheme has declined substantially in 2011, leading to the assumption that there may been a reallocation of insurance costs from the Lower Mary River Bulk scheme to the Lower Mary Distribution system.

The following section seeks to examine in more detail “Operations” costs, by examining the sub activities (outputs) recorded under “Operations” (see Section 4 for a definition of each sub activity).

As indicated previously, SunWater adopted a new Business Operating Model and management accounting system in 2009/10. SunWater has acknowledged that during the process of re-categorising historical data, a number may have been in-correctly coded, particularly for the 2007. Therefore the degree of accuracy for certain sub-activities in 2007 and 2008 is questionable.

A breakdown of historical “Operations” expenditure by sub-activities is highlighted below in Table 8-4 & Figure 8-15. Unfortunately, a breakdown of costs for 2011 was not provided.

Table 8-4. Breakdown of historical “Operations” expenditure for Lower Mary Distribution System

Real dollars, $'000	Financial Year			
	2007	2008	2009	2010
Customer Management	7	-	-	8
Workplace H&S	-	-	-	3
Environmental Management	-	-	-	-
Water Management	-	-	2	-
Scheme Management	-	6	108	140
Dam Safety	-	-	-	-
Schedule /Deliver	61	92	87	36
Metering	-	9	8	7
Facility Management	-	-	-	-
Other	-	-	-	-

Source: SunWater spreadsheet *“”Copy of Extract LBC data conversion to sub activity.xls”*

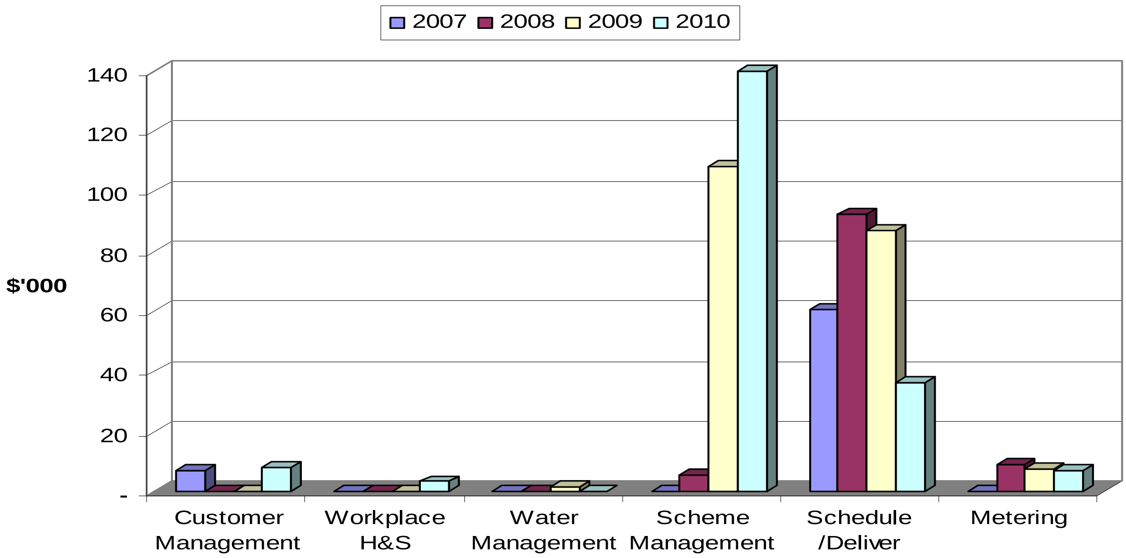
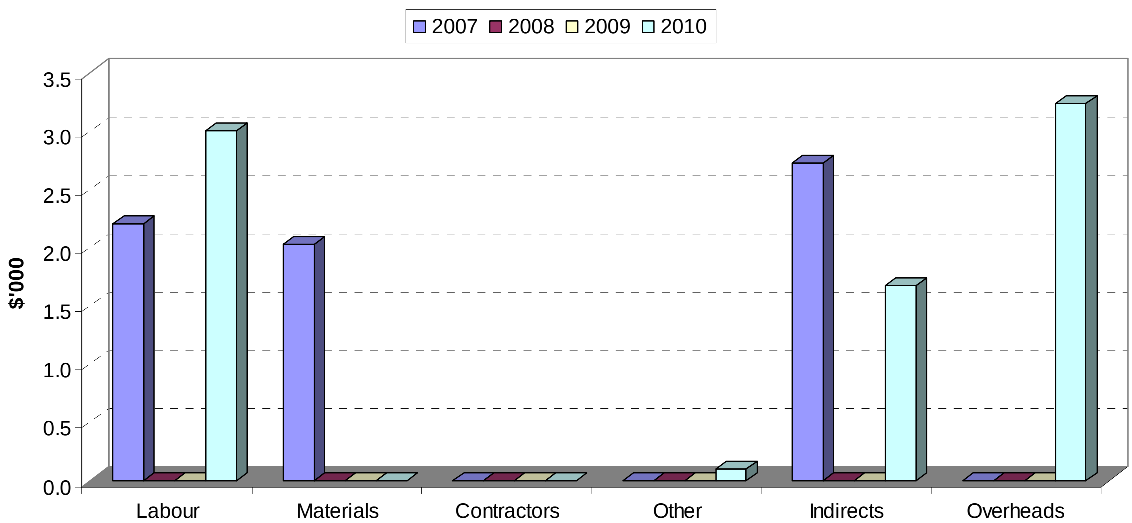


Figure 8-15. Overview of output activities under "Operations" for Lower Mary Distribution System[298]

Customer Management

"Customer Management" includes interfacing & enquiries from customers, billing and account management, and water trading activities.

Of interest is the fact that water usage in 2008 and 2009 was only 20% to 40% of that of 2007, and correspondingly there were no costs incurred over these two years (Figure 8-15 above) indicating that this activity is correlated with water usage.



[298] Raw data sourced from SunWater spreadsheet "*Copy of Extract LBC data conversion to sub activity.xls*".

Figure 8-16. Overview of disaggregated “Customer Management” costs for Lower Mary Distribution System[299]

Aurecon forwarded the following questions to SunWater, and received the following responses[300].

- Why costs for Labour only incurred in 2007 and 2010?

“These costs are attributable directly to the service contract and will be varied from year to year depended upon the nature of customer enquiries”

- Is the Materials charge in 2007 an error due to cost coding?

“2007 was a transition year in which the previous internal trade model was removed and the new BOM model developed and implemented in 2008. This transition period and changes are causing difficulties in comparability across time”

- What level are Labour costs forecast for 2011?

“The forecast cost is based on 5 years average and taking into account SunWater Enterprise Agreement”

Water Management

“Water Management” includes activities related with announcement of water allocations, water quality monitoring and sampling, Blue-Green algae management, SDL readings, shoreline inspections, Monitoring of groundwater levels and salinity levels, bore measurements and preparation of data for NRMW and SunWater.

As illustrated above in Table 8-4 a one-off expense of $2,000 was incurred in 2009.

Scheme Management

“Scheme Management” includes the preparation and provision of reports and statistics for clients, including meetings with clients reviewing contract progress/performance, Energy management including the review of electricity consumption tariffs and accounts, Land and property management including legal advice, O&M Manual development, Scheme Strategies, OMS plans, Facility Contingency Plans and Emergency Action Plans (EAP) for all facilities other than dams, System Leakage Management Plans (SLMPs), insurance costs, rates, land taxes.

As illustrated in Figure 8-15 above there was a substantial increase in “Scheme Management” costs in 2009 and 2010. It seems that there were no “Scheme Management” costs for 2007 indicating no defined activities for costing, and a small amount in 2008.

Figure 8-17 below provides an overview of the cost inputs towards “Scheme Management”. As indicated below, “Other” costs (includes Local Government rates, land taxes and insurance) did not vary much between 2008 and 2010. It also raises the question, if rates and insurance were paid in 2007 in relation to the scheme.

In 2009 and 2010 substantial “Labour” costs emerged, which attracted significant “Indirects” and “Overheads”. In addition, significant costs for “Contractors” was recorded for 2009 and 2010.

[299] Raw data sourced from SunWater spreadsheet “*Copy of Extract LBC data conversion to sub activity.xls*”.
[300] SunWater responses are sourced from email dated 30th June 2011

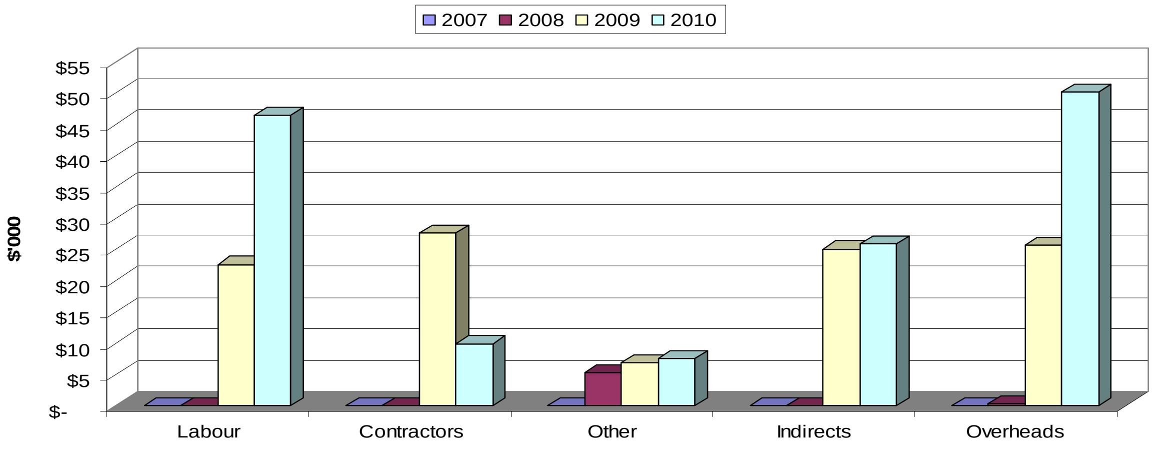


Figure 8-17. Overview of disaggregated "Scheme Management" costs for Lower Mary Distribution System[301]

Aurecon forwarded the following questions to SunWater, and received the following responses[302].

- Overview of what "Contractors" did in 2009 and 2010

"Contractor were employed to prepare one-off Asset Management plan in 2009, whilst in 2010, contractors were employed to prepare one-off Scheme Pricing Preparation."

- Why Labour costs emerged in 2009, and escalated in 2010

"In 2009, the labour costs increased due to one-off job Modernisation of the Distribution asset, whilst in 2010 related to Scheme Pricing Preparation."

- What is the trend for +2011

"The forecast cost is based on 5 years average and taking into account SunWater Enterprise Agreement"

Schedule/Deliver

"Schedule/Deliver" Includes scheduling, releasing, operation of pump stations and SCADA, System surveillance including monitoring of water entitlement and observation of and reporting of any breaches, flood operations preparation, Water harvesting, ROP compliance of water levels and flows and reporting of water information.

As illustrated above in Figure 8-15 and Table 8-4, costs actually were higher in 2008 and 2009, yet water usage during these two years was down as shown earlier. Figure 8-18 below provides more detail regarding the cost inputs for "Schedule/Deliver" activities. Clearly "Labour" costs were up in 2008 and 2009 which resulted in "Indirects" and "Overheads" to also rise.

301 Raw data sourced from SunWater spreadsheet "*Copy of Extract LBC data conversion to sub activity.xls*".
302 SunWater responses are sourced from email dated 30th June 2011

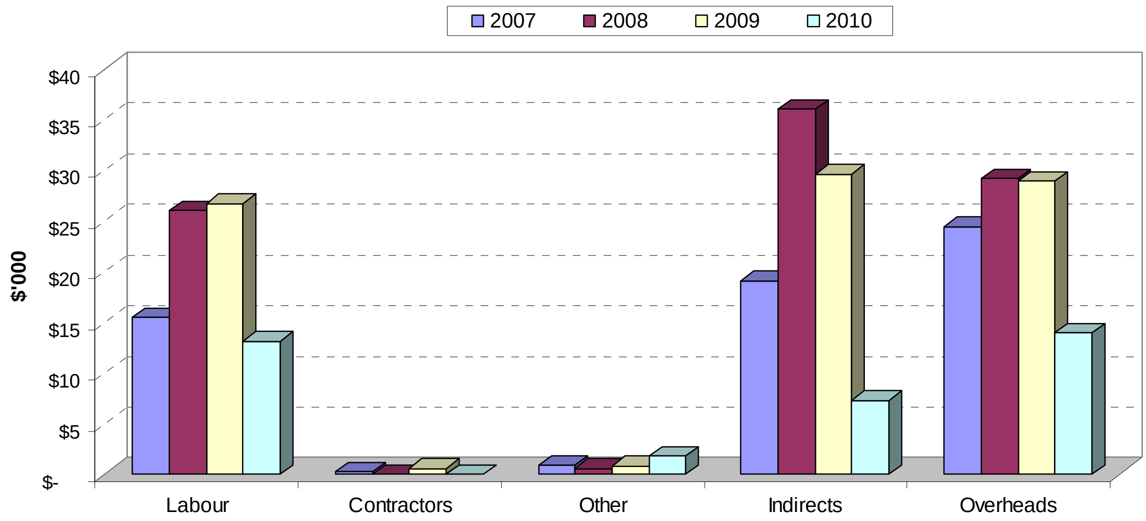


Figure 8-18. Overview of disaggregated "Schedule/Deliver" expenditure for Lower Mary Distribution System[303]

As illustrated above in Figure 8-18, the main direct cost associated with "Schedule/Deliver" is "Labour", which also drives "Overheads" costs (and "Indirects" to some degree in 2010).

Aurecon forwarded the following questions to SunWater, and received the following responses[304].

- Overview of why Labour costs were significantly higher in 2008 and 2009, corresponding with substantially lower water usage rates for the scheme?

"There are more works required in Water Entitlement, ROP, and Customer in 2008 & 2009 due to the Upper Mary River Transfer to SEQ.   Need to check this"

- At what level are costs forecast for 2011?,

"The forecast cost is based on 5 years average and taking into account SunWater Enterprise Agreement"

Metering

"Metering" costs have also risen since 2008 with the introduction of meters, at a cost of approximately $7,000 to $9,000 per annum (Table 8-4 above). The Lower Mary has a total of 177 customers of whom 79 customers take water in the distribution network[305]. SunWater has advised that a total of 143 meters were read in 2010[306]. An examination of the metering costs for 2008 finds[307]:

- $2.5k (28.4%) for Labour
- $3.5k (40%) for Indirects
- $2.8k (31.6%) for Overheads
- $9k in Total Metering costs

Figure 8-19 below illustrates the cost components for "Metering" over 2008 to 2010. The only direct cost recorded is "Labour" for this activity. "Indirects" and "Overheads" are

[303] Raw data sourced from SunWater spreadsheet "*Copy of Extract LBC data conversion to sub activity.xls*".
[304] SunWater responses are sourced from email dated 30th June 2011
[305] Source: SunWater *Lower Mary Distribution System NSP*, (2012-2016) January 2011, page 14.
[306] SunWater email dated 30th June 2011.
[307] Source: SunWater database "*Extract LBC Data Conversion down to sub activity(3).xls*"

allocated based on the amount of labour recorded, and as indicated above these non-direct costs end up accounting for approximately 70% of the total cost.

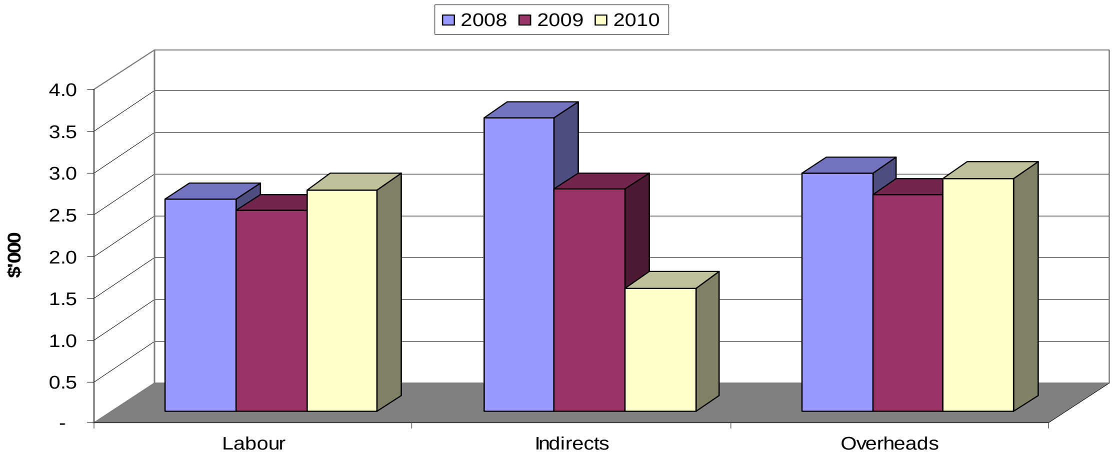


Figure 8-19. Overview of disaggregated "Metering" expenditure for Lower Mary Distribution System[308]

Stakeholders have raised the issue that a significant number of customers within the Lower Mary are currently non-users (sleepers), and are there more cost effective strategies to avoid reading these meters each quarter. Stakeholders suggest that the proportion of sleepers is far greater within the bulk/river system, then within the distribution network.

Aurecon notes that "*Customers can also enter their own meter readings into SunWaterOnline to obtain up-to-date information about water use and availability*[309]."

Aurecon forwarded the following questions to SunWater, and received the following responses[310].

- Other options for meter reading of sleepers?

  See Section 4, which provides SunWater's views regarding meter reading which is common across all schemes

- Incentives/opportunities for users to read and record their own meters on line (mentioned in the NSP that customers can also enter their own meter readings online?).

  See Section 4, which provides SunWater's views regarding meter reading which is common across all schemes

- Also seeking information regarding the number of meters installed since 2009, and read in 2010.

  "*There were 143 meters read in 2010. 4 meters have been installed since 2009"*

As indicated above 4 new meters were installed since 2009. As indicated within Table 8-4, Metering costs have actually decreased each year from $9,000 in 2008, to $7,000 in 2010, possibly indicating that SunWater is identifying substantial labour efficiencies reading meters.

[308] Raw data sourced from SunWater spreadsheet "*Copy of Extract LBC data conversion to sub activity.xls*".
[309] Source: SunWater *Lower Mary River Water Supply Scheme NSP*, (2012-2016) January 2011, page 16.
[310] SunWater responses are sourced from email dated 30th June 2011

Prudency and Efficiency of Operations Expenditure

As highlighted within Table 8-3, direct “Operations” expenditure has increased substantially from $19,000 in 2007 to $86,000 in 2010 (an increase of 352%). The 4 year historical average over this period is $57,000. For 2011, SunWater is proposing direct costs for “Operations” of $124,000, which is more than double the preceding 4 year average.

The provision of disaggregated historical activity data for “Operations” by SunWater provided substantial insights, and identified substantial activities and issues requiring additional information and explanation from SunWater. As highlighted throughout this section, SunWater has provided responses to the additional questions, which in most cases provided valid explanations and information.

However, SunWater was not able to provide 2011 cost estimates for the sub-activities, which Aurecon views as critical in verifying the prudency and efficiency of these costs. Aurecon recommends that to verify the prudency and efficiency of 2011 expenditure, the following information and analysis is required:

- that 2011 cost estimates for sub-activities be released and examined to ensure compliance with SunWater’s averaging methodology (preceding 4/5 years)
- that cost estimates for metering be examined and projected based on 2010 costs (assuming that it represents improved efficiencies reading meters, and if it reflects the fact that all meters were read in 2010)

Due to the above data limitations, Aurecon was unable to validate the prudency and efficiency of “Operations” costs. Of concern, that 2011 cost projections were more than double that of the preceding 4 year average (acknowledged by SunWater as the methodology employed for cost forecasting for the coming price path).

8.4.7 Preventive Maintenance costs

SunWater has defined Preventive Maintenance as activities related to the ongoing operational performance and service capacity of physical assets as close as possible to designed standards. SunWater[311] states that Preventive maintenance is cyclical in nature with a typical interval of 12 months or less, and includes the following key output activities:

- Condition monitoring; the inspection of assets to determine preventive maintenance requirements
- Servicing; planned maintenance activities normally expected to be carried out routinely

A review of SunWater’s reporting system also revealed that “Weed Control” was also a key output activity associated with “Preventive Maintenance”, to which costs were assigned. As indicated earlier within Figure 8-10, “Weed Control” costs (labour input) rose substantially between 2007 and 2010.

Projected “Preventive Maintenance” costs for the Lower Mary Distribution System are highlighted below in Table 8-5. As a proportion of “Total Operating” costs, “Preventive Maintenance” costs have varied from 23.2% in 2010 to 44.4% in 2007.

[311] SunWater, *Lower Mary Distribution System NSP,* (2012-2016) January 2011, Page 28.

Table 8-5. "Preventive Maintenance" costs and "Total Operating" costs for Lower Mary Distribution System

($'000)	Actuals				Forecast	Price Path				
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Preventive Maintenance[1]	158	231	248	171	241	239	248	251	252	249
Annual Change		46.2%	7.4%	-31.0%	40.9%	-0.8%	3.8%	1.2%	0.4%	-1.2%
Change since 2007		46.2%	57.0%	8.2%	52.5%	51.3%	57.0%	58.9%	59.5%	57.6%
Total Operating costs[1]	381	520	613	737	753	747	771	777	780	773
Preventive M as % of Total Operating costs	41.5%	44.4%	40.5%	23.2%	32.0%	32.0%	32.2%	32.3%	32.3%	32.2%

[1]Source: *Lower Mary Distribution System NSP,* (2012-2016) January 2011, Page 7

As indicated earlier, SunWater's deployment of a new Business Operating Model and management accounting system required the retrospective transfer of cost data for 2007 and 2008. A recent review[312] found that costs that should have been coded to refurbishment were coded as "Preventive Maintenance", resulting in many schemes incurring a spike in "Preventive Maintenance" costs in 2007. As indicated above in Table 8-5, "Preventive Maintenance" costs for 2007 were actually lower than the subsequent 3 years of actual costs recorded.

As highlighted by Table 8-5, "Preventive Maintenance" costs have increased 52.5% between 2007 and 2011. The calculated historical annual average (2007 to 2010) is $202,000, and the projected cost in 2011 represents an increase of 19.3% over the historical average.

Some stakeholders have expressed an interest in comparing "Preventive Maintenance" costs against water usage. However, as indicated below in Figure 8-20 there does not seem to be a correlation between costs and water usage. In 2011, the water usage level is projected to decline from that of 2010, yet costs are shown to rise in Figure 8-20.

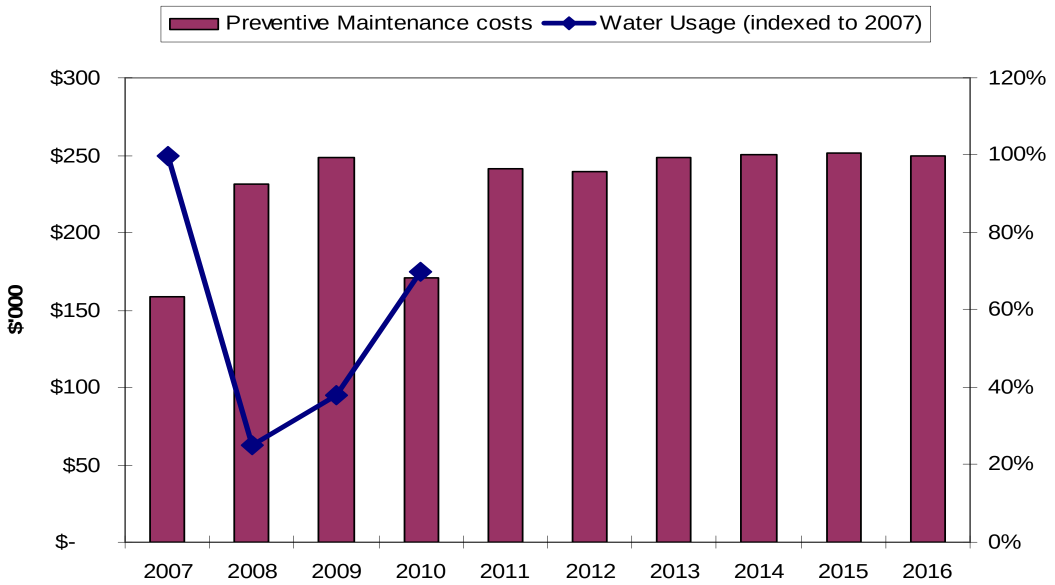


Figure 8-20. Comparison of "Preventive Maintenance" costs against water usage (indexed to water usage in 2007) for Lower Mary Distribution System[313]

[312] Parsons Brinkerhoff, *Provision of Services for Costing SunWater's Work Instructions*, October 2010, page 13.
[313] Raw data sourced from *Lower Mary Distribution System NSP,* (2012-2016) January 2011, Pages 7 & 15.

The following sections seeks to examine in more detail the components that make up the “Preventive Maintenance” costs presented within Table 8-5 above, and examine in detail (data available) where changes have occurred.

As illustrated below in Figure 8-21, “Overheads” and “Indirects” represents 53.9% of the projected total cost in 2011. Other significant components are “Labour” at 35.3%.

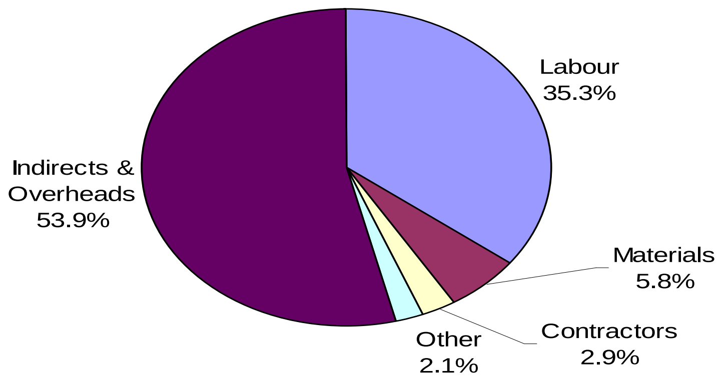


Figure 8-21. Breakdown of cost inputs towards “Preventive Maintenance” for Lower Mary Distribution System in 2011[314]

The following analysis seeks to examine in detail the past and forecast components of “Preventive Maintenance” costs, and where possible identify cost item increases (and possible causes). Figure 8-22 below provides a breakdown of the key input cost components for “Preventive Maintenance”.

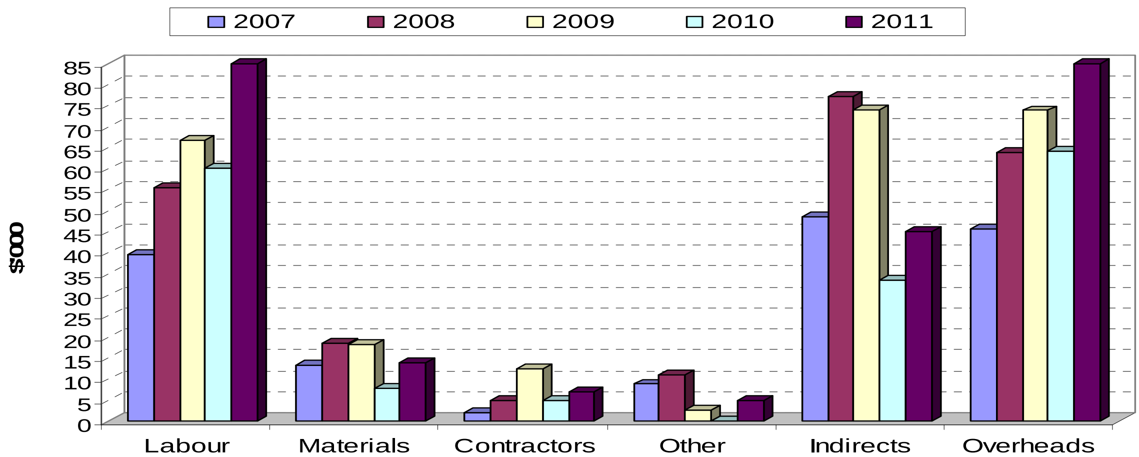


Figure 8-22. Breakdown of cost inputs towards “Preventive Maintenance” for Lower Mary Distribution System 2007 - 2011[315]

The scope of this consultancy was to examine the direct costs, which in this case are Labour, Materials, Contractors and Other.

[314] Raw data extracted from SunWater spreadsheet *“IM Central -610.03.PSV.xls”,*
[315] Raw data extracted from SunWater spreadsheets *“IM Central -610.03.PSV.xls”* and *“Extract LBC data Conversion extra activity detail and preventive main split.xls*”.

As indicated earlier “Labour” costs have risen substantially in 2011, whilst other direct costs have remained relatively constant. “Overheads” are apportioned according to “Labour”, and this relationship is highlighted in Figure 8-22.

To gain an understanding of the increase in “Labour” costs, SunWater also provided the NSP consultants with a breakdown of historical “Preventive Maintenance” costs by output activity, which is defined earlier as “Condition Monitoring”, “Servicing” and “Weed Control” (Figure 8-23 below).

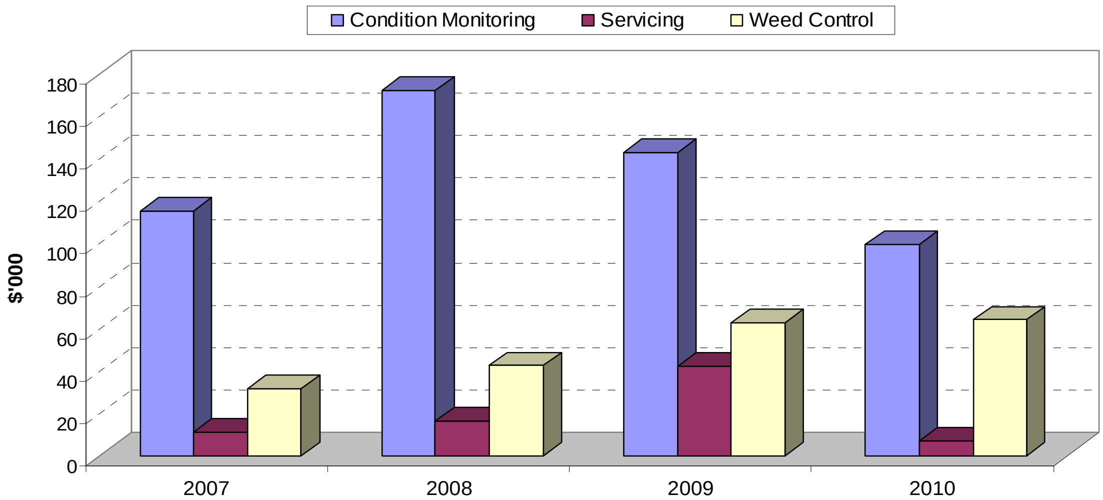


Figure 8-23. Breakdown of output activities towards “Preventive Maintenance” for Lower Mary Distribution System 2007 - 2010[316]

Weed control

“Weed Control” is generally confined to areas along channels, roads accessing channels and assets, and drains within the easement. Weed control activities typically undertaken by SunWater for distribution schemes would include:

- Acrolein chemical dosing for control of aquatic weeds within channels
- A range of other chemicals for the control of terrestrial weeds
- Mechanical weed control options including raking, slashing, burning, etc.

Aurecon notes that historically less than $4,000 in “Materials” was utilised for “Weed Control” (Figure 8-24 below). Considering the small amount spent on “Materials”, Aurecon estimates that either only a partial cylinder of Acrolein (full 200L cylinder costs approximately $6,000) was used for aquatic weed control, or that chemicals for weed control on land was only utilised.

As indicated above in Figure 8-23, “Weed Control” costs have increased significantly from approximately $30,000 in 2007 to $60,000 in 2010, a doubling of cost. Of interest are that costs continued to rise in 2008 and 2009, years in which water usage was substantially lower. Figure 8-24 below provides an overview of the historic cost inputs for “Weed Control”.

[316] Raw data extracted from SunWater spreadsheet *“Extract LBC data Conversion extra activity detail and preventive main split.xls*”.

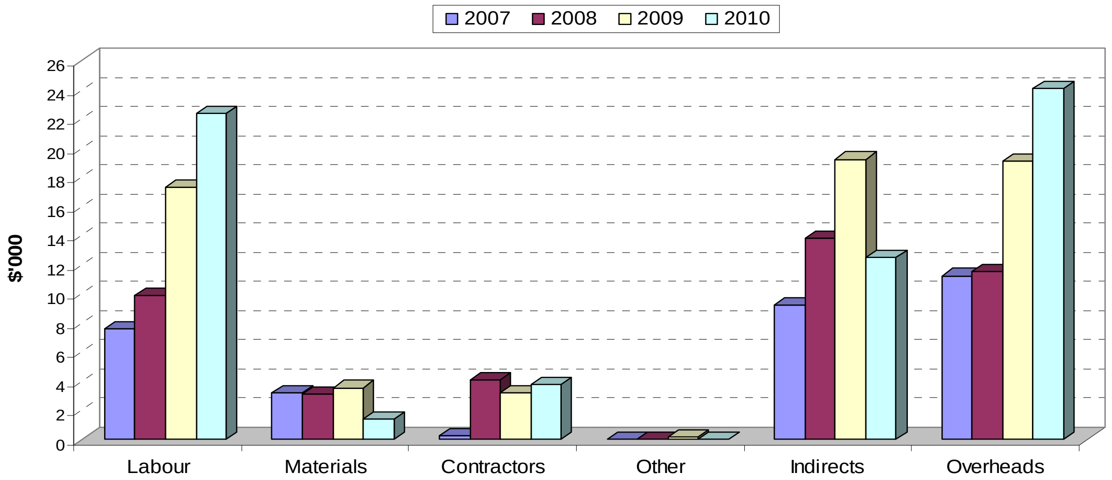


Figure 8-24. Breakdown of input costs towards "Weed Control" for Lower Mary Distribution System[317]

Of interest in Figure 8-24 above is that "Labour" for "Weed Control" has risen for each year; however "Material" costs (ie. chemicals) have not correspondingly increased. Note that

Aurecon sought additional information from SunWater regarding the driver behind the increase in "Weed Control" costs, and received the following response from SunWater[318]:

"The increase in weed control in 2009 & 2010 due mainly to wet weather, the combination of mechanical, chemical and contractors are used to control weed for the Lower Mary Distribution System."

Aurecon notes that "Contractors" are also utilised for "Weed Control" within the scheme. As highlighted above in Figure 8-24, virtually no "Contractor" expense occurred for 2007 corresponding with significant drought conditions and no need for "Weed Control" by contractors[319]. However contractors were since engaged from 2008 onwards at an annual cost between $2,000 and $4,000.

Condition Monitoring and Servicing

As indicated above in Figure 8-23, "Condition Monitoring" is the main output activity. Aurecon notes that the cost for "Condition Monitoring" peaked historical in 2008, and has declined substantially since that year. "Condition Monitoring" activities for a number of assets would be influenced by seasonal conditions and at reduced levels during drought years. "Servicing" costs have also varied substantially between 2006 and 2010, peaking substantially in 2009.

Unfortunately SunWater has not provided a breakdown of costs for 2011 onwards by output activity as illustrated above in Figure 8-23.

SunWater's Operation and Maintenance manuals for the scheme detail the maintenance activities to be undertaken for "Condition Monitoring" and "Servicing", along with detailing the required frequency of activities. A recent review by Parsons Brinkerhoff (2010A) examined each of the individual activities specified within SunWater's Operation and Maintenance manual for the Lower Mary Distribution System, and validated the proposed activities and frequency prescribed. The Parsons Brinkerhoff (2010A) report also quantified the required man hours input required for each activity along with cost based on SunWater's internal hourly rates. Of importance is the fact that the Parsons Brinkerhoff (2010A) study did not find any new required activities.

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[317] Raw data extracted from SunWater spreadsheet *"Extract LBC data Conversion extra activity detail and preventive main split.xls*".
[318] SunWater email dated 30th June 2011.
[319] Contrary to many other schemes within the Central region which incurred higher "Weed Control" costs in 2007.

Table 8-6 highlights the key findings from the Parsons Brinkerhoff (2010A) study, which identified historical total labour costs and hours, but did not report historically the disaggregation of hours by activity. Aurecon notes that the Parsons Brinkerhoff (2010A) study recommended for 2011 an investment of 743 hours of labour input at an annual expense of $38,073. This collates with the average for 2008-10 in terms of annual labour expense, but not hours input[320].

Table 8-6. Required labour input for “Preventive Maintenance” for Lower Mary Distribution System

Year	Hours	Direct annual labour cost	% of 2011 hours
2007	793	$27,889	107%
2008	1,252	$42,360	169%
2009	1,271	$45,787	171%
2010	1,030	$36,196	138%
Average 2007 - 2010	1,086	$38,058	146%
Proposed for 2011	**743**	**$38,073**	**100%**

Source: Parsons Brinkerhoff, “Provision of Services for Costing SunWater's Work Instructions” (2010), working appendices Spreadsheets

As indicated earlier, projected Preventive Maintenance costs for 2011 are $241,000 (Table 8-5), whilst labour is projected to account for 35.3% of this total (Figure 8-21) equating to a labour expense of $85,000. As indicated in Table 8-6 above, the Parsons Brinkerhoff (2010A) recommends labour input towards “Condition Monitoring” and “Servicing” to be $38,000 in 2011 based on 743 hours. If SunWater accepted the recommendation from the Parsons Brinkerhoff report (2010A), then the remaining labour cost allocated to “Weed Control” is $47,000 which is more than twice the $22,000 labour expense allocated for “Weed Control” in 2010.

Aurecon requires additional information from SunWater pertaining to the calculation of the labour expenses for “Condition Monitoring”, “Servicing” and “Weed Control” in 2011 prior to validating the prudency and efficiency of the proposed cost for 2011. Based on the information at hand, Aurecon is unable to substantiate the calculations and data used by SunWater to determine the projected costs for 2011.

Aurecon recommends that labour for Preventive Maintenance be set at $60,000 comprising $38,000 as suggested by Parsons Brinkerhoff (2010A) for Monitoring and Servicing, and $22,000 for Weed Control as incurred in 2010[321]. Note that the historical average annual labour expense for the preceding 4 years for “Preventive Maintenance” has been $55,000.

8.4.8 Corrective Maintenance costs

SunWater describes “Corrective Maintenance” as an unexpected failure requiring reactive corrective maintenance response. Two main types of activities:

- Emergency breakdown maintenance, requiring immediate action to restore normal operation or supply to customer to meet a regulatory obligation
- Non-emergency maintenance, activities no requiring immediate response but scheduled in advance of the planned maintenance cycle[322].

[320] Aurecon suspects that the Parsons Brinkerhoff (2010A) study's recommended a lower quantity of annual hours input, but requiring staff with higher technical competencies at higher hourly costs.
[321] Note that Aurecon questions the hourly charge rates adopted by the Parsons Brinkerhoff (2010A) study, which averages at $51.24. This is substantially higher than the average hourly charge incurred by SunWater in 2010 of $35.14 per hour (indicating that SunWater has historically engaged staff at lower technical levels to undertake the tasks required).
[322] SunWater, *Lower Mary River Water Supply Scheme NSP (2012-2016), January 2011*, page 27.

Projected “Corrective Maintenance” costs for the Lower Mary Distribution System are highlighted below in Table 8-7. As a proportion of “Total Operating” costs, “Corrective Maintenance” costs vary from 19.4% in 2008 to 30.4% in 2010.

Table 8-7. “Corrective Maintenance” costs and “Total Operating” costs for Lower Mary Distribution System

($'000)	Actuals				Forecast	Price Path				
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Corrective Maintenance[1]	82	101	164	224	146	145	151	152	153	152
Annual change		23.2%	62.4%	36.6%	-34.8%	-0.7%	4.1%	0.7%	0.7%	-0.7%
Change since 2007		23.2%	100.0%	173.2%	78.0%	76.8%	84.1%	85.4%	86.6%	85.4%
Total Operating Costs[1]	381	520	613	737	753	747	771	777	780	773
Corrective M as % of Total Operating costs	21.5%	19.4%	26.8%	30.4%	19.4%	19.4%	19.6%	19.6%	19.6%	19.7%

[1]Source*: Lower Mary Distribution System NSP,* (2012-2016) January 2011, Page 7

The following sections seeks to examine in more detail the components that make up the “Corrective Maintenance” costs presented within Table 8-7 above, and examine in detail (where data is available) where changes have occurred.

“Corrective Maintenance” costs could be expected to follow water usage to a degree. As indicated below in Figure 8-25 there seems to be a correlation between water usage and costs from 2008 to 2011. However, this relationship does not occur between 2007 and 2008 in which costs rose yet water usage declined substantially.

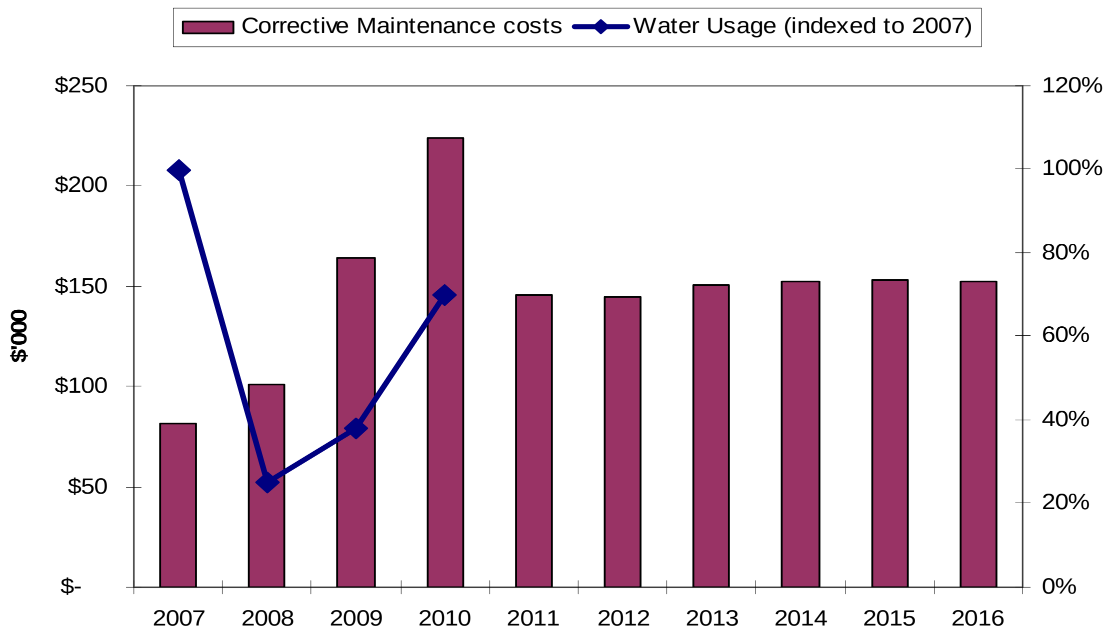

Figure 8-25. Comparison of “Corrective Maintenance” costs against water usage (indexed to water usage in 2007) for Lower Mary Distribution System[323]

[323] Raw data sourced from *Lower Mary Distribution System NSP,* (2012-2016) January 2011, Pages 7 & 15.

The following analysis seeks to examine in detail the historical components of “Corrective Maintenance” costs presented in Table 8-7 above, and examine in detail (where data is available) where changes have occurred.

As illustrated below in Figure 8-26 below, “Overheads” and “Indirects” account for 43.8% of the projected total cost in 2011. Other significant components are “Labour” at 28.1%, “Materials” at 11.6%, and “Other” at 11.0%.

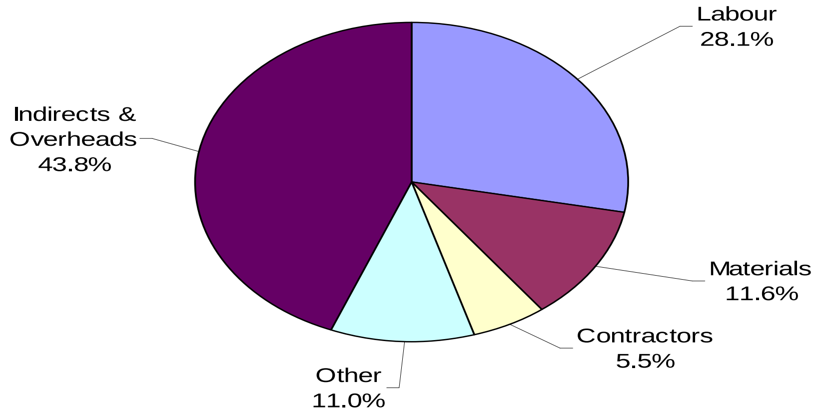

Figure 8-26. Breakdown of cost inputs towards “Corrective Maintenance” for Lower Mary Distribution System in 2011[324]

The following analysis seeks to examine in detail input cost components of “Corrective Maintenance”, and where possible identify drivers for cost item increases (and possible causes). Figure 8-27 below provides a breakdown of the key cost input components for “Corrective Maintenance” over time.

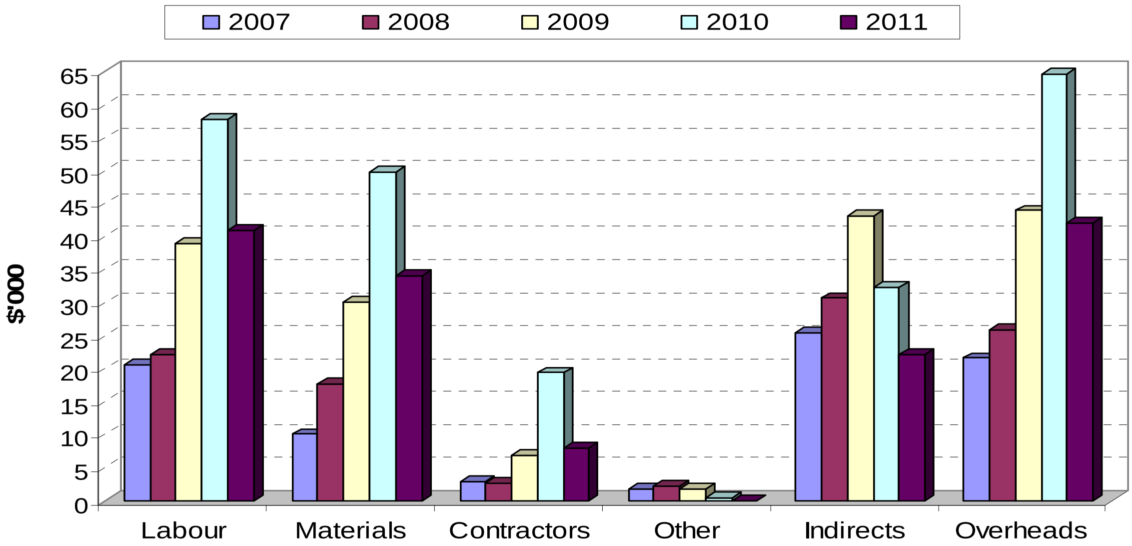

Figure 8-27. Breakdown of input costs for “Corrective Maintenance” for Lower Mary Distribution System 2007 – 2011[325]

[324] Raw data extracted from SunWater spreadsheet *“IM Central -610.03.PSV.xls”.*

[325] Raw data extracted from SunWater spreadsheets *“Extract LBC data Conversion extra activity detail and preventive main split.xls”* and *“IM Central -610.03.PSV.xls”.*

The scope of this consultancy was to examine the direct costs, which in this case are “Labour”, “Materials”, “Contractors” and “Other”.

As illustrated in Figure 8-27 above, in the three year period 2008 to 2010, “Labour”, “Material” and “Contractor” costs have risen substantially, almost in sync with each other indicating proportional input of each in response to additional corrective activities completed. Of concern is that Labour costs in 2009 onwards are approximately twice the annual levels of 2007 and 2008.

Aurecon have sought additional information from SunWater regarding the doubling of “Labour” and “Material” costs in 2009 & 2010, to which SunWater has stated[326]:

“There are a number of jobs made up of the Corrective Maintenance both schedule and emergency maintenance. All costs associated with this activity are capture individually.”

Aurecon notes that “Corrective Maintenance” is unexpected maintenance activities, and as illustrated above in Figure 8-25 and Table 8-7 are highly variable. The average annual historic direct expenditure between 2007 and 2010 is $71,000 (last four years peaking at $127,000 in direct costs for 2010), and SunWater is proposing $82,000 per annum (direct costs) for 2011 at an increase of 15.5%. Note that the average annual direct expenditure between 2008 and 2010 and the most recent three years is $83,000.

Aurecon notes that it is difficult to forecast “Corrective Maintenance” costs. SunWater’s general approach is to use historical expenditure as the basis for forecasting, is commonly utilised by other water utilities. However, Aurecon is not able to substantiate the calculations and data used by SunWater to arrive at 2011 forecast cost. Therefore Aurecon is not in a position to validate the prudency and efficiency of proposed Corrective Maintenance costs for 2011 and the proposed 2012-2016 period without additional information from SunWater regarding the data and methodology it used to arrive at the proposed direct expenditure in 2011of $82,000.

Total Maintenance expenditure

SunWater has indicated its intention to move to a reliability maintenance approach (RCM), which is a rick based process that can assist in providing the optimal mix of “Preventive” and “Corrective Maintenance”. Table 8-8 below highlights the direct costs attributed to “Corrective” and “Preventive Maintenance”, and also indicates that “Total Maintenance” costs in 2011 are 96%% higher than that recorded for 2007. As previously indicated, concerns have been raised regarding the accuracy of the data for “Preventive Maintenance” in 2007.

Table 8-8. “Total Maintenance” costs for Lower Mary Distribution System

Direct Expenditure ($’000)	Actuals				Forecast	Price Path				
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Preventive Maintenance	64	90	100	73	112	116	121	124	128	131
Corrective Maintenance	35	44	77	127	82	85	89	92	95	98
Total Maintenance	**99**	**135**	**178**	**200**	**194**	**201**	**210**	**216**	**222**	**229**
Annual change		36.1%	32.1%	12.7%	-3.3%	4.0%	4.0%	3.0%	3.0%	3.0%
Change since 2007		36.1%	79.8%	102.6%	96.0%	103.8%	112.0%	118.4%	125.0%	131.8%
Preventive maintenance %	64.5%	67.0%	56.4%	36.5%	57.6%	57.6%	57.6%	57.5%	57.4%	57.3%
Corrective maintenance %	35.5%	33.0%	43.6%	63.5%	42.4%	42.4%	42.4%	42.5%	42.6%	42.7%

[326] SunWater email dated 30th June 2011.

[1]Source: Raw data extracted from SunWater spreadsheets *"IM Central -610.03.PSV.xls"* and *"Extract LBC data Conversion extra activity detail and preventive main split.xls*".

Although not stated at this time, it is highly likely that SunWater will identify an optimal ratio of (Preventive: Corrective) maintenance expenditure based on the RCM approach, which may be different to the 58%:42% projected above. An examination of other schemes reveals that the "Corrective" ratio is more likely to be in the 25% to 35%, indicating that as a proportion of total maintenance expenditure, there seems to be a relatively high amount of "Corrective Maintenance" expenditure in proportion to "Preventive Maintenance".

8.4.9 Feedback from Field Visits

Aurecon met with a number of stakeholders from the Lower Mary (customers of both Bulk and Distribution system) at Maryborough (Canegrowers office) on Wednesday 9th March 2011.

General comments regarding both Bulk and Distribution

- Large concern regarding Medium priority vs. High priority.
- Sharing of operational costs is 1 to 1. Yet in many of the years that are dry, it is only High Priority water that use any of the infrastructure/assets.
- Labour seems very high.
  - Are on-costs included, and to what magnitude are these?
  - At MSF, there has been substantial change of permanent labour to casual labour.
  - Is it possible to get labour costs broken down to FTE equivalents?
  - Labour only required for Operational & Maintenance??
- Electricity Adjustment only made after next price path?
- ORC table within the NSP, what is the Table used for.
- Insurance, what is deductable, what is covered? $41K per annum.
- Level of Customer Service.
  - Will consider a lower of standard if it delivers a substantially lowering of scheme costs.
  - Customer support has now moved to Brisbane. MSF had to make 6 telephone calls to officers in Brisbane SunWater regarding a transfer of permanent allocation to MSF, and still not resolve the issue.
- The SunWater office at Maryborough considered by stakeholders as an over investment to house 2 staff.
- Consultation with irrigator stakeholders has not happened for many years, and have not seen Asset Management plans.
- Rates. Are they being paid to Fraser Coast Council?
- Recreational costs. Irrigators have heard $0.37 per ML?
- Operational efficiency gains, cannot see where they have occurred.
- Compliance costs. Within Bulk NSP page 22, states that there are additional costs, what are these costs?
- Reading of the meters. There are 177 customers/meters, with a large number of these being sleepers. Instead of reading all meters quarterly, is it possible to have the sleepers read on an annual basis?
- Concern as to how the 27% transfer of costs is worked out from Distribution to Bulk, as there are no meters on the channels?

8.4.10 Potential efficiency gains & Recommendations

The following points are made in relation to Opex

- On-going re-structuring of the SunWater workforce (and equipment) for the Central region, involving regional office relocations and restructuring of both administrative and operational staff is occurring. However, it was difficult to observe where any of these cost savings emerge.

- "“Operations” is a main cost. Aurecon has submitted a substantial number of questions to SunWater seeking additional information and transaction clarity, and received responses. However, Aurecon has insufficient information to review the prudency and efficiency of forecast expenditure. Aurecon recommends that the 2011 forecasts for Operations sub-activities be examined (and supporting calculations), with particular attention paid to forecast Metering cost estimates. Aurecon notes that total “Operations” direct expenditure proposed for 2011 is approximately 117% higher than the average of the preceding 4 years.
- The prudent and efficient direct “Labour” cost for “Preventive Maintenance” (2011) should be set at $60,000 (compared to $85,000 budgeted). Aurecon recommends that SunWater provide additional details as to how it calculated the forecast labour expense of $85,000. Aurecon also recommend that SunWater audit proposed activities for 2011 against itemised historical activities (2010) to substantiate why additional hours were historically incurred, and an examination of hourly charge costs between those incurred in 2010 against that prescribed within the Parsons Brinkerhoff (2010) report also undertaken.
- Based on the historical data provided by SunWater, and the inability to validate the calculation of the 2011 expenditure using the preceding 4 years costs, Aurecon has insufficient information to validate the prudency and efficiency of proposed “Corrective Maintenance” direct costs. Aurecon recommends that additional clarification be provided by SunWater to substantiate the differences (and reasoning for the additional $9,000 in annual expenses).

8.5 Capital costs review

SunWater has developed a rolling renewal annuity program that runs for a forecast 25 year period. The forecast for the initial 5 year period is based on a detailed assessment of asset condition and risk of failure, whilst forecasts beyond 5 years are based on broader estimates of asset life using engineering estimates and standard replacement rules[327].

SunWater also state that: *Renewals expenditure refers to works intended to maintain the ongoing performance and service capacity of the assets or, if this is no longer possible or economical, to replace the asset with a modern equivalent*. (SunWater, *Lower Mary Distribution System NSP*, (2012-2016) January 2011, Page 29).

In relation to the Lower Mary Distribution System, renewal expenditure is limited:

- Lower Mary Distribution Network including Owanyilla Channel, Teddington Diversion Pipeline, Copenhagen Bend Pipeline and Walker Point Pipeline.
- Copenhagen Bend Pump Station
- Main Roads Pump Station
- Owanyilla Pump Station
- Walker Point Pump Station

8.5.1 Review of historical renewal expenditure

Over the current price path period (2007 – 2011) annual renewals expenditure as stated by SunWater within the NSP has been between $90,000 and $541,000 (Table 8-9). The sum total expenditure over this period is $1,401,000, for a mean annual average of $280,200.

[327] SunWater, *Lower Mary Distribution System NSP*, (2012-2016) January 2011, Page 30.

Table 8-9. Historical renewals expenditure for Lower Mary Distribution System

nominal dollars $'000	Financial Year					
	2007	2008	2009	2010	2011	Sum total 2007-2011
Actual renewal spent[1]	90	169	211	390	541[3]	1,401
LBC target expenditure[2]	69	168	203	148	61	649
Difference ($'000)	21	1	8	242	480	752
Difference (%) from LBC target	30.4%	0.6%	4.0%	163.5%	786.9%	115.9%

[1]Source: *Lower Mary Distribution System NSP,* (2012-2016) January 2011, Page 7
[2]Source: SunWater spreadsheet, *"Compare R&E Spend to Annuity 2007_2011.xls".*
[3]Note that this was forecast value of renewal expenditure as at Feb 2011.

Of concern has been the substantial variation between Actual renewal spent and LBC target expenditure. As noted above in Table 8-9, for the years 2007, 2010 and 2011 the actual spent has exceeded the LBC target by a substantial amount, particularly in 2011 where proposed expenditure is expected to exceed LBC target by 789%. For the entire price path (2007-2011) actual spend has exceeded the LBC target by 115.9%.

SunWater was not been able to provide a detailed list of renewals projects that it intended to deliver over the current price path 2007 to 2011 (that would have formulated the LBC target expenditure). However, SunWater did provide an Excel database containing breakdown of historical renewals expenditure for the period 2007 to 2011 (actual expenditures up until 15th February 2011) for all projects greater than $10,000 in value (Table 8-10 below). However, there were a number of limitations to the database including:

- No indication of the Board approved budget for all projects in 2007
- Additional columns of "Revised Budget", and "Approved" along with "Board Budget" for 2008, 2009, 2010. In most cases, The amount recorded for an activity under "Revised Budget" equalled "Approved", and also "Yearly Total" (actual spend for that year). Highlighted the dynamic nature of the project budget management as the scope of works/activities changed
- Totals include Indirect and Overhead costs, and any proposed changes in allocation methods will impact renewal activity costs
- Many projects would run over several financial years, in which Board Approved budget only appeared in the first year, and not subsequent. Difficultly linking activities across years, due to the nature of the database provided
- The summation of annual totals within the database, did not equate with stated renewals expenditure for the scheme (see Table 8-11 below).

Table 8-10. Itemised historic renewals expenditure for Lower Mary Distribution System

Description	Start Date	Year	Spent	Status
Copenhagen Bend Pstn UN2 Pump & Motor Refurbishment	1/07/2006	2007	$13,887	Closed
Owanyilla Pstn Replace Zorcs (High Voltage SwitchBoard)	1/07/2006	2007	$8,237	Closed
Walker Point Pstn - Replace Pump Guides	1/07/2006	2007	$4,675	Closed
Main Road Pstn New Flowmeter Installation	1/07/2006	2007	$34,043	Closed
TOTAL for 2007		**2007**	**$60,842**	

Description	Start Date	Year	Spent	Status
Copenhagen: Refurbish pump	?	2008	-	Deferred
Owanyilla: Design of lifting equipment for the trash screens	?	2008	$14,354	Closed
Replace 2km Fence - Walker Point Main Channel - see Roy G for specific sites	?	2008	$14,700	Closed
Walker Pt: WHS-Study and implementation into position of fall arrest equip	?	2008	$19,563	Closed
Planning for Modernisation of Irrigation Distribution System - Lower Mary	?	2008	-	Closed
TOTAL for 2008		**2008**	**$48,617**	
Install security fencing at Copenhagen Bend Pump station	9/02/2009	2009	$9,393	Closed
Refurbish Pump Unit 1 guides (Copenhagen Bend Pump station)	9/02/2009	2009	$6,039	Closed
Replace 4 Concrete Lined Bays - Owanyilla Main Channel	1/05/2009	2009	$23,473	Closed
Refurbish Pump and Motor - Pump Unit 1 - Copenhagen Bend Pump Station	1/07/2008	2009	$30,116	Closed
Refurbish Circuit Breakers - HV SwitchBoard - Owanyilla Pump Station	1/02/2009	2009	$56,194	Practical
TOTAL for 2009		**2009**	**$125,215**	
Refurbish Fence along Channel - Walker Point MC	1/10/2009	2010	$11,698	Closed
Replace Reflux valve at Main Roads Pump station	3/09/2009	2010	$13,363	WIP
Install Surrounds/Covers over 10 Air Valves - Lateral C2 - Copenhagen Bend System	1/03/2010	2010	$17,702	Closed
Replace Concrete Lined Bays - 4 off CL01 and 4 off CL02 - Owanyilla MC	1/05/2010	2010	$42,015	Financial
New Meter installation WPC0056 customer DOYLE and air vent conversion	28/04/2010	2010	$12,093	Practical
2010/11 Pumps and Pipelines Project Planning and Scoping	1/04/2010	2010	$2,156	Released
Replace Common Control - Owanyilla Pump Station (Design 2010, Construct 2011)	1/02/2009	2010	$25,537	WIP
Install Flowmeter - Teddington Pipeline	1/09/2009	2010	$74,431	Practical
Investigate Seepage at Walker Point Balancing Storage and Develop Final Remediation Design	1/10/2009	2010	$65,989	WIP
TOTAL for 2010			**$264,984**	
Install Concrete Surrounds and Covers over 10 Air Valves - Lateral C2 - Copenhagen Bend System	1/07/2010	2011	$3,945	Scoping
Replace Reflux valve Main Roads Pump station PUN 1	3/09/2009	2011	$4,081	WIP
Replace Reflux Valve Main Roads Pump station Unit 2	24/12/2009	2011	$3,966	WIP

Description	Start Date	Year	Spent	Status
New Meter installation WPC0056 customer DOYLE and air vent conversion	28/04/2010	2011	$15,028	Practical
Update Electrical Drawings - Walker Point Pump Station	1/07/2010	2011	$7,266	WIP
Install new customer funded meter WPC0057	19/08/2010	2011	$96	WIP
Replace Gate on Outlet 1 From Storage - Copenhagen Ben Balancing Storage	1/07/2010	2011	$10,199	Released
Replace 4 Concrete Lined Bays - CL02 Owanyilla Main Channel	1/07/2010	2011	$21,527	Scoping
Install Walkways and Handrails at Regulating Gate 1 and 2 - Walker Point Main Channel	1/07/2010	2011	$23,928	Scoping
Install Thermographic Windows in HV SwitchBoard - Owanyilla Pump Station	1/07/2010	2011	$17,036	WIP
Replace Common Control - Owanyilla Pump Station (Design 2010, Construct 2011)	1/02/2009	2011	$30	WIP
TOTAL for 2010 up until 15th Feb 2011		**2011**	**$107,102**	

Source: SunWater spreadsheet "*2007-2011 PROJECTS.xls*"

Of the renewal expense items listed above in Table 8-10 for 2010, the following observations are made from the desktop review of data:

- Only 9 projects with expenditure for 2010
- 3 projects did have a Board approved budget
- 3 projects exceeded the Board approved budget
- The remaining 3 projects expenditure for 2010 was below Board approved budget, but one of which was incomplete (WIP).

As highlighted below in section 8.5.4, Aurecon review of the expense incurred for the installation of the marker buoys at the Mary River as prudent and efficient.

Aurecon notes that there are differences between the stated annual renewal expenditure stated within the NSP, and the annual totals calculated by Aurecon based on the itemised database provided by SunWater as highlighted in Table 8-11 below. Aurecon notes that the discrepancy may possibly be due to one or more of the following:

- A significant amount of renewal projects were below $10,000 in value. Note that the consultants requested expenditure items valued at only $10,000 and above
- Additional adjustments and renewal transactions are allocated.

Table 8-8. Difference between itemised renewals expenditure and NSP totals for Lower Mary Distribution System

Year	NSP stated expenditure[1] (A)	Itemised expenditure (Table 8-10) (B)	Difference ($) (B-A)	Difference (%) (B-A) / (A)
2007	$90,000	$60,842	-$29,158	-32.4%
2008	$169,000	$48,617	-$120,383	-71.2%
2009	$211,000	$125,215	-$85,785	-40.7%
2010	$390,000	$264,984	-$125,016	-32.1%
2011	$541,000	$107,102*	-$433,898	-80.2%

[1]Source: *Lower Mary Distribution System NSP,* (2012-2016) January 2011, Page 7

*Progressive total up till 15th February 2011.

Over the current price path period (2007 – 2011) annual renewals expenditure has been between $90,000 and $541,000 (Table 8-12). The sum total expenditure over this period is $1,401,000, for a mean annual average of $280,200.

Table 8-9. Historical renewals expenditure for Lower Mary Distribution System

Real dollars, $'000	Financial Year				
	2007	2008	2009	2010	2011
Renewal annuity charge	90	169	211	390	541

Source: *Lower Mary Distribution System NSP,* (2012-2016) January 2011, Page 7

8.5.2 Forecast renewals expenditure

There are significant renewal expenditures proposed for the Lower Mary Distribution System and there is considerable variance in proposed annual expenditures (Figure 8-28). There are substantial expenditure items in 2023 relating to replacing the electrical components and cabling at Walker Point Pump Station, and $950,000 in 2025 for replacing high voltage switchboard at Owanyilla Pump Station.

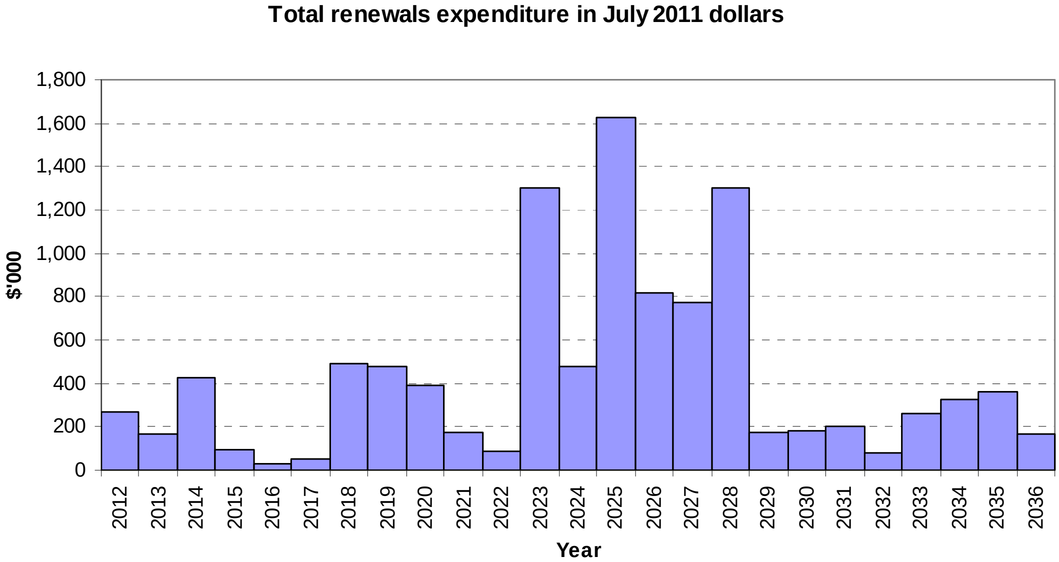

Figure 8-28. Proposed annual renewals expenditure for Lower Mary Distribution System 2012 to 2036 [328]

As disclosed within the NSP, there are a number of significant proposed expenditures for the next price path (Table 8-13). The summary total renewals expenditure for 2012 to 2016 is $991,000, or an annual average of $198,200 (compared to the annual average of $247,400 for the 2007 to 2011 period).

[328] Raw data extracted from SunWater spreadsheet "*NSP Projects Central V4.xls".*

Table 8-13. Forecast renewals expenditure for Lower Mary Distribution System 2012 to 2016

Real dollars, $'000	Financial Year				
	2012	2013	2014	2015	2016
Copenhagen Bend Pump Station	11	112	227		11
Main Roads Distribution				8	
Main Roads Pump Station			32	37	
Owanyilla Diversion Ch Distribution				11	11
Owanyilla Pump Station	93				
Walker Point Distribution	109				
Walker Point Pump Station	55	56	170	40	6
Cost estimate for renewals program	268	168	430	96	29

[1]Source: *Lower Mary Distribution System NSP,* (2012-2016) January 2011, Page 31.

Table 8-14 below provides detailed description of proposed renewal expenditures items for 2012 to 2016.

Table 8-14. Detailed review of forecast renewals expenditure for Lower Mary Distribution System 2012 to 2016

ID No.	Year	SunWater Description	Total cost up to 2016 ($'000)
Copenhagen Bend Pump Station			
F1	2012	SDY: Design of common controls	11
F2	2013	Electrical Component Upgrade - Documentation, Drawings, Specs and Cost Estimate(PLC, SwitchBoards, Cables)	56
F3	2013 & 2014 & 5 yearly thereafter	Refurbish pump and motor (one in 2013 & one in 2014)	113
F4	2014	Electrical Component Upgrade - Supply, Install, Commission (PLC, SwitchBoards, Cables)	170
F5	2014 & 7 yearly thereafter	Refurbish Building - roof, paint, fittings etc	11
Main Roads Distribution			
F6	2015 & 30 yearly thereafter	Replace Screen	8
Main Roads Pump Station			
F7	2014 & 2015, & 13 yearly thereafter	Refurbish Motor - bearings, bake etc (one in 2014 & one in 2015)	22
F8	2014 & 2015, & 13 yearly thereafter	Refurbish Pump - bearings, casing, wear rings etc	41
F9	2015 & 10 yearly thereafter	Refurbish Valve - corrosion, seal, bearings - cheaper to replace?	5
Owanyilla Diversion Channel Distribution			
F10	2015, & 2031	Refurbish Gate - seals, fixings, actuator as required	11
F11	2016 & 6 yearly thereafter	Refurbish Pump, corrosion, seals, impellers, bearings as required - OMC OS03	6

ID No.	Year	SunWater Description	Total cost up to 2016 ($'000)
F12	2016 & 6 yearly thereafter	Refurbish Pump, corrosion, seals, impellers, bearings as required - OMC OS04	6
Owanyilla Pump Station			
F13	2012 & 6 yearly thereafter	Refurbish screens - Corrosion	38
F14	2012 & 10 yearly thereafter	10 Year Crane Inspection - as per AS2550	27
F15	2012 & 10 yearly thereafter	Desilt suction chamber in front of pump inlet	22
F16	2012	Safe Access to Inlet Screen Pit	6
Walker Point Distribution			
F17	2012	Refurbishment of Walker Point Balancing Storage (refer project 10MVA12)	109
Walker Point Pump Station			
F18	2012	Electrical Component Upgrade - Assess, Design Replace PLC, SwitchBoards, Cables	55
F19	2013	Electrical Component Upgrade - Documentation, Drawings, Specs and Cost Estimate(PLC, SwitchBoards, Cables)	56
F20	2014	Electrical Component Upgrade - Supply, Install, Commission (PLC, SwitchBoards, Cables)	170
F21	2015 & approx 5 yearly thereafter @$67	Refurbish Units - incl. Motors, seals, etc	34
F22	2015 & approx 4 yearly thereafter	Refurbish Valve - corrosion, seal, bearings	6
F23	2016 & 15 yearly thereafter	Refurbish: Discharge valve -	6

Source: SunWater Database, "*NSP Projects Central V4.xls*".

Table 8-14 above provides details for specific renewal expenditures proposed for 2012 to 2016, and an indication if a recurring expense occurs between 2017 and 2036. Table 8-15 below highlights additional expenditure activities above $10,000 in costs proposed for 2017 to 2036 that were not captured as expense items for 2012 to 2016 in Table 8-14 above).

Table 8-15. 10Review of forecast renewals expenditure over $10,000 for Lower Mary Distribution System 2017 to 2036

ID No.	Year	SunWater Description	Total activity cost ($'000)
Copenhagen Bend Distribution			
F24	2021& 2022	Refurbish Valve - dismantle buried assembly, externally wrap, remove bonnet in place, corrosion treatment	18
F25	2025 & 2026	Refurbish Scour Outlet - refurbish metalwork/valves - consider retiring asset	67
F26	2020 to 2028	Replace a total of 33 Air Values	223
F27	2025	Replace Scour Outlet (2)	25
F28	2035	Replace Structure, 80-200 Mm Meter Outlets (4)	101

ID No.	Year	SunWater Description	Total activity cost ($'000)
Copenhagen Bend Pump Station			
F29	2025 & 6 yearly thereafter	Change Out - screens as required replace or repair corroded screens	11
F30	2024	Refurbish Pit Covers - midlife based on condition	11
F31	2034	Refurbish switchBoard	28
F32	2020	Replace Cable	229
F33	2028	Replace Discharge Valve And Actuator	78
F34	2021	Replace Structure Of Building	135
F35	2026	Replace Submersible Pump	242
F36	2019	Replace SwitchBoard, Low Voltage	270
Lower Mary Distribution			
F37	2023-2038	Replace Air Values (40)	265
F38	2035	Replace Structure, 80-100Mm Meter Outlet (2)	45
F39	2026	Refurbish Scour Outlet - refurbish metalwork/valves - consider retiring asset	39
Main Roads Distribution			
F40	2028	Refurbish Scour Outlet - refurbish metalwork/valves - consider retiring asset	61
F41	2030	Refurbish Valve - dismantle buried assembly, externally wrap, remove bonnet in place, corrosion treatment	27
F42	2028	Replace Air values (18)	171
F43	2028	Replace Inlet Structure	27
Main Roads Pump Station			
F44	2018	Documents, Drawings, Specs and Cost Estimate for PLC and SCADA system	34
F45	2019 & 6 yearly thereafter	Refurbish Building - roof, paint, fittings etc	17
F46	2018 & 5 yearly thereafter	Refurbish Vacuum Priming System	31
F47	2025	Replace Cable	124
F48	2028	Replace Discharge Valve	20
F49	2028	Replace Electric Motor	64
F50	2029 & 2034	Replace Pump (cost per pump, 2 pumps to be replaced)	104
F51	2028	Replace Reflux Valve	14
F52	2025	Replace SwitchBoard, Low Voltage	264
F53	2027	Replace Vacuum Priming System	29
F54	2017	Study: Review requirement for PLC and SCADA system	11
F55	2019	Supply, Implement, Install, Commission PLC and SCADA system	113
Owanyilla Diversion Channel Distribution			
F56	2017 & 2027	Maintain fence along open channel - OMC	11
F57	2034	Refurbish Scour Outlet - refurbish metalwork/valves - consider retiring asset	17
F58	2034	Replace Air Valve (11 items, total cost)	87
F59	2035	Replace Elect Reticulation To Inlt Str	14
F60	2035	Replace Power Supply To 4 Pumps	32

ID No.	Year	SunWater Description	Total activity cost ($'000)
F61	2035	Replace SwitchBoards Pump (Units 1 to 4, total cost)	32
F62	2026	Study: Develop O&M Manual Owanyilla	11
Owanyilla Pump Station			
	2024	Refurbish Circuit Breakers	125
	2028	Refurbish Crane - mech, elec, corrosion on condition	11
	2020 & 2034	Refurbish Road - repair flood damage	11
	2021& 2036	Refurbish Valve - corrosion, seals, bearings etc incl. Actuator as required	11
	2036	Refurbish Ventilation System - screen, blower	17
	2022	Refurbish Zorcs - replace elements - need to check the cycle for replacement	11
	2024	Replace Cable	191
	2020	Replace Dewatering Pump (No1 & No 2, total cost)	36
	2027	Replace Discharge Valve	338
	2025	Replace Fence	55
	2036	Replace Screen	73
	2027	Replace Suction Valve	338
	2025	Replace SwitchBoard, High Voltage	950
	2024	Replace SwitchBoard, Low Voltage	45
Walker Point Distribution			
	2020 & 2030	Refurbish fence along open channel	13
	2031	Refurbish Fencing	15
	2017/18 & 10 yearly	Refurbish Gate - remove, repaint, anodes & bearings, install (2 items, total cost)	34
	2028	Refurbish Pipework - refurbish or replace pipework, fixings and valves	28
	2028	Refurbish Scour Outlet - refurbish metalwork/valves - consider retiring asset	122
	2018 & 15 yearly	Refurbish Valve - dismantle buried assembly, externally wrap, remove bonnet in place, corrosion treat, reassemble (2 items, total cost)	18
	2035	Replace 3 Phase Elect Ret-Outlet Gate	27
	2028	Replace Air Valve (12 items, total cost)	127
	2028	Replace Air Vents (26 items, total cost)	343
	2018	Replace Fencing, Gates & Grids	257
	2026	Study:Develop O&M Manual	11
Walker Point Pump Station			
	2023	Replace Cable	978
	2028 & 2032	Replace Discharge Valve (2 items, cost per item)	23
	2025	Replace Hdpe Suction Line	87
	2031 & 2033	Replace Pump (cost per pump, 2 pumps to be replaced)	144
	2028	Replace Reflux Valve	35
	2023	Replace SwitchBoard, Low Voltage	220

Source: SunWater Database, "*NSP Projects Central V4.xls*".

8.5.3 Examination of renewals expenditure

As indicated earlier, Aurecon inspected a number of assets during the field trip. For the Lower Mary Distribution System, Aurecon inspected assets at the Walker Point Network, and Copenhagen Bend network.

A general observation regarding the Lower Mary, was that in many instances the facilities appeared way overdesigned compared to modern standards and were attracting additional maintenance and operating costs because of it.

Walker Point Balancing Storage

The Walker Point balancing storage was a 32ML above ground holding dam experiencing leakage along the south-eastern walls. Proposed expenditure for this includes:

- 2010 Investigate Seepage, and Develop Final Remediation Design. Approved $104,302, spent $41,031
- 2012. Refurbishment of Walker Point Balancing Storage (installation of drains and culvert head works). Proposal to spend $109,000 in 2012.

Aurecon noted that significant expenditure has been assigned in relation to the leakage at this balancing storage. It is understood that the proposed works for 2012 would not remediate the leak, but is intended to mitigate risk through controlling the runoff and channelling the seepage, and would provide a control for measuring the water loss.

Unfortunately, at the time of this report, Aurecon was not provided with the investigative report into the seepage (project that was incomplete in 2010), that also would have examined options for repairing the seepage, and costing.

Aurecon was provided with an engineering plan for the drain works, but it did not provide specific details to the quantity of works proposed for the culvert. Nor was any budget details available, highlighting the estimated direct costs for the works to be undertaken by external contractors (note that substantial Indirects and Overheads are incorporated within the proposed $109,000 expense).

At the site visit undertaken by Aurecon, the seepage at the site was clearly visible, validating the need for response. However, Aurecon question the proposed course of works for 2012 and the significant cost proposed.

Adopting SunWater’s interest rate of 9.689% to the proposed $109,000 expense implies an annual interest cost of $10,561. If an average of 3,000ML per annum utilise the balancing storage, then the interest cost alone implies an annual cost of $3.50 per ML per annum. Yet, an additional capital investment is still required to repair the seepage.

Recommendation

Aurecon recommends that SunWater re-examine the proposed renewal works at this site, and undertake additional financial analysis.

Based on the financial cost alone that is proposed for the activity, Aurecon do not view the proposed expenditure in 2012 as efficient. Note that Aurecon were not able to view the Seepage Report at the time of this report, which is a critical document substantiating the proposed course of action adopted by SunWater.

Walker Point Pump Station

There is a significant investment proposed for Walker Point Pump Station, relating to the replacement of the Electrical Control system as follows:

- 2012. Electrical Component Upgrade - Assess, Design Replace PLC, SwitchBoards, Cables. $55,000

- 2013. Electrical Component Upgrade - Documentation, Drawings, Specs and Cost Estimate (PLC, SwitchBoards, Cables). $56,000
- 2014. Electrical Component Upgrade - Supply, Install, Commission (PLC, SwitchBoards, Cables). $170,000

The proposed expenditure aligns with a number of similar other proposals across other pump stations both within the Lower Mary, and at Bundaberg. Aurecon noted that the electrical control panels are original, and somewhat dated causing issues for the replacement of parts as required (SunWater indicated that some parts were not obtainable on the marketplace).

Aurecon noted the Parsons Brinckerhoff report *Audit of Electrical Sites* (2009), made recommendations for the replacement of these electrical control panels across pump house facilities across the state. However, it did not identify the Walker Point Pump Station as a high priority for replacement in the short term.

Aurecon noted that in recent years SunWater adopted a 3 year job process which involved an internal assessment of the works project, followed by detailed design works and specification in the second year (undertaken typically by SunWater), which also included the preparation of the works program for tendering. The tendering process may also be completed in this year, with the third year involving the engagement of an external contractor for the manufacture and installation of the new electrical control system.

The total cost of implementing the Electrical Component Upgrade is $281,000. Adopting SunWater's interest rate of 9.689%, then the annual interest expense for this capital expenditure is $27,226.

If the mean annual volume of water pumped via the pump station is 3,000ML (Aurecon estimates), then the real cost of this investment to the water serviced is approximately $9.00 per ML per annum.

Key points:

- Structured process employed for the replacement of a significant asset, supported to a large degree by the external expert report by Parsons Brinckerhoff report. A number of other major pump station locations are also proposed for similar renewal expenditure.
- Actual works to be undertaken by specialized external electrical contractors.
- Costs incurred for stages 1 and 2 (2012 and 2013) are predominantly incurred by SunWater staff.
- The proposed upgrading will allow external monitoring and remote control of the pump house facilities, improving labour and cost efficiencies. However, the interest cost arising from the works is also high, and Aurecon have not seen if any financial analysis has been undertaken evaluating this cost.

Recommendation

Aurecon recommends that SunWater re-examine the proposed renewal works at this site, and undertake additional financial analysis. Based on the financial cost alone that is proposed for the activity, Aurecon views the proposed expenditure as implying a high cost in consideration of the volume of water delivered by the asset. Considering the impending retirement of assets from the Bundaberg scheme, it may be possible to extend the working life of the existing Electrical Control Panel at Walker Point pump station utilising parts from Bundaberg (however, at some stage replacement would be required).

Aurecon recommends that the proposed works for 2012-2014 be postponed until an evaluation is undertaken examining the feasibility of using parts from Bundaberg.

Copenhagen Bend Pump Station

Although not initially scoped as part of the field trip asset inspection, SunWater was able to provide the opportunity to inspect the proposed facility.

- Electrical Component Upgrade - Documentation, Drawings, Specs and Cost Estimate (PLC, SwitchBoards, Cables) in 2013, at a cost of $113,000
- Electrical Component Upgrade - Supply, Install, Commission (PLC, SwitchBoards, Cables) in 2014, at a cost of $170,000

A total cost of $283,000 is proposed for the upgrading.

The proposed expenditure aligns with a number of similar other proposals across other pump stations both within the Lower Mary, and at Bundaberg. SunWater indicated that many replacement parts were not obtainable on the marketplace).

Aurecon noted the Parsons Brinckerhoff report *Audit of Electrical Sites* (2009), made recommendations for the replacement of these electrical control panels across pump house facilities across the state. At a pump station location at Bundaberg with a similar electrical panel structure (projected for replacement 2012/13), Aurecon noted the increasing frequency of breakdowns and repairs required in recent years.

Irrigator stakeholders present at the site visit expressed concern regarding the cost of the proposed investment for the Copenhagen Bend pump station, considering that usage at this distribution network is extremely low.

The SunWater regional manager remarked that it was highly unlikely that the proposed expenditure would eventuate in 2014, and that parts recovered from the removal of similar electrical control panels at other locations (e.g., Bundaberg) would be retained for use at this location, extending the possible working life of the existing facilities for a number of years.

The total cost of implementing the Electrical Component Upgrade is $283,000. Adopting SunWater’s interest rate of 9.689%, then the annual interest expense for this capital expenditure is $27,420.
If the mean annual volume of water pumped via the pump station is 3,000ML (hypothetical estimate), then the real cost of this investment to the water serviced is approximately $9.00 per ML per annum. If the actual water serviced is only 1,500ML per annum, then the implied cost of this investment is $18 per ML per annum (interest costs alone).

Key points:

- The Pump House and associated assets were installed many years ago, and now operate at a fraction of its capacity. In essence, irrigators have over-capitalized assets which are incurring significant maintenance costs, and in many cases are coming to their end of effective life (likely to incur increased risks and breakdowns going forward).
- There is an increased risk with the maintenance of the outdated electrical control system, but the cost of replacement may clearly out weight the potential financial benefit to all stakeholders.
- In such circumstances involving significant costs and increased operational risks, engagement with irrigators may be beneficial as to the optimal works program (i.e. Refurbishments vs. replacement).
- Although extensive financial modelling and analysis is undertaken by SunWater to determine the least cost strategy for managing the asset over the whole of asset life, there is a need to also incorporate into the decision making, an evaluation process that examines the economic and/or financial merits of such expenditures from a product delivery/customer (water value) prospective.

Recommendation

Aurecon recommends that SunWater re-examine the proposed renewal works at this site, and undertake additional financial analysis. Based on the financial cost alone that is proposed for the activity, Aurecon views the proposed expenditure as implying a high cost in consideration of the volume of water delivered by the asset. Considering the impending retirement of assets from the Bundaberg scheme, it may be possible to extend the working life of the existing Electrical Control Panel utilising parts from Bundaberg (however, at some stage replacement would be required).

Aurecon recommends that the proposed works be postponed until an evaluation is undertaken examining the feasibility of using parts from Bundaberg.

8.5.4 Renewals annuity balances

The Lower Mary Distribution System has a substantial negative balance of -$1.454 million in 2012[329]. Stakeholders have expressed substantial concern in relation to this opening balance for 2012.

SunWater has provided Aurecon with an internal working paper[330] which illustrates:

- Opening Balance at 1 July 2006 was ($973,000) for the Mary River (irrigation sector), and through a process of apportionment have allocated 91% of this starting balance to Distribution system ($888,000)
- Identified annual annuity incomes and expenses specifically for the Distribution System for 2007 to 2011
- Identified that the closing balance for 30 June 2011 for the Distribution System is approximately $1,450,000 (irrigation sector balance). No uplift factor to apply, therefore the opening balance in 2012 $1,450,000
- Applied an interest rate of 9.689% (pre-tax nominal) on annual balances

Utilising this information presented above, Aurecon have modelled the stated expenses and income for 2007 to 2011, incorporating the stated 2007 annuity starting balance and annual interest of 9.689%. Aurecon arrived at a negative closing balance of $1.49m as stated within the SunWater paper.

As indicated below within Figure 8-29, the scheme incurred substantial interest between 2007 and 2011. Based on these calculations, Aurecon estimates that the scheme incurred approximately ($475,000) in interest charges over the entire 2007 to 2011 period. Total annuity income totalled $526,000, whilst renewal expenditure totalled $659,000. Hence, annuity income over this period was short by $133,000 covering renewal expenditures, and before interest charges of $475,000. Note that the interest charge in 2011 was approximately $112,000. Figure 8-28 also highlights that expenses was significantly greater than income in 2011.

[329]Source: *Lower Mary Distribution System NSP,* (2012-2016) January 2011, Page 32.

[330] Source: SunWater, *Renewals annuity calculation, INTERNAL WORKING PAPER*, January 2011

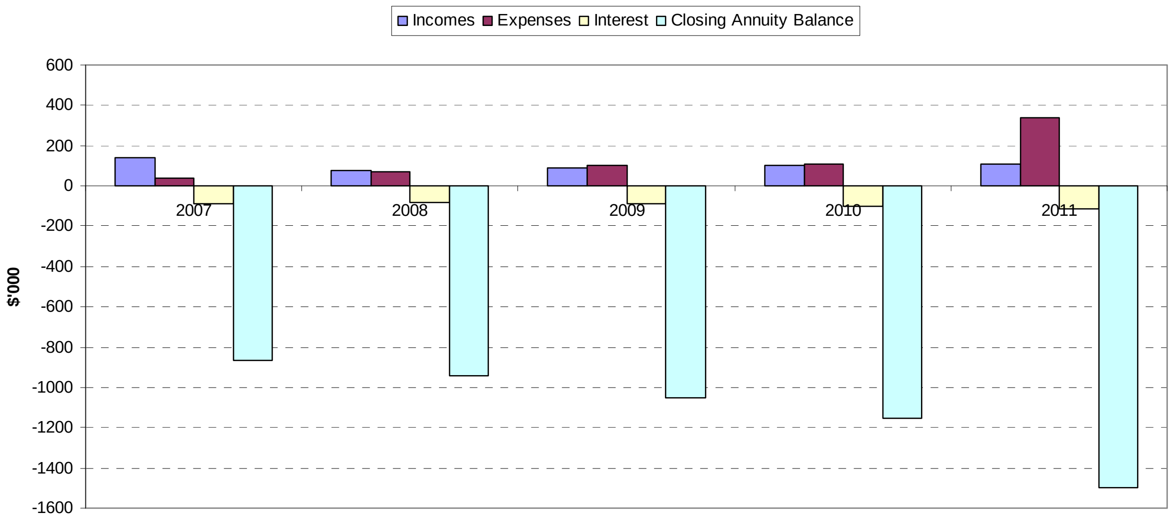

Figure 8-29. Calculated annual renewal balance for Lower Mary Distribution System 2007 to 2011

As illustrated in below in Figure 6-30 below, the balance is projected to fluctuate between positive and negative amounts over the forecast period until the end of 2035.

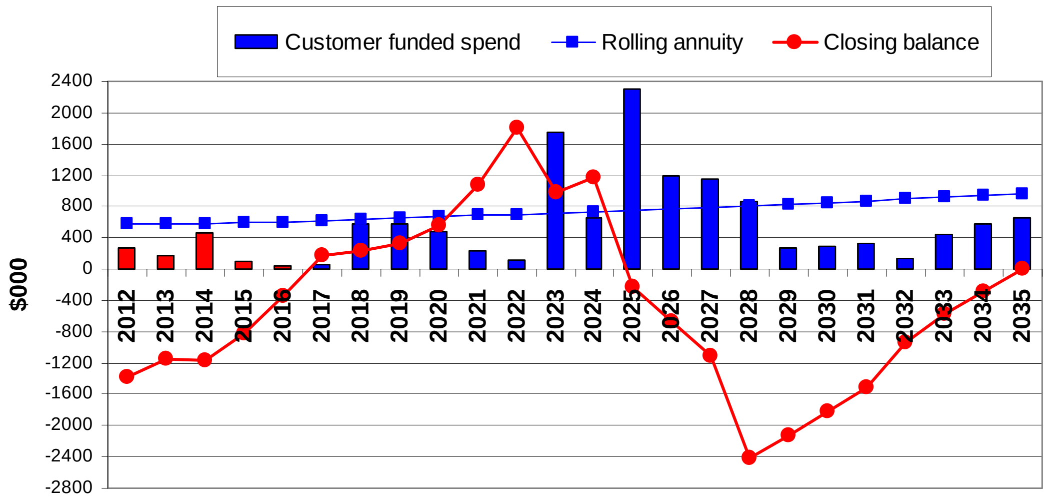

Figure 8-30. Renewals annuity balances for Lower Mary Distribution System 2012 to 2036[331]

Applying SunWater's prescribed real rate of interest of 9.689% upon the starting 2012 annuity balance of -$1.45 million, implies an annual interest charge of approximately $140,000 in 2012.

As indicated above, the proposed average renewal expenditures for 2012 to 2017 is $198,200 per annum. As a result of the substantive negative balance in 2012 (accrues interest and requires capital repayments to be made as well), and the significant expenses proposed (particularly during the 2023 to 2028 period), the annual annuity charge going forward is over $500,000 as shown below in Table 8-16.

[331] Source: SunWater spreadsheet, *"Annuity charts – V610 03.xls*"

Table 8-16. Renewals annuity charge for Lower Mary Distribution System 2012 to 2016

Real dollars, $'000	Financial Year				
	2012	2013	2014	2015	2016
Renewal annuity charge	555	546	541	537	533

Source: *Lower Mary Distribution System NSP,* (2012-2016) January 2011, Page 32

8.5.5 Feedback from field visits

In relation to renewals expenditure, the following two statements from stakeholders are of particular relevance.
Stakeholders would consider comprising the Level of Customer Service

- Will consider a lower of standard if it delivers a substantial lowering of scheme costs.
- Stakeholders stated that there has not been any consultation with SunWater for a number of years in relation to Asset Management plans and projects.

8.5.6 Summary of findings on renewals expenditure

Historical Renewal Expenditure

SunWater was not able to provide to this review the proposed renewal programme as developed in 2006 for the current price path. However, as highlighted earlier SunWater's actual expenditure on renewals over the 2007-2011period was 173% higher than the proposed LBC target expenditure (noting that the data for the 2011 financial year is incomplete).

Aurecon has found that the processes engaged (i.e. identification of need through condition assessments, timing, scoping, and tendering for the engagement of external contractors) indicated a structured and efficient process. However, substantial Indirect and Overhead costs were also incorporated, which greatly distorted the perceived value for money outcome achieved for the activity.

Aurecon notes that the itemised listing of renewal expenditure provided by SunWater did not account correlate with stated annual expenditures, with only 20% to 70% of the annual costs accounted for. Aurecon recommends that an additional request is made to SunWater to provide a comprehensive itemised inventory of renewal expenditure items, so that 100% of the stated annual cost can be validated.

Forecast Renewal Expenditure

To assess the prudency and efficiency of forecast renewal activities, Aurecon examined a number of major expenditure proposals for 2012 to 2016. Aurecon identified a well-documented process (condition assessments, audits, external expert reviews etc) that substantiated the timing or need for a renewal activity, but in all cases questioned the efficiency of the proposed activity from an investment and stakeholder perspective.

Aurecon recommends that all major renewal activities involving asset replacements are re-examined, and additional analysis (financial) be undertaken to prove that proposed replacements are efficient investment from the prospective of product/service delivery.

In particular, Aurecon recommends that SunWater re-evaluate the proposed Electrical Component Upgrade for the Copenhagen Bend Pump Station (refurbishment rather than replacement), and adjust the renewal annuities accordingly.

Aurecon also recommends that the proposed remedial (seepage) works at Walker Point Balancing storage be deferred until the scoping report is completed, and additional financial analysis is undertaken to validate the efficiency of the investment for irrigators.

Need to re-evaluate the scheme's operational capacity

Aurecon notes the inherent difficulties posed by this specific scheme in terms of over-capacity. A number of large asset items are now incurring substantial annual maintenance costs, and significant renewal costs as the need for replacement approaches. Aurecon recommends that all assets be reviewed from the prospective of capacity and service delivery, so that alternative options for rehabilitation and replacement going forward are identified that presents a lower cost base to stakeholders, and seeks to better align the assets of the scheme with users over time.

9. Assessment of Upper Burnett Bulk Water Supply Scheme

9.1 Scheme Description

The Upper Burnett Bulk Water Supply Scheme (WSS) is one of the 5 Water Supply Schemes within the Burnett Basin, with the others being the Barker Barambah, Boyne River and Tarong, Three Moon Creek, and Bundaberg. Figure 9-1 highlights operational features of the Upper Burnett Bulk WSS.

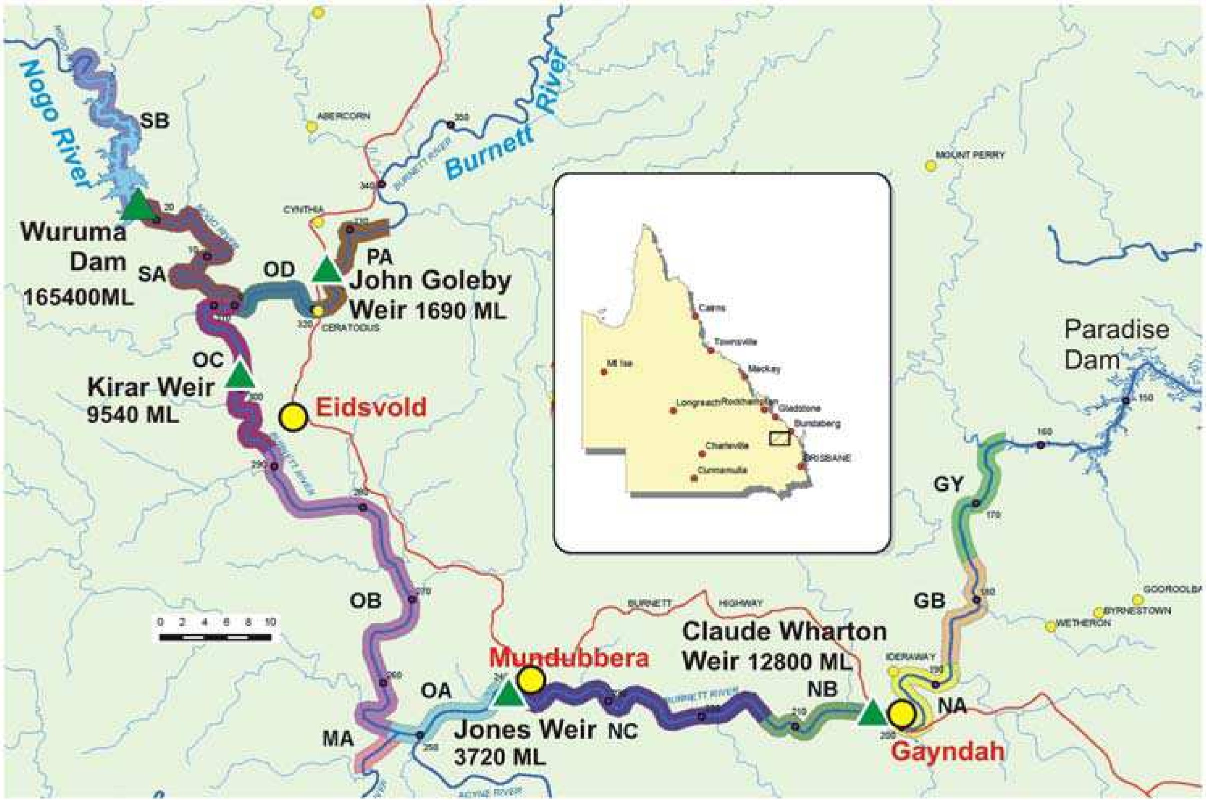

Figure 9-1. Overview of the Burnett River Basin Water Supply Schemes[332]

The Upper Burnett Bulk WSS is centred on the lower reaches of the Nogo and Auburn Rivers and the upper reaches of the Burnett River.

The major storage for the Upper Burnett Bulk WSS is Wuruma Dam (constructed 1965-68), situated approximately 48 km northwest of Eidsvold on the Nogo River, which is a tributary of the Burnett River. The dam was designed and constructed primarily for the purpose of maintaining a regulated supply. The Wuruma Dam together with the Mundubbera Weir, which is located about 88km downstream on the Burnett River, were designed to supply sufficient water to irrigate some 4,450 hectares of land along 165 km of the Burnett River to Mingo Crossing[333].

The Upper Burnett Bulk WSS has a total of 156 customers comprising of 27,170 ML of medium priority WAE and 1,720 ML of high priority WAE. The scheme provides water for:

- irrigation of citrus, small crops and dairy farming
- supplementing urban water supplies to Eidsvold, Mundubbera and Gayndah.

[332] SunWater, *Upper Burnett Water Supply Scheme – Scheme Operation Manual*, page 15, un-dated report.
[333] SunWater (2011), Scheme information http://SunWater.com.au/schemes accessed 25th April 2011

The Burnett Basin Resource Operation Plan (ROP) sets the regulatory framework for the management of water within this scheme. Local management of the scheme is managed from SunWater's regional office at Bundaberg.

Under the ROP, SunWater has obligations to manage and operate the following storages:

- Wuruma Dam is the major storage asset. The dam consists of a mass concrete gravity wall with central spillway. The dam wall is 343 m wide and 44 m high[334]. The dam was completed in 1968 and is a referable dam with a capacity of 165,400 ML.[335].
- John Goleby Weir is a cascading sheet-pile weir (100m wide) located on the Burnett River. It was completed in 1986 and holds has a capacity of 1,690 ML.[336].
- Jones Weir is located on the Burnett River at the town of Mundubbera. The weir consists of a mass concrete wall. It was completed in 1951 and has a capacity of 3,720 ML.[337]
- Claude Wharton Weir is located on the Burnett River at the town of Gayndah. The weir was completed in 1987 and consists of a mass concrete wall. In 1992 the wall was fitted with an inflatable rubber crest which raised the storage level by 1.5 m and the storage volume from 8,080 ML to 12,800 ML. The weir was fitted with a fish lock in 2008. The weir has a high and a low-level outlet and can release up to 3,380 ML/day[338].

9.2 Scheme Management

The Interim Resource Operations Licence (IROL) sets the regulatory framework for the management of water within this scheme. Management of the scheme is conducted by SunWater's regional office at Bundaberg, whilst day-to-day operations are undertaken by operational SunWater staff located at Mundubbera (home based) and one officer that works from the Wuruma Dam office/workshop.

SunWater also has five operational staff primarily located at the Boondooma Dam office/workshop (and small relocatable office located at Bjelke Petersen Dam); however these staff also service the Lower Burnett and the Boyne River system.

At times, SunWater staff from other locations within the Central region may be utilised for scheme specific activities for the Upper Burnett Bulk WSS, particularly from the Bundaberg depot which is the main office for the Central region, and also houses a storage workshop. Key staff resources at the Bundaberg office include:

- Regional Operations Manager & Service Manager
- 3 working teams of two electricians (also assist Biloela)
- 2 working teams of two fitter & turners (also assist Biloela)
- 9 operational staff located at Bundaberg and Gin Gin (operate primarily Bundaberg Bulk and Distribution systems)
- 8 Technical officers and Schedulers (for Central region including Biloela)
- 2 Administrative staff (for Central region)

Other SunWater staff resources within the Central region includes 2 staff located at the Maryborough depot.

[334] SunWater, *Upper Burnett Water Supply Scheme – Scheme Operation Manual*, page 23, un-dated report.
[335] SunWater, *Upper Burnett Bulk WSS NSP*, (2012-2016) January 2011, Page 33.
[336] SunWater, *Upper Burnett Water Supply Scheme – Scheme Operation Manual*, page 24, un-dated report.
[337] SunWater, *Upper Burnett Bulk WSS NSP*, (2012-2016) January 2011, Page 34.
[338] SunWater, *Upper Burnett Bulk WSS NSP*, (2012-2016) January 2011, Page 34.

SunWater advised that in recent years there has been an on-going management strategy to relocate positions (as vacancies arise) from the smaller centres to Bundaberg. As highlighted above, small mobile working teams located at Bundaberg service all schemes across the Central region.

9.3 Summary Opex and Capex information from the NSP

The Upper Burnett Bulk WSS has a total of 156 bulk customers comprising of 27,170 ML of medium priority WAE and 1,720 ML of high priority WAE. SunWater proposess to allocate 94% (based on WAE proportions) of the operating expenses and 18% (based on the Headworks Utilisation Factor) of the renewals annuity cost to medium priority WAE holders.

The NSP for the Upper Burnett Bulk WSS proposes that the efficient operating costs for the scheme for the coming 5 year regulatory period average $701,000 per annum. This represents a 13.8% increase over the current price path average of $616,000 per annum.

A significant proportion of operating costs are influenced by water delivery and utilisations levels. In the current price path (2007 – 2011), it is clearly evident that water utilisation has been low due to the on-going drought over much of this period. It is also acknowledged that the 2010/11 summer season has ensured that all weirs and dams are full, providing the start of the next price path in 2012 with 100% allocation in the first year.

Stakeholders have expressed interest examining the projected lower bound operating costs for the scheme as projected within the 2005/06 Irrigation Price Review by Indec Consulting[339]. However, SunWater advise that a direct comparison between the Tier 1 projected 2005/06 lower bound operating cost against actual expenditure as presented within the NSP for 2007 to 2011 is not feasible as;

> *the Tier 1 tables for “scheme lower bound cost” include only the irrigation share of the costs, and that grossing up the costs is problematic*[340]

Not withstanding these limitations, Aurecon has examined the projected LBC values for 2006-2011 provided within the Tier 1 report against the costs presented within the NSPs (see Appendix A).

Projected renewal annuity spend over the five year period to 2016 is $1,223,000, which is approximately equal to the $1,237,000 spent over the preceding 5 year period. Due to a substantive positive annuity starting balance of $455,000 in 2012, a total charge for renewal annuity of $952,000 is sought for the 2012 to 2016 price path.

The following sections examine Opex (operational costs) and Capex (renewals expenditure) in more detail.

9.4 Operational costs review

An overview of required operational activities for the scheme is identified within the *Upper Burnett Water Supply Scheme – Scheme Operation Manual*[341]. The manual provides in detail an overview of the scheme structure, compliance requirements, overview of scheme operations activity requirements, and references for collecting and reporting scheme data.

For each scheme, SunWater has utilised the Scheme Operation Manual as a key input towards the formulation of the Maintenance Schedule and Operations Manual for individual assets/facilities across the scheme, as highlighted below within Figure 9-2.

339 Statewide Irrigation Pricing Working Group, *SunWater Irrigation Price Review 2005-06 Tier 1 Report*, April 2006,
340 Email from SunWater to the QCA, dated 23rd February 2011.
341 SunWater, *Upper Burnett Water Supply Scheme – Scheme Operation Manual*, un-dated report

In the case of the Upper Burnett Bulk WSS, an Operational Facility O & M Manuals exists for Wuruma Dam supported by a series of designs and construction documents[342].

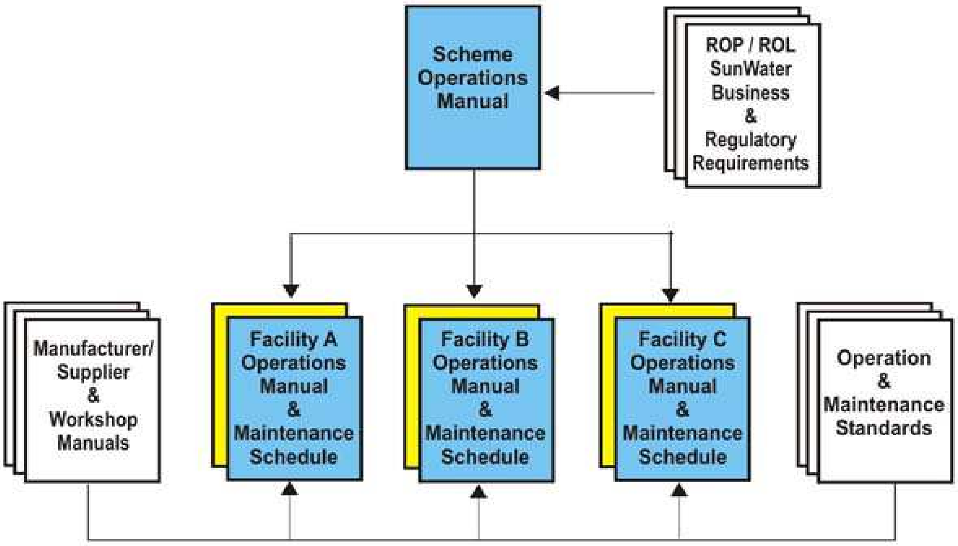

Figure 9-2. Overview of the linkages between Scheme and individual facility Operations Manual[343]

9.4.1 Overview

Within the NSP, SunWater has presented Operational costs by type, and also by activity. For the Upper Burnett Bulk WSS there are costs also incurred for the recreational facilities at Wuruma Dam. As such, Aurecon has undertaken a review of Operational costs by investigating in detail:

- key location expenses for the recreational facilities at Wuruma Dam
- key expenditure items of “Labour” and “Electricity”, and
- key expenditure activities of “Operations”, “Preventive Maintenance” and “Corrective Maintenance”.

Although not consistently obvious across all, many Operational cost items and activities vary accordingly to water usage levels. As indicated below (Figure 9-3), annual water usage has fluctuated substantially within the Upper Burnett Bulk WSS over recent years. The highest annual water usage (ie between 2003 and 2010) occurred in 2005 when approximately 22,500ML were utilised.

For the purposes of incorporating water usage into this cost analysis, Aurecon has indexed annual water usage for 2007 to 2010 period against the 2005 water usage as follows:

- Approximately 70% in 2007
- Approximately 55% in 2008
- Approximately 53% in 2009
- Approximately 58% in 2010

[342] SunWater, *Upper Burnett Water Supply Scheme – Scheme Operation Manual*, page 23, un-dated report.
[343] SunWater, *Upper Burnett Water Supply Scheme – Scheme Operation Manual*, page 14, un-dated report.

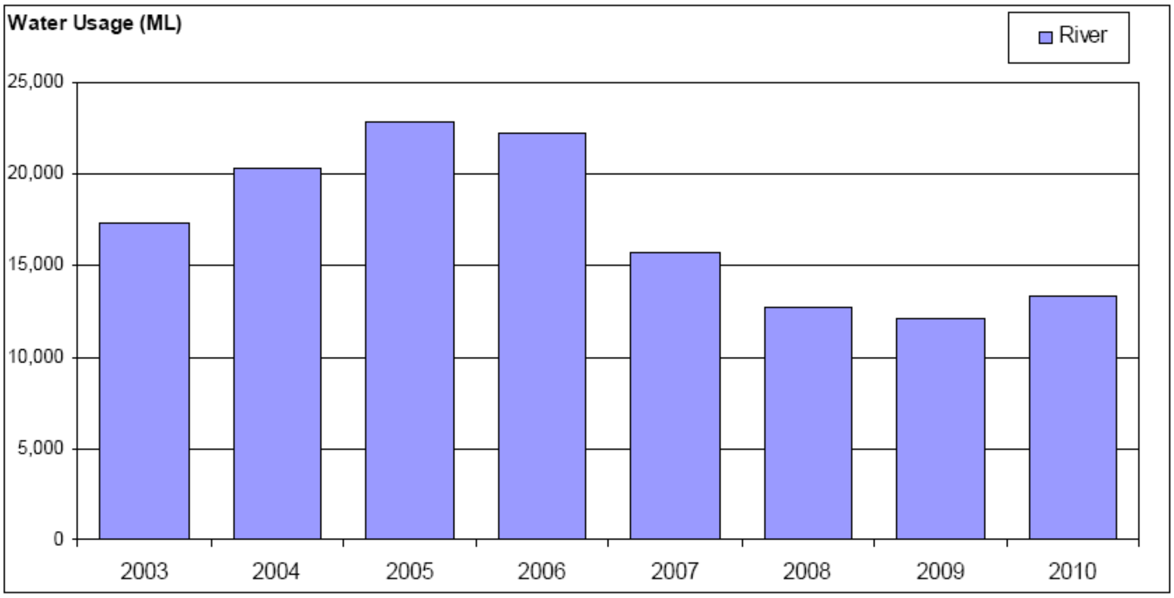

Figure 9-3. Water usage for Upper Burnett Bulk WSS[344]

As a result of the exceptional wet season in 2010/2011, storages across this region have been filled, and corresponding water usage for 2012 onwards may be higher than that experienced between 2007 and 2010. Stakeholders' feedback for a number of schemes across the Central region have indicated that the exceptional wet season for 2010/11 may have resulted in lower water usage in comparison to 2010.

Figure 9.4 below compares water usage against "Operating" costs. Although "Operating" costs declined from 2007 to 2008 as water usage levels declined, in 2009 "Operating" costs increased substantially yet water usage rates for irrigators actually declined.

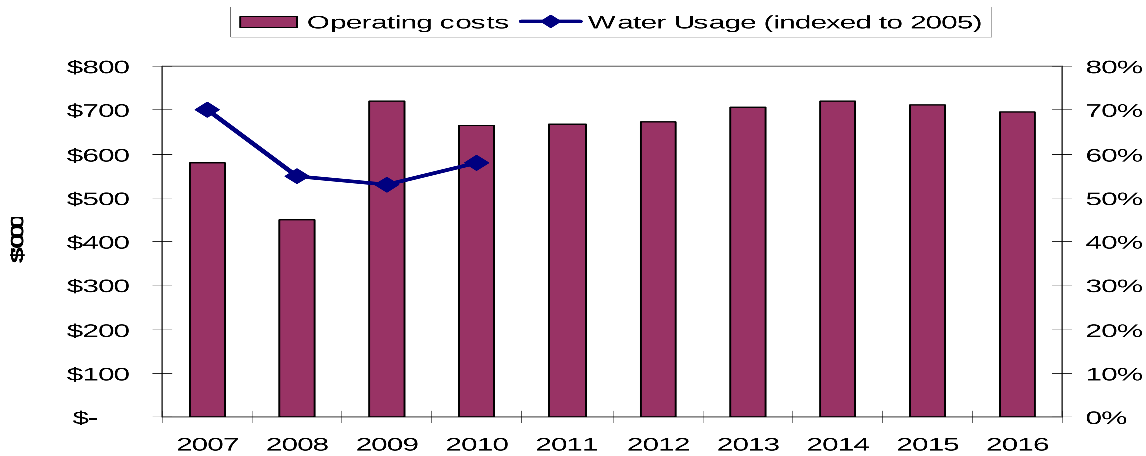

Figure 9-4. Comparison of "Operating" costs against water usage (indexed against 2005) for Upper Burnett Bulk WSS[345]

In 2011, "Operating" costs are projected to stay the same at the same level expense as for 2010, yet water usage across the scheme may well be substantially lower.

[344] *Source: Upper Burnett WSS NSP,* (2012-2016) January 2011, Page 14.
[345] Raw data Sourced from *Upper Burnett WSS NSP,* (2012-2016) January 2011, Pages 6 & 14.

The key cost component of "Operating" cost across the period from 2007 to 2016 is clearly "Operations" as depicted in Figure 9-5. Other "Operating" cost components are Electricity, Preventative Maintenance and Corrective Maintenance.

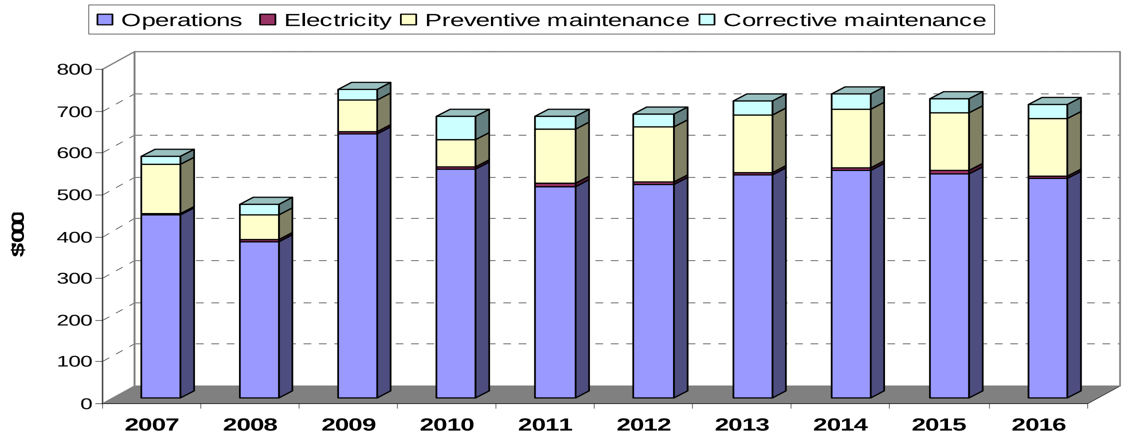

Figure 9-5. Breakdown of "Operating" costs for Upper Burnet Bulk WSS[346]

The following sections examine in more detail operational expense items and activities.

9.4.2 Location expense items

There are specific location expense items under the Operations cost component. Under planning and regulations requirements, SunWater is obliged to provide public access to key bulk storages such as the Wuruma Dam. This often involves facilities including parks and roads. SunWater continually seeks to minimise the cost of providing such facilities by transferring the management (and cost) to private operators or local government.

However, the recreational facilities at the Wuruma Dam continue to be operated and maintained by SunWater. Historical expenditure specific to public access and facilities were as follows:

- $43,000 in 2007
- $40,000 in 2008
- $55,000 in 2009
- $47,000 in 2010

Based on the above cost data, the calculated average annual expense over 2007 to 2010 is $46,250.

Figure 9-6 below provides an overview of historical cost inputs for the facilities at the Wuruma Dam. Clearly, the main direct cost expense incurred for the facilities are labour costs which have risen slightly.

[346] Raw data sourced from *Upper Burnett WSS NSP,* (2012-2016) January 2011, Page 6.

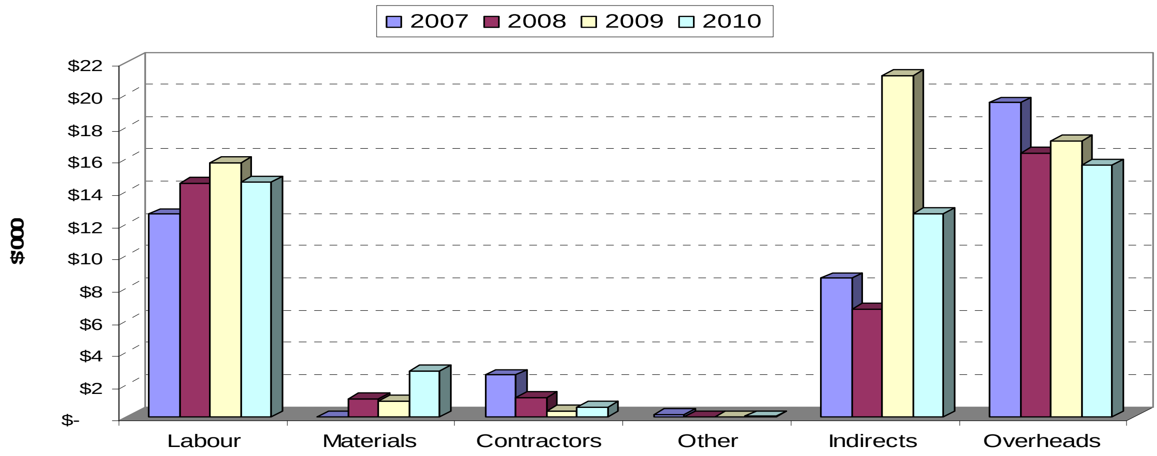

Figure 9-6. Historical recreational facility costs for Upper Burnett Bulk WSS (Wuruma Dam)

The projected costs of maintaining the facilities at Wuruma Dam going forward is illustrated in Table 9-1. These expenses are incorporated into the operations and maintenance expenditure reported in the NSP.

Table 9-1. Projected recreational facility costs for Upper Burnett Bulk WSS 2012 to 2016

Real dollars, $'000	Financial Year				
	2012	2013	2014	2015	2016
Renewal annuity charge	39	39	39	39	39

Source: Upper Burnett Water Supply Scheme NSP, (2012-2016) January 2011, Page 25

It is noted that the proposed expenses for 2012 onwards of $39,000 is lower than the historical annual expense incurred between 2007 and 2010 of $46,250.

Therefore based on the information provided[347], Aurecon assesses the proposed expenditure on these facilities for 2012 to 2016 as prudent and efficient.

9.4.3 Operational Expense Items

This section analyses two key operational expense items, “Labour” and “Electricity”.

Labour costs

Forecast “Labour” costs for the Upper Burnett Bulk WSS are significant as highlighted below in Table 9-2. Historical actual “Labour” costs as a proportion of “Total Operating” costs have varied from 21.9% in 2009 to 28.3% in 2007, but of concern has been the net growth of “Labour” cost increases.

[347] The project did not allow Aurecon to physically examine the recreational facilities and examine the activities against costs as undertaken to date.

Table 9-2. “Labour” costs and “Total Operating” costs for Upper Burnett Bulk WSS

($’000)	Actuals				Forecast	Price Path				
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Labour[1]	164	131	158	169	190	192	195	195	195	195
Annual change		-20.1%	20.6%	7.0%	12.4%	1.1%	1.6%	0.0%	0.0%	0.0%
Change since 2007		-20.1%	-3.7%	3.0%	15.9%	17.1%	18.9%	18.9 %	18.9%	18.9 %
Total Operating costs[1]	578	451	720	666	667	673	705	720	711	695
Labour as % of Total Operating costs	28.3%	29.1%	21.9%	25.4 %	28.5%	28.5%	27.7%	27.1 %	27.4%	28.1 %

[1]Source: *Upper Burnett Bulk WSS NSP*, (2012-2016) January 2011, Page 7.

The average annual “Labour” cost (historical) between 2007 and 2010 was $156,000 per annum. The forecast “Labour” cost in 2011 of $190,000 represents an increase of over 20% over the past annual average of $156,000.

Figure 9-7 below provides an overview of water usage levels against “Labour” costs. There is an observable partial correlation between “Labour” costs and water usage rates within the scheme. As previously noted, “Labour” costs are forecast to rise in 2011, yet water usage levels may actually be lower than 2010 due to the extremely wet 2010/11 season.

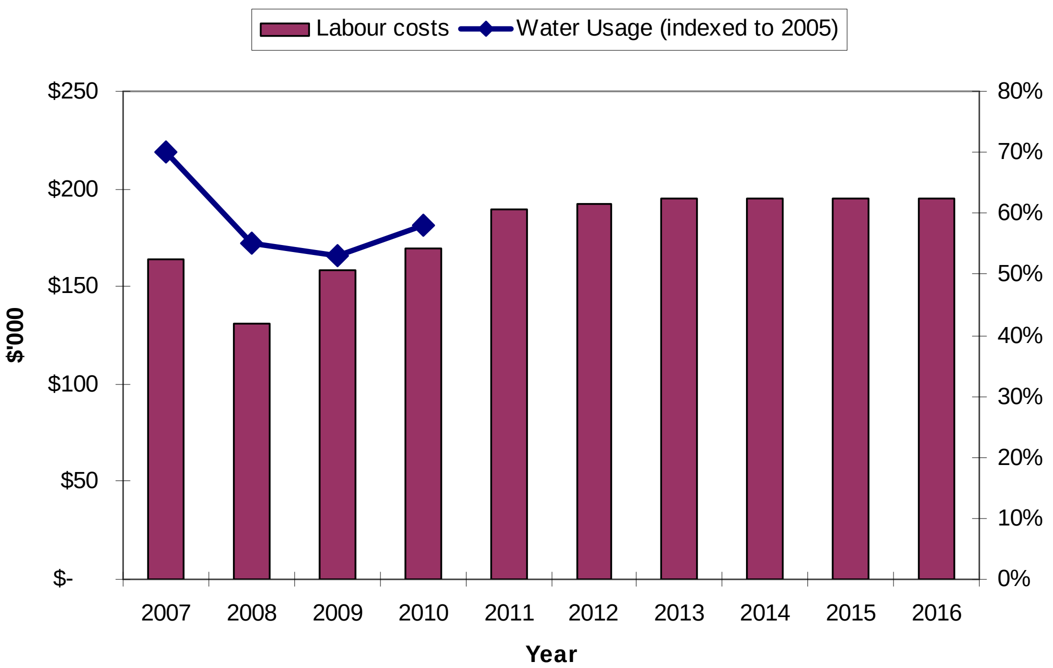

Figure 9-7. Comparison of “Labour” costs against water usage (indexed to water usage in 2005) for Upper Burnett Bulk WSS[348]

The following sections seeks to examine in more detail the components that make up the “Labour” costs presented within Table 9-2 above, and changes in historical labour components.

[348] Raw data sourced from *Upper Burnett Bulk WSS NSP*, (2012-2016) January 2011, Pages 7 & 14.

"Labour" costs in 2011 are forecast to be $190,000 (see Table 9-2). As highlighted below in Figure 9-8 for the Upper Burnett Bulk WSS in 2011, activities related to cost component "Operations" account for 72.6% of the total "Labour" cost, followed by labour costs required for "Preventive Maintenance" (22.6%) and "Corrective Maintenance" (4.7%).

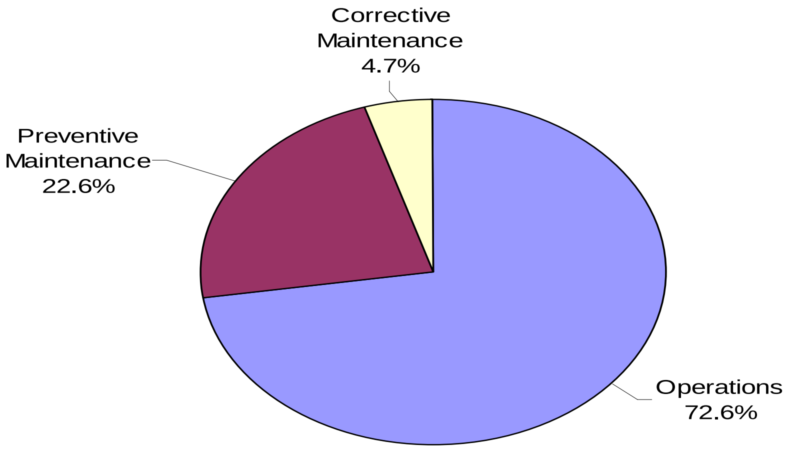

Figure 9-8. Breakdown of "Labour" costs by output activity for Upper Burnett Bulk WSS in 2011[349]

Figure 9-9 below provides additional and more specific information regarding the composition of labour costs associated with "Operations" activities.

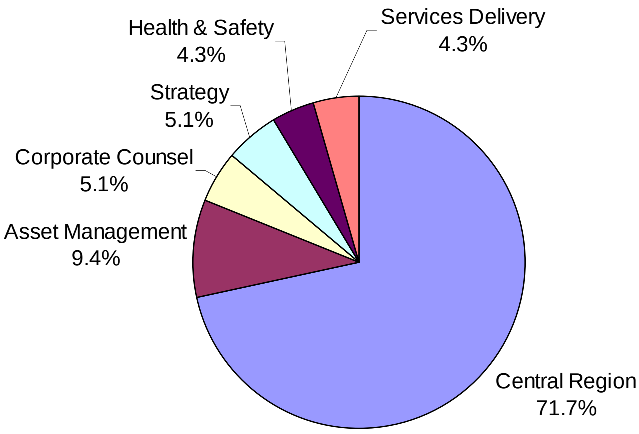

Figure 9-9. Breakdown of "Operations" labour costs for Upper Burnett Bulk WSS in 2011[350]

As illustrated by Figure 9-9 above, approximately 72% of the projected "Operations" labour costs in 2011 are from staff within the Central region, whilst the remainder of labour costs are sourced from outside the Central region (predominantly Brisbane, but may also include SunWater staff from other regional centres) providing specific services of Asset management, Corporate Counsel, Service Delivery, Health & Safety and Strategy.

Whist the information presented in Figures 9-8 and 9-9 above provide useful insights into the expected "Labour" costs for 2011, of considerable interest are the labour costs between 2007 - 2010 and what constituted the breakdown of the costs. Figures 9-10 and 9-11 below provide additional insights into "Labour" costs between 2006 and 2011.

[349] Raw data sourced from SunWater Spreadsheet "*IM Central – 610.03 PSV.xls*"
[350] Raw data sourced from SunWater Spreadsheet "*IM Central – 610.03 PSV.xls*"

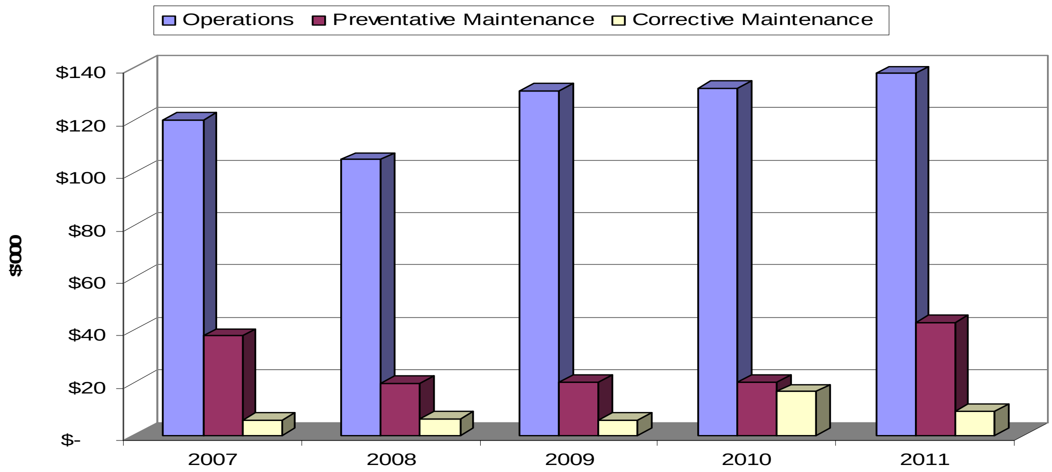

Figure 9-10. Breakdown of "Labour" costs for Upper Burnett Bulk WSS between 2007 and 2011[351]

As indicated in Figure 9-10 above, labour costs associated with "Preventive" and "Corrective Maintenance" were minor in comparison to "Operations" over the period 2007 to 2011 have risen since 2008 when in fact water usage actually declined in 2009. This raises the question of what are the key drivers of that cost increase if it is not linked to water volumes utilised by irrigators.

"Preventive Maintenance" labour costs illustrate a bell shaped curve in Figure 9-10, which correlates to some degree with the pattern of water usage illustrated previously in Figure 9-4.

Figure 9-11 below provides more detailed information regarding "Preventive Maintenance" labour costs. "Condition Monitoring" and "Weed Control" have remained constant between 2007 and 2010, but labour costs associated with "Servicing" spiked in 2007[352].

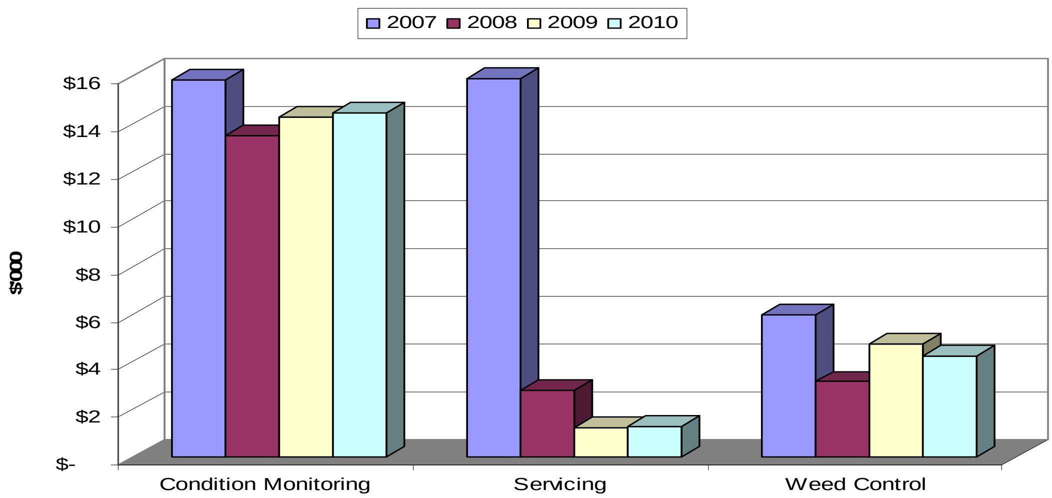

Figure 9-11. Breakdown of "Preventive Maintenance" labour costs for Upper Burnett Bulk WSS between 2007 and 2010[353]

[351] Source: Historical data extracted from SunWater spreadsheet "Extract LBC data Conversion extra activity detail and preventive main split.xls", forecast expenditure data from SunWater "IM Central -610.03.PSV.xls".
[352] Possibly related to errors encountered with the retro-fitting of 2007 data into the new business operating model.
[353] Raw data sourced from SunWater spreadsheet "Extract LBC data Conversion extra activity detail and preventive main split.xls",

9.4.4 Electricity costs

As indicated below in Table 9-3, “Electricity” costs for Upper Burnett Bulk WSS are minor in comparison to other key costs components. As a proportion of “Total Operating” costs, “Electricity” has varied from 0.5% in 2007 to 1.1% in 2008.

Table 9-3. “Electricity” costs and “Total Operating” costs for Upper Burnett Bulk WSS

($’000)	Actuals				Forecast	Price Path				
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Electricity[1]	3	5	6	6	7	7	7	7	7	7
Annual change		66.7%	20.0%	0.0%	16.7%	0.0%	0.0%	0.0%	0.0%	0.0%
Change since 2007		66.7%	100.0%	100.0%	133.3%	133.3%	133.3%	133.3%	133.3%	133.3%
Total Operating costs	578	451	720	666	667	673	705	720	711	695
Electricity as a % of Total Operating costs	(0.5%)	(1.1%)	(0.8%)	(0.9%)	(1.0%)	(1.0%)	(1.0%)	(1.0%)	(1.0%)	(1.0%)

Source: *Upper Burnett Bulk WSS NSP,* (2012-2016) January 2011, Page 7.

Considering that “Electricity” costs for this scheme gradually increased from $3,000 to $6,000 between 2007 and 2010, Aurecon suspects that these are related to lighting and general power supplies associated with the facilities at Wuruma Dam (confirmed as correct by SunWater, email dated 30th June 2011).

Considering the use of the Electricity and the magnitude of expense reported (and mandatory requirement upon SunWater for the provision of these facilities at Wuruma Dam), Aurecon views that the proposed expenditure of $7,000 per annum as prudent and efficient.

9.4.5 Activity based expense items

The following sections examine scheme operational costs from an activity perspective as follows:

- Operations
- Preventive Maintenance
- Corrective Maintenance

9.4.6 Operations costs

Operational activities for the scheme are largely identified within the Upper Burnett Bulk Water Suuply scheme Operation Manual[354]. SunWater has provided a breakdown of “Operations” costs by both sub-activities and cost input. The following analysis begins by examining cost inputs.

Projected “Operations” costs for the Upper Burnett Bulk WSS are significant as highlighted below in Table 9-4. As a proportion of “Total Operating” costs, “Operations” costs have varied considerably from 75.6% in 2007 to 87.6% in 2009.

[354] SunWater, *Upper Burnett Water Supply Scheme – Scheme Operation Manual*, page 23, un-dated report.

Table 9-4. "Operations" costs and "Total Operating" costs for Upper Burnett Bulk WSS

($'000)	Actuals				Forecast	Price Path				
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Labour[1]	120	105	132	132	138	139	140	141	142	141
Materials[1]	6	3	5	4	3	3	3	3	3	3
Contractors[1]	12	9	23	17	9	9	9	10	10	10
Other[1]	89	85	143	130	96	96	96	96	96	96
Total Direct costs	227	202	303	283	246	247	248	250	251	250
Indirects[1]	82	48	177	115	120	120	138	147	140	132
Overheads[1]	128	123	151	148	140	141	143	145	146	142
Total Operations[2]	437	373	631	546	506	508	529	542	537	524
Annual Change		-14.6%	69.2%	-13.5%	-7.3%	0.4%	4.1%	2.5%	-0.9%	-2.4%
Change since 2007		-14.6%	44.4%	24.9%	15.8%	16.2%	21.1%	24.0%	22.9%	19.9%
Total Operating costs[3]	578	451	720	666	667	673	705	720	711	695
Operations as % of Total Operating costs	75.6%	82.7%	87.6%	82.0%	75.9%	75.5%	75.0%	75.3%	75.5%	75.4%

[1]Source: Historical data extracted from SunWater spreadsheet *"Extract LBC data Conversion extra activity detail and preventive main split.xls"*, forecast expenditure data from SunWater spreadsheet *"IM Central -610.03.PSV.xls"*,
[2]Note that there are minor differences between the data reported within the table and that reported within the NSP due to rounding.
[3]Source: *Upper Burnett WSS NSP*, (2012-2016) January 2011, Page 7.

Of concern to stakeholders has been the growth of "Operation" costs in recent years. "Operations" costs were only $375,000 in 2008 with water usage at 55% (with 2005 level of water usage being 100%). In 2009 "Operations" costs increased substantially to $632,000, an increase of 68% in one year yet water usage was practically the same at 53% as the year before (ie 55%).

In 2010, "Operations" cost declined to $549,000 (from $632,000 in 2009) yet water usage increased slightly to 58%. However, costs are still significantly higher than in 2008 when costs were $375,000 with water usage at 55% (see Figure 9-12 below).

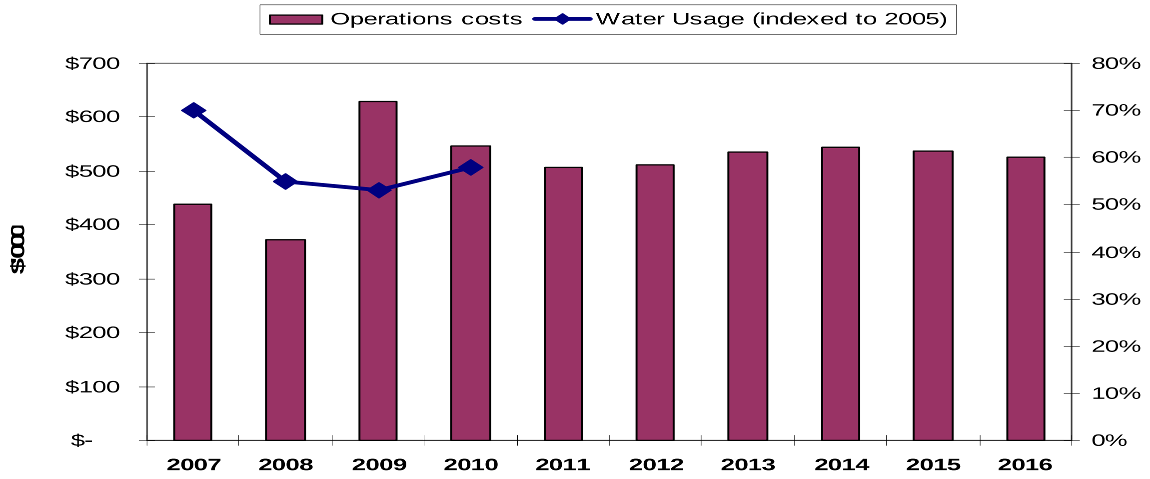

Figure 9-12. Comparison of "Operations" costs against water usage (indexed against 2005) for Upper Burnett Bulk WSS[355]

Aurecon has not been provided with any indications regarding likely water usage rates for 2011, although the extremely wet season experienced in 2010/11 is likely to result in a lower rate than for 2010. As indicated in Figure 9-12 above, "Operations" costs are projected to be lower than those of 2010.

The following sections seeks to examine in more detail the components that make up the "Operations" costs presented within Table 9-4 above, and the changes in historical cost components.

"Operations" costs for 2011 are projected to be $506,000, and forecast to increase to 2014 in real terms. In Figure 9-13, "Overheads" and "Indirects" represents over half of the annual cost. Other significant components are "Labour" at 27.2% (which was examined earlier), and "Other" at 19.1%.

Cost items included within "Other" include Insurance costs (62.9% of total "Other", costing $61,000 in 2011), Local Authority Rates (26.8% or $26,000), Land Tax (2.0% or $2,000), and other local administrative costs including telephone, etc.

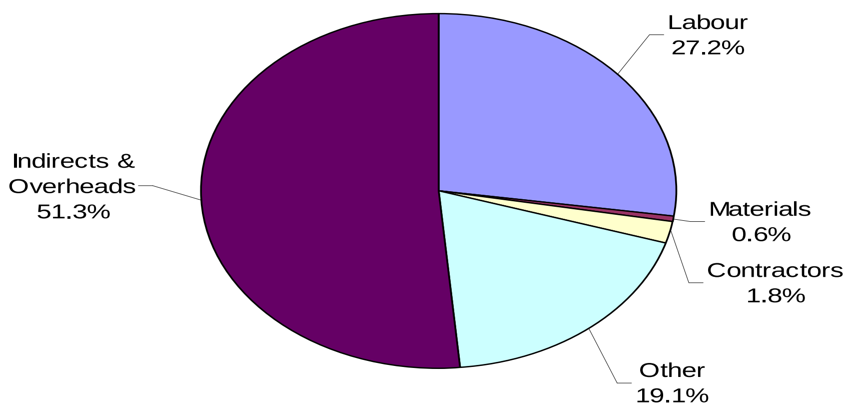

Figure 9-13. Breakdown of input costs towards "Operations" for Upper Burnett Bulk WSS in 2011[356]

[355] Raw data sourced from *Upper Burnett WSS NSP*, (2012-2016) January 2011, Pages 7 and 14.
[356] Raw data extracted from SunWater spreadsheet *"IM Central -610.03.PSV.xls",*

The following analysis examines in detail the historical components of “Operations” costs and cost item increases (and possible causes). Figure 9-14 below provides a breakdown of the key input cost components for Operations while Table 9-4 present the data underpinning the analysis.

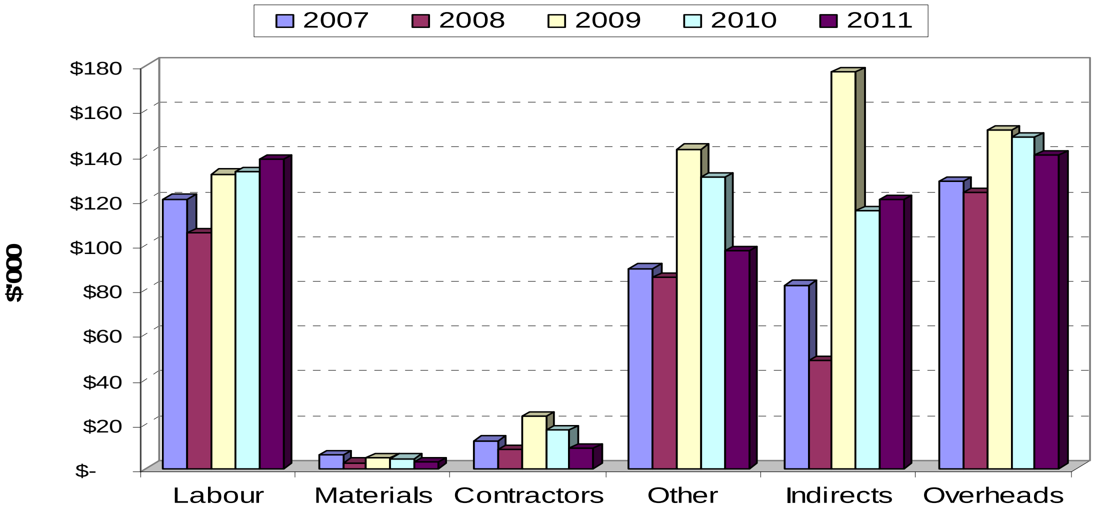

Figure 9-14. Breakdown of “Operations” costs by inputs for the Upper Burnett Bulk WSS 2007 - 2011[357]

The scope of this consultancy was to examine the direct costs, which in this case are “Labour”, “Materials”, “Contractors” and “Other”.

As indicated earlier, “Labour” costs increased significantly in 2009 yet water usage remained relative static, and as highlighted in Figure 9-14 is projected to increase again in 2011.

The other noticeable cost spike incurred within “Other” in 2009 (and to a lesser extent 2010). However “Other” costs are projected at substantially lower levels from 2011.

The following section seeks to examine in more detail these cost increases, by examining the output activities recorded under “Operations” (see Section 4 for definitions for each sub-activity).

SunWater adopted a new Business Operating Model and management accounting system in 2009/10. SunWater has acknowledged that during the process of re-categorising historical data, a number of activity expense items may have been in-correctly coded, particularly for 2007. Therefore the degree of accuracy for certain sub-activities in 2007 and 2008 to a lesser extent is questionable.

A breakdown of historical “Operations” expenditure by output activities/services is highlighted below in Table 9-5 and Figure 9-15. Unfortunately, a breakdown of costs for 2011 was not provided.

Table 9-5. Breakdown of historical “Operations” expenditure for Upper Burnett Bulk WSS

Real dollars, $'000	Financial Year			
	2007	2008	2009	2010
Customer Management	31	33	56	29
Workplace H&S	3	-	-	3
Environmental Management	77	26	24	4

357 Raw data extracted from SunWater spreadsheets *“Extract LBC data Conversion extra activity detail and preventive main split.xls”* and *“IM Central -610.03.PSV.xls”.*

Real dollars, $'000	Financial Year			
Water Management	-	14	71	54
Scheme Management	91	103	211	272
Dam Safety	20	11	43	36
Schedule /Deliver	173	144	163	77
Metering	-	1	8	26
Facility Management	43	40	55	46
Other	1	- 1	- 1	- 0

Source: SunWater spreadsheet *“”Copy of Extract LBC data conversion to sub activity.xls”.*

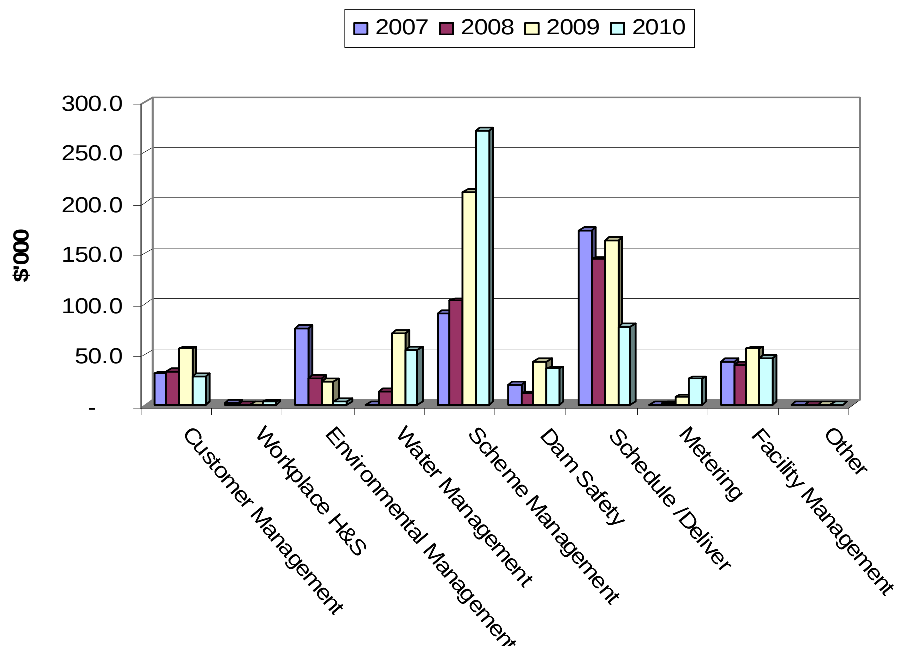

Figure 9-15 Overview of disaggregated historical “Operations” expenditure for Upper Burnett Bulk WSS[358]

Customer Management

“Customer Management” includes interfacing & enquiries from customers, billing and account management, and water trading activities.

As illustrated below in Figure 9-16, “Labour” was the most significant direct cost between 2007 and 2010. Of interest is the fact that “Labour” costs spiked in 2009, yet as highlighted earlier in Figure 9-12, water usage for the scheme was actually lower in 2009 than in 2008.

Due to the overhead cost allocation model, significant “Indirects” and “Overheads” are also added. For 2010, “Labour” costs represented 32.7% of total costs incurred for “Customer Management”.

[358] Raw data extracted from SunWater spreadsheet “”Copy of Extract LBC data conversion to sub activity.xls”.

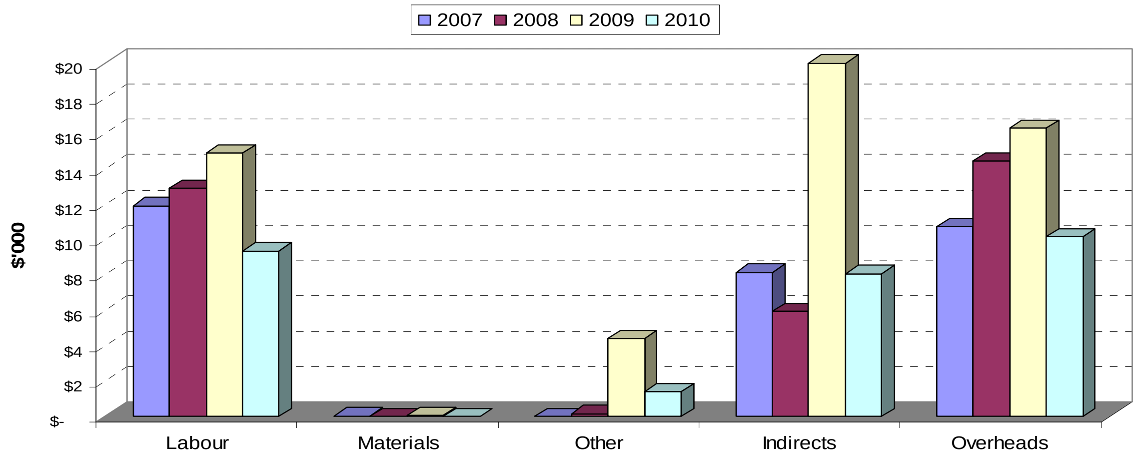

Figure 9-16. Overview of disaggregated "Customer Management" expenditure for Upper Burnett Bulk WSS[359]

Aurecon forwarded the following questions to SunWater, and received the following responses[360].

- Why costs for Labour spiked in 2009, when water usage was actually down?

"The water usage has no/little impact on the Customer Management but the customer enquiries do"

- What level are Labour costs forecast for 2011?

"The forecast cost is based on 5 years average and taking into account SunWater Enterprise Agreement"

Workplace Health and Safety

SunWater has a dedicated workplace, health and safety group to ensure compliance with legislative requirements throughout all workplaces. As such the group conducts regular safety audits and reviews of work practices and ensures that SunWater staff undertake regular training.

As indicated above in Table 9-5, a cost of $3,000 was recorded in 2007 and 2010, comprising of $1,000 in direct labour costs and $2,000 in "Indirects" and "Overheads" for both years. SunWater has not provided an indication of costs for 2011 onwards.

Aurecon forwarded the following questions to SunWater and received the following responses[361].

- Why costs were only recorded for 2007 and 2010?

"These costs are attributable directly to the service contracts and the threshold is 4 hours over a period (weeks, month)."

- At what level are costs forecast for 2011, and are they forecast for every third year?

"The forecast cost is based on 5 years average and taking into account SunWater Enterprise Agreement"

Aurecon notes that the WH&S costs are very small compared to overall Operations costs.

[359] Raw data sourced from SunWater spreadsheet "*Copy of Extract LBC data conversion to sub activity.xls*".
[360] SunWater responses are sourced from email dated 30th June 2011
[361] SunWater responses are sourced from email dated 30th June 2011

Environmental Management

Environmental Management includes the development of weed control plans, assessing impacts downstream of drains, and activities associated with environmental permits (normally undertaken by regional based environmental officer), liaison and coordination with relevant Government agencies and environmental regulators on site-specific issues.

As illustrated above in Figure 9-15 and Table 9-5, an expense of $77,000 was incurred in 2007. The spike in costs in 2007 does not correlate with the labour costs for weed control incurred within "Preventive Maintenance" activities for 2007[362] (see Figure 9-11), highlighting that a linkage does not exist between "Environmental Management" and actual weed control costs incurred within "Preventive Maintenance".

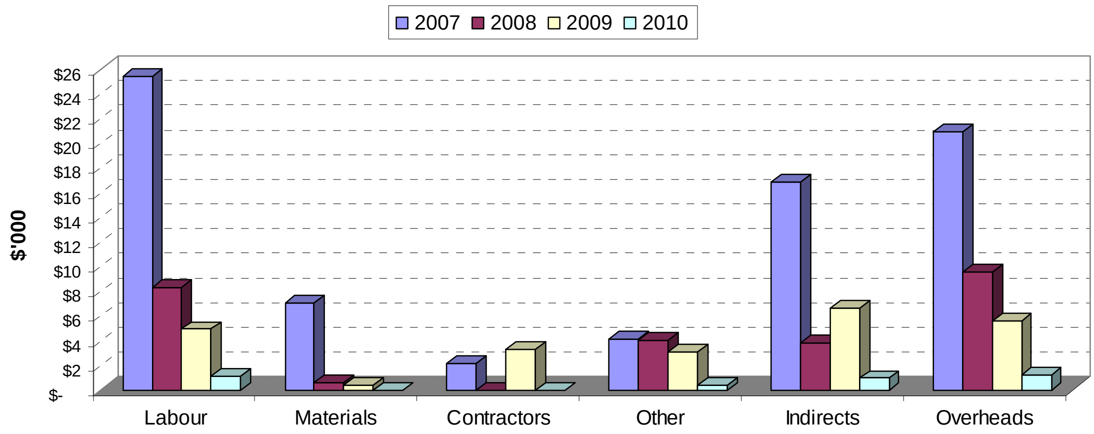

Figure 9-17 Overview of disaggregated "Environmental Management" expenditure for Upper Burnett Bulk WSS[363]

As highlighted above within Figure 9-17, a "Labour" cost was incurred in 2007 of approximately $25,000. By 2010, Labour costs have declined to $1,000, indicating a substantial change in work activities by SunWater. Due to the Indirect and Overhead allocation model, the scheme attracted significant "Indirects" and "Overheads" particularly in 2007.

There was also a substantial one-off expense in 2007 for "Materials".

A small expense for "Contractors" was incurred in 2007 and 2009, amounting to approximately $2,000 in both instances.

Aurecon forwarded the following questions to SunWater and received the following responses[364].

- Why significant labour costs of $25,000 in 2007 and declining to $1,000 in 2010?

"These costs are attributable directly to the service contract and will be varied from year to year."

[362] However, the accuracy of the 2007 data is questionable.
[363] Raw data sourced from SunWater spreadsheet "*Copy of Extract LBC data conversion to sub activity.xls*".
[364] SunWater responses are sourced from email dated 30th June 2011

- Why significant $7,000 material expenses were only recorded in 2007 (possibly due to data coding difficulties retro-fitting 2007 data into the new business model)?

"2007 was a transition year in which the previous internal trade model was removed and the new BOM model developed and implemented in 2008. This transition period and changes are causing difficulties in comparability across time."

- At what level are Labour costs forecast for 2011?

"The forecast cost is based on 5 years average and taking into account SunWater Enterprise Agreement"

Water Management

"Water Management" includes activities related with announcement of water allocations, water quality monitoring and sampling, Blue-Green algae management, SDL readings, shoreline inspections, Monitoring of groundwater levels and salinity levels, bore measurements and preparation of data for NRMW and SunWater.

As identified above in Table 9-5, no expense was incurred in 2007 (i.e. actual high water usage year); however significant costs were incurred in 2009 to 2010 peaking at $71,000 in 2009.

However, as illustrated below in Figure 9-18 a significant negative expense for "Materials" offset the costs incurred for "Other" and "Overheads" in 2007.

Figure 9-18 also highlights that in 2008 significant direct costs of $4,000 emerged for "Labour" which resulted in corresponding "Indirects" and "Overheads". In 2009, "Labour" costs increased to $18,000, while "Contractors" were also engaged at a cost of $7,000 for that year. In 2010, "Labour" costs decreased slightly to $15,000 while "Contractor" costs increased to $9,000.

Significant "Indirects" and "Overheads" are incurred due to the allocation model employed by SunWater.

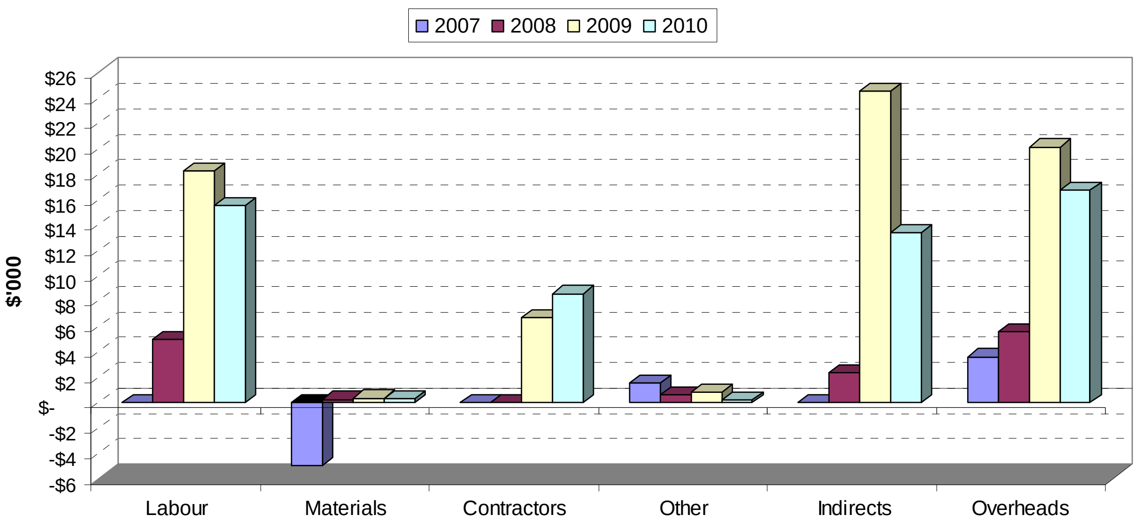

Figure 9-18 Overview of disaggregated "Water Management" expenditure for Upper Burnett Bulk WSS[365]

365 Raw data sourced from SunWater spreadsheet "*Copy of Extract LBC data conversion to sub activity.xls*".

Aurecon forwarded the following questions to SunWater and received the following responses[366].

- Why no expense was incurred in 2007?

“No costs incurred during the Claude Wharton Fishway construction phase.”

- Overview of why labour input/cost increased so much in 2009 (dry year)

“It related to Claude Wharton Fishway monitoring (commission in 2008/9).”

- An overview of the services delivered by contractors in 2009 & 2010

The contractor costs mainly related to Water Monitoring charges.”

- Costs in 2011?

“The forecast cost is based on 5 years average and taking into account SunWater Enterprise Agreement.”

Scheme Management

“Scheme Management” includes the preparation and provision of reports and statistics for clients, including meetings with clients reviewing contract progress/performance, energy management including the review of electricity consumption tariffs and accounts, land and property management including legal advice, O&M Manual development, scheme strategies, OMS plans, Facility Contingency Plans and Emergency Action Plans (EAP) for all facilities other than dams, System Leakage Management Plans (SLMPs), insurance costs, rates and land taxes.

Aurecon notes the substantial increase in “Scheme Management” costs from $91,000 in 2007 to $272,000 in 2010 (see Table 9-5 above).

As highlighted by Figure 9-19 below, the “Labour” expense in 2007 was relatively minor at $2,000, however it has increased exponentially each subsequent year to $47,000 by 2010 indicating a substantial increase in labour investment for the scheme. Significant “Indirects” and “Overheads” are also incurred due to the allocation model employed by SunWater.

The most significant on-going direct cost recorded is “Other”, which predominantly includes Local Government rates, land taxes and Insurance. Costs increased from approximately $75,000 in 2007 and 2008 to $130,000 in 2009 (75% increase in one year), which is uncharacteristic for these cost expenses.

As highlighted earlier in Figure 9-13, “Other” (under “Operations”) include Insurance costs (62.9% of total “Other” costing $61,000 in 2011), Local Authority rates (26.8% or $26,000), Land Tax (2.0% or $2,000), and other local administrative costs including telephone, etc.

[366] SunWater responses are sourced from email dated 30th June 2011

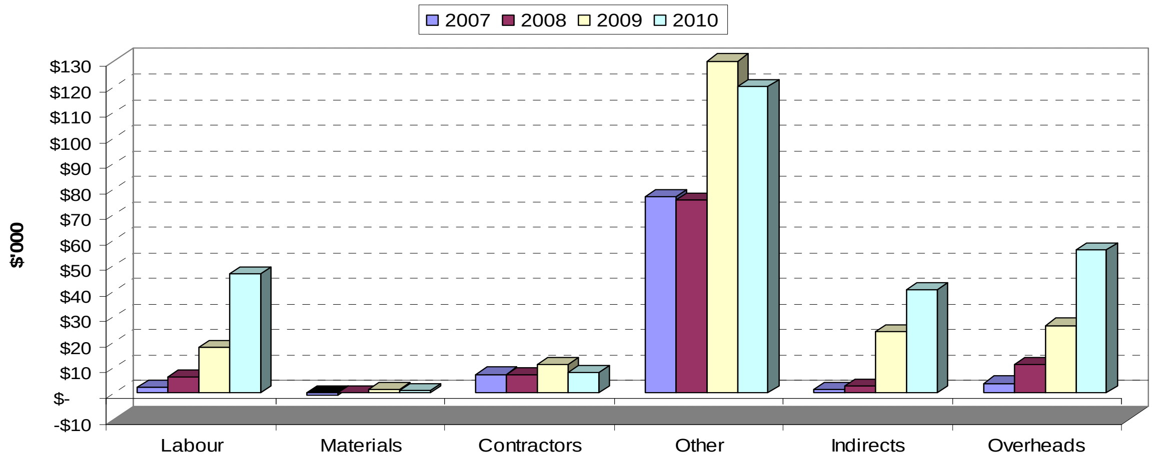

Figure 9-19 Overview of disaggregated "Scheme Management" expenditure for Upper Burnett Bulk WSS[367]

Aurecon forwarded the following questions to SunWater and received the following responses[368].

- Why Labour expenses escalated from 2008, and why the Labour expense more than doubles from 2009 to 2010

"These costs are attributable directly to the service contract and will be varied from year to year. For 2010, the new irrigation pricing costs are also included in this activity."

- Why "Other" costs jumped varied substantially between 2008 and 2009? Insurance?

"The other costs jumped substantially between 2008 and 2009 due to insurance increase."

- What is the trend for 2011+

"The forecast cost is based on 5 years average and taking into account SunWater Enterprise Agreement."

Dam Safety

The Wuruma Dam is classified as a referable dam under the *Water Act 2000*[369]. As such, SunWater is required to have a comprehensive safety management program in place comprising policies, procedures and investigations to minimise the risk of dam failure. Routine dam safety inspections are carried out monthly, which include the monitoring of embankments, piezometers, seepage and general condition of the storages as defined in the dam surveillance specification.

As highlighted in Table 9-5 and Figure 9-15, "Dam Safety" costs have risen in recent years from $20,000 in 2007 to $36,000 in 2010 peaking at $43,000 in 2009.

Figure 9-20 below highlights that "Labour" was the most significant direct cost and increased from approximately $7,000 in 2007 to approximately $12,000 in 2009 and 2010, an increase of over 70%. Due to the overhead cost allocation model, significant "Overheads" are also added. In 2010, the $12,000 in Labour costs also attracted $23,000 in "Indirects" and "Overheads" to the scheme.

[367] Raw data sourced from SunWater spreadsheet "*Copy of Extract LBC data conversion to sub activity.xls*".
[368] SunWater responses are sourced from email dated 30th June 2011
[369] Boyne River and Tarong Water Supply Scheme NSP (2012-2016), January 2011, Page 23.

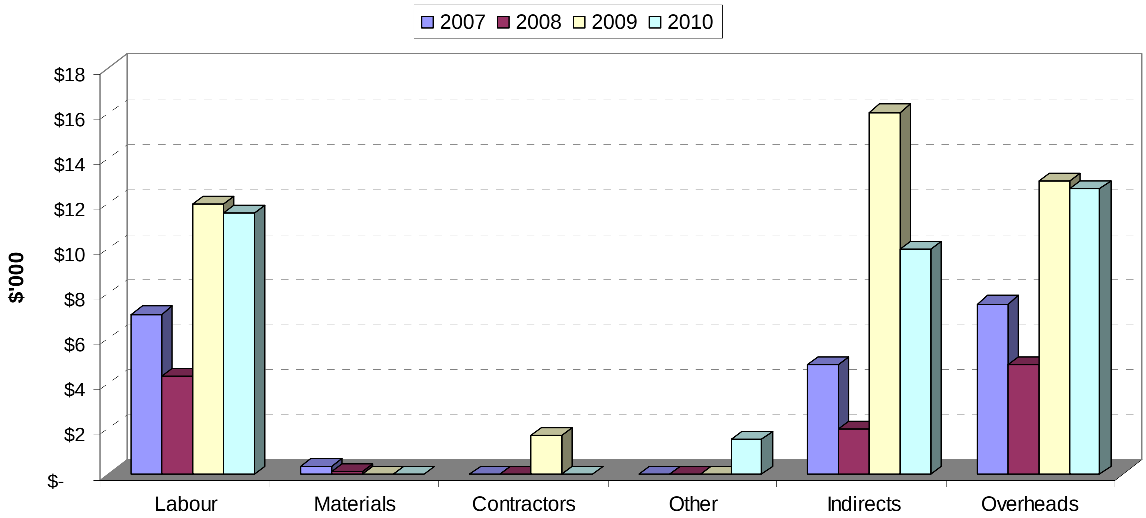

Figure 9-20 Overview of disaggregated "Dam Safety" expenditure for Upper Burnett Bulk WSS[370]

Aurecon forwarded the following questions to SunWater and received the following responses[371].

- Are weir safety inspections included here?

Yes, it included monthly weir safety inspections.

- Why did Labour costs rise two- fold between 2007/08 and 2010 (new activities?).

The labour costs increase related to 12 month dam safety inspection and 12 month review SOP&O&M manual.

- Are what level are costs forecast for 2011?

The forecast cost is based on 5 years average and taking into account SunWater Enterprise Agreement

Schedule/Deliver

"Schedule/Deliver" includes scheduling, releasing, operation of pump stations and SCADA, System surveillance including monitoring of water entitlement and observation of and reporting of any breaches, flood operations preparation, water harvesting, ROP compliance of water levels and flows and reporting of water information.

As indicated above in Figure 9-15, "Schedule/Deliver" was the second largest output activity in terms of expense between 2007 and 2010. Of concern is the fact that costs rose in 2009 to $163,000, yet water usage declined. In 2010, costs declined substantially to $77,000 (reduction of 52%), yet water usage in 2010 actually increases.

Figure 9-21 highlights that "Labour" was the most significant direct cost, however costs have decline substantially from $60,000 in 2007 to $24,000 in 2010 (60% reduction). The spike in "Schedule/Deliver" costs in 2009 was caused by a spike in "Indirect" costs, as highlighted in Figure 9-21.

Other costs have remained constant between 2007 and 2010 at approximately $6,000 per annum.

370 Raw data sourced from SunWater spreadsheet "*Copy of Extract LBC data conversion to sub activity.xls*".
371 SunWater responses are sourced from email dated 30th June 2011

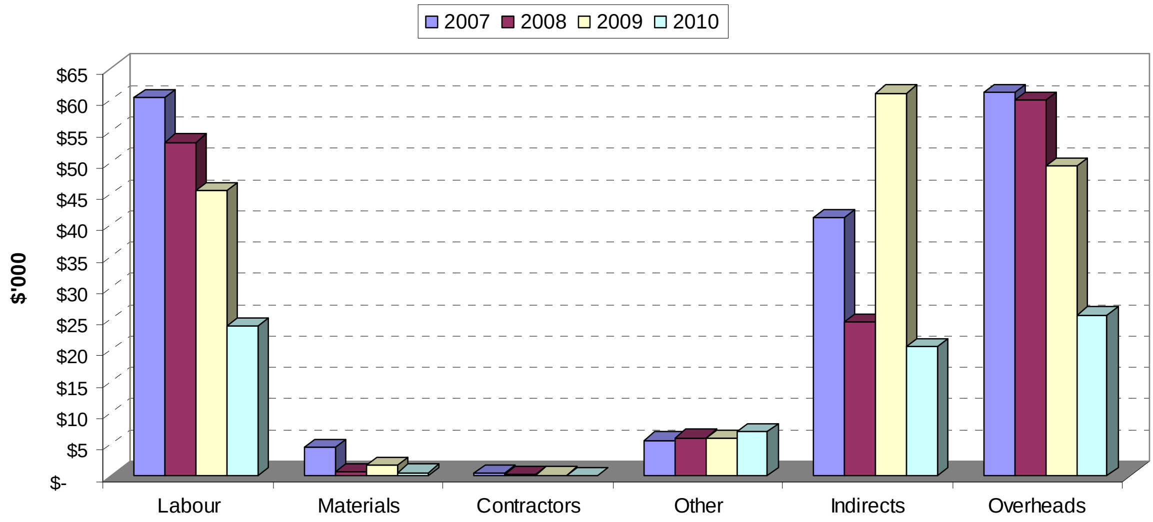

Figure 9-21. Overview of disaggregated "Schedule/Deliver" expenditure for Upper Burnett Bulk WSS[372]

Due to the overhead cost allocation model, significant "Indirects" and "Overheads" are also added. In 2010, the $24,000 in "Labour" costs also attracted $46,000 in "Indirects" and "Overheads" towards the scheme.

Aurecon forwarded the following questions to SunWater and received the following responses[373].

- What is the background information regarding Labour use, and reduction in Labour input in 2010 in the face of increased water usage?

"The labour reduction is in Jones Weir, Wuruma and John Goleby Weir."

- What is the basis of "Other" and what is the basis of the cost of $6,000 pa.?

"The other costs mainly relate to telephone and data line costs used at the Dam to manage the water scheduling."

- At what level are costs forecast for 2011, considering that water usage has been so low between 2007 and 2010?

"The forecast cost is based on 5 years average and taking into account SunWater Enterprise Agreement."

Metering

As highlighted in Table 9-5 "Metering" costs have increased from $1,000 in 2008 (introduction of meters to customers) to $26,000 in 2010. The Upper Burnett Bulk WSS has a total of 156 bulk customers, and a total of 222 meters read by SunWater staff on a quarterly basis.

In comparison, the neighbouring Barker Barambah Bulk WSS has a total of 218 meters customers incurring a cost of $43,000 in metering costs in 2010. However, the Boyne River and Tarong WSS has 172 meters, and only recorded $6,000 metering expense in 2010. Clearly, not all bulk customers across all schemes have meters installed.

Approximately 34.2% of the total recorded costs are actual direct labour costs, with the remainder being "Indirects" and "Overheads". In 2010, "Labour" costs for "Metering" was $9,000 with "Indirects" and "Overheads" accounting for the remaining $17,000.

Stakeholders have raised the issue that there is more cost effective strategies to avoid reading these meter each quarter by SunWater staff.

[372] Raw data sourced from SunWater spreadsheet "*Copy of Extract LBC data conversion to sub activity.xls*".
[373] SunWater responses are sourced from email dated 30th June 2011

Aurecon notes that "*Customers can also enter their own meter readings into SunWaterOnline to obtain up-to-date information about water use and availability*[374]."

Aurecon requested additional information from SunWater regarding options for meter reading, and incentives/opportunities for users to read and record their own meters on line. Section 4 provides an overview SunWater's response, and Aurecon's view.

Aurecon also sought confirmation regarding the number of meters installed since 2009. SunWater advised that 222 meters were read in 2010, with no meters installed since 2009 (indicating that all 222 meters were installed prior to 2009?). A number of bulk customers must have multiple meters to account 222 meters across 161 bulk customers, and Aurecon assumes only a proportion of these 222 meters were read in 2009 (to account for the significantly smaller expense).

Facility Management

"Facility Management" costs are directly related to the maintenance of recreational facilities at Wuruma Dam. These have been examined earlier in Section 9.4.2.

Prudency and Efficiency of Operations Expenditure

As highlighted within Table 9-4, direct costs for Operations expenditure has increased from $227,000 in 2007 to $283,000 in 2010. Note that the proposed expenditure for 2011 is $246,000. SunWater states that the 2011 costs were estimated based on average of the preceding 4/5 years, which equates to $254,000 (based on the information presented within this report).

Sunwater advised that a number of weir safety inspections costs that were previously recorded under Dam Safety, are now incorporated to Preventive Maintenance activity. These activities amount to a direct labour cost of approximately $5,000.

Taking into account the reduction in Dam Safety costs for 2011 of $5,000, Aurecon can replicate the total Operations costs proposed for 2011 based on averaging 2007 to 2010 costs (slight disparity of $4,000).

The provision of disaggregated historical activity data for "Operations" by SunWater provided substantial insights, and identified substantial activities and issues requiring additional information and explanation from SunWater. As highlighted throughout this section, SunWater has provided responses to additional questions which in most cases provided valid information.

However, SunWater was not able to provide 2011 cost estimates for the sub-activities, which Aurecon views as critical in verifying the prudency and efficiency of these costs. Aurecon recommends that to verify the prudency and efficiency of 2011 expenditure, the following information and analysis is required:

- 2011 cost estimates for sub-activities be released and examined to ensure compliance with SunWater's averaging methodology, that is the preceding 4 years
- cost estimates for metering be based on 2010 costs (assuming that is the first time all installed meters were read, and no labour efficiency measures are available at this stage)
- the Dam Safety forecast 2011 costs is reduced by $5,000 to account for the transfer of activities to Preventive Maintenance.

Aurecon notes that the major increase within forecast Operations costs for 2012-2016 is driven by substantial Indirect costs which is outside the scope of this study.

[374] Source: SunWater *Upper Burnett Bulk WSS NSP*, (2012-2016) January 2011, Page 16.

9.4.7 Preventive Maintenance costs

SunWater has defined “Preventive Maintenance” as activities related to the ongoing operational performance and service capacity of physical assets as close as possible to designed standards. SunWater[375] states that “Preventive Maintenance” is cyclical in nature with a typical interval of 12 months or less, and includes the following key output activities:

- Condition monitoring; the inspection of assets to determine preventive maintenance requirements
- Servicing; planned maintenance activities normally expected to be carried out routinely

A review of SunWater’s reporting system also revealed that “Weed Control” was also a key output activity associated with “Preventive Maintenance” to which costs were assigned. As indicated earlier in Figure 9-11 “Weed Control” costs were significant in terms of labour input. Considering that it is a bulk river system, weed control costs would expect to be minimal, with the possible exception of land based weed control around the bulk assets namely Wuruma Dam, John Goleby Weir, Jones Weir and Claude Wharton Weir.

Projected “Preventive Maintenance” costs for the Upper Burnett Bulk WSS are highlighted below in Table 9-6. As a proportion of “Total Operating” costs, “Preventive Maintenance” costs have historically varied considerably from 9.6% in 2010 to 20.2% in 2007.

Table 9-6. “Preventive Maintenance” costs and “Total Operating” costs for Upper Burnett Bulk WSS

($’000)	Actuals				Forecast	Price Path				
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Preventive Maintenance[1]	117	58	76	64	130	131	138	141	139	136
Annual change		-50.4%	31.0%	-15.8%	103.1%	0.8%	5.3%	2.2%	-1.4%	-2.2%
Change since 2007		-50.4%	-35.0%	-45.3%	11.1%	12.0%	17.9%	20.5%	18.8%	16.2%
Total Operating costs[1]	578	451	720	666	667	673	705	720	711	695
Preventive M as % of Total Operating cost	20.2%	12.9%	10.6%	9.6%	19.5%	19.5%	19.6%	19.6%	19.6%	19.6%

[1]Source*: Upper Burnett Bulk WSS NSP,* (2012-2016) January 2011, Page 6.

As indicated earlier, SunWater’s deployment of a new Business Operating Model and management accounting system required the retrospective transfer of cost data for 2007 and 2008. A recent review[376] found that costs that should have been coded to refurbishment were coded as “Preventive Maintenance” resulting in many schemes incurring a spike in “Preventive Maintenance” costs in 2007. As indicated above in Table 9-6 and Figure 9-22 below, costs for the scheme were up significantly in 2007, and therefore the accuracy of the 2007 data is questionable.

“Preventive Maintenance” costs may be expected to follow water usage to some degree, and as indicated below in Figure 9-22, there seems to be a partial correlation between costs and water usage. Note that Aurecon has no information pertaining to water usage in 2011; however stakeholder feedback from other schemes within the Central region indicates that the wet season in 2010/11 has resulted in significantly reduced water demand and usage by

[375] SunWater, *Upper Burnett Bulk WSS NSP,* (2012-2016) January 2011, Page 27.
[376] Parsons Brinkerhoff, *Provision of Services for Costing SunWater’s Work Instructions*, October 2010, page 13.

irrigators in comparison to the 2010 season. It is also noted that costs in 2011 are projected to more than double those of 2010.

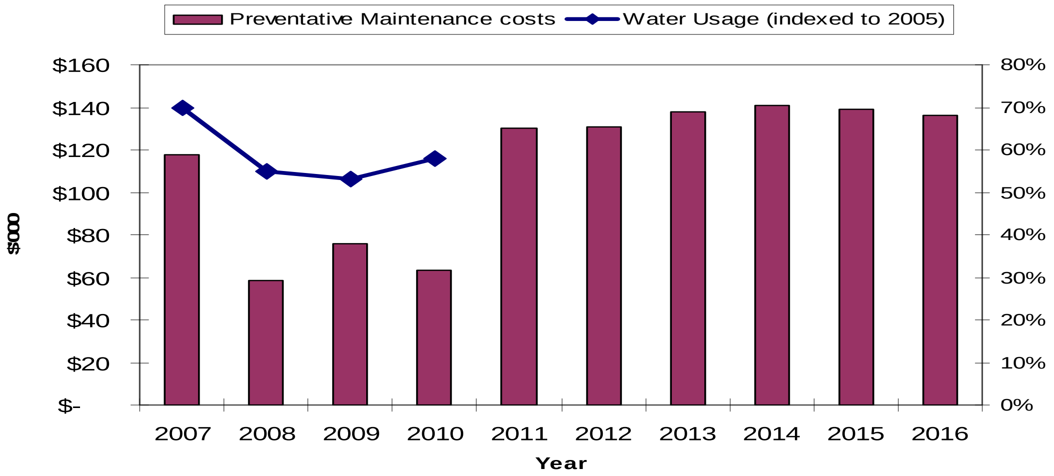

Figure 9-22. Comparison of "Preventive Maintenance" costs against water usage (indexed against 2005) for Upper Burnett Bulk WSS[377]

The following sections seeks to examine in more detail the components that make up the "Preventive Maintenance" costs presented within Table 9-6 above, and where changes have occurred.

As illustrated below in Figure 9-23, "Overheads" and "Indirects" represents 60.8% of the projected total cost in 2011. Other significant components are "Labour" at 33.1% (which was examined earlier), and "Materials" and "Contractors" at 2.3%.

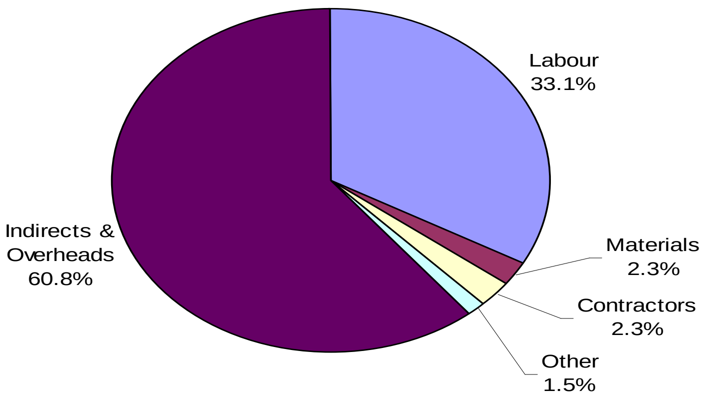

Figure 9-23. Breakdown of cost inputs for "Preventive Maintenance" within the Upper Burnett Bulk WSS in 2011[378]

Figure 9-24 below provides a breakdown of the key cost input components for "Preventive Maintenance" between 2007 and 2011.

[377] Raw data extracted from *Upper Burnett Bulk WSS NSP,* (2012-2016) January 2011, Pages 6 and 14.
[378] Raw data extracted from SunWater spreadsheet *"IM Central -610.03.PSV.xls"*.

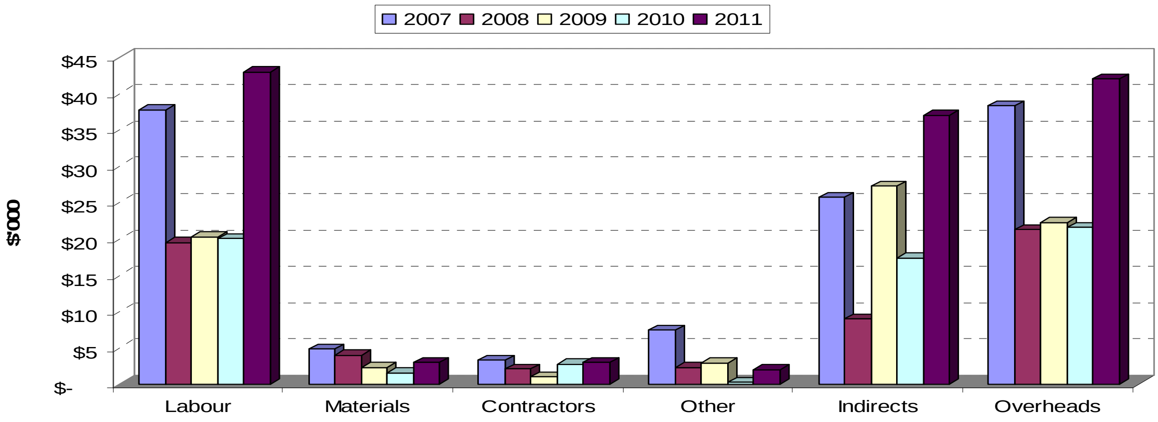

Figure 9-24. Breakdown of cost inputs towards "Preventive Maintenance" for Upper Burnett Bulk WSS 2007 - 2011[379]

Aurecon questions the accuracy of the 2007 data as presented above in Figure 7-24, particularly in the case of "Labour" recorded for "Preventive Maintenance". Therefore, more emphasis is placed on actual costs recorded for the 2008 to 2010 period.

As indicated in Figure 9-24, "Overheads" are allocated almost in direct proportion to that of "Labour", while "Indirects" seem to be apportioned on a different basis. The scope of this consultancy was to examine the direct costs, which in this case are "Labour", "Materials", "Contractors" and "Other".

Of the direct costs, "Labour" is the main cost item. Ignoring the 2007 data, then the average annual "Labour" expense between 2008 and 2010 was very constant at $20,000 per annum, yet SunWater is projecting a "Labour" cost estimate of $43,000 for 2011. The analysis below seeks to examine "Labour" expenditure in detail.

SunWater also provided a breakdown of historical "Preventive Maintenance" costs by output activity, which is defined earlier as "Condition Monitoring", "Servicing" and "Weed Control". As indicated below in Figure 9-25, "Servicing" costs were significant at approximately $53,000 in 2007 only, but have since incurred annual expense of $5,000 to $8,000. As noted earlier, the retrospective transfer of cost data for 2007 into the new business model incorrectly coded many activities..

As a bulk water supply system, "Weed Control" would be related to on-land weed control activities, particularly around structures including Wuruma Dam and the weirs, and access roads. As indicated below in Figure 9-25 "Weed Control" costs have varied from approximately $9,000 in 2008 to approximately $18,000 (2007 and 2009). In 2010, "Weed Control" cost was $14,000.

[379] Raw data extracted from SunWater spreadsheets *"IM Central -610.03.PSV.xls"* and *"Extract LBC data Conversion extra activity detail and preventive main split.xls*".

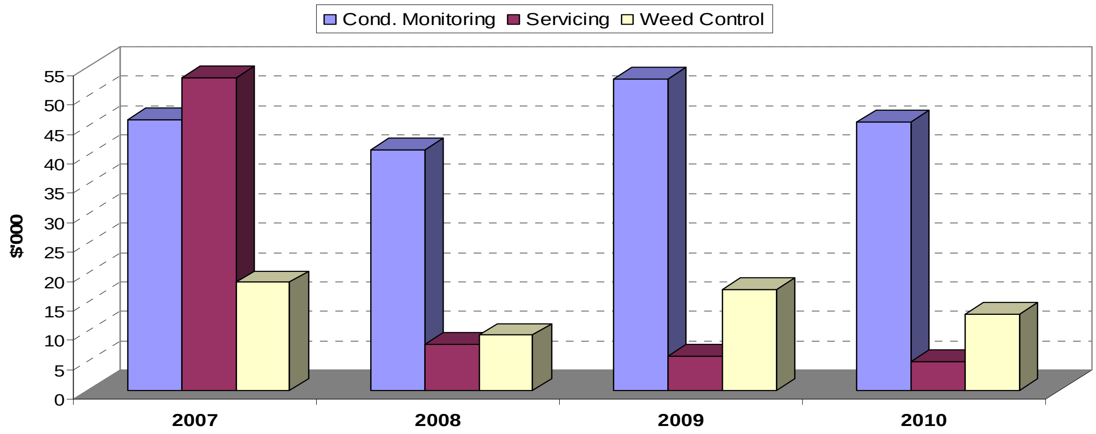

Figure 9-25. Breakdown of output activities under "Preventive Maintenance" for Upper Burnett Bulk WSS[380]

"Labour" is the main direct cost within "Weed Control", and in 2010 was $4,000 in total. Between 2007 and 2010, "Labour" costs for "Weed Control" has varied between $3,000 and $6,000 per annum, averaging $5,000 per annum (Figure 9-25).

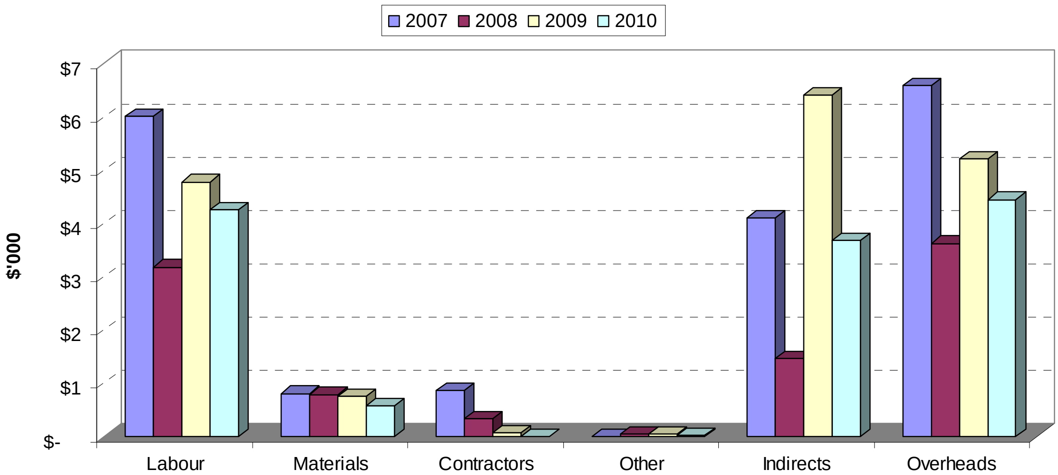

Figure 9-26. Breakdown of input costs towards "Weed Control" for Upper Burnett Bulk WSS 2007-2010[381]

Unfortunately SunWater has not provided a breakdown of costs for 2011 onwards by output activity as illustrated above in Figure 9-25.

Validating the forecast Preventive Maintenance costs for 2011-2016

As indicated earlier within Table 9-6, forecast "Preventive Maintenance" costs for 2011 are $130,000, a doubling from the 2010 expense incurred of $64,000. This section seeks to examine the validity of this cost increase.

Figure 9-23 highlights the main direct cost for 2011 is "Labour" which accounts for 33.1% of total costs, or $43,000. The following analysis seeks to examine the prudency and efficiency of the proposed $43,000 "Labour" expense for "Preventive Maintenance".

380 Raw data extracted from SunWater spreadsheet *"Extract LBC data Conversion extra activity detail and preventive main split.xls*".

381 Raw data extracted from SunWater spreadsheet *"Extract LBC data Conversion extra activity detail and preventive main split.xls*".

SunWater has developed Operation and Maintenance manuals for the scheme, which detail the maintenance activities to be undertaken for "Condition Monitoring" and "Servicing", along with frequency. A recent review by Parsons Brinkerhoff (2010A) examined each of the individual activities specified within SunWater's Operation and Maintenance manual for the Upper Burnett Bulk WSS, and validated the proposed activities and frequency prescribed. The Parsons Brinkerhoff (2010A) report also quantified the required man hours input required for each activity along with cost, based on SunWater's internal hourly rates.

Of importance is the fact that the Parsons Brinkerhoff (2010A) study identified the following new activities that were not previously recorded as a Preventive Maintenance activity (Table 9-7).

Table 9-7. New "Preventive Maintenance" activities not previous recorded within the system for Boyne River and Tarong WSS

Activity	Annual Hours	Labour cost
Claude Wharton Weir Monthly Safety Inspection	50	$1,850
Jones Weir Monthly Weir Safety Inspection	40	$1,480
John Goleby Weir Monthly Weir Safety Inspection	40	$1,480
Upper Burnett Gauging Stations 12M Condition Monitoring	64	$2,368
TOTAL New Activities	**194 hours**	**$7,178**

Source: Parsons Brinkerhoff, "Provision of Services for Costing SunWater's Work Instructions" (2010), working appendices Spreadsheets.

Aurecon notes that the Parsons Brinkerhoff (2010A) report identified additional need for monthly inspections of the weirs (see Table 9-7), yet also notes that within "Operations" a cost expense of $36,000 was incurred in 2010 under "Dam Safety" (see Table 9-5). SunWater has informed Aurecon that these activities for the 2012-2016 price path have been transferred from "Dam Safety" ("Operations") to Preventive Maintenance.

Table 9-7 also highlights the additional need for Condition Monitoring of the Upper Burnett Gauging Stations, requiring 64 hours.

Table 9-8 below highlights the key findings from the Parsons Brinkerhoff (2010A) study. It also highlights the recommended hours for SunWater labour input (2011) against historic labour input (2007 to 2010) by SunWater staff.

Table 9-8. Required labour input for "Preventive Maintenance" for Boyne River and Tarong WSS

Year	Hours	Direct annual labour cost	% of 2011 hours
2007*	627*	$27,669	85.4%
2008	430	$14,717	58.6%
2009	394	$14,591	53.7%
2010	367	$15,336	50.0%
Average 2007 - 2010	454	$18,078	61.9%
Proposed for 2011	**734**	$43,796	

Source: Parsons Brinkerhoff, "Provision of Services for Costing SunWater's Work Instructions" (2010A), working appendices Spreadsheets
*May include substantial error due to retro-fitting of historical data into the new business model

According to the Parsons Brinkerhoff report (2010A), to complete all the prescribed and required "Preventive Maintenance" activities ("Condition Monitoring" and "Servicing" only, ignoring "Weed Control") requires an annual input of 734 hours or a direct annual labour cost of $43,796 (see Table 9-8). This includes 194 hours of new activities identified in Table 9-7 above.

As indicated above in Table 9-8, SunWater has incurred between 627 and 367 hours of labour input between 2007 and 2010 (noting that the 2007 input of 627 hours is questionable) resulting in average input of 454 hours per annum. Aurecon recommends that the following be initially accepted for “Preventive Maintenance” (“Condition Monitoring” and “Servicing”):

- 454 hours, being the average for 2007 to 2010, and
- 194 hours for additional activities (Table 9-7)

Costing “Preventive Maintenance” labour at $50 per hour[382], then the labour cost for 658 hours is $32,900 per annum. Note that the Parsons Brinkerhoff analysis (2010A) itemised each activity labour requirement, and staff increment level requirement. Of interest is that SunWater’s average hourly labour expense in 2010 was $41.78 per hour, yet the average hourly labour expense from the cost Parsons Brinkerhoff analysis (2010A) equates to $60 per hour.

Costing of labour input towards “Weed Control” is also required. The following labour expense for Weed Control was identified[383]:

- $6,000 in 2007
- $3,200 in 2008
- $4,800 in 2009
- $4,300 in 2010

As indicated earlier, the reliability of 2007 data is highly questionable, however regional feedback has indicated that Weed Control costs were up significantly in many areas in 2007. As such, Aurecon have calculated the annual historic average for 2007 to 2010, equating to $4,575. Aurecon recommends that Labour for Weed Control be based on the average for 2007 to 2010 plus 10%, equating to approximately $5,000.

Aurecon recommends that the total budgeted cost for “Preventive Maintenance” labour be set at $37,900 ($32,900 for “Condition Monitoring” and “Servicing” and $5,000 for “Weed Control”). This is a reduction from the $43,000 currently projected for 2011, and will also reduce the allocation of “Indirects” and “Overheads” based on the existing allocation methodology that SunWater has adopted.

Aurecon recommends that an audit be undertaken of the Parsons Brinkerhoff work against historical labour input for 2010 in particularly for itemised “Preventive Maintenance” activities to identify the reasons for the discrepancy between projected labour input requirements against historical, and also examine the variance in hourly charges between that incurred in 2010 by SunWater and that recommended by the Parsons Brinkerhoff (2010) study.

9.4.8 Corrective Maintenance costs

SunWater describes “Corrective Maintenance” as an unexpected failure requiring reactive corrective maintenance response. Two main types of activities:

- Emergency breakdown maintenance, requiring immediate action to restore normal operation or supply to customer to meet a regulatory obligation
- Non-emergency maintenance, activities no requiring immediate response but scheduled in advance of the planned maintenance cycle[384]

[382] Based on using the latest financial cost incurred, ie. 2010 data in Table 9-8, dividing total labour cost of $15,336 by total hours of 367 equals $41.78/hr, Aurecon has then added approximately 20% to account for salary increments for SunWater field staff and propose $50.00hr. Aurecon note that the Parsons Brinkerhoff (2010) analysis recommended 734 hours for an annual labour cost of $43,796, equating to $60.00/hr. The difference between the hourly labour expense incurred for 2010, versus the projected hourly rate by Parsons Brinkerhoff (2010) is most likely due to assumptions of using more senior SunWater staff at higher pay/cost increment.

[383] Raw data sourced from SunWater spreadsheet “*Copy of Extract LBC data conversion to sub activity.xls*”.

[384] SunWater, *Upper Burnett Bulk WSS NSP,* (2012-2016) January 2011, page 27

Projected “Corrective Maintenance” costs (including both emergency and non-emergency maintenance) for the Upper Burnett Bulk WSS are highlighted below in Table 9-9. As a proportion of “Total Operating” costs, “Corrective Maintenance” costs have varied from 3.5% in 2007 to 8.4% in 2010.

Table 9-9. “Corrective Maintenance” costs and “Total Operating” costs for Upper Burnett Bulk WSS

($'000)	Actuals				Forecast	Price Path				
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Corrective Maintenance[1]	20	26	26	56	32	32	34	35	34	34
Annual change		30.0%	0.0%	115.4%	-42.9%	0.0%	6.3%	2.9%	-2.9%	0.0%
Change since 2007		30.0%	30.0%	180.0%	60.0%	60.0%	70.0%	75.0%	70.0%	70.0%
Total Operating Costs[1]	578	451	720	666	667	673	705	720	711	695
Corrective M as % of Total Operating cost	3.5%	5.8%	3.6%	8.4%	4.8%	4.8%	4.8%	4.9%	4.8%	4.9%

[1]Source: *Upper Burnett Bulk WSS NSP,* (2012-2016) January 2011, Page 6.

For some schemes “Corrective Maintenance” costs are partially correlated to water usage levels. As indicated below in Figure 9-27 there does not seem to be an obvious correlation between water usage and costs. As indicated earlier, water usage may well be lower in 2011 due to the extremely wet season, and as highlighted below in Figure 9-27, costs are projected to decline in 2011 from the spike in 2010.

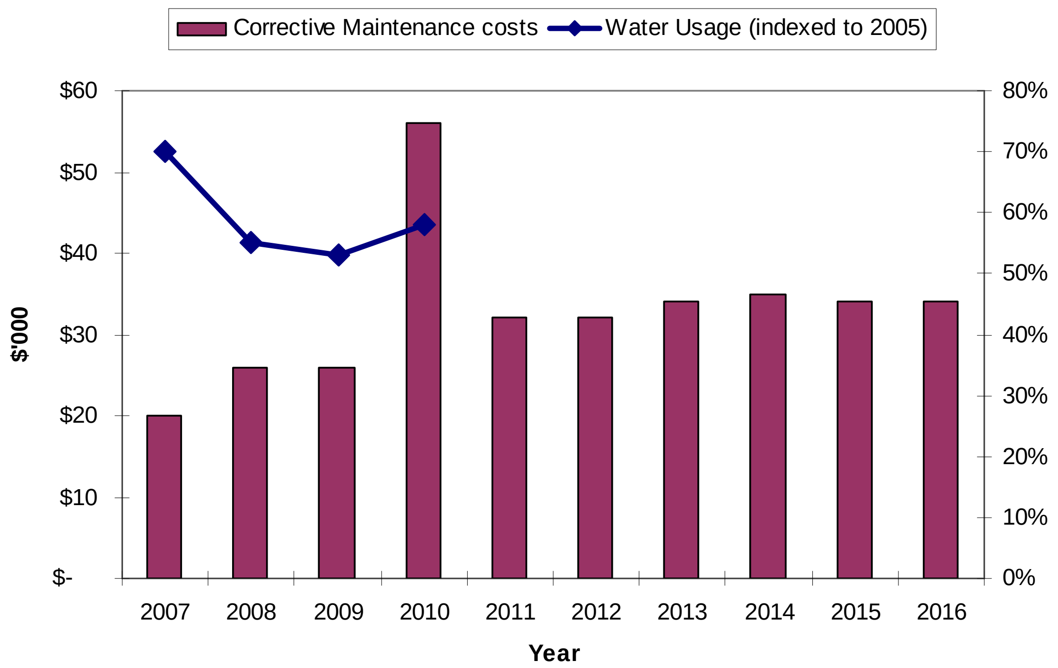

Figure 9-27. Comparison of “Corrective Maintenance” costs against water usage (indexed against 2005) for Upper Burnett Bulk WSS[385]

[385] Raw data sourced from *Upper Burnett Bulk WSS NSP,* (2012-2016) January 2011, Pages 6 and 14.

An observable upward trend in costs is apparent from 2007 to 2011 as highlighted in Figure 9-27. The following section seeks to examine in more detail the components that make up the "Corrective Maintenance", and where changes have occurred.

As illustrated below in Figure 9-28, "Overheads" and "Indirects" represents over half (53.1%) of the projected total cost in 2011. Other significant components are "Labour" at 28.1% (which was examined earlier), "Materials" at 9.4%, "Contractors" at 6.3% and "Other" at 3.1%.

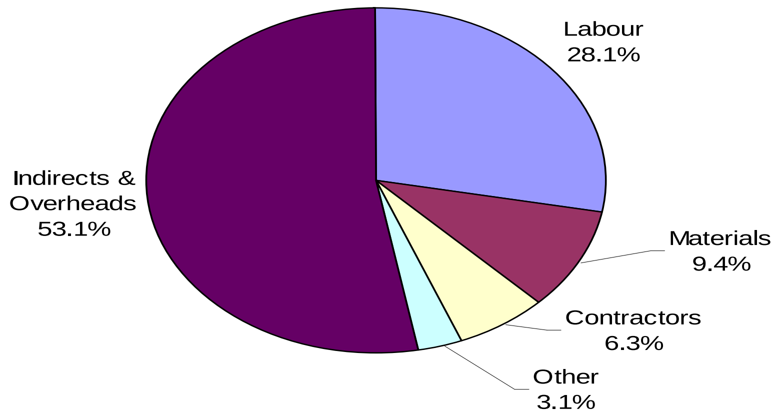

Figure 9-28. Breakdown of cost inputs towards "Corrective Maintenance" for Upper Burnett Bulk WSS in 2011[386]

Figure 9-29 below provides a breakdown of the key input cost components of "Corrective Maintenance" between 2007 and 2011.

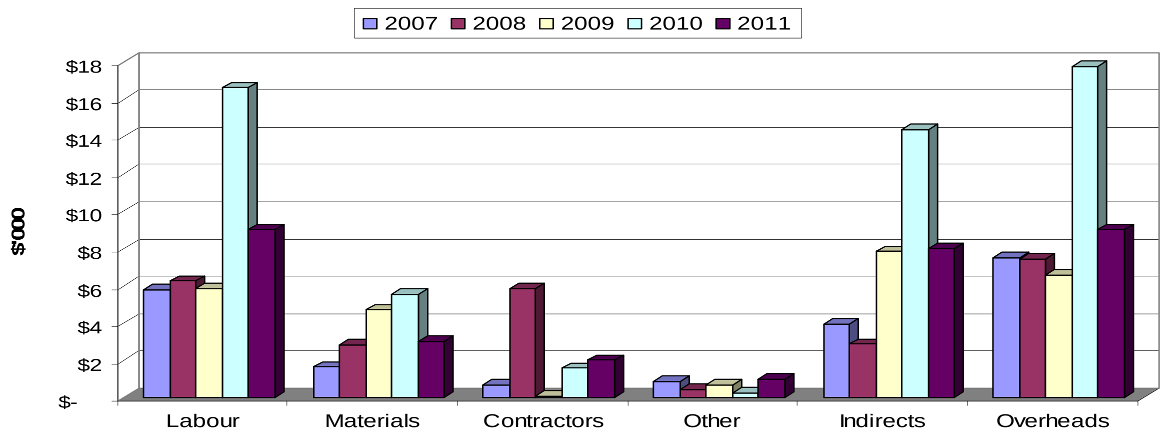

Figure 9-29. Breakdown of cost inputs towards "Corrective Maintenance" for Upper Burnett Bulk WSS over 2007 to 2011[387]

It is noted that the projected cost for 2011 forms the basis for the next price path (2012-2016) (subject to inflation indexation). The scope of this consultancy was to examine the direct costs, which in this case are "Labour", "Materials", "Contractors" and "Other".

As illustrated in Figure 9-29 above "Labour" costs were constant between 2007 and 2009 at approximately $6,000 per annum, however spiked in 2010 at $17,000. In 2011, "Labour" costs are projected to decline to $9,000, which is still approximately 33% higher than 2007 – 2009.

386 Raw data extracted from SunWater spreadsheet *"IM Central -610.03.PSV.xls".*

387 Raw data extracted from SunWater spreadsheets *"Extract LBC data Conversion extra activity detail and preventive main split.xls"* and *"IM Central -610.03.PSV.xls".*

"Material" costs are also significant rising from $2,000 in 2007 to $6,000 in 2010. The average "Material" cost for 2007 to 2010 is $3,500 per annum, yet SunWater is proposing slightly lower "Material" costs of $3,000 in 2011.

Contractors are also utilised for "Corrective Maintenance". A major one-off expense was recorded in 2008 of $6,000. SunWater has projected future "Contractor" costs at approximately $2,000 per annum.

The annual average total direct cost incurred for "Corrective Maintenance" between 2007 and 2010 is $3,700. For the forecast period starting at 2011, SunWater projects "Corrective Maintenance" direct costs at $3,800, which represents a minor increase in expenditure.

Aurecon forwarded the following questions to SunWater and received the following responses (SunWater email dated 30th June 2011):

- What are the breakdown of the Labour cost increase in 2010?

"These were mainly related to the investigate/repair Fishway operation and investigate low oil pressure."

- What are the composition of the Contractor cost of $6,000 in 2008?

"The contractors were engaged to repairs to John Goleby Weir Road and install new safety fence."

Aurecon notes that it is difficult to forecast "Corrective Maintenance" costs. SunWater's approach to use historical expenditure as the basis for forecasting is commonly utilised by other water utilities. The historical average annual direct expense incurred in the period 2007 to 2010) was $15,000, and SunWater has correspondingly projected 2011 at $15,000.

Based on the historical data provided by SunWater, and comparative analysis of historical expenses against forecast costs for 2011 and 2012 to 2016, and the responses received from SunWater, Aurecon assess the proposed "Corrective Maintenance" direct costs for the scheme as being prudent and efficient.

Total Maintenance expenditure

SunWater has indicated its intention to move to a reliability maintenance approach (RCM), which is a risk based process that can assist in providing the optimal mix of "Preventive" and "Corrective Maintenance". Table 9-10 below highlights the direct costs attributed to "Corrective" and "Preventive Maintenance", and also indicates that "Total Maintenance" costs in 2011 are 4.8% higher than that recorded for 2007. As previously indicated, concerns have been raised regarding the accuracy of the data for "Preventive Maintenance" in 2007.

Table 9-10. "Total Maintenance" costs for Upper Burnett Bulk WSS

Direct Expenditure ($'000)	Actuals				Forecast	Price Path				
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Preventive Maintenance	53	28	27	25	50	52	55	56	58	59
Corrective Maintenance	9	15	11	24	15	16	16	17	17	18
Total Maintenance	**62**	**43**	**38**	**49**	**65**	**68**	**71**	**73**	**75**	**77**
Annual change		-30.5%	-12.7%	28.4%	34.5%	4.0%	4.0%	2.8%	2.8%	2.8%
Change since 2007		-30.5%	-39.3%	-22.1%	4.8%	9.0%	13.4%	16.5%	19.8%	23.2%
Preventive maintenance %	85.6%	64.6%	70.2%	50.7%	77.1%	77.1%	77.1%	77.0%	76.9%	76.9%

Direct	Actuals				Forecast	Price Path				
Corrective maintenance %	14.4%	35.4%	29.8%	49.3%	22.9%	22.9%	22.9%	23.0%	23.1%	23.1%

[1]Source: Raw data extracted from SunWater spreadsheets *“IM Central -610.03.PSV.xls”* and *“Extract LBC data Conversion extra activity detail and preventive main split.xls*”.

Although not stated at this time, it is highly likely that SunWater will identify an optimal ratio of (Preventive: Corrective) maintenance expenditure based on the RCM approach, which may be different to the 77%:23% projected above. It is noted that the Bundaberg Distribution System and Bundaberg Bulk System both recorded a ratio mix of 63:37 for “Preventive : Corrective” maintenance.

9.4.9 Feedback from Field Visits

Aurecon did not undertake a field visit to the Upper Burnett WSS. However, the substantial stakeholder feedback obtained from the Bundaberg and Lower Mary field visits may also be relevant to this scheme.

9.4.10 Potential efficiency gains and recommendations

The following points are made in relation to Opex

- On-going re-structuring of the SunWater workforce (and equipment) for the Central region, involving regional office relocations and restructuring of both administrative and operational staff is occurring. However from the preceding analysis, Aurecon has found it difficult to identify where any of these cost savings may emerge.
- Based on the historical “Electricity” cost data provided by SunWater, and explanations provided by SunWater regarding use, and the magnitude of forecast expenditure, Aurecon views the “Electricity” costs as being prudent and efficient.
- “Operations” is a main cost. Aurecon has submitted a substantial number of questions to SunWater seeking additional information and transaction clarity, and received responses. As indicated, Aurecon views that the 2011 forecasts for Operations sub-activities be examined, with particular attention paid to Metering and Dam Safety cost estimates.
- The prudent and efficient “Labour” cost for “Preventive Maintenance” (2011) should be set at $37,900 (compared to $43,000 budgeted), until an audit of itemised historical activities (2010) is undertaken in order to identify what past prescribed activities have been undertaken or not, and examine the differences in hourly costs (between those incurred in 2010 against that prescribed within the Parsons Brinkerhoff (2010) report.
- Based on the historical data provided by SunWater, and comparative analysis of historical expenses against forecast costs for 2011 (2012 to 2016), Aurecon assesses proposed “Corrective Maintenance” direct costs for the scheme as being prudent and efficient.

9.5 Capital costs review

SunWater has developed a rolling renewal annuity program that runs for a forecast 25 year period. The forecast for the initial 5 year period is based on a detailed assessment of asset condition and risk of failure, whilst forecasts beyond 5 years are based on broader estimates of asset life using engineering estimates and standard replacement rules[388].

SunWater also states that *Renewals expenditure refers to works intended to maintain the ongoing performance and service capacity of the assets or, if this is no longer possible or economical, to replace the asset with a modern equivalent*[389].

In relation to the Upper Burnett Bulk WSS, renewal expenditure is limited to

- Wuruma Dam
- Claude Wharton Weir
- John Goleby Weir
- Jones Weir
- Upper Burnett Distribution

The following section provides an overview of renewal expenditure for the current price path (2007-2011) and forecast price path (2012-2016).

9.5.1 Review of historical renewal expenditure

Over the current price path period (2007 – 2011) annual renewals expenditure has been between $148,000 and $374,000 (see Table 9-10). The sum total expenditure over this period is $1,237,000, for a mean annual average of $247,400.

Table 9-10. Historical renewals expenditure for the Upper Burnett Bulk WSS

nominal dollars $'000	Financial Year					
	2007	2008	2009	2010	2011	Sum total 2007-2011
Actual renewal spent[1]	280	275	148	374	160	1,237
LBC target expenditure[2]	219	289	147	245	186	1,086
Difference ($'000)	61	-14	1	129	-26	151
Difference (%) from LBC target	27.9%	-4.8%	0.7%	52.7%	-14.0%	13.9%

[1]Source: *Upper Burnett Bulk WSS NSP,* (2012-2016) January 2011, Page 6.
[2]Source: SunWater spreadsheet, *"Compare R&E Spend to Annuity 2007_2011.xls".*

Of concern has been the substantial variation between Actual renewal spent and LBC target expenditure. As noted above in Table 9-10, for 2007 and 2010 (excluding the minor $1,000 over spend in 2009) the actual renewal spent has exceeded the LBC target. Over the entire price path (2007-2011), actual spend has exceeded the LBC target by $151,000 or 13.9% in aggregate terms.

Due to the very nature of the assets, it is very unlikely that an asset management plan will ever have the capacity to predict all possible renewal expenses in advance, particularly as you go further out in time. Of concern in Table 9-10 above is the fact that renewal expenditure over spend of $61,000 in 2007 (a 27.9% difference) and $129,000 in 2010 (52.7%).

[388] SunWater, *Upper Burnett Bulk WSS NSP*, (2012-2016) January 2011, Page 29.
[389] SunWater, *Upper Burnett Bulk WSS NSP*, (2012-2016) January 2011, Page 29.

SunWater was not been able to provide a detailed list of renewals projects that it intended to deliver over the current price path 2007 to 2011. If available this data would have formulated the LBC target expenditure. However, SunWater did provide an Excel database containing breakdown of historical renewals expenditure for the period 2007 to 2011 (actual expenditures up until 15th February 2011) for all projects greater than $10,000 in value (see Table 9-11 below). However, there were a number of limitations to the database including:

- No indication of the Board approved budget for all projects in 2007
- Additional columns of "Revised Budget", and "Approved" along with "Board Budget" for 2008, 2009, 2010. In most cases, the amount recorded for an activity under "Revised Budget" equalled "Approved", and also "Yearly Total" (actual spend for that year). This highlighted the dynamic nature of the project budget management as the scope of works/activities changed
- Totals include Indirect and Overhead costs, and any proposed changes in allocation methods will impact renewal activity costs
- Many projects would run over several financial years, in which Board Approved budget only appeared in the first year, and not subsequent. There is difficultly linking activities across years, due to the nature of the database provided
- The summation of annual totals within the database, did not equate with stated renewals expenditure for the scheme (see Table 9-12 below)

Table 9-11. Itemised historic renewals expenditure for Upper Burnett Bulk WSS

Description	Start Date	Year	Spent	Status
Wuruma Dam - Failure Impact Assessment	1/07/2006	2007	$10,117	Closed
UPB Replace Meter Outlets	1/07/2006	2007	$21,258	Closed
Claude Wharton Weir - Water Level Recorder Relocation	1/09/2006	2007	$6,496	Closed
Wuruma Dam Comprehensive Safety Inspection - O&M Component	2/11/2006	2007	$27,566	Closed
Wuruma Dam Spillway Risk Assessment	1/07/2006	2007	$68,805	Closed
TOTAL for 2007			**134,242**	
JG Weir: Implement inspection recommendations - Proposal to refurbish protection works	-	2008	$11,978	Closed
Claude Wharton Weir: Refurbish screen - repaint & repair	-	2008	$22,413	Closed
Replace Meters - Upper Burnett River	-	2008	$16,155	Closed
Wuruma Dam: Study - design and fabricate lifting frame(fishing gear)	-	2008	$16,601	Deferred
Replace 450mm Butterfly Valve with Guard Valve & Actuation & Platform - Low Level Irrigation Outlet - Wuruma Dam	-	2008	102,274	WIP
TOTAL for 2008			**$169,421**	
Install Permanent Survey Markers - Jones Weir	1/04/2009	2009	$12,937	Closed
Install Marker Buoys - Jones Weir	1/03/2009	2009	$17,271	Final review
Install Marker Buoys - Claude Wharton Weir	1/04/2009	2009	$20,173	Final review
Replace 450mm Butterfly Valve with Guard Valve & Actuation & Platform - Low Level Irrigation Outlet - Wuruma Dam	1/07/2007	2009	$21,021	WIP

Description	Start Date	Year	Spent	Status
Wuruma Dam CRA Revision	1/07/2008	2009	$15,779	Financial
TOTAL for 2009			**$87,181**	
Replace 450mm Butterfly Valve with Guard Valve & Actuation & Platform - Low Level Irrigation Outlet - Wuruma Dam	1/07/2007	2010	$17,752	WIP
Install Survey Points D/S Wall - Wuruma Dam	1/04/2010	2010	$6,801	Deferred
Improve Access from Service Driveway to VLH Platform - Wuruma Dam (2006 Dam Safety Rec 6.6a)	1/09/2009	2010	$7,991	WIP
Refurbish Valves - Outlet Works - John Goleby Weir	1/01/2010	2010	$28,959	WIP
Refurbish Rock Protection Sinkhole - John Goleby Weir	1/01/2010	2010	$40,936	Practical
Encase Rows 4&5 of Sheet Piling - John Goleby Weir (2005 Weir Insp. Rep Rec 8.3c)	1/01/2010	2010	$216,954	WIP
Replace Fabridam - Claude Wharton Weir (Design 2010) (Replace 2020/21)[390]	1/07/2009	2010	$36,717	WIP
TOTAL for 2010			**$356,110**	
Refurbish Bulkhead Gate Seats - Wuruma Dam	1/04/2010	2011	$12,353	Released
Remove/Stabilise Drummy Cement at Conduit 1 & 2 Bellmouths - Wuruma Dam Outlet Works	1/01/2010	2011	$20,941	Released
Supply and Install Safety Buoys - John Goleby Weir	1/07/2010	2011	$20,160	WIP
Supply and Install Safety Buoys - Wuruma Dam	1/07/2010	2011	$25,653	WIP
TOTAL for 2010 up until 15th Feb 2011			**$79,107**	

Source: SunWater spreadsheet "*2007-2011 PROJECTS.xls*"

Of the renewal expense items listed above in Table 9-11 for 2010, the following observations are made from the desktop review of data:

- All projects did have Board approved budget
- 1 project exceeded Board approved budget by a substantial amount, with Board Budget amounting to $29,402, while actual expenditure totalled $40,936
- remaining 6 projects (which incurred actual expenditure) were underspent (however a number were incomplete in that year, recorded as Work In Progress).

Aurecon notes that there are differences between the stated annual renewal expenditure stated within the NSP, and the annual totals calculated by Aurecon based on the itemised database provided by SunWater as highlighted in Table 9-12 below. Aurecon notes that the discrepancy may possibly be due to one or more of the following:

- A significant amount of renewal projects were below $10,000 in value. Note that the consultants requested expenditure items valued at only $10,000 and above
- Additional adjustments and renewal transactions are allocated.

[390] SunWater (email dated 30th June 2011) state that "SunWater is currently completing an options analysis for the replacement of the Fabridams. The analysis is looking at both engineering and non-engineering solutions".

Table 9-12. Difference between itemised renewals expenditure and NSP totals for Upper Burnett Bulk WSS

Year	NSP stated expenditure[1] (A)	Itemised expenditure (Table 9-11) (B)	Difference ($) (B-A)	Difference (%) (B-A) / (A)
2007	$280,000	$134,242	-$145,758	-52.1%
2008	$275,000	$169,421	-$105,579	-38.4%
2009	$148,000	$87,181	-$60,819	-41.1%
2010	$374,000	$356,110	-$17,890	-4.8%
2011	$160,000	$79,107	-$80,893	-50.6%

[1]Source: *Upper Burnett Bulk WSS NSP,* (2012-2016) January 2011, Page 6
*Progressive total up till 15th February 2011

9.5.2 Forecast renewals expenditure

There are significant renewal expenditures proposed for the Upper Burnett Bulk WSS and considerable variance in proposed annual expenditures (see Figure 9-30). The substantial expenditure in 2028 relates to replacing the Hydraulic Actuator ($300,000) and replacing Control Equipment ($207,000) at Claude Wharton Weir.

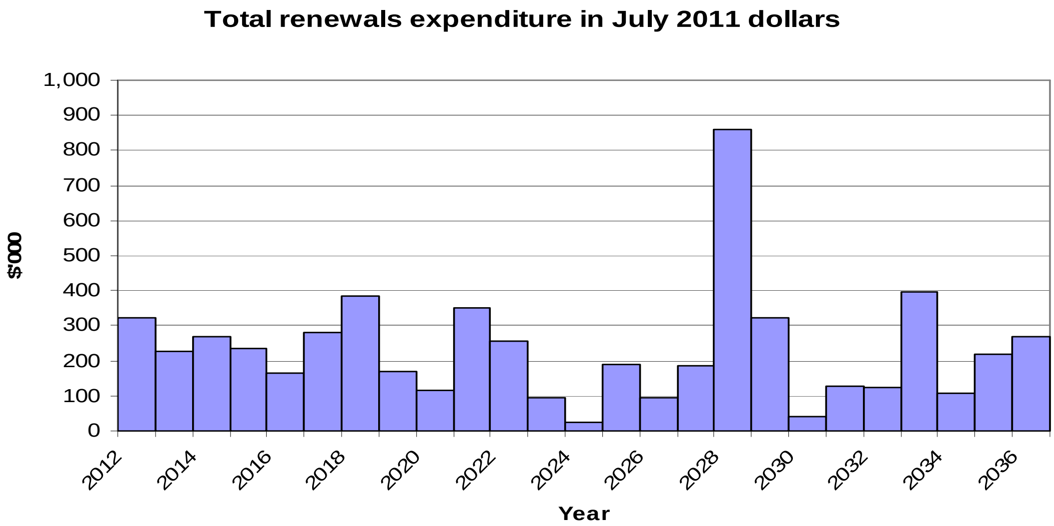

Figure 9-30. Proposed annual renewals expenditure for Upper Burnett Bulk WSS 2012 to 2036[391]

As disclosed within the NSP, there are a number of significant proposed expenditures for the next price path (see Table 9-13).

Table 9-13. Forecast renewals expenditure for Upper Burnett Bulk WSS 2012 to 2016

Real dollars, $'000	Financial Year				
	2012	2013	2014	2015	2016
Claude Wharton Weir	11	115	157	223	0
John Goleby Weir	107				
Jones Weir	15		107	14	11

[391] Raw data extracted from SunWater spreadsheet "*NSP Projects Central V4.xls".*

Real dollars, $'000	Financial Year				
Upper Burnett Distribution	34				
Wuruma Dam	157	112	6		64
Cost estimate for renewals program	324	227	270	237	165

Source: *Upper Burnett Bulk WSS NSP,* (2012-2016) January 2011, Page 29.

The summary total renewals expenditure for 2012 to 2016 is $1,223,000, or an annual average of $244,600 compared to the annual average of $247,400 for the 2007 to 2011 period.

Although the vast majority of expenses highlighted above in Table 9-13 relate to the refurbishment/overhaul/replacement of assets, there also are significant costs associated with auditing including a cost of $23,000 in 2012 for a 5 year comprehensive inspection of the Wuruma Dam.

Table 9-14 below provides detailed description of proposed renewal expenditures for 2012 to 2016.

Table 9-14. Detailed review of forecast renewals expenditure for Upper Burnett Bulk WSS 2012 to 2016

ID No.	Year	SunWater Description	Cost per activity ($'000)
Claude Wharton Weir			
F1	2014 & 10 yearly thereafter	10Y CRANE INSPECTION - as per AS2550	14
F2	2011 & 5 yearly thereafter	5Y COMPREHENSIVE INSPECTION	11
F3	2013 & 7 yearly thereafter	COMPLETE PLC/SCADA UPGRADE	86
F4	2014 & 7 yearly thereafter	Electrical Component Upgrade - Document, Drawings, Specs, Cost Estimate PLC/SCADA replacement	124
F5	2015 & 7 yearly thereafter	Electrical Component Upgrade - Supply, Install, Commission PLC/SCADA	186
F6	2013 & 2031	Refurbish Bulkhead Gate - repaint bulkhead gates, refurbish or change out sluice gates	29
F7	2015 & 2035	Refurbish Outlet Gate No. 1 - blast paint and refurbish rams	37
F8	2014 & 6 yearly thereafter	Refurbish Screen - repaint & repair	19
John Goleby Weir			
F9	2016	REFURBISH CONDUIT - INTERNAL SURFACE	83
F10	2012	REMOVE TREES FROM DISCHARGE CHANNEL	59
F11	2012	WH&S ISSUES FROM 2005 DS REPORT	48
F12	2016 & 5 yearly thereafter	5Y COMPREHENSIVE INSPECTION	7
Jones Weir			
F13	2016 & 5 yearly thereafter	5Y COMPREHENSIVE INSPECTION	11
F14	2012	INSTALL FENCE AND GATE ON L/BANK	6
F15	2015	REPAIRS TO CONCRETE WING WALL	14

ID No.	Year	SunWater Description	Cost per activity ($'000)
F16	2014	Replace Isolating Valves	107
F17	2012	UNDERTAKE WORK IDENTIFIED IN 2005 DS REP	8
Upper Burnett Distribution			
F18	2012, 2017, 2027, 2032	Replace Recorder	34
Wuruma Dam			
F19	2014 & 10 yearly thereafter	10Y CRANE INSPECTION - as per AS2550	6
F20	2016 & 5 yearly thereafter	5Y COMPREHENSIVE INSPECTION	64
F21	2013	Construct V-Notch Weir	16
F22	2012	Manufacture and supply lifting frame to 2008 design.	35
F23	2012/13 & 2032/33	REFURBISH 762MM VALVE	69
F24	2012/13	REFURBISH 915MM BUTTERFLY VALVE	106
F25	2012	Refurbish steel angle on spillway flip	9
F26	2012 & 5 yearly thereafter	Remove vegetation and silt from apron	4
F27	2012	Repair outer left training wall	7
F28	2012 & 5 yearly thereafter	Study: 5 yr Dam Comprehensive Inspection (Review of EAP, O&M & SOPs)	23

Source: SunWater Database, "*NSP Projects Central V4.xls*".

Table 9-12 above provides details for specific renewal expenditures proposed for 2012 to 2016, and an indication if a recurring expenses occurs between 2017 and 2036. Table 9-13 below highlights additional expenditure activities above $10,000 in costs proposed for 2017 to 2036 (that were not captured as expense items for 2012 to 2016 in Table 9-12 above).

Table 9-13. Review of forecast renewals expenditure over $10,000 for Upper Burnett Bulk WSS 2017 to 2036

ID No.	Year	SunWater Description	Cost per activity ($'000)
Claude Wharton Weir			
F16	2029	Change Out Gate & Rams ($20k ram, $30k gate)	121
F17	2017	Change Out Hydraulics	43
F18	2028	Refurbish: Mid life refurbishment of gate and guides	48
F19	2028	Refurbish: Mid life refurbishment of gates and guides	24
F20	2028	Replace Actuator, Hydraulic	301
F21	2023	Replace Cables & Cableways	41
F22	2023 & 2028	Replace Control Equipment	201
F23	2019	Replace Electrical Components	24
F24	2018	Replace Hydraulic Control Cubicle	172

ID No.	Year	SunWater Description	Cost per activity ($'000)
F25	2018 & 2033	Replace Instrumentation	132
F26	2025	Replace Marker Buoys	29
F27	2023	Replace SwitchBoard, Low Voltage	55
F28	2019	Replace Ventilation System	12
F29	2025	Replace BUOYS (5 OFF), SAFETY BUOYAGE SYSTEMS	28
John Goleby Weir			
	2019 & 2028	REFURBISH VALVES	38
	2018 & 2035	Refurbish Protection Works - reseal joints in conc slabs (refer backlog record)	55
Jones Weir			
	2017	Replace Screen	103
	2025	Replace BUOYS (4 OFF), SAFETY BUOYAGE SYSTEMS	23
Upper Burnett Distribution			
	2030	Replace 136113A Wuruma Dam Hw	35
Wuruma Dam			
	2017	INSTALL SURVEY POINTS - D/S WALL	22
	2028	Refurbish Low Level Pipe Works (reline)	101
	2031	Refurbish Pipework - patch paint	18
	2025	Refurbish Road - essential access roads only, fill potholes, reconstruct drainage, spray seal.	30
	2021 & 6 yearly thereafter	Refurbish Trash Racks - patch paint	25
	2019	Refurbish Valves - 450 MSCL + 2 * valves in series; reduced from $50K on GH notes	24
	2019	Replace Lookout	21
	2019	Replace Shelter Shed - Type 3	24
	2022	Replace SwitchBoard, Main	23
	2022	Replace SwitchBoard, Sub	11
	2017	Replace Valve, 450Mm Gate John	22
	2021	Study: 20yr Dam Safety Review (by 1 Jun 2021)	123
Wuruma Dam Wtp			
	2018	Replace Reticulation System	14
	2020	Replace Storage Tank - Rainwater	13
	2029	Replace Storage Tank No 1	11
	2025	Replace Toilet Block No 3	81

Source: SunWater Database, "*NSP Projects Central V4.xls*".

Aurecon selected a handful of renewal projects from the above tables for additional desktop analysis. To assess the prudency and efficiency of these forecast renewal expenditures, Aurecon requested from SunWater:

- Indication of the Asset life assigned, or condition reports, options reports, or asset management plans that demonstrated the need for renewal expenditure
- Bill of Materials that scoped the project identifying the quantities of input materials
- Unit charge rates used for costing purposes (Bill of Materials in most cases)

In response to Aurecon's request, SunWater provided information for the following renewal activities.

Wuruma Dam – butterfly valve – 2008, $102,000

SunWater has advised Aurecon that the need for works was identified during the 2006 comprehensive dam safety inspection as a replacement item[392]. Based on this information, Aurecon views the timing of the renewal expenditure as prudent as it was supported by a technical assessment in need of replacement.

SunWater also provided the following detailed information regarding the works undertaken[393], highlighting the magnitude of tasks undertaken:

"07-2576 Install 450mm valve, pipework, town water supply pipework & pump.
Town water supply pipe work & pump: Fabricate & install new pump base. Supply new town water supply pump, existing motor to be reused. Fabricate new 100NB Sch10 town water supply pipeline, pipe supports & install as per sketches attached.
Low Level Outlet Valve: Install plate baulk on Low Level outlet using divers.
Drain line & remove existing dismantling joint & guard valve.
Inspect & do condition assessment on existing regulating valve & low level conduit.
Install new dismantling joint & guard valve.
Install new 100NB plug valve, 100NB screen tee & air valve on town water supply line.
Modify existing town water supply pipework to suit new pipework.
Install new Rotorks & stem supports on new guard valve & existing regulating valve.
Discard existing grating, manufacture & install new ladder into valve pit.
Manufacture & install new handrail at front of valve pit.
WHS15 Part B to be completed prior to commencement of works.
Update O&M manuals & SOP's from Dam to reflect the restrictive use of the low level guard valve. Signage to be secured to the wall in the area of the valve actuator."

SunWater also provided a budget breakdown for the activity. Some of the key direct expenditures incurred for the activity (total expense of $102,274) include:

- $7,976 for contractors
- $1,110 for rental and hire
- $75 Freight cartage and postage
- $12,930 for materials (non inventory)
- $608 for materials (ex inventory)
- $1,169 plant usage charge
- $8,351 travel allowance and expense
- $32,272 for local SunWater

392 SunWater email dated 1st August 2011.
393 SunWater email dated 1st August 2011.

It is noted that the above direct expenses total $64,491 out of the total project costs of $102,000 (overheads and indirects accounting for the remainder). Based on the investigation of other renewal projects, Aurecon noted that SunWater labour was usually employed for the removal and installation of certain asset components which Aurecon expects occurred with this activity to justify the significant SunWater labour costs incurred.

Insufficient information was provided to Aurecon to evaluate the efficiency of the direct costs incurred for this project, particularly as an overview of work scopes was not provided.

Claude Wharton Weir, replacement of the Control equipment (PLC/SCADA) for the weir.

Based upon a desktop analysis of the forecast renewal database provided by SunWater, Aurecon notes the following multiple expenses recorded against this asset at Claude Wharton Weir:

- Complete PLC/SCADA upgrade $86,000 (2013,2020,2027,2034)
- Electrical Component Upgrade - Document, Drawings, Specs, Cost Estimate PLC/SCADA replacement $124,000 (2014,2021,2028,2035)
- Electrical component upgrade – Supply, Install, Commission PLC/SCADA $186,000 (2015,2022,2029,2036)

The response[394] that was received from SunWater indicated that the existing control equipment for the weir was installed in 1987, and has already exceeded its allocated asset life of 15 years life. SunWater's most recent condition assessments (2006) stated that the PLC's are no longer available. Although the replacement is now projected for 2033, SunWater is considering rescheduling the works for 2028 to match the Fishway Controls replacement works.

The response provided above by SunWater is at odds with the information Aurecon has gathered from the renewal database. Of concern is the fact that the database prescribed replacements at 7 year intervals.

Due to the magnitude of the total expenditure associated with this asset, Aurecon recommends that additional clarification and information be sought from Sunwater in relation to this asset and associated renewal expenditure.

Claude Wharton Weir – replace actuator – hydraulic (2028) - $301,000

Based on the SAP records provided by SunWater a direct cost of $249,517 is estimated for the replacement of 6 individual hydraulic actuators.

SunWater has indicated[395] that the fishlock (and hydraulic actuators) were installed in 2008, and should have a design life of 60 years. SunWater states that the proposed 2028 renewal expenditure is associated with an error on SunWater's behalf in assigning an initial 20 year asset life, and has subsequently amended the SAP live database to reflect a 60 life asset life.

Therefore this proposed renewal expenditure in 2028 is obsolete, and accordingly the annuity renewals program for the scheme needs to be re-adjusted to accommodate this change.

[394] SunWater email dated 1st August 2011.
[395] SunWater email dated 1st August 2011.

Claude Wharton Weir – replace control equipment - $207,000 in 2028, $196,000 in 2033

SunWater has advised[396] that this control equipment is associated with the new fishway which was installed at Claude Wharton Weir in 2008. The prescribed standard asset life for control equipment (PLC's etc) is 15 years, meaning the asset should be replaced in 2023. SunWater states that as the asset risk profile for this asset is low, the replacement date was pushed out a further 5 years to 2028.

SunWater has also indicated that prior to the proposed replacement date (2028) a full condition assessment of the asset will be undertaken to assess whether the asset requires replacement, or the life extended.

The controls at the fishway were capitalised at actual cost of $171,268 (2008 construction/ valuation). No bill of material is available.

Based on the information provided by SunWater, Aurecon views the proposed renewal expenditure in 2028 as prudent and efficient. However, Aurecon recommends that additional clarification be sought from SunWater to explain the subsequent renewal expense of $196,000 planned for this asset in 2033 (5 years latter).

9.5.3 Renewals annuity balances

The Upper Burnett Bulk WSS has a substantial positive balance of $467,000 in 2012.

Stakeholders have expressed interest in relation to the calculation of this opening balance for 2012. SunWater has provided Aurecon with an internal working paper[397] which illustrates:

- Opening Balance at 1 July 2006 was $80,000 for the Upper Burnett (irrigation sector)
- Identified annual annuity incomes and expenses specifically for the Bulk Scheme for 2007 to 2011
- Identified that the closing balance for 30 June 2011 for the Bulk Scheme is $412,000 (irrigation sector balance). This incorporates an uplift factor of 1.13 for whole of scheme, the opening balance for 1 July 2011 is $467,000.
- Applied an interest rate of 9.689% (pre-tax nominal) on annual balances.

Utilising this information presented above, Aurecon has modelled the stated expenses and income for 2007 to 2011, incorporating the stated 2007 annuity starting balance and annual interest of 9.689%. Aurecon arrived at a closing balance of $412,000 (prior to uplift factor) as stated within the SunWater paper.

As indicated below in Figure 9-31, the scheme incurred significant annual interest income throughout (actually higher than annual incomes or expenses), which continued to increase each year. Aurecon estimatess that the scheme accrued approximately $95,000 in interest income over the entire 2007 to 2011 period.

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396 SunWater email dated 1st August 2011.

397 Source: SunWater, *Renewals annuity calculation, INTERNAL WORKING PAPER*, January 2011

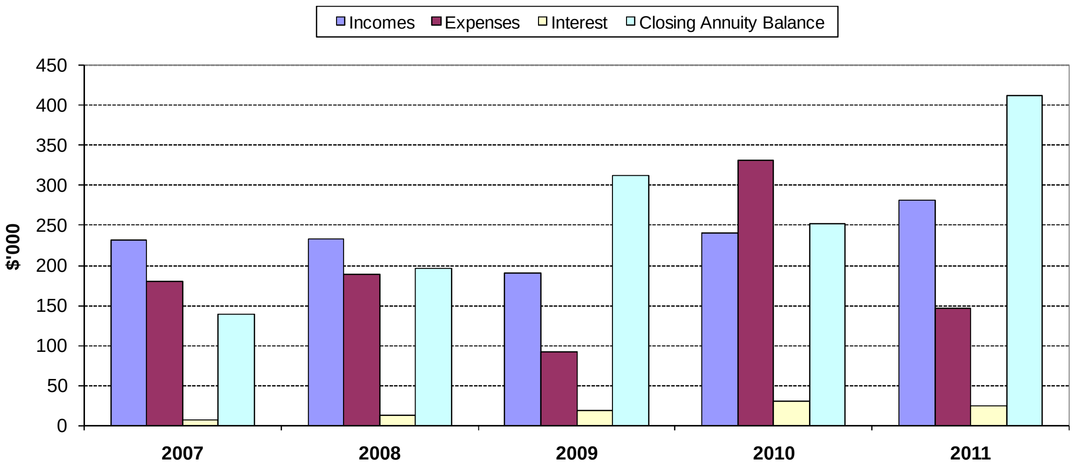

Figure 9-31. Calculated annual renewal balance for Upper Burnett Bulk WSS 2007 to 2011

Figure 9-31 also highlights that annual annuity income was significantly greater than expenses (except for 2010). The sum total of annuity income for 2007 to 2011 was $1,176,000, while renewal expenses totalled $939,000[398], resulting in a surplus of $237,000. Adding the surplus of $237,000, plus the interest income over the period of $95,000 equates to $332,000 (added to the starting 2007 balance of $80,000 equals the closing balance of $412,000).

As indicated in Figure 9-32 below, the balance is to remain positive until 2035.

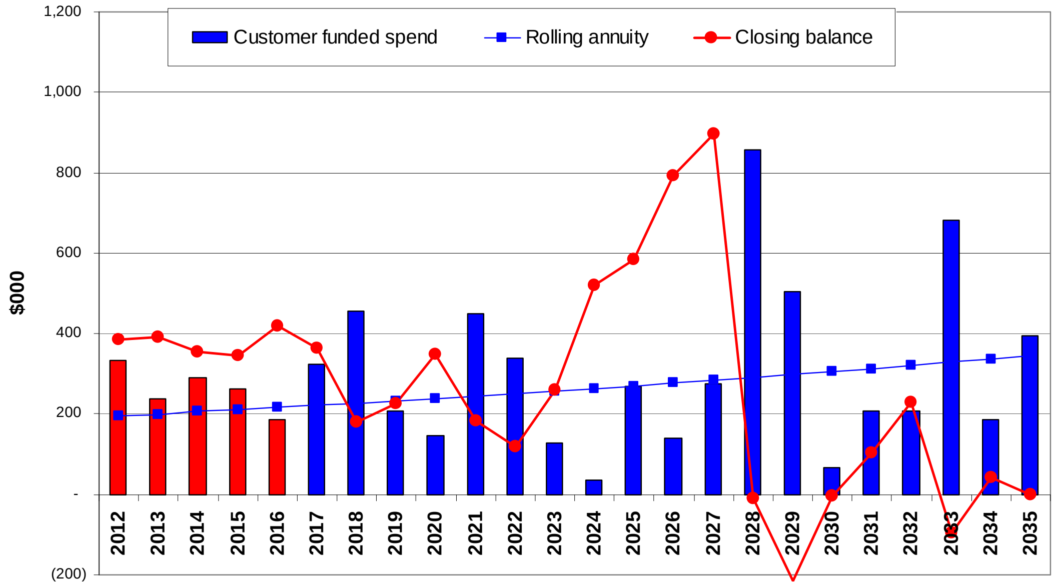

Figure 9-32. Renewals annuity balances for Upper Burnett Bulk WSS 2012 to 2036[399]

Applying SunWater's prescribed real rate of interest of 9.689% upon the starting 2012 annuity balance in 2012 of $455,000 implies an annual interest income of approximately $44,000 in the first year.

As indicated above, the proposed average renewal expenditures for 2012 to 2017 is $244,600 per annum. As a result of the substantive positive balance in 2012, the annual annuity charge going forward is highlighted below in Table 9-14.

[398] Note that only 6% of Renewal Expenditure is apportioned to the irrigation sector for this scheme.
[399] Source: SunWater spreadsheet, *"Annuity charts – V610 03.xls"*

Table 9-14. Renewals annuity charge for Upper Burnett Bulk WSS 2012 to 2016

Real dollars, $'000	Financial Year				
	2012	2013	2014	2015	2016
Renewal annuity charge	190	188	192	191	191

Source: *Upper Burnett Bulk WSS NSP,* (2012-2016) January 2011, Page 31.

9.5.4 Feedback from field visits

Aurecon did not undertake a field visit to the Upper Burnett Bulk WSS. However, the substantially stakeholder feedback obtained from the Bundaberg and Lower Mary field visits are also relevant to this scheme.

9.5.5 Summary of findings on renewals expenditure

Historical Renewal Expenditure

SunWater was not able to provide to this review the proposed renewal programme as developed in 2006 for the current price path. As highlighted earlier, SunWater's actual expenditure on renewals for 2007 was 27.9% over the proposed LBC target expenditure, while in 2010 it was 52.7% over target.

A closer examination of the 2010 data (itemised renewal expenditures) alone revealed that all of the renewal activities had Board approved budget, and only one project had exceeded the Board approved budget by a substantial amount. The remaining projects were under budget, but a number of these were not completed in 2010 and recorded as WIP. As indicated earlier, the itemised database provided by SunWater accounted for 95% of total recorded annual renewal expenditure for 2010.

Due to the inability to undertake a field investigation and difficulties obtaining data from SunWater within nominated timeframes, Aurecon was only able to undertake a desktop review of the historical renewal expenditure items. Aurecon found through its detailed field investigation at Bundaberg and the Lower Mary the processes engaged (ie identification of need through condition assessments, timing, scoping, and tendering for the engagement of external contractors) indicated a structured and efficient process. However, substantial Indirect and Overhead costs were also incorporated, which greatly distorted the perceived value for money outcome achieved for the activity. Where variations were made to renewal activity budgets, substantiated reasoning and justification was found for these projects.

Considering that the itemised listing of renewal expenditure provided by SunWater accounted for approximately 50% of stated annual expenditure for 2007, 2008, 2009 and 2011, Aurecon recommends that an additional request is made to SunWater to provide a comprehensive itemised inventory of renewal expenditure items, so that 100% of the stated annual cost can be validated (particularly for 2007, 2008, 2009 and 2011).

In addition, Aurecon recommends that an audit be undertaken for all projects without Board approved budgets, or that have substantially exceeded the Board approved budget.

Forecast Renewal Expenditure

Aurecon undertook a desktop review of several major proposed renewal projects for the Upper Burnett Bulk WSS, and found that:

- Wuruma Dam (butterfly valve replaced in 2008 for $102,000) for which Aurecon views that the historical renewal expenditure was prudent. However insufficient information was provided to validate the efficiency of the expenditure.

- Claude Wharton Weir (replacement of the Control equipment (PLC/SCADA) for the weir at 7 yearly intervals) for which the information provided by SunWater was at odds with the information Aurecon has gathered from the renewal database. Due to the magnitude of the total expenditure associated with this asset, Aurecon recommends that additional clarification and information be sought from Sunwater in relation to this asset and associated renewal expenditure.
- Claude Wharton Weir (replace actuator hydraulic in 2028 at a cost of $301,000) for which SunWater has acknowledged an error with the assigned asset life prescribed, and have removed this renewal activity from the renewal program for 2012 to 2036.
- Claude Wharton Weir (replace control equipment in 2008 at a cost of $207,000 and in 2033 at a cost of $196,000) for which Aurecon views the proposed renewal expenditure in 2028 as prudent and efficient. However, Aurecon recommends that additional clarification be sought from SunWater to explain the subsequent renewal expense of $196,000 planned for this asset in 2033 (5 years latter).

10. Assessment of Bundaberg Bulk Water Supply Scheme

10.1 Scheme Description

The Bundaberg Bulk Water Supply Scheme (WSS) is one of the 5 Water Supply Schemes within the Burnett Basin, with the others been Barker Barambah, Boyne River and Tarong, Three Moon Creek, and Upper Burnett. Figure 10-1 highlights operational features of the Bundaberg Bulk WSS.

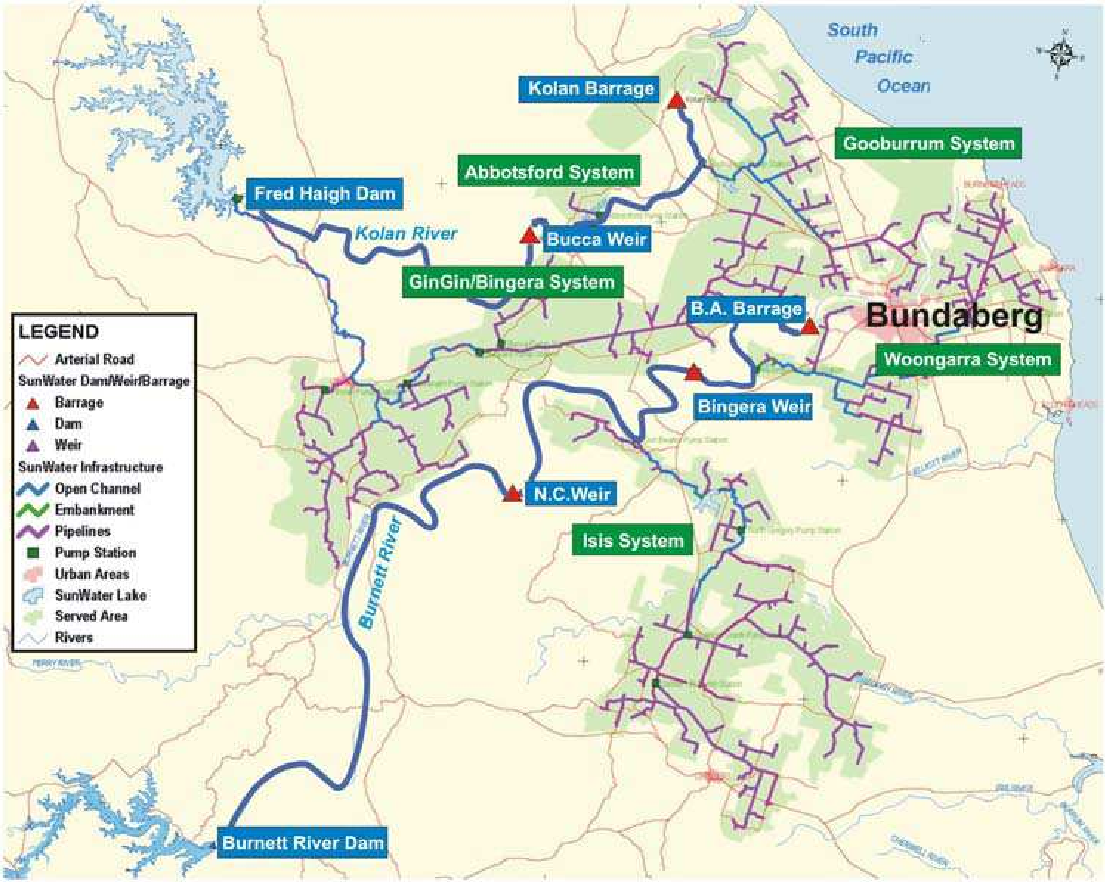

Figure 10-1 Overview of the Bundaberg WSS[400]

The Bundaberg WSS (including the distribution network) surrounds the town of Bundaberg. It supplies water to 55,600 ha of farmland within an area bound by the towns of Childers and Gin Gin to the west and the South Pacific Ocean to the east[401].

The Bundaberg Bulk Water Supply Scheme (WSS) has a total of 1,109 customers (of which 900 take water from the distribution network) comprising of 211,957 ML of medium priority WAE and 24,372 ML of high priority WAE. The scheme provides water for:

- Irrigation: water is supplied for the irrigation of crops including sugar cane, tomatoes, rock melons, watermelons, capsicum, zucchini, beans, macadamia nuts and avocados.
- Urban: supplies water to the city of Bundaberg and communities in the Burnett, Kolan, and Isis shires. These councils treat and reticulate water to residents.

[400] SunWater, *Bundaberg Water Supply Scheme – Scheme Operation Manual*, page 21, un-dated report.
[401] SunWater, *Bundaberg Water Supply Scheme – Scheme Operation Manual*, page 21, un-dated report.

- Industrial: water is supplied to various industrial enterprises including sugar mills[402].

The Burnett Basin Resource Operations Plan (ROP) sets the regulatory framework for the management of water within this scheme. Local management of the scheme is managed from SunWater's regional office at Bundaberg.

Under the ROP SunWater has an obligation to manage and operate the following storage structures[403]:

- The Kolan River Sub-scheme
  - The Fred Haigh Dam is a 562,000 ML referable dam. The dam was constructed in 1974.
  - The Bucca Weir was constructed in 1987. It is a roller-compacted concrete weir that holds 11,600 ML when full. The weir is used to recharge the Kolan Barrage and to supply customers between the weir and the pond of the Kolan Barrage.
  - The Kolan Barrage was constructed in 1974 and holds 4,020 ML when full. It has a vertical-slot fishway, but no other outlet.
- The Lower Burnett River Sub-scheme
  - The Ned Churchward Weir was constructed in 1998 and holds 29,500 ML when full. The weir has a fully automated fishlock. Ned Churchward Weir arrangement includes a small anabranch weir built to prevent the river from deepening the anabranch.
  - The Ben Anderson Barrage was constructed in 1975 and holds 30,300 ML when full. When flow-depth over the shutters approaches 300 mm, the centre shutters will start to drop randomly. If the level continues to rise the outside shutters will drop also. Once the flow ceases the shutters are reset manually. The barrage has a four gated vertical slot fishway. Each gate is positioned at a different level so that the fishway will meet ROP requirements.

Aurecon notes that within the NSP, SunWater has listed Bingera Weir as a storage structure. Aurecon failed to identify Bingera Weir as an infrastructure asset within the Burnett Basin Resource Operation Plan.

10.2 Scheme Management

The Interim Resource Operations Licence (IROL) sets the regulatory framework for the management of water within this scheme. Management of the scheme is managed from SunWater's regional office at Bundaberg, which also houses a storage workshop. Key staff resources at the Bundaberg office include:

- Regional Operations Manager & Service Manager
- 3 working teams of two electricians (also assist Biloela)
- 2 working teams of two fitter & turners (also assist Biloela)
- 9 operational staff located at Bundaberg and Gin Gin (operate primarily Bundaberg Bulk and Distribution systems)
- 8 Technical officers and Schedulers (for Central region including Biloela)
- 2 Administrative staff (for Central region)

At times, SunWater staff from other locations within the Central region will be utilised for scheme specific activities within the Bundaberg WSS.

SunWater advised that in recent years there has been an on-going management strategy to relocate positions (as vacancies arise) from the smaller regional centres to Bundaberg. Small mobile working teams that are permanently located at Bundaberg service all schemes across the Central region.

[402] SunWater (2011), Scheme information http://SunWater.com.au/schemes accessed 25th April 2011.
[403] SunWater *Bundaberg WSS NSP*, (2012-2016) January 2011, Pages 35 and 36.

10.3 Summary Opex and Capex information from the NSP

The Bundaberg Bulk Water Supply Scheme (WSS) has a total of 1,109 customers (of which 900 take water from the distribution network) comprising of 211,957 ML of medium priority WAE and 24,372 ML of high priority WAE. SunWater proposess to allocate 90% (based on WAE proportions) of the operating expenses and 82% (based on the Headworks Utilisation Factor) of the renewals annuity cost to medium priority WAE holders.

The NSP for the Bundaberg Bulk WSS proposes that the efficient operating costs for the scheme for the coming 5 year regulatory period average $1,100,000 per annum. This represents a substantive 15.3% decrease over the current price path average of $1,299,000 per annum.

A significant proportion of operating costs are influenced by water delivery and utilisations levels. In the current price path (2007 – 2011), it is clearly evident that water utilisation has been low due to the on-going drought over much of this period. It is also acknowledged that the 2010/11 summer season has ensured that all weirs and dams are full, providing the start of the next price path in 2012 with 100% allocation in the first year.

Stakeholders have expressed interest examining the projected lower bound operating costs for the scheme as projected within the 2005/06 Irrigation Price Review by Indec Consulting[404]. However, SunWater advise that a direct comparison between the Tier 1 projected 2005/06 lower bound operating cost against actual expenditure as presented within the NSP for 2007 to 2011 is not feasible as;

> *the Tier 1 tables for "scheme lower bound cost" include only the irrigation share of the costs, and that grossing up the costs is problematic*[405]

Not withstanding these limitations, Aurecon has examined the projected LBC values for 2006-2011 provided within the Tier 1 report against the costs presented within the NSPs (see Appendix A).

Projected renewal annuity spend over the five year period to 2016 is $2,798,000, which is substantially less than the $3,120,000 spent over the preceding 5 year period. Due to a negative annuity starting balance of minus $1.3 million in 2012, a total charge for renewal annuity of $3,196,000 is sought for the 2012 to 2016 price path.

The following sections examine Opex (operational costs) and Capex (renewals expenditure) in more detail.

10.4 Operational costs review

An overview of required operational activities for the scheme is identified within the *Bundaberg Water Supply Scheme – Scheme Operation Manual*[406]. The manual provides in detail an overview of the scheme structure, compliance requirements, overview of scheme operations activity requirements, and references for collecting and reporting scheme data.

For each scheme SunWater has utilised the Scheme Operation Manual as a key input towards the formulation of Facility Operations Manuals and Maintenance Schedules for individual assets/facilities across the scheme, as highlighted below within Figure 10-2.

[404] Statewide Irrigation Pricing Working Group, *SunWater Irrigation Price Review 2005-06 Tier 1 Report*, April 2006,
[405] Email from SunWater to the QCA, dated 23rd February 2011.
[406] SunWater, *Bundaberg – Scheme Operation Manual*, un-dated report

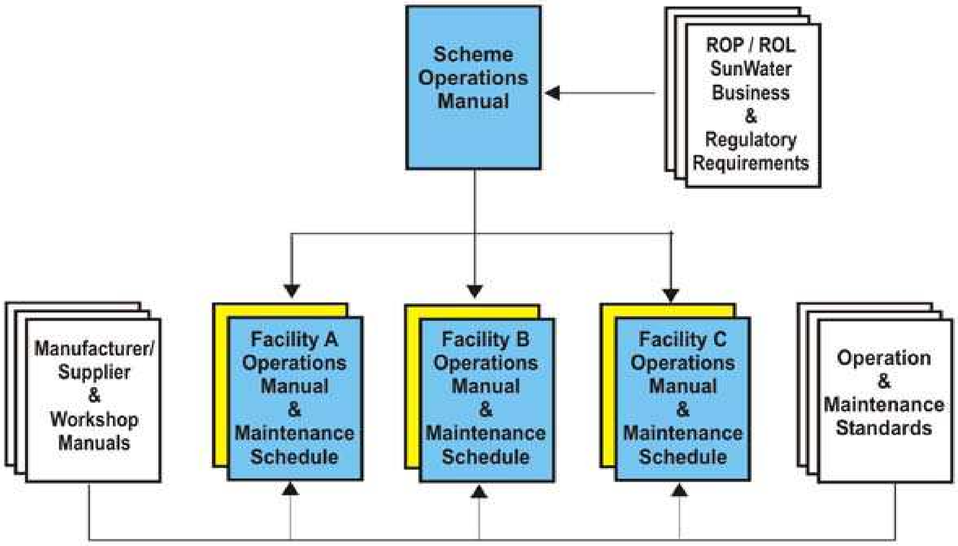

Figure 10-2*.* Overview of the linkages between Scheme and individual facility Operations Manual[407]

10.4.1 Overview Operational costs

Within the NSP, SunWater has presented Operational costs by type, and also by activity. As such, Aurecon has undertaken a review of Operational costs by investigating in detail key expenditure items of “Labour” and “Electricity”, and key expenditure activities of “Operations”, “Preventive Maintenance” and “Corrective Maintenance”.

Although not consistently obvious across all, many Operational cost items and activities vary accordingly to water usage levels. As indicated below (Figure 10-3) annual water usage within the Bundaberg Bulk WSS fluctuated substantially from year to year. The highest annual water usage between 2003 and 2010, and including river use, distribution use, and network losses, occurred in 2006 in which approximately 128,000ML was utilised (or lost).

For the purposes of incorporating water usage into this cost analysis, Aurecon has indexed annual water usage for 2007 to 2010 period against the 2006 water usage level as follows:

- Approximately 80% in 2007
- Approximately 50% in 2008
- Approximately 53% in 2009
- Approximately 82% in 2010

[407] SunWater, *Bundaberg Water Supply Scheme – Scheme Operation Manual*, page 14, un-dated report.

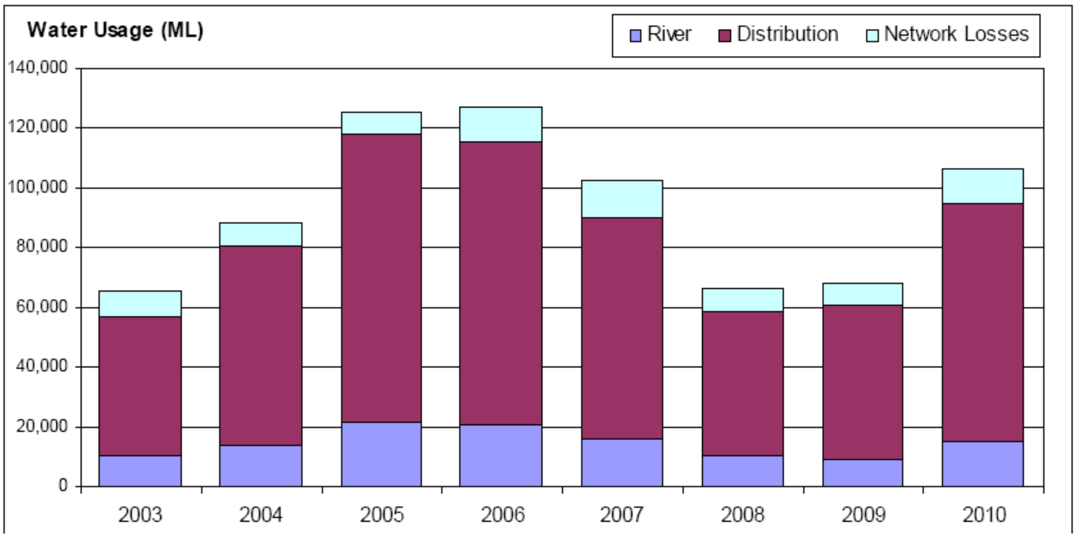

Figure 10-3. Water usage for Bundaberg Bulk WSS[408]

Due to the exceptional wet season in 2010/2011, corresponding water usage for 2011 within this scheme is expected to be much lower (in comparison to 2010).

As indicated below in Figure 8-2, "Operating" costs for the scheme do appear to follow the trend (but not same percentage change) of actual water usage rates. In 2008 "Operating" costs decreased as water usage decreased, and in 2009 when water usage increased marginally costs continued to decrease.

Of interest is the comparison between 2007 and 2010 as follows:

- 2007 water usage approximately 103,000ML with Total "Operating" costs of $1.713m
- 2010 water usage approximately 105,000ML (increase of 2%) with Total "Operating" costs of $1.473 million (down 14%).

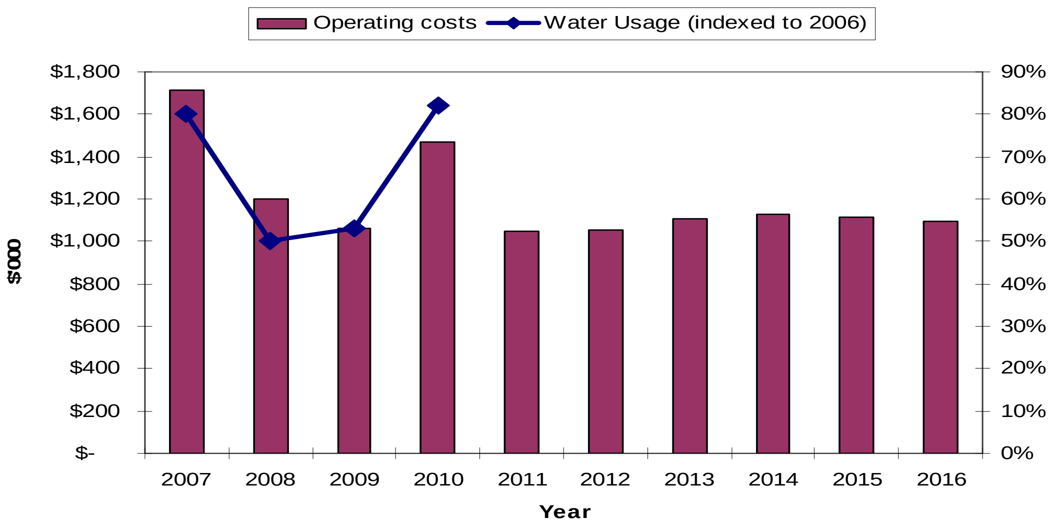

Figure 10-4. Comparison of "Operating" costs against water usage (indexed against 2006) for Bundaberg Bulk WSS[409]

[408] Source: *Bundaberg WSS NSP,* (2012-2016) January 2011, Page 14.
[409] Source: *Bundaberg WSS NSP,* (2012-2016) January 2011, Pages 6 & 14.

In 2011, “Operating” costs are projected to decrease by 29% from 2010, in line with a projected reduction in water usage across the scheme.

The key cost component for “Operating” costs across the period from 2007 to 2016 is clearly “Operations” costs, although it is projected to decrease going forward (see Figure 10-3). “Preventive Maintenance” costs and “Corrective Maintenance” costs are also significant.

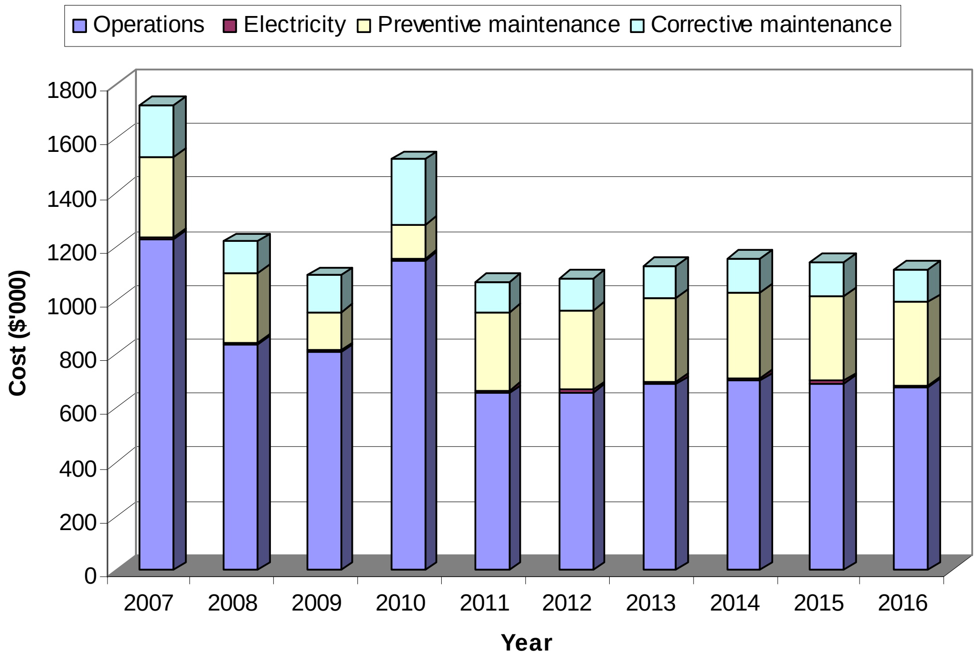

Figure 10-5. Breakdown of “Operating” costs for Bundaberg Bulk WSS 2007 to 2016[410]

The following sections examine in more detail operational expense items and activities.

10.4.2 Operational expense items

Labour costs

Projected “Labour” costs for the Bundaberg Bulk WSS are significant as highlighted below in Table 10-1. “Labour” as a proportion of “Total Operating” costs have historically varied from 20.1% in 2009 to 27.8% in 2010.

[410] Source: *Bundaberg WSS NSP,* (2012-2016) January 2011, Pages 6.

Table 10-1. "Labour" costs and "Total Operating" costs for Bundaberg Bulk WSS

($'000)	Actuals				Forecast	Price Path				
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Labour[1]	352	249	213	410	287	292	296	296	296	296
Annual Change		-29.3%	-14.5%	92.5%	-30.0%	1.7%	1.4%	0.0%	0.0%	0.0%
Change since 2007		-29.3%	-39.5%	16.5%	-18.5%	-17.0%	-15.9%	-15.9%	-15.9%	-15.9%
Total Operating costs	1713	1200	1060	1473	1047	1056	1106	1129	1116	1093
Labour as % of Total Operating costs	20.6%	20.8%	20.1%	27.8%	27.4%	27.7%	26.8%	26.2%	26.5%	27.1%

Source: *Bundaberg WSS NSP,* (2012-2016) January 2011, Page 7.

The average annual "Labour" cost (historical) between 2007 and 2010 was $306,000 per annum. The projected "Labour" cost in 2011 of $287,000 represents a decrease of 6.2%.

Figure 10-6 below provides an overview of water usage levels against "Labour" costs. There is an observable correlation between "Labour" costs and water usage rates within the scheme (with the exception of 2009 where water usage increased marginally, but costs declined).

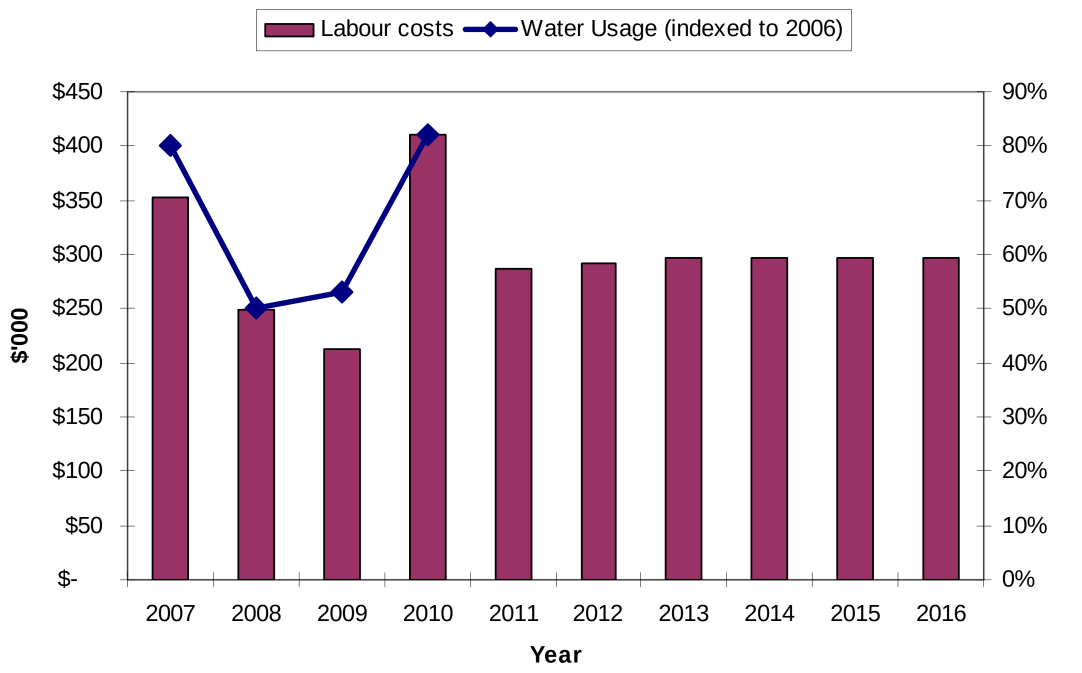

Figure 10-6. Comparison of "Labour" costs against water usage (indexed against 2006) for Bundaberg Bulk WSS[411]

The following sections seeks to examine in more detail the components that make up the "Labour" costs presented within Table 10-1 above, and changes in historical labour components where appropriate data is available..

"Labour" costs in 2011 are forecast to be $287,000. As highlighted below in Figure 10-7, labour activities related to "Operations" (57.3%) are projected to account for the bulk of

[411] Source: *Bundaberg WSS NSP,* (2012-2016) January 2011, Pages 7 & 14.

scheme labour costs in 2011. “Preventive Maintenance” is projected to account for a further 33.6%, followed by labour required for “Corrective Maintenance” (9.1%).

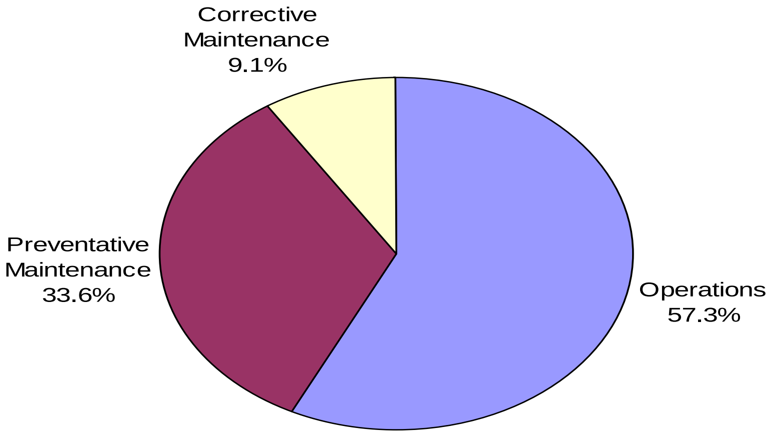

Figure 10-7. Breakdown of “Labour” costs by output activity for Bundaberg Bulk WSS in 2011[412]

As illustrated in Figure 10-7 above, “Operations” related activities accounted for a significant amount (57.3%) of forecast “Labour” expenses for the Bundaberg Bulk WSS in 2011. Figure 10-8 below provides additional information regarding the composition of labour costs associated with “Operations” activities.

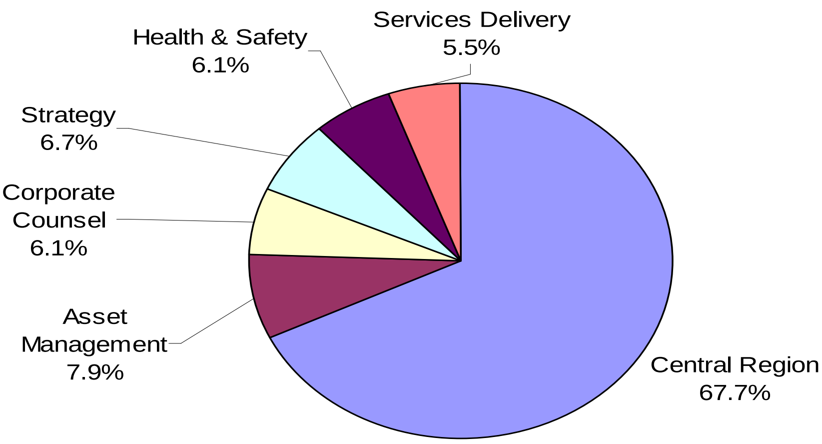

Figure 10-8. Breakdown of “Operations” labour costs for Bundaberg Bulk WSS in 2011[413]

As illustrated by Figure 10-8 above, over half (67.7%) of the projected “Operations” labour costs in 2011 are from staff within the Central region, whilst the remainder of labour costs are sourced from outside the Central region (predominantly Brisbane, but may also include SunWater staff from other regional centres) providing specific services of Asset management, Corporate Counsel, Service Delivery, Health and Safety and Strategy.

Whist the information presented in Figures 10-7 and 10-8 above provide useful insights into the expected “Labour” costs for 2011, of considerable interest are the “Labour” costs between

[412] Raw data sourced from SunWater Spreadsheet “*IM Central – 610.03 PSV.xls*”
[413] Raw data sourced from SunWater Spreadsheet “*IM Central – 610.03 PSV.xls*”

2007 to 2010 and what made these up. Figures 10-9 and 10-10 below provide partial insights into "Labour" costs between 2007 and 2011.

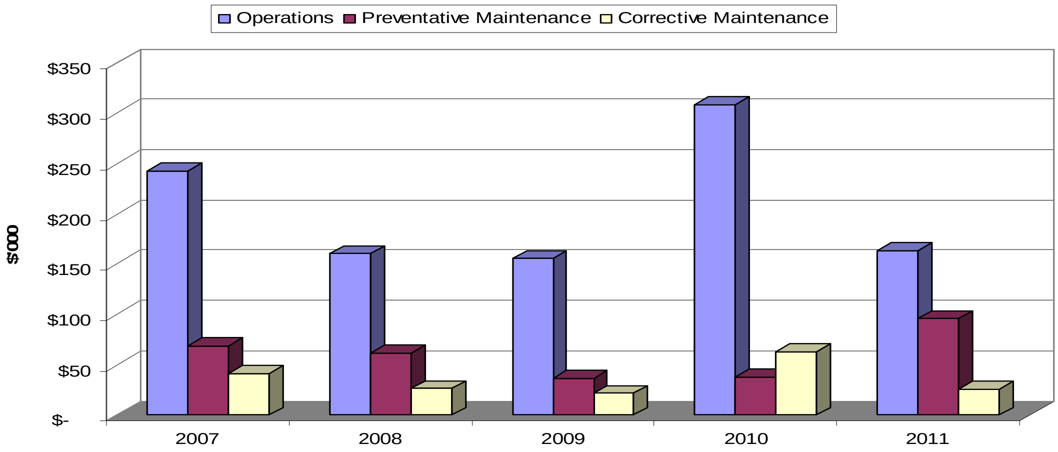

Figure 10-9. Breakdown of "Labour" costs for Bundaberg Bulk WSS between 2007 and 2011[414]

Figure 10-9 above provides valuable insights into labour cost components over the 5 year period. Labour input for both "Preventive" and "Corrective Maintenance" have fluctuated over the period, with "Preventive Maintenance" projected to increase significantly in 2011. Although "Operations" spiked in 2010, in 2011 they are forecast to be at the same cost level as 2008 and 2009.

Figure 10-10 below provides more detailed information regarding historical "Preventive Maintenance" labour costs. The main cost item of "Condition Monitoring" spiked in 2008, but in 2009 and 2010 has remained below the cost incurred in 2007. Of interest is that both "Weed Control" and "Servicing" have trended downward from 2007.

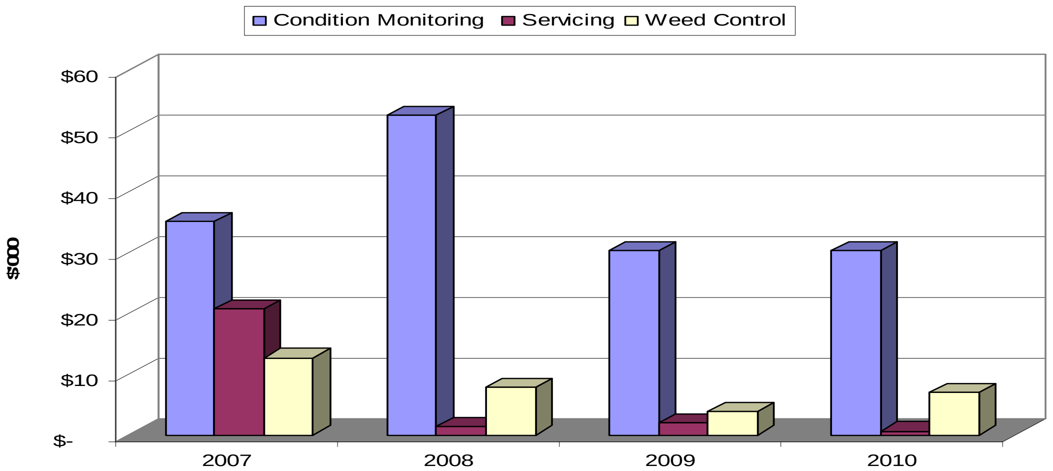

Figure 10-10. Breakdown of "Preventive Maintenance" labour costs for Bundaberg Bulk WSS between 2007 and 2010[415]

"Labour" and "Preventive Maintenance" costs are covered in more detail within the following sections

[414] Source: Historical data extracted from SunWater spreadsheet "Extract LBC data Conversion extra activity detail and preventive main split.xls", forecast expenditure data from SunWater "IM Central -610.03.PSV.xls".
[415] Raw data sourced from SunWater spreadsheet "Extract LBC data Conversion extra activity detail and preventive main split.xls".

10.4.3 Activity based expense items

The following sections examine scheme operational costs from an activity perspective as follows:

- Operations
- Preventive Maintenance
- Corrective Maintenance

10.4.4 Operations costs

Operational activities for the scheme are largely identified within the scheme Operation Manual[416]. SunWater has provided a breakdown of "Operations" costs by both sub-activities and cost input. The following analysis begins by examining cost inputs.

Projected "Operations" costs for the Bundaberg Bulk WSS are significant as highlighted below in Table 10-2. As a proportion of "Total Operating" costs, "Operations" costs historically have varied from 70.0% in 2008 to 77.9% in 2010.

Table 10-2. "Operations" costs and "Total Operating" costs for Bundaberg Bulk WSS

($'000)	Actuals				Forecast	Price Path				
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Labour[1]	242	161	156	309	165	167	167	168	169	169
Materials[1]	17	3	2	2	2	2	2	2	2	2
Contractors[1]	42	35	54	32	29	29	29	30	30	31
Other[1]	161	162	185	191	146	146	145	145	146	146
Total Direct costs	463	360	396	534	342	344	343	345	347	348
Indirects[1]	500	287	230	274	143	143	164	175	167	157
Overheads[1]	264	190	180	339	170	171	174	176	177	172
Total Operations[2]	1,227	838	807	1,147	655	658	681	696	691	677
Annual Change		-31.7%	-3.7%	42.1%	-42.9%	0.5%	3.5%	2.2%	-0.7%	-2.0%
Change since 2007		-31.7%	-34.3%	-6.6%	-46.6%	-46.4%	-44.5%	-43.3%	-43.7%	-44.8%
Total Operating costs[3]	1713	1200	1060	1473	1047	1056	1106	1129	1116	1093
Operations as % of Total Operating costs	71.6%	69.8%	76.1%	77.8%	62.6%	62.3%	61.6%	61.6%	61.9%	61.9%

[1]Source: Historical data extracted from SunWater spreadsheet *"Extract LBC data Conversion extra activity detail and preventive main split.xls"*, forecast expenditure data from SunWater spreadsheet *"IM Central -610.03.PSV.xls"*,
[2]Note that there are minor differences between the data reported within the table and that reported within the NSP due to rounding.
[3]Source*: Bundaberg WSS NSP, (*2012-2016) January 2011, Page 7.

The average annual "Operations" cost between 2007 and 2010 was $1,004,000 per annum. The projected "Operations" cost in 2011 of $655,000 represents a decrease of 34.8%.

[416] SunWater, *Bundaberg Water Supply Scheme – Scheme Operation Manual*, page 23, un-dated report.

Of interest is the comparison “Operations” costs and water usage between 2007 and 2010 as follows:

- 2007: water usage at 80% of 2006 while “Operations” costs were $1.228 million
- 2010: water usage at 82% of 2006 while “Operations” costs were $1.148 million (decrease of 6.5%).

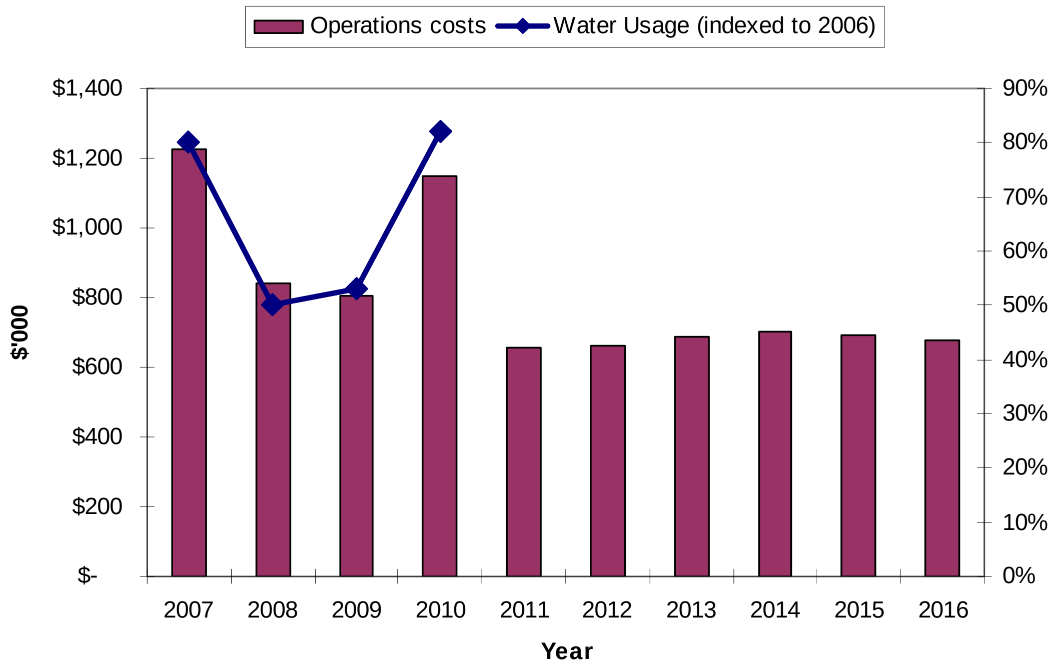

Figure 10-11. Comparison of “Operations” costs against water usage (indexed against 2006) for Bundaberg Bulk WSS[417]

Water usage levels for 2011 are projected to be substantially lower than that for 2010. As indicated in Figure 10-11 above “Operations” costs in 2011 are projected to decline substantially in 2011.

“Operations” costs for 2011 are projected to be $655,000 (Table 10-2). As illustrated below in Figure 10-12, “Overheads” and “Indirects” represents 47.8% of the annual cost. Other significant components are “Labour” at 25.2% (which was examined earlier), and “Other” at 22.3%.

Cost items included within “Other” include insurance costs (62% of total “Other”, costing $90,000 in 2011), Local Authority Rates (12% or $17,000), Land Tax (16% or $23,000), and other local administrative costs including telephone, etc.

[417] Raw data sourced from *Bundaberg WSS NSP*, (2012-2016) January 2011, Pages 7 and 14.

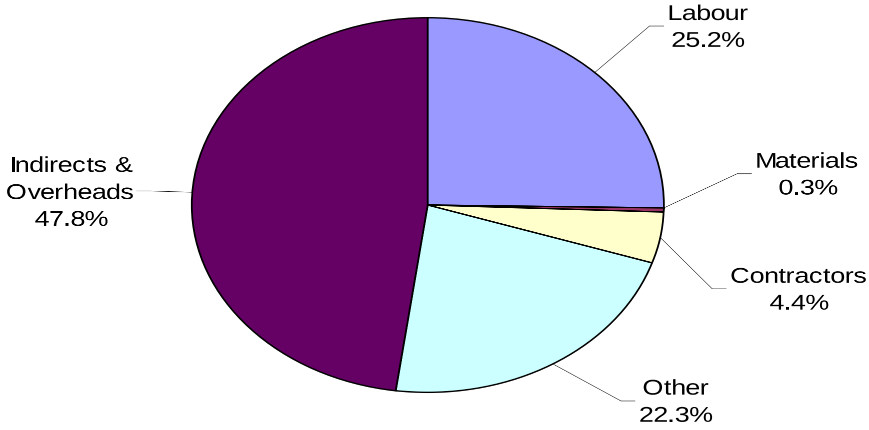

Figure 10-12. Breakdown of "Operations" costs for Bundaberg Bulk WSS in 2011[418]

The following analysis seeks to examine in detail the historical components of "Operations" costs, and where possible identify cost item increases (and possible causes). Figure 10-13 below provides a breakdown of the key input cost components for "Operations" costs.

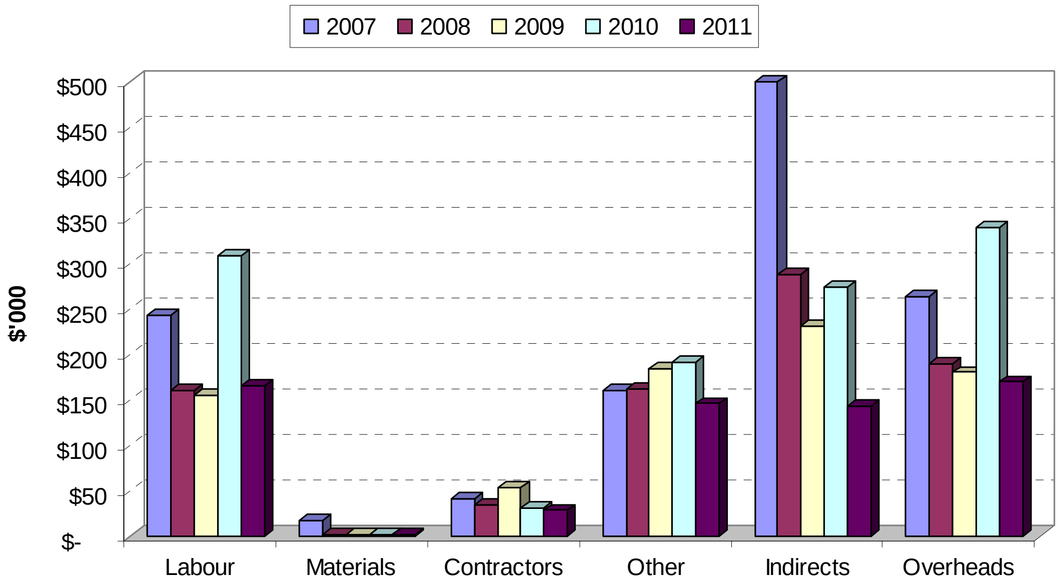

Figure 10-13. Breakdown of "Operations" costs by inputs for Bundaberg Bulk WSS[419]

It is noted that the costs estimates for 2012-2016 for the direct costs including "Labour", "Materials", "Contractors" and "Other" are at the same levels as those shown for 2011 within Figure 10-13 with minor increases for indexation.

The scope of this consultancy was to examine the direct costs which in this case are "Labour", "Materials", "Contractors" and "Other". As illustrated in Figure 10-13 above, there does not seem to be an upward trend with any of the direct cost factors.

418 Raw data extracted from SunWater spreadsheet *"IM Central -610.03.PSV.xls",*
419 Raw data extracted from SunWater spreadsheets *"IM Central -610.03.PSV.xls"* and *"Extract LBC data Conversion extra activity detail and preventive main split.xls*".

The following section seeks to examine in more detail “Operations” costs, by examining the sub activities (outputs) recorded under “Operations” (see Section 4 for a definition of each sub-activity).

SunWater adopted a new Business Operating Model and management accounting system in 2009/10. SunWater has acknowledged that during the process of re-categorising historical data, a number of activity expense items may have been in-correctly coded, particularly for 2007. Therefore the degree of accuracy for certain sub-activities in 2007 and 2008 to a lesser extent is questionable.

A breakdown of historical “Operations” expenditure by sub-activities is highlighted below in Table 10-3 and Figure 10-14. Unfortunately, a breakdown of costs for 2011 was not provided.

Table 10-3. Breakdown of historical “Operations” expenditure by activity for Bundaberg Bulk WSS

Real dollars, $'000	Financial Year			
	2007	2008	2009	2010
Customer Management	53	-	-	68
Workplace H&S	-	-	-	3
Environmental Management	167	-	-	73
Water Management	70	168	156	152
Scheme Management	613	405	413	646
Dam Safety	156	39	69	59
Schedule /Deliver	141	173	95	108
Metering	2	52	67	37
Facility Management	5	1	6	-
Other	21	0	0	- 0

Source: SunWater spreadsheet *“”Copy of Extract LBC data conversion to sub activity.xls”*

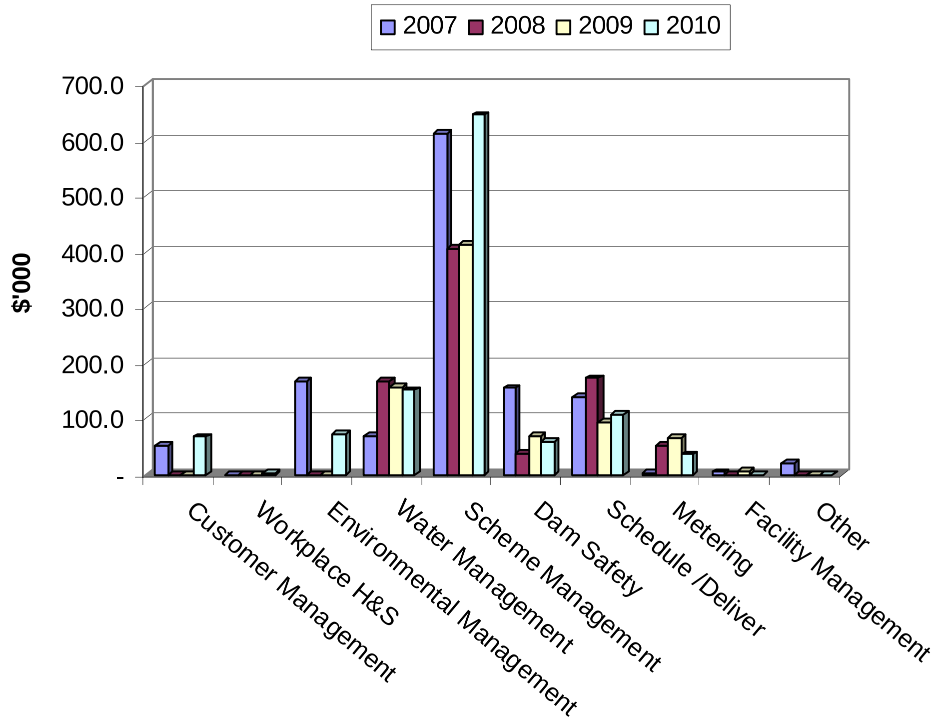

Figure 10-14. Overview of disaggregated historical "Operations" expenditure for Bundaberg Bulk WSS[420]

Customer Management

"Customer Management" includes interfacing & enquiries from customers, billing and account management, and water trading activities.

As indicated above in Table 10-3 and Figure 10-14, costs in "Customer Management" were only incurred in 2007 and 2010. As highlighted earlier within Figure 10-11, 2007 and 2010 were both relative high water utilisation years.

In Figure 10-15 "Labour" was the most significant direct cost between 2007 and 2010. Of interest is the fact that no "Overhead" costs were incurred for 2007, yet they are allocated in proportion to "Labour".

Aurecon suspects that the allocation in 2007 of "Materials" cost and "Contractor" costs are abnormalities associated with the repro-fitting of 2007 data into the new business model.

Due to the overhead cost allocation model, significant "Indirects" and "Overheads" are also added. For 2010, "Labour" costs represented 33.4% of total costs incurred for "Customer Management", with the remainder consisting of "Overheads" and "Indirects".

[420] Raw data extracted from SunWater spreadsheet *""Copy of Extract LBC data conversion to sub activity.xls"*.

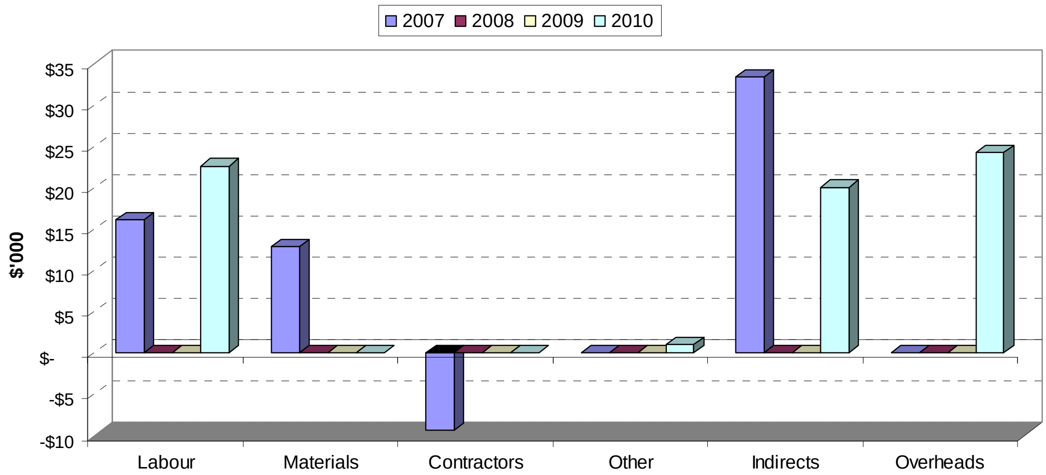

Figure 10-15. Overview of disaggregated "Customer Management" expenditure for Bundaberg Bulk WSS[421]

Aurecon forwarded the following questions to SunWater and received the following responses[422].

- Why are the costs for Labour only occurred in 2007 and 2010 and assumes no input in 2008 and 2009?

"These costs are attributable directly to the service contract and will be varied from year to year depended upon the nature of customer enquiries."

- What levels are Labour costs forecast for 2011?

"The forecast cost is based on 5 years average and taking into account SunWater Enterprise Agreement"

- What are the extent of Materials and Contractor costs for 2007 due to problems with retro-fitting of 2007 data into the new business model?

  "Yes"

Workplace Health and Safety

SunWater has a dedicated workplace, health and safety group to ensure compliance with legislative requirements throughout all workplaces. As such the group conducts regular safety audits and reviews of work practices and ensures that SunWaterstaff undertake regular training.

As indicated above in Table 10-3, a cost of $3,000 was recorded only in 2010, comprising of $1,000 in direct labour costs and $2,000 in "Indirects" and "Overheads".

Aurecon forwarded the following questions to SunWater and received the following responses[423].

- Costs were only recorded for 2010. Are they an irregular, or annual from 2010?

"These costs are attributable directly to the service contract and will be varied from year to year."

[421] Raw data sourced from SunWater spreadsheet "*Copy of Extract LBC data conversion to sub activity.xls*".
[422] SunWater responses are sourced from email dated 30th June 2011
[423] SunWater responses are sourced from email dated 30th June 2011

Environmental Management

Environmental Management includes the development of weed control plans, assessing impacts downstream of drains, and activities associated with environmental permits (normally undertaken by regional based environmental officer), liaison and coordination with relevant Government agencies and environmental regulators on site-specific issues.

As illustrated above in Figure 10-14 and Table 10-3, costs were incurred only in 2007 ($167,000) and 2010 ($73,000). Figure 10-16 below highlights that significant "Materials" and "Labour" costs were incurred in 2007, while in 2010 the main direct cost was "Labour".

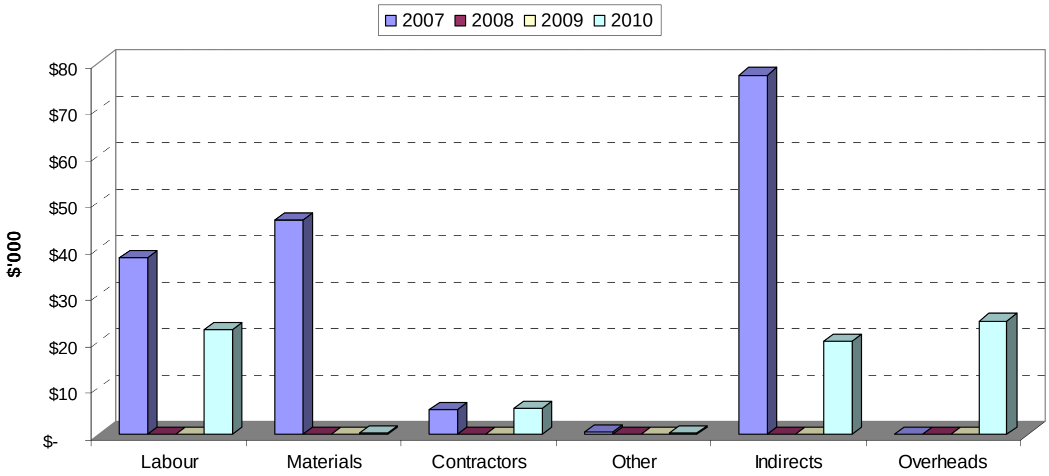

Figure 10-16. Overview of disaggregated "Environmental Management" expenditure for Bundaberg Bulk WSS[424]

Due to the cost allocation model, the scheme attracted significant "Indirects" and "Overheads".

A small expense of approximately $6,000 for "Contractors" was incurred in 2007 and 2010.

Aurecon forwarded the following questions to SunWater and received the following responses[425].

- Why were significant labour costs only recorded for 2007 and 2010

"These costs are attributable directly to Fred Haigh Environment Management and compliance and will be varied from year to year."

- Why were significant $40,000 Material expenses only recorded in 2007 and was it a result of 2007 coding issue with new business model)?

"2007 was a transition year in which the previous internal trade model was removed and the new BOM model developed and implemented in 2008. This transition period and changes are causing difficulties in comparability across time"

- At what level are Labour costs forecast for 2011?

"The forecast cost is based on 5 years average and taking into account SunWater Enterprise Agreement"

[424] Raw data sourced from SunWater spreadsheet "*Copy of Extract LBC data conversion to sub activity.xls*".
[425] SunWater responses are sourced from email dated 30th June 2011

Water Management

"Water Management" includes activities related with announcement of water allocations, water quality monitoring and sampling, Blue-Green algae management, SDL readings, shoreline inspections, monitoring of groundwater levels and salinity levels, bore measurements and preparation of data for NRMW and SunWater.

As illustrated above in Table 10-3, "Water Management" costs were incurred, more than doubling from $70,000 in 2007 to $168,000 in 2008. Costs in 2009 and 2010 have remained at over $150,000.

However, as illustrated below in Figure 10-17 a negative expense for "Materials" costs was incurred for 2007, possibly due to the retro-fitting of 2007 data into the new business model.

Figure 10-17 also highlights that "Labour" was the main direct cost, increasing substantially "Contractors" were also engaged at a cost of approximately $30,000 in 2009 and $15,000 in 2010.

Significant "Indirects" and "Overheads" are incurred due to the allocation model employed by SunWater.

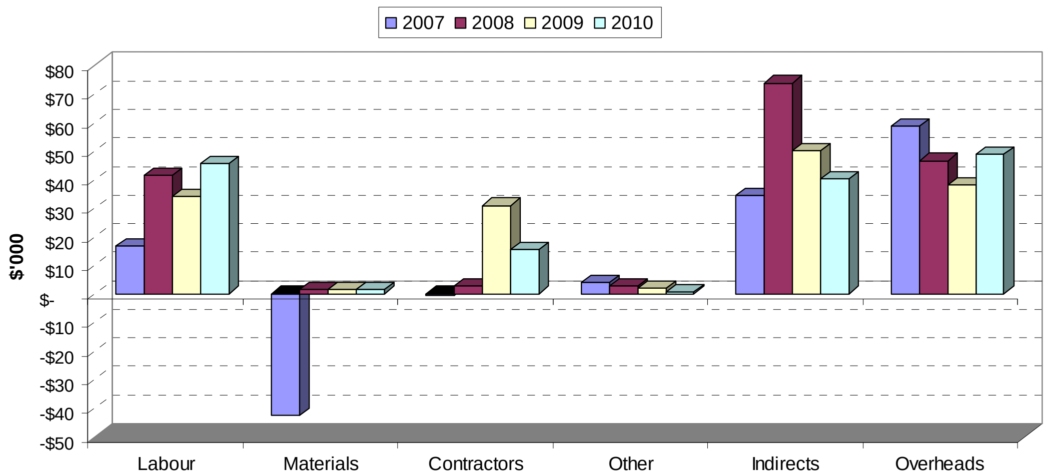

Figure 10-17. Overview of disaggregated "Water Management" expenditure for Bundaberg Bulk WSS[426]

Aurecon forwarded the following questions to SunWater and received the following responses[427].

- Why did labour increased substantially in 2009 onwards (low water utilisation year)?

"The labour increased is in the Fred Haigh Dam, the construction of the spillway upgrade in 2005 -2008 had slow work on the water management activity."

- Is the one-off "Materials" cost in 2007 a data coding issue?

"Yes"

- What services are delivered by Contractors in 2009 and 2010?

"The contractors related to water monitoring charges for Fred Haigh, Ned Churchward weir and Ben Anderson Barrage"

- What is the basis of Costs in 2011?

[426] Raw data sourced from SunWater spreadsheet "*Copy of Extract LBC data conversion to sub activity.xls*".
[427] SunWater responses are sourced from email dated 30th June 2011

"The forecast cost is based on 5 years average and taking into account SunWater Enterprise Agreement"

Scheme Management

"Scheme Management" includes the preparation and provision of reports and statistics for clients, including meetings with clients reviewing contract progress/performance, energy management including the review of electricity consumption tariffs and accounts, land and property management including legal advice, O&M Manual development, Scheme Strategies, OMS plans, Facility Contingency Plans and Emergency Action Plans (EAP) for all facilities other than dams, System Leakage Management Plans (SLMPs), insurance costs, rates, land taxes.

As highlighted in Figure 10-14 and Table 10-3, "Scheme Management" costs were by far the most costly activity, incurring an annual expense between $405,000 and $646,000 per annum between 2007 and 2010.

In Figure 10-18 below, the most significant on-going direct cost recorded is "Other", which predominantly includes Local Government rates, land taxes and Insurance. Costs increased from approximately $150,000 in 2007 to $180,000 in 2010. As indicated earlier, for 2011 Insurance costs were projected at $90,000, Local Government rates at $17,000 and Land taxes at $23,000, amounting to $140,000.

"Labour" input/expense is highly variable and possibly linked to water usage (as water usage highlighted in Figure 10-11 also peaked in 2007 and 2010). Within a year, "Labour" expense increased from approximately $60,000 in 2009 to $150,000 in 2010.

Significant "Indirects" and "Overheads" are also incurred due to the allocation model employed by SunWater.

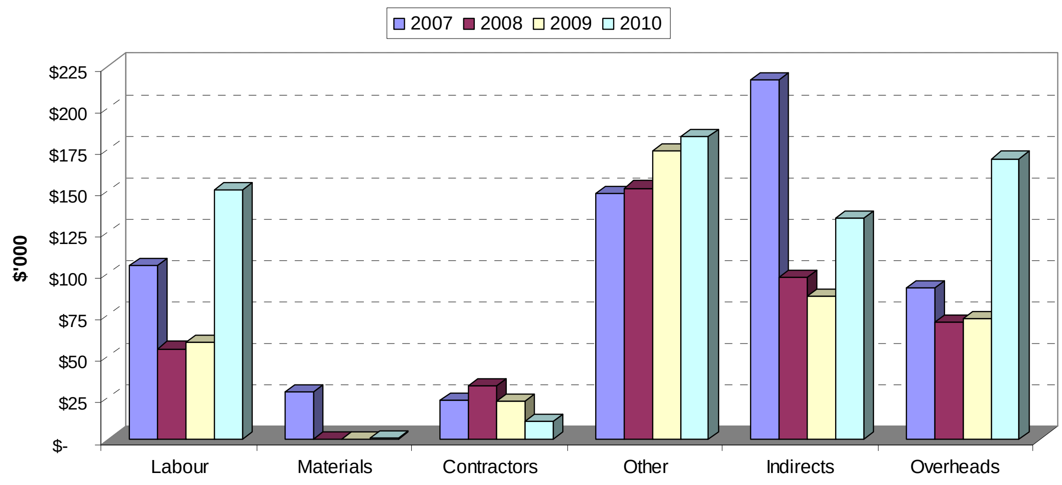

Figure 10-18. Overview of disaggregated "Scheme Management" expenditure for Bundaberg Bulk WSS[428]

Aurecon forwarded the following questions to SunWater and received the following responses[429].

- Why did Labour increased from $60,000 in 2009 to $150,000 in 2010 (costs follow water usage which was higher in 2010)?

[428] Raw data sourced from SunWater spreadsheet "*Copy of Extract LBC data conversion to sub activity.xls*".
[429] SunWater responses are sourced from email dated 30th June 2011

"These costs are attributable directly to the service contract and will be varied from year to year. For 2010, the new Irrigation pricing costs are also included in this activity."

- What made up the $180,000 in "Other" cost in 2010? In 2011 Insurance $90,000, Local rates $17,000 and Land tax $23,000 plus Admin amounts to $140,000. What other costs are included in the 2010 value of $180,000?

"2010 other costs related to Insurance $138,000, Land Tax $20,000 and Rates $10,000 and $8,000 or 5% on standard non labour overhead."

- What is the trend for 2011+

"The forecast cost is based on 5 years average and taking into account SunWater Enterprise Agreement"

Dam Safety

The Fred Haigh Dam is classified as a referable dam under the *Water Act 2000*[430]. As such, SunWater is required to have a comprehensive safety management program in place comprising policies, procedures and investigations to minimise the risk of dam failure. Routine dam safety inspections are carried out monthly, which include the monitoring of embankments, piezometers, seepage and general condition of the storages as defined in the dam surveillance specification.

As highlighted in Table 10-3 & Figure 10-14, "Dam Safety" costs have fluctuated substantially between 2007 and 2010, from $156,000 in 2007 to $59,000 in 2010.

Figure 10-19 below highlights that "Labour" was the most significant direct cost and decreased from approximately $30,000 in 2007 to approximately $20,000 in 2009 and 2010, a decrease of 33%. Figure 10-19 also highlights that significant Indirect and Overhead costs were allocated in 2007, however it is beyond the scope of this study.

Due to the overhead cost allocation model, significant "Overheads" and "Indirects" are also added. In 2010, the $20,000 in "Labour" costs also attracted $39,000 in "Indirects" and "Overheads" to the scheme.

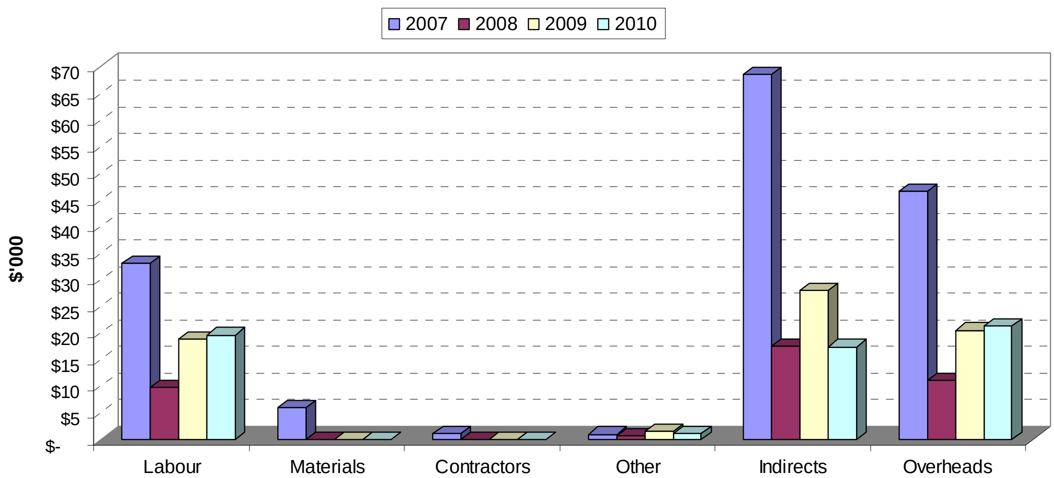

Figure 10-19. Overview of disaggregated "Dam Safety" expenditure for Bundaberg Bulk WSS[431]

Aurecon forwarded the following questions to SunWater and received the following responses[432].

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[430] Bundaberg WSS NSP (2012-2016), January 2011, Page 23.
[431] Raw data sourced from SunWater spreadsheet "*Copy of Extract LBC data conversion to sub activity.xls*".

- Labour costs spiked significantly in 2007, is this due to data coding difficulties?

  "*Yes"*
- Are Weir safety inspections included here?

  "Yes, it included both weir and dam safety inspection."
- Are what level are costs forecast for 2011?

  "The forecast cost is based on 5 years average and taking into account SunWater Enterprise Agreement, but excluding weir and dam inspections (move to Preventative Maintenance)"

Schedule/Deliver

"Schedule/Deliver" includes scheduling, releasing, operation of pump stations and SCADA, System surveillance including monitoring of water entitlement and observation of and reporting of any breaches, flood operations preparation, water harvesting, ROP compliance of water levels and flows and reporting of water information.

As indicated above in Figure 10-14 and Table 10-3 "Schedule/Deliver" costs varied between $95,000 (2009) and $173,000 (2008) (about the second largest output activity in terms of expense between 2007 and 2010). Of concern is the fact that costs rose in 2009 to $163,000, yet water usage declined. In 2010, costs decline substantially to $77,000 (reduction of 52%) yet water usage in 2010 actually increases.

Figure 10-20 highlights that "Labour" was the most significant direct cost, varying between $25,000 in 2009 to $40,000 in 2008 (60% reduction). Of interest is the fact that 2008 was a low water use year, yet costs spiked in this year.

"Other" have remained constant between 2007 and 2010 at approximately $7,000 per annum, while a substantial one-off negative expense for "Materials" was recorded for 2007 (likely coding error due to the retro-fitting of data in 2007 into the new business model).

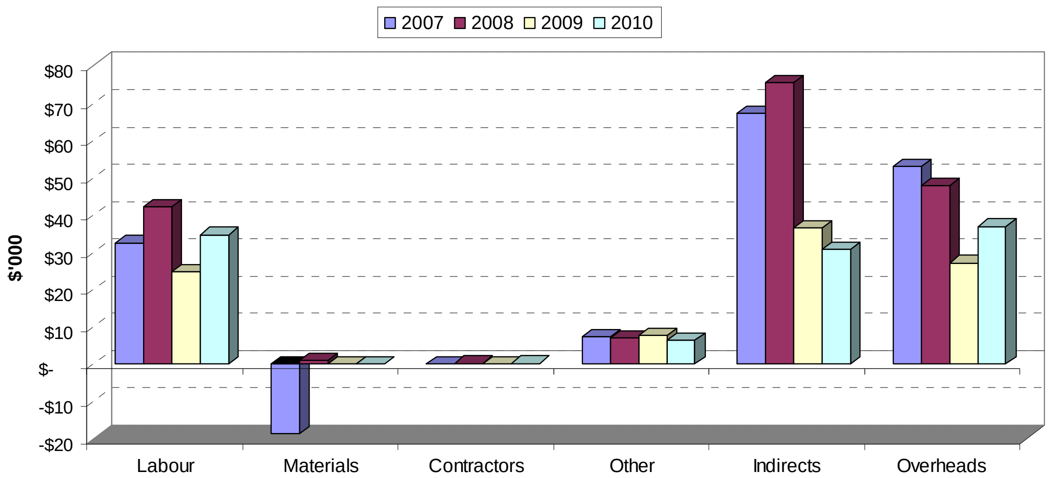

Figure 10-20. Overview of disaggregated "Schedule/Deliver" expenditure for Bundaberg Bulk WSS[433]

Due to the overhead cost allocation model, significant "Indirects" and "Overheads" are also added. In 2010, the $24,000 in "Labour" costs also attracted $46,000 in "Indirects" and "Overheads" towards the scheme.

[432] SunWater responses are sourced from email dated 30th June 2011
[433] Raw data sourced from SunWater spreadsheet "*Copy of Extract LBC data conversion to sub activity.xls*".

Aurecon forwarded the following questions to SunWater and received the following responses[434].

- Could you provide background information regarding Labour use, and why Labour spiked in 2008 when water usage was actually down in that year?

  "Labour spiked in 2008 due to increase in schedule activity in Ned Churchward weir and Ben Anderson Barrage."

- Confirmation that Material negative expense in 2007 is incorrect coding error

  "Yes"

- At what level are costs forecast for 2011?

  "The forecast cost is based on 5 years average and taking into account SunWater Enterprise Agreement."

Metering

As highlighted in Table 10-3 "Metering" costs have increased from $2,000 in 2008 (introduction of meters to customers) to $37,000 in 2010. However, "Metering" costs did increase to $67,000 in 2009, before decreasing to $37,000 in 2010.

The Bundaberg Bulk WSS has a total of 1,109 bulk customers of whom 900 take water from the distribution network[435]. Therefore a maximum of approximately 209 bulk customers exist solely on the river systems, requiring meters to be read by SunWater staff on a quarterly basis. SunWater has advised (email dated 30th June 2011) that a total of 264 meters were read in 2010.

In comparison, the neighbouring Barker Barambah Bulk WSS has a total of 219 meters incurring a cost of $43,000 in "Metering" costs in 2010. However, the Boyne River and Tarong WSS has 172 meters, and only recorded $6,000 "Metering" expense in 2010. Clearly, there is a large variation in metering costs (correlated to distance travelled per meter, meter access, etc) across schemes, and therefore little value in comparing the costs incurred between schemes.

Figure 10-21 highlights key input cost components for "Metering". A one-off negative expense for "Materials" was recorded for 2007, and is most likely a coding error due to the retro-fitting of data in 2007 into the new business model.

Figure 10-21 also highlights "Labour" as the only direct cost component, starting in 2008 ($13,000) with the introduction of meter readings. Labour costs increase in 2009 ($19,000) before decreasing in 2010 at $13,000.

Approximately 34.0% of the total recorded costs are actual direct labour costs, with the remainder being "Indirects" and "Overheads". In 2010, "Labour" costs for "Metering" was $13,000 with "Indirects" and "Overheads" accounting for the remaining $24,000.

[434] SunWater responses are sourced from email dated 30th June 2011

[435] Source: SunWater *Bundaberg WSS NSP*, (2012-2016) January 2011, page 14.

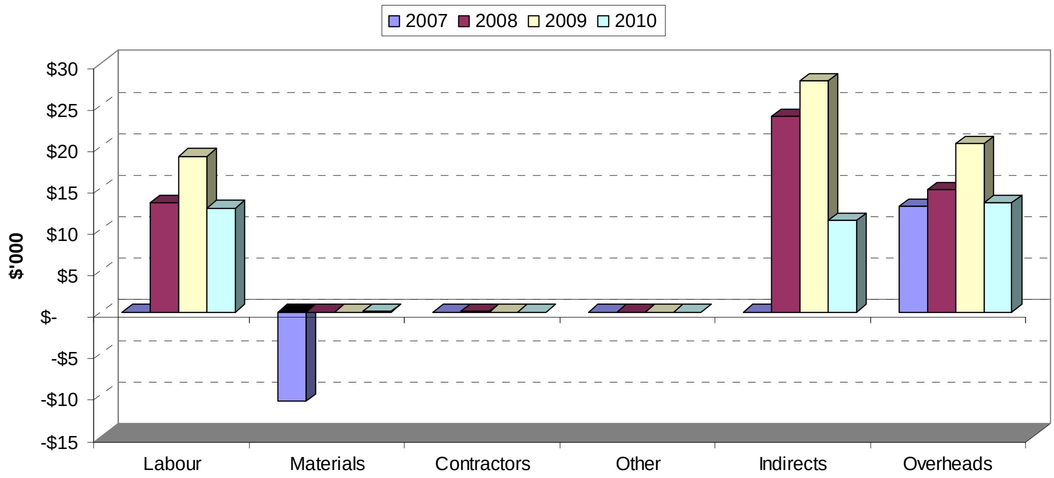

Figure 10-21. Overview of disaggregated "Metering" expenditure for Bundaberg Bulk WSS[436]

Stakeholders have raised the issue that there are more cost effective strategies to avoid reading these meters each quarter by SunWater staff.

Aurecon notes that "*Customers can also enter their own meter readings into SunWaterOnline to obtain up-to-date information about water use and availability*[437]."

Aurecon requested additional information from SunWater regarding options for meter reading, and incentives/opportunities for users to read and record their own meters on line. Section 4 provides an overview of SunWater's response, and Aurecon's view.

Aurecon also sought confirmation regarding the number of meters installed since 2009. SunWater advised that no meters were installed since 2009 indicating that all 264 meters were installed prior to 2009. Aurecon questions if SunWater identified substantial labour efficiencies in 2010, as metering costs decreased substantially yet time taken to read would be expected to be relatively constant.

Facility Management

"Facility Management" costs are commonly related to the maintenance of facilities, predominantly recreational. Bundaberg Bulk WSS does not have any recreational facilities.

As highlighted within Table 10-3, costs of $5,000 were recorded in 2007, $1,000 in 2008 and $6,000 in 2009.

Prudency and Efficiency of Operations Expenditure

As highlighted within Table 10-2, direct costs for Operations expenditure has increased from $463,000 in 2007 to $534,000 in 2010. Note that the proposed expenditure for 2011 is $342,000. SunWater states that the 2011 costs were estimated based on average of the preceding 4/5 years, which equates to $438,000 (based on the information presented within this report).

[436] Raw data sourced from SunWater spreadsheet "*Copy of Extract LBC data conversion to sub activity.xls*".
[437] Source: SunWater *Bundaberg WSS NSP*, (2012-2016) January 2011, Page 16.

Sunwater advised that a number of weir safety inspections costs that were previously recorded under Dam Safety, are now incorporated to Preventive Maintenance activity. These activities amount to a direct labour cost of approximately $5,500.

Taking into account the reduction in Dam Safety costs for 2011 of $5,500, Aurecon cannot replicate the total Operations costs proposed for 2011 based on averaging 2007 to 2010 costs (major disparity of $90,000).

The provision of disaggregated historical activity data for “Operations” by SunWater, provided substantial insights, and identified substantial activities and issues requiring additional information and explanation from SunWater. As highlighted throughout this section, SunWater has provided responses to additional questions, which in most cases provided valid information.

However, SunWater was not able to provide 2011 cost estimates for the sub-activities, which Aurecon views as critical in verifying the prudency and efficiency of these costs. Aurecon recommends that to fully verify the prudency and efficiency of 2011 expenditure, the following information and analysis is required:

- 2011 cost estimates for sub-activities be released and examined to ensure compliance with SunWater’s averaging methodology for preceding 4 years,
- cost estimates for metering be based on 2010 costs (assuming that is the first time all installed meters were read, and major labour efficiency measures were gained in comparison to 2009)
- the Dam Safety forecast 2011 costs is reduced by $5,500 to account for the transfer of activities to Preventive Maintenance.

Aurecon notes that the major increase within forecast Operations costs for 2012-2016 is driven by substantial Indirect costs, particularly 2014, which is outside the scope of this study.

10.4.5 Preventive Maintenance costs

SunWater has defined “Preventive Maintenance” as activities related to the ongoing operational performance and service capacity of physical assets as close as possible to designed standards. SunWater[438] states that “Preventive maintenance” is cyclical in nature with a typical interval of 12 months or less, and includes the following key output activities:

- Condition monitoring; the inspection of assets to determine preventive maintenance requirements
- Servicing; planned maintenance activities normally expected to be carried out routinely

A review of SunWater’s reporting system also revealed that “Weed Control” was also a key output activity associated with “Preventive Maintenance” to which costs were assigned. As indicated earlier within Figure 10-11 “Weed Control” costs were significant in terms of labour input. Considering that it is a bulk water supply scheme, weed control costs would expect to be minimal, with the possible exception of land based weed control around the bulk assets (Fred Haigh Dam, Bucca Weir, Ned Churchward Weir, Ben Anderson Barrage) and access roads.

Projected “Preventive Maintenance” costs for the Bundaberg Bulk WSS are highlighted below in Table 10-4. As a proportion of “Total Operating” costs, “Preventive Maintenance” costs have varied from 8.4% in 2010 to 21.3% in 2008.

[438] SunWater, *Bundaberg Bulk WSS NSP,* (2012-2016) January 2011, Page 28.

Table 10-4. "Preventive Maintenance" costs and "Total Operating" costs for Bundaberg Bulk WSS

($'000)	Actuals				Forecast	Price Path				
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Preventive Maintenance[1]	296	256	144	124	292	295	312	319	314	306
Annual change		-13.5%	-43.8%	-13.9%	135.5%	1.0%	5.8%	2.2%	-1.6%	-2.5%
Change since 2007		-13.5%	-51.4%	-58.1%	-1.4%	-0.3%	5.4%	7.8%	6.1%	3.4%
Total Operating Costs[1]	1713	1200	1060	1473	1047	1056	1106	1129	1116	1093
Preventive M as % of Total Operating cost	17.3%	21.3%	13.6%	8.4%	27.9%	27.9%	24.2%	28.2%	28.1%	28.0%

[1]Source*:* *Bundaberg WSS NSP,* (2012-2016) January 2011, Page 7.

As indicated earlier, SunWater's deployment of a new Business Operating Model and management accounting system required the retrospective transfer of cost data for 2007 and 2008. A recent review found errors associated with labour input recording and coding (See Section 4), resulting in some schemes incurring a spike in "Preventive Maintenance" costs in 2007. As indicated above in Table 10-4 (Figure 10-22 below) costs for the scheme were up in 2007, indicating that there may have been some costs incorrectly coded and allocated to "Preventive Maintenance" in 2007.

The average annual "Preventive Maintenance" cost (historical) between 2007 and 2010 was $205,000 per annum. The projected "Preventive Maintenance" cost in 2011 of $292,000 represents an increase of 42.4%.

Some stakeholders expressed an interest examining "Preventive Maintenance" costs against water usage. As indicated below in Figure 10-22 there does not seem to be a consistent correlation between costs and water usage. In particularly, water usage in 2011 is projected to be much lower than in 2010, yet "Preventive Maintenance" costs are projected to increase by 135%.

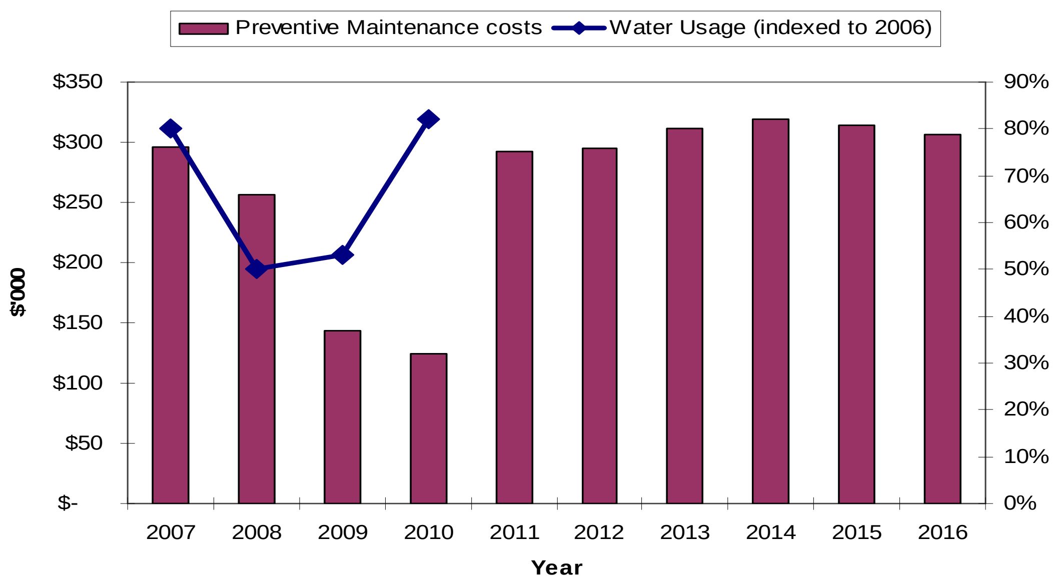

Figure 10-22. Comparison of "Preventive Maintenance" costs against water usage (indexed against 2007) for Bundaberg Bulk WSS[439]

[439] Raw data extracted from *Bundaberg Bulk WSS NSP,* (2012-2016) January 2011, Pages 7 and 15.

The following sections seeks to examine in more detail the components that make up the "Preventive Maintenance" costs presented within Table 10-3 above, and examine where changes have occurred.

As illustrated below in Figure 10-23 below, "Overheads" and "Indirects" represent 61.3% of the projected total cost in 2011. Other significant components are "Labour" at 32.9% (which was examined earlier), and "Materials" at 3.1%.

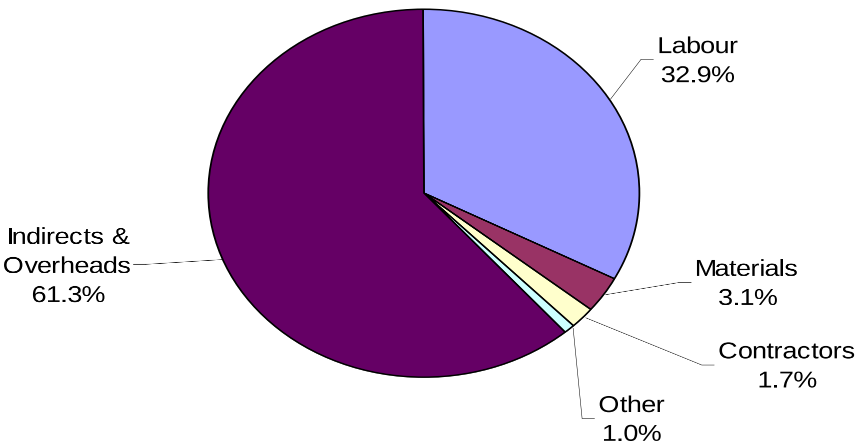

Figure 10-23. Breakdown of cost inputs for "Preventive Maintenance" for Bundaberg Bulk WSS in 2011[440]

Figure 10-24 below provides a breakdown of the key cost input components for "Preventive Maintenance" between 2007 and 2011.

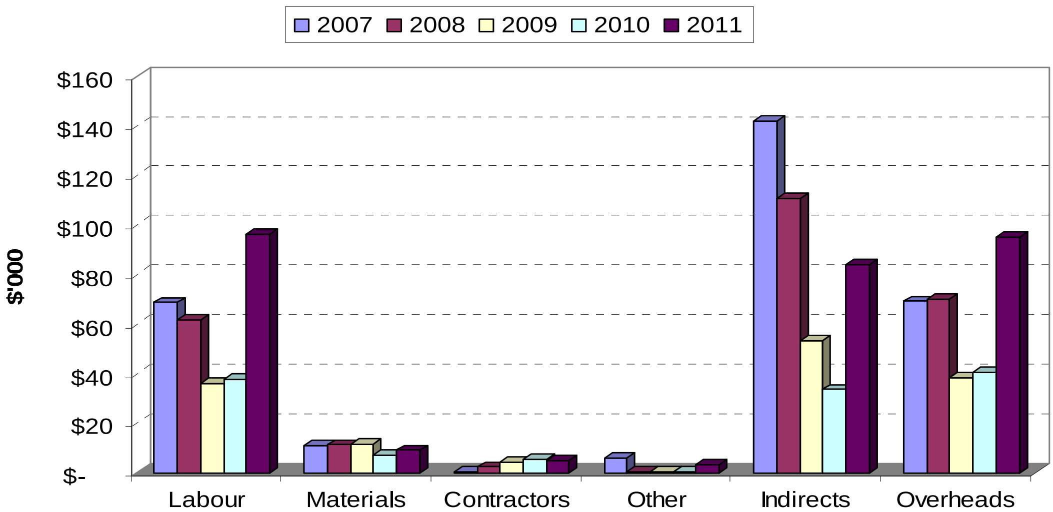

Figure 10-24. Breakdown of cost inputs towards "Preventive Maintenance" for Bundaberg Bulk WSS 2007 - 2011[441]

[440] Raw data extracted from SunWater spreadsheet *"IM Central -610.03.PSV.xls"*.
[441] Raw data extracted from SunWater spreadsheets *"IM Central -610.03.PSV.xls"* and *"Extract LBC data Conversion extra activity detail and preventive main split.xls*".

As indicated in Figure 10-24 “Overheads” are allocated almost in direct proportion to that of “Labour”, while “Indirects” seem to be apportioned on a different basis, but are also very significant. The scope of this consultancy was to examine the direct costs, which in this case are “Labour”, “Materials”, “Contractors” and “Other”.

Of the direct costs, “Labour” is the main cost item. Including the 2007 data, then the average annual “Labour” expense between 2007 and 2010 was $51,000 per annum, yet SunWater is projecting a “Labour” cost estimate of $96,000 for 2011 (almost double). The analysis below seeks to examine “Labour” expenditure in detail.

SunWater also provided the NSP consultants with a breakdown of historical “Preventive Maintenance” costs by output activity, which is defined earlier as “Condition Monitoring”, “Servicing” and “Weed Control”. As indicated below in Figure 10-25, “Servicing” costs were approximately $92,000 in 2007 only, but have since incurred annual expenses of $3,000 to $7,000. As noted earlier, the retrospective transfer of cost data for 2007 into the new business model incorrectly coded many activities. Aurecon did question SunWater regarding the “Servicing” cost spike in 2007, to which SunWater confirmed a data coding error (SunWater email date 30th June 2011).

“Weed Control” would be related to on-land weed control (woody weeds) activities, particularly around structures including Fred Haigh Dam and the weirs, and various access roads. As indicated below in Figure 10-25 “Weed Control” costs have declined from $55,000 (2007) to approximately $22,000 in 2010. Unfortunately SunWater has not provided a breakdown of costs for 2011 onwards by output activity as illustrated in Figure 10-25.

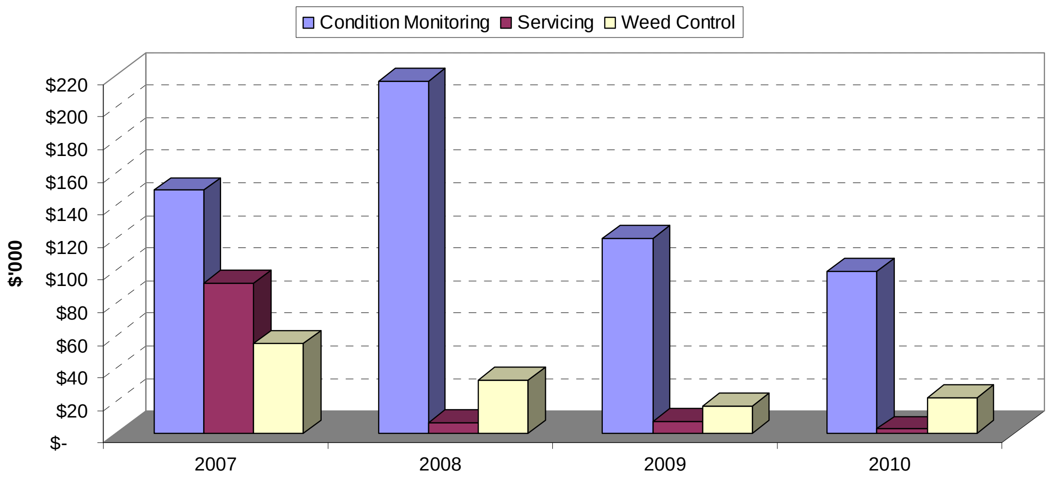

Figure 10-25. Breakdown of output activities under “Preventive Maintenance” for Bundaberg Bulk WSS[442]

Note that “”Labour” is the main direct cost within “Weed Control”, and in 2010 was $7,000 in total (Figure 10-26). Between 2007 and 2010, “Labour” costs for “Weed Control” has varied between $4,000 and $13,000 per annum, averaging $8,000 per annum.

[442] Raw data extracted from SunWater spreadsheet *“Extract LBC data Conversion extra activity detail and preventive main split.xls*”.

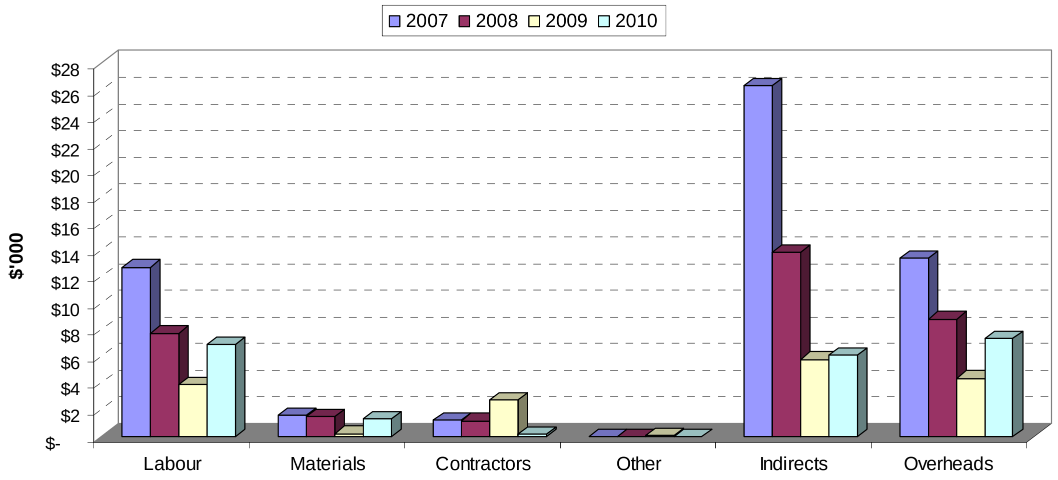

Figure 10-26. Breakdown of input costs towards Weed Control for Bundaberg Bulk WSS 2007-2010[443]

Validating the forecast Preventive Maintenance costs for 2011-2016

As indicated earlier within Table 10-4, forecast "Preventive Maintenance" costs for 2011 is $292,000, more than doubling the 2010 expense incurred of $124,000. This section seeks to examine the validity of this cost increase.

As highlighted earlier within Figure 10-23, the main direct cost for 2011 is "Labour" which accounts for 32.9% of total costs, or $96,000. The following analysis seeks to examine the prudency and efficiency of the proposed $96,000 "Labour" expense for "Preventive Maintenance".

SunWater has developed Operation and Maintenance manuals for the scheme, which detail the maintenance activities to be undertaken for "Condition Monitoring" and "Servicing", along with frequency. A recent review by Parsons Brinkerhoff (2010A) examined each of the individual activities specified within SunWater's Operation and Maintenance manual for the Bundaberg Bulk WSS, and validated the proposed activities and frequency prescribed. The Parsons Brinkerhoff (2010A) report also quantified the required man hours input required for each activity along with cost based on SunWater's internal hourly rates (see Section 4 for more details).

Of importance is the fact that the Parsons Brinkerhoff (2010A) study identified the following new activities that were not previously recorded under Preventive Maintenance (Table 10-5).

Table 10-5. New "Preventive Maintenance" activities not previous recorded within the system for Bundaberg Bulk WSS

Activity	Annual Hours	Labour cost
(a) Monthly Dam Safety Inspection – Bucca Weir.	50	$1,850
(b) Monthly Dam Safety Inspection – Fred Haigh Dam	50	$1,850
(c) Ned Churchward Monthly Safety inspection	50	$1,850
Ned Churchward - Annual Flood Operations Preparation[1]	0	$ -
Burnett River Gauging Stations 12M Condition Monitoring	64	$2,368
Kolan River Gauging Stations 12M Condition Monitoring	64	$2,368
TOTAL New Activities	278	$10,286

Source: Parsons Brinkerhoff, "Provision of Services for Costing SunWater's Work Instructions" (2010A), working appendices Spreadsheets.

[1]*Aurecon suspects that a need for Annual Flood Operations Preparation was identified by Parsons Brinkerhoff for Ned Churchward Weir, but were unable to quantify the hours of input required.*

[443] Raw data extracted from SunWater spreadsheet *"Extract LBC data Conversion extra activity detail and preventive main split.xls"*.

Aurecon notes that the Parsons Brinkerhoff (2010A) report identified additional need for monthly inspections for the weirs (“a” to “c” within Table 10-5), yet also notes that within “Operations” a cost expense of $59,000 was incurred in 2010 under “Dam Safety” (Table 10-3). SunWater has informed Aurecon that these activities for the 2012-2016 price path have been transferred from “Dam Safety” (“Operations”) to Preventive Maintenance.

Table 10-5 also highlights the additional need for Condition Monitoring of the gauging stations on the Burnett River and Kolan River, requiring a total of 128 hours per annum.

Table 10-6 below highlights the key findings from the Parsons Brinkerhoff (2010A) study, particularly the recommended hours for SunWater labour input (2011) against historic labour input between 2007 and 2010 by SunWater staff.

Table 10-6. Required labour input for “Preventive Maintenance” for Bundaberg Bulk WSS

Year	Hours	Direct annual labour cost	% of 2011 hours
2007*	1,159*	$49,024	73.9%
2008	695	$22,926	44.3%
2009	838	$29,782	53.4%
2010	836	$30,036	53.3%
Average 2007 - 2010	882	$32,942	56.2%
Proposed for 2011	**1,569**	**$90,957**	

Source: Parsons Brinkerhoff, “Provision of Services for Costing SunWater’s Work Instructions” (2010A), working appendices Spreadsheets

*May include substantial error due to retro-fitting of historical data into the new business model

The Parsons Brinkerhoff report (2010A) recommend a total of 1,569 hours for “Preventive Maintenance” activities (“Condition Monitoring” and “Servicing” only, ignoring “Weed Control”) at a direct annual labour cost of $90,957 (Table 10-6). This includes 278 hours of new activities identified in Table 10-5 above.

As indicated above in Table 10-6, SunWater has incurred between 695 and 1,159 hours of labour input between 2007 and 2010 (noting that the 2007 input of 1,159 hours as questionable) resulting in average input of 882 hours per annum. Aurecon recommends that the following be initially accepted for “Preventive Maintenance” (“Condition Monitoring” and “Servicing”):

- 882 hours, being the average for 2007 to 2010, and
- 278 hours for additional “Condition Monitoring” activity (Table 10-5)

Costing “Preventive Maintenance” labour at $50 per hour[444], then the labour cost for 1,160 hours is $58,000 per annum. Note that the Parsons Brinkerhoff analysis (2010A) itemised each activity labour requirement, and staff increment level requirement. Of interest is that SunWater’s average hourly labour expense in 2010 was $35.93 per hour, yet the average hourly labour expense from the cost Parsons Brinkerhoff analysis (2010A) equates to $57.97 per hour.

Costing of labour input towards “Weed Control” is also required. The following labour expense for Weed Control was identified[445]:

- $12,700 in 2007
- $7,700 in 2008

[444] Based on using the latest financial cost incurred, ie. 2010 data in Table 10-6 dividing total labour cost of $30,036 by total hours of 836 equals $35.93/hr. Aurecon has proposed average labour cost of $50.00hr to account for salary increments for SunWater field staff, and engagement of higher level staff to undertake certain duties. Aurecon notes The Parsons Brinkerhoff (2010) analysis recommended 1,569 hours for an annual labour cost of $90,957, equating to average of $57.97/hr. The difference between the hourly labour expense incurred for 2010, versus the projected hourly rate by Parsons Brinkerhoff (2010) is most likely due to assumptions of using more senior SunWater staff at higher pay/cost increment.

[445] Raw data sourced from SunWater spreadsheet “*Copy of Extract LBC data conversion to sub activity.xls*”.

- $3,900 in 2009
- $6,900 in 2010

As indicated earlier, the reliability of 2007 data is highly questionable; however regional feedback has indicated that “Weed Control” costs were up significantly in many areas in 2007. Aurecon recommends that “Labour” for “Weed Control” be based on the average for 2007 to 2010 plus 10%, equating to $7,800.

Aurecon recommends that the total budgeted cost for “Preventive Maintenance” labour be set at $65,800 comprising $58,000 for “Condition Monitoring” and “Servicing” and $7,800 for “Weed Control”. This is a reduction from the $96,000 currently projected for 2011, and will also reduce the allocation of “Indirects” and “Overheads” based on the existing allocation methodology that SunWater has adopted.

Aurecon recommends that an audit be undertaken of the Parsons Brinkerhoff work against historical labour input for 2010 in particularly for itemised “Preventive Maintenance” activities, to identify the reasons for the discrepancy between projected labour input requirements against historical, and also examine the variance in hourly charges between that incurred in 2010 by SunWater and that recommended by the Parsons Brinkerhoff (2010) study.

10.4.6 Corrective Maintenance costs

SunWater describes “Corrective Maintenance” as an unexpected failure requiring reactive corrective maintenance response. Two main types of activities:

- Emergency breakdown maintenance, requiring immediate action to restore normal operation or supply to customer to meet a regulatory obligation
- Non-emergency maintenance, activities no requiring immediate response but scheduled in advance of the planned maintenance cycle[446]

Projected “Corrective Maintenance” costs (including both emergency and non-emergency maintenance) for the Bundaberg Bulk WSS are highlighted below in Table 10-7. As a proportion of “Total Operating” costs, “Corrective Maintenance” costs vary from 9.7% in 2008 to 16.5% in 2010.

Table 10-7. “Corrective Maintenance” costs and “Total Operating” costs for Bundaberg Bulk WSS

($’000)	Actuals				Forecast	Price Path				
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Corrective Maintenance[1]	192	116	134	243	116	117	122	125	124	122
Annual change		-39.6%	15.5%	81.3%	-52.3%	0.9%	4.3%	2.5%	-0.8%	-1.6%
Change since 2007		-39.6%	-30.2%	26.6%	-39.6%	-39.1%	-36.5%	-34.9%	-35.4%	-36.5%
Total Operating Costs	1713	1200	1060	1473	1047	1056	1106	1129	1116	1093
Corrective M as % of Total Operating cost	11.2%	9.7%	12.6%	16.5%	11.1%	11.1%	11.0%	11.1%	11.1%	11.2%

[1]Source*: Bundaberg WSS NSP,* (2012-2016) January 2011, Page 7.

[446] SunWater, *Bundaberg Bulk WSS NSP,* (2012-2016) January 2011, page 28.

The average annual "Corrective Maintenance" cost (historical) between 2007 and 2010 was $171,000 per annum. The projected "Preventive Maintenance" cost in 2011 of $116,000 represents a decrease of 32.2%.

For some schemes "Corrective Maintenance" costs are partially correlated to follow water usage levels. As indicated below in Figure 10-27 there seems to be a correlation between water usage and costs. As indicated earlier, water usage is projected to be lower in 2011, and of interest "Corrective Maintenance" costs are projected to decline substantially.

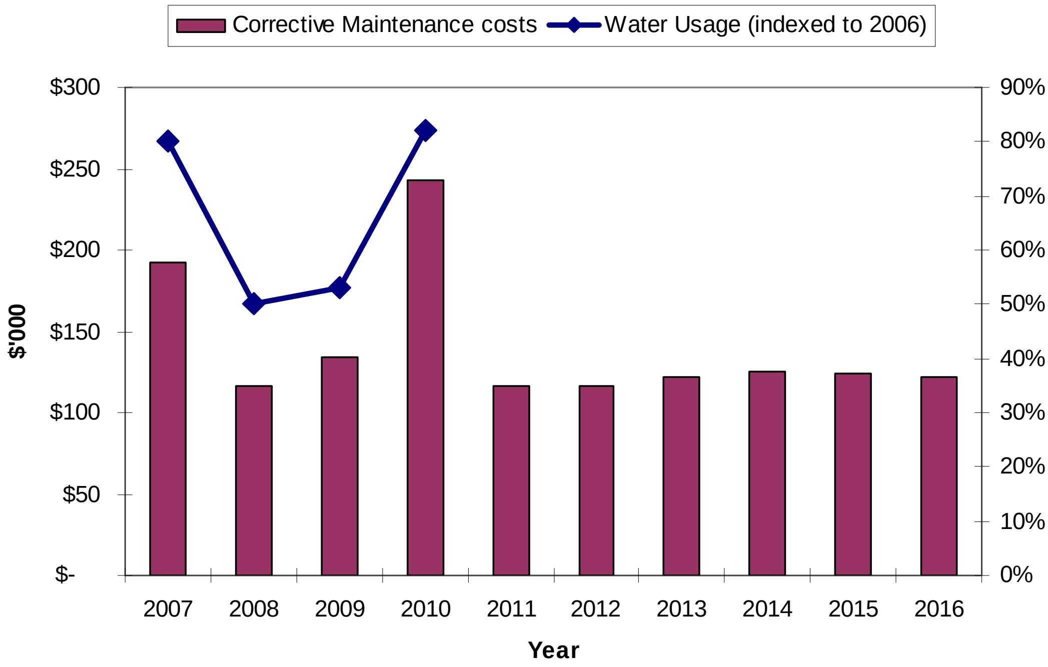

Figure 10-27. Comparison of "Corrective Maintenance" costs against water usage (indexed against 2006) for Bundaberg Bulk WSS [447]

The following sections seeks to examine in more detail the components that make up the "Corrective Maintenance" costs and examine in detail (data available) where changes have occurred.

As illustrated below in Figure 10-28 below, "Overheads" and "Indirects" account for 44.0% of the projected total cost in 2011. Other significant components are "Labour" at 22.4%, "Materials" and "Contractors" both at 12.9%, and "Other" at 7.8%.

[447] Raw data sourced from *Bundaberg Bulk WSS NSP,* (2012-2016) January 2011, Pages 7 and 14.

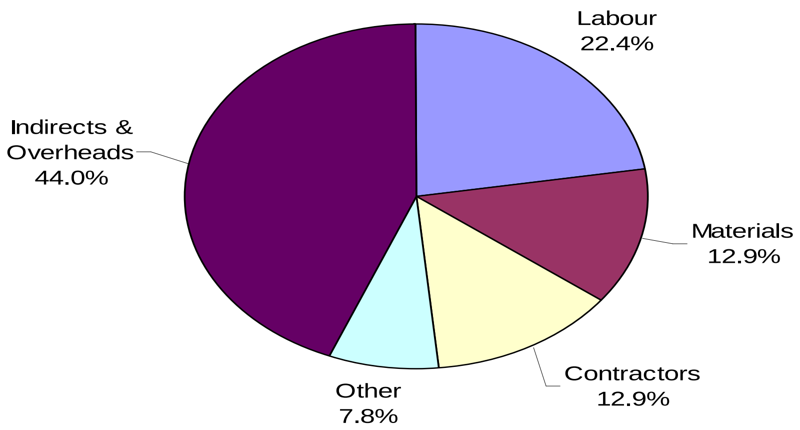

Figure 10-28. Breakdown of cost inputs towards "Corrective Maintenance' for Bundaberg Bulk WSS in 2011[448]

Figure 10-29 below provides a breakdown of the key input cost components of "Corrective Maintenance" between 2007 and 2011.

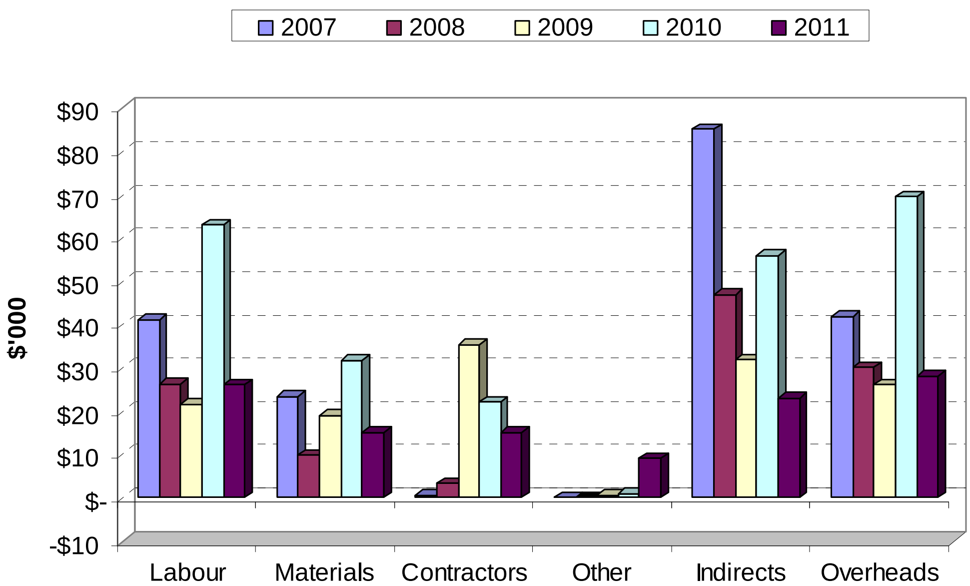

Figure 10-29. Breakdown of cost inputs towards "Corrective Maintenance" for Bundaberg Bulk WSS 2007 – 2011[449]

Aurecon notes that the projected cost in 2011 forms the basis for the next price path (2012-2016) (subject to inflation indexation). The scope of this consultancy was to examine these direct costs, which in this case are "Labour", "Materials", "Contractors" and "Other".

As illustrated in Figure 10-29 above "Labour" costs varied substantially between 2007 and 2010, averaging $38,000 per annum. In 2011 "Labour" costs are projected to decline to $26,000, which is 31.5% lower than the average for 2007 – 2010. Note that SunWater explained that the cost spike in 2010 was related to a number of projects in the Ned Churchward weir (SunWater email dated 30th June 2011).

[448] Raw data extracted from SunWater spreadsheet *"IM Central -610.03.PSV.xls"*.
[449] Raw data extracted from SunWater spreadsheets *"IM Central -610.03.PSV.xls"* and *"Extract LBC data Conversion extra activity detail and preventive main split.xls*".

“Materials” costs are also significant and variable, following the movement of “Labour” costs. The average “Materials” cost for 2007 to 2010 was $21,000 per annum, yet SunWater is proposing a slightly lower “Materials” cost of $15,000 in 2011.

Contractors are also utilised for “Corrective Maintenance”. Costs have varied from $1,000 in 2007 to $35,000 in 2009, averaging $15,000 per annum over the 2007 to 2010 period. Note that the “Contractor costs in 2009 relate to one-off jobs, particularly the refurbishment of the road surface at the recreational area (SunWater email date 30th June 2011). SunWater has projected future “Contractor” costs from 2011 at $15,000 per annum.

Aurecon notes that it is difficult to forecast “Corrective Maintenance” costs. SunWater’s approach to use historical expenditure as the basis for forecasting, is commonly utilised by other water utilities. The historical average annual direct expense incurred (2007-2010) was $75,000, yet SunWater has projected 2011 at $65,000 or 3.3% lower than the 2007-2010 expense.

Based on the historical data provided by SunWater and comparative analysis of historical expenses against forecast costs for 2011 and 2012 to 2016, Aurecon views proposed “Corrective Maintenance” direct costs for the scheme as being prudent and efficient.

Total Maintenance expenditure

SunWater has indicated its intention to move to a reliability maintenance approach (RCM), which is a rick based process that can assist in providing the optimal mix of “Preventive” and “Corrective Maintenance”. Table 10-8 below highlights the direct costs attributed to “Corrective” and “Preventive Maintenance”, and also indicates that “Total Maintenance” costs in 2011 are 18.1% higher than that recorded for 2007, which is quite significant. In addition, concerns have been raised regarding the accuracy of the data for “Preventive Maintenance” in 2007.

Table 10-8. “Total Maintenance” costs for Bundaberg Bulk WSS

Direct Expenditure ($’000)	Actuals				Forecast	Price Path				
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Preventive Maintenance	86	76	52	50	113	118	123	126	129	133
Corrective Maintenance	65	39	76	118	65	68	71	73	76	78
Total Maintenance	**151**	**115**	**129**	**168**	**179**	**186**	**193**	**199**	**205**	**211**
Annual change		-23.9%	12.0%	30.8%	6.1%	4.0%	4.0%	3.0%	3.0%	3.0%
Change since 2007		-23.9%	-14.8%	11.4%	18.3%	23.0%	27.9%	31.7%	35.6%	39.7%
Preventive maintenance %	57.0%	65.9%	40.6%	30.0%	63.4%	63.4%	63.4%	63.3%	63.1%	63.0%
Corrective maintenance %	43.0%	34.1%	59.4%	70.0%	36.6%	36.6%	36.6%	36.7%	36.9%	37.0%

[1]Source: Raw data extracted from SunWater spreadsheets *“IM Central -610.03.PSV.xls”* and *“Extract LBC data Conversion extra activity detail and preventive main split.xls*”.

Although not stated at this time, it is highly likely that SunWater will identify an optimal ratio of (Preventive: Corrective) maintenance expenditure based on the RCM approach, which may be different to the 63%:37% ratio projected above for Bundaberg Bulk.

10.4.7 Scheme specific issues

Stakeholders have raised the issue that Paradise Dam customers were utilising parts of the scheme, but not making a financial contributions (or only part contribution) towards the scheme costs.

Aurecon requested additional information from SunWater pertaining to Paradise Dam customers utilising assets of the Bundaberg schemes, and what processes were in place for allocating the scheme costs to these customers. Aurecon did not receive a response from SunWater at the time this report was finalised.

Based on limited discussions with various stakeholders, Aurecon ascertained that:

- related to temporary transfer/sales
- that the price paid by customers was subsidized in order to encourage the sale of the water from Paradise dam

Due to the temporary nature of such transactions, it is problematic to incorporate this water into the scheme cost/price formulation process. However, Aurecon views that such water transactions should contribute towards the schemes Opex and Capex, thereby increasing the volume/customer base for costs to be spread.

The challenge is to determine the proportion of scheme ML costs (Opex and Capex) to allocate to temporary allocations from Paradise Dam that will not discourage future transactions.

10.4.8 Feedback from field visits

Aurecon met with a number of stakeholders from the Bundaberg schemes (customers of both Bulk and Distribution system) at SunWater's office in Bundaberg on Monday 7th March 2011. A summary of proceedings is as follows:

General comments

- Projected Electricity costs for 2012-2016 based on usage at around 60%, yet historical usage has been around 40%. Potential over-charging by 20%.
  - Very concerned that carry over provision of unders and overs is carried forward to end of the price path (2016) for readjustment.
  - Concern about electricity prices rising from Carbon Tax
  - Concern about potential price rises if off-peak pricing is lost.
  - Is it contestable, or within a regulated market. Currently within Regulated market. Is it the same across all schemes?
- Part B costs should include asset costs as well, to act as motivation on user to use less.
- Concern regarding provision of Paradise water (both new and temporary) to farmers within the schemes.
  - Feeling that new water using the old network did not contribute towards infrastructure costs.
  - Not mentioned within the NSP that Burnett water uses the schemes assets.
  - Also concern that the NSP should show in 2009/10, a $600k transfer from Burnett Water to SunWater accounts for sale of temporary allocations.
- HUF factor. Concerns about allocating costs using different systems. Allocation of 16% of costs to High Priority for 10% of water volumes, translates to conversion factor of 1.6 which seems very low compared to other schemes.
- Standard of service is falling.
  - Raised in last price path.

  - Received an email in recent years, indicating that a new Standard of Service (lower) was to be implemented across the state. Items such as acceptable response times were to be extended from 48hours to 72 hours shutdowns.
  - No reporting other than Annual Report. Are Outages actually recorded?
- CSO value of $38k listed within the 2009 annual report, but cannot find within the NSP.
- Bingera Weir is listed as an asset within the NSP on page 12. Is it a SunWater asset?
- Insurance: professional Indemnity listed, but it should only be relevant for staff engaged in consulting services. Why is it listed?
- Claims for Insurance, where is the income recorded if new asset replaced?
- Confusion regarding what costs are listed under Maintenance vs. R&E.
- Water Bills. Currently sent out showing Part A & B. Should also show costs for distributional losses.
- Replaced assets. Do you get improved efficiencies?
- NSP states 5% procurement fee – should be lower for larger schemes that have larger economies of scale.

Bulk NSP

- River customers have paid over lower bound costs in current price path.
- Over allocation of metering costs for bulk transferred to Distribution customers?
- Gin Gin Main channel also performs a bulk water service, and within the NSP it is stated that 8% of water transported is for bulk (and therefore 8% of costs should be transferred). Concern raised as to what type of hydrological modelling/data was used: e.g. did it include new water (Paradise) being in the scheme now?
- Within the Bulk NSP, labour costs in 2010 spike (doubled from 2009). Why the spike in 2010, as it may have set higher labour costs going forward for next 5 years.
  - SunWater statesd that in 2010, water system recovered from 2009 drought season, and there was some additional 25,000 ML of temporary transfer water from Paradise, that required additional labour resources to handle the demand and infrastructure.
  - What comprises of labour cost as reported within the NSP?

10.4.9 Potential efficiency gains and recommendations

The following points are made in relation to Opex:

- There has been on-going re-structuring of the SunWater workforce (and equipment) for the Central region, particularly the Bundaberg main depot. It is noted that significant changes have been made to both administrative and operational staff numbers and structure. However, it was difficult to observe where any of these cost savings emerge.

- "Operations" is a main cost expense. Aurecon has submitted a substantial number of questions to SunWater seeking additional information and transaction clarity, and received responses. However, Aurecon has insufficient information to review the prudency and efficiency of forecast expenditure. Aurecon recommends that the 2011 forecasts for Operations sub-activities be examined (and supporting calculations), with particular attention paid to forecast Metering and Dam Safety cost estimates.

- The initial prudent and efficient "Labour" cost for "Preventive Maintenance" (2011) should be set at $65,800 (compared to $96,000 budgeted) until an audit of itemised historical activities (2010) is undertaken in order to identify what past prescribed activities have been undertaken or not, and examine the differences in hourly costs between those incurred in 2010 against that prescribed within the Parsons Brinkerhoff (2010) report.

- Based on the historical data provided by SunWater and comparative analysis of historical expenses against forecast costs for 2011 and 2012 to 2016), Aurecon views proposed "Corrective Maintenance" direct costs for the scheme as being prudent and efficient.

10.5 Capital costs review

SunWater has developed a rolling renewal annuity program that runs for a forecast 25 year period. The forecast for the initial 5 year period is based on a detailed assessment of asset condition and risk of failure, whilst forecasts beyond 5 years are based on broader estimates of asset life using engineering estimates and standard replacement rules[450].

SunWater also states that *Renewals expenditure refers to works intended to maintain the ongoing performance and service capacity of the assets or, if this is no longer possible or economical, to replace the asset with a modern equivalent*[451].

In relation to the Bundaberg Bulk WSS, renewal expenditure is limited to

- Fred Haigh Dam
- Bucca Weir
- Kolan Barrage
- Ned Churchward Weir
- Ben Anderson Barrage

The following section provides an overview of renewal expenditure for the current price path (2007-2011) and forecast price path (2012-2016).

10.5.1 Review of historical renewal expenditure

Over the current price path period (2007 – 2011) annual renewals expenditure has been between $302,000 and $1,1021,000 (Table 10-9). The sum total expenditure over this period is $3,120,000, for a mean annual average of $624,000.

Table 10-9. Historical renewals expenditure for Bundaberg Bulk WSS

nominal dollars $'000	Financial Year					
	2007	2008	2009	2010	2011	Sum total 2007-2011
Actual renewal spent[1]	302	450	722	625	1,021	3,120
LBC target expenditure[2]	400	445	352	357	284	1,838
Difference ($'000)	-98	5	370	268	737	1,282
Difference (%) from LBC target	-24.5%	1.1%	105.1%	75.1%	259.5%	69.7% (average)

[1]Source: *Bundaberg Bulk WSS NSP,* (2012-2016) January 2011, Page 6.
[2]Source: SunWater spreadsheet, *"Compare R&E Spend to Annuity 2007_2011.xls".*

Of concern has been the substantial variation between Actual renewal spent and LBC target expenditure. As noted above in Table 10-9, other than 2007 (and 1.1% overspend in 2008) the actual spent has exceeded the LBC target by a substantial amount. Over the entire price path (2007-2011) actual spend has exceeded the LBC target by $1.2 million or 69.7%. Also Aurecon notes that the actual renewal expenditure was substantially higher LBC than in 2009 (105%) and 2011 (259%).

SunWater was not been able to provide a detailed list of renewals projects that it intended to deliver over the current price path 2007 to 2011 (that would have formulated the LBC target

[450] SunWater, *Bundaberg Bulk WSS NSP*, (2012-2016) January 2011, Page 30.
[451] SunWater, *Bundaberg Bulk WSS NSP*, (2012-2016) January 2011, Page 30.

expenditure). However, SunWater did provide an Excel database containing breakdown of historical renewals expenditure for the period 2007 to 2011 (actual expenditures up until 15th February 2011) for all projects greater than $10,000 in value (Table 10-12 below). However, there were a number of limitations to the database including:

- No indication of the Board approved budget for all projects in 2007
- Additional columns of “Revised Budget”, and “Approved” along with “Board Budget” for 2008, 2009, 2010. In most cases, The amount recorded for an activity under “Revised Budget” equalled “Approved”, and also “Yearly Total” (actual spend for that year). Highlighted the dynamic nature of the project budget management as the scope of works/activities changed
- Totals include Indirect and Overhead costs, and any proposed changes in allocation methods will impact renewal activity costs
- Many projects would run over several financial years, in which Board approved budget only appeared in the first year, and not subsequent. Difficultly linking activities across years, due to the nature of the database provided.
- The summation of annual totals within the database, did not equate with stated renewals expenditure for the scheme (see Table 10-11 below)

Table 10-10. Itemised historic renewals expenditure for Bundaberg Bulk WSS

Description	Start Date	Year	Spent	Status
Kolan Barrage Crest Clean Out	1/07/2006	2007	$12,840	Closed
Bucca Weir Install Movement Pts	1/07/2006	2007	$5,680	Closed
Ben Anderson Barrage rope failure study	1/07/2006	2007	$17,191	Closed
Kolan Barrage Rock Fill Mtce	1/07/2006	2007	$17,779	Closed
TOTAL for 2007			**$53,490**	
Fred Haigh Dam: Install access stairs at valve house	-	2008	$ -	Closed
Burnett River: Replace meter - Burnett River System	-	2008	$3,425	Closed
Fred Haigh Dam: Replacement - small Swb for lights, etc	-	2008	$13,988	Closed
Fred Haigh Dam: Repair of erosion gully and spillway flip bucket drainage	-	2008	$18,645	Closed
Ben Anderson Barrage: Study: 5 yearly inspection	-	2008	$12,114	Closed
Fred Haigh Dam: Enhance: Construction of Seepage weir	-	2008	$ -	Deleted
Refurbishment of Bucca Weir as per ES Project 05-004857	-	2008	$28,802	Closed
Ned Churchward: Refurbish left bank sheet piling - 2006 Comp. Weir Insp Rec	-	2008	$30,550	Closed
Bundaberg: Study - System Leakage Management Plan (SLMPS)	-	2008	$19,212	Closed
Ben Anderson: Refurbish Gate - corrosion, rope, seals & actuator	-	2008	$34,863	Closed
Fred Haigh Dam: Investigate and implement replacement of fishing gear	-	2008	$26,289	Closed
Bundaberg: Study: Allowance for preparation of Roads and Bridges strategy	-	2008	$54,509	Closed
Ben Anderson: Refurbish: Remove 10 shutters/20 tie arms & anchors, replace	-	2008	$61,941	Closed
TOTAL for 2008			**$304,338**	

Description	Start Date	Year	Spent	Status
Replace Baffle Supports - Fishladder - Ben Anderson Barrage	1/03/2010	2009	$12,358	WIP
Install Marker Buoys - Bucca Weir	1/12/2008	2009	$17,328	Final review
Maintain Road Surface from Pump House to Lower Carpark - Fred Haigh Dam	1/08/2008	2009	$23,032	Closed
Install Marker Buoys - Kolan Barrage	1/11/2008		$25,814	Final review
Refurbish Fixed Wheel Gate 3 - Ben Anderson Barrage	1/11/2008	2009	$35,362	Closed
Refurbish Fixed Wheel Gate 2 - Ben Anderson Barrage	1/10/2008	2009	$38,218	Closed
TOTAL for 2009			**$152,112**	
5 Yearly Dam Safety Inspection - Bucca Weir	1/09/2009	2010	$10,388	Closed
Failure Impact Assessment - Ben Anderson Barrage	4/06/2010	2010	$3,363	WIP
Install Flowmeter for ROP Compliance - Bucca Weir Outlet Works	1/08/2009	2010	$16,091	Deferred
Construct Drain at Top of Left Bank Rock Mattress - Bucca Weir	1/12/2009	2010	$17,652	Closed
Crane and Winch Inspection - Bucca Weir	19/11/2009	2010	$2,946	WIP
Peer Review Comprehensive Risk Assessment - Fred Haigh Dam	1/05/2010	2010	$20,795	WIP
Blast and Repaint Gate with Approved Coating - FHD - Bulkhead Gate 2	1/10/2009	2010	$21,425	Closed
Install Safety Buoys - Ned Churchward Weir	1/02/2010	2010	$22,383	Practical
10 Yearly Crane Inspections - Gantry Crane and Electric Winch - Ben Anderson Barrage	1/10/2009	2010	$13,962	WIP
2010/11 - Headworks Project Planning and Scoping	1/04/2010	2010	$695	Released
10 Yearly Crane Inspections - Bridge Crane and Town Water Hoist - Outlet Works - FHD	1/10/2009	2010	$8,557	WIP
Condition Assessment and Refurbishment of CP System - Ben Anderson Barrage	1/10/2009	2010	$1,326	WIP
Install Safety Buoys - FHD	1/02/2010	2010	$37,327	Practical
Refurbish 15 Shutters - Ben Anderson Barrage	1/09/2009	2010	$57,315	Closed
Reconstruct Ben Anderson Barrage Left Bank Access Road	9/04/2010	2010	$14,858	WIP
Ned Churchward Weir Fishlock upgrade by DPI	27/10/2009	2010	$59,037	WIP
Refurbish Fixed Wheel Gates - No's 4 and 6 - Ben Anderson Barrage	1/09/2009	2010	$110,196	Practical
Install Outlet Gate to Intake Structure - Bucca Weir	1/07/2009	2010	$163,796	WIP
TOTAL for 2010			**$582,112**	
Replace Piezometer Terminal Board and Install Access Ladder (070628 Report from P.Jensen) - Bucca Weir	1/07/2010	2011	$10,251	WIP
Investigate Possible Contaminated Land Sites - Fred Haigh Dam	1/07/2010	2011	$5,945	Released
Replace SwitchBoard - Inlet Tower - Fred Haigh Dam	1/07/2010	2011	$10,548	Scoping

Description	Start Date	Year	Spent	Status
Install Safety Buoys - Ned Churchward Weir	1/02/2010	2011	$6,100	Practical
Peer Review Comprehensive Risk Assessment - Fred Haigh Dam	1/05/2010	2011	$21,557	WIP
Install Safety Buoys - FHD	1/02/2010	2011	$17,889	Practical
Refurbish Regulating Valve No 1 - Fred Haigh Dam	1/07/2010	2011	$10,074	WIP
Replace Baffle Supports - Fishladder - Ben Anderson Barrage	1/03/2010	2011	$ -	WIP
Erect Fence to Deter Access - Ben Anderson Barrage	1/07/2010	2011	$16,305	WIP
Repair D/S Concrete Slab - Ben Anderson Barrage	1/07/2010	2011	$27,190	WIP
Replace Section of Crane Rail (Complete Replacement to be done over 4 years) - Ben Anderson Barrage	1/11/2009	2011	$ -	WIP
Ned Churchward Weir Fishlock upgrade by DPI	27/10/2009	2011	$38,388	WIP
Refurbish Bulkhead Gates 1 and 3 (Blast, Coat) - Fred Haigh Dam	1/07/2010	2011	$22,795	WIP
Refurbish Fixed Wheel Gate No 6 - Ben Anderson Barrage	1/07/2010	2011	$25,137	WIP
Install Stair Access - Bucca Weir - Left Abutment (WHS Issue)	1/09/2009	2011	$ -	Released
Refurbish U/S L/B Sheet Piling - Ned Churchward Weir (2006 Comp. Weir Insp Rec 4.3.4)	1/04/2010	2011	$ -	Released
Refurbish 10 Shutters - Ben Anderson Barrage	1/07/2010	2011	$75,084	WIP
TOTAL for 2010 up until 15th Feb 2011			**$287,263**	

Source: SunWater spreadsheet "*2007-2011 PROJECTS.xls*"

Of the renewal expense items listed above in Table 10-10 for 2010, the following observations are made from the desktop review of data:

- 6 projects did not have a Board approved budget, amounting to $101,694 in expenditure for that year
- 5 projects exceeded Board approved budget by a substantial amount, with total Board Budget amounting to $295,597 for all 5 projects, while actual expenditure totalled $343,130
- remaining 7 projects (which incurred actual expenditure) were underspend (however a number were incomplete in that year, recorded as Work in Progress (WIP))

Aurecon notes that there are differences between the stated annual renewal expenditure stated within the NSP, and the annual totals calculated by Aurecon based on the itemised database provided by SunWater as highlighted in Table 10-11 below. Aurecon notes that the discrepancy may possibly be due to one or more of the following:

- A significant amount of renewal projects were below $10,000 in value. Note that the consultants requested expenditure items valued at only $10,000 and above
- Additional adjustments and renewal transactions are allocated

Table 10-11. Difference between itemised renewals expenditure and NSP totals for Bundaberg Bulk WSS

Year	NSP stated expenditure[1] (A)	Itemised expenditure (Table 10-10) (B)	Difference ($) (B-A)	Difference (%) (B-A) / (A)
2007	$302,000	$53,490	-$248,510	-82.3%
2008	$450,000	$304,338	-$145,662	-32.4%
2009	$722,000	$152,112	-$569,888	-78.9%
2010	$625,000	$582,112	-$42,888	-6.9%
2011	$1,021,000	$287,263	-$733,737	-71.9%

[1]Source: *Bundaberg Bulk WSS NSP,* (2012-2016) January 2011, Page 6
*Progressive total up till 15th February 2011

10.5.2 Forecast renewals expenditure

As indicated within the NSP, there are significant renewal expenditures proposed for the Bundaberg Bulk WSS and there is considerable variance in proposed annual expenditures (Figure 10-30).

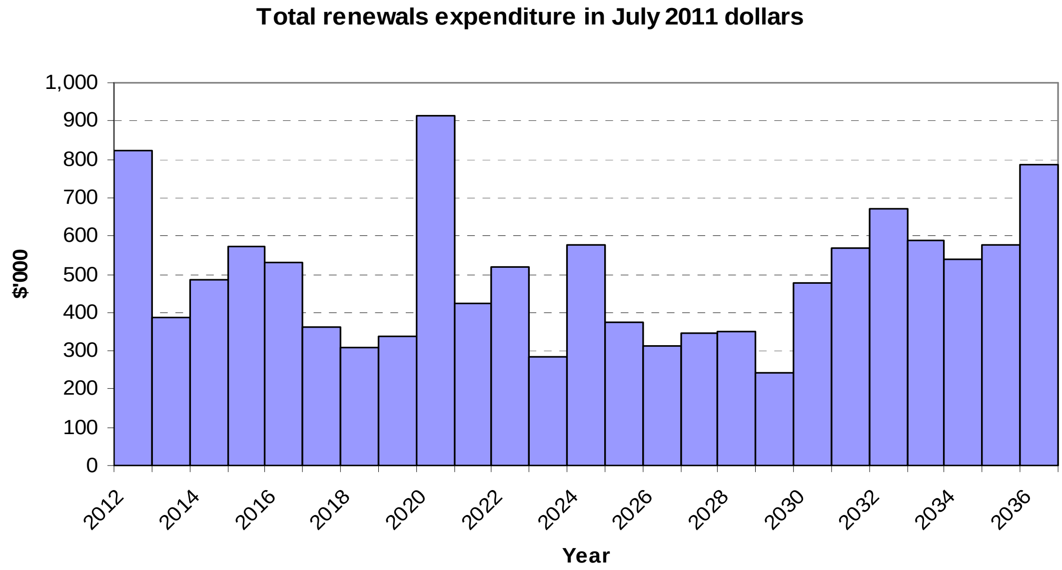

Figure 10-30. Proposed annual renewals expenditure for Bundaberg Bulk WSS 2012 to 2036[452]

As disclosed within the NSP, there are a number of significant proposed expenditures for the next price path (Table 10-12), particularly in 2012.

[452] Raw data extracted from SunWater spreadsheet "*NSP Projects Central V4.xls".*

Table 10-12. Forecast renewals expenditure for Bundaberg Bulk WSS 2012 to 2016

Real dollars, $'000	Financial Year				
	2012	2013	2014	2015	2016
Ben Anderson Barrage	450	294	176	184	427
Bucca Weir				8	
Fred Haigh Dam	242	61	310	317	58
Kolan Barrage					10
Ned Churchward Weir	131	32		62	35
Cost estimate for renewals program	823	387	486	571	531

Source: *Bundaberg Bulk WSS NSP,* (2012-2016) January 2011, Page 30

Although the vast majority of expenses highlighted above in Table 10-12 relate to the refurbishment/overhaul/replacement of assets, there also are costs associated with auditing and comprehensive inspections of bulk storage assets.

Table 10-13 below provides detailed description of proposed renewal expenditures for 2012 to 2016. Due to project time constraints (only allowing 2 days for stakeholder meetings and field site visits), Aurecon was only able to evaluate a small number of projects during its 2 day field visit including stakeholder meetings (See Section 10.5.3 below).

Table 10-13. Detailed review of forecast renewals expenditure for Bundaberg Bulk WSS 2012 to 2016

ID No.	Year	SunWater Description	Total cost up to 2016 ($'000)
Ben Anderson Barrage			
F1	2012	Replace Section of Crane Rail (complete replacement to be done over 4 years)	39
F2	2013r	Replace Section of Crane Rail (final sections after 4 years)	76
F3	2012	Design/Install weed deflector	29
F4	yearly	Refurbish 10 Shutters	165 – 176pa
F5	2015 & 10 yearly thereafter	5Y Crane Inspection - as per AS2550	9
F6	2012 & 10 yearly thereafter	Replace Anodes	217
F7	2016 & 2032	Replace Control	193
F8	2016 & 10 yearly thereafter	Replace Hydraulic Power System	61
F9	2013 & 5 yearly thereafter	Study: 5yr Dam Comprehensive Inspection	30
F10	2013 & 5 yearly thereafter	Study: Failure Impact Assessment	15
Bucca Weir			
F11	2015 & 5 yearly thereafter	5 yearly Comprehensive Inspection	8
Fred Haigh Dam			
F12	2015 & 10 yearly thereafter	5 yearly Crane Inspection - as per AS2550	8
F13	2012 & 2032	Refurbish Cne - rope, corrosion etc	23

ID No.	Year	SunWater Description	Total cost up to 2016 ($'000)
F14	2012 & 2032	Refurbish Door - cannot remove, refurbish insitu, work in confined space difficult	23
F15	2013 & 5 yearly thereafter	Refurbish Trash Racks - patch paint & annodes	36
F16	2016 & 2031	Refurbish Valve	31
F17	2016 & 2036	Refurbish Valve - 751 cone patch painting - carried out Jan 03	27
F18	2012 & 5 yearly thereafter	Remove rocks from spillway floor and pli	12
F19	2012	Repair section of hatch cover	8
F20	2014/2015	Replace Cable Main Wall	619
F21	2012 & 2027	Replace Instrumentation	59
F22	2012 & 5 yearly thereafter	Study: 5yr Dam Comprehensive Inspection (by 1 Sep 2011)	94
F23	2013	Study: Options analysis and condition assessment on cable replacement and cable outlet works etc	24
F24	2012	Check structural integrity of the inlet	7
F25	2012	redesign and construct modified lifting	6
Kolan Barrage			
F26	2016 & 5 yearly thereafter	5 yearly Comprehensive Inspection	10
Ned Churchward Weir			
F27	2012	Refurbish U/S L/B Sheet Piling	119
F28	2012 & 10 yearly thereafter	10 year Crane Inspection - as per AS2550	12
F29	2016 & 5 yearly thereafter	5 year Comprehensive Inspection	11
F30	2015	Change Out Cntl - electronics & SCADA software	62
F31	2016 & 2028	Refurbish screens 1 and 2 - hydraulics, coating etc	25
F32	2013	Replace 450 Dia Supply Line Valve	32

Source: SunWater Database, "*NSP Projects Central V4.xls*".

Table 10-13 above provides details for specific renewal expenditures proposed for 2012 to 2016, and an indication if recurring expenses occurs between 2017 and 2036. Table 10-14 below highlights additional expenditure activities above $10,000 in costs proposed for 2017 to 2036 (that were not captured in Table 10-13 above).

Table 10-14. Review of forecast renewals expenditure over $10,000 for Bundaberg Bulk WSS 2017 to 2036 (not captured in Table 10-13 above)

ID No.	Year	SunWater Description	Cost per activity ($'000)
Ben Anderson Barrage			
F33	2029	Refurbish Gate 2	31
F34	2029	Refurbish Gate 3	30
F35	2025	Replace section of Crane Rail	32
F36	2036	Replace section of rail	33
F37	2019 & 2028	COND ASSES AND REFURB OF CP SYST	52
F38	2030	Refurbish Gate	133
F39	2020 & 2030	10 Year Crane Inspection	26
F40	2036	Reinstate Rockfill	200
F41	2031	REPAIR D/S CONCRETE SLAB	28
F42	2032	Refurbish Control	36
F43	2025	Refurbish Crane - corrosion treatment, mech/elec/hydraulic refurbishment incl winch	54
F44	2028	Refurbish Gate - corrosion, rope, seals & actuator - moved out from 2005	24
F45	2019 & 2033	Refurbish Road - fill potholes, reconstruct table drainage, reseal surface	24
F46	2023	Refurbish Seals etc - Gates are Stainless Stell installed April 2005 (BUN731)	12
F47	2020	Replace Cables & Cableways	58
F48	2025	Replace Electric Winch	50
F49	2024	Replace Hydraulic Control System	238
F50	2033	Replace Transformer Rectifier Unit, Seaford	208
F51	2031	Refurbish Gate	55
Bucca Weir			
F52	2026	Refurbish: Baulks which were installed in 2005.	36
F53	2034	Replace Splitters	32
F54	2024	Replace Buoys (5 off), Safety Buoyage Systems	24
Burnett River Distribution			
F55	2029	Replace Burnett River Meter Outlets	12
F56	2017 & 2032	Replace Gauging Equipment	14
F57	2020 & 2035	Replace Recorder	35
Fred Haigh Dam			
F58	2030	Recoat gate with APP coating	18
F59	2020 & 2030	10 year Crane Inspection	34
F60	2031	Refurbish Bulkhead Gates	49
F61	2031	Refurbish Valve	22
F62	2030	Blast to remove existing coating and repaint gate with an approved APAS coating.	20

ID No.	Year	SunWater Description	Cost per activity ($'000)
F63	2033	Investigate and implement replacement of fishing gear for removal of bhk gates/trks DS Report Rec. ES/OM Pro	30
F64	2023	Refurb valve - 2006 DS Report Rec 6.1a	24
F65	2021	Refurbish Actuator - replace Rotork	49
F66	2020	Refurbish Metal Work - handrails & barriers (gal)	61
F67	2017 & 2032	Refurbish Valve - manual actuation	37
F68	2018 & 2033	Refurbish Valve - manual actuation incl. Insertion piece	36
F69	2019	Replace Cable Inlet Tower	46
F70	2036	Replace Guardrail	79
F71	2036	Replace Guardrail (Upstream)	147
F72	2036	Replace Guardrails & Handrails	29
F73	2020	Study: 20yr Dam Safety Review (by 1 Sep 2019)	121
Kolan Barrage			
F74	2032	June 2005 5 Yearly Barrage Safety Inspection - Recomm 8) Fill holes in concreted rock fill.	24
F75	2024	Replace Fishway Gate	27
F76	2024	Replace Trash Racks	15
	2024	Replace BUOYS (7 OFF), SAFETY BUOYAGE SYSTEMS	34
Kolan River Distribution			
F77	2021 & 2036	Replace Head Water Level Recorder	17
Ned Churchward Weir			
F78	2020 & 2030	REFURBISH VALVE - SEALS	59
F79	2020	Change Out PLC - obsolescence	49
F80	2019 & 2033	Maintain access road - grade, gravel replacement, drainage, road furniture. Brought forward from 2009.	24
F81	2020/21	Refurbish Baulk - paint & annodes, seals	43
F82	2020/21	Refurbish Baulks - paint & annodes, seals	177
F83	2030	Refurbish Bld - paint, fixtures & fittings, house services as required	12
F84	2024/25 & 2034/35	Refurbish Gate - Corrosion (anaerobic) - requirement unknown	48
F85	2020/21	Refurbish Gate - paint & annodes, seals	67
F86	2018 & 2026 & 2034	Refurbish Hoist - mech, elec, change rope, corrosion control as required	18
F87	2017	Refurbish Hydraulics - constant use, pumps, motors brought forward from 2009	24
F88	2020 & 2033	Refurbish Valve - seals, corrosion - Remove?	18
F89	2035	Replace Control Cubicle	57
F90	2034	Replace Electrical Cabling	296
F91	2035	Replace Electro-Hydraulic Cubicle	141
F92	2020	Replace Exit/Ent Upper & Lwr Fish Trap	74
F93	2035	Replace Fencing And Gates	34

ID No.	Year	SunWater Description	Cost per activity ($'000)
F94	2020	Replace Holding Chamber Fish Trap	70
F95	2035	Replace Main SwitchBoard	61
F96	2024	Replace Pump, Submersible	35

Source: SunWater Database, "*NSP Projects Central V4.xls".*

The summary total renewals expenditure for 2012 to 2016 is $2,798,000, or an annual average of $559,600 (compared to the annual average of $624,000 for the 2007 to 2011 period).

10.5.3 Examination of renewals expenditure

To review the prudency and efficiency of renewals expenditure, Aurecon selected a sample number of asset items within the Bundaberg WSS for desktop investigation. To assess the prudency and efficiency of these forecast renewal expenditures, Aurecon requested from SunWater:

- Indication of the Asset life assigned, or condition reports, options reports, or asset management plans that demonstrated the need for renewal expenditure
- Bill of Materials that scoped the project identifying the quantities of input materials
- Unit charge rates used for costing purposes (Bill of Materials in most cases)

In response to Aurecon's request, SunWater provided information for the following two renewal activities.

Fred Haigh Dam – replace cable – main wall - $310,000 in 2014, $309,000 in 2015

Review of the SAP extracts indicates that an asset life of 35 years is assigned, and that the cables have been in existence since 1975 indicating a need for replacement in 2010, although condition assessments indicate that they are still functioning well. The 35 year frequency is consistent with SunWater's adopted asset lives for these assets, and in this case the assets have exceeded the asset life assigned. SunWater plan to undertake a study in 2012/13 to scope works that will be required in 2014 and 2015.

SunWater also provided an extensive Bill of Materials for the proposed replacement works, along with forecast unit rates for inputs, predominately cable and cable conduit. The Bill of Materials provided was based upon a pre-2000 valuation (mainly 1997). Based on the Cardno[453] valuation work a recommendation was made to index all Bill of Materials for Electrical assets by 2.13 to inflate them to a 2008 valuation. Aurecon has reviewed the stated unit rates (2008 valuation) for a number of listed items against quoted commercial rates, finding that the unit rates proposed (2008) were generally comparable.

The Bill of Materials (indexed 2008) indicates a total direct cost of $324,000 for material components. Aurecon notes that an expenditure of $310,000 (2014) and $309,000 (2015) has been assigned for this task. Note that Aurecon have not been provided with a breakdown but assume it is based on the indexed Bill of Materials, project management fees, possibly a percentage for contingency costs (to cover over-runs for material cost inputs and contractor expenses), and possibly other Overheads.

Based upon a desktop review of the information provided, Aurecon views that the proposed renewal activity is prudent in terms of timing. Aurecon also notes that SunWater has planned a study in advance to better scope the project requirements (and costs). Aurecon views the

[453] Cardno (June 2008) Asset Valuation, Final Report SunWater, Job No. 3601-58

proposed direct expenditure, as highlighted within the Bill of Materials, as efficient, based on the comparative analysis undertaken of the unit charge rates used for key material inputs.

Ben Andersen Barrage – replace hydraulic control system (2024) - $238,000

The Ben Andersen Barrage was constructed in 1984 and has a series of gates which are operated by a hydraulic system. The standard asset life assigned to hydraulic systems is 60 years, which would suggest a replacement date in 2044.

SunWater states[454] that although the current condition of the hydraulic system was assessed as a 2, there is a substantial ongoing problem with hydraulic oil leakage. SunWater has provided Aurecon with a summary of the work maintenance orders associated with the leakage which have totalled $85,000 since 2003.

In consideration of the emerging hydraulic oil leakage problems, SunWater has reassessed the asset life of these hydraulics to 40 years, forwarding the replacement date to 2024. Aurecon notes the on-going difficulties encountered at the Ben Andersen Barrage (including deterioration of the shutters), which is mainly attributed to the saline water that the structure is exposed to.

Prior to replacement scheduled for 2024, SunWater proposes a mechanical engineering assessment (including a cost benefit analysis) to examine the feasibility of extending the life of the hydraulic system (in face of increasing maintenance costs) versus the cost of replacement.

An examination of the Bill of Materials provided by SunWater suggests that the replacement costs (direct expenses) is currently projected at $150,000.

Based upon a desktop review of the information provided, Aurecon views that the proposed renewal activity is prudent in terms of timing even though it suggests an earlier replacement date than that assigned by its prescribed asset life. Aurecon also notes that SunWater has planned an engineering study prior to 2024 that seeks to examine the feasibility of deferring replacement.

The Bill of Materials provided did not provide sufficient detail for Aurecon to evaluate the appropriateness of the assigned direct costs for this asset.

Renewal activities investigated during asset site inspections

Aurecon investigated a number of renewal activities as part of its field trip, undertaking on-site inspections. The following discussion provides an overview of Aurecon's findings.

Ben Andersen Barrage

The Ben Anderson Barrage is a significant water storage asset for the Bundaberg Bulk WSS. As indicated below in Table 10-15, there are substantial expenses projected for the Ben Anderson Barrage between 2012 and 2016.

Table 10-15. Projected renewals expenditure for Ben Anderson Barrage

	2012	2013	2014	2015	2016
Refurbish 10 shutters	165	172	176	175	173
Replace Anodes	217				
Other items	68	122	0	9	254
Total projected expense	450	294	176	184	427

454 SunWater email dated 1st August 2011.

Source: SunWater Database, "*NSP Projects Central V4.xls".*

Refurbish shutters
The shutters have been in operation since 1984. A asset life of 50 years is assigned, indicating replacement in 2034 (replacement cost estimated at $2.15 million)

At the Ben Andersen Barrage, there has been significant ongoing expenditure as follows:

- 2008. Refurbish, remove 10 shutters, 20 tie arms & anchors. Approved budget $90,903, spent $61,941
- 2010. Remove and refurbish 10 shutters, but only 5 replaced. Allocated budget of $134,120, but spent $57,315. Original budget was for the replacement of 15 shutters.
- 2011. Refurbish 10 shutters, annual budget of $180,189, but spent $75,084 (to Feb 2011).
- 2012 to 2017, Proposed budget of $165,000 to $173,000 per annum for refurbishing 10 shutters each year.

Aurecon noted that there was a structured process employed in regards to this on-going expenditure at the Barrage including:

- Internal documentation supporting the requirements for works. Aurecon sighted a number of condition assessments undertaken between 2006 and 2009, which allocated scores of 4 for a number of shutters due to coating failure and deep rust.
- Aurecon also reviewed an expert engineering report by JLR Engineering Services Pty Ltd (2008) Ben Anderson Barrage Shutter Maintenance, which examined the merits of alternative options. Aurecon suggest that this analysis re-examine the Net Present Valuation analysis undertaken evaluating the merits of replacing the shutters with stainless steel. Aurecon recommends that the modelling analysis timeframe should have been extended reflecting the extended life expectancy of stainless steel. The report also highlighted that the NPV analysis was highly price sensitive (stainless steel), and that better quotations be sought.
- Research was on-going with alternative coating systems trailed in recent years to identify the optimal protective coating
- Substantial internal documentation highlighting the management approval process
- Detailed financial accounts highlighting historical expenditure, and works completed.

Key points:

- Major on-going refurbishment program with significant investment requirements.
- Transparent and logical asset management process employed to date.
- Removal and subsequent re-installation of refurbished shutters is undertaken by SunWater staff. The actual refurbishment work of shutters undertaken by external contractors.
- Proposed annual refurbishment program has not been fully implemented to date due to a number of drivers including reassessment of shutter conditions, and environmental conditions restricting access to the shutters.

Based on the information reviewed, site inspection, and discussions with SunWater staff, Aurecon views the historical expenses in 2008 and 2010 as prudent and efficient.

Aurecon views the proposed expenditures in 2012 to 2016 as prudent and efficient, however recommends that SunWater re-examine the options study undertaken by JLR Engineering Services (2008) to expand the financial analysis undertaken, and re-examine costing (quotes) for stainless steel.

Anodes at Ben Andersen Barrage

At the Ben Andersen Barrage, there is a proposal to replace the anodes at an expense of $217,000 in 2012. Aurecon noted that:

- These anodes are part of the protection system for the barrage to reduce corrosion and extend the life of the asset. They are deployed underground on the right hand side bank.

- The current anodes were installed in the mid-1980’s. The operational life prescribed by the manufacturer of the anodes is 10 years.
- An external expert report by JLR Engineering Services (2008) recommended the replacement of the anodes.
- The asset management register has incorporated the replacement of the anodes every ten years from 2012.

Key points:

- The replacement of the anodes comes at a significant cost every 10 years. The manufacturers suggest that the operational life is only 10 years.
- Testing operation of the galvanic protections system is relatively simple, and should be carried out on a routine basis. Further, the anodes have well exceeded their expected life. This can mean that either they have not routinely tested the operation of the protections system or have not been responsive to any issues identified, or simply that the life of these is much greater than the 10 years expected. Either way, it indicates that the management or operational strategy for these needs further consideration.

Based on the information reviewed and site inspection, Aurecon views the proposed expenditure in 2012 as prudent and efficient. Aurecon notes that this expense is now projected at 10 year intervals based on the manufacturer’s recommendation. Aurecon recommends that condition assessments at the Barrage incorporates testing of the galvanic protections systems to allow an extended operational life beyond the projected 10 years.

10.5.4 Renewals annuity balances

The Bundaberg Bulk WSS has a substantial negative balance of minus $1,305,000 in 2012[455].

Stakeholders have expressed interest in relation to the calculation of this opening balance for 2012. SunWater has provided Aurecon with an internal working paper[456] which illustrates:

- Opening Balance at 1 July 2006 was positive $120,000 for the Bundaberg Bulk (irrigation sector)
- Identified annual annuity incomes and expenses specifically for the Bulk Scheme for 2007 to 2011
- Identified that the closing balance for 30 June 2011 for the Bulk Scheme is negative ($980,000) (irrigation sector balance). Incorporating an uplift factor of 1.36 for whole of scheme, the opening balance for 1 July 2011 is -$1,337,000.
- Applied an interest rate of 9.689% (pre-tax nominal) on annual balances.

Utilising this information presented above, Aurecon has modelled the stated expenses and income for 2007 to 2011, incorporating the stated 2007 annuity starting balance and annual interest of 9.689%. Aurecon arrived at a closing balance of minus $982,000 (prior to uplift factor) as stated within the SunWater paper.

As indicated below within Figure 8-29, the scheme incurred annual interest income and expense. Aurecon estimates that the scheme accrued approximately $26,000 in interest expense over the entire 2007 to 2011 period.

[455] SunWater, *Bundaberg Bulk WSS NSP,* (2012-2016) January 2011, Page 32.
[456] Source: SunWater, *Renewals annuity calculation, INTERNAL WORKING PAPER*, January 2011

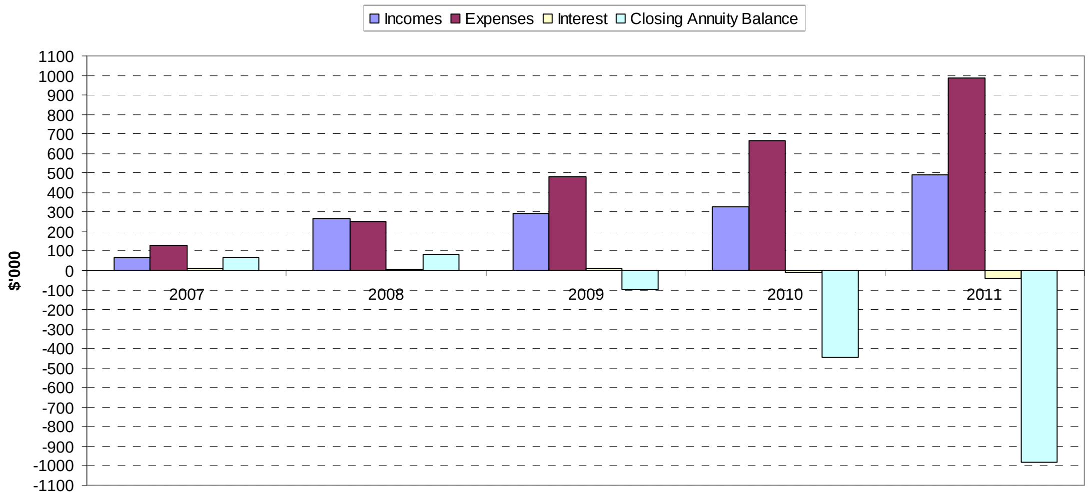

Figure 10-31. Calculated annual renewal balance for Bundaberg Bulk WSS 2007 to 2011

Figure 10-31 highlights that annual annuity income was significantly less than expenses (except for 2008). The sum total of annuity income for 2007 to 2011 was $1,438,000, while renewal expenses totalled $2,514,000, resulting in a deficit of $1,076,000. Adding the deficit of $1,076,000, plus the interest expense over the period of $27,000 equates to minus $1,103,000 (adds to the starting 2007 positive balance of $120,000 equals the closing balance of minus $982,000).

As indicated in Figure 8-32 below, the rolling annuity balance is to remain negative until 2035.

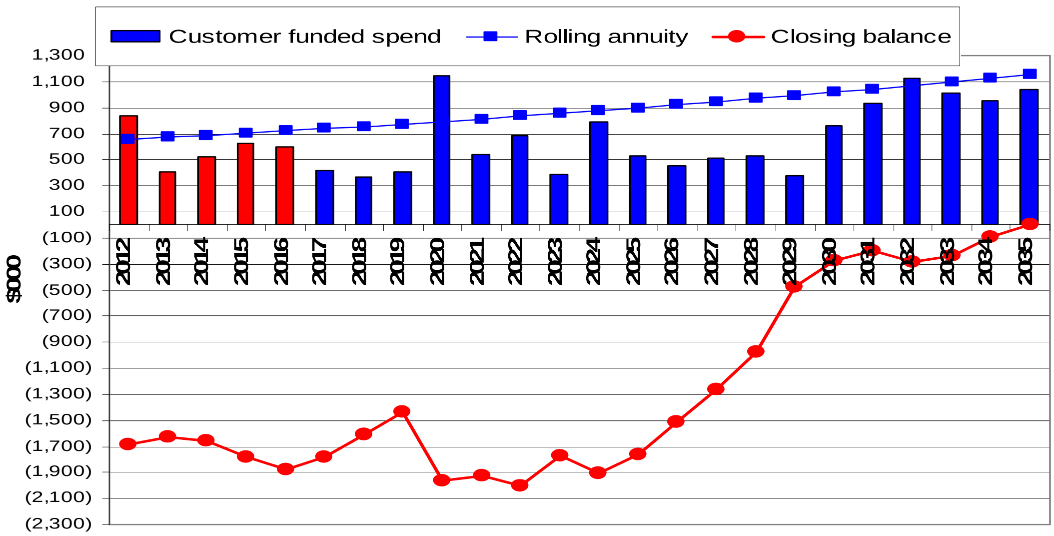

Figure 10-32. Renewals annuity balances for Bundaberg Bulk WSS 2012 to 2036 (nominal terms)[457]

[457] Source: SunWater spreadsheet, *"Annuity charts – V610 03.xls"*

Applying SunWater's prescribed real rate of interest of 9.689% upon the starting 2012 annuity balance in 2012 of minus $1.3 million, implies an annual interest charge of approximately $125,000 in the first year.

As indicated above, the proposed average renewal expenditures for 2012 to 2017 is $559,600 per annum. As a result of the substantive negative balance in 2012 (accrues interest income), and the significant expenses proposed (particularly in 2020), the annual annuity charge going forward is approximately $640,000 as shown below in Table 10-16.

Table 10-16. Renewals annuity charge for Bundaberg Bulk WSS 2012 to 2016

Real dollars, $'000	Financial Year				
	2012	2013	2014	2015	2016
Renewal annuity charge	640	641	640	638	637

[1]Source: *Bundaberg Bulk WSS NSP,* (2012-2016) January 2011, Page 32.

10.5.5 Summary of findings on renewals expenditure

Historical Renewal Expenditure

SunWater was not able to provide to this review the proposed renewal programme as developed in 2006 for the current price path. However, as highlighted earlier, SunWater's actual expenditure on renewals for 2009 was 105% over the proposed LBC target expenditure while in 2011 it is projected at this stage to be 259% over target (providing no major unexpected expenses occur).

A closer examination of the 2010 itemised renewal expenditures data alone revealed that of the 18 renewal activities, 6 had no Board approved budget while 5 projects had exceeded the Board approved budget by a substantial amount. The remaining 7 projects were under budget, but a number of these were not completed in 2010 and recorded as WIP. As indicated earlier, the itemised database provided by SunWater accounted for 93% of total recorded annual renewal expenditure for 2010.

Due to the limited capacity to undertake an extensive field investigation and difficulties obtaining data from SunWater within limited timeframes, Aurecon was only able to examine a small number of historical renewal expenditure items. Aurecon found the processes engaged (identification of need through condition assessments, timing, scoping, and tendering for the engagement of external contractors) indicated a structured and efficient process. However, substantial Indirect and Overhead costs were also incorporated, which greatly distorted the perceived value for money outcome achieved for the activity. Where variations were made to activity budgets, substantiated reasoning and justification was found.

As part of Aurecon's field site visit, it investigated the shutters at Ben Andersen Barrage. Based on the information reviewed, site inspection, and discussions with SunWater staff, Aurecon views the historical expenses in 2008 and 2010 as prudent and efficient.

Considering the magnitude of the budget over-run for historical renewals expenditure identified via the desktop analysis, and the magnitude of projects identified in 2010 alone incurring budget over-runs, Aurecon recommends that:

- A comprehensive itemised inventory of renewal expenditure items from SunWater be reviewed, so that 100% of the stated annual cost can be validated (particularly for 2007, 2008, 2009 and 2011)
- Activities that substantially exceeded the Board budget, and those without a Board budget be reviewed for all years.

Forecast Renewal Expenditure

To assess the prudency and efficiency of forecast renewal activities, Aurecon examined a number of asset site locations during the field trip investigation. For each of the proposed renewal activities, Aurecon identified a well-documented process (condition assessments, audits, external expert reviews) that substantiated the timing or need for expenditure (particularly for assets incurring renewal expenditure within 2012-2014). Aurecon also noted that scoping studies by external consultants were utilised to substantiate the timing, but also examine and recommend least cost options for investment (only major projects).

Unfortunately, no detailed scoping or budgeting is undertaken until the renewal activity falls within a 12 month planning schedule. The cost estimate is typically based on similar activity expense incurred at another location, or replacement value recorded within the system. Aurecon also noted via its field investigation that projected costs incorporated substantial Indirects and Overheads costs.

Aurecon reviewed the following forecast renewal activities:

- Fred Haigh Dam (replace cable main wall $310,000 in 2014, $309,000 in 2015). Based upon a desktop review of the information provided, Aurecon views that the proposed renewal activity is prudent in terms of timing. Aurecon views the proposed direct expenditure (as highlighted within the Bill of Materials) as efficient, based on the comparative analysis undertaken of the unit charge rates used for key material inputs.
- Ben Andersen Barrage (replace hydraulic control system in 2024 for $238,000). Based upon a desktop review of the information provided, Aurecon views that the proposed renewal activity is prudent in terms of timing (even though it suggests an earlier replacement date than that assigned by its prescribed asset life). Due to insufficient information, Aurecon was unable to validate the efficiency of the proposed expenditure.
- Ben Andersen Barrage (annual refurbishment of shutters between 2012 and 2016). Aurecon views the proposed expenditures in 2012 to 2016 as prudent and efficient, however recommends that SunWater re-examine the options study undertaken by JLR Engineering Services (2008) to expand the financial analysis undertaken, and re-examine costing (quotes) for stainless steel.

11. Assessment of Bundaberg Distribution System

11.1 Scheme Description

The Bundaberg Bulk Water Supply Scheme (WSS) (supplying Bundaberg Distribution System) is one of the 5 Water Supply Schemes within the Burnett Basin, with the others been Barker Barambah, Boyne River and Tarong, Three Moon Creek, and Upper Burnett. Figure 11-1 highlights operational features of the Bundaberg Distribution System and Bundaberg Bulk WSS.

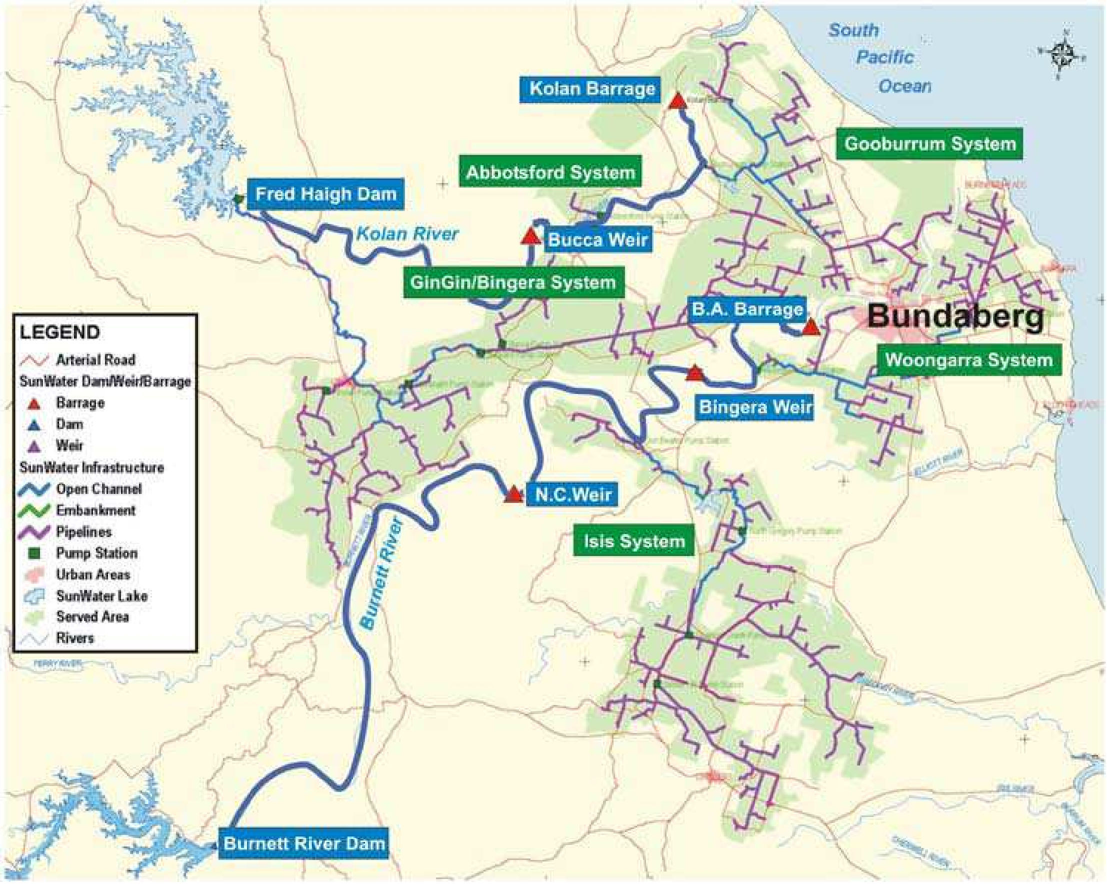

Figure 11-1 Overview of the Bundaberg WSS & Bundaberg Distribution System[458]

The Bundaberg WSS (including the distribution network) surrounds the town of Bundaberg. It supplies water to 55,600 ha of farmland within an area bound by the towns of Childers and Gin Gin to the west and the South Pacific Ocean to the east[459].

The Bundaberg Distribution System has a total of 900 customers comprising of 149,522 ML of medium priority WAE and 1,781 ML of high priority WAE. The scheme provides water predominantly for the irrigation of crops including sugar cane, tomatoes, rockmelons, watermelons, capsicum, zucchini, beans, macadamia nuts and avocados.

The Burnett Basin Resource Operations Plan (ROP) sets the regulatory framework for the management of water within this scheme. Local management of the scheme is managed from SunWater's regional office at Bundaberg.

[458] SunWater, *Bundaberg Water Supply Scheme – Scheme Operation Manual*, page 21, un-dated report.
[459] SunWater, *Bundaberg Water Supply Scheme – Scheme Operation Manual*, page 21, un-dated report.

The Bundaberg Distribution System is located near the towns of Bundaberg, Childers and Gin Gin. Under contractual obligations to its customers SunWater manage and operate the following major sub-systems:

- Gin Gin distribution sub-system: draws from Fred Haigh Dam through the Monduran pump station (3 pumps that can pump 1100 ML/day), and the Tirroan Pump Station (2 pumps with a combined capacity of 72 ML/day) that discharges into the Tirroan balancing storage[460].
- Bingera distribution sub-system: supplied from the Gin-Gin main channel, the Bingera distribution system has three pump stations including Bullyard Pump Station (4 pumps with a combined capacity of 415 ML/day), Bucca Pump Station (2 pumps with a combined capacity of 60 ML/day), and McIllwraith Pump Station (2 pumps with a combined capacity of 60 ML/day) [461].
- Isis distribution sub-system: supplied from the Burnett River's Ben Anderson Barrage through the Don Beattie pump station. The system consists of 4 pump stations including Don Beattie pump station (dry well pump station perched on the right bank of the Burnett River, with 3 pumps that combined can deliver 648 ML/day) [462].
- Woongarra distribution sub-system: borders the north and south-eastern sides of the City of Bundaberg. Two pump stations including Woongarra pump station (5 pumps each with a capacity of 79 ML/day, and the Walker Street pump station (4 pumps with a combined capacity of 225 ML/day[463].
- Abbotsford distribution sub-system: supplied from the Kolan River, it has only one pump station that consists of a wet well built in the left bank of the Kolan River (2 submersible pumps and is rated at 24ML/day) [464].
- Gooburrum distribution sub-system: supplied from the Kolan River through the Gooburrum pump station supplying the coastal strip north of Bundaberg. The Gooburrum pump station consists of a dry well construction (2 pumps with a combined capacity of 300 ML/day)[465].

11.2 Scheme Management

The Interim Resource Operations Licence (IROL) sets the regulatory framework for the management of water within this scheme. Management of the scheme is managed from SunWater's regional office at Bundaberg, which also houses a storage workshop. Key staff resources at the Bundaberg office include:

- Regional Operations Manager & Service Manager
- 3 working teams of two electricians (also assist Biloela)
- 2 working teams of two fitter & turners (also assist Biloela)
- 9 operational staff located at Bundaberg and Gin Gin (operate primarily Bundaberg Bulk and Distribution systems)
- 8 Technical officers and Schedulers (for Central region including Biloela)
- 2 Administrative staff (for Central region)

At times, SunWater staff from other locations within the Central region will be utilised for scheme specific activities within the Bundaberg region.

[460] Source: *Bundaberg Distribution System,* (2012-2016) January 2011, Pages 36 & 37.
[461] Source: *Bundaberg Distribution System,* (2012-2016) January 2011, Pages 38 & 39.
[462] Source: *Bundaberg Distribution System,* (2012-2016) January 2011, Pages 40 & 41.
[463] Source: *Bundaberg Distribution System,* (2012-2016) January 2011, Page 41.
[464] Source: *Bundaberg Distribution System,* (2012-2016) January 2011, Page 42.
[465] Source: *Bundaberg Distribution System,* (2012-2016) January 2011, Page 43.

SunWater advised that in recent years there has been an on-going management strategy to relocate positions (as vacancies arise) from the smaller regional centres to Bundaberg. Small mobile working teams that are permanently located at Bundaberg service all schemes across the Central region.

11.3 Summary Opex and Capex information from the NSP

The Bundaberg Distribution System has a total of 900 customers comprising of 149,522 ML of medium priority WAE and 1,781 ML of high priority WAE.

The NSP for the Bundaberg Distribution System proposes that the efficient operating costs for the scheme for the coming 5 year regulatory period average $7,136,000 per annum. This represents a substantive 14.0% increase over the current price path average of $6,262,000 per annum.

A proportion of operating costs are influenced by water delivery and utilisations levels. In the current price path (2007 – 2011), it is clearly evident that water utilisation has been low due to on-going drought conditions over much of the current price path, particularly 2008 and 2009. is period. It is also acknowledged that the 2010/11 summer season has ensured that all weirs and dams are full, providing the start of the next price path in 2012 with 100% allocation in the first year.

Stakeholders have expressed interest examining the projected lower bound operating costs for the scheme as projected within the 2005/06 Irrigation Price Review by Indec Consulting[466]. However, SunWater advise that a direct comparison between the Tier 1 projected 2005/06 lower bound operating cost against actual expenditure as presented within the NSP for 2007 to 2011 is not feasible as;

> *the Tier 1 tables for "scheme lower bound cost" include only the irrigation share of the costs, and that grossing up the costs is problematic*[467]

Not withstanding these limitations, Aurecon has examined the projected LBC values for 2006-2011 provided within the Tier 1 report against the costs presented within the NSPs (See Appendix A).

Projected renewal annuity spend over the five year period to 2016 is $5,628,000, which is substantially less than the $7,874,000 spent over the preceding 5 year period. Although the scheme has a substantive positive annuity starting balance of $2.29 million in 2012, a total charge for renewal annuity of $7,861,000 is sought for the 2012 to 2016 price path.

The following sections examine Opex (operational costs) and Capex (renewals expenditure) in more detail.

11.4 Operational costs review

An overview of required operational activities for the scheme is identified within the *Bundaberg Water Supply Scheme – Scheme Operation Manual*[468]. The manual provides in detail an overview of the scheme structure, compliance requirements, overview of scheme operations activity requirements, and references for collecting and reporting scheme data.

For each scheme SunWater has utilised the Scheme Operation Manual as a key input towards the formulation of Facility Operations Manuals and Maintenance Schedules for individual assets/facilities across the scheme, as highlighted below within Figure 11-2.

[466] Statewide Irrigation Pricing Working Group, *SunWater Irrigation Price Review 2005-06 Tier 1 Report*, April 2006,
[467] Email from SunWater to the QCA, dated 23rd February 2011.
[468] SunWater, *Bundaberg – Scheme Operation Manual*, un-dated report

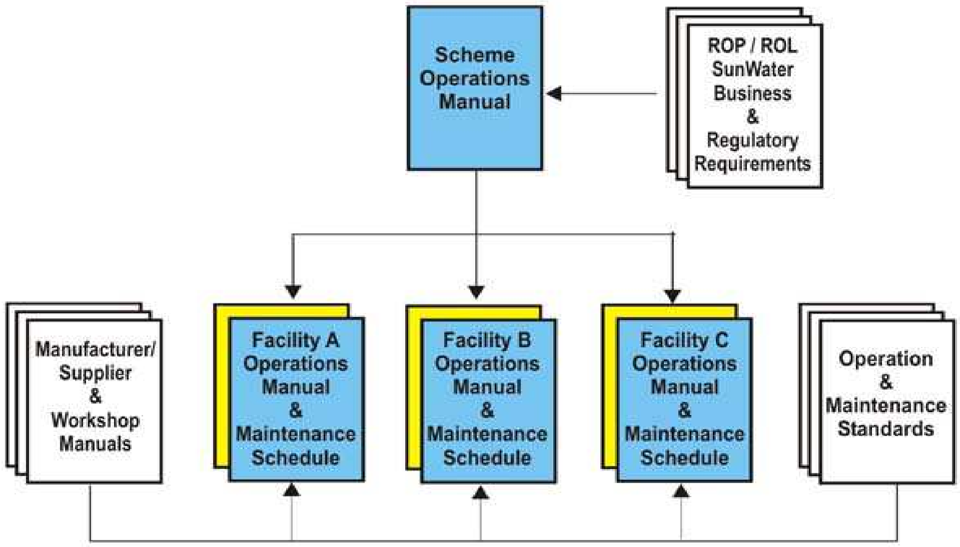

Figure 11-2*.* Overview of the linkages between Scheme and individual facility Operations Manual[469]

11.4.1 Overview Operational costs

Within the NSP, SunWater has presented Operational costs by type, and also by activity. As such, Aurecon has undertaken a review of Operational costs by investigating in detail key expenditure items of “Labour” and “Electricity”, and key expenditure activities of “Operations”, “Preventive Maintenance” and “Corrective Maintenance”.

Although not consistently obvious across all, many Operational cost items and activities vary accordingly to water usage levels. As indicated below (Figure 11-3) annual water usage within the Bundaberg Distribution System fluctuated substantially from year to year. The highest annual water usage (between 2003 and 2010, and including Network losses) occurred in 2006 in which approximately 106,000ML was utilised (or lost).

For the purposes of incorporating water usage into this cost analysis, Aurecon has indexed annual water usage for 2007 to 2010 period against the 2006 water usage level as follows:

- Approximately 80% in 2007
- Approximately 50% in 2008
- Approximately 57% in 2009
- Approximately 87% in 2010

Aurecon notes that stakeholders raised that additional Burnett water was supplied via the infrastructure in 2010, and concerns were raised if this was recorded in the water usage figures, along with associated costs and revenues of supply (see Section 11.4.6) .

[469] SunWater, *Bundaberg Water Supply Scheme – Scheme Operation Manual*, page 14, un-dated report.

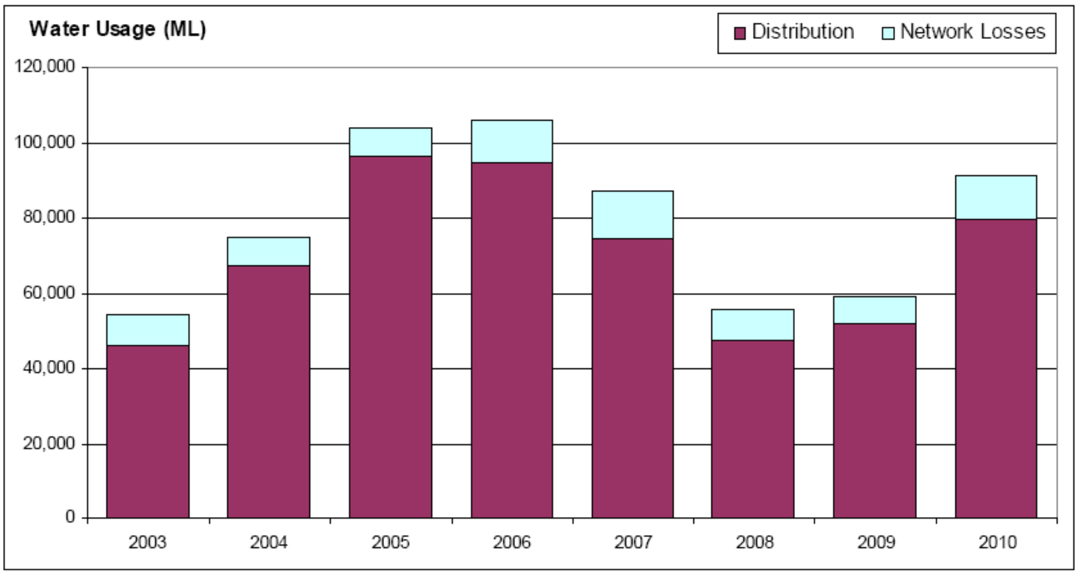

Figure 11-3. Water usage for Bundaberg Distribution System[470]

The exceptional wet season in 2010/2011 throughout the state, corresponding water usage in some areas is expected to be lower (than that of 2010).

As indicated below in Figure 11-4, "Operating" costs for the scheme do appear to follow the trend (but not same percentage change) of actual water usage rates. In 2008 "Operating" costs decreased as water usage decreased, but increased in the subsequent two years (2009 and 2010) as water usage increased.

Of interest is the comparison between 2007 and 2010 as follows:

- 2007: water usage approximately 86,000ML while "Total Operating" costs were $5.87m
- 2010: water usage approximately 92,000ML (increase of 7%) while "Total Operating" costs were $7.29 million (up 24%).

In 2011, "Total Operating" costs are projected to decrease, in line with a projected reduction in water usage across the scheme.

[470] Source: *Bundaberg Distribution System,* (2012-2016) January 2011, Page 15.

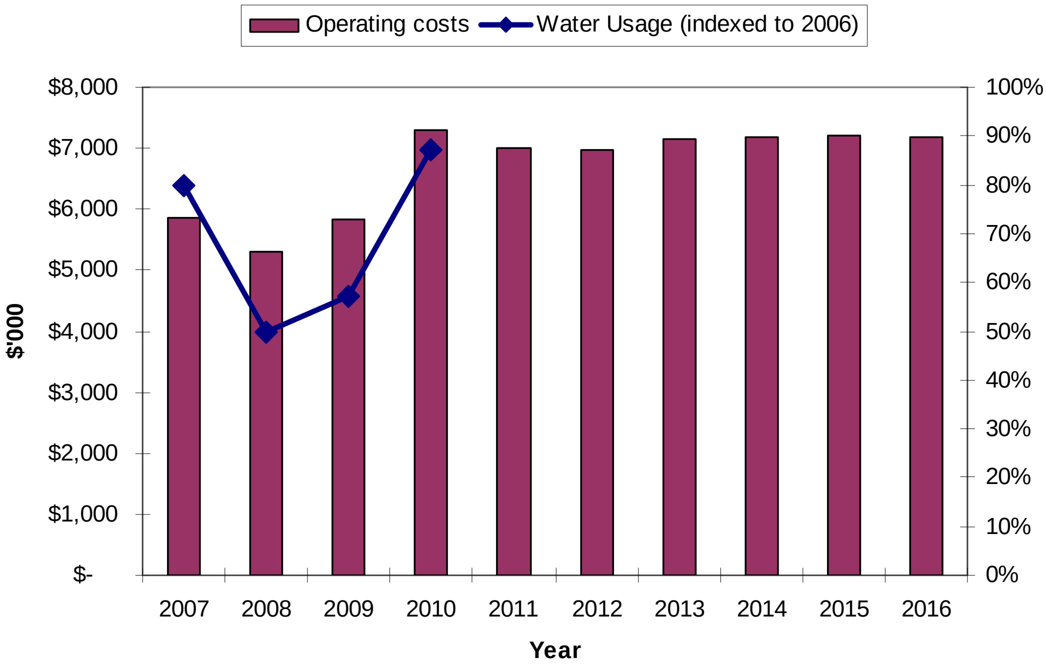

Figure 11-4. Comparison of "Operating" costs against water usage (indexed against 2006) for Bundaberg Distribution System[471]

The key cost components for "Operating" costs across the period from 2007 to 2016 are evenly spread between "Electricity", "Operations" costs, "Preventive Maintenance" costs and to a lesser degree "Corrective Maintenance" costs (Figure 11-5).

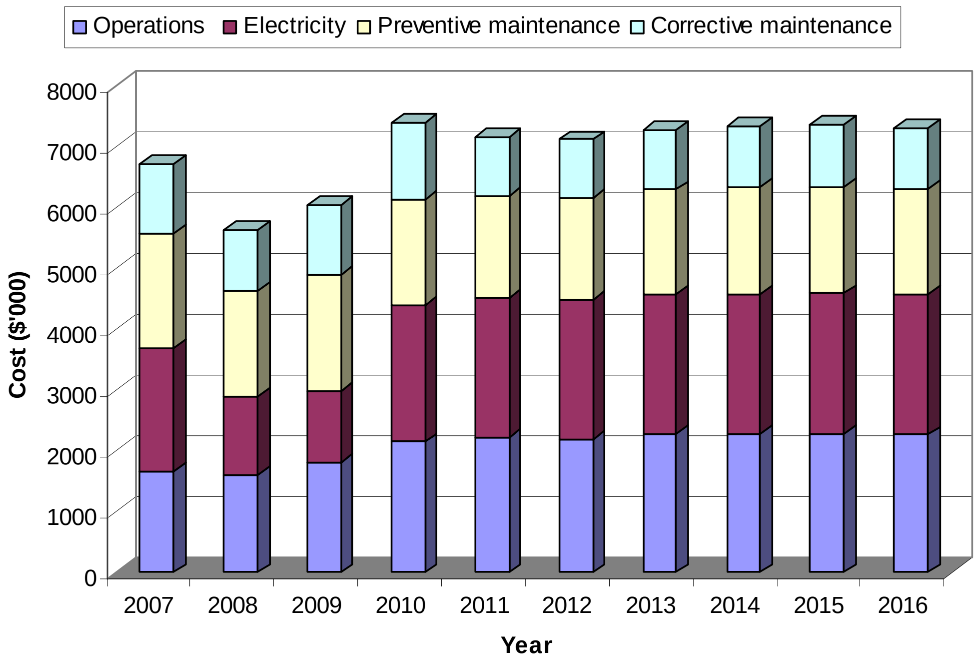

Figure 11-5. Breakdown of "Operating" costs for Bundaberg Distribution System 2007 to 2016[472]

The following sections examine in more detail operational expense items and activities.

[471] Source: *Bundaberg Distribution System,* (2012-2016) January 2011, Pages 7 & 15.
[472] Source: *Bundaberg Distribution System,* (2012-2016) January 2011, Page 7.

11.4.2 Operational expense items

Labour costs

Projected “Labour” costs for the Bundaberg Distribution System are significant as highlighted below in Table 11-1. “Labour” as a proportion of “Total Operating” costs have historically varied from 17.7% in 2008 to 20.1% in 2007, but of concern has been the growth of “Labour” costs in absolute terms since 2008.

Table 11-1. “Labour” costs and “Total Operating” costs for Bundaberg Distribution System

($’000)	Actuals				Forecast	Price Path				
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Labour[1]	1179	940	1145	1399	1426	1447	1469	1469	1469	1469
Annual change		-20.3%	21.8%	22.2%	1.9%	1.5%	1.5%	0.0%	0.0%	0.0%
Change since 2007		-20.3%	-2.9%	18.7%	20.9%	22.7%	24.6%	24.6%	24.6%	24.6%
Total Operating costs	5874	5312	5822	7293	7007	6970	7139	7188	7212	7170
Labour as % of Total Operating costs	20.1%	17.7%	19.7%	19.2%	20.4%	20.8%	20.6%	20.4%	20.4%	20.5%

Source: *Bundaberg Distribution System NSP*, (2012-2016) January 2011, Page 7.

The average annual “Labour” cost (historical) between 2007 and 2010 was $1,165,000 per annum. The projected “Labour” cost in 2011 of $1,426,000 represents a substantial increase of 22.3%.

Figure 11-6 below provides an overview of water usage levels against “Labour” costs. There is an observable correlation between “Labour” costs and water usage rates within the scheme, however the relationship is not linear.

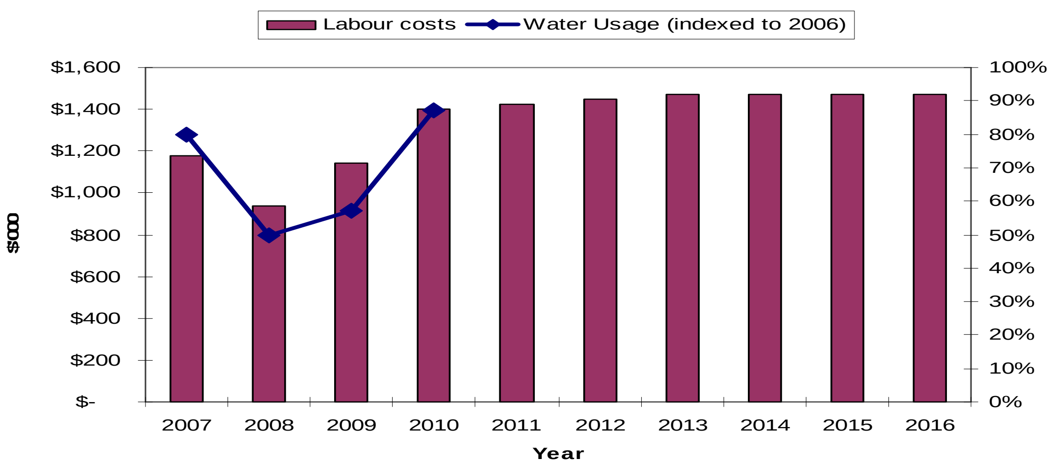

Figure 11-6. Comparison of “Labour” costs against water usage (indexed against 2006) for Bundaberg Distribution System[473]

[473] Source: *Bundaberg Distribution System,* (2012-2016) January 2011, Pages 7 & 15.

The following sections seeks to examine in more detail the components that make up the Labour costs presented within Table 11-1 above, and examine (data available) changes in historical labour components.

"Labour" costs in 2011 are forecast to be $1.426 million. As highlighted below in Figure 11-7, labour activities related to "Operations" (47.5%) are projected to account for the bulk of scheme labour costs in 2011. "Preventive Maintenance" is projected to account for a further 33.3%, followed by labour required for "Corrective Maintenance" (19.1%).

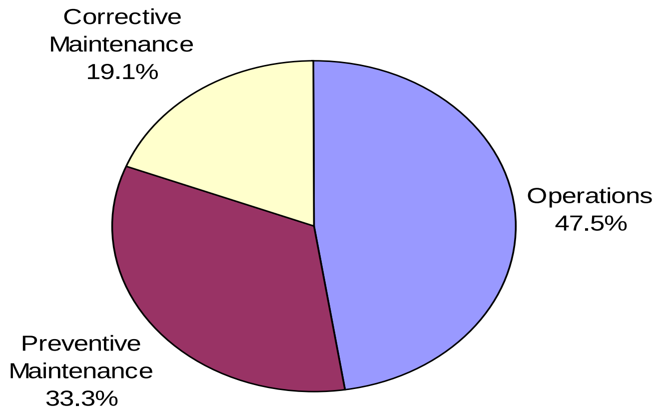

Figure 11-7. Breakdown of "Labour" costs by output activity for Bundaberg Distribution System in 2011[474]

As illustrated in Figure 11-7 above, "Operations" related activities accounted for a significant amount (47.5%) of forecast "Labour" expenses for the Bundaberg Distribution in 2011. Figure 11-8 below provides additional information regarding the composition of labour costs associated with "Operations" activities.

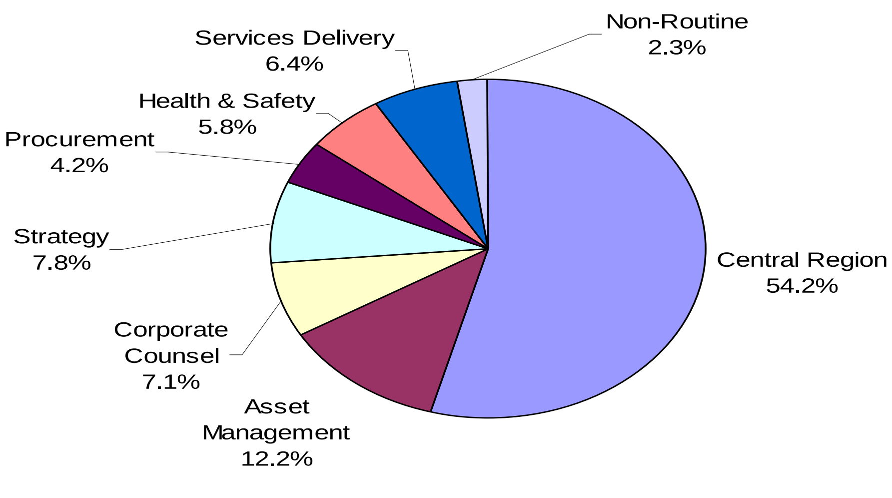

Figure 11-8. Breakdown of "Operations" labour costs for Bundaberg Distribution System in 2011[475]

474 Raw data sourced from SunWater Spreadsheet "*IM Central – 610.03 PSV.xls*"

475 Raw data sourced from SunWater Spreadsheet "*IM Central – 610.03 PSV.xls*"

As illustrated by Figure 11-8 above, over half (54.2%) of the projected "Operations" labour costs in 2011 are from staff within the Central region, whilst the remainder of labour costs are sourced from outside the Central region (predominantly Brisbane, but may also include SunWater staff from other regional centres) providing specific services of Asset Management, Corporate Counsel, Service Delivery, Health & Safety and Strategy.

As stated within the NSP, Operations activities include releasing water, reading meters, repairs and issues such as meeting SunWater's obligation under the ROP / ROL, workplace health and safety, dam safety, environmental management and land management legislation.

Whist the information presented in Figures 11-7 and 11-8 above provide useful insights into the expected "Labour" costs for 2011, of considerable interest are the "Labour" costs between 2007 to 2010 and what made these up. Figures 11-9 and 11-10 below provide partial insights into "Labour" costs between 2007 and 2011.

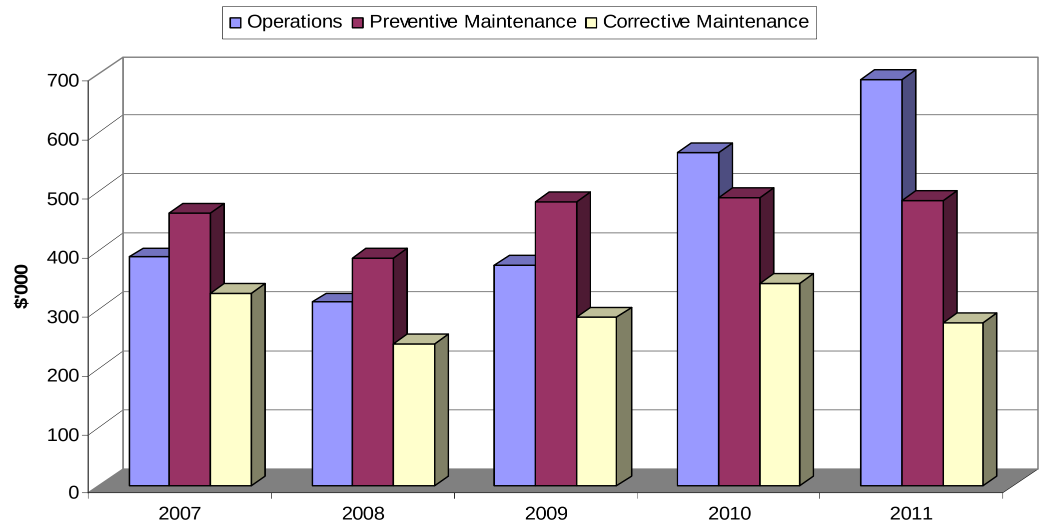

Figure 11-9. Breakdown of "Labour" costs for Bundaberg Distribution System between 2007 and 2011[476]

Figure 11-9 above provides valuable insights into labour cost components over the 5 year period. Labour input for both "Preventive" and "Corrective Maintenance" have fluctuated over the period, although "Operations" displays a noticeable upward trend in costs from 2008, to now become the main labour cost item from 2010 onwards.

Figure 11-10 below provides more detailed information regarding historical "Preventive Maintenance" labour costs. The main cost item of "Weed Control" is highly variable, but of more concern has been the continued rise within the other two components of "Condition Monitoring" (since 2008) and "Servicing" (since 2007). In 2010 "Condition Monitoring" is almost as costly as "Weed Control" from a labour perspective.

[476] Raw data sourced from SunWater spreadsheets "Extract LBC data Conversion extra activity detail and preventive main split.xls" and "IM Central -610.03.PSV.xls".

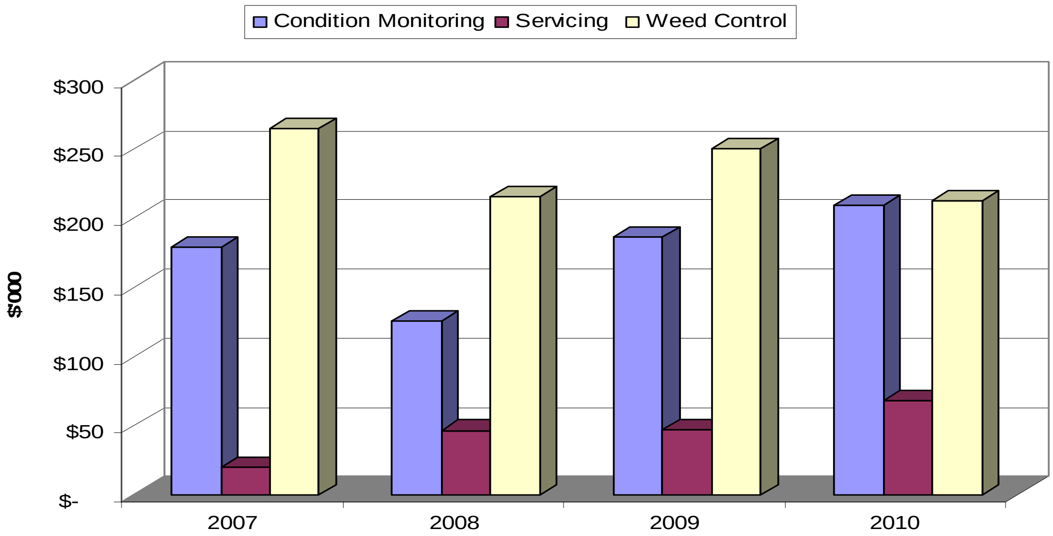

Figure 11-10. Breakdown of "Preventive Maintenance" labour costs for Bundaberg Distribution System between 2007 and 2010[477]

Electricity costs

"Electricity" costs for Bundaberg Distribution System are significant. As a proportion of "Total Operating" costs, "Electricity" costs have historically varied from 20.3% in 2009 to 34.8% in 2007.

Table 11-2. "Electricity" costs and "Total Operating" costs for Bundaberg Distribution System

($'000)	Actuals				Forecast	Price Path				
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Electricity[1]	2046	1292	1179	2245	2300	2300	2300	2300	2300	2300
Annual change		-36.9%	-8.7%	90.4%	2.4%					
Change since 2007		-36.9%	-42.4%	9.7%	12.4%					
Total Operating costs	5874	5312	5822	7293	7007	6970	7139	7188	7212	7170
Electricity as % of Total Operating costs	(34.8%)	(24.3%)	(20.3%)	(30.8%)	(32.8%)	(33.0%)	(32.2%)	(32.0%)	(31.9%)	(32.1%)

Source: *Bundaberg Distribution System NSP,* (2012-2016) January 2011, Page 7.

To a large degree, "Electricity" costs would be expected to correlate closely with water usage rates. As highlighted below in Figure 11-11, there is an obvious relationship between water usage rates and "Electricity" costs incurred for the scheme.

The "Electricity" costs presented within the NSP for 2011 onwards are base on delivering 50% of WDE (yet the past 8 years average is 41%). Note that "Electricity" costs are a variable component of pricing, and therefore irrigators will only pay "Electricity" costs associated with

[477] Raw data sourced from SunWater spreadsheet "Extract LBC data Conversion extra activity detail and preventive main split.xls".

the quantity of water delivered. The uncertainty in “Electricity” costs relates to the projected cost per ML going forward (indexed to CPI).

For 2011, initial stakeholder feedback (March 2011) indicated that water usage rates for 2011 may be well lower than 2010 due to the extended wet periods during the summer, indicating a reduction in scheme “Electricity” costs.

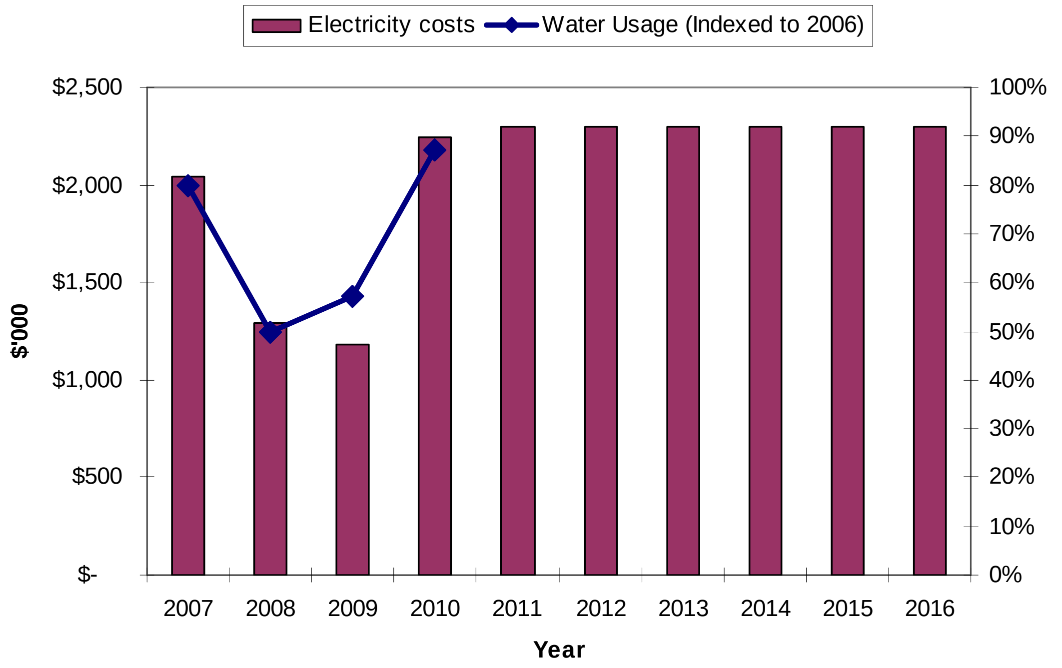

Figure 11-11. Comparison of “Electricity” costs against water usage (indexed against 2006) for Bundaberg Distribution System[478]

11.4.3 Activity based expense items

The following sections examine scheme operational costs from an activity perspective as follows:

- Operations
- Preventive Maintenance
- Corrective Maintenance

11.4.4 Operations costs

Operational activities for the scheme are largely identified within the scheme Operation Manual[479]. SunWater has provided a breakdown of “Operations” costs by both sub-activities and cost input. The following analysis begins by examining cost inputs.

Projected “Operations” costs for the Bundaberg Distribution System are significant as highlighted below in Table 11-3. As a proportion of “Total Operating” costs, “Operations” costs historically have varied from 28.1% in 2007 to 31.0% in 2009.

[478] Source: *Bundaberg Distribution System,* (2012-2016) January 2011, Pages 7 & 15.
[479] SunWater, *Bundaberg Water Supply Scheme – Scheme Operation Manual*, page 23, un-dated report.

Table 11-3. “Operations” costs and “Total Operating” costs for Bundaberg Distribution System

($'000)	Actuals				Forecast	Price Path				
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Labour[1]	388	312	376	565	690	671	677	677	681	692
Materials[1]	17	20	17	25	10	11	11	11	12	12
Contractors[1]	1	1	50	18	115	1	1	1	1	122
Other[1]	478	499	529	556	511	508	505	505	505	504
Total Direct costs	884	831	971	1,165	1,404	1,191	1,194	1,194	1,199	1,330
Indirects[1]	372	390	403	353	365	312	360	369	375	375
Overheads[1]	397	376	432	630	707	679	689	697	703	701
Total Operations[2]	1,653	1,597	1,807	2,148	2,398[4]	2,182	2,243	2,260	2,277	2,406[4]
Annual Change		-3.4%	13.1%	18.9%	15.3%	-11.9%	2.8%	0.8%	0.8%	5.7%
Change since 2007		-3.4%	9.3%	29.9%	49.8%	32.0%	35.7%	36.7%	37.7%	45.6%
Total Operating costs[3]	5874	5312	5822	7293	7007	6970	7139	7188	7212	7170
Operations as % of Total Operating costs	28.1%	30.1%	31.0%	29.4%	35.3%	31.3%	31.4%	31.4%	31.6%	33.6%

[1]Source: Historical data extracted from SunWater spreadsheet *“Extract LBC data Conversion extra activity detail and preventive main split.xls”,* forecast expenditure data from SunWater spreadsheet *“IM Central -610.03.PSV.xls”,*
[2]Note that there are minor differences between the data reported within the table and that reported within the NSP due to rounding with the exception of 2011 and 2016 (see note below).
[3]Source*: Bundaberg Distribution System NSP, (*2012-2016) January 2011, Page 7.
[4]Aurecon notes that the “Operations” costs for 2011 and 2016 calculated using the SunWater data equates to a value approximately $240,000 higher than the value presented within the NSP (no explanation provided from SunWater at the time of this study).

The average annual “Operations” cost (historical) between 2007 and 2010 was $1,801,000 per annum. The projected “Operations” cost in 2011 of $2,476,000 represents an increase of 37.5%. Of concern is the substantial rise in “Operation” costs from 2008.

The comparison between 2007 and 2010 as follows:

- 2007, water usage at 80% (of 2006), “Operations” costs were only $1.652 million
- 2010, water usage at 87% (of 2006), yet “Operations” costs were $2.146 million (increase of 30%)

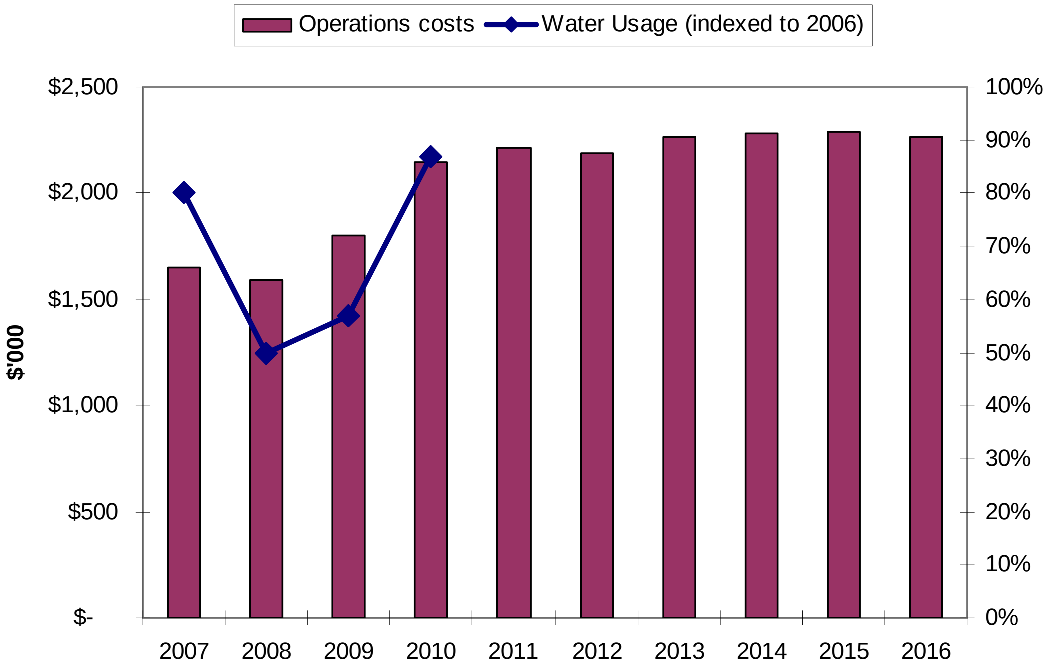

Figure 11-12. Comparison of "Operations" costs against water usage (indexed against 2006) for Bundaberg Distribution System[480]

Water usage levels for 2011 are projected to be substantially lower than that for 2010. As indicated in Figure 11-12 above Operations costs in 2011 are projected to rise further to $2.214 million[481].

The following sections seeks to examine in more detail the components that make up the "Operations" costs presented in above, and examine (data available) changes in historical cost components.

"Operations" costs for 2011 are projected to be $2.398 million[482]. As illustrated below in Figure 11-13, "Overheads" and "Indirects" represents 44.7% of the annual cost. Other significant components are "Labour" at 28.8% (which was examined earlier), and "Other" at 21.3%.

Cost items included within "Other" include insurance costs (93% of total "Other" costs, costing $475,000 in 2011), Local Authority Rates (4% or $20,000), and other local administrative costs including telephone,($16,000) etc.

[480] Raw data sourced from *Bundaberg Distribution System NSP*, (2012-2016) January 2011, Pages 7 and 14.
[481] Note that the values used in Figure 11-12 are those as presented within the NSP, and not from Table 11-3.
[482] Note that this is a calculated value using SunWater disaggregated data, from Table 11-3.

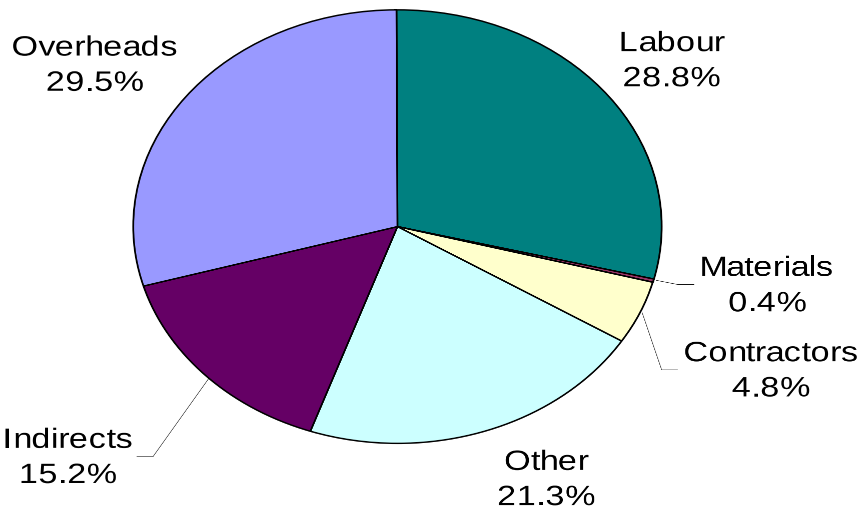

Figure 11-13. Breakdown of “Operations” costs for Bundaberg Distribution System in 2011[483]

The following analysis seeks to examine in detail the historical components of “Operations” costs, and where possible identify cost item increases (and possible causes). Figure 11-12 below provides a breakdown of the key components of “Operations” costs between 2007 and 2011.

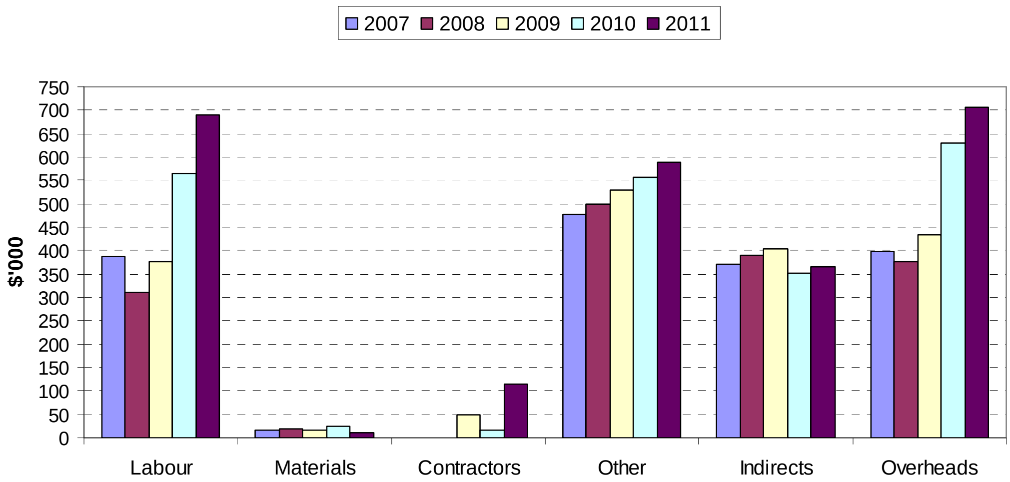

Figure 11-14. Breakdown of “Operations” costs by inputs for Bundaberg Distribution System[484]

Aurecon notes that the costs estimates for 2012-2016 (for the direct costs including “Labour”, “Materials”, “Contractors” and “Other”) are at the same levels as those shown for 2011 within Figure 11-14 with minor increases for indexation.

The scope of this consultancy was to examine the direct costs, which in this case are “Labour”, “Materials”, “Contractors” and “Other”. As illustrated in Figure 11-14 above, there are obvious upward cost increases for “Labour”, “Other” and “Contractors”.

The following section seeks to examine in more detail “Operations” costs, by examining the sub activities recorded under “Operations” (see Section 4 for a definition of each sub-activity).

[483] Raw data extracted from SunWater spreadsheet *“IM Central -610.03.PSV.xls”,*

[484] Raw data extracted from SunWater spreadsheets *“IM Central -610.03.PSV.xls”* and *“Extract LBC data Conversion extra activity detail and preventive main split.xls*”.

As indicated previously, SunWater adopted a new Business Operating Model and management accounting system in 2009/10. SunWater has acknowledged that during the process of re-categorising historical data, a number of activity expense items may have been in-correctly coded, particularly for 2007. Therefore the degree of accuracy for certain sub-activities in 2007 (& 2008 to a lesser extent) is questionable.

A breakdown of historical "Operations" expenditure by sub-activities is highlighted below in Table 11-5 and Figure 11-14. Unfortunately, a breakdown of costs for 2011 was not provided.

Table 11-5. Breakdown of historical "Operations" expenditure for Bundaberg Distribution System

Real dollars, $'000	Financial Year			
	2007	2008	2009	2010
Customer Management	68	-	-	157
Workplace H&S	-	-	-	91
Environmental Management	-	-	7	2
Water Management	-	-	-	29
Scheme Management	468	571	821	1,174
Dam Safety	14	12	14	32
Schedule /Deliver	1,085	944	899	604
Metering	31	68	63	57
Facility Management	16	-	-	-
Other	- 30	1	2	1

Source: *SunWater spreadsheet ""Copy of Extract LBC data conversion to sub activity*

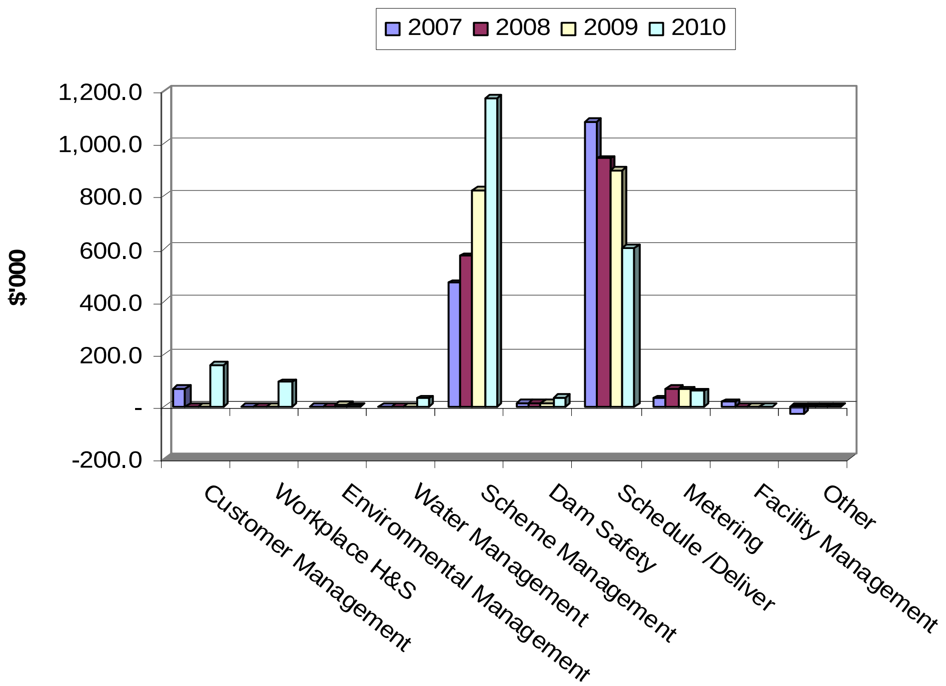

Figure 11-15. Overview of disaggregated historical "Operations" expenditure for Bundaberg Distribution System[485]

485 Raw data extracted from SunWater spreadsheet ""Copy of Extract LBC data conversion to sub activity.xls".

Customer Management

"Customer Management" includes interfacing and enquiries from customers, billing and account management, and water trading activities.

As indicated above in Table 11-5 and Figure 11-15, a cost in "Customer Management" was only incurred in 2007 and 2010, both relative high water utilisation years.

In Figure 11-16 "Labour" was the most significant direct cost in 2007 and 2010. Of interest is the fact that no "Overhead" costs were incurred for 2007, yet they are allocated in proportion to "Labour".

In addition Aurecon notes that substantial transfer of water from Paradise Dam were made, and whether these transaction also incurred costs for "Customer Management" for this scheme.

Aurecon suspects that the allocation in 2007 of "Materials" cost is an abnormalities associated with the repro-fitting of 2007 data into the new business model. "Materials" cost for 2007 were $19,000, slightly lower than the $25,000 recorded for "Labour", and the incurrence of such a significant "Materials" cost for Customer Management seems unwarranted.

Due to the overhead cost allocation model, significant "Indirects" and "Overheads" are also added. For 2010, "Labour" costs represented 36.8% of total costs incurred for "Customer Management", with the remainder consisting of "Overheads" and "Indirects" (with the exception of $1,000 for "Other").

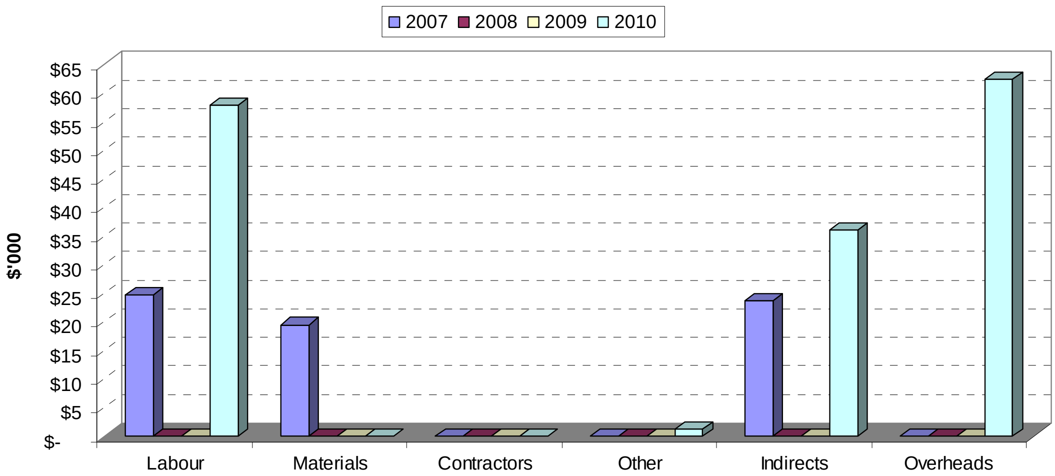

Figure 11-16. Overview of disaggregated "Customer Management" expenditure for Bundaberg Distribution System[486]

Aurecon forwarded the following questions to SunWater and received the following responses[487].

- Why were the costs for Labour only occurred in 2007 and 2010 and assumes no input/activities in 2008 & 2009?

  "These costs are attributable directly to the service contract and will be varied from year to year depended upon the nature of customer enquiries."

- What level of Labour are costs forecast for 2011?

  "The forecast cost is based on 5 years average and taking into account SunWater Enterprise Agreement"

[486] Raw data sourced from SunWater spreadsheet "*Copy of Extract LBC data conversion to sub activity.xls*".
[487] SunWater responses are sourced from email dated 30th June 2011

- Can it be assumed that the "Materials" costs for 2007 are due to problems with retro-fitting of 2007 data into the new business model?

"2007 was a transition year in which the previous internal trade model was removed and the new BOM model developed and implemented in 2008. This transition period and changes are causing difficulties in comparability across time"

Workplace Health and Safety

SunWater has a dedicated workplace, health and safety group to ensure compliance with legislative requirements throughout all workplaces. As such the group conducts regular safety audits and reviews of work practices, and to ensure SunWater staff undertake regular training.

As indicated above in Table 11-5, a cost of $91,000 was recorded only in 2010, comprising of $28,000 in "Labour" costs and $16,000 in "Materials cost". The "Materials" cost seems high in relation to "Labour" costs incurred, but may relate to course fees, supporting manuals, safety equipment, etc.

Due to the cost allocation model adopted by SunWater, a total of $47,000 in "Indirects" and "Overheads" are also allocated in 2010, as highlighted below in Figure 11-17.

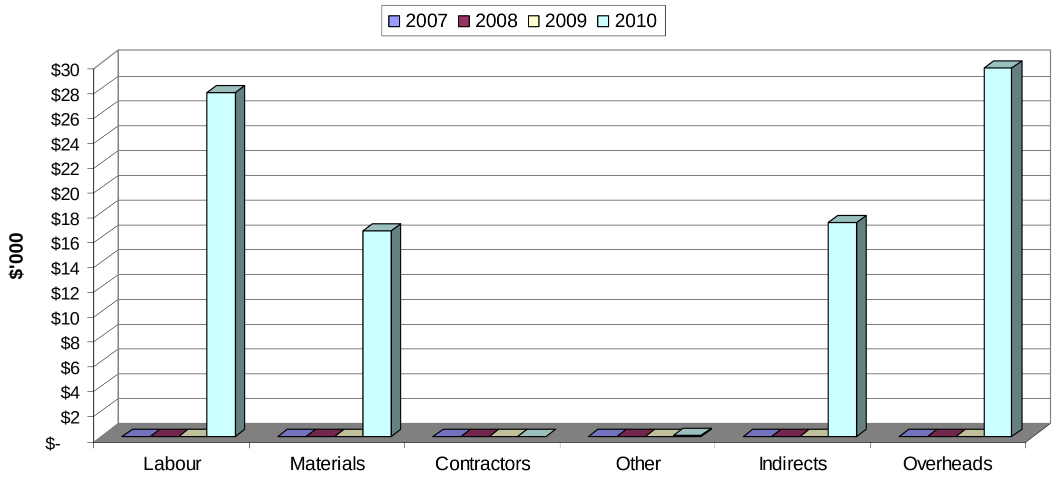

Figure 9-17. Overview of disaggregated "Workplace H&S" expenditure for Bundaberg Distribution System[488]

The 2010 "Workplace H&S" cost incurred for Bundaberg Distribution System is very significant at $91,000. Of all the schemes within the Central region, Bundaberg Distribution System incurs the highest "Labour" expense of $1.42 million in 2011.

In comparison, Bundaberg Bulk WSS has a "Labour" cost of $287,000 in 2011, but only incurred a "Workplace H&S" cost of $3,000 in 2010. Similarly the Lower Mary Distribution incurs an annual "Labour" cost of approximately $200,000, but incurred only $3,000 in "Workplace H&S".

Aurecon forwarded the following questions to SunWater and received the following responses[489].

[488] Raw data sourced from SunWater spreadsheet "*Copy of Extract LBC data conversion to sub activity.xls*".
[489] SunWater responses are sourced from email dated 30th June 2011

- Why costs were only recorded for 2010 (one-off, or annual from 2010?)

"2010 Costs are related to one-off jobs i.e. Review Intersafe Hazards, Confined Space Assessment and Purchase and Install safety Signage."

- Why costs were so high compared to all other schemes, even after taking into account the size difference in total "Labour" costs for Bundy Distribution?

"It related to one-off jobs see above comments."

- What were the $16,000 in Materials cost in 2010?

"The material costs related to purchase safety signage.'

- At what level are costs forecast for 2011?

"The forecast cost is based on 5 years average and taking into account SunWater Enterprise Agreement"

Environmental Management

Environmental Management includes the development of weed control plans, assessing impacts downstream of drains, and activities associated with environmental permits (normally undertaken by regional based environmental officer), liaison and coordination with relevant Government agencies and environmental regulators on site-specific issues.

As illustrated above in Figure 11-15 and Table 11-5, a minor expense was incurred in 2009 ($7,000) and 2010 ($2,000). Figure 11-18 below highlights that significant "Materials" and "Labour" costs were incurred in 2007, while in 2010 the main direct cost was "Labour".

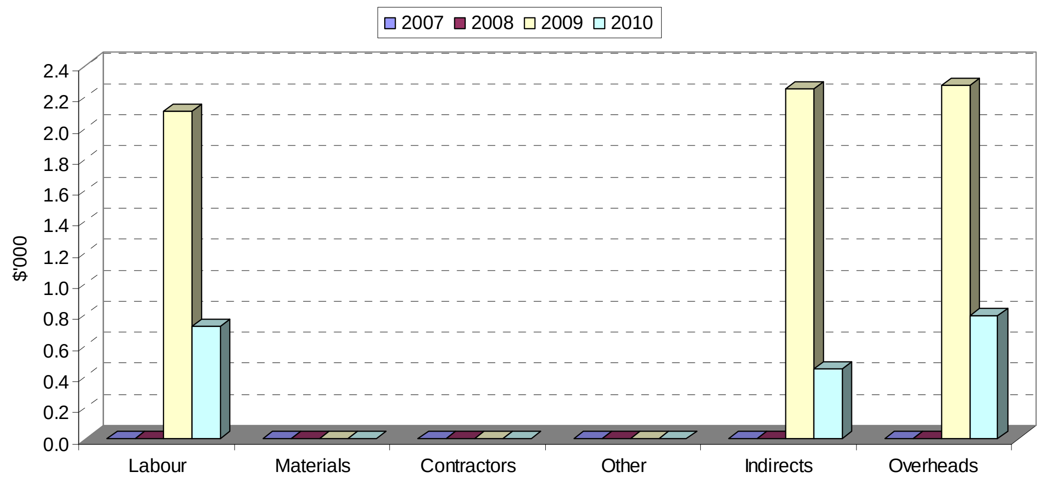

Figure 11-18. Overview of disaggregated "Environmental Management" expenditure for Bundaberg Distribution System[490]

Due to the cost allocation model, the scheme attracted significant "Indirects" and "Overheads".

Aurecon forwarded the following questions to SunWater and received the following responses[491].

- Why were significant labour costs only recorded for 2009 and 2010?

'These costs are attributable directly to Bingera system Environment Management and compliance and will be varied from year to year."

[490] Raw data sourced from SunWater spreadsheet "*Copy of Extract LBC data conversion to sub activity.xls*".
[491] SunWater responses are sourced from email dated 30th June 2011

- At what level are Labour costs forecast for 2011?

"The forecast cost is based on 5 years average and taking into account SunWater Enterprise Agreement"

Water Management

"Water Management" includes activities related with announcement of water allocations, water quality monitoring and sampling, Blue-Green algae management, SDL readings, shoreline inspections, monitoring of groundwater levels and salinity levels, bore measurements and preparation of data for NRMW and SunWater.

As illustrated above in Table 11-5 "Water Management" costs of $29,000 were only incurred in 2010. As illustrated below in Figure 11-19 "Labour" was the only direct cost at $11,000 in 2010.

Significant "Indirects" and "Overheads" of $18,000 were incurred due to the allocation model employed by SunWater.

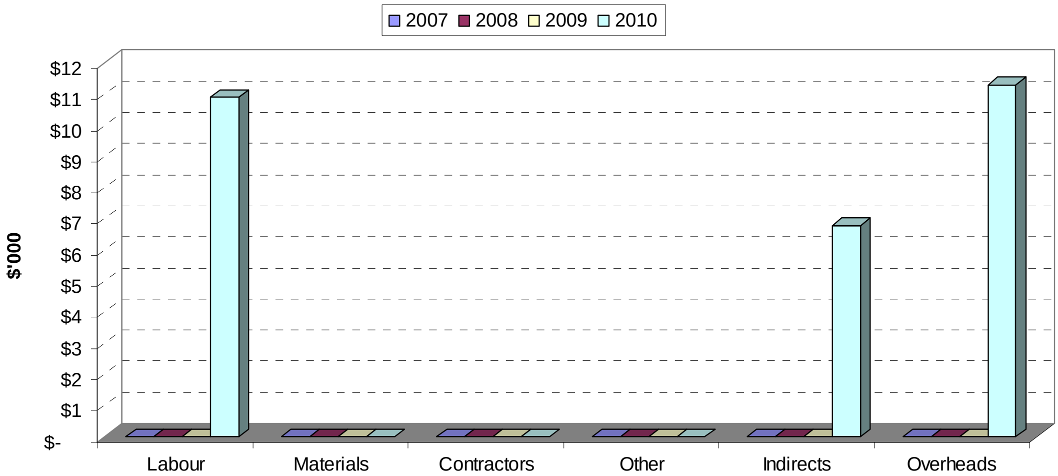

Figure 9-19. Overview of disaggregated "Water Management" expenditure for Bundaberg Distribution System[492]

Aurecon forwarded the following questions to SunWater and received the following responses[493].

- Why costs only in 2010? DFo they relate to a new activity?

"These costs are attributable directly to Gin Gin Main Channel from Water Accounting group."

- What are the costs in 2011?

"The forecast cost is based on 5 years average and taking into account SunWater Enterprise Agreement"

Scheme Management

"Scheme Management" includes the preparation and provision of reports and statistics for clients, including meetings with clients reviewing contract progress/performance, energy management including the review of electricity consumption tariffs and accounts, land and

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[492] Raw data sourced from SunWater spreadsheet "*Copy of Extract LBC data conversion to sub activity.xls*".
[493] SunWater responses are sourced from email dated 30th June 2011

property management including legal advice, O&M Manual development, Scheme Strategies, OMS plans, Facility Contingency Plans and Emergency Action Plans (EAP) for all facilities other than dams, System Leakage Management Plans (SLMPs), insurance costs, rates, land taxes.

As highlighted in Figure 11-15 and Table 11-5, “Scheme Management” costs were one of the main cost activities (“Schedule/Deliver” being the other). Of concern is the fact that costs have increased substantially from $468,000 in 2007 to $1.174 million in 2010, an increase of over 150% between 2007 and 2010. In 2010 “Scheme Management” costs at $1.174m are almost twice that of “Schedule/Deliver” at $604,000.

As highlighted by Figure 11-20 below, the most significant on-going direct cost recorded is “Other”, which increased from $457,000 in 2007 to $542,000 in 2011. “Other” predominantly includes Local Government rates, Land taxes and Insurance. As indicated earlier, for 2011 Insurance costs were projected at $475,000, Local Government rates at $20,000 and Administrative costs of $16,000, amounting to $511,000. The vast majority of “Other” costs are incurred externally, to which SunWater has no direct control over with the exception of Insurance to a minor degree, which is outside the scope of this consultancy.

As highlighted below in Figure 11-20, “Labour” input/expense has increased substantially between 2007 and 2010. Of major concern, has been “Labour” cost increasing from $73,000 in 2009 to $217,000 in 2010, a three-fold increase within a year.

Significant “Indirects” and “Overheads” are also incurred due to the allocation model employed by SunWater.

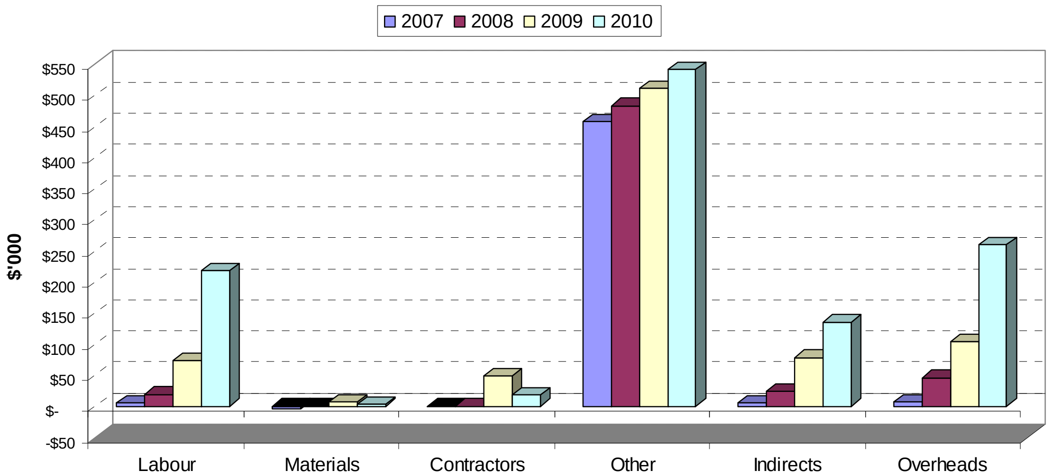

Figure 11-20. Overview of disaggregated “Scheme Management” expenditure for Bundaberg Distribution System[494]

Aurecon forwarded the following questions to SunWater and received the following responses[495].

- Why Labour expenses increased from 2007 ($5,000) to $73,000 in 2009, then increasing three -fold to $213,000 in 2010?

“In 2010, the new Irrigation pricing costs are included in this activity as well as the indirect asset management costs move to the scheme management costs in 2010.”

- Have functions/activities/costs been transferred from “Schedule/Deliver” to “Scheme Management”?

[494] Raw data sourced from SunWater spreadsheet “*Copy of Extract LBC data conversion to sub activity.xls*”.
[495] SunWater responses are sourced from email dated 30th June 2011

"Only the indirect asset management activity move to the scheme management costs in 2010 as well as realign schedule/deliver to scheme management costs."

- What is the trend for 2011+?

"The forecast cost is based on 5 years average and taking into account SunWater Enterprise Agreement"

Dam Safety

For referable water storages under the Water Act 2000, SunWater is required to have a comprehensive safety management program in place comprising policies, procedures and investigations to minimise the risk of dam failure. Routine dam safety inspections are carried out monthly, which include the monitoring of embankments, piezometers, seepage and general condition of the storages as defined in the dam surveillance specification. Also significant compliance issues in relation to documenting, recording and reporting on dams safety.

As highlighted in Table 11-5 and Figure 11-15, "Dam Safety" costs were constant between 2007 and 2009 at $12,000 to $14,000, before more than doubling to $32,000 in 2010.

Figure 11-21 below highlights that "Labour" was the most significant direct cost and between 2007 and 2007 remained relatively constant between $4,000 and $5,000 per annum. In 2010 the "Labour" cost incurred more than doubles to $11,000.

Figure 11-21 also a minor ($1,000) one-off negative expense for "Materials" was recorded for 2007 (likely coding error due to the retro-fitting of data in 2007 into the new business model).

Due to the overhead cost allocation model, significant "Overheads" and "Indirects" are also added. In 2010, the $11,000 in "Labour" costs also attracted $19,000 in "Indirects" and "Overheads" to the scheme.

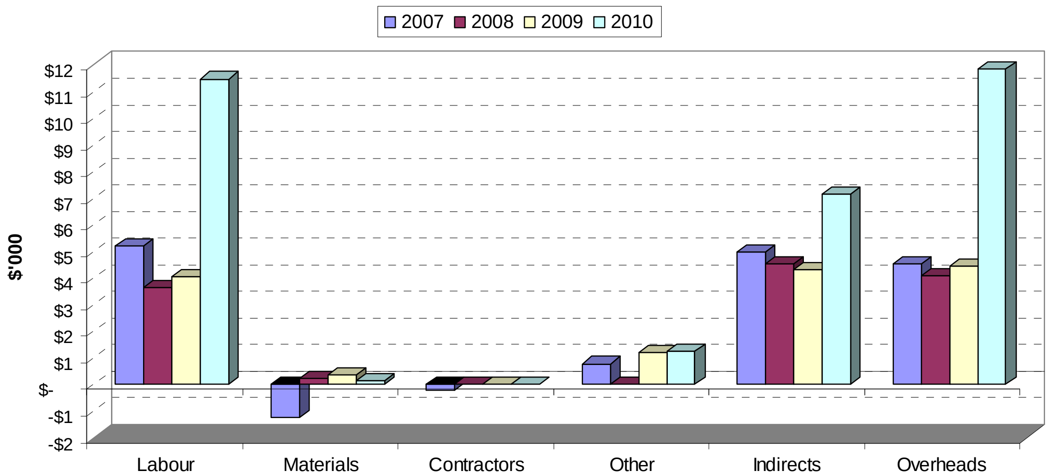

Figure 11-21. Overview of disaggregated "Dam Safety" expenditure for Bundaberg Distribution System[496]

Aurecon forwarded the following questions to SunWater and received the following responses[497].

- Labour costs jump from $4,000 - $5,000 between 2007 to 2009, to $11,000 in 2010. Were there new activities identified in 2010?

"One-off jobs – study Failure Impact Assessment for the Woongarra and Isis system."

[496] Raw data sourced from SunWater spreadsheet "*Copy of Extract LBC data conversion to sub activity.xls*".
[497] SunWater responses are sourced from email dated 30th June 2011

- Were the 2007 negative Materials cost a coding error?

"2007 was a transition year in which the previous internal trade model was removed and the new BOM model developed and implemented in 2008. This transition period and changes are causing difficulties in comparability across time"

- Are these Dam Safety costs related to monthly auditing of the balancing storages?

"Yes, it is related to both balancing storages and systems.'

- At what level are costs forecast for 2011?

"The forecast cost is based on 5 years average and taking into account SunWater Enterprise Agreement, but excluding weir and dam inspections (move to Preventative Mtnce according to Parsons Brinckerhoff)."

Schedule/Deliver

Schedule/Deliver includes scheduling, releasing, operation of pump stations and SCADA, System surveillance including monitoring of water entitlement and observation of and reporting of any breaches, flood operations preparation, water harvesting, ROP compliance of water levels and flows and reporting of water information.

As indicated above in Figure 11-15 and Table 11-5 "Schedule/Deliver" costs have decreased substantially from $1.085 million in 2007 to $604,000 in 2010.

As highlighted earlier within Figure 11-12, water usage declined substantially in 2008 and 2009, which may explain the substantial decline in "Schedule/Deliver" costs in 2008 and 2009. However, water usage in 2010 was actually higher than in 2007, yet "Schedule/Deliver" costs are down by approximately 40% (which seems contrary to expectations).

As highlighted within Table 11-5, as "Schedule/Deliver" costs have decreased substantially, "Scheme Management" costs have increased substantially, possibly indicating that certain activities and costs may have been transferred between these cost centres.

Figure 11-22 highlights that "Labour" was the most significant direct cost, and decreased substantially from approximately $350,000 in 2007 to $220,000 in 2010 (37% reduction).

Both "Materials" and "Other" have incurred relatively minor costs to that of "Labour". "Materials" have decreased from approximately $20,000 in 2007 to $5,000 in 2010, while "Other" costs have decreased from $18,000 in 20007 to $12,000 in 2010.

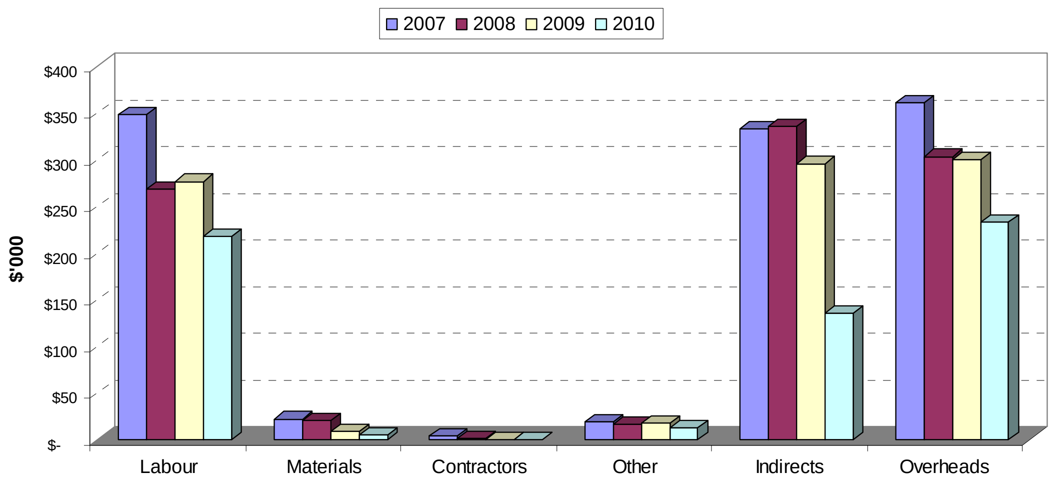

Figure 11-22. Overview of disaggregated "Schedule/Deliver" expenditure for Bundaberg Distribution System[498]

[498] Raw data sourced from SunWater spreadsheet "*Copy of Extract LBC data conversion to sub activity.xls*".

Due to the overhead cost allocation model, significant “Indirects” and “Overheads” are also added. In 2010, the $24,000 in “Labour” costs also attracted $46,000 in “Indirects” and “Overheads” towards the scheme.

Aurecon forwarded the following questions to SunWater and received the following responses[499].

- What is the background information regarding Labour use, and why Labour costs decreased substantially, even in 2010 when water usage was up?

“Realign/move some schedule/deliver activity to scheme management activity.”

- Have some labour activities/costs been transferred to Scheme Management since costs are rising rapidly?

“Yes, see above comments”

- At what level are costs forecast for 2011?

“The forecast cost is based on 5 years average and taking into account SunWater Enterprise Agreement”

Metering

“Metering” costs have increased from $31,000 in 2007 to $68,000 in 2008, before decreasing to approximately $60,000 in 2009 and 2010.

The Bundaberg Distribution System has a total of 900 bulk customers[500]. SunWater has advised that a total of 1,575 meters were read in 2010, and that 24 meters have been installed since 2009.

In comparison, the neighbouring Barker Barambah Bulk WSS has a total of 161 bulk customers (unknown what number have meters) incurring a cost of $43,000 in “Metering” costs in 2010. However, the Boyne River and Tarong WSS has 155 Bulk customers, and only recorded $6,000 “Metering” expense in 2010. Clearly, not all bulk customers across all schemes have meters installed.

Figure 11-23 highlights key input cost components for “Metering”. Of concern are costs in 2007, in which only a one-off expense for “Materials” of approximately $11,000 and Overhead expense of $19,000 was recorded, with no “Labour” expense. It is highly likely that the $31,000 expense recorded for 2007 is a coding error due to the retro-fitting of data in 2007 into the new business model (and in fact a $0 expense should show for 2007 in relation to “Metering” expenses.

Figure 11-23 also highlights “Labour” as the only direct cost component (after 2007), incurring an annual expense of $20,000 between 2008 and 2010.

Due to the cost allocation model, substantial “Indirects” and “Overheads” are allocated to this activity. In 2010, “Labour” costs incurred for “Metering” was $21,000 with “Indirects” and “Overheads” accounting for the remaining $35,000.

[499] SunWater responses are sourced from email dated 30th June 2011
[500] Source: SunWater *Bundaberg Distribution System NSP*, (2012-2016) January 2011, page 14.

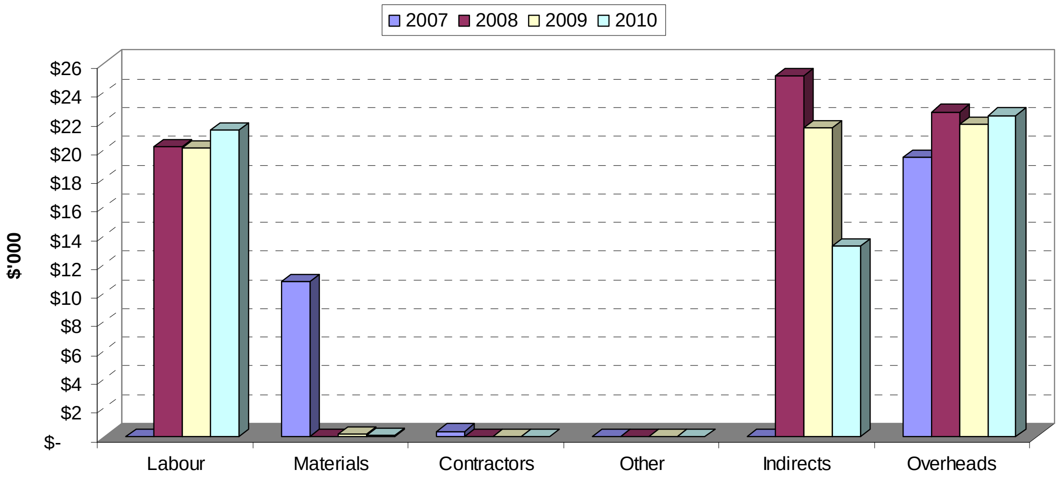

Figure 11-23. Overview of disaggregated "Metering" expenditure for Bundaberg Distribution System[501]

Stakeholders have raised the issue that there are more cost effective strategies to avoid reading these meters each quarter by SunWater staff.

Aurecon notes that "*Customers can also enter their own meter readings into SunWaterOnline to obtain up-to-date information about water use and availability*[502]."

Aurecon requested additional information from SunWater regarding options for meter reading, and incentives/opportunities for users to read and record their own meters on line. Section 4 provides an overview SunWater's response, and Aurecon's view.

Aurecon also sought confirmation regarding the number of meters installed since 2009. SunWater advised that 1,575 meters were read in 2010, with just 24 meters installed since 2009. Of interest is metering costs have been declining since 2008 (even in 2010 when additional 24 meters were installed), possibly indicating that SunWater is identifying labour efficiencies undertaking the task.

Facility Management

"Facility Management" costs are commonly related to the maintenance of facilities, predominantly recreational. Bundaberg Distribution System does not have any recreational facilities.

As highlighted within Table 9-5, a one-off cost of $14,000 was recorded in 2007. It is highly likely that this 2007 expense is a coding error due to the retro-fitting of data in 2007 into the new business model.

Other

As highlighted within Table 11-5, a negative costs of $30,000 was recorded in 2007, and minor costs of $1,000 to $2,000 for 2008 to 2010. It is highly likely that the negative $30,000 expense recorded for 2007 is a coding error due to the retro-fitting of data in 2007 into the new business model.

[501] Raw data sourced from SunWater spreadsheet "*Copy of Extract LBC data conversion to sub activity.xls*".
[502] Source: SunWater *Bundaberg Distribution System NSP*, (2012-2016) January 2011, Page 17.

Prudency and Efficiency of Operations Expenditure

As highlighted within Table 11-3, direct costs for Operations expenditure has increased from $884,000 in 2007 to $1,165,000 in 2010. Note that the proposed expenditure for 2011 is $1,404,000. SunWater states that the 2011 costs were estimated based on the average of the preceding 4/5 years, which should therefore equate to $962,000 based on the information presented within this report. Hence, SunWater has projected substantially higher costs for 2011 ($442,000), which Aurecon is unable to verify using the historical data provided.

Sunwater advised that a number of weir safety inspections costs that were previously recorded under Dam Safety, are now incorporated to Preventive Maintenance activity. One activity *Woongarra System – Monthly Operational Inspection* with a direct labour cost of $5,100 is most likely to have been reallocated from Dam Safety to Preventive Maintenance.

The provision of disaggregated historical activity data for "Operations" by SunWater, provided substantial insights, and identified substantial activities and issues requiring additional information and explanation from SunWater. As highlighted throughout this section, SunWater has provided responses to additional questions, which in most cases provided valid information.

However, SunWater was not able to provide 2011 cost estimates for the sub-activities, which Aurecon views as critical in verifying the prudency and efficiency of these costs.

Aurecon recommends that to verify the prudency and efficiency of 2011 expenditure, the following information and analysis is required:

- 2011 cost estimates for sub-activities be released and examined to ensure compliance with SunWater's averaging methodology (preceding 4/5 years)
- cost estimates for metering be based on 2010 costs assuming that it represents improved efficiencies reading meters, as costs are lower than the preceding years
- the Dam Safety forecast 2011 costs is reduced by $5,100 to account for the transfer of activities to Preventive Maintenance.

11.4.5 Preventive Maintenance costs

SunWater has defined "Preventive Maintenance" as activities related to the ongoing operational performance and service capacity of physical assets as close as possible to designed standards. SunWater[503] state that "Preventive Maintenance" is cyclical in nature with a typical interval of 12 months or less, and includes the following key output activities:

- Condition monitoring; the inspection of assets to determine preventive maintenance requirements
- Servicing; planned maintenance activities normally expected to be carried out routinely

A review of SunWater's reporting system also revealed that "Weed Control" was also a key output activity associated with "Preventive Maintenance", to which costs were assigned. As indicated earlier within Figure 11-10 "Weed Control" costs were significant in terms of labour input. Considering the extensive networks (600km) of channels, weed control costs (land based weeds on the banks of channels and access roads, and aquatic weeds within the channels) is very significant for Bundaberg Distribution System.

Projected "Preventive Maintenance" costs for the Bundaberg Distribution System are highlighted below in Table 11-6. As a proportion of "Total Operating" costs, "Preventive Maintenance" costs have varied from 23.8% in 2010 to 32.8% in 2009.

[503] SunWater, *Bundaberg Distribution System NSP,* (2012-2016) January 2011, Page 28.

Table 11-6. "Preventive Maintenance" costs and "Total Operating" Expenditure for Bundaberg Distribution System

($'000)	Actuals				Forecast	Price Path				
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Preventive Maintenance[1]	1866	1738	1911	1734	1676	1667	1728	1747	1758	1748
Annual change		-6.9%	10.0%	-9.3%	-3.3%	-0.5%	3.7%	1.1%	0.6%	-0.6%
Change since 2007		-6.9%	2.4%	-7.1%	-10.2%	-10.7%	-7.4%	-6.4%	-5.8%	-6.3%
Total Operating Costs[1]	5874	5312	5822	7293	7007	6970	7139	7188	7212	7170
Preventive M as % of Total Operating costs	31.8%	32.7%	32.8%	23.8%	23.9%	23.9%	24.2%	24.3%	24.4%	24.4%

Source: *Bundaberg Distribution System NSP,* (2012-2016) January 2011, Page 7.

As indicated earlier, SunWater's deployment of a new Business Operating Model and management accounting system required the retrospective transfer of cost data for 2007 and 2008. A recent review[504] found that costs that should have been coded to refurbishment, were coded as "Preventive Maintenance", resulting in some schemes incurring a substantial spike in "Preventive Maintenance" costs for 2007. As indicated above in Table 11-6 (Figure 11-24 below) costs for the scheme do not appear to have spiked disproportionally in 2007.

The average annual "Preventive Maintenance" cost (historical) between 2007 and 2010 was $1,812,000 per annum. The projected "Preventive Maintenance" cost in 2011 of $1,676,000 represents a decrease of 7.5% over the historical average expense incurred between 2007 and 2010.

"Preventive Maintenance" costs may be expected to follow water usage to some degree. However, as indicated below in Figure 11-24 there does not seem to be a consistent correlation between costs and water usage.

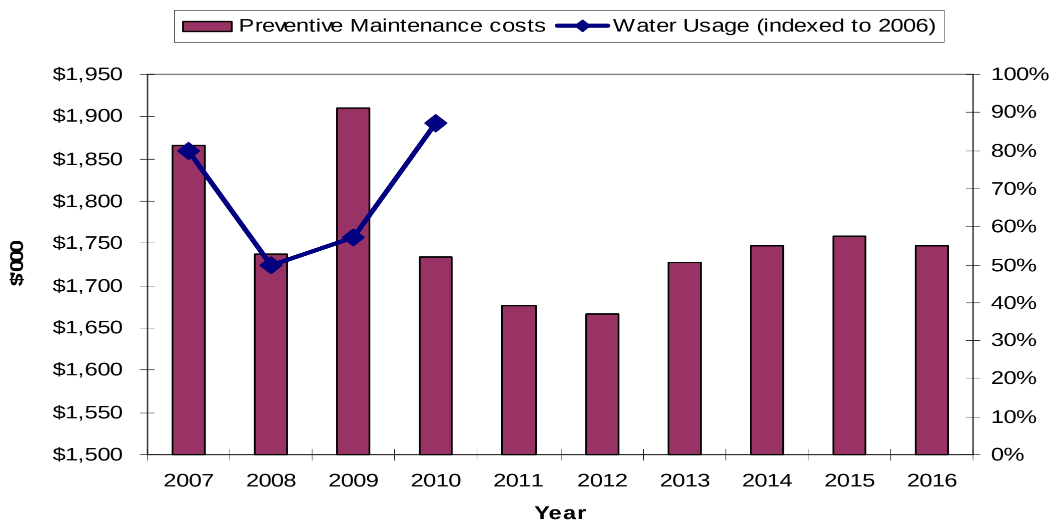

Figure 11-24. Comparison of "Preventive Maintenance" costs against water usage (indexed against 2007) for Bundaberg Distribution System[505]

[504] Parsons Brinkerhoff, *Provision of Services for Costing SunWater's Work Instructions*, October 2010, page 13.
[505] Raw data sourced from *Bundaberg Distribution System NSP,* (2012-2016) January 2011, Pages 7 & 15.

The following seeks to examine in more detail the components that make up the “Preventive Maintenance” costs presented within Table 11-6 above, and examine in detail (data available) where changes have occurred.

As illustrated below in Figure 11-25, “Overheads” and “Indirects” represents 44.9% of the projected total cost in 2011 ($1.676 million). Other significant components are “Labour” at 28.9% (which was examined earlier), and “Materials” at 18.9%.

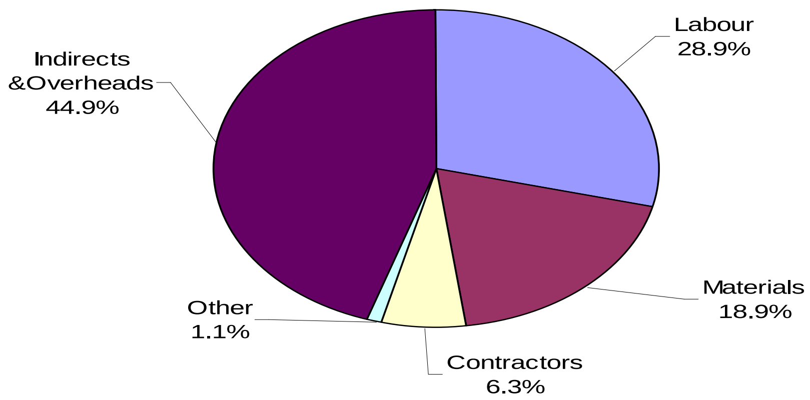

Figure 11-25. Breakdown of cost inputs for “Preventive Maintenance” for Bundaberg Distribution System in 2011[506]

Figure 11-26 below provides a breakdown of the key cost input components of “Preventive Maintenance” between 2007 and 2011.

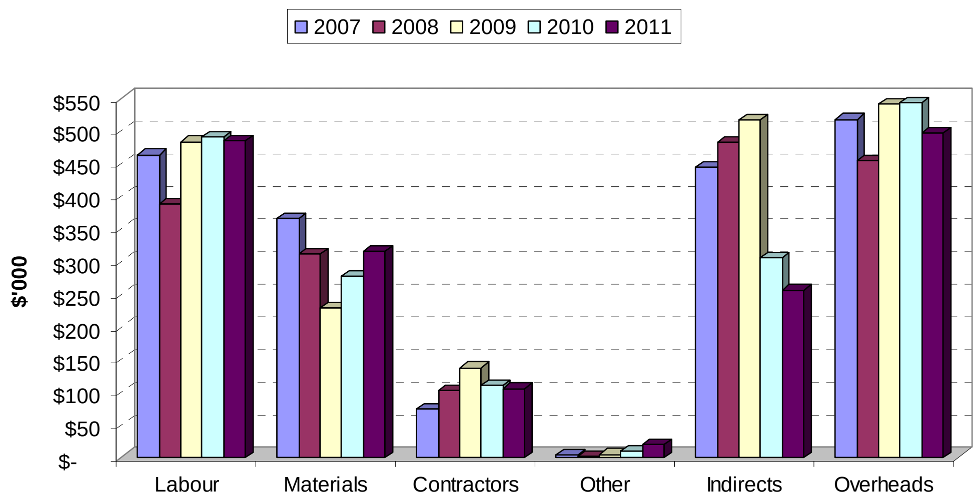

Figure 11-26. Breakdown of cost inputs towards “Preventive Maintenance” for Bundaberg Distribution System 2007 - 2011[507]

As indicated earlier, the accuracy of the 2007 data for many schemes spiked disproportionally to subsequent year. However, as indicated above in Figure 11-26, this does not seem to be the case for the Bundaberg Distribution System.

[506] Raw data extracted from SunWater spreadsheet *“IM Central -610.03.PSV.xls”*.
[507] Raw data extracted from SunWater spreadsheets *“IM Central -610.03.PSV.xls”* and *“Extract LBC data Conversion extra activity detail and preventive main split.xls*”.

It is noted that the 2011 projected cost forms the cost basis for the next price path (2012-2016), subject to inflation indexation, for all the direct costs.

Figure 11-26 indicates that “Overheads” are allocated almost in direct proportion to that of “Labour”, while “Indirects” seem to be apportioned on a different basis, but are also very significant. The scope of this consultancy was to examine the direct costs, which in this case are “Labour”, “Materials”, “Contractors” and “Other”.

Of the direct costs, “Labour” is the main cost item. The historical annual average “Labour” expense between 2007 and 2010 was $456,000 per annum, and SunWater is projecting a “Labour” cost estimate of $484,000 for 2011, an increase of 6.1%. The analysis below seeks to examine “Labour” expenditure in detail.

Figure 11-26 also highlights that “Materials” costs were also significant and highly variable. The historical annual average “Materials” expense between 2007 and 2010 was $295,000 per annum, and SunWater is projecting a “Materials” cost estimate of $316,000 for 2011, an increase of 7.1%.

The use of “Contractors” increased rapidly between 2007 and 2009, but decreased in 2010. The historical annual average “Contractors” expense between 2007 and 2010 was $106,000 per annum, and SunWater is projecting a “Contractors” cost estimate of $105,000 for 2011.

SunWater also provided the NSP consultants with a breakdown of historical “Preventive Maintenance” costs by output activity, which is defined earlier as “Condition Monitoring”, “Servicing” and “Weed Control”.

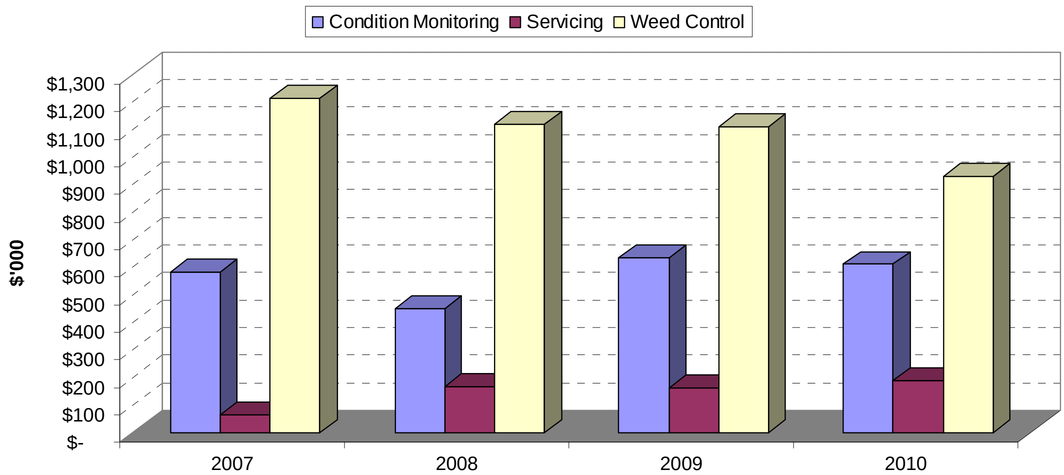

Figure 11-27. Breakdown of output activities under “Preventive Maintenance” for Bundaberg Distribution System 2007 - 2010[508]

As indicated above in Figure 11-27, “Weed Control” was the most significant cost activity for the scheme. In 2007, “Weed Control” cost totalled $1.2 million but subsequently declined to $931,000 by 2010. Figure 11-28 below highlights the key cost components of “Weed Control”, with significant “Labour”, “Materials” and “Contractor” costs incurred between 2007 and 2010. Unfortunately cost forecasts for 2011 at this level of disaggregation were not available at the time of this report for review.

[508] Raw data extracted from SunWater spreadsheet *“Extract LBC data Conversion extra activity detail and preventive main split.xls*”.

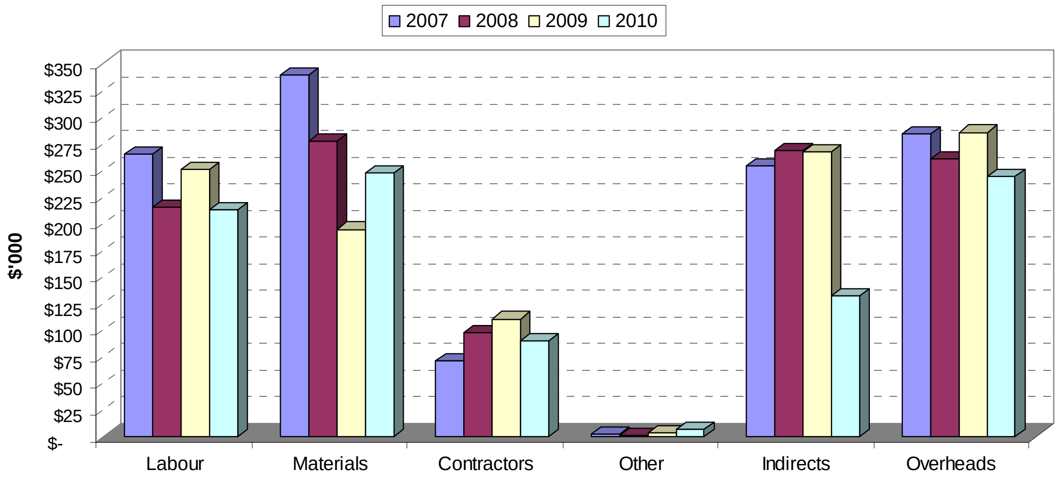

Figure 11-28. Breakdown of input costs towards “Weed Control” for Bundaberg Distribution System 2007 - 2010[509]

The historical annual average “Labour” expense for “Weed Control” between 2007 and 2010 was $236,000 per annum.

Validating the forecast “Labour” input costs for “Preventive Maintenance” for 2011-2016

As highlighted earlier within Figure 11-25, the main direct cost for 2011 is “Labour” which accounts for 28.9% of total “Preventive Maintenance” costs, or $484,000. The following analysis seeks to examine the prudency and efficiency of the proposed $484,000 “Labour” expense for “Preventive Maintenance”.

SunWater has developed Operation and Maintenance manuals for the scheme, which detail the maintenance activities to be undertaken for “Condition Monitoring” and “Servicing”, along with frequency. A recent review by Parsons Brinkerhoff (2010A) examined each of the individual activities specified within SunWater’s Operation and Maintenance manual for the Bundaberg Distribution System, and validated the proposed activities and frequency prescribed. The Parsons Brinkerhoff (2010A) report also quantified the required man hours input required for each activity along with cost based on SunWater’s internal hourly rates.

Of importance is the fact that the Parsons Brinkerhoff (2010A) study identified the following new activities that were not previously listed under Preventive Maintenance (Table 11-7).

Table 11-7. New “Preventive Maintenance” activities not previous recorded within the system for Bundaberg Distribution System

Activity	Annual Hours	Labour cost
Woongarra System – Monthly Operational Inspection	100	$ 4,100
Bingera Flow - Elect Condition Monitoring	8	$ 328
Bingera Flow 12 Month - Elect Condition Monitoring	8	$ 328
12 Monthly Civil Condition Monitoring of Gooburrum Pump Station	10	$ 370
TOTAL New Activities	**126**	**$ 5,126**

Source: Parsons Brinkerhoff, “Provision of Services for Costing SunWater’s Work Instructions” (2010A), working appendices Spreadsheets.

509 Raw data extracted from SunWater spreadsheet *“Extract LBC data Conversion extra activity detail and preventive main split.xls*”.

Table 11-7 highlights the additional need for Condition Monitoring requiring an additional 126 hours per annum.

Table 11-8 below highlights the key findings from the Parsons Brinkerhoff (2010A) study, particularly the recommended hours for SunWater labour input (2011) against historical labour input between 2007 and 2010 by SunWater.

Table 11-8. Required labour input for "Preventive Maintenance" for Bundaberg Distribution System

Year	Hours	Direct annual labour cost	% of 2011 hours
2007*	5,001	$173,821	150.7%
2008	4,792	$154,868	144.4%
2009	6,233	$215,862	187.8%
2010	7,151	$256,379	215.5%
Average 2007 - 2010	5,794	$200,233	174.6%
Proposed for 2011	**3,318**	**$140,439**	

Source: Parsons Brinkerhoff, "Provision of Services for Costing SunWater's Work Instructions" (2010A), working appendices Spreadsheets
*May include substantial error due to retro-fitting of historical data into the new business model

According to the Parsons Brinkerhoff report (2010A), to complete all the prescribed and required "Preventive Maintenance" activities ("Condition Monitoring" and "Servicing" only, ignoring "Weed Control") requires an annual input of 3,318 hours or a direct annual labour cost of $140,439 (Table 11-8). This includes 278 hours of new activities identified in Table 11-7 above.

As indicated above in Table 11-6, the Parsons Brinkerhoff (2010A) study proposes substantially lower labour input in terms of hours and cost than what has been historically incurred. An examination of the working spreadsheet for the Parsons Brinkerhoff (2010A) study identifies that of the 146 prescribed Preventive Maintenance activities, the Parsons Brinkerhoff (2010A) study did not quantity the labour requirements for a total of 38 activities, which may explain the substantial difference between the historical hours and costs incurred by SunWater and the prescribed hours and costs projected by the Parsons Brinkerhoff (2010A).

Aurecon suspects that for the Bundaberg Distribution System, SunWater has projected the 2011 "Labour" cost of $484,000 for "Preventive Maintenance" as follows:

- $213,000 for Weed Control (2010 labour cost)
- $256,000 for Servicing and Condition Monitoring (2010 cost from Table 11-8 above)

As highlighted above, the Parsons Brinkerhoff (2010A) study recommended that labour input towards Servicing and Condition Monitoring at $140,000, which is a substantial reduction of approximately $120,000.

Aurecon recommends that a justification be sought from SunWater as to why a higher labour (possibly 2010) cost was adopted over and above the Parsons Brinkerhoff (2010A) recommendation. The difference may be attributed to SunWater assigning labour to the 38 activities for which Parsons Brinkerhoff were unable to quantify in terms of labour input.

Due to the lack of information provided pertaining the calculation of 2011 expenses, Aurecon is unable to evaluate the prudency and efficiency of Preventive Maintenance expenses.

11.4.6 Corrective Maintenance costs

SunWater describes "Corrective Maintenance" as an unexpected failure requiring reactive corrective maintenance response. Two main types of activities:

- Emergency breakdown maintenance, requiring immediate action to restore normal operation or supply to customer to meet a regulatory obligation
- Non-emergency maintenance, activities no requiring immediate response but scheduled in advance of the planned maintenance cycle[510]

Projected "Corrective Maintenance" costs (including both emergency and non-emergency maintenance) for the Bundaberg Distribution System is highlighted below in Table 11-9. As a proportion of "Total Operating" costs, "Corrective Maintenance" costs vary from 17.6% in 2010 to 19.8% in 2009.

Table 11-9. "Corrective Maintenance" costs and "Total Operating" costs for Bundaberg Distribution System

($'000)	Actuals				Forecast	Price Path				
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Corrective Maintenance[1]	1151	998	1151	1281	968	962	997	1008	1015	1008
Annual change		-13.3%	15.3%	11.3%	-24.4%	-0.6%	3.6%	1.1%	0.7%	-0.7%
Change since 2007		-13.3%	0.0%	11.3%	-15.9%	-16.4%	-13.4%	-12.4%	-11.8%	-12.4%
Total Operating Costs[1]	5874	5312	5822	7293	7007	6970	7139	7188	7212	7170
Corrective M as % of Total Operating costs	19.6%	18.8%	19.8%	17.6%	13.8%	13.8%	14.0%	14.0%	14.1%	14.1%

[1]Source: *Bundaberg Distribution System NSP,* (2012-2016) January 2011, Page 7.

The average annual "Corrective Maintenance" cost (historical) between 2007 and 2010 was $1,145,000 per annum. The projected "Corrective Maintenance" cost in 2011 of $968,000 represents a substantial decrease of 15.5% over the historical average expense incurred between 2007 and 2010.

The following sections seeks to examine in more detail the components that make up the "Corrective Maintenance" costs and examine in detail (data available) where changes have occurred.

"Corrective Maintenance" costs would be expected to follow water usage to a degree. As indicated below in Figure 11-29 there seems to be a correlation between water usage and costs. As indicated earlier, water usage is projected to be lower in 2011, and correspondingly "Corrective Maintenance" costs are projected to decline substantially.

[510] SunWater, *Bundaberg Distribution System NSP,* (2012-2016) January 2011, page 28.

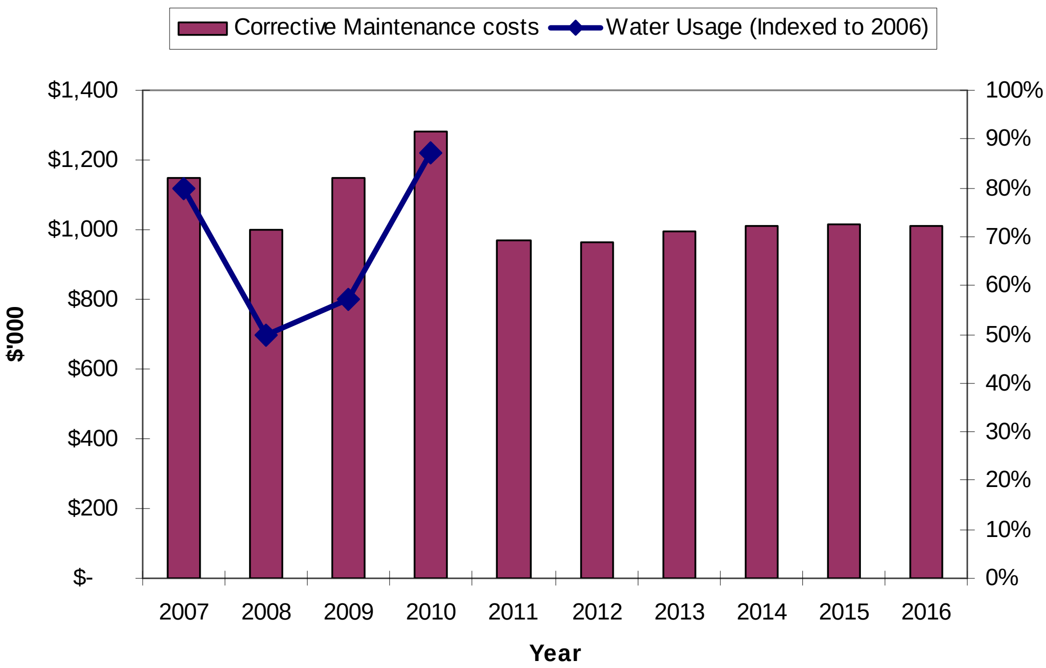

Figure 11-29. Comparison of "Corrective Maintenance" costs against water usage (indexed against 2006) for Bundaberg Distribution System[511]

As illustrated below in Figure 11-30, "Overheads" and "Indirects" account for 44.6% of the projected total cost in 2011. Other significant components are "Labour" at 28.7%, "Materials" at 14.2%, and "Other" at 8.4%.

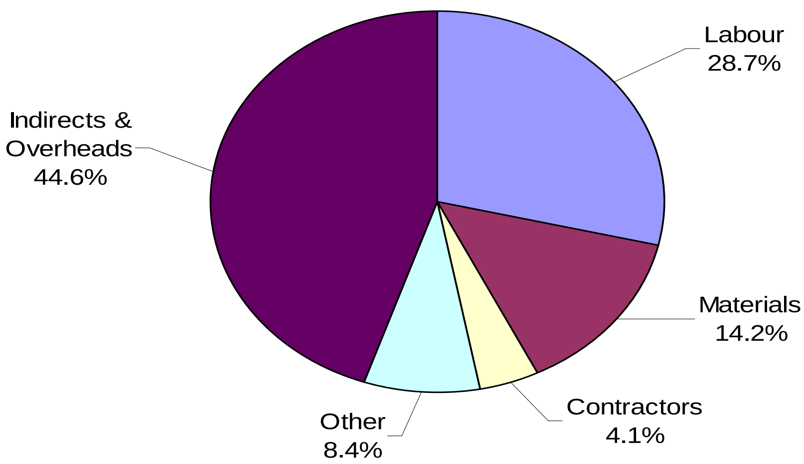

Figure 11-30. Breakdown of cost inputs towards "Corrective Maintenance" costs for Bundaberg Distribution System in 2011[512]

Figure 11-31 below provides a breakdown of the key cost input components for "Corrective Maintenance" between 2007 and 2011.

511 Raw data sourced from *Bundaberg Distribution System NSP,* (2012-2016) January 2011, Pages 7 & 15.
512 Raw data extracted from SunWater spreadsheet *"IM Central -610.03.PSV.xls".*

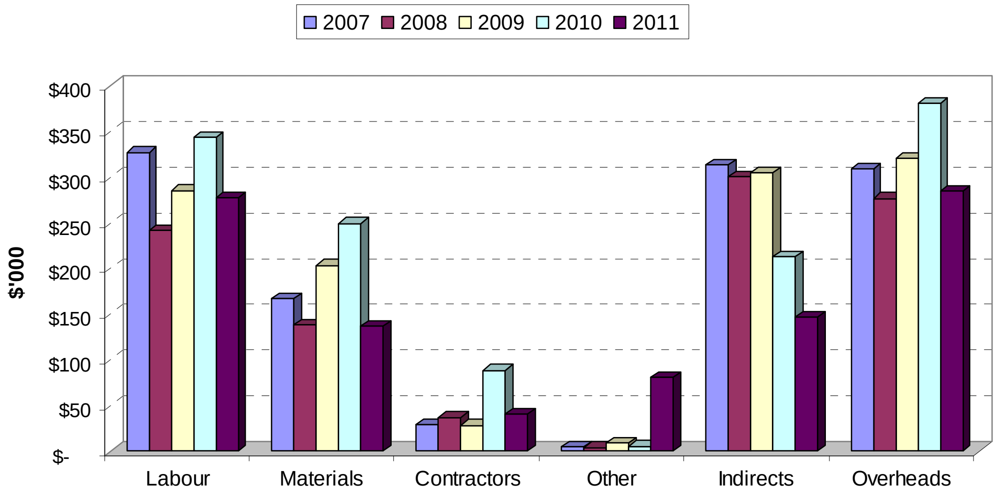

Figure 11-31. Breakdown of cost inputs towards "Corrective Maintenance" for Bundaberg Distribution System 2007 - 2011[513]

It is noted that the projected cost in 2011 forms the basis for the next price path (2012-2016) (subject to inflation indexation). The scope of this consultancy was to examine these direct costs, which in this case are "Labour", "Materials", "Contractors" and "Other".

Figure 11-31 above highlights that "Labour" costs varied substantially between 2007 and 2010, averaging $299,000 per annum. In 2011 "Labour" costs are projected to decline to $278,000, which is 7.0% lower than the average for 2007 – 2010.

"Materials" costs are also significant and variable, following the movement of "Labour" costs. The average "Materials" cost for 2007 to 2010 was $190,000 per annum, yet SunWater is proposing a slightly lower "Materials" cost of $137,000 in 2011.

Contractors are also utilised for "Corrective Maintenance". Costs have varied from approximately $30,000 to $90,000 in 2009, averaging $46,000 per annum over the 2007 to 2010 period. SunWater has projected future "Contractor" costs from 2011 at $40,000 per annum.

In addition, "Other" costs spike in 2011 from a very low base. The spike in costs for 2011 ($80,000) is attributed to the cost of Heavy Plant & Equipment (i.e. 92% of "Other" cost). Note that SunWater (email dated 30th June 2011) clarified that "*in 2010, the plant hire owner operators were utilised, whilst it is more cost effective to utilise SunWater's plant 2011".*

Aurecon notes that it is difficult to forecast "Corrective Maintenance" costs. SunWater's approach to use historical expenditure as the basis for forecasting is commonly utilised by other water utilities. The historical average annual direct expense incurred (2007-2010) was $540,000, yet SunWater has projected 2011 at $536,000.

Based on the historical data provided by SunWater and the comparative analysis of historical expenses against forecast costs for 2011 (2012 to 2016), Aurecon assesses the proposed "Corrective Maintenance" direct costs for the scheme as being prudent and efficient.

Total Maintenance expenditure

SunWater has indicated its intention to move to a reliability maintenance approach (RCM), which is a rick based process that can assist in providing the optimal mix of "Preventive" and "Corrective Maintenance". Table 11-9 below highlights the direct costs attributed to "Corrective" and "Preventive Maintenance", and also indicates that "Total Maintenance" costs

[513] Raw data extracted from SunWater spreadsheets *"IM Central -610.03.PSV.xls"* and *"Extract LBC data Conversion extra activity detail and preventive main split.xls*".

in 2011 are only 1.7% higher than that recorded for 2007 (although concerns have been raised regarding the accuracy of the data for "Preventive Maintenance" in 2007).

Table 11-9. "Total Maintenance" costs for Bundaberg Distribution System

Direct Expenditure ($'000)	Actuals				Forecast	Price Path				
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Preventive Maintenance	905	801	854	887	536	557	579	598	617	637
Corrective Maintenance	528	420	526	687	925	962	1000	1032	1066	1100
Total Maintenance	**1,433**	**1,221**	**1,380**	**1,574**	**1461**	**1519**	**1579**	**1630**	**1683**	**1737**
Annual change		-14.8%	13.0%	14.1%	-7.2%	4.0%	4.0%	3.2%	3.2%	3.2%
Change since 2007		-14.8%	-4.4%	10.2%	1.7%	5.9%	9.6%	12.5%	15.3%	18.1%
Preventive maintenance %	63.2%	65.6%	61.9%	56.3%	63.3%	63.3%	63.3%	63.3%	63.3%	63.3%
Corrective maintenance %	36.8%	34.4%	38.1%	43.7%	36.7%	36.7%	36.7%	36.7%	36.7%	36.7%

[1]Source: Raw data extracted from SunWater spreadsheets *"IM Central -610.03.PSV.xls"* and *"Extract LBC data Conversion extra activity detail and preventive main split.xls*".

Although not stated at this time, it is highly likely that SunWater will identify an optimal ratio of (Preventive: Corrective) maintenance expenditure based on the RCM approach, which may be different to the 63%:37% projected above.

11.4.7 Scheme specific issues

Allocation of costs to Paradise Dam customers

Stakeholders have raised the issue that Paradise Dam customers were utilising parts of the scheme, but not making a financial contributions (or only part contribution) towards the scheme costs.

Aurecon requested additional information from SunWater pertaining to Paradise Dam Customers utilising assets of the Bundaberg scheme, and what processes were in place for allocating the scheme costs to these customers. Aurecon did not receive a response from SunWater.

Based on limited discussions with various stakeholders, Aurecon ascertained that:

- related to temporary transfer/sales
- that the price paid by customers was subsidized in order to encourage the sale of the water from Paradise dam

Due to the temporary nature of such transactions, it is problematic to incorporate this water into the scheme cost/price formulation process. However, Aurecon views such water transactions should contribute towards the schemes Opex and Capex, thereby increasing the volume/customer base for costs to be spread over.

The challenge is to determine the proportion of scheme ML costs (Opex and Capex) to allocate to temporary allocations from Paradise Dam, that will not discourage future transactions.

In addition concerns were raised regarding the 15% of peak channel capacity accessed by Paradise Dam customers.

Discussions with SunWater reveal that a reservation for peak channel capacity for Paradise water was always incorporated within the scheme management plans, but until recently the Paradise capacity was never utilised (due to a lack of water at Paradise Dam until recently).

Therefore, existing scheme customers have actually enjoyed 100% of peak capacity which included capacity assigned to Paradise water (but never accessed until recently).

Concrete lining of channel

Concerns have been raised regarding the relining of channel costs that occur in 2033 and 2035. Aurecon notes within the renewal program, that no allowance for a scoping study has been made, and recommends that scoping studies examines not only alternative options for channel lining, but also options for staggered implementation over a number of years.

Electricity costs

Currently SunWater sources electricity under a Regulated market scheme as opposed to the contestable marketplace.

Aurecon were notified that SunWater recently undertook extensive financial modelling to explore the differences between the two electricity marketplaces to determine the optimal scheme for electricity supply. As of the time of this report, Aurecon has not been provided access to the modelling work undertaken.

11.4.8 Feedback from field visits

Aurecon met with a number of stakeholders from the Bundaberg schemes (customers of both Bulk and Distribution system) at SunWater 's office in Bundaberg on Monday 7th March 2011. The following is a summary of proceedings:

General comments

- Projected Electricity costs for 2012-2016 based on usage at 60%?, yet historical usage has been around 40%. Potential over-charging by 20%.
  - Very concerned that carry over provision of unders and overs is carried forward to 2016.
  - Concern about electricity prices rising from Carbon Tax
  - Concern about potential price rises if off-peak pricing is lost.
  - Is it contestable, or within a regulated market. Currently within Regulated market. Is it the same across all schemes.
- Part B costs should include asset costs as well, to act as motivation on user to use less.
- Concern regarding provision of Paradise water (both new and temporary) to farmers within the schemes.
  - Feeling that new water using the old network did not contribute towards infrastructure costs.
  - Not mentioned within the NSP that Burnett water uses the schemes assets.
  - Also concern that the NSP should show in 2009/10, a $600k transfer from Burnett Water to SunWater accounts for sale of temporary allocations.
- HUF factor. Concerns about allocating costs using different systems. Allocation of 16% of costs to High Priority for 10% of water volumes, translates to conversion factor of 1.6 which seems very low compared to other schemes.
- Standard of service is falling.
  - Raised in last price path.
  - Received an email in recent years, indicating that a new Standard of Service (lower) was to be implemented across the state. Items such as acceptable response times were to be extended from 48hours to 72 hours shutdowns.
  - No reporting other than Annual Report. Are Outages actually recorded?
- CSO value of $38k listed within the 2009 annual report, but cannot find within the NSP.
- Bingera Weir is listed as an asset within the NSP on page 12. Is it a SunWater asset?
- Insurance: professional Indemnity listed, but it should only be relevant for staff engaged in consulting services. Why is it listed?

- Claims for Insurance, where is the income recorded if new asset replaced?
- Confusion regarding what costs are listed under Maintenance vs. R&E.
- Water Bills. Currently sent out showing Part A & B. Should also show costs for distributional losses.
- Replaced assets. Do you get improved efficiencies?
- NSP states 5% procurement fee – should be lower for larger schemes that have larger economies of scale.

Channel NSP

- Flow rate in channels is comprised at time, by some outlet users that are not metered or checked.
- Annuities starting balance for Bulk system is negative (but distribution system is positive). Concern that spillway upgrades contributed to negative balance.
- WACC of around 9.8%, is currently used for all analysis.
    - Three cases/approaches for using an interest rate. Should it be the same rate across all three of the following:
        - New business
        - Discount costs
        - Annuities
    - New water sold, should they pay high initial costs.
- Meters installed by SunWater cost $6 to $8k each, for which the farmer must pay for. Page 37 of the NSP (Bulk), the ORC table states that capital contribution received from irrigators is $0. However, farmers have been paying for the installation of meters.
- Ben Anderson Barrage. Why 10 shutters each year?. Gates actually taken out and installed by SunWater staff, but sandblasted/treated/painted by external contractors.
- Contractors. Used frequently for maintenance jobs, and also for most asset R&E activities.
- Within the Distribution NSP, a Revenue offset of -$839k is recorded for 2007 (Other Charges & Fees). What was this actually for, very large amount.
- Within the NSP, it states that Land Tax is incurred.
    - How much is paid.
    - Should not have to be paid.
- Bucca Weir mentioned on page 31 of Distribution NSP, incurring R&E expense of $72k in 2013. It also appears within the Bulk NSP on page 30, incurring a R&E expense of $8k in 2015.
    - Should be headworks, part of bulk system.-
- Water losses. Channel losses of 40,000ML proposed for pricing decision, yet historically only 10,000ML recorded. This has major implications in pricing.
- Within Distribution NSP, states that $2.43m in 2032 (today's value) is proposed for 2032 to replace common control at Woongarra Pump Station. This expense seems very excessive and unrealistic.
- Concern about upgrading of pump station switchgear, and if electrical upgrades now at pump stations will align with new pumps in the future.
- Rates to local Government. SunWater must hold a substantial number of titles, which attract local government rates/charges. How significant are these??

11.4.9 Potential efficiency gains and recommendations

The following points are made in relation to Opex:

- There has been on-going re-structuring of the SunWater workforce (and equipment) for the Central region, particularly the Bundaberg main depot. It is noted that significant changes have been made to both administrative and operational staff numbers and structure. However, it was difficult to observe where any of these cost savings emerge.
- "Operations" is a main cost. Aurecon has submitted a substantial number of questions to SunWater seeking additional information and transaction clarity, and received responses. However, Aurecon has insufficient information to review the prudency and efficiency of forecast expenditure. Aurecon recommends that the 2011 forecasts for Operations sub-activities be examined (and supporting calculations), with particular attention paid to forecast Metering and Dam Safety cost estimates.
- Aurecon recommends that a justification be sought from SunWater as to why a higher labour cost was adopted over and above the Parsons Brinkerhoff (2010A) recommendation for Preventive Maintenance in 2011.
- Based on the historical data provided by SunWater, and comparative analysis of historical expenses against forecast costs for 2011 (2012 to 2016), Aurecon views proposed "Corrective Maintenance" direct costs for the scheme as being prudent and efficient.

11.5 Capital costs review

SunWater has developed a rolling renewal annuity program that runs for a forecast 25 year period. The forecast for the initial 5 year period is based on a detailed assessment of asset condition and risk of failure, whilst forecasts beyond 5 years are based on broader estimates of asset life using engineering estimates and standard replacement rules[514].

SunWater also state that *Renewals expenditure refers to works intended to maintain the ongoing performance and service capacity of the assets or, if this is no longer possible or economical, to replace the asset with a modern equivalent*[515].

In relation to the Bundaberg Distribution, renewal expenditure is limited to

- Gin Gin distribution sub-system
- Bingera distribution sub-system
- Isis distribution sub-system
- Woonarra distribution sub-system
- Abbotsford distribution sub-system
- Gooburrum distribution sub-system

The following section provides an overview of renewal expenditure for the current price path (2007-2011) and forecast price path (2012-2016).

11.5.1 Review of historical renewal expenditure

Over the current price path period (2007 – 2011) annual renewals expenditure has been between $1.18 million and $1.92 million (Table 11-10). The sum total expenditure over this period is $7,874,000, for a mean annual average of $1,574,800.

[514] SunWater, *Bundaberg Distribution System NSP*, (2012-2016) January 2011, Page 30.
[515] SunWater, *Bundaberg Distribution System NSP*, (2012-2016) January 2011, Page 30.

Table 11-10. Historical renewals expenditure for Bundaberg Distribution System

nominal dollars $'000	Financial Year					
	2007	2008	2009	2010	2011	Sum total 2007-2011
Actual renewal spent[1]	1,922	1,497	1180	1720	1,555	7,874
LBC target expenditure[2]	902	757	559	907	1,152	4,277
Difference ($'000)	1,020	740	621	813	403	3,597
Difference (%) from LBC target	113.1%	97.8%	111.1%	89.6%	35.0%	84.1%

[1]Source: *Bundaberg Distribution System NSP,* (2012-2016) January 2011, Page 7.
[2]Source: SunWater spreadsheet, *"Compare R&E Spend to Annuity 2007_2011.xls".*

Of concern has been the substantial variation between Actual renewal spent and LBC target expenditure. As noted above in Table 11-10, the actual spent has exceeded the LBC target by a substantial amount. Over the entire price path (2007-2011) actual spend has exceeded the LBC target by $3.597 million or 84.1%.

In Table 11-10 above the actual renewal expenditure was overspent by approximately 100% in the first three to four years, but in 2011 actual renewal spent was only 35% over LBC target expenditure.

SunWater was not able to provide a detailed list of renewals projects that it intended to deliver over the current price path 2007 to 2011 that would have formulated the LBC target expenditure. However, SunWater did provide an Excel database containing breakdown of historical renewals expenditure for the period 2007 to 2011 (actual expenditures up until 15th February 2011) for all projects greater than $10,000 in value (Table 11-12 below). There were a number of limitations to the database including:

- No indication of the Board approved budget for all projects in 2007
- Additional columns of "Revised Budget", and "Approved" along with "Board Budget" for 2008, 2009, 2010. In most cases, The amount recorded for an activity under "Revised Budget" equalled "Approved", and also "Yearly Total" (actual spend for that year). Highlighted the dynamic nature of the project budget management as the scope of works/activities changed
- Totals include Indirect and Overhead costs
- Many projects would run over several financial years in which Board approved budget only appeared in the first year, and not subsequent. Difficultly linking activities across years, due to the nature of the database provided
- The summation of annual totals within the database, did not equate with stated renewals expenditure for the scheme (see Table 11-12 below)

Table 11-11. Itemised historic renewals expenditure for Bundaberg Distribution System

Description	Start Date	Year	Spent	Status
Intersafe Non-Gated - Bingera & Gin Gin - SCB	1/07/2009	2007	$ -	WIP
Replace Slide Gate - W04 Pipe Inlet	1/07/2010	2007	$4,712	WIP
Replace Meter and Relocate to 170 M. L M.O - G07 - 0002	9/07/2010	2007	$11,900	Financial
Investigate dampness at downstream toe	1/07/2010	2007	$4,980	WIP
Update Electrical Drawings - Various Pump Stations - Isis	1/07/2010	2007	$7,266	WIP

Description	Start Date	Year	Spent	Status
Replace 3 Concrete Lined Bays - Bingera Main Channel	9/08/2010	2007	$13,330	Practical
Replace Slide Gate - W03 Pipeline Inlet	1/07/2010	2007	$8,136	WIP
Install Bypass Pipe between Woongarra MC and Alloway MC at Woodward Rd Reg Gate	1/07/2009	2007	$18,836	Financial
Intersafe Non-Gated - Gin Gin	1/07/2009	2007	$ -	WIP
Intersafe Non-Gated - Isis	1/07/2009	2007	$ -	WIP
Refurbish Submersible Pump Unit No 1 - Abbotsford Pump Station	1/09/2010	2007	$9,390	WIP
Construct and Install Weed Screen and Modify Security Fence as per ES Design for Sully_Dowding Regulator - Isis Main Channel	1/07/2007	2007	$20,575	WIP
Refurbish Bench Flume - Woongarra MC (Based on 2009 Report)	1/07/2009	2007	$24,915	Financial
Study: Bullyard Creek Balancing Storage - Failure Impact Assessment	1/07/2010	2007	$ -	Scoping
Update Electrical Drawings - Various Pump Stations - Bingera	1/07/2010	2007	$10,903	WIP
Refurbish Discharge Valve - PUN3 - Monduran Pump Station	1/07/2010	2007	$11,280	WIP
Install Rotork on Outlet Gate - Bullyard Reservoir	1/04/2010	2007	-	Released
Refurbish Regulator Gate No 4 - Isis Main Channel	1/07/2010	2007	$15,006	WIP
Replace 29 Isolating Valves on Air Valves - St Agnes Main Channel	1/07/2010	2007	$28,051	Scoping
Replace Motor Fan Cowel and Damaged Wiring - PUN1 - Quart Pot Creek Pump Station	1/07/2010	2007	$49,031	WIP
Replace Concrete Lining - 62R,62L,80R,80L,84R,84L,88L	2/08/2010	2007	$32,791	Practical
Install additional 32 nb railing to pumpwell stairway - Don Beattie Pump Station	1/10/2009	2007	$ -	Released
Refurbish Regulator Gate No 9 - Woongarra Main Channel	1/07/2010	2007	$18,011	Scoping
Install Thermographic Windows in HV SwitchBoard - Don Beattie Pump Station	1/07/2010	2007	$19,878	WIP
Intersafe Non-Gated - Goorburrum	1/07/2009	2007	$ -	WIP
Refurbish Common Control - Preliminary Design Work - Gooburrum Pump Station	1/01/2010	2007	$ -	WIP
Upgrade Electrical Components - Woongarra PSTN (Design 2010, Spec/Cost Estimate 2011, Install 2013)	1/07/2009	2007	$55	WIP
Replace 120m Length of Pipeline (as per Option Analysis HB Doc# 756460) - Isis Lateral F06	1/07/2010	2007	$802	WIP
Conduct EEO Assessment and Report - Gooburrum Pump Station	1/07/2010	2007	$34,265	WIP
Conduct EEO Assessment and Report - Isis System (Don Beattie, North Gregory, Quart Pot Creek & Dinner Hill Pump Stations)	1/07/2010	2007	$41,112	WIP
Intersafe Non-Gated - Woongarra	1/07/2009	2007	$ -	WIP
TOTAL for 2007			**$385,225**	
Bingera: Replace/refurb gearbox		2008	$9,610	Closed
NEW METERED OFFTAKES (2 OF) - COURTICE		2008	$10,460	Closed

Description	Start Date	Year	Spent	Status
Isis: Study: Investigate requirement of replacement of common control		2008	$5,965	Closed
Bingera: Refurbish fences - refer to BIA-SCB-BING-BMC-FNCE-BNDY for sites		2008	$4,761	Closed
Gin Gin: Install handrail on St Agnes Break Pressure Structure		2008	$6,558	Closed
Isis: Refurb air vents - See individual assessments		2008	$4,665	Closed
Woongarra: Replace the section from Nicholls Rd to the regulator gate		2008	$10,790	Closed
Isis: Refurb air vents - see individual assessments		2008	$3,042	Closed
Isis: Design Winch Mechanism for Sully_Dowdings Regulating Gate.		2008	$12,714	Closed
Bingera: Refurb air vent-pole leans and needs straightening-also WHS issue		2008	$13,038	Closed
Don Beattie PSTN No. 1 HV motor failure		2008	$161,271	Closed
Don Beattie Pumpstation Unit 2 Gearbox and Rotork Refurb		2008	$11,877	Closed
Woongarra Walker St PSTN: Refurbish Pump - bearings, casing, changeout impeller		2008	$14,963	Closed
Isis: Refurb 5 air vents		2008	$4,444	Closed
Bingera: Replace 6 bays previously identified by operators in CA's		2008	$16,228	Closed
Gooburrum: Refurbish Gate - remove, repaint, anodes & bearings, install - S	-	2008	$17,705	Closed
Gooburrum Bal Storage: Installation of Walkway and Guides (c/o from 06-001700:Purchase	-	2008	$17,571	Closed
Bingera: Refurbish slide gate	-	2008	$19,386	Closed
Isis: Study: Need to develop O&M Manual, SOP and EAP's for Isis Ba	-	2008	$20,530	Closed
Bingera: Refurbish 20 scour valve lids - rolling program	-	2008	$15,360	Closed
Don Beattie PSTN: Refurbish Ventilation System - screen, blower	-	2008	$25,088	Closed
Gin Gin: Change out - Meter pipe and meter replacement at meter outlets	-	2008	$26,350	Closed
Don Beattie PSTN No. 2 HV circuit breaker refurbishment	-	2008	$8,053	Closed
South to North water transfer - Study	-	2008	$29,261	Closed
Planning for Modernisation of Irrigation Distribution System - Bundaberg	-	2008	$ -	Closed
Monduran PSTN PLC Investigation	-	2008	$36,765	Closed
Gooburrum: Refurbish Valve - Replace body seal and pins - blast and paint	-	2008	$40,099	Closed
TOTAL for 2008			**$546,554**	
Analysis of Shotcrete Data - Deformation Survey Points - Don Beattie Pump Station	8/1/2008	2009	$10,332	Closed
Refurbish Fencing (Moorlands Rd Xing - North Coast Rail Xing)	3/1/2009	2009	$10,530	Closed
Replace Woongarra Pumpstation Cooling Water Booster Pumps - CWU4(10005686)& CWU5(10005685).	3/27/2009	2009	$11,332	Closed
Monduran PSTN Pump/Motor Unit 1 - Replace Valve Actuator	10/10/2008	2009	$11,354	Closed

Description	Start Date	Year	Spent	Status
New metered offtakes - BIA-ISIS-DH2-MO-0009 & BIA-ISIS-DH2-MO-0010	9/1/2008	2009	$13,039	Closed
New metered outlets - BIA-GOOB-G01-MO-0021 & BIA-GOOB-G01-MO-2002	10/8/2008	2009	$11,216	Closed
Replace Surge Tank #1 Check Valve	3/27/2009	2009	$13,950	Closed
Purchase Critical Spares (as per ES Report 06-001664) - SwitchBoard - Gooburrum Pump Station	12/1/2008	2009	$14,129	WIP
Deformation Survey - Don Beattie Pump Station	8/1/2008	2009	$8,627	Closed
Refurbish Scour Valves (WHS) - Berrembea	8/1/2008	2009	$15,481	Closed
Establish New Survey Points - Woongarra Balancing Storage	2/1/2009	2009	$14,745	Closed
New metered offtakes (7x50mm) - DILGER	5/1/2009	2009	$ -	Closed
Establish New Survey Points - Isis Balancing Storage	5/1/2009	2009	$18,205	Closed
Install Air Vent at 2201M - Farnsfield Main Channel	8/1/2008	2009	$17,086	Closed
Refurbish Scour Valves (WHS) - Bingera Main Channel	8/1/2008	2009	$19,207	Closed
Refurbish Scour Valves (see CA long text for individual locations) - Tirroan	9/1/2008	2009	$ -	Closed
Refurbish Circuit Breakers - Motor Starter - Pump Unit 3 - Quart Pot Creek Pump Station	12/1/2008	2009	$21,347	Practical
Refurbish Circuit Breakers - Motor Starter - Pump Unit 2 - Quart Pot Creek Pump Station	9/1/2008	2009	$23,582	AUC/TAC LOC
Refurbish Motor - Pump Unit 3 - Bullyard Pump Station	8/1/2008	2009	$25,048	AUC/TAC LOC
Refurbish Woongarra Bench Flume	1/2/2009	2009	$28,680	Closed
Refurbish Pump - Pump Unit 3 - Walker Street Pump Station	7/1/2008	2009	$28,895	Closed
Refurbish Zorcs - HV SwitchBoard - Quart Pot Creek Pump Station	7/1/2008	2009	$29,058	Closed
New metered offtake - PRESSLER	8/1/2008	2009	$24,990	Closed
Construct and Install Weed Screen and Modify Security Fence as per ES Design for Sully_Dowding Regulator - Isis Main Channel	7/1/2007	2009	$44,836	WIP
Refurbish Regulator Gate 1 (repaint, anodes & bearings) - Woongarra Main Channel	7/1/2008	2009	$46,393	Closed
Replace Comms Link to Storage - Tirroan Pump Station	10/1/2008	2009	$47,009	AUC/TAC LOC
Refurbish Pump, Motor and Discharge Valve - Pump Uni 2 - Don Beattie Pump Station	3/1/2009	2009	$107,021	Closed
Walker Street Pumpstation - SwitchBoard Replacement	10/10/2008	2009	$121,271	Closed
Replace Roof and Gutters on Building - Monduran Pump Station (Design 2008, Construct 2009)	7/1/2008	2009	$280,132	Closed
Enhance assets affected by DNR Ringroad (Enhancement 2009) (Invest 08BOM02)	7/1/2008	2009	$62,260	Closed
TOTAL for 2009			**$ 1,079,755**	
Replace Jib Crane located at Acrolein Shed - Woongarra Storage	7/5/2010	2010	$ -	WIP
Refurbish Common Control - Preliminary Design Work - Gooburrum Pump Station	1/1/2010	2010	$7,261	WIP
Refurbish Bulkhead Gate - Woongarra	1/9/2009	2010	$10,753	Financial

Description	Start Date	Year	Spent	Status
Install Fire Alarm Panel - Don Beattie Pump Station	1/9/2009	2010	$12,001	Practical
Upgrade TMC0001 meter outlet from 150mm to 200mm	14/4/2010	2010	$6,758	Practical
Replace Slide Gate - Inlet to W07 Pipeline - Woongarra	1/7/2009	2010	$12,955	Closed
Refurbish HV SwitchBoard - Don Beattie Pump Station	1/8/2009	2010	$13,034	Practical
Construct and Install Weed Screen and Modify Security Fence as per ES Design for Sully_Dowding Regulator - Isis Main Channel	1/7/2007	2010	$9,618	WIP
Mondurran PSTN filter system - clean out carbon dust on floor and in ventilation	1/9/2009	2010	$15,456	WIP
Purchase new motor	7/12/2009	2010	$10,109	WIP
Study: Discharge Valve Actuator Malfunction - Monduran Pump Station (all pumps)	5/5/2010	2010	$15,606	Released
Refurbish Bulkhead Gate on Inlet - Don Beattie Pump Station	1/2/2010	2010	$16,935	WIP
Replace Scour overflow chamber covers & Valve Lids & inst isolation valve spindels - Bingera B02 pipeline	1/11/2009	2010	$16,533	Closed
Replace Gate (Shutdown Project) - Outlet from Farnsfield Reservoir	1/8/2009	2010	$17,185	Closed
Refurbish Screen (Recoat) - Road and Rail Crossing @ 4171.35M - Bingera MC	1/5/2010	2010	$17,555	Closed
Replace Flow Meter - Quart Pot Pump Station	1/8/2009	2010	$18,383	WIP
RELOCATE PRESSURE RELIEF VALVES (LCM & LC1)	1/7/2009	2010	$52,365	WIP
Fabricate and Install Gate Guides - Reg Struc 1 - Booyan MC/Pipeline	1/7/2009	2010	$18,930	WIP
Replace non return valve	23/2/2010	2010	$1,719	WIP
Refurbish Scour Valve Assemblies - St Agnes	1/12/2009	2010	$19,048	Closed
Intersafe Non-Gated - Bingera & Gin Gin - SCB	1/7/2009	2010	$ -	WIP
Intersafe Non-Gated - Gin Gin	1/7/2009	2010	$ -	WIP
Study Replacement of Pumps and Motors - Woongarra Pump Station	9/9/2009	2010	$11,695	WIP
Establish a SCADA Back-up System for all Bundaberg SCADA Systems	1/7/2009	2010	$2,040	WIP
Maintain Carpark Surface - Monduran Pumpstation Level down to Valve house Access.	1/11/2009	2010	$23,661	Closed
Bullyard Creek Balancing Storage FIA	6/5/2010	2010	$17,215	Practical
Purchase Critical Spares (as per ES Report 06-001664) - SwitchBoard - Gooburrum Pump Station	1/12/2008	2010	$17,594	WIP
Refurbish Fence (8965M - 11174M and 20305M - 25000M) - Gin Gin MC	1/10/2009	2010	$24,946	WIP
Bingera & Gin Gin - WHS - Intersafe Project- Install handrails and steps at Regulator Gate Structures	23/12/2009	2010	$26,135	Closed
Replace Sections of Fencing (Lows Rd - 1.5KM and Palais Crt Area - 160M) - Woongarra MC	1/10/2009	2010	$43,471	Closed
Install Bypass Pipe between Woongarra MC and Alloway MC at Woodward Rd Reg Gate	1/7/2009	2010	$27,244	Financial
Refurbish Regulating Gate 1- Booyan Main Channel/Pipeline	1/7/2009	2010	$27,259	Closed
Refurbish Submerged Disc Valve - Break Pressure Struc - Gooburrum MC	1/7/2009	2010	$26,689	Closed
Replace Screens - Siphons I and H - Gin Gin MC	1/10/2009	2010	$29,479	WIP

Description	Start Date	Year	Spent	Status
Options Analysis to make Break Pressure Structure Safe - Gooburrum MC	1/4/2010	2010	$29,517	Financial
Isis - WHS project - Intersafe - Install handrails and steps at Regulator Gate Structures	23/12/2009	2010	$30,300	Closed
Intersafe Non-Gated - Isis	1/7/2009	2010	$1	WIP
Refurbish Bench Flume - Woongarra MC (Based on 2009 Report)	1/7/2009	2010	$32,526	Financial
Replace Air Valves - Gin Gin MC	1/1/2010	2010	$32,989	WIP
Refurbish Screen (Recoat) - Siphon @ 160.27M-277.2 - Bingera MC	1/10/2009	2010	$33,310	Closed
Refurbish Fencing 8019M - 10089M (Kent Tobins Rd - Simpsons Rd) - BMC	11/1/2009	2010	$837	Deleted
2010/11 Pumps and Pipelines Project Planning and Scoping	1/4/2010	2010	$4,469	Released
Replace Concrete Bays (7 Off) - Gin Gin MC	1/8/2009	2010	$35,462	Closed
10 Yearly Crane Inspection - Bridge Crane - Gooburrum Pump Station	1/10/2009	2010	$19,070	WIP
Modification to Childers Break pressure structure	1/9/2009	2010	$36,891	Closed
Install Thermographic Windows in HV SwitchBoard - Quart Pot Ck Pump Station	1/8/2009	2010	$39,511	Closed
Intersafe Non-Gated - Goorburrum	1/7/2009	2010	$ -	WIP
Intersafe Non-Gated - Woongarra	1/7/2009	2010	$ -	WIP
10 Yearly Crane Inspection - Bridge Crane - Don Beattie Pump Station	1/10/2009	2010	$20,333	WIP
Upgrade Electrical Components - Woongarra PSTN (Design 2010, Spec/Cost Estimate 2011, Install 2013)	1/7/2009	2010	$4,388	WIP
10 Yearly Crane Inspections - Bridge Crane and 2.4T Hoist - Monduran Pump Station	1/10/2009	2010	$23,315	WIP
Replace 306M Pipe 0002 - Isis Lateral F6	1/11/2009	2010	$70,373	Closed
Refurbish Pump & Motor - Pump Unit 2 - Gooburrum Pump Station	1/4/2010	2010	$119,790	AUC/TAC LOC
Replace Common Control Bullyard PS (invest 08) (tender docs 09) (replace 10)	1/7/2007	2010	$51,763	WIP
Install Upgraded Electrical Components - Walker St Pump Station	1/7/2009	2010	$220,567	Practical
TOTAL for 2010			**$1,375,044**	
Intersafe Non-Gated - Bingera & Gin Gin - SCB	1/07/2009	2011	$ -	WIP
Replace Slide Gate - W04 Pipe Inlet	1/07/2010	2011	$4,712	WIP
Replace Meter and Relocate to 170 M. L M.O - G07 - 0002	9/07/2010	2011	$11,900	Financial
Investigate dampness at downstream toe	1/07/2010	2011	$4,980	WIP
Update Electrical Drawings - Various Pump Stations - Isis	1/07/2010	2011	$7,266	WIP
Replace 3 Concrete Lined Bays - Bingera Main Channel	9/08/2010	2011	$13,330	Practical
Replace Slide Gate - W03 Pipeline Inlet	1/07/2010	2011	$8,136	WIP
Install Bypass Pipe between Woongarra MC and Alloway MC at Woodward Rd Reg Gate	1/07/2009	2011	$18,836	Financial
Intersafe Non-Gated - Gin Gin	1/07/2009	2011	$ -	WIP

Description	Start Date	Year	Spent	Status
Intersafe Non-Gated - Isis	1/07/2009	2011	$ -	WIP
Refurbish Submersible Pump Unit No 1 - Abbotsford Pump Station	1/09/2010	2011	$9,390	WIP
Construct and Install Weed Screen and Modify Security Fence as per ES Design for Sully_Dowding Regulator - Isis Main Channel	1/07/2007	2011	$20,575	WIP
Refurbish Bench Flume - Woongarra MC (Based on 2009 Report)	1/07/2009	2011	$24,915	Financial
Study: Bullyard Creek Balancing Storage - Failure Impact Assessment	1/07/2010	2011	$ -	Scoping
Update Electrical Drawings - Various Pump Stations - Bingera	1/07/2010	2011	$10,903	WIP
Refurbish Discharge Valve - PUN3 - Monduran Pump Station	1/07/2010	2011	$11,280	WIP
Install Rotork on Outlet Gate - Bullyard Reservoir	1/04/2010	2011	$ -	Released
Refurbish Regulator Gate No 4 - Isis Main Channel	1/07/2010	2011	$15,006	WIP
Replace 29 Isolating Valves on Air Valves - St Agnes Main Channel	1/07/2010	2011	$28,051	Scoping
Replace Motor Fan Cowel and Damaged Wiring - PUN1 - Quart Pot Creek Pump Station	1/07/2010	2011	$49,031	WIP
Replace Concrete Lining - 62R,62L,80R,80L,84R,84L,88L	2/08/2010	2011	$32,791	Practical
Install additional 32 nb railing to pumpwell stairway - Don Beattie Pump Station	1/10/2009	2011	$ -	Released
Refurbish Regulator Gate No 9 - Woongarra Main Channel	1/07/2010	2011	$18,011	Scoping
Install Thermographic Windows in HV SwitchBoard - Don Beattie Pump Station	1/07/2010	2011	$19,878	WIP
Intersafe Non-Gated - Goorburrum	1/07/2009	2011	$ -	WIP
Refurbish Common Control - Preliminary Design Work - Gooburrum Pump Station	1/01/2010	2011	$ -	WIP
Upgrade Electrical Components - Woongarra PSTN (Design 2010, Spec/Cost Estimate 2011, Install 2013)	1/07/2009	2011	$55	WIP
Replace 120m Length of Pipeline (as per Option Analysis HB Doc# 756460) - Isis Lateral F06	1/07/2010	2011	$802	WIP
Conduct EEO Assessment and Report - Gooburrum Pump Station	1/07/2010	2011	$34,265	WIP
Conduct EEO Assessment and Report - Isis System (Don Beattie, North Gregory, Quart Pot Creek & Dinner Hill Pump Stations)	1/07/2010	2011	$41,112	WIP
Intersafe Non-Gated - Woongarra	1/07/2009	2011	$ -	WIP
TOTAL for 2010 up until 15th Feb 2011			**$385,225**	

Source: SunWater spreadsheet "*2007-2011 PROJECTS.xls*"

Of the renewal expense items listed above in Table 11-11 for 2010, the following observations are made from the desktop review of data:

- 11 projects did not have a Board approved budget, amounting to $188,320 in expenditure for that year
- 9 projects exceeded Board Approved Budget by a substantial amount, with total Board Budget amounting to $156,478 for all 9 projects, while actual expenditure totalled $268,555

- remaining 50 projects (which incurred actual expenditure) were underspend (however a number were incomplete in that year, recorded as Work in Progress (WIP))

Aurecon notes that there are differences between the stated annual renewal expenditure stated within the NSP, and the annual totals calculated by Aurecon based on the itemised database provided by SunWater as highlighted in Table 11-12 below. Aurecon notes that the discrepancy may possibly be due to one or more of the following:

- A significant amount of renewal projects were below $10,000 in value. Note that the consultants requested expenditure items valued at only $10,000 and above
- Additional adjustments and renewal transactions are allocated.

Table 11-12. Difference between itemised renewals expenditure and NSP totals for Bundaberg Distribution System

Year	NSP stated expenditure[1] (A)	Itemised expenditure (Table 11-11) (B)	Difference ($) (B-A)	Difference (%) (B-A) / (A)
2007	$1,922,000	$385,225	-$1,536,775	-80.0%
2008	$1,497,000	$546,554	-$950,446	-63.5%
2009	$1,180,000	$1,079,755	-$100,245	-8.5%
2010	$1,720,000	$1,375,044	-$344,956	-20.1%
2011	$1,555,000	$385,225*		

[1]Source: *Bundaberg Distribution System NSP,* (2012-2016) January 2011, Page 7.
*Progressive total up till 15th February 2011

11.5.2 Forecast Renewals Expenditure

There are significant renewal expenditures proposed for the Bundaberg Distribution System and there is considerable variance in proposed annual expenditures (see Figure 11-32). Of specific concern from a cost prospective are the proposed costs over the 2032 to 2035 period.

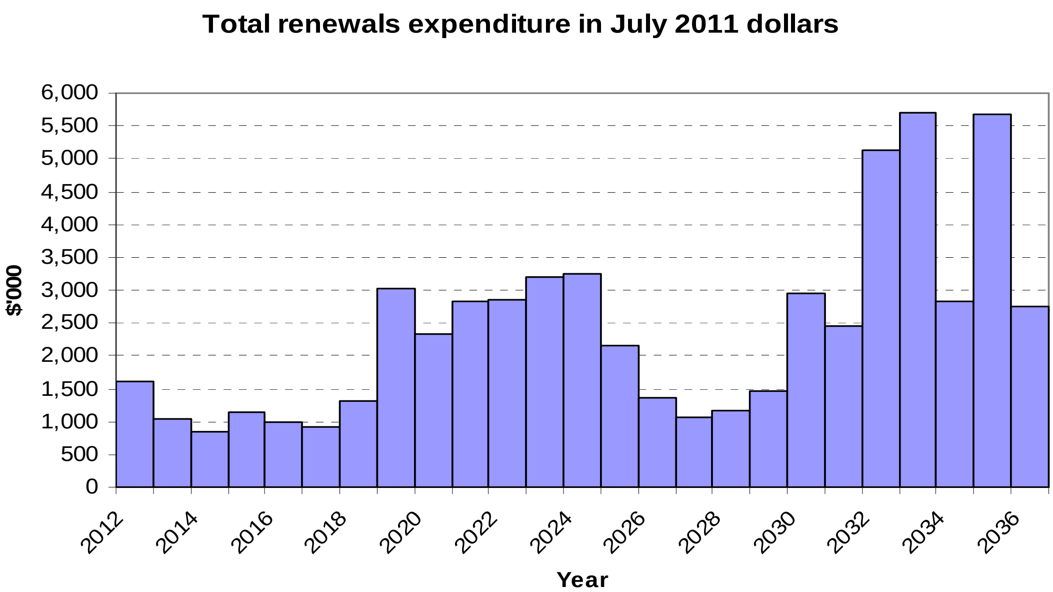

Figure 11-32. Proposed annual renewals expenditure for Bundaberg Distribution System 2012 to 2036[516]

[516] Raw data extracted from SunWater spreadsheet "*NSP Projects Central V4.xls".*

As disclosed within the NSP, there are a number of significant proposed expenditures for the next price path (Table 11-33), particularly in 2012.

Table 11-13. Forecast renewals expenditure for Budaberg Distribution System 2012 to 2016

Real dollars, $'000	Financial Year				
	2012	2013	2014	2015	2016
Abbotsford Pump Station	22	28		23	179
Berrembea Distribution		6			
Bingera Distribution	17	30	10	12	79
Bucca Pump Station				23	46
Bucca Weir		72			
Bullyard Distribution		6			14
Bullyard Pump Station	5				46
Childeers Distribution		17			
Dinner Hill Pump Station	55	168			23
Don Beattie Pump Station	89	56		126	97
Farnsfield Distribution	87	90			
Gin Gin Main Channel Distribution				10	6
Gooburrum Distribution	45	73	164	26	65
Gooburrum Pump Station	262	28	3	6	85
Isis Balancing Storage	62			13	
Isis Distribution		28	48	11	
Mcilwraith Distribution		18			
Mcilwraith Pump Station		51	66	375	
Moduran Pump Station	211	62	153	9	92
North Gregory Distribution			27	6	
North Gregory Pump Station			35		
Quart Pot Creek Pump Station	98	28			103
Tirroan Distribution	2				12
Tirroan Pump Station		73	108	276	
Walker Street Pump Station	5	28	13	47	
Woongarra Balancing Storage	44	15		7	
Woongarra Distribution	113	51	101	32	105
Woongarra Pump Station	491	102	119	138	46
Woongarra Relift	3				
Total	1,611	1,030	848	1,142	997

[1]Source: *Bundaberg Distribution System NSP,* (2012-2016) January 2011, Page 31.

The summary total renewals expenditure for 2012 to 2016 is $2,798,000, or an annual average of $559,600 (compared to the annual average of $624,000 for the 2007 to 2011 period).

Table 11-14 below provides detailed description of proposed renewal expenditures for 2012 to 2016. Due to project time constraints (only allowing 2 days for stakeholder meetings and field site visits), Aurecon was only able to evaluate a small number of projects during its field visit (see Section 11.5.3 below).

Table 11-14. Detailed review of forecast renewals expenditure over $10,000 for Bundaberg Distribution System 2012 to 2016 (and recurring date of future expense)

ID No.	Year	SunWater Description	Cost per activity ($'000)
Abbotsford Pump Station			
F1	2012 & 6 yearly thereafter	Refurbish Abbotsford #2 Submersible Pump	22
F2	2013 & 10 yearly thereafter	Refurbish pump station building	28
F3	2016	Replace SwitchBoard, Low Voltage	179
F4	2015	Study: Review requirement for PLC and SCADA system	23
Bingera Distribution			
F5	2015 & 5 yearly thereafter	REFURB SCREEN - RECOAT	12
F6	2016 & 6 yearly thereafter	REFURB SCREEN - RECOAT	23
F7	2016 & 2028	Refurbish bulkhead gate guides at SI03 - Bingera Main Channel	11
F8	2016 & 2028	Refurbish bulkhead gate guides on SI04 - Bingera Main Channel	29
F9	2013 & 10 yearly thereafter	Refurbish Fencing - party fencing issues, repairs only	13
F10	2012	Refurbish scour valves (replace lid)	14
F11	2014 2033 2034 2035 2036	Replace Screen	10 15 217 17 29
Bucca Pump Station			
F12	2016	Documents, Drawings, Specs and Cost Estimate for PLC and SCADA system (from 2016 study)	46
F13	2015	Study: Review requirement for PLC and SCADA system	23
Bucca Weir			
F14	2016 & 10 yearly thereafter	REFURBISH TRASH RACKS AND GUIDES	72
Bullyard Distribution			
F15	2013 & 9 yearly thereafter	Refurbish Valve, paint & refurbish - BMC BP01	14
Bullyard Pump Station			
F16	2016 & 10 yearly thereafter	Refurbish Building - paint, fixtures, fittings, electrical installation etc	34
F17	2016, 2020, 2021, 2026, 2031,	Refurbish Valve - corrosion, seals, bearings etc	11
Childers Distribution			
F18	2013 & 10 yearly thereafter	Refurbish: Refurbish Slide Gates	17
Dinner Hill Pump Station			

ID No.	Year	SunWater Description	Cost per activity ($'000)
F19	2012	Documents, Drawings, Specs and Cost Estimate for PLC and SCADA system	55
F20	2016 & 2034	Refurbish building electricals - lights, fittings ect	11
F21	2016 & 2029	Refurbish Motor - bearings, bake etc	19
F22	2013	Supply, Implement, Install, Commission PLC and SCADA system	168
Don Beattie Pump Station			
F23	2016 & 5 yearly thereafter	EEO Assessment and report	85
F24	2012	INSTALL ACCESS LADDER TO OHC	35
F25	2013 & 10 yearly thereafter	Refurbish Building - roof, paint, cladding, fittings etc	56
F26	2015 & 10 yearly thereafter	Refurbish Circuit Breakers - new vacuum bottles etc (same as Quart Pot, failure could affect motor?)	17
F27	2015 & 10 yearly thereafter	Refurbish Circuit Breakers - new vacuum bottles etc (same as Quart Pot, failure could affect motor?)Taken out of budget so DT put to 04	17
F28	2015 & 10 yearly thereafter	Refurbish Lift - mech & elec overhaul - specialist contractor	34
F29	2015	Refurbish Protection Works - stabilise and replace as required	17
F30	2012	Refurbish Pwks - shotcrete slope protection - movement -bi-annual deformation survey to monitor ness	55
F31	2016 & 6 yearly thereafter	Refurbish Screens - corrosion treatment and repair as required	11
F32	2015 & 2030	Refurbish Valve - corrosion, seal, bearings	11
F33	2015 & 2030	Refurbish Valve - corrosion, seals, bearings etc incl. air actuator as required	23
Farnsfield Distribution			
F34		Replace 120m length of pipeline as per option analysis hummingbird doc No. 756460 2012 2013	87 90
Gin Gin Main Channel Distrib			
F35	2015 & 10 yearly thereafter	Refurbish Gate, paint gate, anodes, lifting gear - GGM OTLT2	10
Gooburrum Distribution			
F36	2012 & 10 yearly thereafter	REFURBISH FENCE 6360M - 7108M	16
F37	2014 & 2034	Refurbish Penstock Gates on Goob	42
F38	2016 & 10 yearly thereafter	Refurbish / Replace and upgrade security on gates - moved out from 03 master blaster - GOOB BSTR	34
F39	2014 2024 2034	Refurbish Gate - paint gate, anodes, lifting gear	13 27 27
F40	2013 & 10 yearly thereafter	Refurbish Gate - remove, repaint, anodes & bearings, install	28
F41	2013 & 10 yearly thereafter	Refurbish Gate - remove, repaint, anodes & bearings, install - BYM RG02	17
F42	2014 & 10 yearly thereafter	Refurbish Gate - remove, repaint, anodes & bearings, re-install	57

ID No.	Year	SunWater Description	Cost per activity ($'000)
F43	2015 & 10 yearly thereafter	Refurbish Gate, remove, repaint, anodes & bearings, install - GMC RG03	23
F44	2013	Replace Gate Valve At 0.50M	17
F45	2014	Replace Safety Screen	15
F46	2013	Replace Scour Valve At 589.35M	12
F47	2016 & 2019 2024 2025 2027 2028	Replace Screen	8 29 22 18 11
F48	2016	Replace Slide Gate	22
F49	2012 2014	Replace Weed Screen	20 38
Gooburrum Pump Station			
F50	2016 & 5 yearly thereafter	EEO Assessment and Report	85
F51	2012	Electrical Component Upgrade (from 2010/11) - Supply, Implement, Install, Commission	262
F52	2013 & 10 yearly thereafter	Refurbish Bulkhead Gate - paint and seals - deferred from 03 Master blaster	13
F53	2013 & 10 yearly thereafter	REPLACE AIR CONDITIONER UNIT	15
Isis Balancing Storage			
F54	2012	Remove trees within 6M of embankment	29
F55	2013 & 5 yearly thereafter	Study: 5yr Dam Comprehensive Inspection (by 1 Oct 2011)	33
Isis Distribution			
F56	2015 & 9 yearly thereafter	Refurbish Fencing, party fencing issues, repairs only - IMC FN01	11
F57	2014 & 10 yearly thereafter	Refurbish gate	28
F58	2013 & 10 yearly thereafter	Refurbish Gate - remove, repaint, anodes & bearings	28
F59	2014	Replace Screen	19
Mcilwraith Distribution			
F60	2013	Replace Scour Outlet At 1396.6 M	12
Mcilwraith Pump Station			
F61	2014	Electrical Component Upgrade (from 2012/13) - Documents, Drawings, Specs and Cost Estimate	57
F62	2015	Electrical Component Upgrade (from 2013/14) - Supply, Implement, Install, Commission	172
F63	2013 & 6 yearly thereafter	Refurbish Building - roof, fittings, fixtures, paint, electrical installation	22
F64	2015 & 2028	Refurbish Motor - bearings, bake etc - inspected July 04, good condition push maintenance out from 04	14
F65	2015 & 2030	Refurbish Pump - bearings, casing, wear rings etc - inspected July 04, good condition push maintena	23

ID No.	Year	SunWater Description	Cost per activity ($'000)
F66	2015	Replace SwitchBoard, Low Voltage	157
F67	2013	Study: Options analysis for Electrical Component Upgrade (PLC, SCADA)	28
Monduran Pump Station			
F68	2013 2023 2028 2033	REFURBISH VALVE	40 13 27 13
F69	2012	Cement line suction main downstream of 84 inch guard valve	109
F70	2012	Install Thermographic Windows	44
F71	2014 & 10 yearly thereafter	Refurbish Building - ventilation syst, general repairs, roof, doors etc	57
F72	2016	Refurbish Common Control - replace obsolescent electrical components, spare parts	57
F73	2012 2017 2025 2030	Refurbish Motor - bearings, bake, slip rings etc	38 68 39 67
F74	2022 2026 2027 2031 2032 2036	Refurbish Valve - corrosion, seals, bearings etc	8 17 11 17 8 17
F75	2014 2019 2024 2034	Refurbish Valve - corrosion, seals, bearings etc - actual cost	17 9 17 26
F76	2014	Replace incomer section of cable	80
F77	2013	Review need to replace cables in 2014	22
North Gregory Distribution			
F78	2014 & 10 yearly thereafter	Refurbish vertical control gate inc corrosion control	11
F79	2014	Replace Screen	15
North Gregory Pump Station			
F80	2014 & 10 yearly thereafter	Refurbish Building - roof, fixtures, fittings, electrical installation etc	28
Quart Pot Creek Pump Station			
F81	2012	CONSTRUCT ROOF	90
F82	2013	Refurbish Building - roof, paint, fittings, fixtures, electrical installation etc	28
F83	2016 & 2029	Refurbish Motor - bearings, bake etc-actual cost	69
F84	2016	Study: Review requirement for PLC and SCADA system	34
Tirroan Pump Station			
F85	2014	Documents, Drawings, Specs and Cost Estimate for PLC and SCADA system	45
F86	2014 & 10 yearly thereafter	Refurbish Building - paint, fittings, fixtures, roof, electrical installation etc	28

ID No.	Year	SunWater Description	Cost per activity ($'000)
F87	2014, 2025, 2034	Refurbish Motor - bearings, bake etc	11
F88	2013, 2024, 2035	Refurbish Motor - bearings, bake etc-actual cost	22
F89	2013 & 2026	Refurbish Pump - bearings, casing, wear rings etc	22
F90	2014 & 2027	Refurbish Pump - bearings, casing, wear rings etc-actual cost	23
F91	2015	Replace SwitchBoard, Low Voltage	184
F92	2013	Study: Review requirement for PLC and SCADA system	28
F93	2015	Supply, Implement, Install, Commission PLC and SCADA system	92
Walker Street Pump Station			
F94	2013 & 10 yearly thereafter	Refurbish Building - roof, fixtures & fittings	28
F95	2014/15 & 2027/28	Refurbish motor	26
F96	2015, 2017, 2024, 2026, 2033, 2035	Refurbish Pump - bearings, casing, changeout impeller	33
Woongarra Balancing Storage			
F97	2012, 2021, 2030	Refurbish Gate - paint gate, anodes, lifting gear	11
F98	2012 & 5 yearly thereafter	Study: 5yr Dam Comprehensive Inspection (by 1 Nov 2011)	33
F99	2013 & 2033	Refurbish bulkhead gates. 2010 DS Rec 2.	15
Woongarra Distribution			
F100	2016, 2023, 2031	Replace Slide Gate on WMC Access	16
F101	2015 & 10 yearly thereafter	Refer SG strategy - ARMCO - Cast 1800*1800	14
F102	2013 & 10 yearly thereafter	Refurbish Gate - remove, repaint, anodes & bearings, install	28
F103	2014 & 10 yearly thereafter	Refurbish Gate, remove, repaint, anodes & bearings, install - AMC RG01	22
F104	2014 & 10 yearly thereafter	Refurbish Gate, remove, repaint, anodes & bearings, install - WMC RG01	45
F105	2014 & 10 yearly thereafter	Refurbish Gate, remove, repaint, anodes & bearings, install - WMC RG04	23
F106	2015 & 10 yearly thereafter	Refurbish Gate, remove, repaint, anodes & bearings, install - WMC RG08	17
F107	2016 & 10 yearly thereafter	Refurbish Gate, remove, repaint, anodes & bearings, install, moved from 2004 - AMC RG02	23
F108	2012 & 10 yearly thereafter	Refurbish Reg. Gate - remove, repaint, anodes & bearings, install - WMC RG06	22
F109	2012 & 10 yearly thereafter	Refurbish Reg. Gate - remove, repaint, anodes & bearings, install WMC RG07	16
F110	2016 & 10 yearly thereafter	Refurbish Reg. Gate, remove, repaint, anodes & bearings, install - WMC RG02	42
F111	2012	Remove decommissioned access crossing - WMC AC04	22

ID No.	Year	SunWater Description	Cost per activity ($'000)
F112	2012 2014 2016 2029 2030 2031 2034 2035	Replace Screen	25 24 19 16 31 82 37 15
F113	2012	Replace Weed Screen (1215M)	23
Woongarra Pump Station			
F114	2012	Electrical Component Upgrade - Supply, Install, Commission (PLC, SwitchBoards, Cables)	262
F115	2016, 2018, 2029, 2031	Refurbish motor	45
F116	2015, 2017, 2028, 2030	Refurbish Motor - bearings, bake etc	45
F117	2012, 2021, 2030	Refurbish pump	87
F118	2012 2013 2014 2022 2023 2031 2032	Refurbish Pump - bearings, casing, wear rings etc	87 90 91 179 89 89 178
F119	2015, 2024, 2033	Refurbish Pump - bearings, casing, wear rings etc - New Diffuser (Reduced from $80K) - Pump 3 failed christmas 03, this job deferred	92
F120	2014, 2025, 2036	Refurbish: HV switchBoard	28
F121	2012	Reprogram SCADA based on pumps and motors upgrade study from 2010	55

Source: SunWater Database, "*NSP Projects Central V4.xls".*

Table 11-14 above provides details for specific renewal expenditures proposed for 2012 to 2016, and an indication if a recurring expenses occurs between 2017 and 2036. Table 11-15 below highlights additional expenditure activities above $50,000 in costs proposed for 2017 to 2036 (that were not captured in Table 11-14 above).

Table 11-15. Review of forecast renewals expenditure over $50,000 for Bundaberg Distribution System 2017 to 2036 (not captured in Table 11-13 above)

ID No.	Year	SunWater Description	Cost per activity ($'000)
Abbotsford Pump Station			
F1	2018	Documents, Drawings, Specs and Cost Estimate for PLC and SCADA s	79
F2	2033	Replace Cable	342
F3	2021	Replace Structure Of Building	181
F4	2021	Replace Submersible Pump, No.1	57

ID No.	Year	SunWater Description	Cost per activity ($'000)
F5	2022	Replace Submersible Pump, No.2	56
F6	2019	Supply, Implement, Install, Commission PLC and SCADA system	169
Berrembea Distribution			
F7	2022 & 2035	Refurbish Scour Outlet - refurbish metalwork/valves - consider retiring asset	67
F8	2033 2035	Replace Concrete Lining	2,360 2,706
F9	2034	Replace Regulator Structure (109.42M)	102
Bucca Distribution			
F10	2026	Refurbish Scour Outlet - refurbish metalwork/valves - consider retiring asset	100
F11	2033	Replace Structure, 150Mm Meter Outlet	121
F12	2033	Replace Structure, 200Mm Meter Outlet	71
F13	2033	Replace Structure, 50Mm Meter Outlet	100
Bucca Pump Station			
F14	2022	Replace Cable	126
F15	2032 & 2033	Replace Pump	63
F16	2022	Replace SwitchBoard, Low Voltage	124
F17	2017	Supply, Implement, Install, Commission PLC and SCADA system	170
Bullyard Distribution			
F18	2026 2027	Refurbish Scour Outlet - refurbish metalwork/valves - consider retiring asset	111 177
F19	2033	Replace Structure, 150Mm Meter Outlet	529
F20	2033	Replace Structure, 200Mm Meter Outlet	268
F21	2025	Replace Submerged Disk Valve	97
Bullyard Pump Station			
F22	2022	Replace Cable	631
F23	2026	Replace Discharge Valve	88
F24	2032	Replace Motor, 315Kw 415V Cmg	64
F25	2025 2026 2034	Replace Reflux Valve	45 90 45
F26	2036	Replace Steel Gantry Structure	120
F27	2026	Replace Suction Valve	144
F28	2022	Replace SwitchBoard, Low Voltage	276
Childers Distribution			
F29	2032 2033	Refurbish Scour Outlet - refurbish metalwork/valves - consider retiring asset	206 56
F30	2032	Replace Isolating Valve	66
Dinner Hill Distribution			

ID No.	Year	SunWater Description	Cost per activity ($'000)
F31		Refurbish Scour Outlet - refurbish metalwork/valves - consider retiring asset	128
Dinner Hill Pump Station			
F32	2027	Replace Cable	54
F33	2031	Replace Discharge Valve	323
F34	2021 2031	Replace Pump	100 104
F35	2026	Replace Structure Of Building	136
F36	2027	Replace SwitchBoard, Low Voltage	183
Don Beattie Pump Station			
F37	2024	REFURBISH PUMP, MOTOR, DV	100
F38	2020 & 2030	10Y CRANE INSPECTION - as per	60
F39	2017 & 2030	Refurbish Motor - bearings, bake etc - actual costs	51
F40	2017 & 2030	Refurbish Motor - bearings, bake etc - Brought forward from 2007; - actual cost	51
F41	2018 & 2031	Refurbish Motor - bearings, bake etc - was ROC375 in 2002 (deferred)Taken out of budget so DT put to 04	51
F42	2020 & 2035	Refurbish Pipework - external paint & refurbish within pstn	101
F43	2018 & 2033	Refurbish Pump - bearings, casing, wear rings etc - actual costs	68
F44	2020 & 2035	Refurbish Pump - bearings, casing, wear rings etc - was roc379 2002- deferred; Taken out of budget so DT put to 04	68
F45	2019 & 2034	Refurbish Pump - bearings, casing, wear rings etc -brought forward from 2007 - actual cost	67
F46	2021	Refurbish slope stability works - unstable slope - dropped from $1Mill in Oct 04 JK	283
F47	2019 2034	Replace Common Controls	1,220 1.206
F48	2024	Replace Discharge Valve	83
F49	2024	Replace Suction Valve	91
F50	2024	Replace SwitchBoard, High Voltage	893
F51	2025	Replace SwitchBoard, Low Voltage	73
Farnsfield Distribution			
F52	2030 2031 2032	Refurbish Scour Outlet - refurbish metalwork/valves - consider retiring asset	89 33 156
F53	2020	Replace a further 240m section as required (requires further analysis)	180
Gin Gin Main Channel Distribution			
F54	2020 & 2030	REFURBISH FENCE 20305M - 25000M	109
F55	2025	Refurbish Bench Flume - reseal contraction joints - pending condition assessment	67
F56	2027	Refurbish Scour Outlet - refurbish metalwork/valves - consider retiring asset	116

ID No.	Year	SunWater Description	Cost per activity ($'000)
F57	2035	Replace Slide Gate Actuators (3 Of)	146
F58	2036	Replace Slide Gates (3)	65
Givelda Distribution			
F59	2023 & 2036	Refurbish Scour Outlet - refurbish metalwork/valves - consider retiring asset	111
Gooburrum Distribution			
F60	2028	Replace Concrete Lining	113
F61	2021	Replace Fencing, Gates And Grids	170
F62	2028	Replace Slide Gates (2)	125
Gooburrum Pump Station			
F63	2023 & 2036	10BIA37 REFURBISH MOTOR	50
F64	2025	10BIA37 REFURBISH PUMP	50
F65	2020 & 2030	10BIA42 - 10Y CRANE INSPECTION	60
F66	2017 & 2030	Refurbish Motor - bearings, bake etc	51
F67	2019 & 2034	Refurbish Pump - bearings, casing, wear rings etc - actual cost	51
F68	2023	Refurbish Valve - Replace body seal and pins - blast and paint	67
F69	2023	Replace Cable	483
F70	2029	Replace Concrete Structure	94
F71	2028	Replace Stairways, Ladders & Handrails	153
F72	2023	Replace SwitchBoard H V	688
Isis Balancing Storage			
F73	2027	Study: 20yr Dam Safety Review (by 1 Oct 2026)	55
Isis Distribution			
F74	2030	Change Out Guides - place stainless steel guides	223
F75	2029 2030	Refurbish Scour Outlet - refurbish metalwork/valves - consider retiring asset	73 89
Mcilwraith Distribution			
F76	2024	Refurbish Scour Outlet - refurbish metalwork/valves - consider retiring asset	72
Mcilwraith Pump Station			
F77	2034 & 2035	Replace Pump	98
Monduran Pump Station			
F78	2020 & 2030	10Y CRANE INSPECTION - as per	72
F79	2017 2020 2032 2035	Refurbish Pump - casing, bearings etc	85 45 83 44
F80	2035	Replace Cable	321
F81	2035	Replace Common Control	469

ID No.	Year	SunWater Description	Cost per activity ($'000)
F82	2021 2022 2023	Replace Reflux Valve	65 64 64
F83	2025	Replace Station Services, 415V	140
F84	2021, 2022, 2023	Replace Suction Valve	95
F85	2020	Replace Suction Valve (Supp)	64
F86	2036	Replace SwitchBoard, High Voltage	873
F87	2018	Replace Valve, 900Mm Butf John	121
North Gregory Pump Station			
F88	2025	Replace Cable	164
F89	2023	Replace Structure Of Building	127
F90	2025	Replace SwitchBoard, Low Voltage	131
F91	2019	Supply, Implement, Install, Commission PLC and SCADA system	169
Quart Pot Creek Pump Station			
F92	2024	09BIA30 REFURBISH ZORCS	66
F93	2017	Documents, Drawings, Specs and Cost Estimate for PLC and SCADA system	57
F94	2018 2019 2031 2032	Refurbish Motor - bearings, bake etc	45 68 44 67
F95	2021 & 2036	Refurbish Pump - bearings, casing, wear rings etc	56
F96	2019 & 2034	Refurbish Pump - bearings, casing, wear rings etc - - actual cost	56
F97	2020 & 2035	Refurbish Pump - bearings, casing, wear rings etc- from quote for 03/04	56
F98	2018 & 2033	Refurbish Pump - bearings, casing, wear rings etc-actual cost	57
F99	2025	Replace Cable	98
F100	2024	Replace Structure Of Building	163
F101	2024	Replace SwitchBoard, High Voltage	766
F102	2025	Replace SwitchBoard, Low Voltage	235
F103	2018	Supply, Implement, Install, Commission PLC and SCADA system	283
St Agnes Distribution			
F104	2035	REFURB SCOUR VALVE LIDS St Agnes	74
F105	2025 2033	Refurbish Scour Outlet - refurbish metalwork/valves - consider retiring asset	72 172
F106	2030	Replace Structure, 200Mm Meter Outlet	76
Tirroan Pump Station			
F107	2025	Replace Cable	110
F108	2032 & 2033	Replace Pump	144
Walker Street Pump Station			

ID No.	Year	SunWater Description	Cost per activity ($'000)
F109	2031	Replace Cable	96
F110	2022	Replace Motor, 200Kw Electric Toshiba - 20411490	74
F111	2028	Replace Pump Cartridge, 450Mm Indeng - 47079	79
F112	2034	Replace Pump Cartridge, 450Mm Indeng - 47081	79
F113	2019	Replace Pump Cartridge, 450Mm Indeng - 47082	80
F114	2019	Replace Pump, 450Mm Indeng - 47080	80
F115	2031	Replace Screen	87
Woongarra Balancing Storage			
F116	2033	Replace Gates, Flap (5 Of)	69
F117	2017 2031	Replace Slide Gate	8 62
F118	2027	Study: 20yr Dam Safety Review (by 1 Nov 2026)	55
F119	2029	Replace INNER FACE EMBANKMENT EARTHWORKS	309
F120	2029	Replace OUTER FACE EMBANKMENT EARTHWORKS	309
Woongarra Distribution			
F121	2019 & 2029	09BIA16 REFURBISH GATE	56
F122	2017 2019 2020 2030 2032 2033 2034 2035	Refurbish Scour Outlet - refurbish metalwork/valves - consider retiring asset	6 101 22 6 95 17 6 6
Woongarra Pump Station			
F123	20020, 2021, 2022	Replace Electric Motor	85
F124	2020 2021 2023	Replace Pump	161 162 160
F125	2032	Replace Common Control (2032)	2,583
Woongarra Relift			
F126	2031	Refurbish Reservoir - replace lining	111
F127	2020 2021 2022 2033 2034 2035 2036	Refurbish Scour Outlet - refurbish metalwork/valves - consider retiring asset	67 85 123 62 72 117 11

Source: SunWater Database, "*NSP Projects Central V4.xls*".

Aurecon notes that a number of items listed above had notes "consider retiring asset", which would indicate that the proposed renewal expenditure may be obsolete. Aurecon recommends that additional explanation be sought from SunWater to clarify the retirement of these assets.

11.5.3 Examination of renewals expenditure

To review the prudency and efficiency of renewals expenditure, Aurecon selected a sample number of asset items within the Bundaberg Distribution system for investigation. These assets either incurred a recent (2009-2010) expense, or were projected to incur a significant expense (2012-2016).

Woongarra Point Pump Station

There is a significant investment proposed for Woongarra Point Pump Station, relating to the replacement of the Electrical Control system as follows:

- 2011. Design, Specifications and cost estimate works. $60,500 (however no expenditure up to Feb 2011)
- 2012. Electrical Component Upgrade - Supply, Install, Commission (PLC, Switchboards, Cables). $262,000

This proposed expenditure aligns with a number of other similar proposals across pump stations both within the Lower Mary, and at Bundaberg. Aurecon noted that a certain level of upgrading and changes had been made on the control panels since originally built, however most of the electrical control equipment appeared to be original, and somewhat dated causing issues for the replacement of parts as required. SunWater indicated that some parts were not obtainable on the marketplace. The pump station was built around 1979, making the pump station around 32 years old. Some upgrading of electrical equipment was carried out in 1998, meaning that even the upgrade equipment would be dated by today's standards.

Aurecon noted the Parsons Brinckerhoff report *Audit of Electrical Sites* (2009), highlighted the need for the replacement of control panel at Woongarra Point Pump station as a high priority to be undertaken in the short term. At the Dinner Hill pump station at Bundaberg (with a similar electrical panel structure projected for replacement 2012/13) Aurecon noted the increasing frequency of breakdowns and repairs required in recent years.

Aurecon noted that in recent years SunWater adopted a 2 to 3 year work program which involved an internal assessment of the works project, followed by detailed design works and specification in the second year undertaken typically by SunWater, which also included the preparation of the works program for tendering. The tendering process may also be completed in this year, with the final year involving the engagement of an external contractor for the manufacture and installation of the new electrical control system.

Key points:

- Structured process employed for the replacement of a significant asset, supported to a large degree by the external expert report by Parsons Brinckerhoff report. A number of other major pump station locations are also proposed for similar renewal expenditure.
- Costs incurred for Stage 1 (2011) are predominantly incurred by SunWater staff.
- Actual works to be undertaken by specialized external electrical contractors (Stage 2).
- The proposed upgrading will allow external monitoring and remote control of the pump house facilities, improving labour efficiencies.

Based on the review information and reports provided, particularity the Parsons Brinkerhoff study, and the site inspection visit and discussions held with SunWater staff, Aurecon views that the proposed renewal activity is both prudent and efficient (direct costs).

Woongarra Distribution (2012)

There are some proposed expenditures at Woongarra Balancing storage as follows:

- 2012. Refurbish Reg. Gate - remove, repaint, anodes & bearings, install. $22,000
- 2012. Replace Weed Screen. $23,000

Although Aurecon undertook a site inspection, as water levels were up it was not readily able to inspect these assets specifically. However, Aurecon was able to make the following observations regarding these proposals:

- Regular condition assessment reports were undertaken specifically for the gate and weed screen, providing detailed quantitative and qualitative assessments. A review of these reports indicated that in recent years the condition scoring of these assets deteriorated, and subsequent recommendations made for the refurbishment of these assets.
- SunWater had detailed costing for similar work programs completed.
- The works would be undertaken by external contractors, based on a merit selection process.
- SunWater indicated that the paint and bearings for the automatic control gates have a typical life of about 7 years. The suggested life seems entirely credible given that the control gates are permanently in contact with water.

Based on the information and reports provided along with the site inspection visit and discussions held with SunWater staff, Aurecon views that the proposed renewal activities as both prudent and efficient (direct costs).

Dinner Hill Pump Station

There is a significant investment proposed for Dinner Hill Pump Station, relating to the replacement of the Electrical Control system as follows:

- 2012. Documents, Drawings, Specs and Cost Estimate for PLC and SCADA system. $55,000
- 2013. Supply, Implement, Install, Commission PLC and SCADA system. $169,000

This proposed expenditure aligns with a number of other similar proposals across pump stations both within the Lower Mary, and at Bundaberg. Aurecon noted that the electrical control panels are original, and the equipment is somewhat dated causing issues for the replacement of parts as required (SunWater indicated that some parts were not obtainable on the marketplace and utilized old or redundant part from other pump stations as spares for those pump stations still using original equipment).

Aurecon noted the Parsons Brinckerhoff report *Audit of Electrical Sites* (2009), made recommendations for the replacement of these electrical control panels across pump house facilities across the state. At this site, Aurecon noted the increasing frequency of breakdowns and repairs required in recent years.

Aurecon noted that in recent years SunWater adopted a two to three year work program which involved an internal assessment of the works project, followed by detailed design works and specification in the second year (undertaken typically by SunWater), which also included the preparation of the works program for tendering. The tendering process may also be completed in this year, with the final year involving the engagement of an external contractor for the manufacture and installation of the new electrical control system. In this case, the process has been condensed over the two year period of 2012 and 2013.

Key points:

- Structured process employed for the replacement of a significant asset, supported to a large degree by the external expert report by Parsons Brinckerhoff report. A number of other major pump station locations are also proposed for similar renewal expenditure.
- Actual works to be undertaken by specialized external electrical contractors.
- Costs incurred for Stage 1 (2012) are predominantly incurred by SunWater staff.
- The proposed upgrading will allow external monitoring and remote control of the pump house facilities, improving labour efficiencies.

Based on the review information and reports provided, particularity the Parsons Brinkerhoff study, and the site inspection visit and discussions held with SunWater staff, Aurecon views that the proposed renewal activity is both prudent and efficient (direct costs).

Monduran Pump Station

In 2009 a renewal expense of $280,132 was recorded for replacement of roof and gutters at the pump station.

Aurecon examined the works undertaken at the pump station during its field trip investigation to Bundaberg. During our visit we were able to identify residual damage (staining) to ceiling/walls caused by water leakage from the previous roof. SunWater also provided condition assessments for the pump station which identified the need for roof works. Aurecon also examined the expenditure associated with roof replacement, which Aurecon estimatesd had a surface area of approximately 880m^2. Aurecon noted the complexity of the roof in terms of height from ground, the need for insulation protection from lighting, and a central gantry walkway on the roof which would have required removal and re-installation.

SunWater provided to Aurecon background files which contained:

- 3 quotes by external contractors for the replacement of the roof (January 2008), which were utilised for project budgeting purposes. The range in cost for these quotes ranged from approximately $190,000 (Ex GST) to approximately $245,000 (Ex GST)
- tendering process documentation including advertisements within the Bundaberg Newspaper and Qld Government Tendering.
- Two tenders were submitted.
- The invoice for the contractor (remove original roof/insulation/roof catwalk, and installation of new roof 0.42 Ultra Interdeck roofing, insulation, and catway installation) was approximately $220,000 (includes GST). Aurecon viewsed the expenditure of $220,000 for the contracted works as efficient.

A component of the remaining amount ($60,000) included SunWater labour costs associated with project management, and equipment hire, along with indirects and overheads.

Based on information reviewed and the site inspection visit, discussions held with SunWater staff and examination of the works undertaken, Aurecon views that the renewal expenditure was both prudent and efficient (direct costs).

Bucca Weir

Aurecon noted that a renewal expenditure has been assigned to Bucca Weir within the NSP. Bucca Weir is a listed asset of the Bundaberg Bulk WSS. Aurecon notes that the proposed renewal expenditure relates to $72,000 in 2013, for the refurbishment of Trash Racks and Guides. Aurecon questions if the actual expense relates to the Weir itself, or supporting channel/infrastructure directly related to the Distribution network.

Bingera Distribution – replace screen in 2034 – $217,000

Aurecon also undertook a desktop review of a number of renewal proposals, based on information provided by SunWater.

SunWater has indicated that this renewal activity involves a total of 7 screen functional asset locations. These screens have a notional 30 service life, and were installed in 1983. Based on a recent condition assessment (score of 2) SunWater has extended the service life of these aluminium screens to 2034. These screen have 50 year operating life.

Based on the information presented within the Bill of Materials (1997), and subsequently indexed by 2.09 as recommended by the Cardno report[517], the replacement direct costs assigned per functional location is $21,412.

Based upon a desktop review of the information provided, Aurecon views that the proposed renewal activity is prudent in terms of timing particularly as the projected replacement date is 20 years beyond its assigned asset life.

Although Aurecon was provided with a Bill of Materials, it did not provide sufficient information for Aurecon to undertake an evaluation of the appropriateness of the cost estimates. Hence, Aurecon is unable to validate the efficiency of the proposed renewal expenditure.

Bingera Distribution – concrete lining - $2.36m in 2033, $2.7m in 2035;

The assigned standard asset life for concrete lined channels is 80 years. The Bingera Distribution channels were constructed in 1983, so notional replacement year is 2063. SunWater provided Aurecon with two separate condition reports:

- Condition Assessment for CL08 (2007), which indicated scores of 4 for cracking in panels and concrete panel foundation, and a recommendation of replacing 2 bays
- Condition Assessment for CL11 (2004), which indicated scores of 3 for cracking on concrete panels in most panels from pencil line thickness to 3mm[518]

SunWater has provided Bill of Materials for both of the projects referred to above (CL08 and CL11). Aurecon's review of the asset database has revealed that the actual works program is split as follows:

- $2.36m in 2033 (CL01-CL07, CL09, CL10, CL12, CL13)
- $2.7m in 2035 (CL08 and CL11)

Aurecon has reviewed the Bill of Materials for the proposed replacement works (CL08 & CL11), along with unit rates for inputs (reinforced and unreinforced concrete the main cost input). The Bill of Materials provided was based upon a pre-2000 valuation (mainly 1997). Based on the Cardno[519] valuation work a recommendation was made to index all Dam Concrete inputs by 2.24 to inflate them from 1997 to a 2008 valuation. Aurecon has reviewed the stated unit rates (2008 prescribed unit rates) for a number of listed items against quoted commercial rates, finding that the unit rates proposed were comparable.

Based on the Bill of Materials, direct estimated costs associated with the works for 2035 is $1.908 million. Unfortunately Aurecon has insufficient information regarding the length of channel involved with the works to calculate the cost of works per channel meter delivered.

Of relevance is the Halcrow (2011)[520] report which examined proposed renewal expenditure involving the replacement of concrete channel lining at Emerald for 2032. Halcrow's (2011) analysis identified that the proposed renewal expenditure using concrete translated to a cost

[517] Cardno (June 2008) Asset Valuation, Final Report SunWater, Job No. 3601-58, Page 119.

[518] SunWater email dated 1st August 2011.

[519] Cardno (June 2008) Asset Valuation, Final Report SunWater, Job No. 3601-58

[520] Halcrow (2011) Biloela Water Supply Schemes: Review of Price Paths 2011-2016, Page 115

of $2,547 per meter (dimensions/width of the channel unknown). Halcrow (2011) noted there have been successful installations of using HDPE to line channels within the Emerald district, and costing approximately $330 per meter direct cost installed. Using HDPE for channel lining would come at a cost of only 13% of that incurred using concrete.

Based on the condition assessment provided, Aurecon views the proposed need to forward the renewal works to 2033 and 2035 as prudent. Based upon a review of unit charge rates quoted within the Bill of Materials for the works, Aurecon views the costing charge rates used by SunWater as efficient. However, based on observations made by the Halcrow (2011) study, Aurecon question the efficiency of using concrete to reline the channels as proposed by SunWater for the Bingera Distribution, particularly considering the magnitude of the expense. Aurecon recommends that additional analysis be undertaken to examine the merits and feasibility of using HDPE lining as opposed to concrete for this renewal activity, before accepting a costing for this renewal activity as being efficient.

Bullyard Distribution – replace structures150Mn Meter Outlet (2033) $529,000, & replace structure 200Mm Meter outlet (2033) $268,000

Although the standard asset life assigned for meter structures is 60 years, Sunwater[521] has conservatively planned meter outlets for 50 years pending ongoing condition assessment and design obsolescence. These meter outlets were constructed in 1983, and therefore have been planned for renewal in 2033.

The proposed works to replace meter outlets (both 150Mn and 20Mm) within the Bullyard Distribution involves a total of 65 functional locations. It is noted that meter replacements are not included within the renewal program, only structures.

SunWater provided a Bill of Materials for each of the functional locations. The Bill of Materials provided was based upon a pre-2000 valuation (mainly 1997). Based on the Cardno[522] valuation work a recommendation was made to index all Pipe Fittings cost inputs by 2.28 to inflate them from 1997 to a 2008 valuation. Aurecon has reviewed the stated unit rates (i.e. 2008 prescribed unit rates) for a number of listed items against quoted commercial rates, finding that the unit rates proposed (2008) were comparable.

Based upon a desktop review of the information provided, Aurecon views that the proposed renewal activity is prudent in terms of timing. Aurecon also notes that SunWater is actively monitoring the condition of the outlet structures, which may bring forward or delay the renewal activity based on condition (and design obsolescence). Aurecon views the proposed direct expenditure (as highlighted within the Bill of Materials) as efficient, based on the comparative analysis undertaken of the unit rates proposed for key material inputs.

11.5.4 Renewals annuity balances

The Bundaberg Distribution system has a substantial positive balance of $2.291 million in 2012[523].

Stakeholders have expressed interest in relation to the calculation of this opening balance for 2012. SunWater has provided Aurecon with an internal working paper[524] which illustrates:

- Opening Balance at 1 July 2006 was positive $427,000 for the Bundaberg Distribution (irrigation sector)
- Identified annual annuity incomes and expenses specifically for the Bulk Scheme for 2007 to 2011

[521] SunWater email dated 1st August 2011.
[522] Cardno (June 2008) Asset Valuation, Final Report SunWater, Job No. 3601-58
[523] SunWater, *Bundaberg Distribution System NSP,* (2012-2016) January 2011, Page 33.
[524] Source: SunWater, *Renewals annuity calculation, INTERNAL WORKING PAPER*, January 2011

- Identified that the closing balance for 30 June 2011 for the Distribution Scheme is positive $2,348,000 (irrigation sector balance). As there are no other users within the scheme, the opening balance for 1 July 2011 is $2,348,000.

- Applied an interest rate of 9.689% (pre-tax nominal) on annual balances

Utilising this information presented above, Aurecon has modelled the stated expenses and income for 2007 to 2011, incorporating the stated 2007 annuity starting balance and annual interest of 9.689%. Aurecon arrived at a closing balance of $2,344,000, just $4,000 less than stated within the SunWater paper ($2,348,000).

As indicated below within Figure 11-34 the scheme incurred annual interest income. Aurecon estimates that the scheme accrued approximately $565,000 in interest income over the entire 2007 to 2011 period.

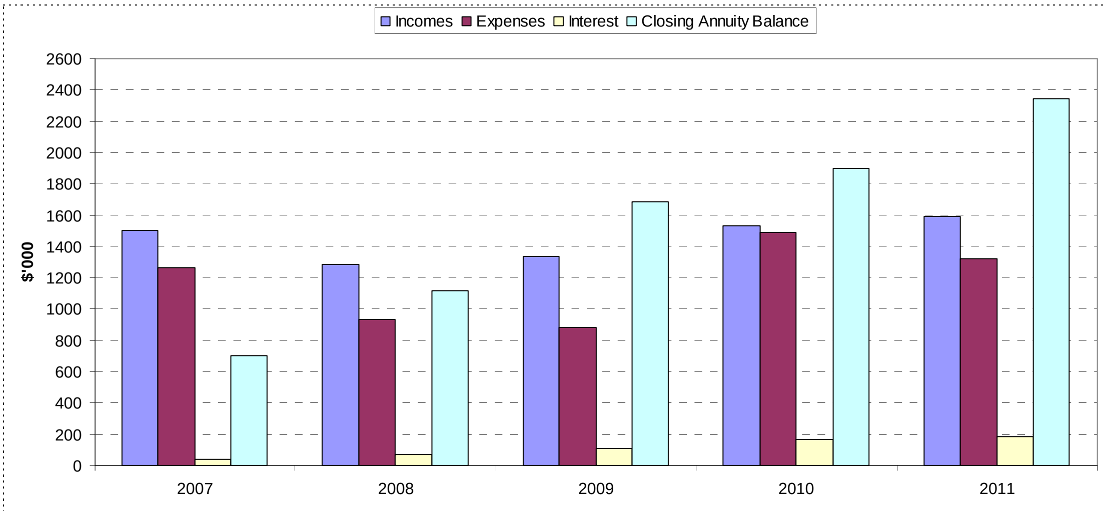

Figure 11-34. Calculated annual renewal balance for Bundaberg Distribution System 2007 to 2011

Figure 11-34 highlights that annual annuity income was significantly greater than expenses for all years. The sum total of annuity income for 2007 to 2011 was $7,241,000, while renewal expenses totalled $5,889,000, resulting in a net surplus of $1,352,000. Adding the surplus of $1,352,000, plus the interest income over the period of $565,000 equates to minus $1,917,000 (add to the starting 2007 positive balance of $427,000 equals the closing balance of $2,344,000).

As indicated in Figure 11-35 below, the rolling annuity balance is to remain positive until 2035.

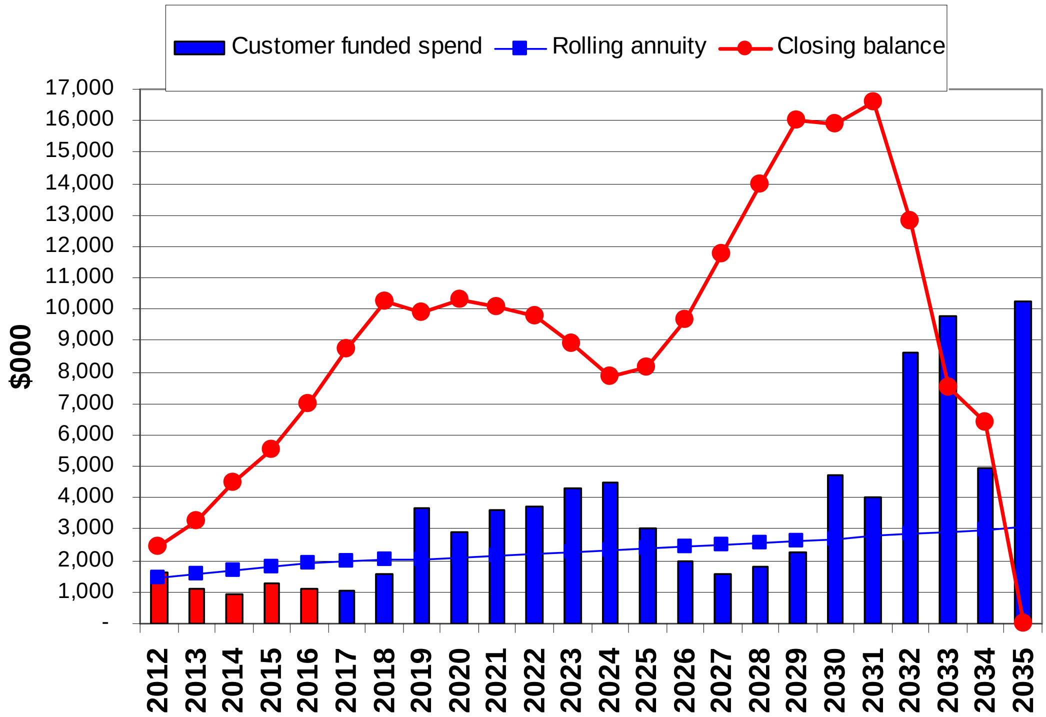

Figure 11-35. Renewals annuity balances for Bundaberg Distribution System 2012 to 2036 (nominal terms) [525]

Applying SunWater's prescribed real rate of interest of 9.689% upon the starting 2012 annuity balance in 2012 of $2.291 million, implies an annual interest of approximately $220,000 in the first year.

As indicated above, the proposed average renewal expenditures for 2012 to 2017 is $1.125 million per annum. Although the scheme has a substantial positive opening balance in 2012 (accrues interest income), the significant expenses proposed (particularly during the 2032 to 2035 period) results with the annual annuity charge (2012 to 2017) rising from $1.44 million to $1.69 million as shown below in Table 11-16.

Table 11-16. Renewals annuity charge for Bundaberg Distribution System 2012 to 2016

Real dollars, $'000	Financial Year				
	2012	2013	2014	2015	2016
Renewal annuity charge	1445	1515	1593	1616	1692

[1]Source: *Bundaberg Bulk WSS NSP,* (2012-2016) January 2011, Page 32.

11.5.5 Summary of findings on renewals expenditure

Historical Renewal Expenditure

SunWater was not able to provide to this review the proposed renewal programme as developed in 2006 for the current price path. However, as highlighted earlier SunWater's actual expenditure on renewals for 2007 to 2010 was approximately 100% over the proposed LBC target expenditure, while in 2011 it is projected at this stage to be 35% over target (providing no major unexpected expenses occur).

[525] Source: SunWater spreadsheet, *"Annuity charts – V610 03.xls"*

A closer examination of the 2010 itemised renewal expenditures data alone revealed that of the 70 renewal activities, 11 had no Board approved budget while 9 projects had exceeded the Board approved budget by a substantial amount. The remaining 50 projects were under budget, but a number of these were not completed in 2010 and recorded as WIP. As indicated earlier, the itemised database provided by SunWater, only accounted for 80% of total recorded annual renewal expenditure for 2010.

Due to the limited capacity to undertake an extensive field investigation (and difficulties obtaining data from SunWater within the study's timeframes), Aurecon was only able to examine a small number of historical renewal expenditure items. Aurecon found the processes engaged (identification of need through condition assessments, timing, scoping, and tendering for the engagement of external contractors) indicated a structured and efficient process. However, substantial Indirect and Overhead costs were also incorporated, which greatly distorted the perceived value for money outcome achieved for the activity. Where variations were made to activity budgets, substantiated reasoning and justification was found.

Aurecon review of the roof replacement at Monduran Pump Station (2009 for $280,132) found that the renewal expenditure was both prudent and efficient (direct costs).

Considering the magnitude of the budget over-run for historical renewals expenditure, and the magnitude of projects identified in 2010 alone incurring budget over-runs, Aurecon recommends that:

- A comprehensive itemised inventory of renewal expenditure items from SunWater be reviewed so that 100% of the stated annual cost can be validated
- Activities that substantially exceeded the Board budget, and those without a Board budget be reviewed.

Forecast Renewal Expenditure

To assess the prudency and efficiency of forecast renewal activities, Aurecon examined a number of asset site locations during the field trip investigation. For each of the proposed renewal activities, Aurecon identified a well documented process (condition assessments, audits, external expert reviews) that substantiated the timing or need for expenditure (particularly for assets incurring renewal expenditure within 2012-2014. Aurecon also noted that scoping studies by external consultants were utilised to substantiate the timing, but also examine and recommend least cost options for investment (only major projects).

Unfortunately, no detailed scoping or budgeting is undertaken by SunWater until the renewal activity falls within a 12 month planning schedule. The cost estimate is typically based on similar activity expense incurred at another location, or replacement value recorded within the system. Aurecon also noted via its field investigation that projected costs incorporate substantial Indirects and Overheads costs.

Specific outcomes for the renewal activities examined include:

- Woongarra Point Pump Station (replacement of the Electrical Control system in 2011 $60,500, 2012 $262,000). Aurecon views that the proposed renewal activity is both prudent and efficient (direct costs).
- Woongarra Distribution (2012 Refurbish Reg. Gate - remove, repaint, anodes & bearings, install. $22,000, Replace Weed Screen. $23,000). Aurecon views that the proposed renewal activities as both prudent and efficient (direct costs).
- Dinner Hill Pump Station (replacement of the Electrical Control, $55,000 in 2012 and $169,000 in 2013). Aurecon views that the proposed renewal activity is both prudent and efficient (direct costs).
- Bucca Weir ($72,000 in 2013 for refurbishment of Trash Racks and Guides). Aurecon questions if the actual expense relates to the Weir itself, or supporting channel/ infrastructure directly related to the Distribution network, and recommends that SunWater provide additional clarification

- Bingera Distribution (replace screen in 2034 for $217,000). Aurecon views the proposed renewal activity is prudent in terms of timing (particularly as the projected replacement date is 20 years beyond its assigned asset life). However Aurecon was unable to verify the efficiency of the proposed expenditure.
- Bingera Distribution (concrete lining - $2.36m in 2033, $2.7m in 2035). Aurecon views the proposed need to forward the renewal works to 2033 and 2035 as prudent. However, Aurecon recommends that SunWater investigates the suitability of using HDPE lining to replace the need for concreting, before accepting a costing for this renewal activity as being efficient.
- Bullyard Distribution (replace structures150Mn Meter Outlet (2033) $529,000, and replace structure 200Mm Meter outlet (2033) $268,000). Aurecon views that the proposed renewal activity is prudent and efficient.

12. Conclusions and Recommendations

Aurecon has undertaken a review of SunWater’s proposed Opex and Capex for the Central region which involved extensive consultation with SunWater, a field site visit to the Bundaberg and Maryborough region, meetings with irrigator stakeholders and desktop review of the information obtained from SunWater and other sources.

Aurecon has drawn the following conclusions and recommendations that are primarily common to all schemes. Specific conclusions regarding prudency and efficiency are in the respective sections for each scheme and not repeated below.

1. Information availability.

Aurecon was constrained in reaching a definite conclusion regarding the prudency and efficiency of certain Opex and Capex activities due to a lack of information. Although SunWater sought to respond to all data demands in a timely matter, SunWater encountered substantial difficulties responding within timeframes provided. In many cases, the information provided was insufficient for evaluation purposes.Aurecon recommends that SunWater evaluate its information management systems to improve its capacity to provide timely and sufficient information for future reviews.

2. Opex forecasting methodology

Aurecon supports SunWater’s general approach to averaging the preceding 4 years excluding spurious costs. However, Aurecon notes that for some activities, this may not be appropriate. For activities such as ‘Metering”, a forecast using just the latest year’s expenses may be more appropriate, as it represents the reading of all meters within the system. SunWater did not provide insights into the actual calculations employed for each Opex activity, other than stating the general methodology of averaging preceding years cost data. Aurecon recommends that SunWater provide additional information pertaining to the calculations employed and details of any spurious costs omitted.

3. Metering

Aurecon supports the current approach of using one SunWater staff to read meters quarterly. However, Aurecon advocates that the annual costs associated with meter readings be discussed by irrigators with SunWater at regional annual forums in order to processes and related costs in the manual reading of meters.

4. Preventive Maintenance

SunWater recently engaged Parsons Brinkerhoff (2010) to develop the Work Instructions for Condition Assessments and Servicing for each scheme, along with projected labour requirement to fulfil all the projected activities. SunWater did not provide a disaggregation of its forecast “Preventive Maintenance” budget. Based on the limited information provided, it became obvious during the course of this NSP review that the Parsons Brinkerhoff recommendations were not universally adopted across all schemes. Aurecon recommends that SunWater provides the background information and calculations employed to calculate the “Preventive Maintenance” forecasts. Aurecon also recommends an audit be undertaken of the “Preventive Maintenance” activities undertaken in 2010 against those recommended by Parsons Brinkerhoff.

5. Annuities Renewal Methodology

Aurecon makes the following recommendations relating to the proposed annuities renewal methodology:

Discount rate

Aurecon supports the use of a relatively high discount rate, that is a WACC at 12.11%, to increase the financial significance of short term activities at the expense of longer term activities. As the reliability of short term forecast events is much more certain than those over the longer term, a higher discount rate, as currently employed by SunWater, provides a better outcome.

Forecasting period

Aurecon recommends that SunWater retains the 30 year rolling annuity, that is 30 years plus the 5 year forecast price path, for the renewals annuity calculation.

Customer involvement in renewal expenditure

Aurecon recommends that an additional avenue for engagement of stakeholders be provided that allows stakeholders to view the process and analysis undertaken by SunWater to validate the renewals expenditure.

6. Audit historical renewal expenditure

Aurecon's desktop review of historical renewal expenditure found that a number of activities did not have either have a Board approved budget, or for those that did, exceeded it in some instances.

Aurecon recommends that:

- A comprehensive itemised inventory of renewal expenditure items is sourced from SunWater, so that 100% of the stated annual renewal expenditure can be validated
- An audit is undertaken of all activities that substantially exceeded the Board budget, and those without a Board budget be audited, and reasons obtained for variations.

7. Need to incorporate economic analysis for major renewal projects

Aurecon have identified a number of major proposed renewal activities that were questionable, particularly within the Lower Mary region. Aurecon recommends that all scoping studies undertaken for major renewal activities in future incorporate an economic evaluation from an investor's perspective. In this regard, an analysis is undertaken that examines and captures all parameters including:

- the capital investment costs including initial scoping and background investigations that are fully captured in the scoping analysis, along with the indirect/overhead costs likely to be allocated to the activity
- on-going direct operational costs including maintenance, and for mechanical assets cost of energy/electricity (including direct and indirect/overhead costs allocated to the activity)
- on-going annual opportunity cost of capital incorporated during the working life of the asset, defined as the annual interest charge of the total initial capital investment
- incorporating incomes in terms of operational efficiencies gained

8. Provision of detailed asset renewal information to irrigator stakeholders

Aurecon noted that irrigator stakeholders were lacking basic background information pertaining to both historical and forecast renewals expenditure. This report has provided a level of historical renewal expenditure detail, and also provided additional detail regarding forecast renewal expenditure. Aurecon recommends that options be considered to provide information at regular annual intervals pertaining to the renewal program.

9. Annual forums for stakeholder engagement regarding renewal program

Aurecon also noted that irrigator stakeholders did not understand the basis for a number of renewal activities undertaken. Aurecon recommends an annual forum be held with irrigator stakeholders to allow SunWater to also explain the reasoning behind a number of major renewal expenditure activities.

10. Cost escalation rates

Labour

Aurecon supports SunWater use of 4% until June 2012, and CPI post June 2012. Considering the regional demands for skilled labour emerging from the resources sector, Aurecon views SunWater's use of CPI for June 2012 to June 2016 as an underestimate of the likely cost pressures.

Materials and contractors

Aurecon supports the use of a 4% cost escalation for materials and contractors. In view of the growth of the resources sector for goods and services, Aurecon views the use of an escalation rate of 4% as most representative of likely future price movements for both Materials, and Contractors.

11. Allocation of costs within Bulk/River WSS

Capex

Aurecon support SunWater's proposal to adopt the HUF allocation methodology for renewal annuities.

Opex

SunWater is now proposing to allocate operating costs equally (1:1 basis) per unit of nominal WAE. Aurecon does not support the move to allocate costs equally (1:1 basis) per unit of nominal WAE. Aurecon recommends that the existing operating cost allocation methodology utilising CNA be retained, as it more closely follows the user pay principles (ie. proportional utilisation of the asset) that have been more commonly endorsed by stakeholders.
Aurecon recommends that an alternative allocation methodology be investigated that not only better captures allocation/usage by priority customers, but also examine more specifically the incurrence of specific operating costs against possible linkages with water usage and by priority group over time.

12. Allocation of CApex and Opex costs within Distribution systems

Aurecon advocates an allocation methodology that captures the customer's actual utilisation of the infrastructure rather than the customers assigned capacity to access the system based on equal WDE. As such, Aurecon recommends that the existing cost allocation methodology utilising CNA be retained, as it more closely follows the user pay principles more commonly endorsed by stakeholders.

13. Benchmarking

Aurecon acknowledge the variance between schemes in terms of yield capacity and reliability, nature of customer base, asset age and structure that make it difficult to compare schemes. Aurecon also noted difficulties encountered with the financial data published within the National Performance Report 2008-2009 for all schemes, including those scheme management by SunWater.Aurecon views that there is an opportunity to undertake financial benchmarking other than those already published. It would require a review and identification of priority parameters and that of SunWater's management accounting system, to identify Benchmark indicators that will provide the most relevance to all stakeholders including SunWater.

13. References

SunWater Limited

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- January 2011. Background Paper – Centralised Costs
- January 2011. Background Paper – Contributed Assets
- January 2011. Background Paper – Cost Forecasting Assumptions
- January 2011. Background Paper – Electricity Costs
- January 2011. Background Paper – Renewals Annuity
- January 2011. Background Paper – Pricing Principles and Tariff Structures
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- January 2011. Network Service Plan – Barker Barambah Water Supply Scheme
- January 2011. Network Service Plan – Boyne River and Tarong Water Supply Scheme
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- Parsons Brinkerhoff (2010) Provision of services for Costing SunWater's Work Instruction
- PricewaterhouseCoopers (September 2010), Pricing Principles and Tariff Structures for SunWater's Water Supply Schemes, Issues Paper prepared for the Queensland Competition Authority,
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- Rawlinsons (2010) *Australian Construction Handbook* (28th edition)

Appendix A. Comparative analysis of the Tier 1 Report (Indec)

Stakeholders have expressed interest examining the projected lower bound operating costs for each scheme for the current price path (2006/07 to 2010/11) as projected within the Tier 1 Report prepared by Indec Consulting[526].

However, SunWater advise that a direct comparison between the Tier 1 projected 2005/06 lower bound operating cost against actual expenditure as presented within the NSP for 2007 to 2011 is not feasible as;

- the Tier 1 tables for "scheme lower bound cost" include only the irrigation share of the costs, and that grossing up the costs is problematic
- and that Tier 1 data is "whole of scheme', whereas SunWater has unbundled costs between bulk and distribution for the Lower Mary and Bundaberg[527]

In addition, through the course of this investigation Aurecon has discovered a number of new activities and requirements that have emerged in recent years (post Tier 1 Indec Report) incurring additional costs including:

- New monitoring requirements for bulk storages
- Metering reading costs (introduced in many schemes around 2008)
- Increased requirements for monitoring of stream/river flows.
- New workplace and safety requirements requiring additional investment in staff training, but also substantial new investments with facilities (high cost security fencing for bulk storage assets near residential areas), security mesh encasement of outlets and values around storages and channels, etc.
- Key assets (particularly electrical control panels for pumps) requiring replacement rather than refurbishment due to either parts becoming obsolete, or changes in Work place & safety requirements driving a need for improved operator safety.

The Tier 1 report (page 21) states that attention was paid in the analysis to capture "efficiency and appropriateness of other forecast costs including scheme management costs, maintenance, metering and workplace health and safety". However, it is unclear what allowances (ie. cost estimation and incorporation into the LBC analysis) was made in forecasting these emerging cost activities

Acknowledging these significant limitations, the following analysis should therefore be interpreted with substantial caution, and treated as high level indicative analysis identifying potential areas for discussion and additional research.

Examining the proposed LBC Aurecon noted the inclusion of Electricity costs and the Asset refurbishment annuity. Analysis of the Tier 1 LBC was undertaken with these two cost elements removed.

[526] Statewide Irrigation Pricing Working Group, *SunWater Irrigation Price Review 2005-06 Tier 1 Report*, April 2006.
[527] Email from SunWater to the QCA, dated 23rd February 2011.

Barker Barambah WSS

Table A1 below highlights the proposed LBC for the Barker Barambah WSS as proposed by the Tier 1 report (Indec 2006). Note that substantial efficiency gains (Tier 1 Productivity Adjustment) was projected for this scheme by the Indec analysis, averaging $97,713 per annum over 2006/07 to 2010/11 period.

Table A-1. Scheme Lower Bound Costs for Barker Barambah WSS

	Financial Year					
	2006/07	2007/08	2008/09	2009/10	2010/11	5 Yr Av.
Operations, maintenance & administration	768,122	884,537	751,615	740,773	808,502	790,710
Electricity	26,966	26,966	26,966	26,966	26,966	26,966
Asset refurbishment annuity	120,861	120,181	118,614	117,249	116,699	118,721
Total Lower Bound Costs	915,949	1,031,683	897,195	884,987	952,166	936,396
less Tier 1 Productivity Adjustment	(80,706)	(105,523)	(93,076)	(98,731)	(110,530)	(97,713)
Total Efficient Lower Bound Costs	**835,242**	**926,160**	**804,120**	**786,257**	**841,636**	**838,683**

Source: *SunWater Irrigation Price Review 2005-06, Tier 1 Report*, Indec Consulting, April 2006.

Table A-2 below highlights Aurecon's analysis of the Tier 1 LBC against actual expenditure reported by SunWater within the NSP. Of interest is the fact that Actual Operations/ maintenance and administrative expenses were actually lower than those suggested by the Tier 1 report, with the exception of 2009/10 where expenditure exceeded proposed LBC by 10.6%. Over the entire price path, SunWater's annual average expenditure was actually 19.1% lower than the suggested LBC.

As indicated earlier within this report (Figure 3.3), actual water usage for the scheme between 2006 and 2010 was extremely low at 4% to 29% of the usage levels achieved for the scheme in 2003. Extremely low water usage/delivery rates and drought conditions would have lowered SunWater's operational expenditure substantially during this period.

Table A-2. Analysis of LBC (Tier 1 Report) versus actual for Barker Barambah WSS

	Financial Year					
	2006/07	2007/08	2008/09	2009/10	2010/11	5 Yr Av.
Operations, maintenance & administration	768,122	884,537	751,615	740,773	808,502	790,710
less Tier 1 Productivity Adjustment	(80,706)	(105,523)	(93,076)	(98,731)	(110,530)	(97,713)
Proposed efficient LBC for operations, maintenance & administration	687,416	779,014	658,539	642,042	697,972	692,997
Brisbane CPI Index[1]	156.2	160.3	168.4	171.8	177.3	
Indexed efficient LBC for operations, maintenance & administration (A)	715,829	832,506	739,320	735,352	825,003	769,602
Actual Expenditure[2] (B)	498,000	524,000	827,000	643,000	680,000	634,400
Difference between Actual & LBC (B – A)	-217,829	-308,506	87,680	-92,352	-145,003	-121,352
% Difference (B – A)/ B	-43.7%	-58.9%	10.6%	-14.4%	-21.3%	-19.1%

[1]Note that the CPI Index values relate to the June quarter reading for Brisbane for each year (Sourced ABS *Consumer Price Index Australia*, Cat. No. 6410.0):. The Index value for June 2005 was 150.0, and Aurecon assume that the analysis undertaken by Indec was in relation to data correlating to 2005 financial year, and therefore all values for 2006/07 were indexed accordingly.

[2]Actual expenses recorded for Operations, Preventive maintenance and Corrective Maintenance, as stated within the *Barker Barambah WSS NSP*, (2012-2016) (January 2011), Page 7.

Boyne River and Tarong WSS

Table A-3 below highlights the proposed LBC for the Boyne River and Tarong WSS as proposed by the Tier 1 report (Indec 2006). Note that substantial efficiency gains (Tier 1 Productivity Adjustment) was projected for this scheme by the Indec analysis, averaging $33,062 per annum over 2006/07 to 2010/11 period.

Table A-3. Scheme Lower Bound Costs for Boyne River and Tarong WSS

	Financial Year					
	2006/07	2007/08	2008/09	2009/10	2010/11	5 Yr Av.
Operations, maintenance & administration	341,140	352,538	352,174	351,746	347,494	349,018
Electricity	80,971	80,971	80,971	80,971	80,971	80,971
Asset refurbishment annuity	33,120	32,742	32,402	32,261	32,401	32,585
Total Lower Bound Costs	455,231	466,251	465,547	464,978	460,866	462,575
less Tier 1 Productivity Adjustment	(24,196)	(31,901)	(34,836)	(38,015)	(36,362)	(33,062)
Total Efficient Lower Bound Costs	**431,035**	**434,349**	**430,711**	**426,964**	**424,505**	**429,513**

Source: *SunWater Irrigation Price Review 2005-06, Tier 1 Report*, Indec Consulting, April 2006.

Table A-4 below highlights Aurecon's analysis of the Tier 1 LBC against actual expenditure reported by SunWater within the NSP. Of interest is the fact that Actual operations/ maintenance and administrative expenses were actually lower than those suggested by the Tier 1 report for three out of five years (2007/08, 2008/09 and 2010/11). The annual average over the 5 years indicates a underspend of minus $21,210 per annum, (or 6.4%).

As indicated earlier within this report (Figure 4.3), actual water usage for the scheme between 2006 and 2010 was low at 39% to 75% of the usage achieved for the scheme in 2004. Reduced water usage/delivery rates and drought conditions would have lowered SunWater's operational expenditure for the scheme during this period.

Table A-4. Analysis of LBC (Tier 1 Report) versus actual for Boyne River and Tarong WSS

	Financial Year					
	2006/07	2007/08	2008/09	2009/10	2010/11	5 Yr Av.
Operations, maintenance & administration	341,140	352,538	352,174	351,746	347,494	349,018
less Tier 1 Productivity Adjustment	(24,196)	(31,901)	(34,836)	(38,015)	(36,362)	(33,062)
Proposed efficient LBC for operations, maintenance & administration	316,944	320,637	317,338	313,731	311,132	315,956
Brisbane CPI Index[1]	156.2	160.3	168.4	171.8	177.3	
Indexed efficient LBC for operations, maintenance & administration (A)	330,044	342,654	356,265	359,327	367,758	351,210
Actual Expenditure[2] (B)	375,000	243,000	290,000	379,000	363,000	330,000
Difference between Actual & LBC (B – A)	44,956	(99,654)	(66,265)	19,673	(4,758)	(21,210)
% Difference (B – A)/ B	12.0%	(41.0%)	(22.8%)	5.2%	(1.3%)	(6.4%)

[1]Note that the CPI Index values relate to the June quarter reading for Brisbane for each year (Sourced ABS *Consumer Price Index Australia*, Cat. No. 6410.0):. The Index value for June 2005 was 150.0, and Aurecon assume that the analysis undertaken by Indec was in relation to data correlating to 2005 financial year, and therefore all values for 2006/07 were indexed accordingly.
[2]Actual expenses recorded for Operations, Preventive maintenance and Corrective Maintenance, as stated within the *Boyne River and Tarong WSS NSP*, (2012-2016) (January 2011), Page 6.

Bundaberg WSS

Table A-5 below highlights the proposed LBC for the Bundaberg WSS as proposed by the Tier 1 report (Indec 2006). Note that substantial efficiency gains (Tier 1 Productivity Adjustment) was projected for this scheme by the Indec analysis, averaging $679,148 per annum over 2006/07 to 2010/11 period.

Table A-5. Scheme Irrigation Lower Bound Costs for Bundaberg WSS

	Financial Year					
	2006/07	2007/08	2008/09	2009/10	2010/11	5 Yr Av.
Operations, maintenance & administration	6,014,949	5,181,046	5,395,918	5,255,758	5,097,261	5,388,986
Electricity	2,005,006	2,005,006	2,005,006	2,005,006	2,005,006	2,005,006
Asset refurbishment annuity	1,584,454	1,619,688	1,646,865	1,657,241	1,759,002	1,653,450
Total Lower Bound Costs	9,604,409	8,805,740	9,047,789	8,918,004	8,861,269	9,047,442
less Tier 1 Productivity Adjustment	(640,542)	(596,531)	(685,028)	(739,391)	(734,250)	(679,148)
Total Efficient Lower Bound Costs	8,963,867	8,209,209	8,362,761	8,178,613	8,127,018	8,368,294

Source: *SunWater Irrigation Price Review 2005-06, Tier 1 Report*, Indec Consulting, April 2006.

Table A-6 below highlights Aurecon's analysis of the Tier 1 LBC against actual expenditure reported by SunWater within the NSP. Of interest is the fact that Actual operations/ maintenance and administrative expenses exceeded those suggested by the Tier 1 report for all of the years (2006/07 to 2010/11). The annual average over the 5 years indicates an over spend of $985,110 per annum, or 15.6%.

As indicated earlier within this report (Figure 8.3 and 9.3), actual water usage for the scheme was relatively low between 2008 and 2009. Water usage was substantially higher in 2010, which may have precipitated the scheme cost blowout highlighted below in Table A-6.

Table A-6. Analysis of LBC (Tier 1 Report) versus actual for Bundaberg WSS

	Financial Year					
	2006/07	2007/08	2008/09	2009/10	2010/11	5 Yr Av.
Operations, maintenance & administration	6,014,949	5,181,046	5,395,918	5,255,758	5,097,261	5,388,986
less Tier 1 Productivity Adjustment	(640,542)	(596,531)	(685,028)	(739,391)	(734,250)	(679,148)
Proposed efficient LBC for operations, maintenance & administration	5,374,407	4,584,515	4,710,890	4,516,367	4,363,011	4,709,838
Brisbane CPI Index[1]	156.2	160.3	168.4	171.8	177.3	
Indexed efficient LBC for operations, maintenance & administration (A)	5,596,549	4,899,318	5,288,759	5,172,746	5,157,079	5,222,890
Actual Expenditure[2] (B)	6,385,000	5,836,000	5,952,000	6,946,000	5,921,000	6,208,000
Difference between Actual & LBC (B – A)	788,451	936,682	663,241	1,773,254	763,921	985,110
% Difference (B – A)/ B	12.3%	16.1%	11.1%	25.5%	12.9%	15.6%

[1]Note that the CPI Index values relate to the June quarter reading for Brisbane for each year (Sourced ABS *Consumer Price Index Australia*, Cat. No. 6410.0):. The Index value for June 2005 was 150.0, and Aurecon assume that the analysis undertaken by Indec was in relation to data correlating to 2005 financial year, and therefore all values for 2006/07 were indexed accordingly.

[2]Actual expenses recorded for Operations, Preventive maintenance and Corrective Maintenance, as stated within the *Bundaberg Distribution System NSP*, (2012-2016) (January 2011), Page 7, and *Bundaberg WSS NSP*, (2012-2016) (January 2011), Page 6.

Mary River WSS

Table A-7 below highlights the proposed LBC for the Mary River WSS as proposed by the Tier 1 report (Indec 2006). Note that substantial efficiency gains (Tier 1 Productivity Adjustment) were projected for this scheme by the Indec analysis, averaging $110,944 per annum over 2006/07 to 2010/11 period.

Table A-7. Scheme Lower Bound Costs for Mary River WSS

	Financial Year					
	2006/07	2007/08	2008/09	2009/10	2010/11	5 Yr Av.
Operations, maintenance & administration	831,780	903,899	829,745	852,313	872,184	857,984
Electricity	198,569	198,569	198,569	198,569	198,569	198,569
Asset refurbishment annuity	290,918	293,202	293,132	291,321	290,269	291,768
Total Lower Bound Costs	1,321,267	1,395,670	1,321,446	1,342,203	1,361,022	1,348,322
less Tier 1 Productivity Adjustment	(76,612)	(107,752)	(109,275)	(132,162)	(128,918)	(110,944)
Total Efficient Lower Bound Costs	1,244,656	1,287,918	1,212,170	1,210,041	1,232,104	1,237,378

Source: *SunWater Irrigation Price Review 2005-06, Tier 1 Report*, Indec Consulting, April 2006.

Table A-8 below highlights Aurecon's analysis of the Tier 1 LBC against actual expenditure reported by SunWater within the NSP. Of interest is the fact that Actual operations/ maintenance and administrative expenses were actually lower than those suggested by the Tier 1 report for two out of five years (2006/07 and 2007/08). The annual average over the 5 years indicates under spent of minus $98,200 per annum, (or 21.3%) as a result of the substantial underspend achieved in 2006/07 and 2007/08).

As indicated earlier within this report (Figure 5.3 and 6.3), actual water usage for the scheme was extremely low in 2008 (25% of 2007 usage) and 2009 (32% of 2007), and to a lesser degree 2010 (61%). The reduced water usage/delivery rates and drought conditions would have lowered SunWater's operational expenditure for the scheme during this period.

Table A-8. Analysis of LBC (Tier 1 Report) versus actual for Mary River WSS

	Financial Year					
	2006/07	2007/08	2008/09	2009/10	2010/11	5 Yr Av.
Operations, maintenance & administration	831,780	903,899	829,745	852,313	872,184	857,984
less Tier 1 Productivity Adjustment	(76,612)	(107,752)	(109,275)	(132,162)	(128,918)	(110,944)
Proposed efficient LBC for operations, maintenance & administration	755,168	796,147	720,470	720,151	743,266	747,040
Brisbane CPI Index[1]	156.2	160.3	168.4	171.8	177.3	
Indexed efficient LBC for operations, maintenance & administration (A)	786,382	850,816	808,848	824,813	878,540	829,880
Actual Expenditure[2] (B)	475000	550000	836000	900000	897000	731,600
Difference between Actual & LBC (B – A)	(311,382)	(300,816)	27,152	75,187	18,460	(98,280)
% Difference (B – A)/ B	(65.6%)	(54.7%)	3.2%	8.4%	2.1%	(21.3%)

[1]Note that the CPI Index values relate to the June quarter reading for Brisbane for each year (Sourced ABS *Consumer Price Index Australia*, Cat. No. 6410.0):. The Index value for June 2005 was 150.0, and Aurecon assume that the analysis undertaken by Indec was in relation to data correlating to 2005 financial year, and therefore all values for 2006/07 were indexed accordingly.
[2]Actual expenses recorded for Operations, Preventive maintenance and Corrective Maintenance, as stated within the *Lower Mary River WSS NSP*, (2012-2016) (January 2011), Page 7, and *Lower Mary Distribution System NSP*, (2012-2016) (January 2011), Page 7, .

Upper Burnett WSS

Table A-9 below highlights the proposed LBC for the Upper Burnett WSS as proposed by the Tier 1 report (Indec 2006). Note that substantial efficiency gains (Tier 1 Productivity Adjustment) was projected for this scheme by the Indec analysis, averaging $179,924 per annum over 2006/07 to 2010/11 period.

Table A-9. Scheme Lower Bound Costs for Upper Burnett WSS

	Financial Year					
	2006/07	2007/08	2008/09	2009/10	2010/11	5 Yr Av.
Operations, maintenance & administration	795,714	850,001	780,736	770,213	821,164	803,566
Electricity	91	91	91	91	91	91
Asset refurbishment annuity	274,361	271,613	268,759	265,129	261,416	268,256
Total Lower Bound Costs	1,070,166	1,121,705	1,049,586	1,035,434	1,082,672	1,071,912
less Tier 1 Productivity Adjustment	(155,724)	(196,001)	(166,438)	(178,964)	(202,492)	(179,924)
Total Efficient Lower Bound Costs	914,442	925,704	883,149	856,469	880,179	891,989

ource: *SunWater Irrigation Price Review 2005-06, Tier 1 Report*, Indec Consulting, April 2006.

Table A-10 below highlights Aurecon’s analysis of the Tier 1 LBC against actual expenditure reported by SunWater within the NSP. Of interest is the fact that Actual operations/ maintenance and administrative expenses were actually lower than those suggested by the Tier 1 report for all years but 2008/09. The annual average over the 5 years indicates a underspend of minus $71,290 per annum, (or 14.5%).

As indicated earlier within this report (Figure 7.3), actual water usage for the scheme between 2006 and 2010 was low at 53% to 70% of the usage achieved for the scheme in 2005. Reduced water usage/delivery rates and drought conditions would have lowered SunWater’s operational expenditure for the scheme during this period.

Table A-10. Analysis of LBC (Tier 1 Report) versus actual for Upper Burnett WSS

	Financial Year					
	2006/07	2007/08	2008/09	2009/10	2010/11	5 Yr Av.
Operations, maintenance & administration	795,714	850,001	780,736	770,213	821,164	803,566
less Tier 1 Productivity Adjustment	(155,724)	(196,001)	(166,438)	(178,964)	(202,492)	(179,924)
Proposed efficient LBC for operations, maintenance & administration	639,990	654,000	614,298	591,249	618,672	623,642
Brisbane CPI Index[1]	156.2	160.3	168.4	171.8	177.3	
Indexed efficient LBC for operations, maintenance & administration (A)	666,443	698,908	689,652	677,177	731,270	692,690
Actual Expenditure[2] (B)	576,000	459,000	734,000	669,000	669,000	621,400
Difference between Actual & LBC (B – A)	(90,443)	(239,908)	44,348	(8,177)	(62,270)	(71,290)
% Difference (B – A)/ B	(15.7%)	(52.3%)	6.0%	(1.2%)	(9.3%)	(14.5%)

[1]Note that the CPI Index values relate to the June quarter reading for Brisbane for each year (Sourced ABS *Consumer Price Index Australia*, Cat. No. 6410.0):. The Index value for June 2005 was 150.0, and Aurecon assume that the analysis undertaken by Indec was in relation to data correlating to 2005 financial year, and therefore all values for 2006/07 were indexed accordingly.
[2]Actual expenses recorded for Operations, Preventive maintenance and Corrective Maintenance, as stated within the *Upper Burnett WSS NSP*, (2012-2016) (January 2011), Page 6.

Appendix B. Benchmarking

Benchmarking is a useful tool for identifying the relative performance via comparative analysis. However, the usefulness of benchmarking is compromised when the systems being compared are not identical in structure or operating nature, which is very obvious with irrigations schemes that have vastly different assets, regulatory approaches, history, geographies, climatic/environmental conditions, and water resource demand conditions, etc within each scheme for Queensland, let alone interstate schemes.

The National Water Commission's (NWC) report *Performance Report for Rural Water Service Providers for 2008/09* is a high level benchmarking analysis examining the performance of a number of irrigation schemes across Australia. The NWC report provides a number of indicators and values under the following three key parameter headings:

- Detailed characteristic
- Environmental indicators
- Financial indicators

The NWC report only provides information at the individual scheme level for 2008-09 year, which limits the capacity to undertake trend analysis, however the NWC intends to continue the national benchmarking report on a regular basis (providing greater opportunities to undertake trend analysis and benchmarking in the future).

The NWC relies totally on the data supplied by the various rural water service providers (un-audited). It is highly possible that costs have been treated quite differently by some providers.

Due to the constraints listed above, the benchmarking presented below should only be used for indicative purposes, rather than an assessment of the efficiency of the performance of individual schemes.

Note that the following analysis follows the NWC segmentation of differentiating Regulated River Supply Service from Gravity Irrigation Network Supply.

In addition to presenting a range of NWC published indicators (C12, F1, F9, F10, F16, F22, F23), Aurecon also calculated the following two indicators for each scheme:

- Operation cost / Long term supply; calculated by dividing Operation Expenditure (F9) by Long term annual supply expectation (C12), to arrive at an indicator ($ / ML).
- Maintenance cost / Long term supply; calculated by dividing Maintenance Expenditure (F10) by Long term annual supply expectation (C12), to arrive at an indicator ($ / ML).

Aurecon also notes that this analysis could be substantial expanded, to calculated Operations and Maintenance expenditure by other denominators such as annual volume (ML) delivered in the past year, length of distribution channels (km), etc.

Regulated River Supply Service

The following Central Region schemes fall within the Regulated River Supply:

- Boyne River
- Bundaberg
- Lower Mary
- Upper Burnett
- Barker Barambah

Table B1 below provides a number of indicators to allow indicative analysis to be made between the schemes within the Central region and those from interstate. Before examining the indicators, the following shortcomings need to be reviewed:

- For the Murray Basin (Goulburn-Murray Water, Vic), a current asset replacement cost of $12,734 is assigned to the scheme, while Operational Expenditure for 2008-08 is estimated at $11.453m, and no Maintenance expenditure is recorded. It is highly likely that these figures may have been entered into the NWC analysis incorrectly.
- For many of the SunWater Central region schemes, it is difficult to reconcile the figures published within the NWC report and those reported within the NSP for individual schemes. In some cases, it appears to be under-reporting of actual costs whilst in other SunWater schemes it appears to over-report actual expenditure. Examples are:
  - NWC report states Lower Mary Operational Expenditure at $120,969, whereas NSP states $183,000 for 2009. Maintenance is stated at $27,538 whereas the NSP states Maintenance as $37,000 (Corrective & Preventive).
  - NWC report states Bundaberg Operational Expenditure at $1.166m, whereas NSP states $807,000 for 2009. NWC report states Bundaberg Maintenance Expenditure at $2.378m, whereas NSP report states $278,000 for 2009 (Corrective & Preventive), and $722,000 for renewal expenditure. NWC report states $36,044 for capital Expenditure.
  - The NWC report states Boyne River Operational Expenditure at $1.166m and Maintenance expenditure at $244,837. The NSP states 2009 Operations expenditure at $214,000 and Maintenance at $76,000 (Corrective and Preventive).
- The reliability of achieving the Long term expected supply varies substantially between schemes, and should also be taken into account when comparative benchmarking analysis is undertaken. Note that this was not evaluated within the WNC report.

Considering the difficulties posed with the points raised above, the following general observations are made in respect of Table B1 below:

- Within Central region, Operation cost per ML (long term supply expectation) varies from $9.64ML within the Lower Mary, to $22.28 per ML Upper Burnett. Similarly, Maintenance costs per ML also vary within the Central region from $2.19 per ML within the Lower Mary, to $29.05 per ML for the Boyne River.
- Operation costs on a per ML basis varies considerably for the interstate schemes. Ignoring the $123 ML for the Murray Basin (as a possible data error), Operations costs per Ml vary from $6.04 Ml for Border to $28.84 ML for the Macalister.
- Maintenance costs per ML also vary, from $3.03 ML for Border to $22.58 ML for the Loddon Basin.

Combining Operation and Maintenance costs per ML

- Within the Central region, the Boyne River has the highest combined Operational and Maintenance costs on a ML basis at $46.71, followed by Upper Burnett at $42.47, and Bundaberg at 30.30. The Lower Mary has the lowest cost at $11.83 ML.
- Combining Operation and Maintenance costs per ML, some schemes interstate have comparative low costs including Border at $9.07 ML and Gwydir at $12.32 ML. However, there also are interstate schemes with comparative higher costs including Loddon Basin at $54.79 Ml and Macalister/Thomson System at $37.50 ML.

Table B-1. Benchmarking Regulated River Supply

Scheme	NWC indicators							Aurecon calculation	
	C12 Long term annual supply Expectation (ML)	F1 Current asset replacement cost ($)	F9 Operation Expend' ($)	F10 Maintenance Expend' ($)	F16 Maintenance Expend' as % of current asset replace' cost (%)	F22 Nominal capital expend' ($)	F23 Capital Expend' per current replace' cost (%)	Operation cost /Long term supply ($/ML)	Maintenance cost /Long term supply ($/ML)
Barker Barambah	23,229	$139.9m	$426,144	$129,845	0.1%	$20,000	0.0%	$18.35	$5.59
Boyne River	8,429	$100.9m	$148,306	$244,837	0.2%	$6,727	0.0%	$17.66	$29.05
Bundaberg	116,962	$395.8m	$1.166m	$2.378m	0.6%	$36,044	0.0%	$9.97	$20.33
Lower Mary	12,554	$11.9m	$120,969	$27,538	0.2%	$16,062	0.1%	$9.64	$2.19
Upper Burnett	22,137	$141.6	$493,202	$447,022	0.3%	$90,585	0.1%	$22.28	$20.19
Gwydir *(NSW Sun Water)*	275,597	$370.1m	$1.748m	$1.649m	0.4%	$1.439m	0.4%	$6.34	$5.98
Upper/Lower Namoi *(NSW Sun Water)*	170,193	$296.8m	$2.14m	$1.611m	0.5%	$2.546m	0.9%	$12.57	$9.47
Border *(NSW Sun Water)*	148,923	$142.1m	$899,000	$452,000	0.3%	$95,000	0.1%	$6.04	$3.03
Macquarie *(NSW Sun Water)*	269,989	$567.7m	$2.403m	$1.724m	0.3%	$210,000	0.0%	$8.90	$6.39
Loddon Basin *(Goulburn-Murray Water, Vic)*	25,453	$144.5m	$819,944	$574,590	0.4%	$6.425m	4.4%	$32.21	$22.58
Murray Basin *(Goulburn-Murray Water, Vic)*	92,792	$12,734	$11.453m	$0	0.0%	$0	0.0%	$123.44	$-
Ovens Basin *(Goulburn-Murray Water, Vic)*	34,460	$68.8m	$524,639	$356,127	0.5%	$915,801	1.3%	$15.22	$10.33
Macalister/Thomson System *(Southern Rural Water, VIC)*	24,000	$-	$692,053	$207,776	-%	$1.57m	-%	$28.84	$8.66

[1]Source: *National Performance Report 2008-09, Rural Water providers,* Australian Government, National Water Commission.

Gravity Irrigation Network Supply

The following Central Region schemes fall within the Gravity Irrigation Network Supply:

- Bundaberg
- Lower Mary

Table B-2 below provides a number of indicators to allow indicative analysis to be made between the schemes within the Central region and those from interstate. Before examining the indicators, the following shortcomings need to be acknowledged

- For the Murray Basin (Goulburn-Murray water, Vic), an Current asset replacement cost of $12,734 is assigned to the scheme, while Operational Expenditure for 2008-08 is estimated at $11.453m, and no Maintenance expenditure is recorded. It is highly likely that these figures may have been entered into the NWC analysis incorrectly.
- For many of the SunWater Central region schemes, it is difficult to reconcile the figures published within the NWC report and those reported within the NSP for individual schemes. In some cases, it appears to be under-reporting actual costs whilst in other SunWater schemes it appears to over-report expenditure. Examples are:
  - The NWC report states Bundaberg Operational Expenditure at $2.328m and Maintenance expenditure at $2.297 million. The NSP states 2009 Operations expenditure at $1.8 million and Maintenance at $3.06 million (Corrective and Preventive).
  - The NWC report states Lower Mary Operational Expenditure at $109,190 and Maintenance expenditure at $331,994. The NSP states 2009 Operations expenditure at $204,000 and Maintenance at $412,000 (Corrective and Preventive).
- The reliability of achieving the Long term expected supply varies substantially between schemes, and should also be included in a detailed comparative benchmarking analysis (not provided within the WNC report). For instance, the Murray Irrigation Ltd scheme has a Long term annual supply expectation (C12) of 700,000, however only achieved an annual average of 107,127 ML between 2006-07 and 2008-08.

Considering the shortcomings raised above, the following general observations are made in respect of Table B-2 below:

- The Operation cost / ML for Bundaberg and Lower Mary ($26.04 & $22.33) are the highest costs recorded of all schemes sampled and analysed within Table X below. For some interstate schemes, this is very obvious with Coleambally Irrigation scheme with Operation cost at $3.46 ML and Murray Irrigation at $4.48 ML.
- The calculated Maintenance cost /ML also highlights areas of interest, particularly the Lower Mary in which a Maintenance cost of $67.91 ML is calculated based on the cost and Long terms supply expectation information presented. Bundaberg's Maintenance cost per ML is much lower at $25.69 per ML, but this is still relatively high compared to a number of schemes including Murray Irrigation at $3.64 ML, Shepparton $4.41 ML, Pyramid-Boot at $5.66 ML, and Rochester $7.53 ML.

Combining Operation and Maintenance costs per ML

- Within the Central region, the Lower Mary has a very high combined Operational and Maintenance costs on a ML basis at $90.24, while Bundaberg also has a relatively high cost structure of $51.73 per ML.

- Combining Operation and Maintenance costs per ML, some schemes interstate have comparative low costs including Murray irrigation at $8.12 ML, Coleambally $15.22 ML, and Pyramid-Boot at $15.91 ML.

Table B-2. Benchmarking Gravity Irrigation Network Supply

Scheme	NWC indicators							Aurecon calculation	
	C12 Long term annual supply Expectation (ML)	F1 Current asset replacement cost ($)	F9 Operation Expend' ($)	F10 Maintenance Expend' ($)	F16 Maintenance Expend' as % of current asset replace' cost (%)	F22 Nominal capital expend' ($)	F23 Capital Expend' per current replace' cost (%)	Operation cost /Long term supply ($/ML)	Maintenance cost /Long term supply ($/ML)
Bundaberg	89,416	$657.6m	$2.328m	$2.297m	0.3%	$563,384	0.1%	$26.04	$25.69
Lower Mary	4,889	$43.7m	$109,190	$331,994	0.8%	$10,461	0.0%	$22.33	$67.91
Coleambally Irrigation *(Coleambally Irrigation Cooperative Ltd, NSW)*	333,226	$98.6m	$1.154m	$3.92m	4.0%	$2.128m	2.2%	$3.46	$11.76
Murray Irrigation Ltd *(Murray Irrigation Ltd, NSW)*	700,000	$346.1m	$3.134m	$2.55m	0.7%	$8.81m	2.5%	$4.48	$3.64
Shepparton *(Goulburn-Murray Water, Vic)*	162,991	$237.6m	$2.104m	$718,348	0.3%	$667,234	0.3%	$12.91	$4.41
Central Goulburn *(Goulburn-Murray Water, Vic)*	344,453	$425.5m	$3.532m	$6.924m	1.6%	$1.344m	0.3%	$10.26	$20.10
Rochester *(Goulburn-Murray Water, Vic)*	169,040	$118.5m	$1.745m	$1.272m	1.1%	$445,079	0.4%	$10.33	$7.53
Pyramid-Boot *(Goulburn-Murray Water, Vic)*	200,010	$146.1m	$2.05m	$1.132m	0.8%	$759,764	0.5%	$10.25	$5.66
Campaspe *(Goulburn-Murray Water, Vic)*	17,692	$21.2m	$138,731	$155,207	0.7%	$49,316	0.2%	$7.84	$8.77
Murray Valley *(Goulburn-Murray Water, Vic)*	253,002	$217.2m	$2.389m	$2.195m	1.0%	$1.078m	0.5%	$9.44	$8.68
Torrumbarry *(Goulburn-Murray Water, Vic)*	315,373	$179.1m	$3.079m	$2.579m	1.4%	$985,742	0.6%	$9.76	$8.18
First Mildura Irrigation District *(Lower Murray Water, Vic)*	64,085	$22.8m	$1.244m	$2.956m	2.0%	$688,787	1.0%	$19.42	$46.12

Scheme	NWC indicators							Aurecon calculation	
Red Cliffs Irrigation & drainage District *(Lower Murray Water, Vic)*	42,635	$51.57m	$834,611	$1.155m	2.0%	$593,708	1.0%	$19.58	$27.09
Macalister Irrigation District *(Southern Rural Water, Vic)*	139,000	$-	$2.53m	$1.604m	-%	$4.866m	-%	$18.20	$11.54
Harvey *(Harvey Water, WA)*	35,000	$86.77m	$503,268	$592,744	0.7%	$8.486m*	9.8%	$14.39	$16.94

[1]Source: *National Performance Report 2008-09, Rural Water providers,* Australian Government, National Water Commission.

*Construction of 18km pipeline to transfer water between districts (Harvey, F22. capital costs)