QUEENSLAND COMPETITION AUTHORITY

Final Report

SunWater
Irrigation Price Review: 2012-17

Volume 2

Pioneer River Water Supply Scheme

April 2012

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GLOSSARY

Refer to Volume 1 for a comprehensive list of acronyms, terms and definitions.

EXECUTIVE SUMMARY

Ministerial Direction

The Authority has been directed by the Minister for Finance and The Arts and the Treasurer for Queensland to recommend irrigation prices to apply to particular SunWater water supply schemes (WSS) from 1 July 2012 to 30 June 2017 (the 2012-17 regulatory period). A copy of the Ministerial Direction forms **Appendix A** to Volume 1.

Summary of Price Recommendations

The Authority's recommended irrigation prices to apply to the Pioneer River WSS for the 2012-17 regulatory period are outlined in Table 1, together with actual prices since 1 July 2006.

Table 1: Recommended Prices for the Pioneer River WSS ($/ML)

	Actual Prices						*Recommended Prices*				
	2006-07	***2007-08***	***2008-09***	***2009-10***	***2010-11***	***2011-12***	***2012-13***	***2013-14***	***2014-15***	***2015-16***	***2016-17***
River (Pioneer Valley Water Board) – High B Priority											
Fixed (Part A)	6.24	7.88	9.64	9.92	10.24	12.60	12.46	12.77	13.09	13.42	13.75
Volumetric (Part B)	4.86	6.15	7.50	7.74	7.97	8.26	2.62	2.69	2.76	2.83	2.90

Note: 2011-12 prices include the interim price increase of $2/ML in addition to CPI. Source: Actual Prices (SunWater, 2011al) and Recommended Prices (QCA, 2011 and QCA, 2012).

Final Report

Volume 1 of this Final Report addresses key issues relevant to the regulatory and pricing frameworks, renewals and operating expenditure and cost allocation, which apply to all schemes.

Volume 2, which comprises scheme specific reports, should be read in conjunction with Volume 1.

Consultation

The Authority has consulted extensively with SunWater and other stakeholders throughout this review. Consultation has included: inviting submissions from, and meeting with, interested parties; the commissioning of independent reports and issues papers on key issues; and publication of all relevant documents.

All submissions received on the Draft Report have been taken into account by the Authority in preparing its Final Report.

1. PIONEER RIVER WATER SUPPLY SCHEME

1.1 Scheme Description

The Pioneer River Water Supply Scheme (WSS) is located near the town of Mackay. An overview of the key characteristics of the scheme is provided in Table 1.1.

Table 1.1: Key Scheme Information for the Pioneer River WSS

	Pioneer River WSS
Business Centre	Mackay
Irrigation Uses of Water	Sugar cane
Urban Water Supplies	Mackay and surrounding townships

Source: Synergies Economic Consulting (2010).

The scheme has a total of seven customers, of which only one has a water access entitlement (WAE) for irrigation purposes. Under the Pioneer Valley Resource Operations Plan (ROP), the Pioneer Valley Water Board (PVWater) holds a Distribution Operations Licence (DOL) to pump water from the river and deliver it to irrigation customers in the Pioneer River WSS. Approximately 250 irrigators are serviced by PVWater, which is responsible for the construction and maintenance of infrastructure associated with supplying water to these customers.

The volume of WAE in the Pioneer River WSS is detailed in Table 1.2. There is nominally no medium priority entitlements in the scheme – urban and industrial sectors hold High A priority and the irrigation sector holds High B priority.

Table 1.2: Water Access Entitlements (ML)

Customer Group	*Irrigation*	*Total*
High B[1] Priority	47,357	47,357
High A Priority	0	30,753
Total	47,357	78,110

[1]All irrigators are supplied High B priority water through PVWater. Source: SunWater (2011am).

1.2 Bulk Water Infrastructure

The bulk water service involves the management of storages and WAEs in accordance with regulatory requirements, and the delivery of water to customers in accordance with their WAE.

Stakeholder Submissions

SunWater

The main infrastructure in the scheme is the Teemburra Dam, completed in 1996. It is the primary source of water supply releasing water to a series of downstream weirs and supplying water to channel systems. The other storages are Dumbleton Weir (1982), Mirani Weir (1987) and Marian Weir (1952). Table 1.3 details the full supply storage capacity and age of the key infrastructure.

Table 1.3: Bulk Water Infrastructure in the Pioneer River WSS

Storage Infrastructure	*Capacity (ML)*	*Age (years)*
Teemburra Dam	147,500	16
Dumbleton Weir	8,840	30
Mirani Weir	4,660	25
Marian Weir	3,980	60

Source: SunWater (2011) and QCA (2011).

The characteristics of the bulk water assets are:

(a) Teemburra Dam consists of a concrete faced rockfill structure with two saddle dams located on the eastern rim of the storage. It also has two outlets which have a capacity of 600 ML/day and 240 ML/day respectively;

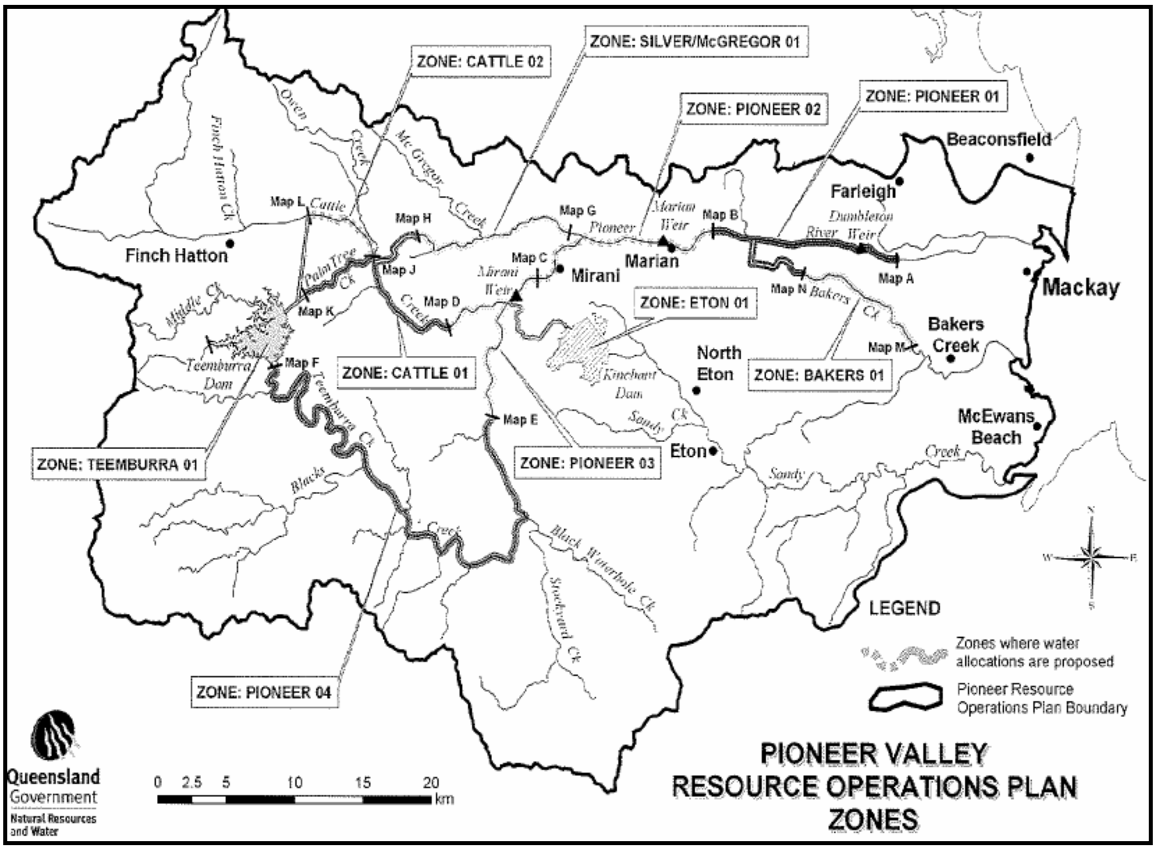
(b) Dumbleton Weir is a mass concrete structure fitted with an inflatable rubber bag (currently deflated) and a fishlock. Upgrades were undertaken at Dumbleton Weir in 1992 and 1998;

(c) Mirani Weir on the Pioneer River is a mass concrete structure with an inflatable rubber bag (currently deflated). It has a dual function, providing instream storage for the Pioneer River WSS and as a pumping pool for Mirani Pump Station for diversion into Kinchant Dam and the Eton WSS; and

(d) Marian Weir is a mass concrete structure with an ogee crest in two sections and at different levels. The outlet capacity is currently being upgraded as a requirement of the ROP to enable a release capacity of 500 ML/day.

The location of the Pioneer River WSS and key infrastructure is shown in Figure 1.1.

Figure 1.1: Pioneer River WSS Locality Map



Source: SunWater (2011).

1.3 Network Service Plan

The Pioneer River WSS water network service plan (NSP) presents SunWater's:

(a) existing service standards;

(b) forecast operating and renewals costs, including the proposed renewals annuity; and

(c) identified risks to the NSP and possible reset triggers.

SunWater has also prepared additional papers on key aspects of the NSPs and this price review, which are available on the Authority's website.

1.4 Consultation

The Authority has consulted extensively with SunWater and other stakeholders throughout this review on the basis of the NSPs and supporting information. To facilitate the review, the Authority has:

(a) invited submissions from interested parties;

(b) met with stakeholders to identify and discuss relevant issues (two rounds of consultation prior to the Draft Report);

(c) published notes on issues arising from each round of consultation;

(d) commissioned independent consultants to prepare Issues Papers and review aspects of SunWater's submissions;

(e) published all issues papers and submissions on its website;

(f) considered all submissions and reports in preparing a Draft Report for comment; and

(g) in particular, after releasing the Draft Report:

  (i) considered issues arising from a third round of consultation in November and December 2011 and submissions on the Draft Report;

  (ii) obtained and reviewed additional information, particularly relating to past and future renewals expenditures, and non-direct and direct costs; and

  (iii) subjected SunWater's financial, renewals annuity and electricity models and the Authority's pricing module to independent external review.

In preparing its Draft Report, the Authority also received a number of submissions from stakeholders on matters such as capacity to pay, rate of return on existing assets, contributed assets, dam safety upgrades, nodal pricing, national metering standards and whether or not to recover recreation management costs from SunWater customers.

Following the amendment to the original Ministerial Direction of 19 March 2010 and further advice from the Minister of 23 September 2010 and 9 June 2011 these issues are outside the scope of the current investigation and have therefore not been addressed.

The Ministerial Direction forms **Appendix A** to Volume 1.

2. REGULATORY FRAMEWORK

2.1 Introduction

Under the Ministerial Direction, the Authority must recommend the appropriate regulatory arrangements, including price review triggers and other mechanisms, to manage the risks associated with identified allowable costs.

During the negotiations that preceded the 2006-11 price path, the Pioneer River Tier 2 group indicated that they were in favour of retaining the existing price cap regulatory arrangement. This arrangement was retained for the 2011-12 interim price period.

2.2 Draft Report

Stakeholder Submissions

SunWater

SunWater identified a range of generic risks considered relevant to allowable costs across all schemes (see Volume 1). SunWater also considered that it should not bear the risk of water availability (volume risk). The following are scheme specific risks identified by SunWater in the NSP associated with the Pioneer River WSS:

(a) damages to SunWater's assets, to the extent that such damage is not recoverable under insurances;

(b) levies or charges made in relation to regulation of irrigation prices by the Authority;

(c) metering costs related to changes in regulatory standards;

(d) replacement of inflatable rubber dams on Dumbleton and Mirani Weirs subject to the outcome from current workplace health and safety (WHS) investigations[1]; and

(e) outbreak of noxious weeds.

Other Stakeholders

Mackay Irrigation Stakeholders (MIS, 2010) expressed support for the continuation of a price cap.

PVWater (2011a) did not comment whether a price cap should be continued. Further, in view of the major deficiencies in the NSP, particularly in relation to proposed costs, it did not support that any mechanisms be in place for price reset triggers (for example, the outbreak of noxious as all other land owners are responsible for management of their land and for the control of noxious weed outbreaks).

PVWater contended that any indexation of prices during the pricing period should factor in productivity gains to ensure that major cost blow outs do not occur (as appears to have occurred during the present price path and without reference to customers at a scheme level).

[1] In November 2008, an inflatable rubber dam (fabri-dam) on top of the Bedford Weir (in the Nogoa-Mackenzie WSS) failed and an unexpected release of water downstream resulted in a fatality. The Government subsequent directed that all rubber fabri-dams in the State be deflated.

For unforeseen circumstances that arise during the price period that have cost implications, PVWater (2011) recommended that SunWater adopt an open and transparent consultation with customers to develop a strategy to rectify the situation, including funding arrangements.

Authority's Analysis

In Volume 1, the Authority analysed the general nature of the risks confronting SunWater and recommended that an adjusted price cap apply to all WSSs. The proposed allocation of risks and means for addressing them is outlined in Table 2.1.

Table 2.1: Summary of Risks, Allocation and Authority's Recommended Response

Risk	***Nature of the Risk***	***Allocation of Risk***	***Authority's Recommended Response***
Short Term Volume Risk	Risk of uncertain usage resulting from fluctuating customer demand and/or water supply.	SunWater does not have the ability to manage these risks and, under current legislative arrangements, these are the responsibility of customers. Allocate risk to customers.	Cost-reflective tariffs.
Long Term Volume Risk (Planning and Infrastructure)	Risk of matching storage capacity (or new entitlements from improving distribution loss efficiency) to future demand.	SunWater has no substantive capacity to augment bulk infrastructure (for which responsibility rests with Government). SunWater does have some capacity to manage distribution system infrastructure and losses provided it can deliver its WAEs.	SunWater should bear the risks, and benefit from the revenues, associated with reducing distribution system losses.
Market Cost Risks	Risk of changing input costs.	SunWater should bear the risk of its controllable costs. Customers should bear the risks of uncontrollable costs.	End of regulatory period adjustment for over- or under-recovery. Price trigger or cost pass through on application from SunWater (or customers), in limited circumstances.
Risk of Government Imposts	Risk of governments modifying the water planning framework imposing costs on service provider.	Customers should bear the risk of changes in water legislation though there may be some compensation associated with National Water Initiative (NWI) related government decisions.	Cost variations may be immediately transferred to customers using a cost pass-through mechanism, depending on materiality.

Source: QCA (2011).

Consistent with the Authority's allocation of risks, the scheme-specific cost risks identified by SunWater in items (a) and (e) above will be dealt with an end-of-period adjustment, or price trigger or cost pass through upon application by SunWater or customers. The Authority does not agree with PVWater that price triggers must never be used but, in the Authority's view, the circumstances in which they would be adopted are limited and discussed in Volume 1.

Indexation of prices is discussed in Chapter 6 – Recommended Prices.

It should be noted that anticipated prudent and efficient electricity costs are reviewed as part of the Authority's analysis of efficient operating costs, and it is only if they are materially different to those forecast would there be a case to consider price triggers or cost pass throughs.

No levies or charges (b) are to be applied by the Authority as a result of this irrigation review. Meter upgrades (c) are outside the scope of the investigation. The replacement of the Mirani and Dumbleton Weir inflatable rubber dams (d) is addressed in Chapter 4 – Renewals Expenditure.

2.3 Submissions Received from Stakeholders on the Draft Report

As outlined in Volume 1, the Authority notes that several submissions regarding the Draft Report's recommendations on the regulatory framework were received. These submissions primarily referred to how more accurate forecasts of electricity costs could be undertaken and how best to accommodate any variance between actuals and forecasts that occur during the 2012-17 regulatory period through mechanisms such as a cost pass through.

2.4 Authority's Response to Submissions Received on the Draft Report

As noted above, the Authority considers that only if costs are materially different to those forecast would there be a case to consider price triggers or cost pass throughs.

The Authority concluded that no compelling evidence had been put forward to change the approach recommended in the Authority's Draft Report.

The Authority's recommendation relating to consultation and reporting are summarised below but outlined in more detail in Volume 1.

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3. PRICING FRAMEWORK

3.1 Tariff Structure

Introduction

For the 2006-11 price path, the Pioneer River Tier 2 group accepted a tariff structure to recover 70% of the required revenue in the fixed (Part A) charge and 30% of revenue in the variable (Part B) tariff.

Draft Report

Stakeholder Submissions

SunWater (2011d) submitted that the fixed charge should recover fixed costs and the volumetric charge should recover variable costs.

MIS (2010) favoured a two-part tariff which reflects the fixed and variable costs for the scheme and submitted that the differential pricing structure [on the basis of service quality] under which the scheme was established be retained.

Authority's Analysis

In Volume 1, the Authority analysed the tariff structure, and the efficiency implications of the tariff structure, to apply to SunWater's schemes.

The Authority considered that, in general, aligning the tariff structure with fixed and variable costs will manage volume risk over the regulatory period and send efficient price signals. To signal the efficient level of water use, the Authority recommended that all, and only, variable costs be recovered through a volumetric charge.

The Authority recognised that tariff structures are only part of a mix of institutional arrangements in Queensland designed to direct water to its highest and best use from the overall community perspective. In addition to these institutional arrangements, normal commercial profit motives and water trading are relevant to ensuring water is directed to its highest and best use.

The volumes of permanent and temporary water traded (across all sectors, separately from land) for the Pioneer River WSS are identified in Table 3.1.

Table 3.1: Volume of Water Trades in the Pioneer River WSS (ML)

	2002-03	*2003-04*	*2004-05*	*2005-06*	*2006-07*	*2007-08*	*2008-09*	*2009-10*
Permanent	-	-	-	255	511	139	208	206
Temporary	2,064	6,608	2,358	10,998	12,478	537	509	495

Source: SunWater (2003-2010g) and Queensland Valuation Services (2010).

The Authority's analysis of whether service delivery costs are fixed or variable is addressed in a subsequent chapter as is cost allocation.

In relation to issues raised by MIS (2010) in regard to pricing differentiation on the basis of service quality, the Authority noted that there is only one tariff group for the Pioneer River

WSS. The Authority understands that differential pricing occurs within PVWater's operations. This is outside the Authority's remit.

Submissions Received from Stakeholders on the Draft Report

PVWater (2011e) submitted that the Pioneer scheme supplies only supplementary irrigation supply and also principally supplies an agricultural mono culture area. The highest and best use for water in the Pioneer is obviously urban and industrial but with SunWater holding substantial reserves of High A allocation in the scheme this trading option does not apply for the foreseeable future. Further, trade of allocation away from irrigation would increase pressure on sugar cane production in Mackay which has seen substantial reduction in recent years.

In the Pioneer WSS, the overwhelming majority of temporary trading occurs in dry periods when less than full announced allocation is available. This is clearly demonstrated in Table 3.1 where temporary trading (which was available before water reforms were introduced) during the period 2003-04 to 2006-07 was at a time of low allocation. In 2005-06 and 2006-07 almost all temporary trading was from the SunWater reserve High A allocation to irrigators and without access to the reserve allocation trading would have been virtually non-existent.

In regard to permanent trading in the Pioneer, PVWater noted that it represents less than 1% of total allocation in the scheme.

PVWater submitted that with present charges including the capital cost for the scheme, there is evidence that water pricing plays a major input into decisions into whether to irrigate. Over the last two years with full allocation and relatively high sugar prices irrigation water use during dry periods has been much less than expected. Irrigators in the Pioneer WSS have little if any trading opportunity for their water and with sharply rising input costs, particularly electricity, agricultural revenue is diminishing. PVWater submitted that irrigators have no way to divest themselves of their allocation and, regardless of tariff structure and lower bound costs, must draw on reserves or overdrafts to continue. This inevitably leads to foreclosures, reduced water use and reduced agricultural production.

Authority's Response to Submissions Received on the Draft Report

The Authority acknowledges that irrigation is a supplementary activity in the Pioneer WSS. This in particular acts as a natural constraint on the level of trading. Any trading activity by SunWater in temporary trading is outside of the Authority's current remit.

3.2 Water Use Forecasts

Introduction

During the 2006-11 price path, water use forecasts played an essential role in the determination of the tariff structure.

In the previous review, up to 25 years of historical data was collated for nominal allocations, announced allocations and volumes delivered. The final water usage forecasts were based on the long term average actual usage level. Where there was a clear trend away from the long term average, SunWater somewhat arbitrarily adjusted the forecast in the direction of that trend. Usage forecasts also took into account SunWater's assessment of future key impacts on water usage, such as changes in industry conditions, impact of trading and scheme specific issues.

For the Pioneer River WSS, an annual water usage of 55% of WAE in the river system was assumed. Water usage for High A and High B priority irrigation WAE were not separately identified (SunWater, 2006b).

Draft Report

Stakeholder Submissions

<u>SunWater</u>

The available supply of water is determined by the announced allocations which are set according to rules contained in the ROP.

SunWater (2011d) noted that demand forecasts are not relevant for price setting under SunWater's proposed tariff regime.

SunWater's usage forecasts for 2012-17 are made having regard to historic averages over an eight-year period and the usage forecast applied for the current price path.

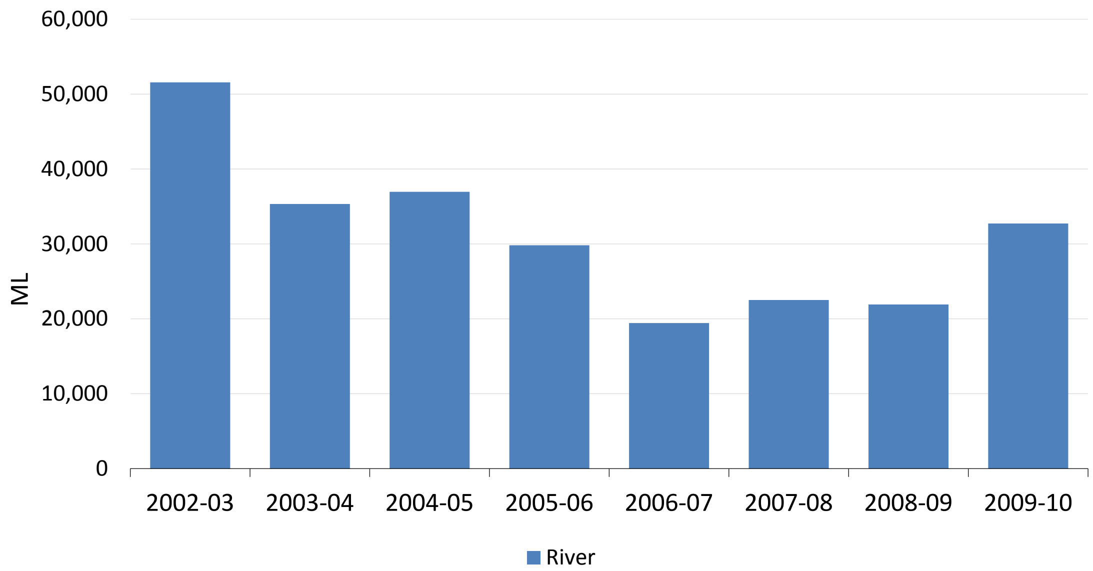
Based on observations over the last eight years, SunWater has forecast use as follows:

(a) at a whole scheme level (all sectors) – an average of 38% of WAE; and

(b) for the irrigation sector only – 40% of WAE, which is more than the eight-year average of 34%.

Figure 3.1 shows the historic usage information for the Pioneer River WSS submitted by SunWater (2011).

Figure 3.1: Water Usage for the Pioneer River WSS (All Sectors)



Source: SunWater (2011).

<u>Other Stakeholders</u>

The issue of timing and water availability was raised by several stakeholders. MIS (2010) advised that while available allocations have historically been 100% by the end of the season, irrigation water is not always available at critical times in the crop cycle. The announced allocation, which is recalculated monthly under the ROP, is increased depending on actual water use in the previous period and system inflows. As a result, irrigation water demand is normally highest during the first half of the water year (July to December), while demand during the second half the year is very dependent on wet season rainfall. PVWater (2010) noted that irrigation in the scheme is termed 'supplementary irrigation' and reflects the difference between full crop water demand and average effective rainfall.

The issue of water availability was also raised during Round 1 of consultation (April 2010), with stakeholders advising the Authority that the water is often not available when required. As a result, Part A charges could penalise irrigators as the total availability does not match demand in some areas.

During the Authority's first round of consultation, stakeholders also queried whether historical usage would be the basis for forecasting water usage and, hence, tariffs. PVWater (2011) submitted that in the NSP there is no explanation as to the logic behind adopting an eight-year period for assessing historic average water use. All factors relevant to actual water usage by irrigators must be taken into account. PVWater considered that a 10-year period, which aligns with the last two price path periods, would be more appropriate for assessing historic water use.

Authority's Analysis

As noted in Volume 1, the Authority does not consider that water use forecasts are relevant to establishing cost-reflective prices for SunWater.

Nonetheless, the Authority has considered past water use in calculating cost-reflective volumetric charges that recover variable costs (see Chapter 6 – Final Prices).

Under the Direction, the Authority must recommend prices that maintain revenues in real terms where current prices are above the level required to recover prudent and efficient costs. For this purpose, the Authority has considered forecast irrigation water use (see Chapter 6 – Final Prices).

No submissions were received in regard to water use forecasts in the Pioneer River WSS. The Authority has reviewed its water use forecasts (see Volume 1).

3.3 Tariff Groups

The amended Ministerial Direction specifically directs the Authority to adopt the tariff groups as proposed in SunWater's NSP.

In the previous review, one tariff group – Pioneer River (Bulk) – was nominated for the scheme.

SunWater proposed in its NSP that the current bulk tariff group be retained.

In accordance with the Ministerial Direction, the Authority will adopt the proposed tariff group for this scheme.

3.4 Mirani Diversion Channel

Although the Pioneer River WSS does not specifically include a distribution system, there are a number of customers on the Mirani Diversion Channel (part of SunWater's Eton WSS) who also hold WAE for the Pioneer River WSS and are supplied and billed by PVWater and SunWater.

Draft Report

Stakeholder Submissions

SunWater's Pioneer River WSS NSP did not address the issue of Mirani Channel diversions. The Eton NSP indicated that six properties adjacent to the Mirani Diversion Channel hold

504 ML of risk WAE, which can only be taken when SunWater is water harvesting into Kinchant Dam under its Resource Operations Licence (ROL). These same irrigators purchased an additional 1,002 ML from the Pioneer River WSS (via PVWater) after the construction of Teemburra Dam.

MIS (2010) submitted that SunWater incurs significant water losses through the channel and irrigators are concerned that SunWater may seek to deduct losses from irrigators' individual water allocations to cover distribution losses. MIS sought clarification of this matter.

Authority's Analysis

The Authority noted that the Mirani Diversion Channel customers are in effect bulk customers of the Pioneer River WSS (for 1,002 ML) and are also SunWater bulk customers of the Eton WSS (for 504 ML of risk allocation). SunWater (2011ab) advised that historically 86% of water deliveries to these customers have been through their Pioneer River WAE, with the remaining 14% from their Eton Risk WAE. The proportion varies with the climatic cycles with the Pioneer River allocations being utilised during the drier periods.

SunWater further advised that it charges a delivery fee of $21.90/ML to provide the 1,002 ML WAE to this small customer group (in addition to the Pioneer River WSS bulk charge). According to SunWater, this charge is billed by SunWater when deliveries are made directly to the irrigators. PVWater has confirmed that the $21.90/ML delivery fee is not part of PVWater's charges to irrigators.

The Authority noted, however, that there is no specific tariff grouping identified for Mirani Diversion Channel irrigators for either the 1,002 ML or 504 ML WAE. The Authority is therefore not able to consider or recommend charges specifically for these irrigators, although it would seem that a separate tariff group is justifiable.

Therefore, as PVWater is charging customers for the 1,002 ML there is no case for SunWater to also apply a separate charge for this purpose.

In response to the MIS concerns, SunWater advised that deliveries to these farms incur significant costs and delivery losses in the Mirani Diversion Channel as the channel system was never designed to deliver such small volumes on a continual basis. Further, DERM has not provided SunWater with any loss allocation to deliver the volumes of Pioneer River WSS (1,002 ML) and therefore all losses need to be borne by the users.

The Authority considered that a provision for losses should have been incorporated in the initial release of allocations, and this is a matter that needs to be resolved with DERM. As a general principle, the cost of any loss allowance should be allocated to customers. However, the Authority had no details of the loss allowance and proposes to allocate costs on the basis of WAE.

Submissions Received from Stakeholders on the Draft Report

SunWater (2011as) did not agree with the Authority's draft finding that, as PVWater is charging customers for the 1,002 ML there is no case for SunWater to also apply a separate charge for this purpose. If SunWater is not able to charge for the service of delivering the Pioneer River WAE then the holders of this allocation will have to access it at the river, at their own cost. This will also resolve the issue of no loss allocation being available for delivery.

PV Water (2011e) sought confirmation that the PVWater charge to Mirani Diversion Channel customers is the only charge that should apply to these customers. PVWater welcomed any review involving a separate tariff group being established and for DERM to resolve the matter of distribution loss allocation for this section.

Authority's Response to Submissions Received on the Draft Report

The Authority's Draft Report position was that it could not determine pricing for the 1,002ML supplied through Mirani Diversion Channel as there was no separate tariff grouping. This remains the case. Accordingly, while SunWater may separately contract to supply these customers with distribution services, this is outside the scope of the Authority's remit.

The Authority proposes no change to its Draft Report recommendation.

3.5 Mirani Weir – Cost Allocation

SunWater's NSP indicated that Mirani Weir on the Pioneer River has a dual function, providing instream storage for the Pioneer River WSS and as a pumping pool for Mirani Pump Station for diversion into Kinchant Dam and the Eton WSS. However, the costs associated with Mirani Weir are fully allocated to the Pioneer River WSS.

Draft Report

Stakeholder Submissions

PVWater (2011a) submitted that Mirani Weir has a dual function – to provide in-stream storage for the Pioneer River WSS and to operate as a pumping pool for Mirani Pump Station for diversion into Kinchant Dam for the Eton WSS. PVWater further noted that in the NSP for the Eton WSS, SunWater declared that the Mirani Weir is not part of the Eton Scheme, being a Pioneer River WSS asset. Accordingly, all Mirani Weir costs have been included in the Pioneer River NSP.

PVWater advised that the Mirani Weir was constructed in 1987 as an integral part of the Eton WSS, noting that without the ponded pool upstream of the weir, pumping into Kinchant Dam would only be possible in very high flow events. However, pumping at such times would be difficult due to additional sediment and debris. On this basis, PVWater submitted that operating and renewals costs for the weir should be shared between the Pioneer River WSS and the Eton WSS.

Authority's Analysis

The Authority invited SunWater to respond to the issues raised by PVWater in regard to the function of Mirani Weir.

SunWater (2011ab) submitted that pricing for services from an asset should be forward looking and not constrained by the original basis for its construction.

SunWater indicated that Mirani Weir is a bulk water asset under the ROP and would remain so whether the Eton Distribution System existed or not. While it had not investigated the claim by PVWater, SunWater acknowledged that impoundments provided by dams and weirs can provide benefits to customers diverting water at those storages by providing a 'pumping pool'. However, SunWater considered these benefits incidental and that the storages are not managed to specifically provide any particular level of 'pumping pool' to those customers. That is, there is no such ROP requirement for a pumping pool to be provided to Eton WSS.

SunWater advised that customers on weir ponds may gain such incidental benefits. PVWater has customers in the Pioneer River WSS with pumps in the weir pond and SunWater does not charge a premium for any such incidental benefits.

The Authority noted that a submission from the EIAC (2011b) expressed concern that the deflated fabri-dam on Mirani Weir impacts on the pumping opportunity from the Pioneer River particularly during low flow periods when the fabri-dam would normally be inflated. This would seem to suggest that the Weir, or at least the fabri-dam, does indeed serve a function for Eton WSS.

The Authority also noted SunWater's own scheme description, which states that:

> *Mirani Weir ... was constructed to provide additional yield for downstream irrigators as well as to provide a pumping pool from which flood flows are diverted through the Mirani Diversion Channel to Kinchant Dam.*

In addition, the Pioneer ROP stipulates that the ROL holder must only take water to supply allocations in the Eton WSS when inflows to Mirani Weir are greater than 250 ML/day and when the water level in Mirani Weir is at or above fixed crest level. This implies that the Mirani Weir is integral to the Eton WSS.

Taken together, the Authority's view was that the Mirani Weir is a joint asset for the Pioneer River WSS and the Eton WSS, even though it is nominally part of the Pioneer River WSS rather than the Eton WSS.

The Authority noted however, that no such cost allocation to the Eton WSS has been made in existing pricing for Eton WSS, and that it may be difficult to identify a cost apportionment. The costs for Mirani Weir would need to be separated from other headworks costs and a cost allocation between the two schemes determined.

Submissions Received from Stakeholders on the Draft Report

SunWater (2011as) noted the Authority's view that as diversion to Kinchant Dam is restricted to when the flow into Mirani Weir is > 250ML/day and above the fixed crest of the weir, this proves that the Mirani Weir is an integral part of the Eton Scheme. SunWater's view is that this ROP restriction to pumping into Kinchant Dam proves exactly the opposite; that the weir is only being used as a measuring point and is not part of the Eton Scheme.

PVWater (2011e) submitted that Mirani Weir is clearly a shared asset between the Pioneer and Eton Schemes, and costs should be dissected between the schemes.

For renewals, PVWater proposed an interim cost allocation based on an analysis of the share of Mirani Weir in total renewals costs for 2011-17. PVWater estimated a total renewals cost of $129,000 for Mirani Weir out of a total of $1.099 million for the total scheme, and therefore proposed that 12% of renewals costs be apportioned to Mirani Weir for 2012-17.

PVWater then used this 12% proportion to split the renewals annuity share attributable to Mirani Weir, and then allocated costs between Eton and Pioneer WSSs based on the operational arrangements for diversion from Mirani Weir to the Eton Scheme as set down in the ROP.

Diversion to the Eton Scheme can only occur when inflow to Mirani Weir exceeds 250 ML/day and the water level in the weir is at or above fixed crest. The storage volume held by the Mirani Weir fabri-dam is of significant benefit to diversions to Eton. PVWater proposed that the ratio of 50% of the volume stored by the fabridam over total storage volume be the basis for sharing of renewals cost.

On this basis, the renewals sharing would be 80% Pioneer and 20% Eton as follows.

(a) full supply volume – 4660 ML;

(b) fixed crest volume - 2730 ML;

(c) Fabri-dam volume – 1930 ML – 50% = 965 ML; and

(d) Eton WSS share – 965/4660 = 20%.

The average annuity for the Pioneer for 2012-13 to 2016-17 is $144,400 and under the above PVWater proposed a renewals annuity amount of $3,456 average per annum be apportioned to Eton WSS (12% of the 20% share).

In regard to Eton / Pioneer sharing of operational costs, PVWater proposed that total asset value be adopted to set the Mirani Weir component of operational cost for the Pioneer. Asset values are shown as Optimised Replacement Cost (ORC) in Appendix A.2 of the SunWater NSP for the Pioneer River WSS. On this basis, Mirani Weir has a total ORC of $54.01 million of a total $230.94 million, or 23%. PVWater proposed that similar sharing as for renewals be adopted which would see Eton apportioned 5% of the total Pioneer operational costs for its share of Mirani Weir (20% of the 23% share).

The average operating cost for the Pioneer for 2012-13 to 2016-17 is $888,400 and under the above would see an amount of $40,866 average per annum apportioned to Eton.

The EIAC submitted that it was concerned about the issue of reliability and loss of efficiencies due to the loss of head arising from deflation of the Mirani Weir fabri-dam.

Authority's Response to Submissions Received on the Draft Report

The Authority sought further comment from SunWater in regard to PVWater's proposals. SunWater noted that the storage volume of Mirani Weir is included in the announced allocation formulae (Table 10A of the Pioneer Valley ROP) for the Pioneer River WSS. Hence, the full benefit of the Mirani Weir storage accrues to the Pioneer scheme allocation holders and not to any holders in the Eton scheme.

SunWater also advised that the diversion to the Eton scheme along the Mirani Diversion channel is governed by the rules in Section 90 of the Pioneer Valley ROP. In simple terms the diversion is allowed when there is a significant inflow to Mirani Weir and the weir is spilling. Hence in practice, only run-of-the-river flows in the Pioneer River are allowed to be diverted that is there is no practical impact on the diversion volume to Eton WSS from the storage capacity afforded by the Mirani Weir.

There are possibly some minor benefits to the operations of the diversion pumps but these indirect benefits would be difficult to quantify and are not likely to be significant when compared to the benefits which Pioneer River scheme customers directly derive from Mirani Weir. SunWater reiterated that its earlier submission on this matter discussed incidental "pumping pool" benefits that apply to any pump within the ponded area of any weir.

On the basis of particularly SunWater's further advice, the Authority is of the view that the benefit of Mirani Weir to the Eton WSS is limited to provision of relatively minor pumping pool benefits, and that these benefits are difficult and impractical to evaluate. The Authority's understanding is that pumping would occur only when flows reach a particular level and occur regardless of whether the weir was in place.

The approach suggested by PVWater is likely to over-estimate the Eton WSS share, as, while the Weir provides a pumping pool, it is not essential for enabling pumping of water into the Eton scheme when inflows exceed 250ML/day. Further, the share of infrastructure costs defined by PVWater relate only to the fabri-dam, which is currently deflated.

Although accepting that a minor benefit accrues to Eton WSS, the Authority proposes to make no adjustment to reflect a sharing of Mirani Weir renewals and operating costs between Eton and Pioneer WSSs.

As noted by the EIAC, the deflation of the fabri-dam means that the benefits to the Eton WSS in terms of pumping pool elevation are currently not available, and remain subject to decisions in regard to replacement of the fabri-dam.

4. RENEWALS ANNUITY

4.1 Background

Ministerial Direction

Under the Ministerial Direction, the Authority is required to recommend a revenue stream that allows SunWater to recover prudent and efficient expenditure on the renewal and rehabilitation of existing assets through a renewals annuity.

The Ministerial Direction also requires the Authority to have regard to the level of service provided by SunWater to its customers.

Previous Review

In 2000-06 and 2006-11, a renewals annuity approach was used to fund asset replacement for SunWater WSSs.

As discussed in Volume 1, the renewals annuity for each WSS was developed in accordance with the Standing Committee for Agriculture and Resource Management (SCARM) Guidelines (Ernst & Young, 1997) and was based on two key components:

(a) a detailed asset management plan, based on asset condition, that defined the timing and magnitude of renewals expenditure; and

(b) an asset restoration reserve (ARR) to manage the balance of the unspent (or overspent) renewals annuity (including interest).

The determination of the renewals annuity was then based on the present value of the proposed renewals expenditure minus the ARR balance.

The allocation of the renewals annuity between users of different priority was based on water pricing conversion factors (WPCFs).

Issues

In general, a renewals annuity seeks to provide funds to meet renewals expenditure necessary to maintain the service capacity of infrastructure assets through a series of even charges. SunWater's renewals expenditure and ARR balances include direct, indirect and overhead costs (unless otherwise specified).

The key issues for the 2012-17 regulatory period are:

(a) the establishment of the opening ARR balance (at 1 July 2012), which requires:

  (i) an assessment of whether renewals expenditure in 2007-11 was prudent and efficient. This affects the opening ARR balance for the 2012-17 regulatory period; and

  (ii) the extension of the opening ARR balance (calculated for 1 July 2011) to 1 July 2012 to account for the adjusted timelines specified in the amended Ministerial Direction;

(b) the prudence and efficiency of SunWater's forecast renewals expenditure;

(c) the methodology for apportioning bulk and distribution renewals between medium and high priority WAEs; and

(d) the methodology to calculate the renewals annuity.

The Authority's general approach to addressing these issues is outlined in Volume 1.

The Authority notes that SunWater has estimated that it has under management about 50,000 assets relevant to irrigators and, given this number of assets, has developed an asset planning methodology designed to cost-effectively identify assets requiring renewal or refurbishment.

Some of the assets were renewed during the 2006-11 price paths. Others are eligible for renewal over the 2012-17 regulatory period. Depending on their asset life, some are renewed several times during the Authority's recommended 20-year planning period.

It was therefore not practicable within the timeframe for the review, nor desirable given the potential costs, to assess the prudence and efficiency of every individual asset.

The Authority initially relied on its four principal scheme consultants – Arup, Aurecon, GHD and Halcrow – to identify and comment upon SunWater's renewals expenditure items. However, the Authority's four consultants expressed concerns about the lack of timely information relating to the past and proposed expenditures at the time of their reviews.

Subsequently, the Authority liaised directly with SunWater to obtain further information, and commissioned Sinclair Knight Merz (SKM) to address material expenditure items (that is, those renewals items which represented more than 5% of the present value of forecast expenditure) and/or those of particular concern (usually in response to customers' submissions). Across all schemes, a total of 36 past and forecast renewals items were reviewed by SKM in the Draft Report.

An additional six past renewals items across the schemes were reviewed for the Final Report, bringing the total proportion of past items reviewed to 34% by value (up from 29% in the Draft Report). A further 14 forecast renewals items were reviewed, increasing the proportion reviewed to 29% (up from 13% in the Draft Report).

The size of the sample is sufficiently large to determine and apply separate cost savings to past (and forecast) non-sampled items.

The Authority's assessment of the prudence and efficiency of proposed renewals expenditures therefore draws upon the contributions of all of these sources as detailed below.

4.2 SunWater's Opening ARR Balance (1 July 2006)

The 2006-11 price path was based on the scheme's opening ARR balance at 1 July 2006.

SunWater submitted that the opening balance for the Pioneer River WSS was negative $247,000.

In Volume 1, the Authority noted that the opening ARR balance at 1 July 2006 is not subject to review for the 2012-17 regulatory period.

The Draft Report opening balance of negative $247,000 remains unchanged for the Final Report.

4.3 Past Renewals Expenditure

Draft Report

As noted in Volume 1, the Authority reviewed the prudency and efficiency of selected renewals expenditures over the 2006-11 price paths. The Authority also sought to compare the original expenditure forecasts underlying the 2006-11 price paths with actual expenditure, to establish the accuracy of SunWater's forecasts.

Submissions

SunWater

SunWater (2011) submitted actual renewals expenditure for the Pioneer River WSS for 2006-11 (Table 4.1). This expenditure included indirect and overhead costs which are subject to a separate review by the Authority (see Chapter 5 – Operating Costs). SunWater advised that it was unable to provide the forecast renewals expenditure (approved for the 2005-06 review) for this period.

These estimates reflect SunWater's most recent information (including that received by the Authority in September 2011 relating to renewals expenditure) and differ from SunWater's NSP.

Table 4.1: Past Renewals Expenditure 2006-11 (Real $'000)

	2006-07	*2007-08*	*2008-09*	*2009-10*	*2010-11*
Renewals Expenditure	197	696	846	2,235	789

Note: The estimates reflect the most recent information provided by SunWater to the Authority in September 2011.
Source: SunWater (2011an).

Other Stakeholders

PVWater (2011a) submitted that the renewals annuity spend for 2006-11 ($6,939,000) is very large and full details are required to ensure that the expenditure is for renewal of assets and not for works more appropriately classed as maintenance.

PVWater (2011a) noted that there is no discussion in the NSP on the fabri-dams on Mirani and Dumbleton Weirs which have been deflated since 2008 but had previously been identified as being in a very poor state. PVWater accept that any final decision on this matter is subject to the outcomes of the Bedford Weir investigation, however, the matter should be mentioned in the NSP.

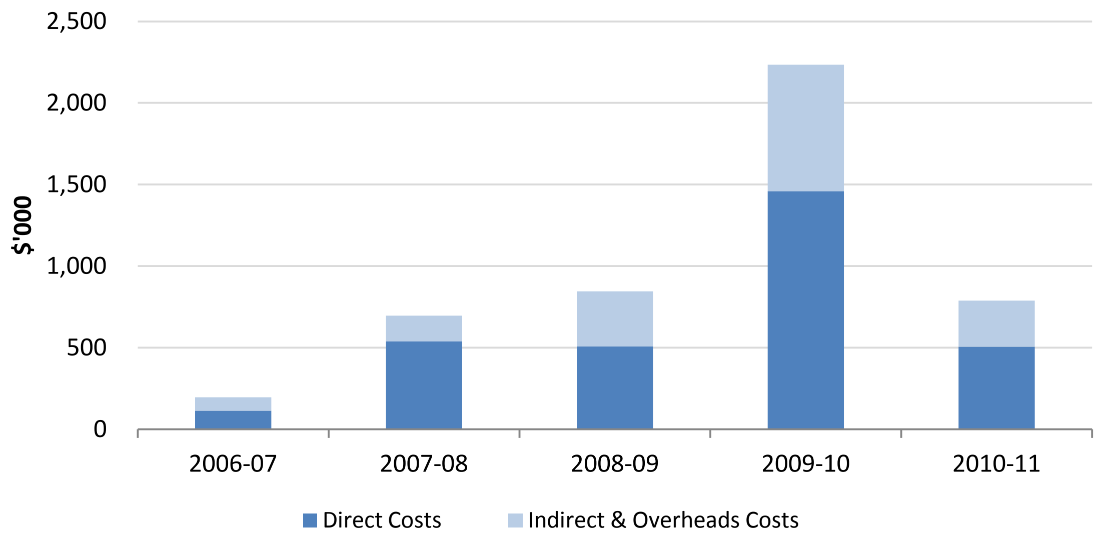
PVWater (2011b) also submitted that overspends have been noted and all expenditures must be quantified and fully investigated especially to ascertain what amount of interest has accrued on the negative account balance. The additional renewals works listed must also be quantified particularly to determine if insurances have covered flood damage.

Authority's Analysis

Total Renewals Expenditure

The total renewals expenditure over 2006-11 is detailed in Figure 4.1. Indirect and overhead costs are addressed in the following chapter.

Figure 4.1: Past (Actual) Renewals Expenditure 2006-11 (Real $)



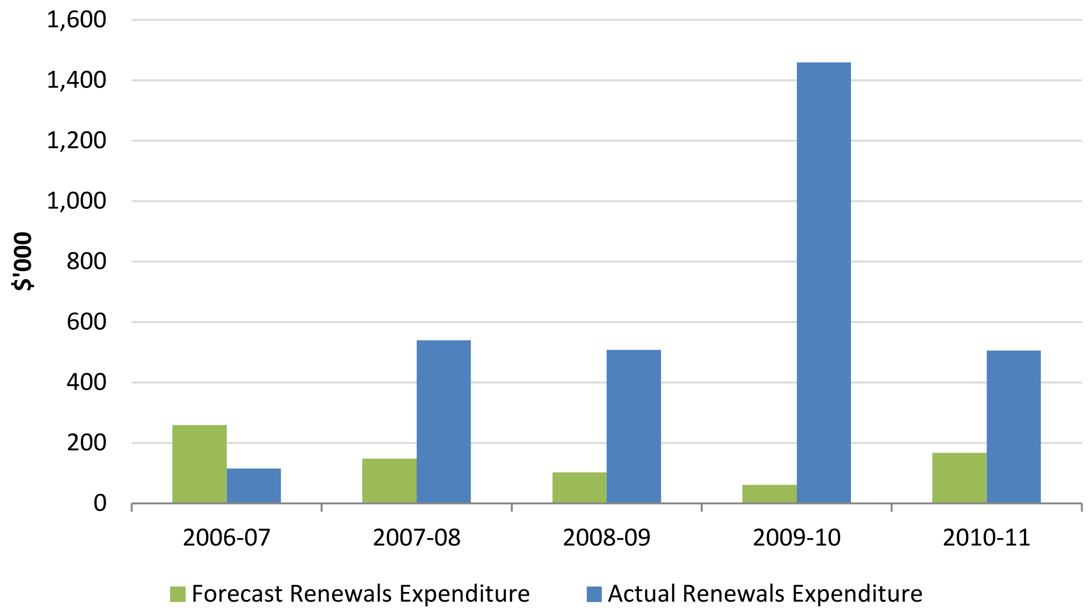
Note: The estimates reflect the most recent information provided by SunWater to the Authority in September 2011.
Source: Indec (2011d).

<u>Comparison of Forecast and Actual Costs</u>

The Authority was able to source details of forecast direct renewals expenditure from Indec, who undertook the analysis for the 2005-06 review.

A comparison of forecast and actual direct renewals expenditure in the Pioneer River WSS for 2006-11 is shown in Figure 4.2.

Figure 4.2: Direct Renewals Expenditure 2006-11 (Real $)



Note: The estimates reflect the most recent information provided by SunWater to the Authority in September 2011.
Source: Forecast (Indec, 2011d) and Actuals (SunWater, 2011k).

Actual renewals expenditure was $2,389,474 (direct costs) above that forecast over the period, which can partly be attributed to $123,475 (nominal) of unplanned expenditure on flood damage repairs in 2007-08.

Review of Past Renewal Items

Arup was appointed to review the prudence and efficiency of past renewals expenditure items. In the absence of forecast renewals expenditure for 2006-11 from SunWater (at the time of Arup's review), Arup sought to identify variances between annually budgeted and actual expenditure for certain projects.

As SunWater's NSP does not provide this information, Arup's list of selected past renewals expenditure items is provided below for the information of stakeholders (Table 4.2).

Arup noted that a significant component of the past renewals expenditure relates to the enlargement of outlet works at Marian Weir, which is due to ROP requirements. However, Arup advised that they were not provided with details as to the reason for these works, nor if they were undertaken in response to the Pioneer Valley ROP (2005) or the Amended Pioneer Valley ROP from 2007. If the latter, Arup noted that they would not have been identified in 2006.

Table 4.2: Historical Renewals Expenditure – Selected Items

Item	*Year*	*Budget*	*Actual*
Flood Damage Repair	2007-08	$123,475	$123,475
Marian Weir – Enlarge outlet works (Stage 2)	2007-08	$100,000	$73,246
Marian Weir – Enlarge outlet works (Stage 2)	2008-09	$306,000	$194,015
Marian Weir – Enlarge outlet works (Stage 2)	2009-10	$2,270,000	$1,658,482
Marian Weir – Enlarge Outlet Works(Stage 2)	2010-11	$2,168,634	$159,180
Palmtree Creek Pipeline – Replace regulating valve RV01	2007-08	$451,351	$470,992
Palmtree Creek Pipeline – Replace regulating valve RV01	2008-09	$38,000	$350,509
Palmtree Creek Pipeline – Replace regulating valve RV01	2009-10	$321,113	$321,113
Teemburra Dam – Repair dam wall upstream face concrete	2009-10	$61,367	$61,367
Teemburra Dam – Conduct 5-Year dam safety inspection	2010-11	$122,610	$121,587

Note: Costs include indirect and overhead costs. Source: Arup (2011).

The following items were assessed by Arup. Further detailed assessments of the Palm Tree Creek Pipeline and Marian Weir were undertaken by SKM.

Item 1: Palm Tree Creek Pipeline – replacement of regulating valve (2007-10)

Draft Report

This item involved the replacement of the Palm Tree Creek Pipeline regulating valve, which was scheduled to take place over the period 2007-10. Water from Saddle Dam No 2 enters a two km long, 1,200mm pipeline which discharges into Palm Tree Creek some 186 m below the dam. SunWater spent a total of $1,142,614 (direct and indirect costs) over 2007-10.

Stakeholders' Submissions

PVWater (2011a) and MIS (2010) submitted that the variable discharge cone valve failed some three years after the dam was completed and a further cone valve has also failed. They sought clarification on how SunWater is funding the repair attempts and of the eventual rectification of the matter. They submitted that funding of this work from the scheme's renewals fund is not appropriate as it is rectification of the failure of very new infrastructure having been initially installed in 1996.

PVWater (2011b) submitted that the Palm Tree Creek Regulating Valve was installed new in 1996 and first failed in 2000 and attempts to rectify have been ongoing since then (not 2008).

CANEGROWERS (2011c) submitted that all costs associated with the Palm Tree Creek valve should be worn by SunWater since the failures were a result of inadequate design, wrong valve selection and/or faulty valves.

Arup's Review

Arup noted that the actual expenditure has exceeded the original board approved budget for this item in 2007-08 and 2009-10.

Arup advised that SunWater has undertaken an options study to understand the best way to solve the issue and have shortlisted a range of options to be investigated further. SunWater provided Arup with costings for the various options.

Arup noted that a waterhammer analysis has been undertaken for this item. However, this does not cover all the options. Arup considered that SunWater should have undertaken the appropriate waterhammer modelling for each of the shortlisted options.

Arup noted that SunWater commissioned a peer review of the work it has so far undertaken, including an independent review of the options proposed by SunWater. Specifically, Glen Hobbs and Associates were engaged by SunWater in May 2010 to review the various control valve options and comment on whether SunWater's selected option of a globe valve was an acceptable one. Glen Hobbs and Associates further commissioned two experts to provide comment, and subsequently found that the options proposed by SunWater were not viable including the globe valve option and instead suggested three options ranging from $0.3 million to $1.3 million in cost.

Arup advised that on the basis of the information provided it is not clear which option is being taken forward and what the justification is behind the choice.

Arup considered that the highly technical nature of the problem and history of issues indicates that there is a risk that further costs will be incurred in the next price path. SunWater has undertaken a risk assessment in relation to the project and a rating of high has been given to the risk of project cost escalation above budget. The proposed mitigation strategy is to secure cost and time estimates from potential contractors in developing budget. It is likely that contractors will identify this as a risk and therefore build contingencies into their budgets to mitigate.

Arup noted that while SunWater is operating in a prudent manner to develop a viable solution, the highly complex technical nature of the problem suggest that the financial risk to SunWater, and therefore the irrigators, is high.

Arup did not provide a conclusion on the prudence or efficiency of this renewals item.

SKM's Review

SKM specifically commented on the prudency and efficiency of the costs associated with the selection and installation of an AVK/Glenfield valve. This valve has since been replaced as it failed to solve the operational problems.

(a) Available Information

SKM reviewed SunWater's Systems, Applications and Products (SAP) Works Management System (WMS), and asset condition and risk assessment policy and procedures.

In addition, the following information was available for this review:

(a) Tender Document Contract No: 07SW3468 Volume No 2 of 3 Volumes (SunWater, April 2007);

(b) Palm Tree Creek Valve Purchase Plan (SunWater, 03/04/2007);

(c) Tender Report and Recommendation for Contract No. 07SW3468 (SunWater, undated);

(d) Palm Tree Creek Valve Tender Acceptance Letter (SunWater, 08/06/2008);

(e) Meeting of Executive Management Committee – minutes for meetings held on the 03/11/2009, 06/04/2010, 09/03/2010, 23/09/2010, 24/11/2010, 24/03/2011;

(f) Briefing Note for Approval (SunWater, 07/12/2009);

(g) Palm Tree Creek Study: Options for Remedial Work on Pipeline (SunWater, undated);

(h) Peer Review of Waterhammer Analysis of the Palm Tree Creek Pipeline System for SunWater, Queensland (Adelaide Research and Innovation Pty Ltd, May 2010);

(i) Palm Tree Creek Pipeline: Provision of a Peer Review of the Valve and System Selection (Glen Hobbs and Associates, August 2010);

(j) Briefing Note for Information (SunWater, 15/10/2010);

(k) Palm Tree Creek Risk Assessment (SunWater, April 2011);

(l) Record of Consultation – Consultation with PVCW, 02/06/2011;

(m) Project Scope Definition: Palm Tree Creek Outlet Works (SunWater, undated); and

(n) Minutes of Palm Tree Creek Outlet Works Projects – minutes for meetings held on the 07/04/2011, 21/04/2011, 12/05/2011, 19/05/2011, 27/05/2011, 10/06/2011, 17/06/2011, 22/07/2011 recorded by G Kelly.

(b) Prudency Review

A brief history of the project is presented below:

(a) 1996 – GE Energy (then Kvaerner Energy) supplied the original valve as part of the Teemburra Dam Project. The valve failed to meet maximum flow requirements and was modified in situ and later in a workshop. Following modifications, excessive vibrations were noted;

(b) 2001 – following failure of the value sleeve (attributed to fatigue) two temporary fixed ‘pepper pot’ dissipaters were fabricated and installed (only one is used at a time, selection being dependent on the selected flow rate of 100 or 150 ML/day);

(c) September 2003 – the GE Energy valve was repaired and reinstalled. After running for a period of time, a crack was discovered in the inner sleeve connection and the pepper pot was reinstalled. Later documentation states that the valve was in place for five weeks prior to the defect being identified. The 2007 Purchase Plan states that the re-installed modified valve was commissioned in September 2003 and no defects were detected until 15 months later (three months after the defects liability period);

(d) April 2007 – SunWater issues a Purchase Plan. Within the plan, SunWater recommended approaching AVK/Glenfield for the supply of a replacement valve (the subject of this review);

(e) April 2007 – SunWater issues a tender document for the manufacture, design, supply, delivery and joint commissioning of a submerged vertical regulator valve;

(f) June 2007 – SunWater issues the Tender Report and Recommendation for Contract No. 07SW3468 recommending that the tender from AVK is accepted;

(g) May 2007 – SunWater awards the contract for the manufacture, design, supply, delivery and joint commissioning of submerged vertical regulator valve to AVK;

(h) March 2008 – an AVK/Glenfield valve was designed and manufactured to replace the GE Energy Valve with two pressure discs (these are purposely designed weak elements to relive high pressure). One pressure disc burst during initial filling of the outlet;

(i) April 2008 – there was a failure of the bronze ported body of the AVK/Glenfield value. According to Palm Tree Creek Pipeline: Provision of a Peer Review of the Valve and System Selection (Glen Hobbs and Associates, August 2010) the “cause of the failure has never been fully resolved and agreed between SunWater and AVK…SunWater attributes the failure to casting defects combined with high stresses in the body. AVK considers the failure is a result of pressure surge in the pipeline”;

(j) November 2008 – the outer sleeve of the valve was replaced with high tensile aluminium bronze, however, during re-commissioning the pressure discs failed again. The discs were replaced and subsequently failed a second time. According to the Palm Tree Creek Study: Options for Remedial Work on Pipeline (SunWater) “the bursting discs were found to be unacceptably closely rated to pressures at the valve and would fail because of repeated cycling of surge conditions during normal stable operating conditions”;

(k) 2009 – the AVK/Glenfield valve was removed and the pepper-pot reinstalled with no internals. The flow is regulated by opening and closing the guard valve, a 900mm butterfly valve, which was not specifically designed for this operation. It is understood that this is the current operating condition;

(l) unknown date – the report: Palm Tree Pipeline Dissipater Value – Waterhammer investigations of alternatives to Rupture Discs was prepared by SunWater. This report has not been provided for this investigation;

(m) unknown date – the report: Palm Tree Creek Study: Options for Remedial Work on Pipeline prepared by SunWater (James Harrap). This investigation identified 14 possible options and associated costs. Three options were short listed for further investigation. The costs for these options ranged from $364,603 to $575,315;

(n) unknown date – the report: Options for Redesign of Pipeline Outlet was prepared by SunWater (James Harrap) – Whilst not provided for this investigation, it is understood that the recommended option from this report was the installation of a 600 mm Singer anti-cavitation globe valve and a parallel 350mm branch line with three orifice plates;

(o) May 2010 – the report: Peer Review of Waterhammer Analysis of the Palm Tree Creek Pipeline System for SunWater, Queensland was prepared by Adelaide Research and Innovation Pty Ltd. The report recommendations include that the AVK/Glenfield valve be abandoned and replaced with a more suitable valve and that an alternative option be considered to the preferred option (600 mm Singer valve and a 300 mm Signer valve in parallel with an upstream strainer). No estimated costs were produced as part of this report;

(p) August 2010 – the report: Palm Tree Creek Pipeline: Provision of a Peer Review of the Valve and System Selection was prepared by Glen Hobbs and Associates. The report recommendations include that there are a number of viable valve solutions available, with the most cost effective solution being the retention of the pepper pot device and the installation of an extra isolation valve (however this option only provides limited flow control, with a manual change in the pepper pot required to change flow conditions). The estimated cost for this option is $330,000 with an estimated $4,000 a year for twice-yearly flow control. It was also recommended to review the operation of the 900 mm butterfly valve;

(q) April 2011 – the report: Palm Tree Creek Risk Assessment was prepared by SunWater. The report recommendations include that the actuator on the 900mm butterfly valve be upgraded for limited short term use only for a nominal period of 12 months (estimated cost $15,000), that a trash screen’s spacing is reduced to prevent large debris entering the system (estimated cost $5,000) and that crack detection and fatigue analysis is undertaken at the dissipation chamber (estimated cost $18,000). This report also recommended that further consideration be given to the Tanalo system supplying PVWater; and

(r) unknown date – the report: Project Scope Definition: Palm Tree Creek Outlet Works, prepared by SunWater. This document outlines the following proposed works for the system including: the replacement of the 900 mm guard valve with a new butterfly valve, the replacement of the pepper pot with a ported body, with the ability to have ports manually closed off to create a variety of flows, the modification of existing pipework to allow for the new valve and the fitting of water hammer mitigation devices. The cost estimate for these works is $769,950. This document provides a program, showing completion of the works due in June 2012. This document is supported by a series of design meeting minutes (latest dated 22 July 2011) which provide updates on the design of the major items.

SunWater has undertaken two condition assessments. In 2001, the first condition assessment was undertaken. The notes from this assessment stated that the valve was under repair during inspection. Excessive vibration was a concern and modification was underway. The maximum score for the asset was one. SKM suggested that as the valve was under repair at the time of the condition assessment, a high score would be expected against ‘Valve operation’, rather than a score of ‘N/A’.

In 2006, a second condition assessment was undertaken. This was in line with SunWater’s policy of a minimum recommended assessment frequency for valves as five years. In the 2006 condition assessment, it was noted “Regulator valve and vanes have failed in service, unable to repair, must be replaced”. The score for the asset was 6, with both categories of ‘Operation’ and ‘Function’ receiving maximum scores of 6.

The recorded condition assessments support the project history as recorded above, and support the replacement of the AVK/Glenfield valve.

SunWater undertook a risk assessment of the valve in February 2009. The identified risk was “Failure to control release from dam”. The assessment resulted in a low risk for all three asset/business risks.

No WHS or environmental risks have been recorded for this asset.

Based on SKM’s review of the data in SAP, SKM considered that SunWater has followed the policies and procedures that it has in place.

SKM focused on the costs incurred between 2007-08 and 2009-10 associated with the installation of the AVK/Glenfield valve, which failed to solve the operational problems. No comments are provided regarding the selection of the initial GE Energy valve or the solution currently under development.

SKM agreed that the replacement or modification of the GE Energy valve was required. The failure of the original GE Energy valve resulted in reliance on a flow control system that results in an abrupt stop in pipeline flow. This could lead to water hammer and pipeline bursts. SKM noted that the modified GE Energy valve failed after the defects liability period had expired (in late 2004). As the valve was out of warranty the manufacturer refused to take responsibility for the failure of the valve and, as such, a new valve was required.

SKM noted that following the repeated failure of the GE Energy valve, the temporary pepper pot arrangement was reinstalled. The Palm Tree Creek Pipeline: Provision of a Peer Review of the Valve and System Selection (Glen Hobbs and Associates, 2010) noted that the temporary pepper pot arrangement satisfactorily dissipates energy and that the resulting vibration is considered acceptable by SunWater operations. However, the continued use of the fixed pepper pot arrangement was an unacceptable long term solution due to the flow control limitations.

The selection of the AVK/Glenfield Valve is recorded in the 2007 Purchase Plan. Within the 2007 Purchase Plan, the options for valve suppliers were investigated. Three options are summarised, including GE Energy, AVK/Glenfield and an Italian valve (not named further). GE Energy was excluded as having “neither the capacity nor inclination to provide a suitable valve”. The Italian valve was assessed as “performance not known with limited technical details available”. Comments on the AVK/Glenfield included “the firm has supplied a proven valve with the same duty as the Palm Tree Creek Valve…the GM of Engineering Services has visited the site and confirmed that the valve is suitable”.

The 2007 Purchase Plan reviewed two procurement options: directly approaching a single supplier and calling for open tenders. The recommended option was to approach a single supplier. The reasons for adopting this solution included that it was a proven product, that the scope of work and specification can be developed jointly. The weaknesses of the open tender process were identified as longer delivery times and possibly costs, risk of failure in service not anticipated in testing and the potential need for a two stage process to select preferred tender and then jointly develop a suitable configuration for the site.

SKM noted that the objectives of the Purchase Plan align well with best practice, including achieving value for money, secure delivery within the stated timeframe and budget, and ensure probity and accountability for outcomes. SKM also acknowledged that due to previous problems with the GE Energy valve, SunWater was very keen to use a proven product. However, SKM considered that by not approaching an open market, albeit after a preliminary vetting of suppliers, SunWater did not thoroughly explore all of the possible options for design and supply of a suitable valve.

Tender documentation was provided by SunWater, including a specification for the new valve. It is not known whether this specification was developed jointly with AVK/Glenfield as intended in the Purchase Plan. The specification for the new valve provides details of design pressure (head) and surge pressures on the valve. Based on conversations with SunWater, SKM observed that the water hammer results were calculated using available technology. A peer review of the water hammer modelling software (SURGE, 2008) used by SunWater (Peer Review of Waterhammer Analysis of the Palm Tree Creek Pipeline System for SunWater, Queensland, Adelaide Research and Innovation Pty Ltd, 2010) recommended that SunWater should replace the computer package with an alternative water hammer modelling software due to concerns with the graphics capability of representing the hydraulic grade line along the pipeline, and the results for column separation and for calculated velocities.

SKM recognised that water hammer modelling is complicated and that software packages are frequently updated and have varying levels of sophistication. SKM considered that SunWater's approach for developing the specification using the software available was reasonable.

In April 2007, there was a failure of the bronze ported body of the AVK/Glenfield value. It is understood that the AVK/Glenfield replaced the outer sleeve at no additional cost. Following the continual failures of the pressure discs, the AVK/Glenfield valve was replaced. Calculations subsequently carried out on the valve show that the velocities generated by the ports are very high (Glen Hobbs and Associates, 2010) and will generate high turbulence leading to vibration. The Glen Hobbs and Associates peer review concluded that the AVK/Glenfield value was not suitable for this application in its present form and SunWater was correct to remove it.

The preferred option for cost recovery was identified as "returning the valve to the supplier as being unfit for purpose". However, AVK/Glenfield indicated that the initial information provided on water hammer was insufficient. SKM indicated that SunWater is unable to obtain a refund for this valve from AVK/Glenfield.

Following failure of the valve, the temporary arrangement was reinstated and a further three investigations were undertaken:

(a) options assessment;

(b) peer review of water hammer analysis; and

(c) peer review of the valve and system selection.

SKM agreed that there was a need to undertake these actions.

In relation to prudency, SKM concluded that:

(a) it was prudent to replace the original GE Valve. The valve had failed and a temporary solution did not provide the flow control required;

(b) the selected procurement strategy was to contact only one valve supplier. SKM believed this did not thoroughly explore all of the options for this site;

(c) SunWater developed a specification for the valve using the software they had available at the time. SKM considered that this approach was reasonable;

(d) following the failure of the valve SunWater investigated options for obtaining a refund from AVK/Glenfield. SKM believed that this approach was reasonable, although are unable to confirm whether more could have been done to follow through with this action; and

(e) following failure of the valve, SunWater reinstated the temporary arrangement and undertook investigations, including peer reviews. SKM agreed that there was a need to undertake these actions. The lessons learnt as documented in the Executive Management Committee minutes highlighted the need for suitable peer review and both peer reviews undertaken support the removal of the valve.

Consistent with SunWater's own assessment, SKM recommended that, in future:

(a) comprehensive design reviews are undertaken to ensure the design is robust and fit for purpose;

(b) the specifications are clear and adequate, including peer review where necessary; and

(c) inclusion of a performance clause within the contract ensuring that fitness for purpose risk is transferred to the equipment supplier.

SKM considered that had these good practice measures been implemented at the commencement of the valve replacement project, some of the costs incurred by SunWater may have been avoided.

(c) Efficiency Evaluation

Based on the provided documentation, SKM found that that approximately $1,875,000 has been spent to date since 2000-01 on the two valves plus additional work. The costs to date are shown in Table 4.3.

Table 4.3: Expenditure on Outlet Valves

Work	***Cost***
Corrective work to the (GE Energy) Kvaerner valve and installation	$572,000
Investigation leading to the purchase of the Glenfield Valve	$159,000
Purchase/installation/commissioning of the Glenfield Valve	$337,000
Water hammer and options investigations to replace the Glenfield Valve	$569,000
Peer review and associated costs	$238,000
Total	**$1,875,000**

Source: SKM (2011).

SKM noted that information provided by SunWater stated that, as at 15 September 2011, only $1.52 million had been spent. SKM understood that this is an error and that some initial costs associated with the corrective work to the GE Energy valve and installation, were not captured within the earlier documents.

SKM compared the costs presented in Table 4.3 to the costs within SunWater's SAP. However, only SAP cost data from 6 February 2007 to 17 September 2010 was available. Therefore, SKM was not able to confirm the costs for the initial stage of work relating to the corrective work to the GE Energy valve and installation [which occurred prior to 6 February 2007]. As such the costs associated with the GE Energy valve were not considered by SKM. However, SKM advised that these costs ($572,000) were likely to have been incurred prior to the 2006-11 regulatory period.

Aside from the initial correct work to the GE Energy valve, the total cost recorded by SunWater was $1,303,000. SKM was unable to reconcile that to the total costs in the available SAP data of $1,243,917. SKM noted that the difference may be due to costs incurred prior to February 2007, but this cannot be verified without complete financial records.

Assuming that all costs associated with the AVK/Glenfield Valve investigations is captured with the above costs, the identified cost breakdown [as recorded in the available SAP data] is shown in Table 4.4.

Table 4.4: Palm Tree Creek Outlet Valve – Cost Breakdown – Main Items

Cost Category	*Cost*	*Percentage*
Contractors	$345,979	28%
Overhead	$335,519	27%
Staff costs	$298,048	24%
Indirects	$104,925	8%
Prior Year Expenses	$78,178	6%
Consultants	$30,683	2%
Plant	$17,119	1%
Materials	$17,097	1%
Air Fare	$8,260	1%
Travel	$5,248	0%
Freight	$578	0%
Entertainment	$330	0%

Source: SKM (2011).

The top four costs were contractors, overheads, staff costs and indirect costs.

The majority of the contractor costs were associated with the awarded tender to AVK/Glenfield for the manufacture, design, supply, delivery and joint commissioning of a replacement valve for $299,000. These costs were obtained via a tendering process, although it is noted that it was not a competitive tender, as AVK/Glenfield was the only supplier approached. Given the highly site specific nature of this valve, it is difficult to find comparative benchmarks for this installation.

SKM noted that the costs associated with overheads and indirect costs are high at over a third of the project costs.

It is noted that almost 5000 SunWater man hours have been spent on the project between 2006-07 and 2009-10. SKM considered the number of hours is high for the installation of a valve of this type. SKM recognised that a number of factors have resulted in increased staff costs, including the difficulties experienced by SunWater, including numerous occasions of replacing the valve with the temporary arrangement and reviewing the failure of the valve. These actions were as a direct result of the failure of the valve and therefore outside the control of SunWater.

SKM indicated that while a number of staff hours could have been reduced by improved project management, including developing a more robust specification for the valve and incorporating 'fit for purpose' clauses in the contract, and that the project costs could have been reduced by using an open market tender process, it is difficult to quantify the extent of these cost reductions. As such the following review is highly subjective. Table 4.5 provides SKM's best estimate of the project costs.

SKM considered that some of the costs incurred could have been avoided if a more robust specification of the valve had been developed following more detailed studies as to its requirements, and if there had been a greater risk transfer to the valve manufacturer, putting the onus onto the valve manufacturer to ensure that the valve was fit for purpose and that they satisfied themselves that the data they had on its specification was adequate and correct.

SKM concluded that while the costs are higher than would have been expected for the replacement of a valve of this type, a number of items contributed to these costs that were outside the control of SunWater.

(d) SKM's Summary and Conclusions

SKM concluded that the project is prudent as the need to replace the failed valve has been established. However, the implementation of the project did not follow best practice. The majority of the liability for this falls to the valve manufacturer but some liability is attributable to SunWater.

SKM concluded that some of the project costs could have been avoided by SunWater through:

(a) the development of a more robust specification for the valve and ensuring fit for purpose risk transfer to the manufacturer;

(b) the timely use of specialist support, where strengths and capabilities are lacking in house; and

(c) the use of a competitive tender process for the valve.

SKM provided a subjective estimate of a possible saving of 20-30%.

<u>Authority's Analysis</u>

The Authority noted that a total of $572,000 was identified by SKM as having been incurred prior to 2006-07. This amount is not subject to review by the Authority.

The Authority acknowledged the subjectivity of ex-post analysis of expenditure on the Palm Tree Creek regulating valve. For example, it is difficult to identify the extent of any savings had SunWater adopted different processes for managing contract risk and assessing the options.

The Authority proposed to accept SKM's broad recommendation that savings of up to 30% could have been realised. The Authority recommended that this adjustment be applied to expenditure of $1,303,000 identified as having being incurred since 2006-07. This resulted in an efficient cost of $912,000 or a saving of $391,000.

Table 4.5: Summary of Item Costs

Work	*Cost*	*SKM's Comments*
Corrective work to the (GE Energy) Kvaerner valve and installation	$572,000	Not reviewed by SKM.
Investigation leading to the purchase of the Glenfield Valve	$159,000	Based on the production costs for these initial documents only, the costs appear high by about 40- 50%.
Purchase/installation/ commissioning of the Glenfield Valve	$337,000	The majority of these costs are associated with the contractor costs for the supply and installation of the valve. The costs were obtained from the market but not under market conditions. Within its Purchase Plan, SunWater has acknowledged that not approaching the market results in a risk of higher costs. As such the cost savings achieved through a competitive tender could have been 10-20% of actual.
Water hammer and options investigations to replace the Glenfield Valve	$569,000	These costs are associated with the production of at least three studies, the first on water hammer analysis (*Palm Tree Pipeline Dissipater Value – Water hammer investigations of alternatives to Rupture Discs* was not been provided for this investigation) and two following options studies. Regarding the water hammer analysis, the later peer review identifies that "*a very detailed SURGE 2008 model of the entire Palm Tree Creek pipeline system and piles supplying the PVWater irrigation area was developed by SunWater. In my opinion too much detail has been included and the model could be simplified by including longer reaches of the same diameter pipeline*". This suggests that at least some of the initial water hammer analysis pipeline was inefficient. The first of the options studies was provided for this review. Within this report, 14 options were identified. It should be noted that of the three short listed options, following peer review, none of these are being progressed as the current design. This suggests that the time spent on this activity may have been inefficient. It is suggested that a more efficient approach to the options investigation would have been to approach the market to find suitably qualified consultants to undertake a comprehensive review of the scenario and design of a new valve. As such, SKM considered the cost savings achieved through a competitive tender of the water hammer analysis and concept design of the solution could be in the region of 25-35%.
Peer review and associated costs	$238,000	SKM was only been able to determine the direct costs of one of the peer review reports as follows: Adelaide Research and Innovation $28,068. The costs associated with the Glen Hobbs and Associates Report cannot be easily distinguished (apart for some minor costs associated with a meeting). No information has been provided on whether these reports were undertaken following a competitive tender for this work. There may have been opportunities to undertake both reviews under a single contact, thus reducing any double up on work (it is noted that both reports provide an opinion on the developed solutions). SKM considered that the cost savings potentially achieved through improved project management and competitive tendering could be in the region of 10-20%.
Total	**$1,875,000**	**Based on the above cost estimate, the overall costs could be reduced by 20 to 30%**

Source: SKM (2011).

Submissions Received from Stakeholders on the Draft Report

SunWater (2011as) noted that SKM identified cost savings of 20 to 30% but the Authority reduced the cost by 40%. SunWater proposed that the 20% reduction should be adopted.

PVWater (2011e) noted the comprehensive overview of the saga of the Palm Tree Creek outlet valve but contended that both the consultants and the Authority have been very generous in their assessment of SunWater's prudency in their attempts to rectify the valve which failed in 2001 during the first period of extended releases from the newly completed Teemburra Dam.

PVWater noted particularly the report "Palm Tree Creek Pipeline: Provision of Peer Review of the Valve and System Selection (Glen Hobbs and Associates, August 2010)". This report examines the matter of jet velocity from the Glenfield Valve in the dissipater pit and raises the matter of excessive turbulence and hence vibration of the valve and pipework in the pit.

The report states 'The jet velocity at the wall (of the dissipater pit) of 20 m/sec is a very high velocity that will generate high turbulence leading to vibration'. In their conclusions the report states 'the Glenfield valve in its present form is not suitable as an end of line discharge valve to meet the operational requirements of the Palm Tree Creek pipeline. SunWater took the correct action in removing the valve from the pipeline…..'.

PVWater submitted that the report also indicates that the jet velocity for the pepperpot arrangement presently in place is only 5.6 m/sec which is within the range of low velocity and generates lower turbulence that will not generate vibration.

PVWater submitted that in view of the concerns raised in both the Glen Hobbs and Associates review and by the Authority's consultants over high jet velocities and subsequent turbulence and vibration this aspect should be considered in much more detail than appears to have occurred.

PVWater suggested that there are serious doubts as to the adequacy of the design of the valve for the Palm Tree Creek installation. This is particularly relevant as failure of the discs occurred immediately following installation of the valve and it would be expected that the pressure surges associated with the Glenfield valve would have been thoroughly investigated as part of valve selection.

PVWater submitted that the major component of costs associated with investigation and installation of the Glenfield valve should be excluded from past renewals and not just that deemed by the Authority's consultants to be due to an inadequate procurement process.

In a subsequent submission, PVWater (2012) submitted that the Authority was exceedingly generous in allowing $912,000 of past expenditure on the valve. Following the failure of the first valve (GE Energy/Kvaerner) through excessive turbulence and vibration in the discharge chamber, a very similar valve (AVK/Glenfield) was then installed and suffered a similar fate. PVWater submitted that it would have been prudent to have designed a replacement in full knowledge of the high velocities and vibration. A lack of prudency is evident in two valves failing for the same reason under circumstances that existed for the initial design of the system.

Authority's Response to Submissions Received on the Draft Report

In response to SunWater's comment, the Authority notes that, for the Draft Report, it adopted a 30% reduction in costs as the upper range identified by SKM, not 40% as suggested by SunWater. In addition, the Authority did not make any adjustments to expenditure prior to 2006-07, as this was outside of the scope of the investigation.

In regard to comments from PVWater, the Authority notes SKM's analysis took into account the fact that SunWater made two attempts to resolve the problem, without success at the time of the Draft Report. SKM focused on the expenditure related to the AVK/Glenfield valve, and did review the Glen Hobbs and Associates report which investigated the issue of water velocity and the vibration impacts. SKM noted that much of the costs of the project related to the need for temporary arrangements, and that the main areas of potential savings related to procurement, project management and concept design.

The Authority notes that in all, SunWater has incurred $1.875 million in expenditure ($1.303 million since 2006-07) and the Authority identified savings of $0.391 million in the Draft Report.

At the time of the Draft Report, the Authority had not been provided details of any further investment to rectify ongoing problems with the outlet valve. SunWater has now provided this information, and the proposed expenditure of $770,000 has been reviewed by SKM and found to be prudent and efficient (see analysis below).

On the basis of this new information and further analysis, the Authority has revisited its previous recommendations on the past expenditure.

In a competitive market sense, a service provider would be unable to recoup the full costs of every attempt to correct the same problem from its customers. It is unreasonable for customers to bear all the costs of three attempts to resolve one problem.

The Authority therefore considers that SunWater should bear the full cost of the last failed solution, that is, the AVK Glenfield valve. The Authority therefore recommends that the full cost of the works ($1.303 million) be excluded (added back to the renewals reserve). However, as noted below, the Authority accepts the future forecast capex to be prudent and efficient, in expectation that it will provide a final solution.

Item 2: Marian Weir – enlargement of outlet works (2007-11)

Draft Report

The Marian Weir is the oldest weir on the Pioneer and is situated between Mirani and Dumbleton Weirs. Marian Weir has a small outlet to pass water through the weir and at times when there is high demand in the lower reaches of the system, water needs to pass over Marian Weir due to the small outlet.

The Pioneer Valley ROP requires that Marian be lowered below fixed crest at certain times of the year to capture any small flow events that occur. This is not possible with the current outlet capacity. This project is to enlarge the outlet works at Marian Weir for compliance with the ROP.

Marian Weir's current outlet consists of two 450mm diameter ductile iron pipes controlled by downstream gate valves, with a calculated capacity of 121 ML/day. The enlargement of the outlet would enable the delivery of water to meet demands downstream of the weir whilst drawing the weir pool down to enable the Water Allocation Security Objectives (WASOs) to be met.

According to SunWater modification to the outlet is needed to increase the capacity to not less than 500 ML/day with the water storage at 70% to satisfy downstream requirements set by the ROP, which can currently only be met by over topping the weir.

Stakeholders Submissions

PVWater (2010) submitted that SunWater holds some 12,500 ML of High Priority A water allocation in the Pioneer WSS. This supply has been held since Teemburra Dam and Dumbleton Weir Stage 3 were completed in the late 1990s. An alternative to engineering solutions for the above works is for SunWater to surrender part of the reserve allocation to replace supply reliability lost as a result of the two matters above. Detailed hydrological analysis would be required to ascertain volume etc required to implement this option. This could then be compared with the engineering costs for the SunWater solutions.

Arup's Findings

Arup noted that detailed design and procurement for the project was completed in September 2009 and work commenced on site in early October 2009.

SunWater advised Arup that the work on site was managed by SunWater through a combination of direct works and specialised contracts.

Arup noted that the 2011 SunWater Board Report states that the following works have been completed:

(a) construction of the control building and permanent access road;

(b) all off-site work for the supply of the electro hydraulic equipment for the fixed wheel gate operation;

(c) supply of principal supply metal work; and

(d) construction of temporary downstream access and work platform, however it is expected that the section in the river has been eroded by the river floods early this year.

The SunWater Board Report further stated that the contractor constructing the temporary upstream coffer dam had commenced construction of a sheet piled coffer dam. Work was stopped for the 2009-10 wet season.

Work recommenced in early June 2010, however an incident with the construction of the coffer dam in late June 2010 resulted in the site being effectively closed by Workplace Health and Safety Queensland (WHSQ). There has been no further construction work on site. The selected option for progressing the works is an AS2124 contract with the Contractor being appointed as Principal Contractor and being responsible for the completion of all remaining works apart from the electro hydraulics.

This includes the investigation and design of coffer dams, obtaining approvals and permits, providing access and construction of the new outlet and associated works. Arup noted that SunWater intended to tender a provisional lump sum price for the coffer dams and work platforms and to negotiate a final risk adjusted lump sum amount on an open book basis. SunWater indicated that it planned to go to the market for commissioning of a contractor in the third quarter of 2011.

Arup noted that the current expenditure to date on the project is $2.838 million, of which $1.01 million is for expenditure on legal and incident related costs from the June 2010 incident. Therefore, the original budget for this project will no longer be relevant. While Arup understood the broad circumstances, details were not apparent. The total cost was identified as $4.844 million.

Arup advised that they would like to understand whether some legal and incident related costs can be recouped through insurances held by the contractor if they are seen to be liable for the incident. Further, it is not possible to comment on whether the mode of operation originally adopted by SunWater (i.e. part self-management and part going to contractors) can be considered an efficient mode of operation and whether this may have in part contributed to the incident of June 2010. The impact to the irrigators here is significant and further explanation to the irrigation community needs to be provided.

Arup did not provide a conclusion on prudence or efficiency.

<u>SKM's Findings</u>

(a) Available Information

SKM reviewed SunWater's SAP-WMS, and asset condition and risk assessment policy and procedures. Information sources included 'Pioneer River Water Supply – Marian Weir – New Outlet Works Project 07PIO02' (including attachments).

(b) Prudency Review

A brief history of the project is presented below:

(a) 1952 – Marian Weir constructed;

(b) 2003 – SunWater's Infrastructure Development Group completed the conceptual investigations into the outlet works upgrade. Documentation associated with this activity was not provided for this review;

(c) 2005 – SunWater's Infrastructure Development Group completed the feasibility investigations into the outlet works upgrade. Documentation associated with this activity was not provided for this review;

(d) June 2005 – revised ROP issued. It is assumed that this version and similar previous versions had a similar requirement for downstream flows as the 2007 version of the ROP provided for this review;

(e) June 2006 – SunWater's Implementation Program states that the "design for the upgrade of the Marian Weir commenced in 2006/07, site works and commissioning planned for 2007/08/09";

(f) July 2006 – letter from DERM to SunWater states that "SunWater needs to ensure that due priority is given to these works and aim for commissioning that is sooner than 2009";

(g) 2008 – based on conversations with SunWater, design was underway at this stage. The original budget for the works was $1.173 million;

(h) September 2009 – the procurement plan for the works is altered due to deferral of the modifications to the Dumbleton Weir. Instead of construction by a single contractor, a mix of contracts and day-works is selected. Eight individual contracts are identified. An updated budget of $2.27 million was approved based on a revised design and construction program;

(i) 24 September 2009 – the contract for the installation of a cofferdam and excavation within a cofferdam was let. These works were due for completion in October 2009;

(j) 30 November 2009 – a stop work order was issued to the contractor installing the cofferdam due to difficulties relating to higher than anticipated rock foundation levels being encountered during the installation of the upstream sheet pile coffer dam. Agreement was reached with the contractor for works to be suspended until after the wet season (December 2009 to April 2010). Some additional works were required to make the site safe for wet season flows, but SunWater stated this was considered to be a more cost effective solution than removal of the partially completed works. At this point completion was scheduled for October 2010, after recommencement in May 2010;

(k) March 2010 – a revised forecast budget of $3.84 million was produced;

(l) June 2010 – a WHS incident occurred which resulted in loss of life. This incident resulted in the suspension of all works on site. This incident is the subject of an ongoing legal investigation; and

(m) September 2011 – SKM was presented with documentation presenting an increase in project costs to $4.85 million. SunWater advised that the actual costs could be higher still, as these revised costs do not include any allowance for additional legal fees resulting from the outcomes of the ongoing investigation. SKM was advised that a revised cost estimate is currently being established and is due to be presented to the board for approval within the next two months.

The driver for this project is the need to meet the conditions set out within Section 83 of the ROP, which states that the demands downstream of the Marian Weir must be satisfied through the outlet works at a level of EL 31.0m. No information has been provided on the current level of the outlet.

In addition, SunWater advised SKM that there is a requirement to provide 500 ML/d during winter months. Based on SKM's review of the ROP, there is no specific requirement for the Marian Weir to provide 500 ML/d during winter months. However, the ROP does provide specifications for the whole system and according to the Design Report (SunWater, April 2010) "the existing outlet capacity of 121 ML/d needs to be increased to not less than 500 ML/d with the weir storage at 70% of capacity to satisfy the Water Resource Plan based on IQQM modelling carried out by Water Services in 2007". Documentation on the modelling carried out in 2007 was not provided for SKM's review.

SKM noted that following the WHS incident the need to undertake the project was reviewed. This reinvestigation included determination of the water demand below Marian Weir, review of water supply arrangements, stream hydrology and model development, including Mirani, Marian and Dumbleton Weirs to verify the supply and demand conditions. SKM was advised that the outcome of the investigation was a recommendation to undertake the construction project as proposed.

SKM noted PVWater's proposal that an alternative to engineering solutions for the above works is for SunWater to surrender part of the reserve allocation to replace the lost supply reliability. PVWater recommend that hydrological modelling is undertaken to ascertain volume etc required to implement this option and determine the impact of leaving Marian Weir as it is, followed by consultation with DERM and stakeholders.

SunWater advised SKM that some modelling has already occurred, including a consideration of the other dams in the system. SKM recommended that the results of this modelling be provided to stakeholders, and that it should include the option proposed by PVWater. SKM was unable to conclude that the no build solution has been investigated and is not feasible.

The options considered for increasing the downstream flow included a siphon over the weir and a 'hole in the wall'. It was concluded that the 'hole in the wall' was the best option given the likelihood of the flood damage to a structure mounted on the weir crest.

The adopted arrangement consists of a rectangular hole cut though the weir, which removes completely the two existing pipes. The width of the outlet is greater than required to avoid the two existing outlet pipes during the concrete cutting operation. The outlet is controlled by a fixed wheel gate operated by a hydraulic ram located in the inlet structure and discharges to the existing weir apron. The inlet structure is an L-shaped reinforced concrete wall positioned to limit silt build up at the outlet. Both water and silt loads were factored by 1.5 for ultimate conditions.

Given the flooding at the site and that similar arrangements have been used at other dams (Bedford and Bingegang Weirs) SKM considered that the adopted arrangement is suitable.

SKM concluded that whilst SunWater has undertaken some works to determine the prudence of this project, these have not been provided for this review, and as such, SKM was unable to conclude that the no build solution has been investigated and is not feasible.

SKM recommended that SunWater produces documentation to establish that the no-build solution has been adequately considered and discussed with all stakeholders, including DERM. If the no-build solution is found not to be feasible through hydraulic modelling or not found to be acceptable by DERM, SKM would conclude that the proposed project is prudent.

(c) Efficiency Evaluation

SKM noted that the costs of this project have escalated over time and have increased from \$1.1 million in 2008 to \$4.8 million currently. This includes \$1.01 million associated with legal and incident costs relating to the WHS incident. In addition, SKM noted that a revised and likely higher cost estimate is currently being established and is due to be presented to SunWater’s Board for approval within the next two months.

SKM noted that the delivery model has changed for this project, from initially a single contract to be awarded combined with works with Dumbleton Weir, to a number of individual contracts. All specialised contracts terminated at the time of the WHS incident. The future works are proposed to be awarded as a single contract. SunWater’s preference is to manage works internally using separate contracts with suppliers as necessary, as this is considered to be a more cost effective method of delivery. The reason for the proposed change in delivery mechanism is due to a lack of suitable internal resources to manage the project.

SKM found that the increase in project costs can be attributed to key reasons:

(a) delays to the project commencement resulted in construction starting late on site, and in combination with an early start to the wet season, resulted in the need to de-establish and then re-establish works on site; and

(b) a fatality on site has caused further delay to the works and also resulted in unforseen legal fees.

Table 4.6: WHS Incident Costs

Item	*Cost ($000)*
External Legal Costs	$732
Internal Legal Costs	$152
Other Internal Costs	$128
Total	**$1,012**

Source: SKM (2011).

Nearly 90% of the costs are associated with legal fees, which are the result of the ongoing legal investigation. SKM considered the costs associated with the incident to be outside the control of SunWater and recommend that these costs are re-examined following the outcome of the current investigation.

Delays to the project resulted in construction starting late on-site, and in combination with an early start to the wet season, resulted in the need to de-mobilise and then re-establish works on site. This has had an impact on the project costs. With hindsight, it is likely that SunWater could have delayed the construction works until the following year, to prevent this need to abandon and make safe the cofferdam and the access road. Although there may have been penalties for delaying contracts, this would have resulted in lower project costs.

SKM was provided with the March 2010 Board Report, which provided an update cost forecast, based upon this requirement.

Table 4.7: Summary of Costs ($000)

Item	*Sept 2009 Budget*	*Feb 2010 Forecast*	*Difference*
Project management	$68	$178	$110
Design	$228	$420	$192
Procurement	$35	$124	$89
Construction management and supervision	$215	$371	$156
Access and cofferdam	$600	$865	$265
Demolition	$157	$101	-$56
Construction directs and other	$967	$1,520	$553
Risk	$0	$263	$263
Total	**$2,270**	**$3,842**	**$1,572**

Source: SKM (2011).

SKM had difficulties reconciling the totals within the breakdown (Table 4.7). For example, within the cost breakdown the costs for civil construction management and supervision equate to $606,600, compared to the forecast $371,000.

In relation to specific cost items:

(a) construction directs and other – SunWater advised SKM that additional costs of $553,000 were due to the suspension of the works and an extension of the construction period by one month. It also included additional provision for labour and crane hire for day works. However, the bulk of this budget increase was not realised since the works were not completed. The budget increase was due to re-forecasting of cost to completion in parallel with reprogramming of the remaining work. SKM considered that at least a portion of these costs could have been avoided by delaying the works to the following dry season;

(b) access and cofferdam – SunWater advised SKM that the bulk of the additional budget of $265,000 was allowed for contractual costs related to the deferral of the work over the wet season from December 2009 to May 2010. The costs under this budget which were expended on the contract are shown in Table 4.8 below. The work under Item PV003/002 was not completed.

Table 4.8: Access and Cofferdam Costs

Item	*Description*	*Cost per item ($)*	*Qty*	*Amount ($)*
PV003/001	Option B - Trimming of sheet piles	7,277	100%	7,277
PV003/002	Option B - Reinstatement of trimmed sheet piles in workshop upon removal from site	21,600		0
PV003/003	Option B - Retention cost for piling/bracing (until 1st May 2010)	73,700	100%	73,700
PV003/004	Option B - Weekly retention cost for piling/bracing beyond 1st May 2010	3,350	5	16,750
PV003/005	Option B - Removal/reinstatement of fabric/gravel to hardstand	16,435	100%	16,435
PV003/006	Option B - Reinstatement of access road (if required)	27,500	100%	27,500
PV003/007	Option B - Removal/reinstatement of access road culvert (if required)	2,980	100%	2,980
PV003/008	Delay charges - Cost recovery for employee standby (Commencing 25/11/09 until date of SunWater acceptance of Option A or B)	2,124	7	14,868
PV003/009	Removal/reinstatement of silt curtain	6,400	100%	6,400
PV003/010	Removal of steel from hardstand to compound area	1,495	100%	1,495
PV04	Re-establishment to site in June 2010	18,786	100%	18,786
PV05	Relocate steel from compound to hardstand (included in PV04)	-	-	0
PV06	Replace rock to downstream hardstand	133	441	58,653
PV07	Reinstall fish ladder access platform and access ladder	3,493	100%	3,493
TOTAL				**248,337**

Source: SKM (2011).

SKM considered that the bulk of these cost increases could have been prevented by delaying the start of the construction until the following dry season. In particular, there would have been no need to pay a retention cost for the piling/bracing, as this would have not been installed on site, and there would have been no need to reinstate the access road. As noted above, with this option there are likely to have been cost increases with postponed contracts, although this is likely to be significantly less than the costs of establishing and the de-establishing the site;

(c) design – SKM considered the design costs to be high, particularly as cofferdam was awarded as a D&C contract. Within the March 2010 Board Report, the reason for the increase was the insufficient provision made for design support and documentation during construction. However, SKM noted that within the cost breakdown there are separate allowances for supervision; and

(d) risk – the risk allowance was generated from a costed risk register dated July 2010. The largest risk ($225,000) is associated with difficulties encountered in completing an excavation dam down to a specified level. SKM agreed that this is a large risk and that contingency should be made to cover this risk.

Table 4.9 identifies the costs associated with the construction delays. It is difficult to quantify the exact extent of the impact of the delay. As such the following review is highly subjective.

Table 4.9: Summary of Cost Increases

Item	*Cost increase ($000)*	*Proportion Attributable to delays*	*Cost attributable to delays ($000)*
Project management	$110	100%	$110
Design	$192	0%	$0
Procurement	$89	0%	$0
Construction management and supervision	$156	100%	$156
Access and cofferdam	$265	100%	$265
Demolition	-$56	0%	$0
Construction directs and other	$553	100%	$553
Risk	$263	0%	$0
Total	**$1,572**		**$1,084**

Source: SKM (2011).

In relation to benchmarking, SKM noted that this project is a unique construction project and therefore there are no available similar projects to provide benchmarks.

SKM compared the costs to replace each of the storages within the system (based on replacement costs from SAP) with the volume of water available. Based on these costs it is noted that the cost per ML of storage are higher for this project than for the overall storage system (Table 4.10).

Table 4.10: Comparison with Pioneer River Storages

Dam	*Cost to Replace ($)*	*Storage Volume (ML)*	*Cost ($/ML)*
Teemburra Dam	64,522,817	147,500	437.44
Mirani Weir	32,662,644	4,660	7,009.15
Marian Weir	6,103,434	3,980	1,533.53
Dumbleton Weir	12,601,474	8,840	1,425.51
Total	**115,890,369**	**164,980**	**702.45**
Marian Weir Project	4,846,000 (4.2%)	2,000 (1.2%)	2,423.00

Source: SKM (2011).

SKM noted that the project is now due for completion in the fourth quarter 2012. The planned delivery method is an AS 2124 contract with the contractor as Principal Contractor and being responsible for completion of all remaining works, with the exception of the hydraulic electrical, which has already been completed.

A provisional lump sum price will be tendered and final risk adjusted lump sum amount negotiated. The tenders are currently out but are not yet agreed. A presentation to the Board was expected in August 2011, but this has been delayed by approximately two months. SunWater has stated that the revised project costs of $4.8 million (as presented in the September 2011 documentation) do not include legal fees or revised contract fees and are therefore subject to change.

Costs for this project have escalated for two key reasons.

(a) a fatality on site resulted in a number of legal fees. As this incident is the subject of an ongoing legal investigation, SKM was unable to state whether this incident was outside the control of SunWater. SKM recommended that these costs are re-examined following the outcome of the current investigation; and

(b) delays to the project resulted in construction starting late on site, and in combination with an early start to the wet season, resulted in the need to de-mobilise and then re-establish works on site. The majority of the $1.57 million cost increase (approximately $1 million) can be associated with this delay and could therefore have been avoided if work had been started sooner (and completed prior to the wet season) or not commenced until the start of the following dry season.

Overall the project costs are high compared to the overall cost of storage within the Pioneer system.

(e) SKM Summary and Conclusions

SKM recommended that SunWater produces documentation to establish that the no-build solution has been adequately considered and discussed with all stakeholders, including DERM. If the no-build solution is found not to be feasible through hydraulic modelling or not found to be acceptable by DERM, SKM would conclude that the proposed project is prudent.

SKM also concluded that some of the project costs, approximately $1 million, could have been avoided by SunWater through not commencing work until the start of the following dry season.

Other Stakeholders' Response

In response to the information and conclusions contained in Arup's report, PVWater (2011b) submitted that underspend in 2010-11 on Marian Weir would be due to the fatality that occurred when work commenced on the outlet upgrade and has been stalled since. This inflates the overall negative balance in the renewals account and requires close scrutiny to ensure that double dipping does not occur when and if work recommences on the weir. Alternatively, only actual expenditure that has passed the prudence and efficiency testing should be included for this price path.

PVWater noted that Arup indicated that the "current expenditure to date on the project (Marian Weir) is $2.838 million" which does not match the $2.084 million as above.

PVWater noted that Arup commented that the Marian Weir outlet upgrade is being undertaken to meet the operational requirements set down in the initial Pioneer Valley ROP of 2004-05. To maximise system yield, Marian Weir water level is to be lowered below fixed crest by 0.9 metre during the period December to September and by 1.9 metres during the period October to November. The lowering can only be achieved when water flow is being controlled through releases from Teemburra Dam. It is not possible when natural stream flows are maintaining weir levels at or above fixed crest.

PVWater noted that water levels in Marian Weir can only be lowered by releasing through the outlet valve which must also be of sufficient size to meet the demand downstream which for the Pioneer includes supply to Mackay City as well as irrigators. The present valve is too small for this duty and consequently water must pass over the weir to meet high downstream demands. This then does not meet the ROP requirement which is to lower the weir upstream level to capture any small natural flow events that occur.

Building on its previous submission, PVWater submitted that total water storage capacity in the Pioneer is 164,980 ML made up as Teemburra Dam (147,500), Mirani Weir (4,660), Marian Weir (3,980) and Dumbleton Weir (8,840). The storage made available in Marian Weir by lowering to 1.9 metres below fixed crest is only some 2,000 ML which represents 1.2% of total system storage capacity. With SunWater's budget of some $5 million (see above) for the outlet upgrade and $2 million already spent, serious consideration needs to be given to a cost benefit analysis for the project. With the unfortunate incident that occurred in 2009-10 any future work may well be at a cost well in excess of original estimates to address the risk involved. Also unknown legal costs from the incident and how these costs will be met may see the outlet upgrade become a very costly project.

PVWater submitted that hydrological modelling should be undertaken to determine the impact of leaving the Marian Weir outlet valve as is and should involve the following:

(a) reduction in WASO for High Priority B water allocation as set down in the Pioneer Valley Water Resource Plan with Marian Weir operating at the current outlet capacity;

(b) operating Mirani and Dumbleton Weirs at lower levels with Marian Weir at current outlet capacity to achieve current WASO levels; and

(c) substitution of SunWater High Priority A water allocation to maintain High Priority B WASO with Marian Weir operating at the current outlet capacity.

PVWater considered that following this, full consultation should occur and involve all stakeholders including DERM water planning section to determine the appropriate course of action.

Authority's Analysis

In the Draft Report, the Authority noted that this item is an ongoing project, due to be completed in late 2012, after commencing in 2007-08. The original budget of $1.17 million has expanded to $4.8 million, and potentially higher once final assessments are completed. However, at the time of writing the Draft Report, not all $4.8 million has been spent. Information provided to the Authority by Indec (2011d) indicated expenditure of $1.3 million (nominal terms, direct costs) up until 30 June 2011. Information provided by SunWater indicates that $2.1 million (2010-11 dollars, direct and indirect costs) was spent up until February 2011. Arup identified expenditure of $2.8 million spent.

The Authority noted that SKM was unable to conclude that the no build solution has been investigated and is not feasible. As a result, the Authority recommended that this item is not prudent and excluded all costs from its recommended tariffs.

The Authority accepted SKM's recommendations that SunWater should demonstrate why the no-build solution is not feasible. The Authority also agreed with PVWater and recommended that SunWater investigates, in conjunction DERM and customers, a number of non-infrastructure options to meet customer demand downstream of Mirani Weir, including:

(a) surrendering or substitution of SunWater owned WAE to allow the Mirani Weir to meet customer demand by overtopping;

(b) alternate operating modes of the scheme to meet customer demand; and

(c) reducing the flow rates available to downstream customers.

The costs associated with the above options should be compared to the latest estimates of costs relating to enlarging the outlet works.

The Authority recommended that legal costs be excluded from past renewals expenditure. As noted below by SunWater in relation to fabri-dams, unplanned legal costs should not be included in its past renewals expenditures, as SunWater bears the risk of operating costs over the 2006-11 price path (and by extension for 2011-12).

Submissions Received from Stakeholders on the Draft Report

SunWater (2011as) submitted that the project is a ROP requirement and compliance is not optional. SunWater further noted that SKM failed to understand the ROP requirements, and that SKM's alternatives are neither technically feasible nor appropriate.

SunWater's submitted that the authors of the SKM report do not appear to have a clear understanding of the *Water Act 2000* and its subordinate legislation, namely the Water Resource (Pioneer Valley) Plan 2002.

The Pioneer WRP includes among its provisions the requirement for the operation of the Pioneer River Water Supply Scheme to meet certain Environmental Flow Objectives (refer WRP schedule 4) in addition to the Water Allocation Security Objectives (refer WRP schedule 5). Based on the statutory requirements of the WRP, the regulator (now known as the Department of Environment and Resource Management) developed the Pioneer Valley Resource Operations Plan, through an open consultative process to which SunWater contributed as the licence holder for the scheme. Other stakeholders also contributed to this processes, including the Pioneer Valley Water Board.

In simple terms, the various rules of the ROP ensure that the WRP provisions are implemented e.g. water sharing rules, operational rules, monitoring and reporting rules, etc.

SunWater advised that the requirement to upgrade the outlet capacity of Marian Weir mainly arises from two sections of the ROP:

(a) Section 83 Operating levels of storages, and the accompanying Table 5; and

(b) Section 93 Minimum flow rates, and the accompanying Table 6.

Table 6 lists minimum flow rates at ‘Node A’ of the Pioneer River (location at AMTD 15.5 km). This is depicted on a map in Schedule 1 of the Pioneer WRP.

As stated in Attachment 3(a) of the ROP, Marian Weir is located at AMTD 32.0 km on the same river. Hence ‘Node A’ is approximately 16.5km downstream of Marian Weir and flows which are required to be achieved at Node A would have to be passed through Marian Weir.

Section 93 of the ROP covers the minimum flow rate requirement and is read in conjunction with Table 6. The third row of Table 6 refers to a minimum flow requirement in the period April- July of “greater than 500 ML/ day for at least 10 days before the end of June”, provided that Teemburra Dam storage volume is greater than 73630 ML. Unless the weir is spilling (overtopping) this requirement indicates that the outlet works at Marian Weir should be able to pass a flow of 500 ML/day.

At the time the ROP first came into effect (June 2005) SunWater submitted it was unable to comply with the release requirements mandated by these two ROP sections, and accordingly negotiated an Implementation Program (June 2006) with DERM. SunWater noted that, without amendment to the underlying legislation (namely the Pioneer WRP), it is not possible for SunWater to seek to avoid undertaking these works. This point is reinforced by the regulator’s response to the Implementation Program in a letter to SunWater in which it is stated that “…SunWater needs to ensure that due priority is given to these works and aim for commissioning that is sooner than the 2009 year outlined in (the) implementation program”.

SunWater also attached the above mentioned letter from DERM dated July 2006 requiring SunWater to place priority on completing the infrastructure solution by 2009.

In an initial submission, PVWater (2011e) supported QCA in removing all costs associated with this project from past renewals and the recommendation that SunWater enter into detailed negotiations with all stakeholders to determine the appropriate strategy for progressing the matter.

PVWater’s view was that the prudent approach to such projects must surely be to involve all stakeholders, particularly customers who ultimately will pay, at the earliest stages of the project to ensure that all options are fully explored in truly open consultation. PVWater was vehemently opposed to re-inclusion of any costs for the Marian Weir project in past renewals until such time as the recommended consultation with customers occurs.

PVWater noted that the current estimate for the Marian Weir Project ($4.846 million) is not much below the Cost to Replace Marian Weir of $6.103 million.

In responding to SunWater’s submission (above), PVWater (2012) submitted that SunWater’s lengthy explanation of the legislation fails to advise that legislated processes also exist for review and/or amendment of both Plans. The WRP was gazetted in December 2002 and must be reviewed every 10 years. The review is scheduled for 2012-13. PVWater submitted that this provides a logical mechanism to re-examine the hydrology of the Pioneer River system and model the impacts on the WASOs and Environmental Flow Objectives under the range of options for Marian Weir operation. The statutory planning process also requires consultation with all stakeholders.

PVWater therefore submitted that it supported the Authority's position that Marian Weir outlet costs be excluded until appropriate options analysis and customer consultation have been conducted, largely through the WRP review process.

Authority's Response to Submissions Received on the Draft Report

The Authority notes and accepts that where SunWater is required to comply with the ROP, its compliance is not optional. SunWater in its submission in response to the Draft Report, provided a letter from DERM dated July 2006 in relation to the programmed augmentation of Marian Weir outlet works in response to Section 83(3) of the ROP. DERM advises that SunWater '*needs to ensure that due priority is given to these works and aim for commissioning that is sooner than the 2009 year outlined in implementation program'*.

As DERM did not amend its ROP requirements, and specifically requested that SunWater comply by modifying the Marian Weir outlet works, this provides a basis for SunWater to justify its position that the project was prudent. On the basis of new information provided in regard to DERM directives, the Authority accepts that SunWater acted at the time in good faith in response to the technical regulator to comply with a statutory requirement under the ROP. The Authority therefore recommends that the past expenditure was prudent.

Therefore, an efficient level of expenditure should be incorporated into the past renewals costs.

In regard to amounts spent to date, the Authority notes that:

(a) SunWater's submission in response to the Draft Report has not clarified the amount spent to date, but included only an estimate for remaining expenditure in 2012-13;

(b) the original total budget was $1.17 million but is now likely to be in excess of $4.84 million (although not confirmed, a four-fold blow-out), excluding legal fees; and

(c) the best estimate currently available is total expenditure of $2.084 million as at February 2011, excluding legal costs. This is consistent with a grand total of $4.84 million, with the sum of $2.76 million yet to be spent, as identified by SunWater in its submission.

The Authority notes SKM's Draft Report conclusions that of the total of $2.084 million, some $1.08 million was over-spent due to delays in construction that could have been saved if the project had been timed to commence in the dry season. SKM rounded the savings amount to $1 million. The Authority therefore proposes to accept the balance, $1.084 million, in past expenditure.

The issue of future expenditure is a separate issue and is discussed in the context of forecast expenditure below.

Item 3: Mirani Weir and Dumbleton Weir – Fabri-dam

Draft Report

SunWater[2]

On 23 November 2008, there was an unexpected rapid deflation of one of the inflatable rubber dams on Bedford Weir in the Nogoa-Mackenzie WSS. In the ensuing release of water, a fatality

[2] In response to Authority requests for further information in relation to the costs of this incident, SunWater provided a background paper to the Authority in September 2011 on the Treatment of costs related to Inflatable Rubber Dams. Thus, the Authority's Draft Report includes material from SunWater's paper that was not available for Aurecon's review and was not addressed in its report.

occurred. In response to this event, SunWater decommissioned the inflatable rubber dams at Mirani and Dumbleton Weirs.

SunWater received a complaint and summons from WHSQ alleging a failure to comply with the provisions of the *Workplace Health and Safety Act 1995* (Qld) (WHS Act) in relation to this incident. The manufacturer of the rubber dam (Trelleborg Engineered System Australia Pty Ltd) has also been charged by the WHSQ on similar terms.

SunWater advised that this matter is presently before the Industrial Magistrates Court, and it is also possible that this matter may be the subject of a coronial inquest.

SunWater advised that there were a range of total costs (in 2010-11 dollars, including direct and indirect) in relation to the incident:

(a) legal costs were incurred in responding to the charges made by WHSQ. SunWater has incurred $1.87 million in responding to this matter up to 30 June 2011, and a further $781,631 is forecast for 2011-12;

(b) incident response costs of $605,607 relating solely to the Bedford Weir. SunWater advised that no specific operating costs were incurred relating to deflation of the Fabri Dams at Mirani Weir and Dumbleton Weir; and

(c) costs of developing and assessing options for restorative measures including legal and engineering advice, to place Mirani Weir and Dumbleton Weir in their previous position in terms of long term service levels (or water allocation security objectives), of $216,315 to 30 June 2011.

In relation to the recovery of these past costs, SunWater submitted that:

(a) legal costs should not be included in its renewals expenditures, as SunWater bears the risk of operating costs over the 2006-11 price path (and by extension for 2011-12);

(b) incident response costs should be included in the Nogoa-Mackenzie WSS renewals expenditure; and

(c) the costs of developing and assessing options for restorative measures have been treated as renewals expenditure and included in SunWater's proposed ARR balance for Pioneer River WSS. SunWater noted that it is possible that some of these costs may be recoverable under insurance, and any future insurance proceeds will be applied as revenue offset to the ARR.

In relation to the recovery of future costs in relation to this incident, SunWater submitted that:

(a) it does not accept that it should bear the risks of legal costs into the 2012-17 regulatory period, including any continuation of legal costs to the WHSQ charge or any subsequent coronial inquest. Any costs beyond 1 July 2012 should be dealt with in accordance with the arrangements set for the next regulatory period. SunWater did not specify how it intended to recover these costs, or from which schemes;

(b) there will be no future incident response costs; and

(c) more significant restoration costs will need to be incurred in future to restore the long-term service levels (or water allocation security objectives) of the scheme, as this is required under the ROL. SunWater advised that it is in the final stages of assessing options, and expects a decision will be made over the coming months. Once decided,

> SunWater submitted that consequential changes will be required to the existing renewals program.

SunWater submitted that the deflation of the fabri-dams on Mirani Weir and Dumbleton Weir did not reduce customers' access to water, as announced allocations have been at 100% throughout this time.

Other Stakeholders' Submissions

During Round 1 Consultation (May 2010), stakeholders expressed concern that weir storage had been reduced following the deflation of the rubber fabri-dams on Dumbleton and Mirani Weir, and that this had impacted on customers' supply reliability. It was also noted that SunWater had advised that the fabri-dams may not be replaced as the manufacturer no longer makes them.

PVWater (2011) expressed concern that supply reliability had been impacted by the deflation of the rubber fabri-dams, and noted that both fabri-dams had previously been identified to be in poor state of repair. PVWater further submitted that although it accepts that any final decision on the matter is subject to the outcomes of the Bedford Weir investigations, the matter should have been mentioned in SunWater's NSP discussion on renewals.

PVWater suggested that as an alternative to engineering solutions, SunWater could surrender some of the 12,500 ML of High A Priority allocation that its holds in the Pioneer WSS.

Consultant's Review

Halcrow was engaged by the Authority to review costs in the Nogoa-Mackenzie WSS, including costs relating to the failure of the fabri-dam at Bedford Weir.

While Halcrow sought additional information on the nature of expenditure, SunWater indicated at the time that for commercial-in-confidence reasons, it was unable to provide any information on this matter.

Halcrow questioned whether legal fees should be classified as renewals expenditure and whether some of this expenditure could be recouped through insurance coverage. However, Halcrow was unable to review the prudence or efficiency of the expenditure due to information deficiencies at the time of its review.

Authority's Analysis

As noted above, Halcrow and the Authority sought further advice from SunWater on its proposed treatment of the costs of responding to the Bedford Weir incident. SunWater provided further information subsequent to Halcrow's review and report, which has been summarised above.

After reviewing this information, the Authority concurred with SunWater's view that unexpected legal costs should not be recovered from users, as unexpected operating expenditure from 2006-12 is for SunWater to bear under the arrangements struck for the previous price path.

The Authority also noted that legal action is ongoing and insurance payments are yet to be determined.

The Authority considered that the outcomes of legal action are likely to be an important factor in determining whether SunWater was prudent and efficient and where the risks and costs should lie. Any insurance payments can offset any costs that should be passed through to irrigators.

Pending this information, the Authority was not inclined to opine in the Draft Report on whether other (non-legal) costs relating to Mirani and Dumbleton Weirs incurred as a result of the Bedford Weir incident should be recovered from users or SunWater.

Therefore, the Authority considered that SunWater's proposed renewal expenditures – including the costs of developing and assessing options for restorative measures and the costs of any actual restorative measures – should be excluded from prices. Past renewals expenditure should therefore be adjusted to exclude the cost of developing and assessing options for restorative measures as only these costs have been included by SunWater. The costs to be excluded were submitted by SunWater as $33,921 in 2008-09 and $182,394 in 2010-11.

When legal action and insurance payouts are resolved, any prudent and efficient costs can be addressed by an application to the Authority for an end-of-period adjustment, or in limited circumstances, a within period review. This approach aligned with the Authority's Volume 1 recommendation that SunWater should bear the risk of controllable costs and customers should bear the risks of uncontrollable costs. The cost to be met by irrigators should reflect the replacement cost less any insurance payout, or if SunWater is shown to be imprudent, the replacement cost less the full cost of the fabri-dam.

Sufficient information would need to be provided by SunWater to substantiate its application. Any expenditure would be assessed under the Authority's prudence and efficiency criteria as adopted in this review, and after consideration of any contractual obligations and insurance payouts.

For further reference, the Authority provided some guidance on extraordinary circumstances in its Draft Report on General Pricing Principles for Infrastructure Investments made in Response to Extraordinary Circumstances (2004). This Report stated that, notwithstanding the need to consider the particular characteristics of each extraordinary circumstance, service providers are in general entitled to pass costs through to users to the extent that the risk is commercially relevant, the provider is (and has been) prudent, the response is cost-effective, the provider is best able to manage the risk, and there is no double charging.

In relation to any concerns on insurance, the Authority addressed some aspects of this issue in the 2009 QR Network Draft Access Undertaking (DAU), where the Authority accepted QR Network's claimed self-insurance costs as being reasonable, on the basis that QR Network's claim included:

(a) the identification of the specific risks to be self-insured;

(b) quantification of the expected incidence and costs of the risks by a method consistent with an actuarial assessment;

(c) confirmation of a board resolution to self-insure;

(d) explicit confirmation that the regulated entity will not recover costs covered by self-insurance through other regulatory cash-flows; and

(e) evidence that the regulated entity has the financial capacity to assume the self-insured risks.

In relation to stakeholders' concerns regarding the impact of the deflation of the Fabri-Dam on reliability of supply, the Authority considered that the risk of asset failure is commercially relevant and that any related impacts on supply should be borne by users, provided that all reasonable steps are taken by SunWater to address the impacts. The Authority noted that fortuitously, the impact on reliability is minimised due to favourable seasonal conditions.

The option proposed by PVWater for SunWater to surrender unallocated volumes requires hydrological analysis and may require a variation to the ROP. The Authority was unable to assess such an option, but it remains an option for consideration by SunWater in conjunction with DERM.

Submissions Received from Stakeholders on the Draft Report

SunWater (2011as) submitted that the Authority's position of not including any fabri-dam replacement costs pending the outcome of legal action is not a valid position as it does not consider the prudency or efficiency of reinstating the lost storage capacity. The legal action concerns liability for the Bedford incident under the WHS Act, not any replacement options. The legal action will not result in a situation where a party other than SunWater becomes responsible for re-instating the lost storage capacity in the Upper Burnett, Pioneer or Nogoa-Mackenzie WSSs.

PVWater (2011e) supported the Authority in excluding all costs associated with the fabri-dams pending the outcome of the legal investigation of the Bedford Weir incident. PVWater did not support inclusion of any costs associated with the fabridams until it has participated in open consultation including full options analysis.

Authority's Response to Submissions Received on the Draft Report

The Authority accepts that the claimed legal costs relate to liability issues and not the replacement of lost storage capacity. However, the issue of whether legal costs should be passed through to customers or borne by SunWater cannot currently be determined pending the outcome of legal proceedings.

The Authority therefore recommends no change to Draft Report conclusions.

The issue of replacement of storage capacity is reviewed in the context of future renewals below.

Item 4: Flood Damage Repairs

Submissions Received from Stakeholders on the Draft Report

In its submission in response to the Draft Report, SunWater (2011as) advised that additional information is now available on required flood damage repairs which need to be taken into account for the renewals annuity calculation. For the Pioneer Valley WSS, the flood repair costs are $134,544 (actual) for 2010-11 and $126,987 (estimated) for 2011-12.

SunWater has advised that the 2010-11 flood damage repair costs are included in its proposed renewals expenditure and the 2011-12 flood damage repair costs are additional to its proposed renewals expenditure.

However, SunWater subsequently submitted that insurance revenue was also expected to be received, which would offset some of the flood repair costs. SunWater sought that this submission remains confidential as the negotiations with the insurer are still ongoing.

Authority's Response to Submissions Received on the Draft Report

As outlined in Volume 1, the Authority reviewed a sample of flood damage repairs across SunWater's schemes. The sampled items accounted for 30% of total flood repairs. SKM found that all sampled items were prudent and efficient.

However, the Authority notes that if flood damage repair costs are to be included then so should any offsetting insurance revenues. As insurance revenues are yet to be determined, the Authority has not included flood damage repairs costs in prices.

Therefore, once the insurance matter is settled, SunWater may apply for an adjustment to prices to account for the flood damage expenditure and revenue, or the ARR balances will be adjusted during the next regulatory review.

Conclusion

Draft Report

In the Draft Report, three items for the Pioneer River WSS were reviewed in detail for prudency and efficiency, of which the Authority considered that:

(a) one item was prudent but not efficient (Palm Tree Creek outlet works) and was adjusted accordingly;

(b) one item was not prudent and was removed from past expenditure. This item, Marian Weir, is an ongoing expenditure. Total expended to date of $2.084 million was deleted from past expenditure; and

(c) one item (fabri-dam expenditure) was removed from past expenditure pending the outcome of a legal investigation.

As noted in Volume 1, after a consideration of all its consultants' reviews, the Authority recommended that a 10% saving be applied to all non-sampled and sampled items for which there was insufficient information.

In total, the Authority's Draft Report recommended the expenditure be as summarised in Table 4.11.

Final Report

After review of submissions in response to the Draft Report, the Authority's conclusions in relation to specific items have changed as follows:

(a) the expenditure on the Palm Tree Creek outlet works is now excluded as being not prudent or efficient, on the basis that a new solution to the system failure is now proposed in forecast expenditure;

(b) the (past) Marian Weir outlet works are now considered prudent, in view of statutory requirements, but expenditure was not efficient. An amount of $1.084 million in past expenditure is now accepted; and

(c) flood repair costs previously included in 2010-11 are now excluded.

As outlined in Volume 1, the Authority undertook further sampling of past renewals expenditures across SunWater's schemes. The larger sample of items reviewed indicated that a lower level of average savings for past renewals expenditures could have been achieved. (A separate level of savings was calculated for forecast renewals expenditures – see further below).

After consideration of this further work, the Authority recommended that a 4% saving be applied to all non-sampled and sampled items for which there was insufficient information.

Table 4.11: Review of Selected Past Renewals Expenditure 2006-11 ($'000)

Item	*Date*	*SunWater ($'000)*	*Authority's Draft Report Findings*	*Draft Recommended ($'000)*	*Authority's Final Report Findings*	*Final Recommended ($,000)*
Sampled Items						
1. Palm tree Creek outlet valve	2007-08 to 2009-10	1,303	Prudent but not efficient	912	Not prudent	0
2. Marian Weir	2007-08 to 2010-11	4,844 total budget, 2,084 to date	Not prudent	0	Prudent but not efficient	1,084
3. Mirani Weir and Dumbleton Weir – Fabri Dam	2008-09, 2010-11	216	Removed pending outcome of legal investigation	0	Removed pending outcome of legal investigation	0
4. Flood damage repairs	2010-11, 2011-12	134.5 in 2010-11 and 127 in 2011-12	Not sampled	10% saving on 2010-11 cost, 2011-12 not included	Excluded pending outcome of insurance claim	0
Non-Sampled Items				10% saving applied		4% saving applied

Note: Values relating to the replacement of fabri-dams at Mirani Weir and Dumbleton Weir include both direct and indirect costs. Source: SunWater (2011), Arup (2011) and SKM (2011).

4.4 Opening ARR Balance (at 1 July 2012)

Draft Report

Stakeholder Submissions

SunWater indicated that the opening ARR balance for 1 July 2011 was negative $3,448,000 for the Pioneer River WSS. This estimate reflects the most recent information provided by SunWater to the Authority in September 2011 and may differ from the NSP.

CANEGROWERS (2011a) noted that the opening ARR balance for 2011-12 is much higher compared to that of two years ago (negative $0.5 million) and accounts for 46% of the total negative renewals balance for all SunWater schemes. Consequently, renewals [annuities] are 47% of total costs [paid by irrigators], despite [renewals] spending being 11% of total costs [incurred by SunWater].

CANEGROWERS further noted that over the next 25 years the average renewals spend is around $250,000 compared to an annuity of $817,000. If the starting balance was zero then the price in 2015-16 would be $20/ML rather than $28/ML, which is only slightly above the current price of $18.21/ML (with a 70:30 split between Part A and B charges). Hence, serious scrutiny needs to be placed on renewals spending, especially over the past two years.

PVWater (2011a) submitted that the opening balance for the renewals annuity requires clear and transparent explanation from SunWater as it has a significant impact on the required annuity for the new price path.

PVWater (2011b) further submitted that the calculation presented for the renewals accounting process has no explanations and there seems to be a mismatch with the opening balance presented in the NSP of negative $5,160,000. PVWater share the concern raised “that further costs will be incurred in the next price path and thereby further bringing down the annuity balances” particularly if it continues as for the last price path with the absence of any information from SunWater to customers on the position and the presentation of information in SunWater Annual Reports that is vastly different from what is now in the NSP.

Authority's Analysis

Arup noted that the decline in value of the opening ARR balance is largely due to the following projects:

(a) enlargement of the outlet works at Marian Weir to meet ROP operational requirements;

(b) replacement of the regulating valve at Palm Tree Creek pipeline; and

(c) flood damage repair works.

In the Draft Report, the expected costs of the Marian Weir outlet works are now much higher than originally budgeted.

As also noted above, a key contributor is the expenditure on the Palm Tree Creek outlet valve and significant uncertainty remains around the ability to solve this problem.

The Authority calculated the opening ARR balance at 1 July 2011 by:

(a) adopting the opening balance as at 1 July 2006;

(b) adding 2006-11 renewals annuity revenue;

(c) subtracting prudent and efficient 2006-11 renewals expenditure. An adjustment was made for the $2.084 million spent on Marian Weir, for the Palm Tree Creek outlet valve and fabri-dam costs, and the 10% cost savings on remaining renewals items; and

(d) adjusting interest over the period consistent with the Authority's recommendations detailed in Volume 1.

The Authority's draft opening ARR balance for 1 July 2011 for the Pioneer River WSS was a positive balance of $1,333,000.

To establish the closing ARR balance as at 30 June 2012 of $1,509,000, the Authority:

(a) added forecast 2011-12 renewals annuity revenue;

(b) subtracted forecast 2011-12 renewals expenditure; and

(c) adjusted for interest over the year.

The closing ARR balance for 30 June 2012 is the opening ARR balance for 1 July 2012.

Final Report

In Volume 1, the Authority acknowledged that the Draft Report incorrectly applied 100% of the ARR balance adjustment to the ARR irrigation balance, rather than proportioning the adjustment based on the irrigation share of the ARR balance. This has been corrected in the calculation of final prices.

In the Pioneer WSS, this correction had a marked effect, changing the Draft Report 30 June 2011 ARR from a positive $1.33 million to a negative $817,000. While this is a substantial deterioration in the estimated ARR balance, it reflects an improvement against SunWater's own estimate of negative $3.558 million.

In addition to this adjustment, the Authority revised its Draft Report estimates of the ARR balances as at 30 June 2011 and 2012 to take account of the key changes since the Draft Report as outlined above including:

(a) removal of all expenditure on the Palm Tree Creek outlet valve (previously allowed $912,000);

(b) reinstatement of $1.084 million in expenditure on Marian Weir;

(c) removal of 2010-11 flood damage repair costs; and

(d) application of a 4% saving to non-sampled items and sampled items for which there was insufficient information (instead of 10% in the Draft Report).

The resulting revised ARR as at 1 July 2011 is negative $1,329,000. The Authority has estimated the ARR as at 1 July 2012 to be negative $1,457,000.

4.5 Forecast Renewals Expenditure

Planning Methodology

Draft Report

The Authority reviewed SunWater's Asset Management Planning Methodology in Volume 1 and recommended improvements to their current approach, including:

(a) high-level options analysis for all material renewals expenditures expected to occur over the Authority's recommended planning period (20 years), with material renewals expenditure being defined as one which accounts for 10% or more in present value terms of total forecast renewals expenditure;

(b) detailed options analysis (which also takes into account trade-offs and impacts on operational expenditures) for all material renewals expenditures expected to occur within the first five years of each planning period; and

(c) SunWater to adopt the Authority's consultants' suggested improvements for forecasting renewals expenditure.

Submissions Received from Stakeholders on the Draft Report

SunWater submitted that:

(a) the costs of undertaking options analysis (and associated activities including consultation) are excessive ($445,000 annually for all schemes);

(b) these costs are to be allocated exclusively to the irrigation sector; and

(c) although some of the Authority's consultants' suggested improvements have merit, they all involve additional cost. SunWater sought to implement only those that demonstrate a net-benefit.

Authority's Response to Submissions Received on the Draft Report

In response to SunWater, and as outlined in Volume 1, the Authority considers that:

(a) the cost of the options analyses is acceptable when compared to SunWater's total renewals expenditure ($14.5 million in 2011-12). In addition, SunWater's estimated $445,000 does not include the savings associated with options analyses;

(b) the cost of carrying out options analyses should be met by all water users (including irrigators and non-irrigators where they exist) in the relevant service contract; and

(c) SunWater should review its renewals planning process (taking into account the Authority's consultants' suggested improvements) and provide a copy of the review to Government and the Authority by 30 June 2014.

As noted in Volume 1, the Authority has not, therefore, amended its draft recommendations regarding SunWater undertaking high-level and detailed options analyses. The Authority has, however, modified its draft recommendation as noted in (c) above.

Prudency and Efficiency of Forecast Renewals Expenditure

Submissions

SunWater

SunWater's forecast renewals expenditure for 2011-16 for the Pioneer River WSS, as provided in its NSP, is presented in Table 4.12 (this was submitted prior to the Government's announced interim prices for 2011-12).

Table 4.12: Forecast Renewals Expenditure 2011-16 (Real $'000)

Facility	***2011-12***	***2012-13***	***2013-14***	***2014-15***	***2015-16***
Dumbleton Weir	-	-	-	10	40
Marian Weir	36	-	-	10	-
Mirani Weir	-	-	-	10	-
Palmtree Creek Pipeline	-	63	25	-	-
Pioneer River Distribution	-	4	3	-	-
Teemburra Dam	30	62	33	77	231
Total	**66**	**129**	**61**	**107**	**271**

Source: SunWater (2011).

The major renewals item is a 20-year safety review for Teemburra Dam, incorporating a major five-yearly dam safety inspection at an estimated cost of $231,000 in 2015-16. These works are required for compliance with dam safety obligations.

The major expenditure items from 2006-17 are:

(a) replacement of control equipment and pipework at Palm Tree Creek Pipeline at an estimated cost of $377,000 in 2022-23;

(b) replacement of fishlock hydraulics on Dumbleton Weir at an estimated costs of $410,000 in 2022-23; and

(c) replacement of electrical cabling and control equipment at Mirani Weir at an estimated costs of $200,000 in 2022-23.

SunWater's forecast renewal expenditure items greater than $10,000 in value, for the years 2011-12 to 2035-36 in 2010-11 dollar terms are provided in **Appendix A**.

Other Stakeholders

PVWater (2011a) submitted that, overall, there is insufficient detail provided in the NSP of renewals to accept that the expenditures proposed are realistic. In particular, details should be provided for the proposed annual expenditures for each facility and detailed costs should be provided for all years (not just 2022-23).

PVWater (2011a) further submitted that although dam safety upgrades are now excluded from the pricing review, it is stated [in the NSP] to occur for the Pioneer River WSS in 2014-15 and 2015-16. PVWater (2011b) sought clarification on this issue as it understood that the upgrade of Teemburra Dam was not required until much later, and it is in reality a regular preventive maintenance activity.

PVWater also raised the following issues:

(a) whether the five-yearly Teemburra Dam safety inspection could correctly be included as renewals;

(b) how the proposed expenditure of $231,000 for dam safety inspection for Teemburra Dam compares with the actual cost for the dam safety inspection completed in 2009-10;

(c) what are the major cost components of the proposed $231,000 dam safety inspection in 2015-16; and

(d) the description of items in the 25 year renewals profile requires much more specific detail to justify amounts such as $377,000 for control equipment and pipework and $410,000 for fishlock hydraulics.

In response to Arup's report (see below), PVWater noted that excluding 2010-11, expenditure of some $820,000 has occurred on "unspecified work". This is a significant sum over four years and further detail would be appreciated to gain a better understanding of the overall renewals program for the scheme as it appears to involve numerous very small projects.

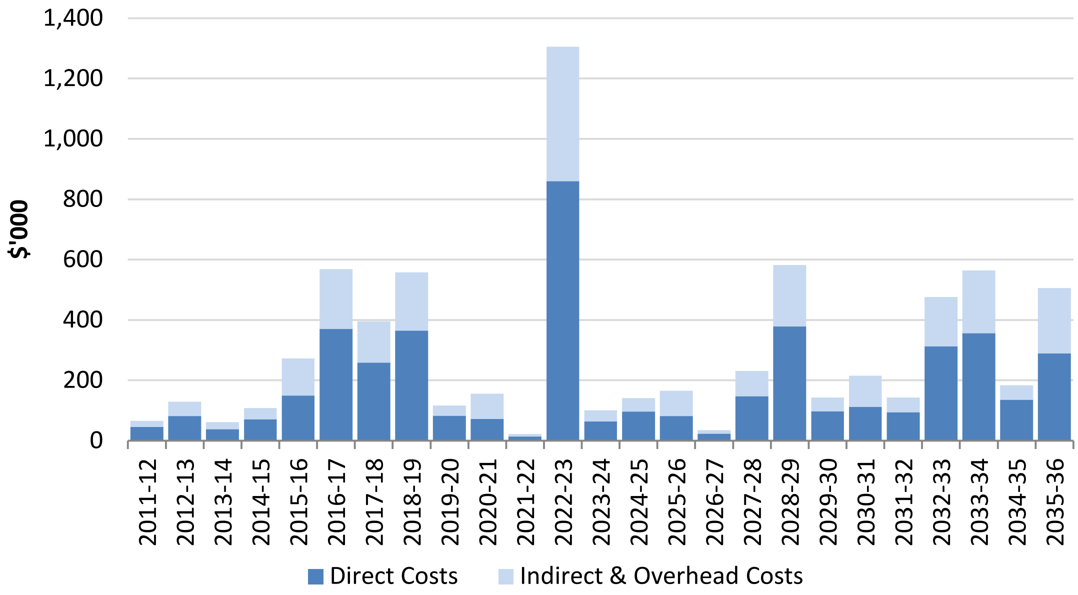
Authority's Analysis

Total Costs

SunWater's proposed renewals expenditure for 2011-36 for the Pioneer River WSS is shown in Figure 4.3. This reflected the most recent renewals information provided by SunWater to the Authority in September 2011 and differs from the NSP. The Authority identified the direct cost component of this expenditure, which is review below. The indirect and overheads component of expenditure relating to these items are reviewed in Chapter 5 – Operating Costs.

The Authority noted that proposed expenditure on dam safety upgrades of $2.0 million in 2014-15 and $3.2 million in 2015-16 are excluded from forecast renewals expenditures for the purposes of this review. The Authority has not sought to review the timing or value of this expenditure.

Figure 4.3: Forecast Renewals Expenditure 2011-36 (Real $)



Source: SunWater (2011am).

Review of Forecast Renewals Items

Arup were engaged to review the prudence and efficiency for a sample of renewals expenditure items, with additional analysis provided by SKM. Each of the assessed items is discussed below.

In general, Arup noted that the majority of projects over the 2012-17 price path are relatively minor and do not seem unreasonable. Only five items in the next four years were identified with costs in excess of $100,000. Arup identified that the largest forecast expenditure item relates to the enlargement of outlet works at Marian Weir. This, along with the replacement of regulating valve at Palm Tree Creek, is a continuation of renewals projects from previous years (reviewed above). The remaining projects are scheduled dam safety inspections which are necessary under relevant legislation.

The following observations were reported by Arup with regard to the forecast renewals expenditure program:

(a) there are three expenditure amounts attached to the same item for the replacement of control equipment at Teemburra Dam ($133,000 in 2017-18; $276,000 in 2022-23; $132,000 in 2032-33). Arup considered it unlikely that control equipment would be so frequently replaced and SunWater needs to clarify which is the correct item and provide justification for the cost and why there are two largely varying amounts;

(b) a large number of works at Teemburra Dam are proposed in 2016-17 which have been individually costed based on replacement cost. Arup advised that it would expect that these works could be undertaken in a more efficient manner given that they are scheduled for the same year though this is not apparent from the costing which makes up the renewals program; and

(c) the Dumbleton Weir control building and switchboard are scheduled for replacement in 2028-29 ($150,000 and $225,000 respectively), while the control equipment is scheduled for replacement at a cost of $382,000 in 2018-19 and again in 2033-34. Arup considered that this demonstrates the consequence of identifying projects based on asset life where the sequence and timing of works is not conducive to an economically efficient outcome. Arup advised that it would expect that SunWater would review these sequences of works along with the cost and schedule works in the most efficient manner. While this may become apparent upon reviewing works in that particular year, they will none the less have an impact on the already large negative balance current attached to the scheme.

The Authority has reviewed the replacement of control equipment at Dumbleton Weir (item (c) above) in more detail, with additional analysis provided by SKM.

In addition to the particular items reviewed as part of the Draft Report, the Authority has identified and reviewed some additional items of forecast renewals for the Final Report.

Item 1: Dumbleton Weir – replacement of control equipment

Stakeholder Submissions

SunWater submitted this item involves the replacement of electrical control equipment. The expenditure is forecast to occur in 2018-19 at a cost of $381,864 ($308,584 direct).

No other stakeholders have commented on this item.

Consultant's Review

As noted above, Arup considered that determining the timing of this item on the basis of projected asset life may not lead to efficient outcomes. However, Arup did not recommend an alternative date.

SKM's review of this item was prepared by accessing and viewing SunWater's WMS, and asset condition and risk assessment policy and procedures.

<u>Prudency Review</u>

SKM viewed the WMS record for this asset confirmed that the asset has been in service since 1998. The standard object type (asset type) allocated for this infrastructure in SAP-WMS is ELECONG – Electrical Control Gear.

SKM noted that SunWater has allocated a standard run to failure asset life of 20 years and a maximum condition assessment frequency of every two years. SKM were not provided with a detailed description of this asset and, since the asset was installed post the 1996-97 valuation, a bill of materials (BOM) is not available from SunWater's SAP-WMS. SKM assume, however, that the equipment is related to low voltage, non PLC or SCADA based electrical control gear in the form of actuators and relay based controllers. As such, SKM consider an asset life allocation of 20 years and a condition inspection period to be reasonable.

SKM advised that SunWater has applied its risk evaluation method to this asset and determined, during the most recent risk assessment in 2005, that it has a Production/Operations and Stakeholder/Relations criterion consequence rating of minor (Score 8). This, together with a probability (likelihood of occurrence) score of 3 results in an overall risk score of 24 which, under SunWater's risk assessment method, places this asset in a Low risk category.

SKM viewed the WMS record for this asset and confirm that it has been allocated a Low risk rating. An overall risk category of Low should not trigger any reduction in the standard run to failure asset life of this type of asset and this was confirmed to be the case. Hence the risk adjusted run to failure asset life for this asset is 20 years (as per the standard asset life).

The next stage of SunWater's method for determining asset replacement/refurbishment timing is by means of adjusting the risk adjusted run to failure asset life according to the variance of the condition score of the asset, at the time the last condition assessment was undertaken, with the condition that the standard asset condition decay curve predicts at that time.

The last condition assessment, a Field assessment, was undertaken in 2006-07 with the highest scoring condition criteria (Internal Components - Age, Internal Components – Availability and Functionality) each being allocated a score of 3 (Moderate deterioration with minor refurbishment required to ensure ongoing reliable operation). SKM questioned the use of age as a criterion for assessing condition given that asset age is implicit and inherently built into the standard asset condition decay curve. By using age as a criterion for a particular asset precludes the option of extending the run to failure asset life of that asset in circumstances where its condition is superior to that which the decay curve would predict.

However, SKM noted that inputting a 2006-07 condition score of 3, a risk adjusted run to failure life of 20 years and in operation date of 1997-98 into SunWater's condition based replacement life adjustment modelling tool yielded a projected run to failure asset life of 24 years and a recommended condition based replacement date of 2021-22. SunWater stated that this demonstrates that its planned replacement date of 2018-19 is 'reasonable'. Given that one of the assessment scores relates to functionality and recognising that the failure mechanism for electrical equipment is different to civil or mechanical equipment in that sudden catastrophic failure can occur without prior warning, SKM considered that SunWater's proposal to maintain a standard asset life based replacement date of 2018-19, rather than extend the asset life by three years, as the planning tool would suggest, is reasonable.

However, SKM noted that this is very subjective, and it would be equally as justified to argue that SunWater should adopt the asset age extension suggested by the planning tool. If the replacement date were deferred to 2021-22, it would not make a material difference to the calculated overall renewals expenditure.

As such SKM considered the replacement date of 2018-19 to be prudent.

Efficiency Evaluation

SKM noted that for assets that are planned to be replaced five years or more hence of the planning date, SunWater uses a valuation method based on a BOM for the asset. The BOM has been developed from as built drawings and a 1996-97 value (determined from a 1997 valuation) attached to each item making up the BOM based on a 1997 valuation. The 1996-97 value for each line is then escalated by a multiplier determined by Cardno in a 2008 valuation. This multiplier varies according to the component type being escalated. For example, all electrical equipment should be escalated by a 2.13 multiplier. The sum of costs is then adjusted by an indirect multiplier to take account of renewals item replacement specific factors such location, project management costs etc.

However, as this asset was installed post the 1996-97 valuation, no BOM has been developed and stored in SAP-WMS for this asset. Therefore SunWater has based its asset replacement value on the original installed costs incurred in 1997-98. SKM noted an original installed cost from SAP-WMS of $152,216 (in 2007-08 dollars).

As there is no BOM in SAP-WMS, SKM were unable to benchmark the replacement costs for this renewals item. However it was noted that the original installed cost of $152,216 was re-valued during the 2007-08 revaluation to $308,584. During the 2007-08 revaluation, a standard multiplier of 2.13 for all electrical equipment was developed by SunWater's consultants. Applying this multiplier would yield a replacement value of $324,200.

However, SKM's comparison of the Cardno developed escalators with other indices for the period 1996-08, such as those produced by the Australian Bureau of Statistics (ABS), generally found the Cardno multipliers to be overstated. For example, for electrical equipment the ABS derived multiplier is 1.53 as compared to 2.13 for Cardno. If the ABS multiplier is used then the replacement value ($2007-08) becomes $233,000. Escalating to $2009-10 terms results in a replacement cost of around $250,000. SKM compared this cost estimate against SunWater's cost estimate (Table 4.13).

Table 4.13: Comparison of SunWater and SKM Cost Estimates ($2009-10)

SunWater	*SKM*	*Variance*
$308,584	$250,000	+23.2%

Source: SKM (2011).

SunWater's replacement cost is approximately 23% higher than SKM's estimate which is within the +30%/-20% range for a level 4 estimate.

SKM noted that a Planning Order has not yet been developed for this asset; as such, SunWater has not developed a breakdown of direct and overhead costs.

The renewals expenditure submitted by SunWater for replacement of this renewals item is within the estimating range of SKM's estimated cost. As such, SunWater's proposed renewals item value of $309,000 was considered to be efficient.

SKM's Summary and Conclusions

SKM agreed with the timing of the replacement of this asset and considered it prudent to include this asset's replacement value in this current renewals planning period. From internal benchmarking of the replacement costs, SKM were satisfied that the renewals item replacement value submitted by SunWater is efficient.

Authority's Analysis

For the Draft Report, the Authority accepted SKM's conclusion that the expenditure is prudent and efficient. The Authority proposes no change to this recommendation.

Item 2: Palm Tree Creek 900mm – Refurbishment of guard valve

SunWater proposed to refurbish the guard valve at a total cost of $25,000 in 2012-13.

Arup noted this item was listed as costing $22,000 in 2004-05, with a reschedule for every 15 years. However, Arup noted the item was listed for 2012-13. Arup considered that if this costing was obtained from 2004-05, and therefore last done in 2004-05, rescheduling to every 15 years would indicate that this item should be undertaken again in 2019-20, not 2012-13.

Item 3: Marian Weir

Draft Report

In the Draft Report, further planned expenditure on Marian Weir outlet works of $2.76 million ($4.844 million less $2.084 million already spent) was not included in SunWater's NSP pending a revision to the budgeted amount. As noted in regard to past renewals, SKM assessed this expenditure as not prudent and suggested that SunWater should consider other options (including a no-build option). The Authority's analysis of forecast renewals did not include any further expenditure on the Marian Weir outlet works.

Submissions Received from Stakeholders to the Draft Report

As detailed above, SunWater (2011as) submitted that the no-build option proposed by PVWater was unworkable and requested the Authority review its recommendation to exclude the investment as not being prudent. SunWater provided a letter from DERM approving the implementation program and requesting that the works be given priority for commissioning before 2009.

While it can be seen that SunWater has not completed the work within the timeframe requested by the regulator, the requirement for its completion remains in force.

In further support of the above, SunWater quoted the results from a SunWater modelling report which was undertaken in October 2007. Based on IQQM modelling, a valve size of 500ML/day is required to meet both WASOs and EFOs.

SunWater noted a suggestion made by Pioneer Valley Water Board that SunWater "surrender" part of its water access entitlement (WAE) "to replace supply reliability ….". This argument is not accepted by SunWater on the following grounds:

(a) this approach is not technically feasible and would not satisfy SunWater's compliance obligation. As may be gathered from the SunWater's comments above, it is not a simple matter of replacing 'reliability lost' as the Pioneer WRP requires both environmental flow objectives (EFOs) and WASOs to be met. Storage volume does not equate to system yield in the simple manner as suggested by the Water Board's sample calculation;

(b) the Authority's approach is counter to the Direction Notice which requires the Authority to have regard to SunWater's legitimate commercial interests, as SunWater should be free to decide how to deal with its WAE. SunWater Limited holds WAE in the Pioneer River scheme. SKM has confused SunWater's service obligations as owner of the bulk water supply scheme and holder of the resource operations license, with its legitimate commercial decisions to hold and deal with its WAE as it sees fit. SunWater should be no more obliged to consider 'surrendering' its WAE as a non-infrastructure solution, than any other WAE holder, including the customers of the Pioneer Valley Water Board. If the Authority continues to uphold the SKM recommendation, despite that recommendation being technically unworkable, it is effectively forcing SunWater to deal with its WAE in a particular manner, and blur the divide between SunWater's regulated and unregulated business activities; and

(c) even if SunWater were compensated for any 'surrender' of its WAE, the valuation of those WAE will be contentious, and inevitably lead to a regulatory value being ascribed to those WAE despite them being unregulated assets. Notably, those WAE are not (and should not be) declared for the purpose of monopoly prices oversight, and are not assets to which the Direction Notice applies. To continue to uphold the SKM recommendation would represent an expansion of scope of regulation that clearly falls outside the Authority's remit.

SunWater believed that the above response should be sufficient grounds for the report authors and/or the Authority to review the conclusions contained in the review with regard to the necessity and the timing of upgrading the outlet works capacity at Marian Weir. SunWater requested the Authority review its decision to find the expenditure not prudent (and partially not efficient) and allow the past and forecast expenditure.

SunWater advised that the contract to complete the works will be awarded via tender in 2012 with final costs dependent on the contractor's approach to the construction of the coffer dam. SunWater proposed that remaining expenditure of $2.76 million should be included in the renewals annuity calculation in 2012-13.

PVWater (2011e) submitted that it supported excluding all costs associated with the Marian Weir until an appropriate options analysis and customer consultations have been conducted. This could be achieved through the WRP process which is due for 2012-13.

In Round 3 consultations, stakeholders noted that the weir is not designed for the conditions under which it is operated. Stakeholders were concerned about the effect on prices if the Marian Weir upgrade works were re-instated. It was suggested that any under-recovery of renewals be offset against the 'above lower bound' revenue.

Authority's Response to Submissions Received on the Draft Report

The Authority's preceding analysis of expenditure to date on Marian Weir accepted that the initial investment was prudent in view of a clear instruction from DERM under then prevailing statutory requirements, but not efficient.

SunWater has still not completed the project to comply with the original DERM Direction, and substantial investment remains to complete the structure. The total projected cost for the project has since escalated four-fold, and expected completion is much later than required by DERM as regulator. This leaves open the option for alternative solutions to be reviewed. In this regard, the Authority is also aware that the ROP can be varied to take account of any changes arising from 10-year reviews of the WRP, as suggested by PVWater.

The Authority is particularly concerned if the ROP was to enforce a capital investment option that is not economically viable and not acceptable to stakeholders. The Authority does not have sufficient information at this stage to conclude on the costs and benefits of the investment or whether an alternative non-infrastructure option could have been adopted.

The Authority notes that if an infrastructure option results in cost reflective prices that are higher than current prices for irrigation, the Government would need to provide a CSO to cover the shortfall until charges can be raised sufficiently.

In response to issues raised by SunWater in response to PVWater's proposal of a non-structural option, the Authority has not suggested that SunWater should relinquish its WAE. Rather, the Authority suggested that SunWater should act commercially in conjunction with the technical regulator (DERM) and its customers, to review all infrastructure and non-infrastructure options to provide a least cost solution. An on-market buy-back of WAE is one feasible option, not necessarily requiring buy-back of SunWater's WAE.

While the value of any WAE held by SunWater is outside of the Authority's remit, the Authority's remit requires it to ensure that investment in new and replacement infrastructure is optimised.

The Authority considers that in view of the upcoming WRP review, and likely risks of further cost blow-outs due to uncertainties relating to the coffer dam, there is an opportunity for the prudency of the preferred option to be subject to further evaluation and consultation with stakeholders. Any such assessment should take into account that works completed to date are sunk costs. All opportunities for a lower cost option should be explored by SunWater and DERM.

In summary, the Authority considers that, for the above reasons, there is insufficient basis to include any forecast costs for Marian Weir in the renewals annuity at this stage. SunWater has not provided an updated estimate of costs for completion.

The Authority recommends that once the preferred option is identified following an appropriate consultation process, as part of the WRP review or separately, (involving irrigators, DERM and Treasury), the efficient cost should be considered as part of a within-period review or as part of the next regulatory review.

Item 4: Fabri-Dam replacement

Submissions Received from Stakeholders on the Draft Report

SunWater

SunWater (2011as) submitted that it has regulatory compliance requirements for the reinstatement of lost storage space caused by the deflation of four fabri-dam structures.

SunWater has sought advice as to preferred replacement options. Following an extensive assessment of benefits, costs and risks by both the expert consultant and SunWater it was concluded that non-structural options were not viable.

SunWater's independent consultant, following an extensive review and consultation process, shortlisted three structural options for detailed analysis:

(a) Obermeyer Gates;

(b) Tilting Crest Gates; and

(c) Overshot (Drop) Gates.

Based on preliminary design of Obermeyer Gates fitted on Claude Wharton and Bedford Weirs, SunWater has provided indicative total costs of $17.24 million for the two weirs in the Pioneer WSS (Dumbleton and Mirani).

SunWater did not agree with the Authority's approach proposed in its Draft Report to treat the projects as either end-of-period or mid-period adjustments. Rather SunWater considered it prudent to include the efficient cost of reinstating the lost storage capacity into the renewals profile.

SunWater submitted that if the Authority is to maintain its position that the costs of reinstating future storage capacity will be determined at a later time, it should, as a minimum, include in the current renewals annuity the replacement cost for the inflatable rubber dams that would have occurred if not for the Bedford Weir incident. This preserves the 'status quo' and provides a baseline from which decisions can be made following the legal action, and ensures the renewals annuity is not set artificially low.

The like for like replacement cost for the inflatable rubber dams is estimated to total $6.135 million for Dumbleton and Mirani Weirs in 2013-14. The costs are based on an estimate of $2.045 million per bag (2 on Dumbleton and 1 on Mirani).

SunWater's Industrial Special Risk (ISR) policy is limited to the replacement value of the Bedford inflatable rubber dam as at the date of the incident, less the deductible and it is unlikely that any substantial positive return would result from an insurance claim.

Other Stakeholders

In an initial submission, PVWater (2011e) supported the Authority in excluding all costs associated with the fabridams pending the outcome of the legal investigation of the Bedford Weir incident. PVWater did not support inclusion of any costs associated with the fabri-dams until it has participated in open consultation including full options analysis.

PVWater noted that, in regard to the Dumbleton Weir fabridam, a previous contribution of $2.2 million (1997 dollars) as part of local funding for the Teemburra Dam Project should be considered in all future deliberations on the matter.

In responding to SunWater's submission (above), PVWater expressed concern that SunWater's estimated costs for re-instatement of a structural option appeared arbitrary and should have varied between the fabri-dams in the different schemes. PVWater noted that rubber dam heights vary from 1.2 metres at Bedford Weir to 2 metres at Dumbleton Weir and crest lengths vary from 120 metres at Mirani Weir to 185.9 metres at Bedford Weir.

PVWater suggested that SunWater should provide improved cost estimates for the 4 affected weirs. PVWater also noted that funds should have been collected over previous price paths for renewal of the fabri-dams. The matter of re-instatement of the fabri-dams should also be addressed as part of the 2012-13 WRP review process, which provides an appropriate forum for stakeholder consultation.

In Round 3 consultations, stakeholders were concerned that if fabri-dams are not replaced, then the issue of over-allocated water needs to be addressed. Stakeholders suggested this be purchased from the scheme.

Authority's Response to Submissions Received on the Draft Report

The Authority notes SunWater's submission that it has regulatory compliance requirements to reinstate the lost storage space in the weirs.

In December 2011 DERM as technical regulator requested SunWater to provide details of when its intentions and commitments in regard to the affected weirs will be resolved as the Pioneer Water Resource Plan (WRP) is due to be reviewed prior to 2013. SunWater indicated (as noted in its submission to the Authority) that further analysis is being undertaken of the structural versus non-structural options for Dumbleton and Mirani Weirs before the business case is finalised.

The Authority considers that SunWater's $17.4 million proposed structural solution involves a significant capital investment which should at least be subject to a wider analysis to ensure it provides the least cost solution for the scheme as a whole.

This should involve SunWater consulting with DERM and customers, particularly irrigators, in relation to pricing impacts of proposed structural options, and service quality impacts of other non-structural options. Alternative options involving trade-offs between cost and service standards may be considered and presented to relevant regulators as justification for an amendment to SunWater's regulatory compliance requirements.

SunWater has not yet finalised its cost estimates and has provided indicative estimates only. As noted by PVWater, the cost estimates provided by SunWater are high-level and do not appear to be tailored to the individual characteristics of the weirs.

In summary, there are a number of unresolved issues that will determine the cost that should be borne by irrigators in relation to reinstatement of lost capacity. The Authority considers that there is insufficient basis to include proposed structural capacity re-instatement costs in the renewals annuity at this stage.

The Authority notes SunWater's proposal to include, as a minimum, like-for like fabri-dam replacements to maintain the status quo of renewals reserves. While this option may minimise the need for an increase in the renewals annuity at a later date, concerns are that:

(a) the renewals annuity would be adjusted for the cost of an option that is known to be the least preferred response; and

(b) SunWater has not justified why its proposed 'status quo' approach was not adopted in its original submission to the Authority. SunWater indicated that the cost of like-for-like fabri-dam replacements were excluded from renewals forecasts, that is, no provision for their replacement was ever made in the renewals annuity; and

(c) legal issues and insurance claims remain pending (as noted above).

The Authority therefore proposes not to accept this approach, given that the replacement of fabri-dams option will not be adopted.

In summary, the Authority considers that, for various reasons including outstanding legal issues and incomplete business cases, there is insufficient basis to include any fabri-dam replacement or capacity re-instatement costs in the renewals annuity at this stage for Pioneer WSS.

The Authority recommends that once the preferred option is identified following an appropriate consultation process (involving irrigators, DERM and Treasury), the efficient cost should be considered for pass-through to renewals costs as part of a within-period review or as part of the next regulatory review.

Item 5: Palm Tree Creek Outlet Valve

Submissions Received from Stakeholders on the Draft Report

<u>SunWater</u>

SunWater provided details on an additional $770,000 required to address remaining issues with the Palm Tree Creek outlet valve. The additional details are noted below.

There has been a history of problems associated with the Palm Tree Creek outlet regulating valves as highlighted in SKM's review of past renewals expenditure.

Given the long history of difficulty, an internal multidisciplinary engineering team was established to undertake a detailed investigation into the cause of the failures, and to recommend solution options for the pipeline and valve continuing operations.

This work has now been completed, and has been peer reviewed by industry specialists. Consultation has been ongoing with the Pioneer Valley Water Co-operative.

The engineering challenge for this project is to effectively manage the high energy generated by the dynamics of the pipeline system. The Palm Tree Creek pipeline is 1.9km in length and falls approximately 183m. The pipeline was designed for a flow rate three times more than that required for the Palm Tree Creek outlets current operating needs. The energy contained in the Glenfield valve which currently exits through four water jets is approximately 4.4MW.

At the valve the water jets exit with very high velocities through ports. As a design principle, the smaller the port the higher the velocity. In this case the exit velocity is in the order of 50m/s.

The velocity of the jets slows as it loses concentration (dissipates) through the outlet chamber that is full of water. The reduced velocity jets strike the chamber walls at about 14m/s. Because there is a lot of energy (1.1MW) contained in each narrow water jet impacting on a small surface area, this causes the vibration within the chamber walls. This vibration permeates the discharge chamber causing stress to the metal components, especially the welded joints.

This velocity induced vibration is the root cause of the premature failures of the Kvaerner and Glenfield valves used in the past.

Engineering Solution

The energy contained within a jet of water is a function of the velocity squared. In other words should the water jet velocity double then the energy in that jet increases four-fold.

As a rule of thumb, the recommended design velocity of water in a cement lined pipe is limited to a maximum of 6m/s. The velocities as described above are certain to generate problems within any system.

The engineering challenge is managing the energy concentrated through a small number of high energy jets. The approach therefore is to change the dynamics of the problem. The most efficient answer is to increase the total area of the exit ports the water must pass through, thereby reducing the exit velocities. If the number of jets is increased significantly and also point in all directions (dispersed more uniformly) around the chamber then the velocities can be reduced to more acceptable levels.

If these 2 elements are incorporated into a new design, then the resultant forces applied to the chamber walls per unit area will be reduced and the level of vibration significantly moderated.

The second source vulnerability in the design of the previous valves is the existence of moving parts and welded seams. Therefore an optimum solution should seek to eliminate these aspects.

Recommended engineering option

The recommended option is to install fixed ‘pepperpot’ ported spool in combination with an additional guard valve into the pipeline as preferred to resolve the issues.

With the existing temporary pepperpot, the releases are started by opening the existing guard valve in a mode for which it was not designed. The proposed second guard valve will be specifically designed for the purpose, thereby ensuring the integrity of the guard valve and the pipeline are maintained. The guard valve will operate in the fully open or fully closed position

A new fixed ‘pepperpot’ ported spool device will be fabricated and installed at the bottom of the dissipation pit. This will enable limited incremental flow adjustment to be achieved by way of closing off selected ports, providing four possible flow rates of 50, 100, 150 or 200ML/d.

The pepperpot arrangement diffuses the concentrated powerful water jets impacting the chamber walls (~6m/s compared to ~14m/s) and will result in a greatly reduced level of vibration. By halving the velocity the kinetic energy is reduced to a quarter. The pepperpot also distributes the jets all around the chamber instead of four powerful jets targeted to the corners

Operational Considerations

Two ‘pepperpot’ spools have been used to date to deliver water from the pipeline at flow rates of 100ML/d and 150ML/d.

The disadvantage of the pepperpot is that adjustment of flow is achieved only in a limited number of discreet steps and the adjustment is a manual process. The infrequent operational changes to the flow rate require the pit to be pumped dry, this can take up to 8 hours to achieve. It is not envisaged that these changes would be required more than a few times a year.

Installation of the second valve has two major benefits. The valve provides an effective double isolation point for the outlet works and allows PVWC to continue using water without interruption should work be required within the outlet chamber. PVWC strongly support this enhancement.

SunWater also has specific requirements regarding releases to satisfy demands or fill downstream weirs within its resource operating license. A letter has been sent to DERM in December 2010 seeking approval to proceed with this arrangement. Although we have not yet received a response, it is not anticipated that DERM will be concerned with the proposal.

Project cost and timing

The current cost estimate to complete the project is $770,000. The estimate is in addition to the cost to date. The cost estimate will be refined following the detailed design and procurement phases. Stages still to follow are detailed design, procurement, supply and installation and commissioning.

The time frame to complete this project is approximately 6 months from January 2012.

Conclusion

The project to replace the guard valve and reconfigure the submerged dissipater system at Palmtree Creek outlet works is considered prudent to overcome deficiencies that have potential safety implications:

The two valves that were previously used in this application were unsuitable due to the high energy that was being dissipated that caused extreme vibration within the chamber. A sudden uncontrolled closure of the valve would potentially cause the pipe to rupture

The guard valve was not capable of closing under ‘open pipe flow conditions’.

By utilising the proposed arrangement in the chamber that has no moving parts allowing the energy to be widely distributed thereby reducing the level of vibration to an acceptable level and thus avoiding potentially serious consequences.

The guard valve needed to be replaced to cater for the higher duty and to allow people to work within the chamber whilst the pipe in front of the valve was full and allows Pioneer Valley Water to continue taking water simultaneously.

For this project it was very important to have a reliable robust solution that was peer reviewed by recognised experts within water-hammer and high head pipeline systems similar to ours.

The proposed engineering solution is simple, the technology is well understood and it will eliminate moving parts and welds. It can also be described as a low cost solution compared with all the other options considered.

The proposed solution has been peer reviewed, and independently endorsed.

The only disadvantage to the proposed design is that adjustment to flow is limited and will be a manual task. However the frequency of flow changes is low and it can be completed in a safe manner, typically less than 8 hours.

The proposed solution has been discussed with the PVWC, and they are supportive of the arrangement.

SunWater requests that the QCA allow the expenditure on the proposed solution in the renewals profile for the scheme.

Other Stakeholders

In response to SunWater's submission, PVWater submitted that no part of SunWater's proposed 2012-17 expenditure should be allowed as the original design of the outlet appears to have been sub-standard and appropriate action was not taken immediately following failure of the first valve to reassess the design.

SKM's Review

The additional cost of $770,000 to address the Palm Tree Creek outlet valve was not identified by SunWater prior to the Authority's Draft Report. The Authority engaged SKM to review this expenditure.

SKM noted that the annuity item is for the installation of an isolating valve and an energy dissipation device, referred to as a 'pepperpot' ported spool, at $770,000.

This project concerns the outlet regulating valve to Palm Tree Creek. Water from Saddle Dam No 2 enters a 2 km long, 1,200 mm diameter pipeline which discharges into Palm Tree Creek some 186 metres below the dam. The outlet regulating valve has a history of failures since installation in 2001. This report will determine the prudency and efficiency of the proposed installation of a butterfly valve and the pepperpot ported spool energy dissipation device.

<u>Prudency Review</u>

SKM noted that SunWater has undertaken two condition assessments. In 2001, the assessment stated: '*Valve under repair during inspection. Excessive vibration was a concern. Modification underway*'. In 2006 a second condition assessment was undertaken. This is in line with SunWater's policy of a minimum recommended assessment frequency for valves as five years. In the 2006 condition assessment, it was noted '*Regulator valve and vanes have failed in service, unable to repair, must be replaced*'. The score for the asset was six, with both categories of 'Operation' and 'Function' receiving maximum scores of six, indicating that the asset is unserviceable and not capable of meeting its intended function.

The recorded condition assessments support the project history as recorded above, and support the replacement of the AVK/Glenfield valve.

SunWater undertook a risk assessment of the valve in February 2009. The identified risk was 'Failure to control release from dam'. The assessment resulted in a low risk for all three asset/business risks.

SKM considered that SunWater has followed the policies and procedures that it has in place.

SKM noted that the Executive Management Committee paper of December 2010, stated: 'A multidisciplinary team from Infrastructure Management and Infrastructure Development undertook a detailed investigation to the cause of the failures and developed 14 possible options that would mitigate the serious risks the Glenfield valve presents'. However, the 14 options were not disclosed.

Further documentation provided for SKM's review showed that a workshop took place to determine the need for a single or double valve. The outcome of this workshop concluded that there was no need to install a double valve system.

The proposed solution is to remove the existing Glenfield 4 ported body, replace this with a new pepperpot ported spool that will be manually adjusted, and install a new guard valve that is specifically designed for the operating conditions. The flow rate of the proposed pepperpot will require manual adjustment. For this to take place the guard valve will be closed and the chamber will be required to be emptied. It is anticipated that the frequency of this setting will be low as it is expected that it will take approximately hours hours to change the flow conditions.

SunWater advised SKM that a replacement guard valve is required as the current valve is not capable of closing in an 'open pipe' situation. A re-designed pepperpot flow control unit is required to replace the temporary pepperpot following failure of the flow control valve to improve the turn-around times to adjust the level of flow to meet customer service requirements.

In consultation with PVWater it was noted that a minimum flow of 50 ML/day in four increments of 50 ML/d to a maximum of 200 ML/d would be acceptable to PVWater.

SKM considered the options investigated reasonable and considered the approach/method followed to be in keeping with good industry practice.

In reviewing the past renewals component of the report it stated that in 2009, the AVK/Glenfield valve was removed and the pepper-pot reinstalled with no internals. The flow is regulated by opening and closing the guard valve, a 900mm butterfly valve, which was not specifically designed for this operation.

SKM agrees that the existing operating regime poses long term consequences should this method of operation continue and is only intended to be a temporary solution until such time that the permanent solution is implemented. SKM considered it prudent to complete the installation in a timely manner and therefore SKM has determined the timing of the permanent solution to be prudent.

On the understanding that SunWater's policies for adjusting refurbishment periods and assessing asset condition have been followed, SKM concluded that the need for replacement of this annuity asset has been demonstrated as prudent both on operation and safety grounds.

<u>Efficiency Evaluation</u>

For asset works where the planned replacement date is within five years from the planning date, SunWater's planning team determines a detailed estimate for the proposed works.

The cost estimate contained within SAP for this project is $769,950. This estimate contains various sub items:

(a) Commercial Contractor - $210,000;

(b) Materials – Non-Inventory - $279,000;

(c) SunWater overheads - $118,513;

(d) SunWater indirect cost - $81,807; and

(e) Construction monitoring and design - $80,630.

From the above it can be seen that SunWater's overheads and indirect cost is 41% of the construction (Contractor and materials) cost and that the construction monitoring and design costs are 16.5% of the Construction (Contractor and materials) cost. These percentages are within the expected limits based on the expected construction cost. SunWater proposes to go to tender for the construction component of this project.

The past capital expenditure shows that the replacement of only the valve was awarded for $298,785 in 2007 (adjusted to $343,920 using the CPI from June 2007 to December 2011). Taking into consideration that the above value only includes for the replacement of the valve, it is reasonable to expect that the "pepperpot" ported spool device will cost a third of the valve to supply and install.

Based on the above SKM estimated the construction (contractor and materials) to cost $458,559. After including 45% for SunWater's overheads and indirect cost ($206,351) and a nominal 17% for the design and construction monitoring components ($77,955) the total cost is estimated to be $742,865, or 3.5% less than the annuity value submitted. SKM does not consider this variance to be significant and therefore found the submitted annuity value to be efficient.

<u>SKM's Summary and Conclusions</u>

SKM was satisfied that the timing and need for replacement of this annuity item is prudent, and the cost of replacement is efficient.

Authority's Response to Submissions Received on the Draft Report

The Authority accepts that the proposed project is prudent as a long term solution is clearly required to enable effective and safe operations. SKM has also endorsed the efficiency of the proposed expenditure.

The Authority notes that the proposed works represent the third attempt by SunWater to repair a specific problem. The first attempt was outside of the Authority's remit (before 2006-07) and was not reviewed. In the Authority's Draft review, the second attempt was found to be prudent but not efficient, and the Authority in its Draft Report excluded 30% of the costs. Both previous attempts failed to resolve the problem.

As noted above, the Authority now considers that, in the light of an apparent solution, the previous failed solution should be excluded, on the grounds that, in a competitive market, a service provider would be unable to recoup the full costs of every attempt to correct the same problem. As noted above, the Authority recommends that the cost of the AVK/Glenfield valve be excluded.

It is recommended that the cost of the proposed final solution ($770,000) be accepted as prudent and efficient, in place of the previous expenditure.

Item 6: Palm Tree Creek Pipeline Rupture Discs

Submissions Received from Stakeholders on the Draft Report

In an initial submission, PVWater (2011e) noted that $98,000 is included for replacement of rupture discs on the Palm Tree Creek Pipeline in 2017-18. PVWater's understanding was that these discs will not be required with the proposed outlet arrangements and these costs should be removed.

SunWater (2011as) advised that this provision was made on the basis of the infrastructure as at September 2010. Once the modifications are made to the infrastructure a new forward works plan will be developed based on the new configuration. SunWater suggested that while the rupture discs will not be in the forward program, expenditure will still be incurred in servicing, refurbishing and replacing the new kit. The costing should remain in place in lieu of an alternative.

Authority's Response to Submissions Received on the Draft Report

The Authority understands that the proposed solution obviates the need for the expenditure on rupture discs. The Authority proposes to remove this item.

Conclusion

Draft Report

In the Draft Report, two items for the Pioneer River WSS were sampled, both of which were considered to be prudent and efficient but could be deferred.

Further, as noted in Volume 1, after a consideration of all its consultants' review, the Authority recommended that a 10% saving be applied to the direct costs of all non-sampled and sampled items for which there was insufficient information.

In total, the Authority's Draft Report recommended the direct renewals expenditure be adjusted, as shown in Table 4.14.

Final Report

Following SunWater's submission, with new information and further analysis, the Authority recommends the following changes from the Draft Report:

(a) the fabri-dam replacement costs be excluded, pending further review;

(b) the cost of the Palm Tree Creek outlet valve replacement be included as prudent and efficient, with a retrospective adjustment to exclude the previous failed solution, as noted above; and

(c) Palm Tree Creek Rupture Disks be excluded as that the proposed solution obviates the need for the expenditure on rupture discs.

As outlined in Volume 1, the Authority undertook further sampling of forecast renewals expenditures across SunWater's schemes. For the Final Report, the Authority recommended that a 20% saving be applied to the direct costs of all non-sampled and sampled items for which there was insufficient information.

Table 4.14: Review of Forecast Renewals Expenditure 2011-36 (Real $'000)

Item	*Year*	*SunWater ($'000)*	*Authority's Draft Report Findings*	*Draft Recommended ($'000)*	*Authority's Final Report Findings*	*Final Recommended ($'000*
Sampled Items						
1. Dumbleton Weir - replacement of control equipment	2018-19	382	Prudent and efficient	382	Prudent and efficient	382
2. Palmtree Creek Pipeline – guard valve	2012-13	25	Prudent, but deferred to 2020	25	Prudent, but deferred to 2020	25
3. Marian Weir	2012-13	2,760	Not prudent	0	Excluded pending review of options	0
4. Fabri-Dam replacement	2013-14	6,135	N/a	N/a	Pending legal issues and further review	0
5. Palm Tree Creek Outlet Valve	2012-13	770	N/a	N/a	Prudent and efficient	770
6. Rupture Discs	2017-18	98	Not reviewed	10% saving applied	Not prudent	0
Non-Sampled Items				10% saving applied		20% saving applied

Source: SunWater (2011), Arup (2011), SKM (2011, 2012) and QCA (2011, 2012).

4.6 SunWater's Consultation with Customers

Draft Report

Submissions

SunWater (2011b) submitted that through IACs customers are:

(a) able to offer suggestions on planned asset maintenance which are considered by SunWater in the context of asset management planning;

(b) consulted on various operational and other aspects of service provision, including the timing of shutdowns and managing supply interruptions; and

(c) provided with information about renewals expenditure, particularly where supply interruptions may result.

Nonetheless, SunWater noted opportunities for greater consultation with irrigators do exist.

PVWater (2010) submitted that for the determination of pricing it is critical to establish the efficient costs for the service provider to provide that service. However, during negotiations for the current price path there was uncertainty by customers as to the accuracy of the efficient cost information presented by SunWater. It was recommended from those negotiations that a customer reporting framework be developed to provide feedback of SunWater's implementation of incentives to reduce efficient costs. PVWater submitted that to date this has not occurred, which further questions the validity of the efficient cost data used for that exercise.

PVWater (2011a) expressed concern that the renewals spend for the current price path has occurred without any formal notification to customers by SunWater of the significant expenditures proposed outside of that understood to be included in the 2006-11 price path.

Authority's Analysis

In the Draft Report, the Authority noted customers' concerns about the lack of involvement in planning future renewals expenditure.

In the context of the Draft Report, the Authority recommended that there be a legislative requirement for SunWater to consult with customers about any changes to its service standards and proposed renewals expenditure program. SunWater should also be required to submit the service standards and renewals expenditure program to irrigators for comment whenever they are amended and that irrigators' comments be documented and published on SunWater's website and provided to the Authority.

Submissions Received from Stakeholders on the Draft Report

SunWater (2011as) submitted that the nature and extent of stakeholder consultation is ultimately a matter for SunWater and its customers. SunWater submitted that costs would be involved in implementing the Authority's recommendations and that the Authority had failed to establish that the benefits outweighed the costs.

SunWater considers that although it is crucial that SunWater retains ultimate control over decisions regarding renewals expenditure, opportunities to improve information provided to customers that does not involve legislative amendment do exist.

PVWater (2011e) submitted that it supported the Authority's recommendation that there be a legislative requirement for SunWater to consult with its customers.

In Round 3 consultations, stakeholders suggested that SunWater should always consult with customers regarding expenditure on the scheme. SunWater should consult with customers on how to proceed with the replacement of fabri-dams.

Further, stakeholders stated that SunWater's costs categories keep changing so it is very difficult to track costs over time. They suggested a template be developed for SunWater to present its costs so that they can be tracked from one review to the next.

Authority's Response to Submissions Received on the Draft Report

In response to SunWater's concerns that excessive costs will be incurred undertaking consultation, the Authority considers that SunWater's estimated cost is modest compared to total renewals spend, as noted previously. The benefits of greater consultation are likely to outweigh the costs, as noted in Volume 1.

In addition, the Authority agrees that SunWater maintain ultimate control over its renewals annuity program. However, the Authority considers that customer consultation has not been adequate under current legislation (despite explicit recommendations of the past price review) and, as a consequence, SunWater should be more formally obliged to undertake consultation.

The Authority notes PVWater's comment and proposes no change to its recommendation.

4.7 Allocation of Headworks Renewals Costs According to WAE Priority

Draft Report

Previous Review

For the 2006-11 price path, the renewals costs for bulk water infrastructure were apportioned between priority groups using converted nominal water allocations. The conversion from high priority A to high priority B was determined by a WPCF of 1.5: 1, that is, one ML of High A Priority WAE was considered equivalent to 1.5 ML of High B priority WAE.

Stakeholder Submissions

<u>SunWater</u>

For the 2012-17 regulatory period, SunWater proposed that renewals costs for bulk water infrastructure be apportioned in accordance with the share of utilisable storage headworks volumetric capacity dedicated to that priority group – as measured by the headworks utilisation factor (HUF).

SunWater submitted that, in general, the HUF allocates a greater proportion of capital costs per ML to high priority WAE. Specifically, the HUF methodology takes into account water sharing rules, critical water sharing arrangements (CWSAs) and other operational requirements that typically give high priority entitlement holders exclusive access to water stored in the lower levels of storage infrastructure.

SunWater (2010d) submitted a detailed outline of the HUFs methodology, outlining its derivation and application for each scheme. This methodology, discussed in detail Volume 1, can be summarised as follows.

Step 1: Identify the water entitlement groupings for each scheme, as listed in DERM's Water Entitlement Register, and establish which groups are to be considered as high priority (HP) and medium priority (MP) for the purposes of the HUFs calculation[3].

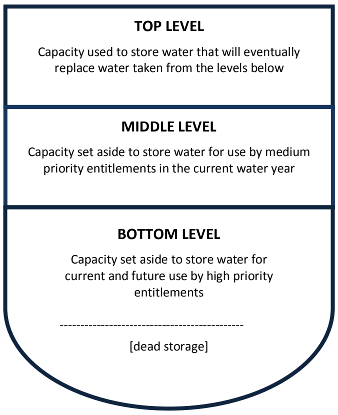
Step 2: Determine the volumes associated with the high and medium priority groupings identified in Step 1, taking into account any allowable conversion from medium to high priority under the scheme's ROP.

Step 3: Determine the extent to which water sharing rules, CWSAs and other operational requirements give the different water entitlement priority groups exclusive or shared access to capacity components of the storage infrastructure.

This step divides the storage infrastructure into three levels: the bottom layer, which is exclusively reserved for high priority; the middle layer, which is effectively reserved for medium priority; and the top layer, which is shared between the medium and high priority groups.

[3] If more than two priority groups exist, water sharing rules and other differentiating characteristics are taken into account to determine whether they are included in the high or medium priority grouping, or neither.

Step 4: Assess the hydrological performance in 15-year sequences of each layer identified in Step 3 to determine the probability of each component of headworks storage being accessible to the relevant priority group.



Step 5: Calculate the percentage of storage headworks capacity to which medium priority users have access for each of the 15-year sequences analysed in Step 4:

$$\frac{MP\ Utilised\ Capacity}{Total\ Utilised\ Capacity} = \frac{MP_{1(utilised)} + MP_{2(utilised)}}{MP_{1(utilised)} + HP_{1(utilised)} + MP_{2(utilised)} + HP_{2(utilised)}}\ (\%)$$

Set the HUF_{mp} equal to the minimum of these values to reflect the worst 15-year period (HUF_{hp} = 1-HUF_{mp}).

If more than two types of water entitlements were aggregated in Step 1 these are then disaggregated.

The parameters used for determining the HUFs for the Pioneer River WSS are summarised in Table 4.15. The HUFs for this scheme (SunWater, 2010d) are 44% for High B priority and 56% for High A priority.

Table 4.15: Application of HUFs Methodology

STEP 1: Water Entitlement Groups (DERM's Water Allocation Register)

Nominal Group	(ML)	HUF Group	(ML)
High B Priority	47,357	MP_A	47,357
High A Priority	30,753	HP_A	30,753

STEP 2: ROP Conversion Factor Adjustment

Conversion Factor: ROP_{CF}	N/A
Maximum volume of HP: $HP_A max$	30,753
Corresponding volume of MP: $MP_A min = MP_A - (HP_A max - HP_A) * ROP_{CF}$	47,357

STEP 3: Water Sharing Rules & Operational Requirements

Water Sharing Rules	
Volume below which MP not available: MP_0AA	44,035
Volume above which max. MP available: $MP_{100}AA$	102,292
CWSAs and other operational requirements	
Likely increase in volume effectively reserved for HP: MP_0	51,065
Likely increase in min. storage before maximum MP available: MP_{100}	102,292
Key Dam Level Measures	
Full Supply Level: FSV_{hwks}	164,980
Dead Storage Level: DSL_{hwks}	8,950

STEP 4: Hydrologic performance of headworks storage

Storage Layer	Storage Capacity (ML)	Prob. of Utilisation	Utilised Capacity (ML)
Top: $\max\{(FSV_{hwks} - MP_{100}), 0\}$*	MP_2 = 34,404; HP_2 = 28,284	19%	MP_{2u} = 6,494; HP_{2u} = 5,339
Middle: $\min\{(MP_{100} - MP_0), (FSV_{hwks} - MP_0)\}$	MP_1 = 51,227	55%	MP_{1u} = 28,375
Bottom: MP_0 - DSV_{hwks}	HP_1 = 42,115	95%	HP_{1u} = 39,944

STEP 5: Calculation of HUFs for each Water Entitlement Group

Formula	HUF Group	Nominal Group
MP_A: $(MP_{1u}+MP_{2u}) / (MP_{1u}+HP_{1u}+MP_{2u}+HP_{2u})$ = (28,375+6,494) / (28,375+39,944+6,494+5,339)	HUF_{mp} = 44%	High B Priority = 44%
HP_A: $(HP_{1u}+HP_{2u}) / (MP_{1u}+HP_{1u}+MP_{2u}+HP_{2u})$ = (39,944+5,339) / (28,375+39,944+6,494+5,339)	HUF_{hp} = 56%	High A Priority = 56%

**Apportioned between MP_2 and HP_2 using the ratio MP_1:HP_1. Source: SunWater (2010d).*

<u>Other Stakeholders</u>

PVWater (2011a) expressed support for the HUFs methodology, but advised that they have been unable to reconcile the calculation presented for the Pioneer River WSS in SunWater's Technical Report. In their submission, PVWater identified several discrepancies between

SunWater's calculations and its application of the Water Sharing Rules outlined in ROP, and concluded that further detail on the HUF calculations is required.

In a later submission (2011b), PVWater submitted that the HUF approach should not be used as it is a new concept proposed by SunWater for the next price path. PVWater preferred the previous approach of a converted nominal allocation basis.

MIS (2010) submitted that, in principle:

(a) they support the use of the HUFs methodology as the mechanism to enable users' share of capital costs to be distributed on the basis of the different benefits enjoyed by different priority entitlements; and

(b) that the HUF method be assessed on the basis of the performance of each scheme of the 15-year term which reflects the poorest hydrological performance for supply for medium priority use.

However, MIS considered that a detailed explanation of the HUF calculation is required for each scheme, including the reasons for choosing the 15-year period and the correlation with the ROP water sharing rules. Additionally, SunWater owned high priority entitlements should be included in the HUF calculation for Teemburra Dam.

MIS also noted that while the HUF methodology allocates capital costs according to the benefits enjoyed by different priority groups, it does not establish what the users' share of the capital costs should be. MIS recommended that the users' share of capital costs should be established using the cost sharing ratios of the initial capital investment in the scheme.

Authority's Analysis

The Authority commissioned Gilbert & Sutherland (G&S) to conduct an independent review of SunWater's proposed HUFs methodology. G&S (2011) concluded that the input data and model sources were appropriate, calculations were accurate to the method and input data utilised, the methodology exhibits rigour and is generally robust in providing consistent outcomes. G&S also recommended some amendments to SunWater's approach.

As discussed in Volume 1, the Authority endorsed SunWater's proposed approach for the allocation of capital costs, subject to the following amendment proposed by G&S that the method for apportioning the top layer of storage between medium and high priority be modified to reflect the ratio of nominal volumes rather than ratio of MP_1:HP_1.

SunWater (2011x) accepted these recommendations and submitted recalculated HUFs for each scheme. For the Pioneer River WSS, the revised ratio resulted in no material changes in the HUF values (Table 4.16).

Table 4.16: Revised HUF Calculations

STEP 4: Hydrologic performance of headworks storage

Storage Layer	Storage Capacity (ML)	Prob. of Utilisation	Utilised Capacity (ML)
Top layer			
Initial	MP_2 = 34,404; HP_2 = 28,284	19%	MP_{2u} = 6,494; HP_{2u} = 5,339
*Revised**	MP_2 = 38,007; HP_2 = 24,681	no change	MP_{2u} = 7,174; HP_{2u} = 4,659
Middle Layer	MP_1 = 51,227	55%	MP_{1u} = 28,375
Bottom Layer	HP_1 = 42,115	95%	HP_{1u} = 39,944

STEP 5: Calculation of HUFs for each Water Entitlement Group

	Initial	Revised	Nominal Group
HUF_{mp}	44%	44%	High B Priority = 44%
HUF_{hp}	56%	56%	High A Priority = 56%

**Apportioned between MP_2 and HP_2 using the ratio of nominal volumes (MP_A:HP_A). Source: SunWater (2011x).*

The Authority estimated that based on the HUF methodology, the conversion for high priority B to high priority A would be 2.0:1. This compares with the water pricing conversion factor of 1.5:1 used for 2006-11 price paths. Further, the Authority notes that under the HUF approach, High B priority irrigators will now pay 44% of the cost of renewals whereas previously these irrigators paid 51%.

In relation to issues raised by stakeholders:

(a) the above overview should provide greater clarity in regard to how the HUF applies. While it is a new concept, the Authority considers that it is an appropriate approach as it takes into account a wider range of variables reflecting the costs of providing higher priority water;

(b) the basis for using the 15-year period is discussed in Volume 1;

(c) SunWater owned high priority volumes are taken into account; and

(d) the HUF approach would apply to all capital related costs associated with the storage and bulk functions of a scheme.

Submissions Received from Stakeholders on the Draft Report

PVWater (2011e) submitted that, for the 2006-11 price path, High B WAE was assigned 54.5% of lower bound costs, and this equates to a water pricing conversion factor of 1.3:1, rather than 1.5:1.

Authority's Response to Submissions Received on the Draft Report

The Authority agrees with PVWater that although a conversion factor of 1.5:1 was identified by SunWater, the actual conversions were consistent with a factor of 1.3:1. While the Authority is unable to explain the discrepancy, and SunWater has provided no explanation, it has no bearing on the current HUF approach being adopted for the 2012-17 price paths.

The Authority therefore proposes no change to its Draft Report conclusions.

4.8 Calculating the Renewals Annuity

Draft Report

In Volume 1, the Authority recommended an indexed rolling annuity, calculated for each year of the 2012-17 regulatory period.

For the Pioneer River WSS, the draft recommended renewals annuity for the 2012-17 regulatory period was identified in Table 4.17.

The table showed the total renewals annuity recommended by the Authority and the component amounts for High B and High A priority customers. Also presented for comparison were SunWater's total renewals annuity for 2006-11 and SunWater's proposed total annuity for 2012-16. SunWater did not submit a disaggregation between priority customers.

Final Report

For the Final Report, there have been a number of changes to the Authority's recommended forecast renewals annuity including:

(a) a change in the review of specific past renewals items:

  (i) removal of all expenditure on the Palm Tree Creek outlet valve;

  (ii) reinstatement of $1.08 million in expenditure on Marian Weir;

  (iii) exclusion of flood damage repair costs;

(b) application of a 4% saving to non-sampled items and sampled past renewals items for which there was insufficient information (instead of 10% in the Draft Report);

(c) a change in the review of specific forecast renewals items:

  (i) inclusion of the Palm Tree Creek outlet valve solution;

  (ii) exclusion of fabridam (not previously proposed) and rupture discs costs; and

(d) application of a 20% saving to non-sampled items and sampled forecast renewals items for which there was insufficient information (instead of 10% in the Draft Report).

The revised renewals annuities are compared to the Draft Report recommendations in Table 4.17.

Table 4.17: Pioneer River WSS Renewals Annuity (Real $'000)

	2006-07	*2007-08*	*2008-09*	*2009-10*	*2010-11*	*2011-12*	*2012-13*	*2013-14*	*2014-15*	*2015-16*	*2016-17*
Draft Report											
Total SunWater	275	287	328	380	373	837	824	816	810	798	798
Total Authority	-	-	-	-	-	-	131	139	148	148	156
High A Priority	-	-	-	-	-	-	72	76	82	82	86
High B Priority	-	-	-	-	-	-	59	62	67	67	70
Final Report											
Total Authority							403	402	403	394	394
High A Priority							225	225	225	221	220
High B Priority							178	177	177	174	174

Note: Includes indirect and overhead costs relating to renewals expenditure, which is discussed in Chapter 5.
Source: Actuals (SunWater, 2011) and Recommended (QCA, 2011, 2012).

5. OPERATING COSTS

5.1 Background

Ministerial Direction

The Ministerial Direction requires the Authority to recommend a revenue stream that allows SunWater to recover efficient operational, maintenance and administrative (that is, indirect and overhead) costs to ensure the continuing delivery of water services.

Issues

To determine SunWater's allowable operating costs for 2012-17, the Authority considered the following:

(a) the scope of operating activities for this scheme;

(b) the extent to which previously anticipated cost savings (identified prior to the 2006-11 price paths) have been incorporated into SunWater's total cost estimates for the purpose of 2012-17 prices;

(c) the prudency and efficiency of SunWater's proposed operating expenditures including direct and non-direct costs and escalation factors; and

(d) the most appropriate methodologies for assigning operating costs to service contracts[4] and to different priority customer groups (within each service contract).

5.2 Total Operating Costs

Operating costs are generally classified by SunWater as either non-direct or direct.

Non-direct costs are classified as either:

(a) overhead costs – allocated to all of SunWater's 62 service contracts for services that support the whole business (for example, Board, CEO and human resource management costs); and

(b) indirect costs – allocated to more than one service contract (but not all service contracts) for specialised services pertaining to a particular type of asset or group of service contracts (for example, asset management strategy and systems).

Direct costs are those readily attributable to a service contract (for example, labour and materials employed directly to service a scheme asset) and have been classified as operations, preventive maintenance (PM), corrective maintenance (CM), electricity and other costs.

In its NSP, SunWater described the scope of its operating activities for this scheme to include service provision, compliance, insurance, recreation and other supporting activities (these were not classified by direct and indirect costs). SunWater noted that:

(a) a Service Manager and 10 staff are located at the Eton depot and are responsible for day-to-day water supply management and delivery of the programmed works for all users in the region. Specialist operations, in areas such as communication systems, electrical,

[4] SunWater refers to each bulk scheme and each distribution system as a service contract. Consequently, SunWater has 22 irrigation bulk service contracts and eight irrigation distribution system service contracts.

mechanical and civil engineering, are provided centrally with resources shared across all schemes. These personnel are located in Brisbane, Ayr and Bundaberg;

(b) service provision relates to:

(i) water delivery – scheduling and releasing bulk water from storages, surveillance of water levels and flows in the river, and quarterly meter reading; and

(ii) customer service and account management – managing enquiries about accounts and major transactions; providing up to date online data on WAE, water balances and water usage; and managing transactions such as temporary trades, transfers and other scheme specific transactions;

(c) compliance requirements to provide the bulk service include those relating to:

(i) the ROP and ROL – a major part of which is gathering and reporting data at quarterly and annual intervals on water sharing rules, ROP amendments and modifications; water accounting and reporting on stream flow, water quality and other data (Table 5.1);

Table 5.1: DERM's Water Quality Monitoring Requirements of SunWater

Storage	***Monthly Monitoring Requirements***			
	Inflow	***Head Water***	***Tail Water***	***BGA***
Teemburra Dam	Yes	Yes	Yes	Yes
Mirani Weir	No	No	Yes	Yes
Marian Weir	Yes	Yes	Yes	Yes
Dumbleton Weir	No	Yes	Yes	Yes

Includes sampling for the following variables: Dissolved oxygen, electrical conductivity, pH, temperature; total nitrogen, phosphorus and BGA. Source: SunWater (2011).

(ii) dam safety – as Teemburra Dam is classified as referable dam under the *Water Act 2000*, SunWater is required to have a program in place to minimise the risk of dam failure, which involves documenting, recording and reporting on dam safety. Audits and thorough inspections are carried out annually.

Routine dam safety inspections are carried out daily on Teemburra Dam and quarterly on Mirani, Marian and Dumbleton Weirs. Specific dam safety inspections required at Teemburra Dam include monitoring of embankments, piezometers, seepage, general condition of the storages as defined in the dam surveillance specification and condition inspections to identify and plan maintenance requirements and to provide information for management planning of water delivery assets.

(iii) environmental management to comply with the ROP and *Environmental Protection Act 1994* which require SunWater to deal with risks such as fish deaths, chemical usage, pollution, contaminants and approvals for instream works; and

(iv) land management (weed and pest control, rates and land tax, security and trespass and access to land owned by SunWater) as well as other obligations in relation to WHS, financial reporting and taxation and irrigation pricing;

(d) insurance is obtained on a portfolio basis and allocated to the scheme;

(e) SunWater has sought to transfer the management and cost of recreation activities to private operators or Government. Recreation facilities are Teemburra Dam are owned and managed by the Mackay Regional Council; and

(f) other supporting activities include central procurement, human resources and legal services.

Previous Review

For the 2006-11 price paths, Indec identified annual cost savings of between $3.8 million and $5.5 million (2010-11 dollars) (or 7.5% to 9.9%) of total annual costs, which SunWater was to achieve during the 2006-11 price paths (SunWater, 2006a). See Volume 1.

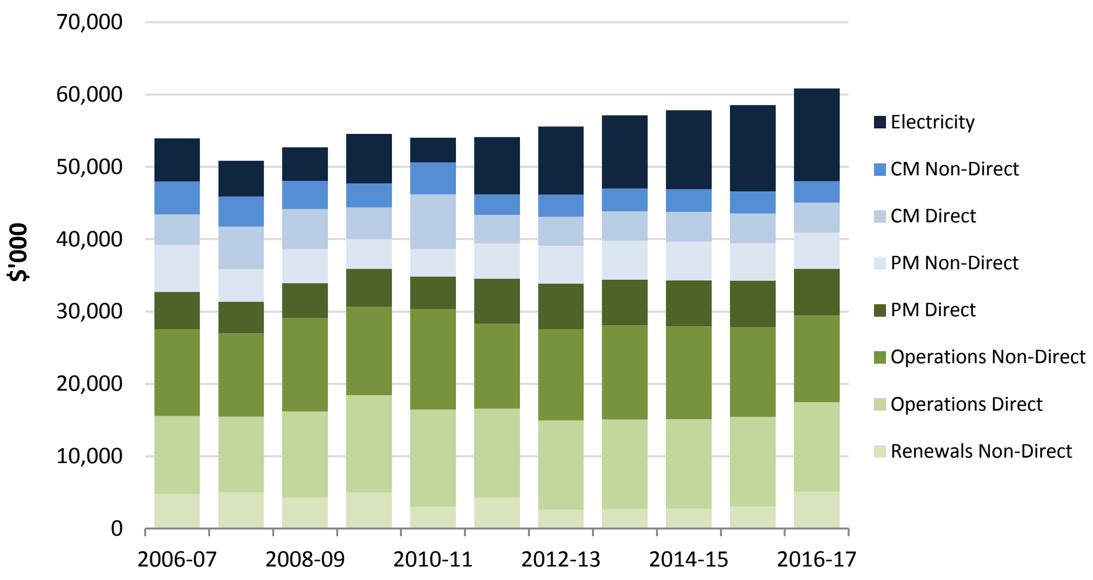
Draft Report

Stakeholder Submissions

<u>SunWater</u>

SunWater's past and forecast total operating costs for its irrigation service contracts (all sectors) are summarised in Figure 5.1. SunWater's allocation of non-direct costs to activities (including renewals) is also identified. These estimates reflect SunWater's most recent information (including that received by the Authority in October 2011) and differ from SunWater's NSP as noted in Volume 1.

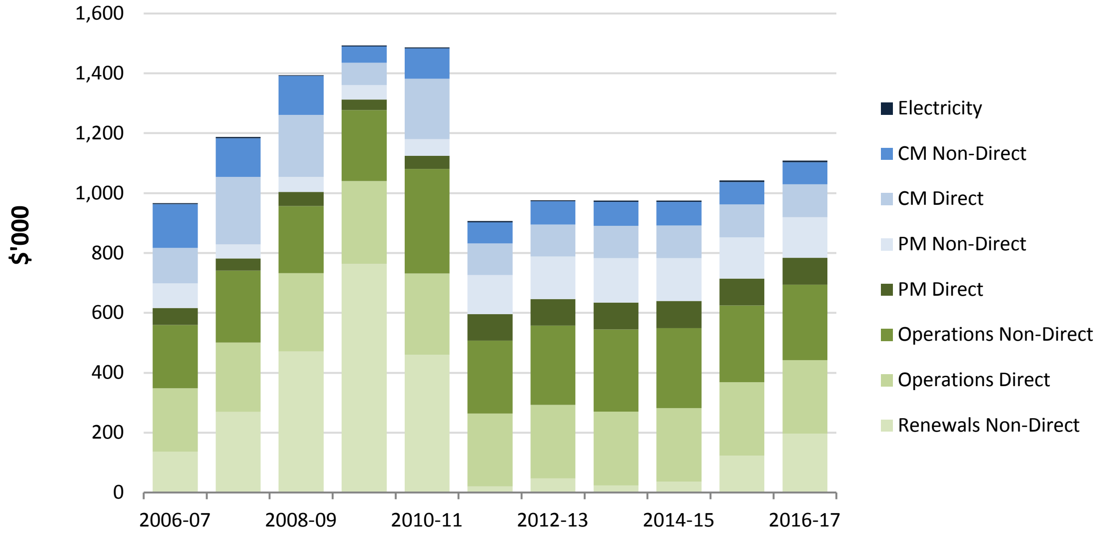
Figure 5.1: SunWater's Total Operating Costs (Real $) – All Service Contracts



Note: Renewals direct costs are discussed in the previous chapter. Renewals non-direct costs are the non-direct operating costs allocated to renewals. Totals vary from NSP due to the inclusion of renewals non-direct costs, SunWater's revised approach to insurance and electricity, exclusion of revenue offset (which is dealt with in the following chapter) and rounding. The estimates also reflect the most recent information provided by SunWater to the Authority in October 2011. Source: SunWater (2011ap) and SunWater (2011ao).

Expenditure by activity in the Pioneer River WSS (all sectors) is shown in Figure 5.2, Table 5.2 and Table 5.3.

Figure 5.2: Total Operating Costs – Pioneer River WSS (Real $)



Note: Renewals direct costs are discussed in the previous chapter. Renewals non-direct costs are the non-direct operating costs allocated to renewals. Totals vary from NSP due to the inclusion of renewals non-direct costs, SunWater's revised approach to insurance and electricity, exclusion of revenue offset (which is dealt with in the following chapter) and rounding. The estimates also reflect the most recent information provided by SunWater to the Authority in October 2011. Source: SunWater (2011ap) and SunWater (2011ao).

Table 5.2: Expenditure by Activity (Real $'000)

	2006-07	*2007-08*	*2008-09*	*2009-10*	*2010-11*	*2011-12*	*2012-13*	*2013-14*	*2014-15*	*2015-16*	*2016-17*
Operations	423	472	486	514	620	487	510	521	513	502	498
Electricity	3	4	2	3	2	3	4	4	5	5	6
Preventive Maintenance	139	87	97	83	99	219	231	238	234	228	225
Corrective Maintenance	265	355	337	129	304	176	184	188	187	185	184
Renewals non-direct	136	270	471	764	460	20	47	23	36	123	196
Total	**966**	**1,187**	**1,393**	**1,492**	**1,486**	**906**	**976**	**975**	**975**	**1,042**	**1,108**

Note: Renewals direct costs are discussed in the previous chapter. Renewals non-direct costs are the non-direct operating costs allocated to renewals. Totals vary from NSP due to the inclusion of renewals non-direct costs, SunWater's revised approach to insurance and electricity exclusion of revenue offset (which is dealt with in the following chapter) and rounding. The estimates also reflect the most recent information provided by SunWater to the Authority in October 2011. Source: SunWater (2011).

Table 5.3: Expenditure by Type (Real $'000)

	2006-07	*2007-08*	*2008-09*	*2009-10*	*2010-11*	*2011-12*	*2012-13*	*2013-14*	*2014-15*	*2015-16*	*2016-17*
Labour	203	198	208	168	213	227	230	230	230	230	230
Electricity	3	4	2	3	2	3	4	4	5	5	6
Materials	32	95	126	37	136	54	55	56	56	57	57
Contractors	41	94	38	34	59	46	47	48	48	49	49
Other	110	110	143	147	109	110	111	111	110	110	110
Non-direct	576	685	876	1,104	966	466	530	526	525	591	656
Total	**966**	**1,187**	**1,393**	**1,492**	**1,486**	**906**	**976**	**975**	**975**	**1,042**	**1,108**

Note: Renewals direct costs are discussed in the previous chapter. Non-direct costs include the non-direct operating costs allocated to renewals. Totals vary from NSP due to the inclusion of renewals non-direct costs, SunWater's revised approach to insurance and electricity, exclusion of revenue offset (which is dealt with in the following chapter), and rounding. The estimates also reflect the most recent information provided by SunWater to the Authority in October 2011. Source: SunWater (2011).

In its NSP, SunWater submitted that operating costs for this scheme averaged $846,000 per annum over the period of the current price path. [Operating costs as defined in the NSP exclude the indirect and overhead costs allocated to renewals expenditure.] The projected efficient average operating costs in the NSP for 2011-16 are $912,000 per annum.

<u>Other Stakeholders</u>

Canegrowers (2011a) noted that total lower bound costs for the irrigation section of this scheme were set by Indec in 2006 to be $724,000 in 2010-11 dollars. The SunWater estimates are around $189,000 (26%) higher than this figure and such a large increase needs serious scrutiny.

PVWater (2011b) submitted that the description of how the operating costs have been developed is quite good but it means nothing unless the "bottom-up" detail is also provided to confirm the requirements for expenditure by activity and type. The detailed work instructions and operational manuals should be provided by SunWater as the first step to justification of the proposed costs. Further, the NSP makes no reference to actual operating costs for the present price path other than to state that bulk water operating costs have averaged $846,000 per annum over the period. Also missing is the detailed breakdown of the proposed operating costs by activity or type.

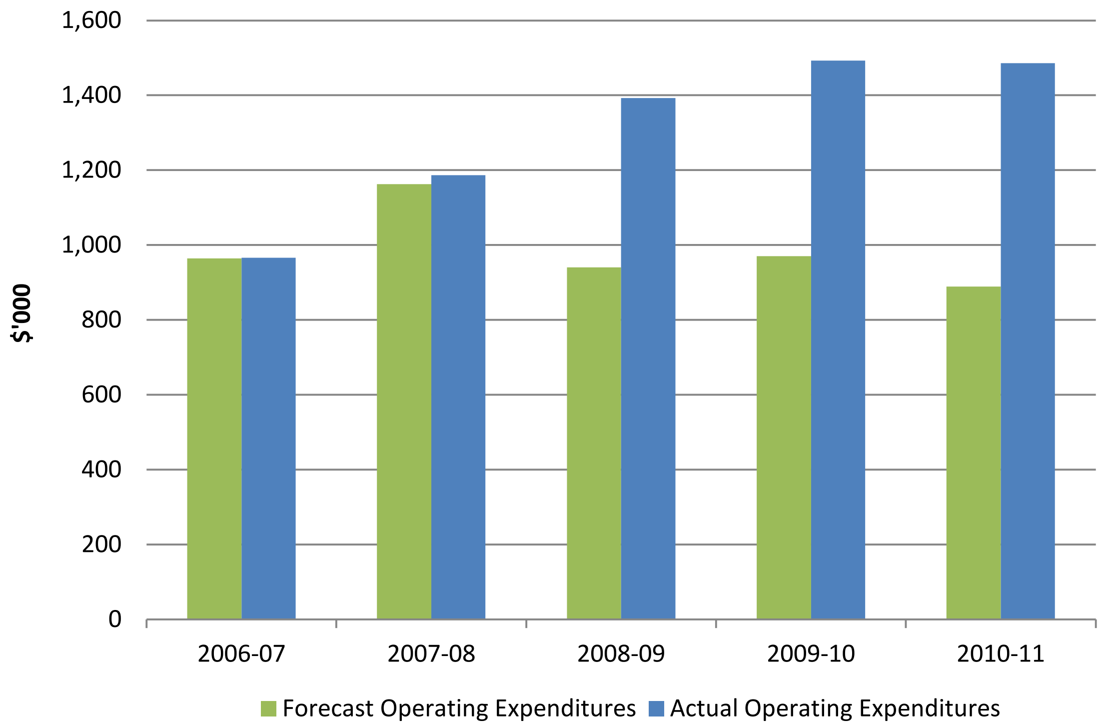
Authority's Analysis

The Authority sought to review the extent to which previously anticipated cost savings (identified prior to the 2006-11 price paths) have been incorporated into SunWater's total cost estimates for the purpose of 2012-17 prices.

In Volume 1, the Authority noted that during the beginning of the 2006-11 price paths, SunWater's total operating costs increased above those previously forecast. In response, in July 2009, SunWater instigated a program to reduce costs by $10 million (the Smarter Lighter Faster Initiative (SLFI)). SunWater submitted that these savings should be fully realised by 30 June 2012.

In 2010-11, the Authority engaged Indec to assess whether SunWater achieved the cost savings forecast for 2005-06. A comparison of forecast and actual total operating costs for the Pioneer River WSS is shown in Figure 5.3.

Figure 5.3: Forecast and Actual SunWater Total Operating Expenditure 2006-11 (Real $)



Source: SunWater (2011ap) and Indec (2011f).

Indec has not, however, inferred from its analysis that SunWater should alter its costs over the 2012-17 regulatory period to the level of efficient costs determined for 2010-11. It observed that further analysis would be required to justify and support such an inference (see Volume 1). The Authority has engaged other consultants to address potential scheme specific cost savings.

Following the Draft Report, further information was received from SunWater about how savings from SLFI are taken into account in its operating cost estimates. This information is set out in Volume 1.

5.3 Non-Direct Costs

Introduction

Since structural reforms were implemented, SunWater has become a more centrally organised business. SunWater's strategic operational management (for example, Finance, Strategy and Stakeholder Relationships) is provided centrally. This arrangement seeks to ensure that appropriate systems and processes are in place, are being applied in a consistent manner, are addressing key regulatory compliance and business requirements, and to ensure a high degree of flexibility across SunWater's workforce.

Some specialist operations staff with expertise in key operational areas may be located either in Brisbane or regional locations. Their specialist expertise is applied to technical problems and issues in support of local operators.

Operational works planning and maintenance scheduling is provided by regional management, although all staff positions and budgets are managed centrally. For example, spare capacity in one region will be diverted (and billed) to regions with higher demand. Similarly, staff may be assigned to either irrigation or non-irrigation service contracts.

The nature of these non-direct activities, which are categorised by SunWater as either indirect or overhead costs, is detailed in Volume 1.

Previous Review

As noted above, in the previous review, Indec reviewed SunWater's non-direct costs for 2006-11. Non-direct costs were allocated to schemes on the basis of total direct costs.

Draft Report

Stakeholder Submissions

SunWater

As noted in Volume 1, SunWater submitted that it will incur $23.5 million in total non-direct costs in 2012-13 (Table 5.4). SunWater's approach to the forecasting of non-direct operating expenditures is detailed in Volume 1.

In brief, SunWater forecast non-direct costs for 2010-11 and then escalated these forward using indices applied to the components of these costs. The costs in 2010-11 were based on actual costs over the past four years (excluding spurious costs) and adjustments for known or expected changes in costs. In particular, SunWater proposed that salaries and wage costs generally will rise by 4% per annum. However, SunWater has forecast that its total salaries and wages will rise by only 2.5% per annum, with the difference (1.5% per annum) being accounted for by (unspecified) productivity improvements.

SunWater proposed that the total direct labour costs (DLCs) of each service contract be used to allocate non-direct costs.

Total non-direct costs and those allocated to the Pioneer River WSS are set out in Table 5.4.

Table 5.4: SunWater's Actual and Proposed Non-Direct Costs (Real $'000)

	2006-07	*2007-08*	*2008-09*	*2009-10*	*2010-11*	*2011-12*	*2012-13*	*2013-14*	*2014-15*	*2015-16*	*2016-17*
SunWater	27,831	25,097	25,872	24,579	25,152	23,770	23,512	24,244	24,055	23,708	25,089
Pioneer River	576	685	876	1,104	966	466	530	526	525	591	656

Source: SunWater (2011).

The non-direct costs for this scheme include a portion of SunWater's total overhead costs (for example, HR, ICT and finance), as well as a share of Infrastructure Management costs for each region (South, Central, North and Far North) and a share of the overhead costs of SunWater's Infrastructure Development Unit.

Other Stakeholders

CANEGROWERS (2011a) and PVWater (2011c) noted that indirect and overhead costs account for approximately half of total operational costs. CANEGROWERS submitted that this is very high and needs to be reviewed. PVWater submitted that this highlights a major concern with the review conducted by Deloitte Touche Tohmatsu (Deloitte) in that it has examined the administration costs of SunWater for its full business and not focussed on administration cost that should be apportioned to the irrigation sector. Whilst it is understandable that SunWater's other activities such as infrastructure development and engineering consultancies may well require substantial overheads for their operation, no component should be included in the costs apportioned to irrigation. PVWater further submitted that as a bare minimum this line item should be split into separate indirect and overhead costs with the break-down between central and regional offices.

PVWater (2011b) and MIS (2010) noted that bulk water contracts are between SunWater as the ROL holder and individual irrigators and the WAE holders; however, irrigators have their WAE supplied and managed by PVWater (the DOL holder).

PVWater further noted that the ROL contract is a legislated instrument under the *Water Act 2000* and SunWater's principal role is to provide evidence of the existence of a ROL contract so that water allocation permanent transfers can be registered on the Water Allocation Register.

PVWater maintained that under the aforementioned ROL/DOL arrangements, all day to day irrigation water supply matters and most service delivery functions in the scheme are handled by PVWater. In particular, PVWater highlighted that in relation to:

(a) water ordering – SunWater does not process any individual irrigator water orders. PVWater collates water orders through its system and provides SunWater with required flows at key points in the system to meet demand;

(b) meter reading – SunWater does not read irrigation meters. PVWater reads some 400 irrigation meters quarterly, while SunWater's other six customers supply their meter readings;

(c) invoicing – SunWater issues one invoice only (to PVWater) for irrigation and PVWater bills irrigators and manages their accounts;

(d) water trading – SunWater only manages the permanent transfer of water allocations – all temporary trades are managed by PVWater;

(e) information provision and reporting – SunWater does not meet periodically with customers, with most contact with SunWater is issue or incident based.

(f) water delivery – to account for SunWater's fixed release capacity through the Palm Tree Creek outlet, PVWater, through close management of its pumping stations drawing from the system extends as long as possible the use of natural flows prior to the fixed release from Teemburra Dam commencing. This is to minimise losses from the system as the fixed release may exceed demand. Once the release commences through the Palm Tree Creek outlet the only decision then required from SunWater is when to close following a natural flow event. Under these arrangements, and until such time as the Palm Tree Creek outlet is rectified, it is contended that scheduling and releasing of bulk water in the Pioneer River WSS is a minor activity for SunWater compared to other storages;

(g) compliance (ROP amendments and modifications) – the Pioneer Valley ROP commenced in 2005 and was subject to an amendment in 2007 to include critical water sharing rules. Rather than actively assisting customers during these processes SunWater chose to adopt a commercial in confidence approach to its submissions to the regulator and conducted very limited consultation with customers. It is accepted that SunWater must participate in any water planning activities but with Water Resource Plans on a ten year cycle and

ROP's amended very infrequently funding should be on a needs basis rather than long term funding of a central group in SunWater;

(h) compliance (water accounting) – all monitoring of customer's use against water allocation and maintaining customer's water accounts is done by PVWater under the DOL with bulk reporting to SunWater by PVWater; and

(i) compliance (water quality monitoring) – PVWater is not aware of water quality monitoring that is stated to be done for Teemburra Dam and Marian Weir inflows.

PVWater therefore contented that as most irrigation customer related activities in the scheme are performed by PVWater, not SunWater, the Pioneer River WSS should not be apportioned the same level of administration and overhead costs as other schemes.

PVWater also commented on the following bulk water service cost descriptions in the NSP:

(a) compliance (environmental management) – this explanation would benefit if there was discussion on the specific environmental risks for Pioneer River WSS, for example, whether a scheme level risk assessment been undertaken as part of the development of the central specialist group for environmental management;

(b) compliance (land management) – this discussion would benefit from inclusion of the full property description (Lot on Plan) for all land owned by SunWater in the scheme. This would also assist in understanding the land value on 1 July 2010 shown in Appendix A.2 of the NSP of $5,157,031; and

(c) compliance (insurance) – details are required here of the specific assets in the Pioneer River WSS that are covered by insurance and how the $90,000 annual premium is apportioned to the various insurance policies for the scheme.

Authority's Analysis

As noted in Volume 1, the ratio of non-direct to total costs reflects the structure of the organisation. A more centralised organisation can be expected to have a higher ratio of non-direct to direct costs.

In seeking to establish prudency and efficiency, the Authority commissioned Deloitte to review SunWater's non-direct costs. Deloitte carried out benchmarking to assess where potential efficiencies within SunWater may be achieved. Deloitte identified savings of $495,314 (in 2010-11 real terms) per annum in finance, human resources, information technology, and health, safety, environmental and quality areas (for the whole of SunWater).

Deloitte was unable to draw any definitive conclusions from an attempt to benchmark against the Pioneer Valley Water Board (PVWater) and other Australian rural water service providers. Deloitte noted that PVWater's non-direct costs were higher than those of SunWater as a percentage of total operating costs – but that there are differences between PV Water and SunWater which made the comparison unreliable[5].

The Authority accepted that $495,314 of full time equivalent staff costs were not efficient and should be excluded from SunWater's total non-direct costs (of which an amount of

[5] For example, PVWater has only four FTE staff. For the benchmarking exercise, PVWater needed to estimate the proportion of staff time spend on administration versus operations and maintenance activities, which varied considerably depending on weather conditions and workloads. Deloitte found it difficult to compare PVWater's estimated apportionments with SunWater, who have around 500 staff assigned to specific projects or centralised functions.

approximately $297,189 relates to irrigation service contracts under SunWater's proposed cost allocation methodology). See Volume 1.

In addition, the Authority recommended that SunWater's forecast total non-direct operating costs should be reduced by a compounding 1.5% per annum (based on the Authority's view that non-labour productivity gains are achievable and in line with labour productivity gains).

The Authority also reviewed the allocation of non-direct costs to irrigation service contracts.

SunWater's proposed use of DLCs is on the basis that it best reflects activity and effort, is a proxy for other drivers, and provides consistency across service contracts.

Deloitte reviewed SunWater's proposal and identified alternative cost allocation bases (CABs). On the basis of this analysis, the Authority concludes that no alternative CAB is superior to DLC and that the introduction of any alternative would likely be costly and complex.

The Authority therefore accepted SunWater's proposed DLC methodology with two exceptions recommended by Deloitte:

(a) the overhead component of Infrastructure Management (Regions) should be allocated directly to the service contracts serviced by each relevant resource centre (South, Central, North and Far North), on the basis of DLC from each respective resource centre (targeted DLC); and

(b) the overhead component of the Infrastructure Development unit should be allocated (on the basis of DLC) to service contracts receiving services from that unit (that is, targeted DLC).

This adjustment ensured that schemes are paying for the overhead costs from those resource centres that are most directly related to their schemes and not, for example, for Infrastructure Management overhead costs from the other three regions.

Insurance and labour utilisation rates (which affect non-direct and direct costs) are addressed in Volume 1.

The Authority allowed SunWater the opportunity to respond to the PVWater's issues in relation to the allocation of centralised costs for this Pioneer River WSS.

SunWater acknowledged that PVWater is a relative large customer in so far as it acts on behalf of its own irrigation customers whom individually hold WAE. Accordingly, PVWater is effective an 'on-supplier' of water to its 250 customers and PVWater is correct to point out that SunWater manages deliveries to their customers in aggregate rather than individually. The NSP states that the scheme has seven customers, one of which is PVWater which in turn supplies approximately 250 customers. SunWater reaffirmed that it did not state in the Pioneer River NSP that it deals with these customers directly in terms of delivering water.

SunWater noted however that it holds a direct contractual relationship with each individual customer and must transact with these customers when they deal with or transfer their WAE. This process also involves interaction with PVWater as a referral organisation to ensure that its interests are accounted for. This intermediate step is not necessary in schemes where SunWater deals directly with irrigation customers and therefore increases administrative costs in these instances.

SunWater acknowledged that some costs would be affected by customer numbers. In its submission on the allocation of centralised costs, SunWater (2011ab) noted that "... the cost of some centralised functions will be affected by the number of customers serviced. For example, within the Service Delivery group resourcing customer enquiries could arguably be affected by the size of the customer base. However, the relationship between customer numbers and related customer functions is not linear – the addition of one customer does not generate additional costs for the customer service function. Moreover, customer numbers only impact upon a small portion of centralised costs – for example, asset management, dam safety or internal audit costs will not be sensitive to the number of customers".

SunWater submitted that for PVWater, the increase in centralised costs as between one customer and many would be limited to the cost of producing additional invoices (stationary, postage) and the costs of handling any additional customer enquiries that would arise, although many of these enquiries will occur regardless of PVWater. In any case, SunWater maintains some records and information relating to the PVWater customers who SunWater holds a contract with. There are of course fewer meters to read. SunWater submitted that any savings (compared to having to read all PVWater customer meters) will already be reflected in the direct operational costs for the scheme.

The Authority considered that the only costs that would vary according to the number of customers are those related to billing, meter-reading and customer services. These costs are likely to represent a relatively small proportion of scheme level operating costs. Non-direct and overhead costs would be expected to remain unchanged regardless of the number of customers. The Authority therefore accepted SunWater's advice that any savings in customer-related costs are already incorporated into scheme-level costs. However, the Authority subjected these costs to efficiency assessment.

The Authority's Draft Report estimates of non-direct costs are summarised in Table 5.5 below.

Submissions Received from Stakeholders on the Draft Report

Concerns that non-directs accounted for around half of the operating costs of the scheme were raised by stakeholders at round three consultation (November 2011). PVWater (2011e) did not accept that around half of the operating costs for a bulk irrigation water supply scheme are indirect and overhead costs. PVWater accepted that SunWater as a GOC would incur higher than commercial overheads but not to the level proposed.

PVWater also raised concerns that the operating costs for SunWater for the Pioneer scheme do not fully recognise the ROL/DOL relationship where PVWater undertakes most customer dealings in the scheme. SunWater's activities relate to managing headworks with customer dealings only relating to permanent transfer of water allocations. SunWater raises a fee for transacting transfers of water allocation. PVWater expected that the income to SunWater from the transaction fees is accounted for in revenue offsets for the scheme.

Authority's Response to Submissions Received on the Draft Report

Allocation of Non-directs to Service Contracts

In regard to the allocation of non-direct costs to irrigation service contracts, the Draft Report recommended a change to SunWater's approach to allocating non-direct costs for Infrastructure Management (IM) and Infrastructure Development (ID). The Authority recommended (regionally) targeted DLC. SunWater recommended state-wide DLC, consistent with SunWater's general approach to the allocation of other non-direct costs.

However, as set out in Volume 1, in the light of new information submitted by SunWater, the Authority now considers that the benefit of using targeted DLC is unlikely to outweigh the additional complexity and cost of implementing and maintaining this alternative approach. It is proposed to adopt the approach initially proposed by SunWater.

Accordingly, the Authority has amended its recommendation (removing the recommendation to adopt targeted DLC for these cost centres).

For the Final Report, the cost of options analyses and consultation with customers on renewals items ($445,000 for SunWater as a whole) has also been allocated to schemes on the basis of direct labour.

Proportion of Non-direct to Total Costs

The Authority also notes that in many schemes (including Pioneer WSS), irrigators considered that the non-direct costs allocated to their schemes appeared to be high, and in some cases much higher than the SunWater-wide average ratio of non-direct to total costs. The reason for the wide variation of non-direct to total cost ratios across service contracts is because non-direct costs are allocated on the basis of DLC. It follows that if a service contract has a relatively high proportion of labour costs it will attract a relatively high proportion of non-direct costs.

In addition, the greater the indirect resources absorbed by a particular scheme, the higher will be the ratio of non-direct costs to direct labour costs. Together, these factors result in a relatively high non-direct to total cost ratio for irrigation service contracts.

The Authority's draft and final recommended level of non-direct costs to be recovered from the Pioneer River WSS (from all customers) is set out below in the table below. The allocation of these costs between high and medium priority customers is discussed below.

The Authority noted an abnormal level of non-direct expenditure in 2012-13, which is due to a large renewals expenditure scheduled for that year, including the Palm Tree Creek outlet valve.

Table 5.5: Recommended Non-Direct Costs (Real $'000)

	2006-07	*2007-08*	*2008-09*	*2009-10*	*2010-11*	*2011-12*	*2012-13*	*2013-14*	*2014-15*	*2015-16*	*2016-17*
SunWater	576	685	876	1,104	966	466	530	526	525	591	656
Authority Draft	-	-	-	-	-	-	489	534	496	551	604
Authority Final							763	539	500	546	588

Source: SunWater (2011), QCA (2011, 2012).

Remaining Scheme Specific Concerns

In regard to PVWater's concerns that SunWater does not incur costs in customer dealings in the Pioneer WSS, the Authority considers that this issue was addressed comprehensively in the Draft Report. That is, while the proportion of costs reflecting customer numbers is small, and includes invoicing, costs of handling customer enquiries and meter-reading, SunWater indicated that many customer enquiries are diverted to SunWater via PVWater.

The Authority accepted SunWater's advice that the lower customer-related costs in the Pioneer WSS are already incorporated into scheme-level costs.

The transactions fee for transfers should be treated as a revenue offset for the scheme. The Authority notes that SunWater has identified land lease revenue for the Pioneer WSS but has not identified revenue from other fees and charges. Revenue offsets are reviewed in Chapter 6.

5.4 Direct Costs

Introduction

SunWater classified its operational activities into operations, PM, CM and electricity. SunWater's operating costs were forecast using this classification. The nature of these activities and costs are identified below.

With the exception of electricity, SunWater has disaggregated each of the above activities into cost types:

(a) labour – direct labour costs attributed directly to jobs, not including support labour costs such as asset management, scheduling and procurement, which are included in administration costs;

(b) materials – direct materials costs attributed directly to jobs, including pipes, fittings, concrete, chemicals, plant and equipment hire;

(c) contractors – direct contractor costs attributed directly to jobs, including weed control contractors, commercial contractors and consultants; and

(d) other – direct costs attributed directly to service contracts, including insurance, local government rates, land tax and miscellaneous costs.

Draft Report

Stakeholder Submissions

<u>SunWater</u>

SunWater estimated the costs of each activity in 2010-11, based on actual costs over the past four years (excluding spurious costs) with adjustments for known or expected changes in costs. Adjustments were also made to preventive maintenance in line with the Parsons Brinckerhoff (PB, 2010) review. These estimates were then escalated forward for the 2012-17 pricing period. Further details are outlined in Volume 1.

SunWater's forecast of direct operating expenditure by activity is set out in Table 5.6. These estimates reflect SunWater's most recent positions and differ from the NSP. The estimates also reflect the most recent information provided by SunWater to the Authority in October 2011.

Table 5.6: SunWater Direct Operating Expenditures by Activity (Real $'000)

	2006-07	*2007-08*	*2008-09*	*2009-10*	*2010-11*	*2011-12*	*2012-13*	*2013-14*	*2014-15*	*2015-16*	*2016-17*
Operations	212	232	262	276	271	243	246	246	246	246	246
Electricity	3	4	2	3	2	3	4	4	5	5	6
Preventive Maintenance	56	40	47	35	44	88	90	90	90	90	90
Corrective Maintenance	119	226	207	75	202	105	107	108	109	110	110
Total	**389**	**502**	**517**	**389**	**520**	**441**	**446**	**448**	**450**	**452**	**452**

Note: Totals vary from NSP due to SunWater's revised approach to insurance and electricity, exclusion of revenue offset (which is dealt with in the following chapter), and rounding. The estimates also reflect the most recent information provided by SunWater to the Authority in October 2011. Source: SunWater (2011ap) and SunWater (2011ao).

Table 5.7 presents the same operating costs developed by SunWater on a functional basis.

Table 5.7: SunWater Direct Operating Expenditures by Type (Real $'000)

	2006-07	*2007-08*	*2008-09*	*2009-10*	*2010-11*	*2011-12*	*2012-13*	*2013-14*	*2014-15*	*2015-16*
Labour	203	198	208	168	213	227	230	230	230	230
Electricity	3	4	2	3	2	3	4	4	5	5
Contractors	32	95	126	37	136	54	55	56	56	57
Materials	41	94	38	34	59	46	47	48	48	49
Other	110	110	143	147	109	110	111	111	110	110
Total	**389**	**502**	**517**	**389**	**520**	**441**	**446**	**448**	**450**	**452**

Note: Totals vary from NSP due to SunWater's revised approach to insurance and electricity, exclusion of revenue offset (which is dealt with in the following chapter), and rounding. The estimates also reflect the most recent information provided by SunWater to the Authority in October 2011. Source: SunWater (2011ap) and SunWater (2011ao).

Authority's Analysis

The Authority engaged Arup to review the prudence and efficiency of SunWater's proposed direct operating expenditure for this scheme. Arup's review involved:

(a) site inspections and discussions with local managers to appraise the efficiency of work practices, operators' knowledge of assets and day-to-day operation issues;

(b) discussions with irrigators to identify, understand and verify key issues; and

(c) a desktop assessment of data provided by SunWater in order to:

  (i) compare historical actual and forecast data;

  (ii) investigate operational forecasts based on historical trends and field observations;

  (iii) understand historical trends in line with actual water usage; and

(iv) understand how systems have been modified with respect to management of operating expenditure.

Arup reviewed the extent to which SunWater's operating expenditure forecasts are based on appropriate cost drivers (including water use), and the cost escalation methods and factors used to prepare them. The assessment was undertaken having regard to the conditions prevailing in relevant markets, historical trends, relevant interstate and international benchmarks, and SunWater's service standards and compliance requirements.

Arup reported, however, that SunWater's information systems were not specifically designed for the provision of information to assess prudence and efficiency. In particular, the information provided by SunWater did not sufficiently enable costs to be connected with the discharge of specific service obligations. Arup also noted that operational and procedural changes following the SLFI review and the introduction of ROPs may have made the extraction and reconciliation of such information difficult.

Arup advised that since the information provided by SunWater did not afford the ability to "drill down" into costs to adequately review prudence and efficiency, their assessment of direct operating expenditure was limited to a general review of SunWater's processes, procedures and trend.

On this basis, Arup considered that SunWater's policy and procedural documents are broadly consistent with industry practice, and that SunWater have demonstrated the adoption and integration of them into their management system. Site visits also showed that field personnel are gradually adopting these systems and processes.

Arup acknowledged that SunWater continually review policies and procedures to take account of changed market conditions, with the aim of streamlining operations across the organisation. While in some instances observing such changes from a regional perspective may give the impression that the changes are inefficient, Arup considered that when observed from a state wide perspective, significant efficiencies are being made.

Arup concluded that, in general, the procedures adopted are prudent and SunWater is undertaking work to make their operations more efficient.

In Volume 1, the Authority recommended that SunWater undertake a review of its planning policies, processes and procedures to better achieve its strategic objectives. The Authority also recommended that SunWater needs to improve the usefulness of its information systems. In particular, SunWater needs to document and access relevant information necessary to:

(a) attain greater operating efficiency;

(b) achieve greater transparency;

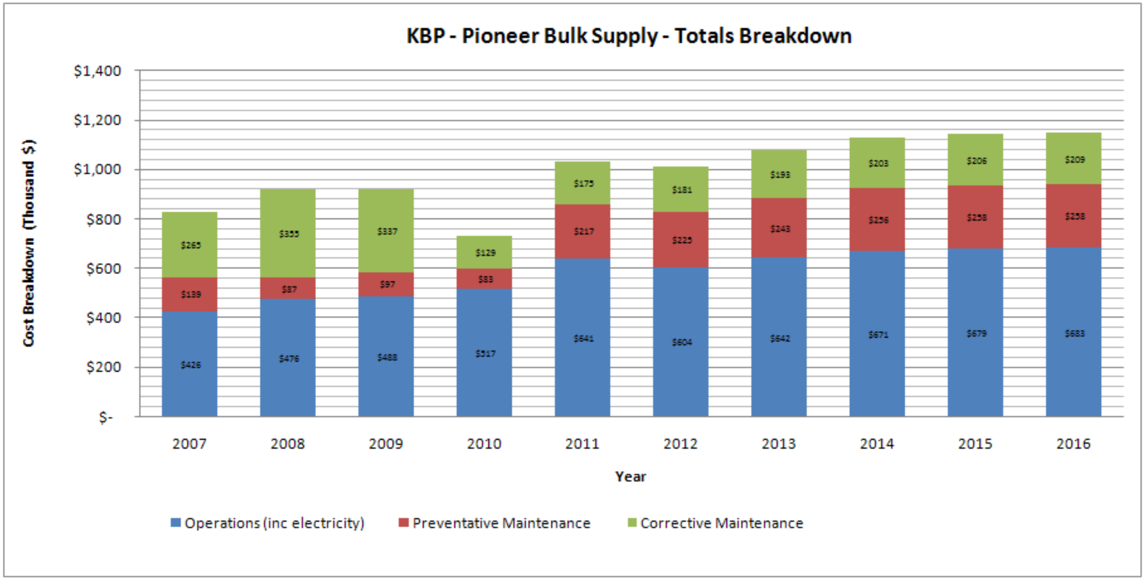
(c) facilitate future price reviews; and

(d) promote more meaningful stakeholder engagement.

Arup's review of specific cost categories for this scheme and the Authority's conclusions and views on cost escalation are outlined below.

Arup noted that total operating expenditure is increasing (Figure 5.4), which is largely due to changes to indirect and overhead costs.

Figure 5.4: Total Operating Expenditure Breakdown – Pioneer River WSS



Note: Data in figure based on NSP and may differ from most recent SunWater data. Source: Arup (2011).

Submissions Received from Stakeholders on the Draft Report

PVWater (2011e) submitted that the changes in SunWater's direct costs after the NSP are not readily quantifiable. PVWater suggested this raised questions about the consultant's review of the NSP due to altered data, as well as bringing into question the transparency of the process.

PVWater requested that the amendments be provided in a format to allow comparison with the original NSP.

In general, PVWater submitted that more detail needs to be available for PVWater to be satisfied that the bottom up approach to setting operating costs is reasonable.

Authority's Response to Submissions Received on the Draft Report

The Authority accepts that there are difficulties associated with nature of the revisions to costs proposed by SunWater after the issuance of the NSPs. As in other regulatory contexts, the Authority has had to make its recommendations based on the best available information.

As noted in Volume 1, to achieve greater transparency, the Authority has also recommended that SunWater's Statement of Corporate Intent (and relevant legislation) require SunWater to consult with customers in relation to forecast and actual operating expenditure and publish on its website, annually updated NSPs (containing this and renewals information) commencing by 30 June 2014. The NSPs should be enhanced to present details of SunWater's proposed operating expenditure and to account for significant variances between previously forecast and actual material operating expenditure.

In this manner, greater transparency will be achieved over time.

Review of Direct Operating Expenditure

Item 1: Operations

Draft Report

Stakeholder Submissions

SunWater noted that operations relate to the day to day operational activity (other than maintenance) enabling water delivery, customer management, asset management planning, financial and ROP reporting, WHS compliance, administration, and environmental and land management.

SunWater's operating expenditure forecasts have been developed on the basis of detailed work instructions and operational manuals for each scheme. SunWater's proposed operations costs are set out in Table 5.6.

SunWater advised that the ownership of recreation facilities at Teemburra Dam had been transferred to the Mackay Regional Council.

CANEGROWERS (2011a) noted that operational costs are projected to increase by 8% in real terms over the next five years compared to the last five years. Scheme total lower bound costs for the irrigation sector were set by Indec in 2006 to be $724,000 in 2010-11 dollars. The SunWater estimates are around $189,000 (26%) higher than this figure. This is a large increase and needs serious scrutiny.

MIS (2010) supported, in principle, the recovery of recreation costs from the communities that benefit from the use of these facilities.

CANEGROWERS (2011c) submitted that water treatment costs at recreational facilities are not recreation costs but water service delivery so should be taken out of bulk costs. If SunWater wants to do more and be good corporate citizens then this should be funded from SunWater profits not growers.

PVWater (2011a) submitted that the description of operating activities in the NSP is totally inadequate to justify a bottom-up approach. The detailed work instructions and operational manuals should be provided by SunWater as the first step to justification of the proposed costs.

PVWater also submitted that they do not accept providing specialist operational staff centrally is the most cost efficient method of sourcing those specialist services. The private sector can provide those specialist services at most scheme locations, on an as needs basis, which would truly reflect the cost of the specialist services at a scheme based level.

Authority's Analysis

Arup noted that key drivers affecting operating expenditure include WHS, environmental obligations (such as ROLs and ROPs) and dam safety obligations.

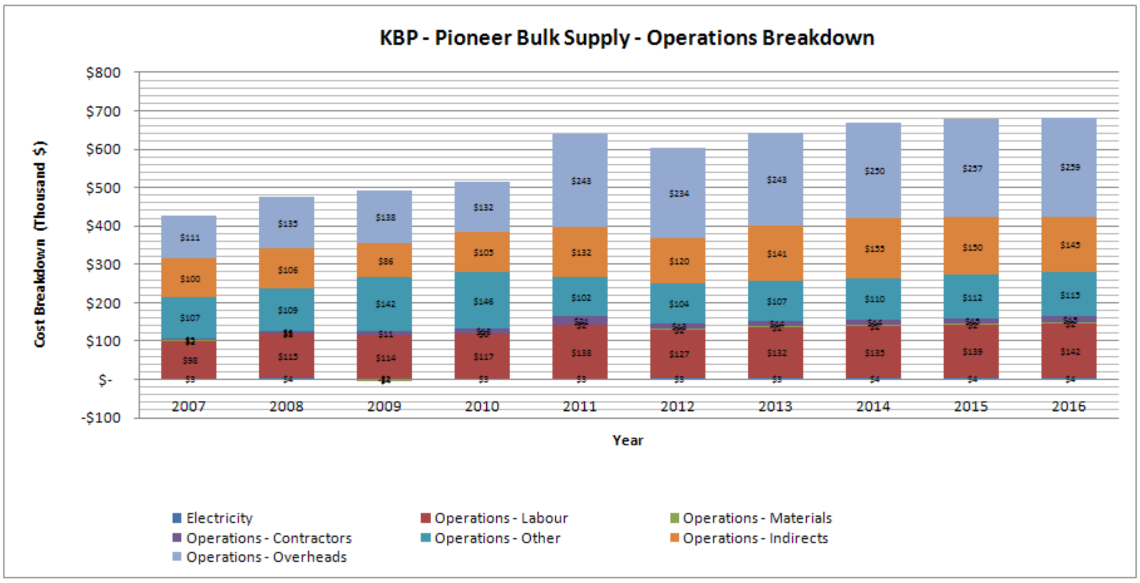
In meeting these obligations Arup considered that a smaller water service provided may be able to take a more relaxed approach and, in effect, accept a higher level of risk. However, for a large organisation such as SunWater, the financial risks of not meeting these obligations are significant.

In reviewing operating expenditure for the Pioneer River WSS (Figure 5.5), Arup noted that:

(a) labour and insurance costs remain steady, with increases in line with an accepted level of indexation;

(b) the increase in labour costs in 2000-01 can, in part, be attributed to the increased surveillance at Teemburra Dam.

Figure 5.5: Operations Expenditure Breakdown – Pioneer River WSS



Note: Data in figure based on NSP and may differ from most recent SunWater data. Source: Arup (2011).

Arup did not recommend an adjustment to SunWater's operating expenditure for this scheme.

In the Draft Report, the Authority noted that Arup did not recommend any adjustment to operating expenditure for this scheme.

The Authority noted that the consultants engaged to review operations costs in other SunWater schemes (Halcrow (2011), GHD (2011) and Aurecon (2011)) also did not recommend any adjustment to operations costs.

The Authority accepted that recreational site water treatment costs are part of the operation costs and should be recovered from customers along with other recreation facilities costs.

On the basis of the consultants' reviews, the Authority did not specifically adjust SunWater's operations expenditure forecast.

Final Report

No submissions on these matters were received in response to the Draft Report and the Authority has not identified any other grounds to alter its approach. No changes are therefore proposed for the Final Report.

Item 2: Preventive Maintenance

Draft Report

Stakeholder Submissions

SunWater defines preventive maintenance as maintaining the ongoing operational performance and service capacity of physical assets as close as possible to designed standards. Preventive maintenance is cyclical in nature with a typical interval of 12 months or less.

Preventive maintenance includes:

(a) condition monitoring – the inspection, testing or measurement of physical assets to report and record its condition and performance for determination of preventive maintenance requirements; and

(b) servicing – planned maintenance activities normally expected to be carried out routinely on physical assets.

Preventive maintenance costs are based on the updated work instructions developed for operating the scheme and an estimate of the resources required to implement that scope of work.

SunWater's proposed preventive maintenance costs are set out in Table 5.6.

No stakeholder comments were received on this item.

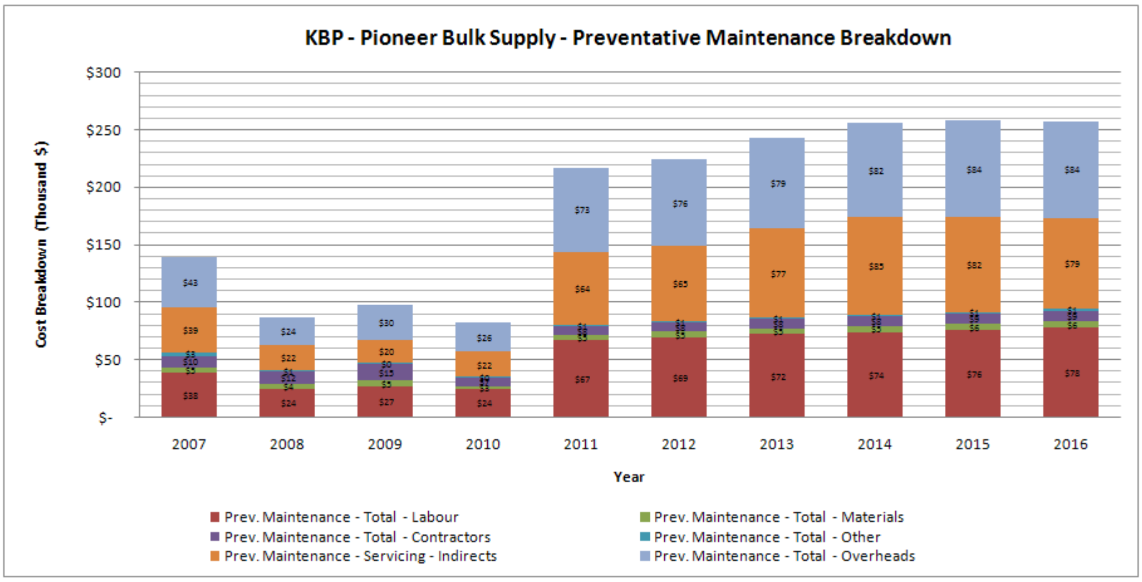
Authority's Analysis

Arup noted that PB were engaged by SunWater in 2010 to assess the organisation's preventive maintenance work instructions and associated costs, and establish a confidence level of planned baseline costs for 2010-11 for all services contracts.

Arup requested a formal statement from SunWater as to how the outcomes of this assessment had been incorporated into preventive maintenance forecasts, including details of what initiatives had been or are scheduled to be put in place. However, on the basis of the information provided, Arup were not able to determine how PB's revised forecasts had been integrated into the NSP forecasts.

In reviewing preventive maintenance for the Pioneer River WSS, Arup noted that there is an increase in labour for the 2011-16 price path (Figure 5.6). However, they were not able to ascertain what this increase is for given that no similar trend is seen in the current price path.

Figure 5.6: Preventive Maintenance Breakdown – Pioneer River WSS



Note: Data in figure based on NSP and may differ from most recent SunWater data. Source: Arup (2011).

Arup did not recommend an adjustment to SunWater's preventive maintenance expenditure for this scheme.

In the Draft Report, the Authority noted that Arup did not recommend any adjustment to preventive maintenance expenditure for this scheme.

In Volume 1, the Authority noted that most of its consultants considered that that there is scope for SunWater to achieve further efficiencies once the balance of preventive and corrective maintenance is optimised. The Authority considered that this potential for efficiency could be addressed via the broad efficiency measures imposed on SunWater schemes (noted further below).

In Volume 1, the Authority also recommended that SunWater implement PB's earlier recommendations that:

(a) SunWater's maintenance plans and work instructions; and associated labour inputs and unit costs should be audited, including a review of sub-contracted maintenance activities;

(b) maintenance practices and costs need to be examined to identify the optimum mix of preventive and corrective maintenance activities for each scheme; and

(c) a Reliability Centred Maintenance (RCM) approach to formulating maintenance activity requirements should be adopted.

For this scheme, the Authority did not specifically adjust SunWater's prevent maintenance expenditure forecast.

Final Report

No submissions on these matters were received in response to the Draft Report and the Authority has not identified any other grounds to alter its approach. No changes are therefore proposed for the Final Report.

Item 3: Corrective Maintenance

Draft Report

Stakeholder Submissions

SunWater submitted that even with sound preventive maintenance practices, unexpected failures can still occur or other incidents can arise that require reactive corrective maintenance.

SunWater identifies two types of corrective maintenance activities:

(a) emergency breakdown maintenance which refers to maintenance that has to be carried out immediately to restore normal operation or supply to customers or to meet a regulatory obligation (e.g. rectify a safety hazard); and

(b) non-emergency maintenance which refers to maintenance that does not have to be carried out immediately to restore normal operations, but needs to be scheduled in advance of the planned maintenance cycle.

SunWater has forecast corrective maintenance based on past experience. This provision includes a portion of labour costs in the scheme for such events, as well as additional materials and plant hire.

SunWater's corrective maintenance forecast does not include any costs of damage arising from events covered by insurance.

SunWater's proposed corrective maintenance costs are set out in Table 5.6.

PVWater (2011a) submitted that if corrective maintenance forecasts are stated to be based on past experience then details of that experience are required to allow a clear understanding of the unexpected failures that could occur in this scheme to require an annual amount of $185,000. PVWater considered that this amount appears excessive for a bulk water scheme.

Authority's Analysis

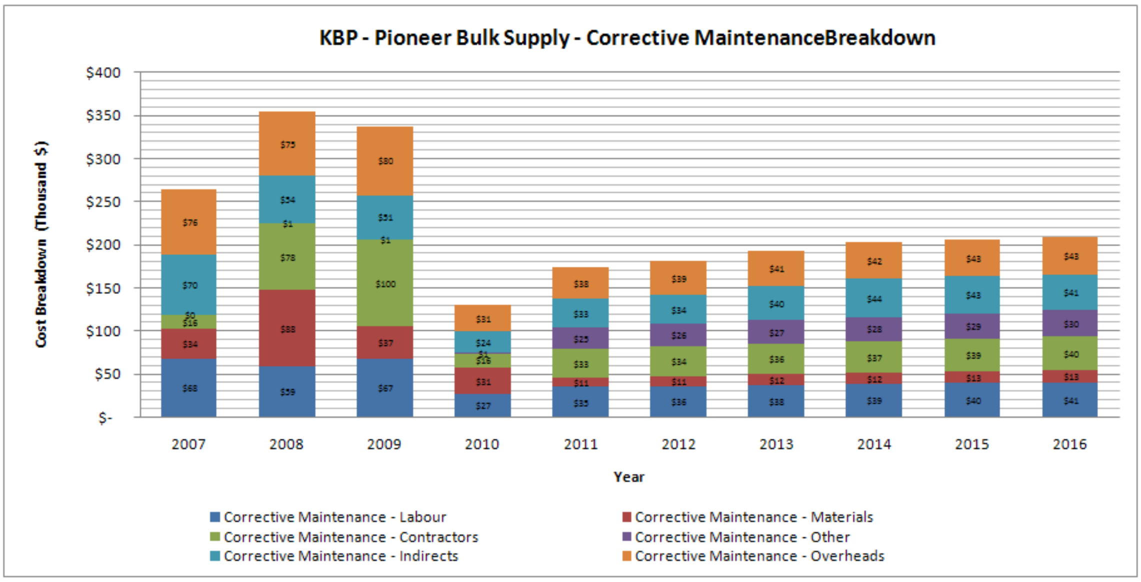
Arup noted that corrective maintenance forecasts are based on actual spends from the last four years.

Although, SunWater advised Arup that they have sought to review the balance between corrective and preventive maintenance, Arup reported that they were not provided with any formal documentation indicating the exact methodology used to prepare the correctively maintenance forecasts.

Arup also noted that if adopted, the RCM approach recommended by PB (2010) would seek to optimise the process by which maintenance is undertaken and, in doing so, would also optimise the balance between preventive and corrective maintenance.

In reviewing corrective maintenance for the Pioneer River WSS, Arup noted that there is a significant reduction in costs from 2009-10 (Figure 5.7). While the overall trend indicates that a reduction in corrective maintenance has translated into an increase in preventive maintenance, the full basis for this change has not been able to be determined.

Figure 5.7: Corrective Maintenance Breakdown – Pioneer River WSS



Note: Data in figure based on NSP and may differ from most recent SunWater data. Source: Arup (2011).

Arup did not recommend an adjustment to SunWater's corrective maintenance expenditure for this scheme.

In the Draft Report, the Authority noted that Arup did not recommend any adjustment to corrective maintenance expenditure for this scheme.

As noted above, in Volume 1, the Authority recommended an optimal mix of preventive and corrective maintenance should be pursued by SunWater. Further, for corrective maintenance, the Authority recommended that SunWater formally document its processes for the development of correct maintenance expenditure forecasts.

In the absence of any measure of the impact of the optimisation process, the Authority did not propose to apply any specific adjustments to this measure but intended to take this into account when considering the application of a general efficiency target (as outlined below).

Final Report

No submissions on these matters were received in response to the Draft Report and the Authority has not identified any other grounds to alter its approach. No changes are therefore proposed for the Final Report.

Item 4: Electricity

Draft Report

<u>Stakeholder Submissions</u>

SunWater initially proposed that electricity costs increase in line with inflation with prices adjusted annually (cost pass through) to reflect the actual change in electricity costs.

SunWater subsequently proposed to escalate electricity prices by 10.5% per annum over the regulatory period reflecting the average in the Benchmark Retail Cost Index (BRCI) between 2007-08 and 2011-12, together with further adjustments in 2012-13 and 2015-16 to reflect expected increases from the introduction of the carbon tax and carbon trading scheme (SunWater, 2011ak).

SunWater submitted that electricity costs are not significant for the Pioneer River WSS (see Table 5.7).

No other stakeholders commented on this item prior to the Draft Report.

Authority's Analysis

Arup noted that SunWater have undertaken extensive cost benefit analyses into when and where they should adopt contestable or franchise tariffs. In particular, specialist consultants in this field have been employed to advise SunWater on such strategies and for this scheme the current advice is to run a franchise tariff.

Arup did not recommend an adjustment to SunWater's electricity expenditure for this scheme.

In Volume 1, the Authority recommended that SunWater review the cost differential between franchise and contestable electricity contracts on an annual basis. Further, that SunWater report back to stakeholders on the success (or otherwise) of its energy savings measures, and quantify the savings that have been achieved.

The Authority proposed electricity be escalated at 7.41% per annum, based on expected growth in the four key components of electricity prices – network costs, energy costs, retail operating costs and retail margin.

In the Draft Report, the Authority did not accept an escalation rate that made an explicit allowance for carbon price impacts prior to them becoming enacted legislation.

The Authority adjusted proposed electricity costs as set out in Table 5.8.

Final Report

Further information relevant to electricity cost escalation was available following the Draft Report. This included the release of the Authority's Draft Determination regarding the review of regulated (franchise) tariffs, the passing of relevant legislation relating to a carbon tax and the Australian Government's forecast of the impact of carbon trading.

As a result, and as set out in Volume 1, the Authority revised its recommended escalation of electricity costs.

The Authority recommends that electricity should be escalated by 6.6% in 2011-12, 12.5% in 2012-13 and 7% per annum for subsequent years, with the exception of 2015-16 where 8% will apply (reflecting a further 1% increase from the introduction of carbon trading). Proposed electricity costs are set out further below.

Item 5: Cost Escalation

Draft Report

As noted in Volume 1, the Authority's consultants were required to examine the appropriateness of SunWater's proposed cost escalation methods (electricity has been dealt with above).

Direct Labour

The consultants generally agreed that SunWater's labour escalation forecast using the general inflation rate (2.5%) underestimated the likely actual movement in the cost of labour.

Evidence cited included the growth in both the Labour Price Index for the Electricity, Gas, Water and Waste Services Industry and the Labour Price Index for Queensland, which have averaged around 4% per annum in recent years, and recent forecasts by Deloitte suggesting an average increase in the labour costs facing Queensland's utilities sector of 4.3% per annum between 2011-12 and 2017-18.

The Authority recommended that labour costs be escalated at 4% per annum.

Direct Materials and Contractors

Most consultants agreed that SunWater's proposed escalation factor of 4% per annum for this component of cost was appropriate. Evidence in support included the historical analysis of Australian Bureau of Statistics (ABS) construction cost data and forecasts of industry trends. However, both Halcrow and GHD considered that SunWater had not provided sufficient rationale for its proposed escalation factor of 4% per annum for direct materials and contractor services, and that these costs should be escalated at the general rate of inflation.

The Authority recommended that direct materials and contractor costs be escalated at 4% per annum.

Other Costs

The Authority accepted SunWater's proposal to escalate other direct costs and all non-direct costs by the general inflation rate as these costs are primarily administrative and management functions.

Final Report

No submissions on these matters were received in response to the Draft Report and the Authority has not identified any other grounds to alter its approach. No changes are therefore proposed for the Final Report.

Conclusion

Draft Report

A comparison of SunWater's and the Authority's direct operating costs for the Pioneer River WSS is set out in Table 5.8.

The Authority's proposed costs include all specific adjustments and the Authority's proposed cost escalations as noted above.

In the Draft Report, the Authority applied a minimum 2.43% saving to direct operating costs (excluding electricity) in 2012-13. A further 0.75% saving arising from labour productivity is also applied, compounding annually.

Final Report

For the Final Report, the Authority's proposed costs include a change to the escalation of electricity costs to reflect new information.

Further, as noted in Volume 1, in the Draft Report the Authority inadvertently understated cost saving percentage estimates. These have been corrected and as a result, the Authority has now applied a minimum 4.5% saving to direct operating costs (excluding electricity) in 2012-13. A further 0.75% saving arising from labour productivity is also applied annually.

The Authority's final recommended direct costs are shown in Table 5.8 compared to the Draft Report recommendations.

Table 5.8: Direct Operating Costs (Real $'000)

	SunWater					***Authority***				
	2012-13	***2013-14***	***2014-15***	***2015-16***	***2016-17***	***2012-13***	***2013-14***	***2014-15***	***2015-16***	***2016-17***
Operations	246	247	246	246	246	238	238	238	239	239
Electricity	4	4	5	5	6	3	4	4	4	4
Preventive Maintenance	90	90	90	90	90	87	87	88	88	88
Corrective Maintenance	107	108	109	110	110	103	104	105	106	105
Total	**447**	**449**	**450**	**452**	**452**	**432**	**433**	**435**	**436**	**436**
Final Report										
Operations						233	233	233	234	234
Electricity						4	4	4	4	5
Preventive Maintenance						85	85	86	86	87
Corrective Maintenance						101	102	103	103	103
Total						423	425	426	428	428

Note: Totals vary from NSP due to SunWater's revised approach to insurance and electricity, exclusion of revenue offset (which is dealt with in the following chapter), and rounding. The estimates also reflect the most recent information provided by SunWater to the Authority in October 2011. Source: SunWater (2011ap), SunWater (2011ao) and QCA (2011 and 2012).

5.5 Cost Allocation According to WAE Priority

It is necessary to establish a methodology to allocate operating costs to the differing priority groups of WAE.

Previous Review

For the 2006-11 price paths, all costs were apportioned between medium and high priority customers according to WPCFs in both bulk and distribution systems.

Draft Report

Stakeholder Submissions

Other Stakeholders

PVWater (2011a) submitted that the operating costs proposed in the NSP do not recognise that PVWater manages a major portion of service delivery and water allocation management for irrigation in the Pioneer River WSS. Hence, SunWater's proposal to allocate operating costs on the basis of total allocation is not supported. PVWater considered that the hydrologic conversion factors used for the previous price path are more appropriate for sharing operating costs but noted that they have not been calculated for the Pioneer ROP. Hence they contend that SunWater's proposed HUF methodology also be adopted for the allocation of operating costs.

SunWater

SunWater (2011j) proposed to assign operating costs to users on the basis of their current WAE, except for non-direct costs allocated to renewals (on the basis of DLC) which are to be allocated to priority groups using WAEs.

For the purpose of allocating operating costs in this Pioneer River WSS, SunWater submitted that the total WAE is 78,110 ML, of which 47,357 (61%) is High B priority.

In response to the issues raised by PVWater, SunWater (2011ab) submitted that PVWater did not explain why the use of hydrologic conversion factors should be retained. In particular, SunWater disputed that the HUFs are appropriate for allocating operating costs as it is specifically aimed at determining the storage capacity dedicated to high and medium priority. It does not reflect any differential in the operating costs between high and medium priority WAE.

SunWater noted that its proposed approach would result in a small (approximately $31,000 or 3.6%) increase in the costs allocated to medium priority [High B] WAE compared to the current approach.

Authority's Analysis

In Volume 1, the Authority summarised the views of its consultants and has recommended that, in relation to bulk schemes:

(a) variable costs be allocated to medium and high priority WAE on the basis of water use;

(b) fixed preventive and corrective maintenance costs be allocated to medium and high priority WAE using HUFs; and

(c) for fixed operations costs 50% be allocated using HUFs and 50% using current nominal WAEs.

The Authority recommended that within bulk service contracts, insurance premiums are allocated between medium and high priority customers on the basis of HUFs.

The effect for the Pioneer River WSS is detailed in the following chapter (as it takes into account other factors relevant to establishing total costs).

In response to PVWater, the Authority considered that fixed preventive and corrective maintenance costs are linked to storage costs – that is, any allocation of costs considered appropriate for renewals is also relevant for these maintenance items. For example, renewals includes major periodic maintenance items that occur at intervals longer than 12 months, while preventive maintenance incorporates similar activities occurring at less than 12 month intervals. Similarly, corrective maintenance and a proportion of fixed operations costs are expected to be linked to storage related expenditures in bulk WSSs. The Authority therefore recommended that the approach defined above be adopted.

Final Report

No general submissions on the allocation of insurance costs were received in response to the Draft Report. However, following further consultation with SunWater, the Authority has concluded that an allocation of bulk insurance costs based solely on HUF is not appropriate (as other than asset utilisation factors are also relevant) and has decided to allocate the cost in the same manner as fixed bulk operations costs (50% HUF and 50% WAE).

On other cost allocation matters, no submissions were received in response to the Draft Report and the Authority has not identified any other grounds to alter its approach. No changes are therefore proposed for the Final Report.

5.6 Summary of Operating Costs

SunWater's proposed operating costs by activity and type are set out in Table 5.9. The Authority's draft recommended operating costs are set out in Table 5.10, and final recommended operating costs are provided in Table 5.11.

Compared to the Draft Report, the Final Report estimated operating costs take account of:

(a) an increase in non-direct costs to include the cost of options analyses and consultation with customers on renewals items ($445,000 for SunWater as a whole) which has been allocated to schemes on the basis of direct labour;

(b) lower direct operating costs reflecting higher efficiency gains; and

(c) slightly increased electricity costs reflecting a higher increase for 2012-13 compared to the Draft Report.

Taken together, total operating costs are little changed since the Draft Report.

Table 5.9: SunWater's Proposed Operating Costs (Real $'000)

	2012-13	***2013-14***	***2014-15***	***2015-16***	***2016-17***
Operations					
Labour	126	126	126	126	126
Materials	4	4	4	4	4
Contractors	13	13	13	14	14
Other	104	104	103	103	103
Non-Direct	264	275	267	256	251
Preventive Maintenance					
Labour	69	69	69	69	69
Materials	6	6	6	6	6
Contractors	8	8	8	8	8
Other	7	7	7	7	7
Non-Direct	142	148	144	137	135
Corrective Maintenance					
Labour	36	36	36	36	36
Materials	37	38	38	39	39
Contractors	34	34	35	35	35
Other	0	0	0	0	0
Non-Direct	77	80	78	75	74
Electricity	4	4	5	5	6
Total	**929**	**952**	**938**	**919**	**912**

Note: Totals vary from NSP due to SunWater's revised approach to insurance and electricity, exclusion of revenue offset (which is dealt with in the following chapter), and rounding. The estimates also reflect the most recent information provided by SunWater to the Authority in October 2011. Source: SunWater (2011ap) and SunWater (2011ao).

Table 5.10: The Authority's Draft Recommended Operating Costs (Real $'000)

	2012-13	***2013-14***	***2014-15***	***2015-16***	***2016-17***
Operations					
Labour	122	123	123	124	125
Materials	3	4	4	4	4
Contractors	13	13	13	13	13
Other	100	100	99	98	97
Non-Direct	257	264	252	237	230
Preventive Maintenance					
Labour	66	67	67	68	68
Materials	6	6	6	6	6
Contractors	7	8	8	8	8
Other	7	7	7	7	7
Non-Direct	138	142	136	128	123
Corrective Maintenance					
Labour	35	35	35	35	36
Materials	36	36	36	37	36
Contractors	33	33	33	34	33
Other	0	0	0	0	0
Non-Direct	75	77	74	70	67
Electricity	3	4	4	4	4
Total	**902**	**916**	**896**	**871**	**857**

Source: QCA (2011).

Table 5.11: The Authority's Final Recommended Operating Costs (Real $'000)

	2012-13	*2013-14*	*2014-15*	*2015-16*	*2016-17*
Operations					
Labour	119	120	121	122	122
Materials	3	3	3	3	3
Contractors	12	12	13	13	13
Other	98	97	97	96	95
Non-Direct	265	272	261	247	240
Preventive Maintenance					
Labour	65	66	66	66	67
Materials	6	6	6	6	6
Contractors	7	7	7	7	7
Other	7	7	7	6	6
Non-Direct	138	142	136	128	124
Corrective Maintenance					
Labour	34	34	34	35	35
Materials	35	35	36	36	36
Contractors	32	32	33	33	33
Other	0	0	0	0	0
Non-Direct	75	77	74	70	68
Electricity	4	4	4	4	5
Total	**901**	**915**	**896**	**872**	**859**

Source: QCA (2012).

6. RECOMMENDED PRICES

6.1 Background

Ministerial Direction

The Ministerial Direction requires the Authority to recommend SunWater's irrigation prices for water delivered from 22 SunWater bulk water schemes and eight distribution systems and, for relevant schemes, for drainage, drainage diversion and water harvesting.

Prices are to apply from 1 July 2012 to 30 June 2017.

Recommended prices and tariff structures are to provide a revenue stream that allows SunWater to recover:

(a) prudent and efficient expenditure on renewing and rehabilitating existing assets through a renewals annuity; and

(b) efficient operational, maintenance and administrative costs to ensure the continuing delivery of water services.

In considering the tariff structures, the Authority is to have regard to the fixed and variable nature of the underlying costs. The Authority is to adopt tariff groups as proposed in SunWater's network service plans and not to investigate additional nodal pricing arrangements.

The Ministerial Direction also requires that:

(a) where current prices are above the level required to recover prudent and efficient costs, current prices are to be maintained in real terms;

(b) where cost-reflective prices are above current prices, the Authority must consider recommending price paths to moderate price impacts on irrigators, whilst having regard to SunWater's commercial interests; and

(c) for certain schemes or segments of schemes [hardship schemes], prices should increase in real terms at a pace consistent with 2006-11 price paths, until such time as the scheme reaches the level required to recover prudent and efficient costs.

Price paths may extend beyond 2012-17, provided the Authority gives its reasons. The Authority must also give its reasons if it does not recommend a price path, where real price increases are recommended by the Authority.

Previous Review

In the 2006-11 price paths, real price increases over the five years were capped at $10/ML for relevant schemes. The cap applied to the sum of Part A and Part B real prices. In each year of the price path, the prices were indexed by the consumer price index (CPI). Interim prices in 2011-12 we increased by CPI, with additional increases in some schemes.

For Pioneer River WSS, in addition to CPI increases over 2006-11, the prices for both tariff groups were also increased in real terms to achieve lower bound costs in 2008-09. In 2011-12, prices were increased by $2/ML and CPI.

6.2 Approach to Calculating Prices

In order to calculate SunWater's irrigation prices in accordance with the Ministerial Direction, the Authority has:

(a) identified the total prudent and efficient costs of the scheme;

(b) identified the fixed and variable components of total costs;

(c) allocated the fixed and variable costs to each priority group;

(d) calculated cost-reflective irrigation prices;

(e) compared the cost-reflective irrigation prices with current irrigation prices; and

(f) implemented the Government's pricing policies in recommended irrigation prices.

Submissions Received from Stakeholders on the Draft Report

In Round 3 consultations, irrigators questioned whether the 12,000ML of WAE held by SunWater was taken into account in the price determination.

Authority's Response to Submissions Received on the Draft Report

The Authority assigned a share of costs to all WAE regardless of owner, for the purpose of estimating cost reflective and recommended prices. SunWater is therefore bearing a relevant share of costs for unallocated WAE.

For the Draft Report, the Authority adopted a 20 year price model mainly to promote long term price stability. Under this approach, prices are above costs for the first ten years of the 20 year model and below costs for the last ten years. Over the 20 year period, costs are fully recovered.

Some stakeholders raised concerns about estimated cost reflective prices exceeding lower bound costs over the 2012-17 price period.

In the Final Report, the Authority has adopted a five year pricing model for the purpose of developing prices. The Authority has retained the rolling 20 year renewals annuity planning period and used the relevant five years of the smoothed renewals annuity. For non-renewals costs the five year model now incorporates only five years of such costs, rather than 20 years. Such an approach also has the advantage of removing from prices the inaccuracies associated with longer term forecasts in non-capital costs.

6.3 Total Costs

Draft Report

The Authority's estimates of prudent and efficient total costs for the Pioneer River WSS for the 2012-17 regulatory period is outlined in Table 6.1. Total costs since 2006-07 are also provided. Total costs reflect the costs for the service contract (all sectors) and do not include any adjustments for the Queensland Government's pricing policies.

Submissions Received from Stakeholders on the Draft Report

PVWater submitted that the income to SunWater from the transaction fees charged on transfers of allocation should be accounted for in revenue offsets for the scheme.

Authority's Response to Submissions Received on the Draft Report

The Authority noted that the amount of $10,000 identified as revenue offsets in the Pioneer WSS relates to land lease revenue. SunWater has not included provision for transaction fee revenue. However, as the volume of trades in recent years has been relatively low (Table 3.1), the amount of revenue is not likely to be significant.

Table 6.1: Total Costs for the Pioneer River WSS (Real $'000)

	Actual Costs						*Future Costs*				
	2006-07	*2007-08*	*2008-09*	*2009-10*	*2010-11*	*2011-12*	*2012-13*	*2013-14*	*2014-15*	*2015-16*	*2016-17*
SunWater's Submitted Costs	1,096	1,195	1,242	1,099	1,390	1,713	1,743	1,758	1,738	1,707	1,700
Renewals Annuity	275	287	328	380	373	837	824	816	810	798	798
Operating Costs	829	917	922	729	1,026	886	929	952	938	919	912
Revenue Offsets	-9	-9	-9	-10	-8	-10	-10	-10	-10	-10	-10
Draft Report											
Authority's Total Costs	-	-	-	-	-	-	1,023	1,045	1,035	1,010	1,004
Renewals	-	-	-	-	-	-	131	139	148	148	156
Operating Costs	-	-	-	-	-	-	902	916	896	871	857
Revenue Offsets	-	-	-	-	-	-	-10	-10	-10	-10	-10
Return on Working Capital	-	-	-	-	-	-	0	0	0	0	0
Final Report											
Authority's Total Costs -							1,295	1,308	1,290	1,258	1,244
Renewals							403	402	403	394	394
Operating Costs							901	915	896	872	859
Revenue Offsets							-10	-10	-10	-10	-10
Return on Working Capital							1	0	0	0	0

Note: Costs are presented for the total service contract (all sectors). Costs reflect SunWater's latest data provided to the Authority in October 2011 and may differ from the NSP. Source: Actual Costs (SunWater, 2011ap), Draft Costs (QCA, 2011), Final Costs (QCA, 2012).

6.4 Fixed and Variable Costs

The Ministerial Direction requires the Authority to have regard to the fixed and variable nature of SunWater's costs in recommending tariff structures for each of the irrigation schemes.

Draft Report

SunWater submitted that all of its operating costs are fixed in the Pioneer River WSS.

As noted in Volume 1, the Authority engaged Indec to determine which of SunWater's costs are most likely to vary with water use. Indec identified:

(a) costs that would be *expected* to vary with water use. Indec expected that electricity pumping costs would generally be variable and non-direct costs would be fixed. All other activities and expenditure types would be expected to be semi-variable, including: labour, material, contractor and other direct costs, maintenance, operations and renewals expenditures;

(b) costs that *actually* varied with water use in 2006-11, by activity and by type:

   (i) by activity, Indec found that operations, preventive and corrective maintenance and renewals were semi-variable. Electricity was generally highly variable with water use in five distribution systems and two bulk schemes. In three distribution systems electricity pumping costs were semi-variable due to gravity feed;

   (ii) by type, Indec found that labour, materials, contractors and other direct costs were semi-variable. Non-direct costs were fixed; and

(c) costs that *should* vary with water use under Indec's proposed optimal (prudent and efficient) management approach (this approach is outlined in Volume 1). On average across all SunWater's bulk schemes, Indec considered 93% of costs would be fixed and 7% variable under optimal management. However Indec proposed that scheme-specific tariff structures should be applied, to reflect the relevant scheme costs.

For this scheme, Indec recommended 94% of costs should be fixed and 6% variable under optimal management. The Authority notes that this ratio differs from the current tariff structure which reflects the recovery of 30% of costs in the fixed charge and 70% of costs in the volumetric charge.

In general, the Authority accepts Indec's recommended tariff structure, for the reasons outlined in Volume 1. No change is proposed from the Draft Report.

6.5 Allocation of Costs According to WAE Priority

Fixed Costs

The method of allocating fixed costs to priority groups is outlined in Chapter 4 – Renewals Annuity and Chapter 5 – Operating Costs. The outcome is summarised in Table 6.2. These costs are translated into the fixed charge using the relevant WAE for each priority group.

Table 6.2: Allocation of Fixed Costs According to WAE Priority (Real $'000)

	2012-13	*2013-14*	*2014-15*	*2015-16*	*2016-17*
Draft Report					
Net Fixed Costs	961	982	973	949	943
High A Priority	500	511	507	495	492
High B Priority	461	470	466	454	451
Final Report					
Net Fixed Costs	1,209	1,222	1,203	1,171	1,158
High A Priority	640	647	637	621	614
High B Priority	569	575	566	551	544

Note: Net fixed costs are net of revenue offsets and return on working capital. Source: Actual Costs (SunWater, 2011ap), Draft Costs (QCA, 2011), Final Costs (QCA, 2012).

Variable Costs

Volumetric tariffs are calculated based on SunWater's eight-year historical water usage data for all sectors. However, consistent with SunWater's assumed typical year for operating cost forecasts, the Authority has removed from the eight years of data, the three lowest water-use years for each service contract. .

6.6 Cost-Reflective Prices

Cost-reflective prices reflect the Authority's estimates of prudent and efficient costs, recommended tariff structures, and the allocation of costs to different priority groups.

The cost-reflective prices in the Draft Report are contrasted with its Authority's final cost-reflective prices below.

Table 6.3: High B Priority Prices for the Pioneer River WSS ($/ML) (Cost Reflective)

	Actual Prices						*Cost Reflective Prices*				
	2006-07	***2007-08***	***2008-09***	***2009-10***	***2010-11***	***2011-12***	***2012-13***	***2013-14***	***2014-15***	***2015-16***	***2016-17***
River (Pioneer Valley Water Board) Draft Prices											
Fixed (Part A)	6.24	7.88	9.64	9.92	10.24	12.60	10.03	10.28	10.53	10.80	11.07
Volumetric (Part B)	4.86	6.15	7.50	7.74	7.97	8.26	1.85	1.90	1.95	2.00	2.05
Final Cost-Reflective Prices											
Fixed (Part A)							12.46	12.77	13.09	13.42	13.75
Volumetric (Part B)							2.62	2.69	2.76	2.83	2.90

Source: Actual Prices (SunWater, 2011al), Draft Cost Reflective Prices (QCA, 2011) and Final Cost-Reflective Prices (QCA, 2012).

6.7 Queensland Government Pricing Policies

As noted above, the Queensland Government has directed that:

(a) where current prices are above the level required to recover prudent and efficient costs, current prices are to be maintained in real terms;

(b) where cost-reflective prices are above current prices, the Authority must consider recommending price paths to moderate price impacts on irrigators, whilst having regard to SunWater's commercial interests; and

(c) for certain schemes or segments of schemes [hardship schemes], prices should increase in real terms at a pace consistent with 2006-11 price paths, until such time as the scheme reaches the level required to recover prudent and efficient costs.

Price paths may extend beyond 2012-17, provided the Authority gives its reasons. The Authority must also give its reasons if it does not recommend a price path, where real price increases are recommended by the Authority.

As noted in the Draft Report, to identify the relevant price path (if any), the Authority must first identify whether current prices recover prudent and efficient costs. To do so, given changes to tariff structure, the Authority has compared current revenues with revenues that would arise under the cost-reflective tariffs, if implemented (see Volume 1).

The Authority has calculated these current revenues using the relevant 2010-11 prices, current irrigation WAE and the five-year average (irrigation only) water use during 2006-11 (Table 6.4). For this scheme, in the Draft Report, current revenues were above the level required to recover prudent and efficient costs. Therefore, the Authority was required to recommend prices that maintain revenues in real terms for the 2012-17 regulatory period.

In the Final Report, the Authority found that the scheme is now slightly under-recovering the required cost reflective revenue. Cost reflective tariffs are reached in the first year of the price path.

Table 6.4: Comparison of Revenues - Current Prices and Cost-Reflective Tariffs ($2012-13)

Tariff Group	2011-12 Prices (indexed to $2012-13) Fixed	2011-12 Prices (indexed to $2012-13) Variable	Irrigation WAE (ML)	Irrigation Water Use (ML)	Current Revenue	Revenue from Cost-Reflective Tariffs	Difference
River (Draft)	10.76	8.37	47,357	11,311	604,198	495,750	108,448
River (Final)	10.76	8.37	47,357	8,837	583,485	613,179	-29,694

Source: SunWater (2011al), SunWater (2011ao), QCA (2011) and QCA (2012).

6.8 The Authority's Recommended Prices

The Authority's draft and final recommended prices to apply to the Pioneer River WSS for 2012-17 are outlined in Table 6.5, together with actual prices since 2006-07. In calculating the recommended prices, a 10-year average irrigation water use has been adopted (see Volume 1).

Table 6.5: Recommended High B Priority Prices for the Pioneer River WSS ($/ML)

	Actual Prices						Recommended Prices				
	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17
Draft Report											
Fixed (Part A)	6.24	7.88	9.64	9.92	10.24	12.60	12.09	12.39	12.70	13.02	13.35
Volumetric (Part B)	4.86	6.15	7.50	7.74	7.97	8.26	1.85	1.90	1.95	2.00	2.05
Final Report											
Fixed (Part A)							12.46	12.77	13.09	13.42	13.75
Volumetric (Part B)							2.62	2.69	2.76	2.83	2.90

Note: 2011-12 prices include the interim price increase of $2/ML in addition to CPI. Source: Actual Prices (SunWater, 2011am), Draft Recommended Prices (QCA, 2011) and Final Recommended Prices (QCA, 2012).

6.9 Impact of Recommended Prices

The impact of any change in prices on the total cost of water to a particular irrigator, can only be accurately assessed by taking into account the individual irrigator's water usage and nominal WAE (see Volume 1).

Submissions in Response to the Draft Report

In Round 3 consultations, stakeholders commented that if there is a substantial change in recommended prices, say 10%, the Authority has an obligation to further consult with irrigators.

Authority's Response to Submissions Received on the Draft Report

The Authority notes that the sum of Part A and Part B recommended prices increases by 8% compared with the Draft Recommended Prices.

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APPENDIX A: FUTURE RENEWALS LIST

Below are listed SunWater's forecast renewal expenditure items greater than $10,000 in value, for the years 2011-12 to 2035-36 in 2010-11 dollar terms.

Asset	*Year*	*Description*	*Value ($'000)*
Dumbleton Weir	2014-15	Study: 5yr Dam Comprehensive Inspection	10
	2015-16	Outlet Valve Refurbishment - Dumbleton Weir	40
	2016-17	08PIO02 - Dumbleton Weir O&M Manual (Not statutory Requirement)	47
		Replace Slide Gate 1 (Lock Entrance)	24
		Replace Slide Gate 2 (Channel Exit)	16
		Dumbleton Weir - Road Gravel Repairs and Regrading	12
	2018-19	Replace Control Equipment	382
		09PIO-BOUY LINES WHS/PUBL DUMB W (PLAN)	24
		09PIO-UPGRD H/RAIL STCHN PINS DUMB(PLAN)	19
	2020-21	Refurbish Metalwork - Replace/refurbish access ladders & handrails ($4k), gate steel work overhaul major (with gate repl)	24
	2022-23	Replace Fish Lock Hydraulics	410
	2024-25	Replace Outlet Valve	20
	2025-26	Refurbish: WHS Issue, Install additional handrails and access (refer 2005 Condition Assessment)	12
	2028-29	Replace Switchboard	225
		Replace Control Building	150
		09PIO-BOUY LINES WHS/PUBL DUMB W (PLAN)	24
		09PIO-UPGRD H/RAIL STCHN PINS DUMB(PLAN)	19
		09PIO-MDFY ROLLER DOOR ACCES D'TON(PLAN)	15
	2030-31	Outlet Valve Refurbishment - Dumbleton Weir	39
	2033-34	Replace Control Equipment	379
		09PIO-O&M SYSTEM MANUAL DUMBLETON	49
		Refurbish Metalwork - Replace/refurbish access ladders & handrails ($4k), gate steel work overhaul major (with gate repl)	23
		Replace Electrical Cable	16
Marian Weir	2011-12	Carry out RH bank stabilisation work - Marian Weir - See Notes	36
	2014-15	Study: 5yr Dam Comprehensive Inspection	10
	2016-17	08PIO03 - Marian Weir - O&M System Manual pushed out to 2017 as not statutory requirement	44
	2018-19	09PIO-BOUY LINES WHS/PUB MARIAN W (PLAN)	24
	2027-28	08PIO05-MDFY F/W VRTCLSLT MRIN 09 (plan)	39
	2028-29	09PIO-BOUY LINES WHS/PUB MARIAN W (PLAN)	24
	2032-33	Replace Handrails	62
Mirani Weir	2014-15	Study: 5yr Dam Comprehensive Inspection	10
	2016-17	08PIO04 - Mirani Weir - O&M System Manual	49
		Replace Radio Repeater	37
		Mirani Weir - Maintain / Repaint Baulks	19
		Replace Sump Pump	14
	2018-19	09PIO-BOUY LINES WHS/PUB MIRANI W (PLAN)	24
		Replace Auto Dialler, Edac 700	12
	2022-23	Replace Cables & Cableways	115
		Replace Control	74

Asset	Year	Description	Value ($'000)
		Replace Switchboard	11
	2027-28	Replace Sluice Gate & Fittings	25
	2028-29	09PIO-BOUY LINES WHS/PUB MIRANI W (PLAN)	24
	2031-32	Replace Radio Repeater	36
	2032-33	Replace Trashracks	17
	2033-34	Replace Auto Dialler, Edac 700	12
Palmtree Creek Pipeline	2012-13	Refurbish: Palmtree Ck 900mm dia guard valve: total repaint and refurbish hydraulics ($22k in 2005); Reschedule to every 15 yrs	25
		Refurbish: Tannalo Guard Valve - Refurbish 700 dia guard valve hydraulics @ 15 yrs	25
	2013-14	Refurbish: Palmtree Ck Pipeline- Refurbish pipeline protection works adjacent to Teemburra Dam Access Road.	25
	2017-18	Replace Rupture Disk 1	49
		Replace Rupture Disk 2	49
		Replace Cathodic Protection	21
	2022-23	Replace Pipework	254
		Replace Control Equipment	123
	2023-24	Replace Protection Works	31
	2027-28	Refurbish: Palmtree Ck 900mm dia guard valve: total repaint and refurbish hydraulics ($22k in 2005); Reschedule to every 15 yrs	25
		Refurbish: Tannalo Guard Valve - Refurbish 700 dia guard valve hydraulics @ 15 yrs	25
	2028-29	Study: Condition Assessment	12
	2035-36	11PIO-CREATE PALM TREE O&M MANUAL	39
Teemburra Dam	2011-12	12PIO-EXTND CEMENT CREST ACCESS M/DAM	18
	2012-13	Teemburra Saddle Dam 2 - Blast and paint valve pit pipework every 15 yrs. Include sump pump	25
		Teemburra Saddle Dam 2 - Maintain Guard Valve (Remove internal corrosion and paint) (item 6.3.6a & 6.3.7a)	25
		Refurbish: Teemburra Saddle Dam 2 - Maintain outlet works trash screens: Patch paint	12
	2013-14	Teemburra Dam - SCADA software and battery repair/maintenance	25
	2014-15	10PIO-BLST/PNT M/DAM BLKS RPR GUIDE(PLAN	45
		10PIO-RPLCE SD2 BACK UP BATTERIES(PLAN)	15
		Refurbish: Blast and Repaint intake trash racks	13
	2015-16	Study: 20yr Dam Safety Review (by 1 Dec 2015)	131
		11PIO-5Y DAM SAFETY INSPCTN TEEMBURRA	100
	2016-17	Teemburra Dam - Refurbish concrete works: Recaulk joints	93
		Replace Instrumentation	37
		Refurbish: Refurb Cone valve after 20-year period if advised by Dam Safety report due in 2016	25
		Teemburra Main Dam - Blast and paint valve chamber pipework every 15 yrs	19
		Teemburra Main Dam - Winch Motor Overhaul	19
		Study: Options analysis on replacement of Scada and Control Systems in 2018	15
		Teemburra SD2 - Access Road (reseal)	15
		Palmtree Creek Pipeline - Erosion Repairs and Drainage Controls	12

Asset	Year	Description	Value ($'000)
		Refurbish outlet works guard valve @ 15yrs - Teemburra Main Dam	12
	2017-18	Replace Control Equipment	133
		Seal and repaint	43
		Replace Main Dam Repeater Station	19
		Replace Mirani Repeater Station	19
		Replace Office Hill Repeater Station	19
	2018-19	Teemburra Dam - SCADA software and battery repair/maintenance	25
		09PIO-REPL DOOR BLK TRCTR BLD SD2 (PLAN)	14
		Refurbish: Teemburra Saddle Dam 2 - Maintain outlet works trash screens: Patch paint	12
	2019-20	10PIO-BLST/PNT M/DAM BLKS RPR GUIDE(PLAN	44
		10PIO-RPLCE SD2 BACK UP BATTERIES(PLAN)	14
	2020-21	11PIO-5Y DAM SAFETY INSPCTN TEEMBURRA	101
		Replace Alarm Paging System	15
		Refurbish: Blast and Repaint intake trash racks	12
	2022-23	Replace Control Equipment	276
	2023-24	Teemburra Dam - SCADA software and battery repair/maintenance	25
		Teemburra Main Dam - Winch Motor Overhaul	19
	2024-25	10PIO-BLST/PNT M/DAM BLKS RPR GUIDE(PLAN	44
		10PIO-RPLCE SD2 BACK UP BATTERIES(PLAN)	14
		Refurbish: Teemburra Saddle Dam 2 - Maintain outlet works trash screens: Patch paint	12
	2025-26	11PIO-5Y DAM SAFETY INSPCTN TEEMBURRA	96
		Teemburra Saddle Dam 2 - Maintain Guard Valve (Remove internal corrosion and paint) (item 6.3.6a & 6.3.7a)	24
		Teemburra SD2 - Refurbish Baulks (Sched.Corrective)	18
	2026-27	Refurbish: Blast and Repaint intake trash racks	12
	2027-28	Teemburra Saddle Dam 2 - Blast and paint valve pit pipework every 15 yrs. Include sump pump	25
		Replace Main Dam Switchboard	21
		Replace Main Switchboard	21
		Replace Crest Distribution Switchboard	12
	2028-29	Teemburra Dam - SCADA software and battery repair/maintenance	25
		09PIO-REPL DOOR BLK TRCTR BLD SD2 (PLAN)	14
	2029-30	10PIO-BLST/PNT M/DAM BLKS RPR GUIDE(PLAN	44
		10PIO-RPLCE SD2 BACK UP BATTERIES(PLAN)	14
		10PIO-MODIFY M/D BAULK LOCKING PINS PLAN	10
	2030-31	11PIO-5Y DAM SAFETY INSPCTN TEEMBURRA	97
		Teemburra Main Dam - Winch Motor Overhaul	18
		Teemburra SD2 - Access Road (reseal)	15
		Refurbish: Teemburra Saddle Dam 2 - Maintain outlet works trash screens: Patch paint	12
	2031-32	Replace Instrumentation	37
		Teemburra Main Dam - Blast and paint valve chamber pipework every 15 yrs	18
		Refurbish outlet works guard valve @ 15yrs - Teemburra Main Dam	12

Asset	Year	Description	Value ($'000)
	2032-33	Replace Electrical Cable	143
		Replace Control Equipment	132
		Replace Main Dam Repeater Station	18
		Replace Mirani Repeater Station	18
		Replace Office Hill Repeater Station	18
		Refurbish: Blast and Repaint intake trash racks	12
	2033-34	Teemburra Dam - SCADA software and battery repair/maintenance	25
	2034-35	10PIO-REPAIR UNSEALED MAIN DAM RD (PLAN)	56
		10PIO-BLST/PNT M/DAM BLKS RPR GUIDE(PLAN	44
		10PIO-RPLCE SD2 BACK UP BATTERIES(PLAN)	14
	2035-36	Study: 20yr Dam Safety Review (by 1 Dec 2015)	129
		Replace Control Equipment	112
		11PIO-5Y DAM SAFETY INSPCTN TEEMBURRA	97
		Seal and repaint	43
		Replace Alarm Paging System	15