Central Lockyer Valley Water Supply Scheme

Network Service Plan

1. Introduction

Review Context

The QCA has been directed by the Queensland Government to develop irrigation prices for the Central Lockyer Valley Water Supply Scheme (the Scheme) for the four-year regulatory period 1 July 2013 to 30 June 2017.

The QCA is required to provide a draft report including draft irrigation prices by 30 November 2012 and a final report with recommended price paths by April 2013.

The current irrigation prices were set when the Scheme was owned by SunWater, and commenced from 1 July 2006. The Scheme was transferred to Seqwater in 2008-09, along with the SunWater pricing arrangements. This is the first review of irrigation prices since the Scheme has been in Seqwater ownership.

This document is the Network Service Plan (NSP) for the Scheme. It sets out information relevant to the QCA's review, including Seqwater's expenditure proposals over the regulatory period and specific pricing proposals for the Scheme.

It should be noted that this review is occurring alongside a separate review of Grid Service Charges, and that certain costs also form part of that review, although over a different timeframe.

About Seqwater

Seqwater owns different types of water supply assets and service types, namely:

- Storage assets - Seqwater owns 26 dams and 48 weirs which provide bulk water storage services to a range of water entitlement holders in South East Queensland, including irrigators, local governments, industrial users and the SEQ Water Grid Manager (WGM);
- Bulk distribution assets - Seqwater also provides distribution system services to irrigators from pipelines and channel systems;
- Water treatment assets - Seqwater provides drinking water to the WGM from 46 water treatment plants;
- A desalination plant - provides bulk drinking water to the WGM;
- An advanced recycled water scheme, which provides treated recycled water to the WGM;

- Groundwater - Seqwater provides drinking water to the WGM from 14 groundwater bore fields.

Seqwater owns, manages and operates physical assets with a book value of $6.3 billion. Seqwater provides irrigation services to around 1,200 rural customers in seven water supply schemes.

Seqwater also owns unregulated assets such as its head office building at 240 Margaret Street, water entitlements held for trading in the Upper Mary Water Supply Scheme, and two hydro-electricity plants. No costs of these assets are attributed to regulated assets.

Seqwater's total regulated revenue allowance for 2011-12 was $705M to $709M, of which some $3.3M relates to irrigation supplies. Of this $3.3M, some $1.9M is sourced directly from irrigation charges, with the balance sourced from a Community Service Obligation (CSO) payment.

Interpretation of terms used

For the purposes of this NSP, the following terms are defined as follows:

Water Access Entitlement (WAE) – means water allocations, interim water allocations or water licences.

Scheme background and context

The Central Lockyer Water Supply Scheme is located east of Gatton in South East Queensland. The scheme supplies water for the Morton Vale Pipeline, recharges the groundwater areas adjacent to Lockyer Creek, and supplies downstream area-based surface-water entitlements.

The Clarendon Dam and Bill Gunn Dam are the scheme's two main facilities. Both are offstream storages filled by diverting water from nearby creeks during significant flow events.

The Scheme was established to support irrigation in dairy, vegetable and forage crops sectors following construction of various weirs from the 1940s-1980s, Bill Gunn Dam and Lake Clarendon in 1988 and 1992 respectively and the Morton Vale Pipeline in the mid-1990s. The Scheme is also located in the Clarendon Subartesian Area which is a benefitted groundwater area, with irrigators within the Scheme licensed, metered and charged for their groundwater use.

The Scheme was transferred to Seqwater from SunWater Limited on 1 July, 2008. The map in section 2 presents an overview of the Scheme, including the locations of storages and monitoring/gauging stations.

The Scheme is regulated under the Interim Resource Operations Licence for the Central Lockyer Valley Water Supply Scheme, issued in July 2008.

The scheme consists of bulk water supply and distribution assets.

Customers served

The customers serviced by the scheme are:

- Irrigation users;
- Sporting clubs and associations;
- Lockyer Valley Regional Council and other agencies;
- Crowley Vale Water Board; and
- Seqwater.

Further details are set out in section 2 below.

Asset base

The asset base of the scheme consists of bulk water storage assets. These assets are listed in section 2 below and details of individual assets can be found in Appendix A.

Organisational resourcing arrangements

Seqwater is well advanced in transitioning its resourcing arrangements from those inherited in July 2008. Key achievements include:

- replacing service level agreements with previous asset owners (e.g. Councils) with internal staff appointments;
- negotiating a single enterprise bargaining agreement (refer below) to standardise work conditions; and
- developing and refining the structure of the organisation and recruiting the necessary resources.

Seqwater has also substantially completed its procurement arrangements for external resources, including consultants and contractors. Seqwater continues to outsource many maintenance activities for its assets, usually with local suppliers. In most cases suppliers were providing similar services to the previous asset owner, and Seqwater has retained these contractors to ensure continuity in asset performance and retention of asset knowledge.

Seqwater inherited 14 different enterprise agreements which required 47 separate payroll runs. Seqwater has since consolidated these into a single enterprise agreement, with a single payroll.

The enterprise agreement process also provided for more standardised work hours and overtime arrangements, and included the establishment of a 38 hour week.

The standardisation achieved through a single enterprise agreement has allowed more streamlined systems to be implemented, reducing the implementation costs for the payroll system and enabling a reduction in the number of staff required to administer the payroll from seven to two.

Seqwater's current enterprise agreement, which was certified on 2 November 2009, will expire on 30 June 2012. Seqwater is now meeting with all unions in regards to a replacement agreement.

Key systems and processes

Seqwater also inherited a diverse range of systems and business processes from previous asset owners. Since 2008-09, Seqwater has given priority to developing its systems so that they can support the business and enable more streamlined business processes.

Seqwater is in the second year of using its Corporate Information System (CIS) and has completed a post implementation review across all modules. As a result, Seqwater is committed to a series of continuous improvements for better business performance.

Seqwater is continuing with its program of end-to-end process reviews to identify improvements and generate cost savings in performing its business support and related activities.

Asset management

Asset management practice within Seqwater does not distinguish between irrigation and non-irrigation assets. Assets are managed as a portfolio and not on an industry sector basis.

Seqwater acquired the Central Lockyer Valley Water Supply Scheme from SunWater Limited. While the physical assets were transferred, much of the asset history was not. The staff members who also transferred to Seqwater were mostly operations rather than maintenance staff. This meant that corporate asset management knowledge was not transferred along with the assets.

Seqwater's maintenance and renewals program is evolving and moving towards industry best practice. However, this process is resource-intensive and relies on a long history of quality, consistent asset information before reaching full maturity.

Seqwater's maintenance tasks and associated expenditure follows three broad categories:

- Scheduled maintenance – which relates to regular maintenance items that are planned in advance;
- Corrective maintenance – relating to maintenance that is made in reaction to events or new information/inspections during the year; and
- Strategic asset maintenance – which relates to asset replacements and renewals and involves a mix of operating and capital expenditure.

Seqwater uses the Asset Management module within CIS to plan and schedule asset maintenance work. Work orders are produced on the system for each parcel of work required to be performed to capture the costs of performing the work.

Renewals and refurbishments are determined through a strategic asset management process. This process and its outcomes are documented in Facility Asset Management Plans (FAMPs), which are being rolled out across all assets. Irrigation assets are currently not as advanced in this process as the high-priority water treatment plants.

Procurement

Seqwater complies with the State Procurement Policy (SPP). Policies, procedures and processes consistent with, and supporting, the requirements of the SPP have been developed and are in operation. Where possible, procurement processes are system based using the Supply Chain Module in Seqwater's Corporate Information System (CIS).

Procurement activities are undertaken at all business sites.

Seqwater's Procurement Team monitors and analyses a range of performance indicators to identify opportunities to improve performance and minimise costs.

Seqwater is currently reviewing its "procure to pay" process to streamline the procurement of services and goods, management of delivery and payment for services.

Customer and Financial Management

Customer information management including invoicing and accounts receivable operations for the Scheme are carried out from Seqwater's Karalee office. Financial management including financial reporting and accounts payable processing is centralised in Seqwater's

Finance group in the Margaret Street office. Accounts payable is carried out using the AP module in CIS.

Insurance

Seqwater's portfolio of assets is insured with differing premium and deductible arrangements in place for bulk water and channel distribution systems. This requires specialist management of the insurances held, including management of claims and renewals and providing information to insurers and brokers.

Insurance premiums are obtained for a portfolio of Seqwater assets.

Although insurance premiums have not been allocated directly to schemes previously, these costs will be properly allocated to each WSS in future.

2. Scheme details

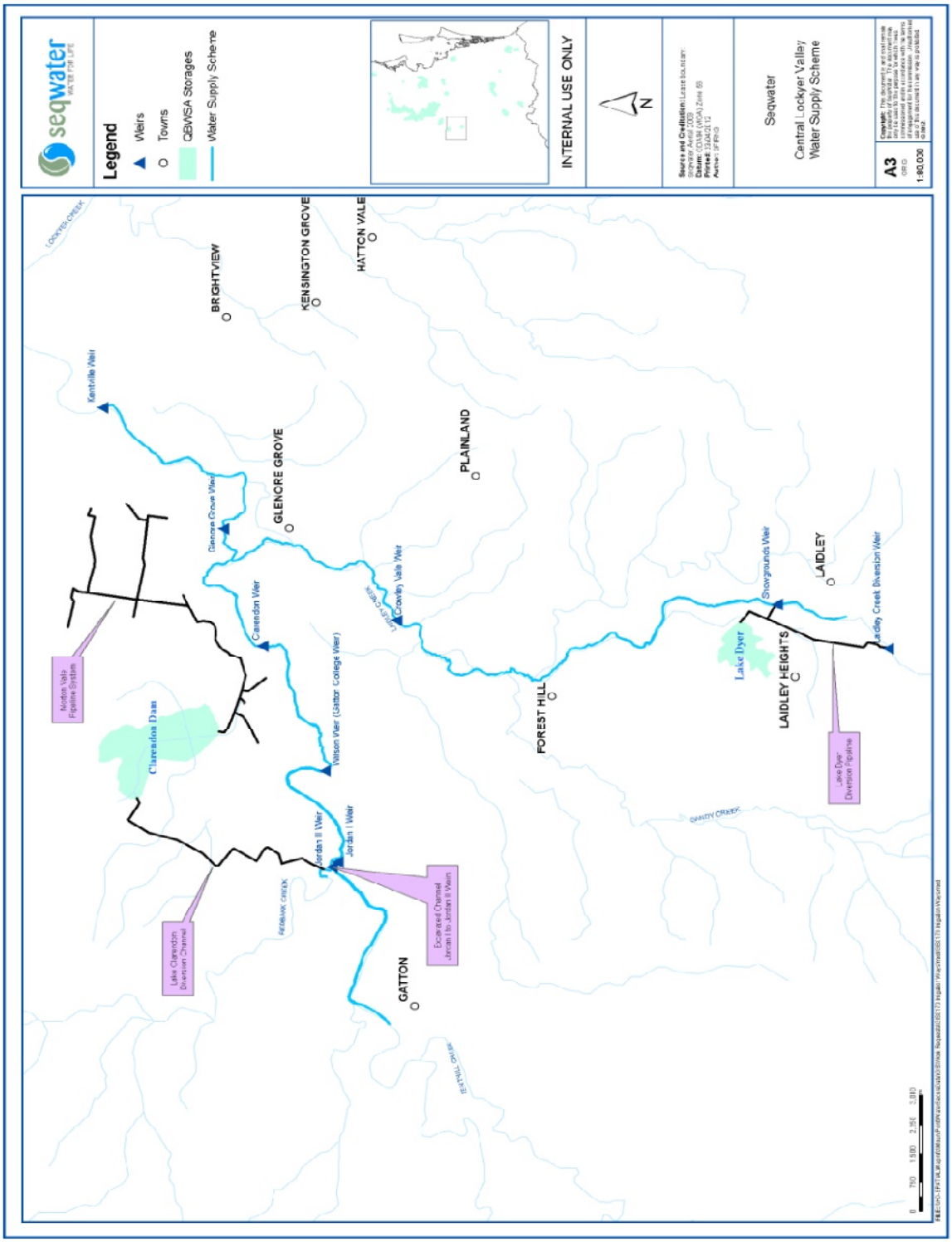
The Scheme constitutes two tariff groups being Central Lockyer and Morton Vale. The water year for Central Lockyer runs from 1st July to 30th June.

The Scheme supplies water to:

- irrigation entitlement holders who are supplied from the Morton Vale Water Supply System;
- customers who have Risk A and Risk B priority surface water entitlements; and
- customers who have bore licences for bores within the benefited underground water areas of the Scheme.

Central Lockyer differs to other water supply schemes in that surface water and groundwater irrigators who have area-based licences which do not specify a water volume, do not receive a Part A charge because Part A charges are volume-based. This is described further below.

Scheme map


seqwater
WATER FOR LIFE
Legend
Weirs
Towns
QBWSA Storages
Water Supply Scheme
INTERNAL USE ONLY
N
Seqwater
Central Lockyer Valley
Water Supply Scheme
A3
1:80,000
BRIGHTVIEW
KENSINGTON GROVE
HATTON VALE
GLENORE GROVE
PLAINLAND
FOREST HILL
LAIDLEY
LAIDLEY HEIGHTS
GATTON
Kentville Weir
Glenore Grove Weir
Coominya Vale Weir
Showgrounds Weir
Laidley Creek Diversion Weir
Morton Vale Pipeline System
Clarendon Dam
Clarendon Weir
Watson Weir (Gatton College Weir)
Jordan II Weir
Jordan I Weir
Lake Clarendon Diversion Channel
Excavated Channel Jordan I to Jordan II Weir
Lake Dyer
Lake Dyer Diversion Pipeline
LOCKYER CREEK
REMBARK CREEK
SANDY CREEK
TENTHILL CREEK

Infrastructure details

The table below sets out the bulk water assets that comprise the scheme.

Table 2-1. Bulk water assets

Dams/ Off-stream storages	Bill Gunn Dam (Lake Dyer), Clarendon Dam (Lake Clarendon)
Weirs	Kentville Weir, Jordan I & II Weirs, Wilson Weir, Clarendon Weir, Glenore Grove Weir, Laidley Creek Diversion Weir, Showgrounds Weir, Crowley Vale Weir
Other bulk water assets	Redbank Creek Pump Station, Clarendon Pump Station, Clarendon Diversion Channels, Gauging stations
Distribution assets	Morton Vale Pipeline

Customers and water entitlements serviced

The Scheme supplies water to:

- 51 irrigation users comprising customers on the Morton Vale Pipeline;
- 205 surface water irrigation users;
- 113 ground water irrigation users;
- Laidley Golf Club;
- Crowley Vale Water Board;
- Seqwater; and
- One non-riparian stock and domestic user.

Under the IROL, WAE (i.e. interim water allocations) are identified in two ways for management and sharing purposes. The first way is described in the IROL as “Interim Water Allocation to be managed under the Licence”. These are all surface water WAE which have volumes attached and receive Part A charges. Their distribution is illustrated in the following chart and table.

Figure 2-1. Central Lockyer IWA Managed Under Licence

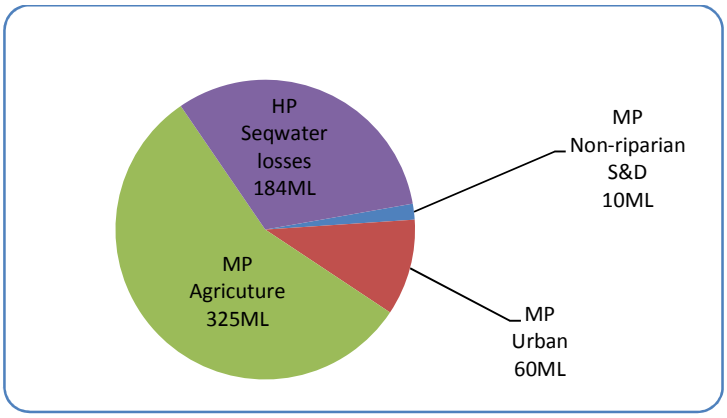


Table 2-2. Ownership of entitlements

Customer Type	No. of customers	Risk A Priority Vol (ML)	HP Vol (ML)	Notes
Non-riparian stock and domestic users	1	10	-	• 1 active licence (2ML). • 3 licences (6ML) being confirmed. • 1 licence (2ML) surrendered.
Urban	1	60	-	Laidley Golf Club
Agriculture	1	325	-	Crowley Vale Water Board
Seqwater	-	-	184	Losses
Totals	**3**	**395**	**184**	

The second way that WAE are identified under the IROL is described as "Details of Other Existing Water Supply Responsibilities". These are recognised in the IROL as three separate types. The WAE that relates to the Morton Vale Water Supply System are medium priority WAE (surface water) with volumes attached. These receive Part A charges. The risk-A and risk-B priority WAE (surface water) are area-based licences that are not restricted by volume. No Part A charges are applied to these WAE. Customers pay the minimum annual charge unless their usage exceeds the minimum. The medium priority WAE (underground water) are also area-based licences that are not restricted by volume and so no Part A charges are applied. These customers also pay the minimum annual charge unless their usage exceeds the minimum.

These other WAE are illustrated in the following chart and table below.

Figure 2-2. Distribution of other Central Lockyer IWA

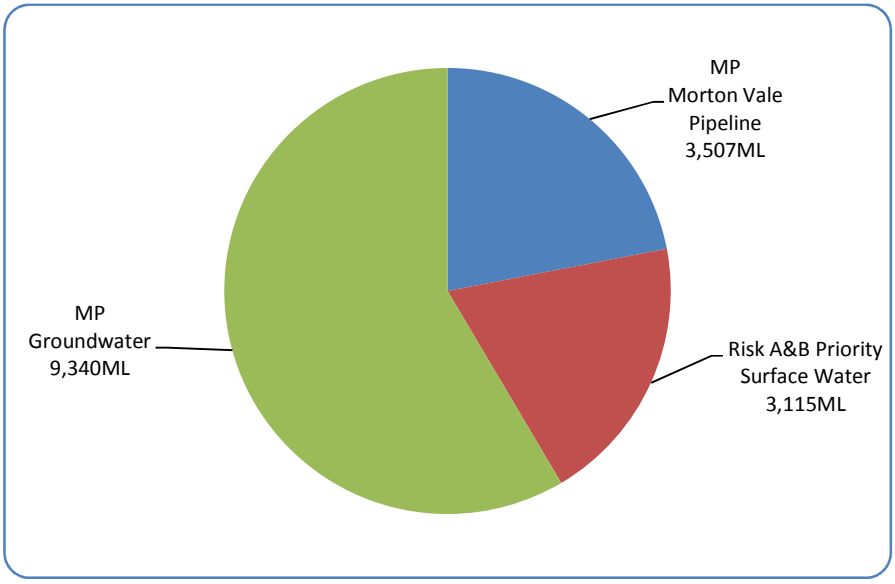


Table 2-3. Ownership of other entitlements*

Customer Type	No. of customers	Risk A&B/ MP Vol (ML)	HP Vol (ML)	Notes
Irrigation (surface water - Morton Vale)	51	3,507	-	• 3,470ML currently taken up by customers • 37ML not allocated
Irrigation (surface water – Risk A&B Priority)	205	3,115	-	No volumes attributed to individual licences. Minimum charge of $258 per year unless usage exceeds.
Irrigation (ground water)	113	9,340	-	No volumes attributed to individual licences. Minimum charge of $258 per year unless usage exceeds this.
Totals	**369**	**15,962**	**-**	

*This information was sourced from the Interim Resource Operations Licence for the Central Lockyer Valley Water Supply Scheme, issued in July 2008, and Seqwater's customer information data.

Accordingly, medium priority WAE comprise 96% of all WAE issued in the Scheme.

Water availability and use

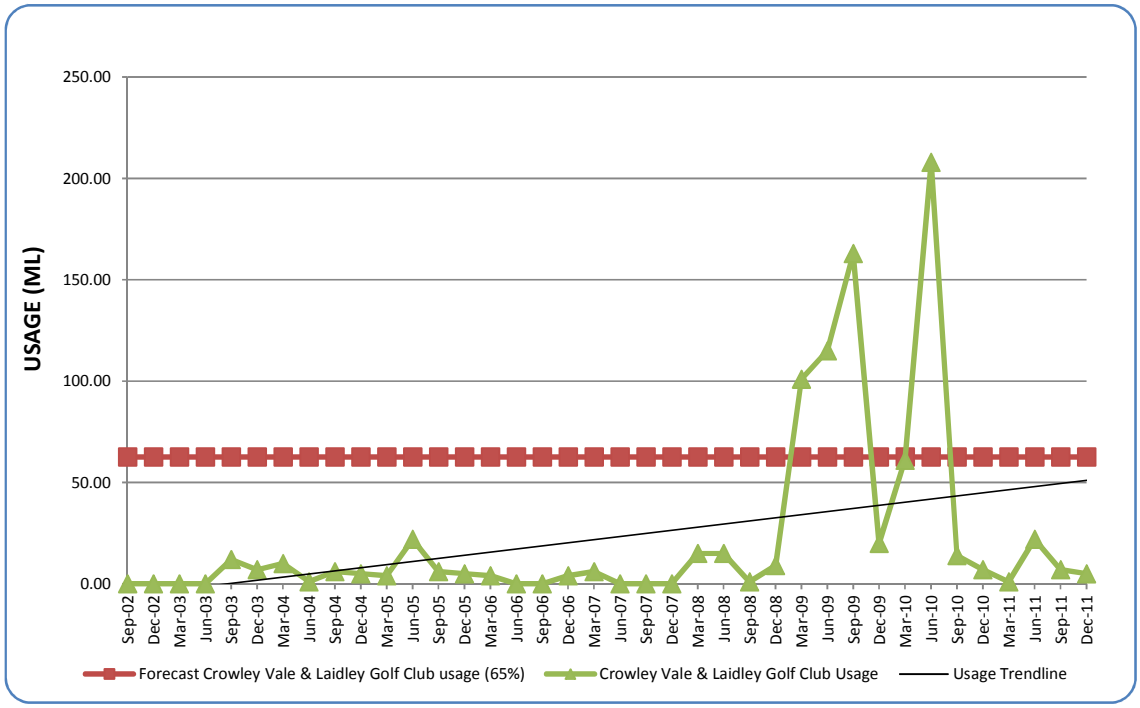
The announced allocation determines the percentage of nominal WAE volume that is available in a water year (1 July to 30 June). Under the IROL, announced allocation determinations are required for the Morton Vale Water Supply System (medium priority) and for the Crowley Vale Water Board (Risk A). The historical announced allocations are set out in the table below.

Table 2-4. Announced allocations (%)

	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12
MP	0	0	0	0	20	81	100	100	100
Risk A&B	2	0	0	0	0	58	100	100	100

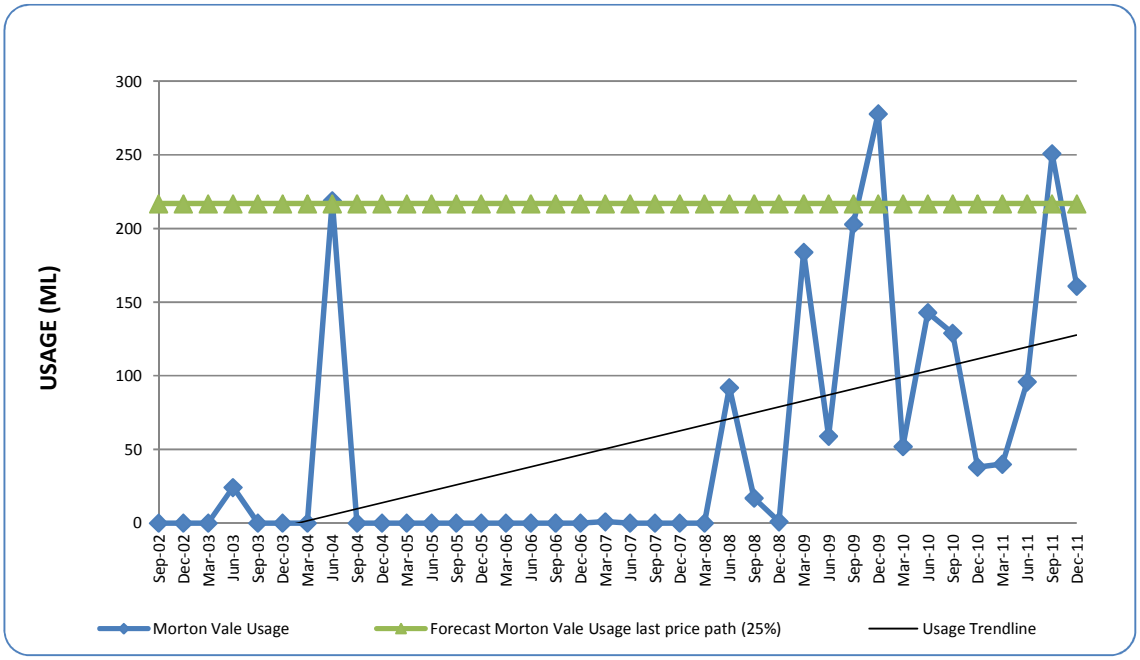
The impact of drought conditions can be seen in the chart below.

Figure 2-3. Cowley Vale Water Board and Laidley Golf Club (Risk A) usage



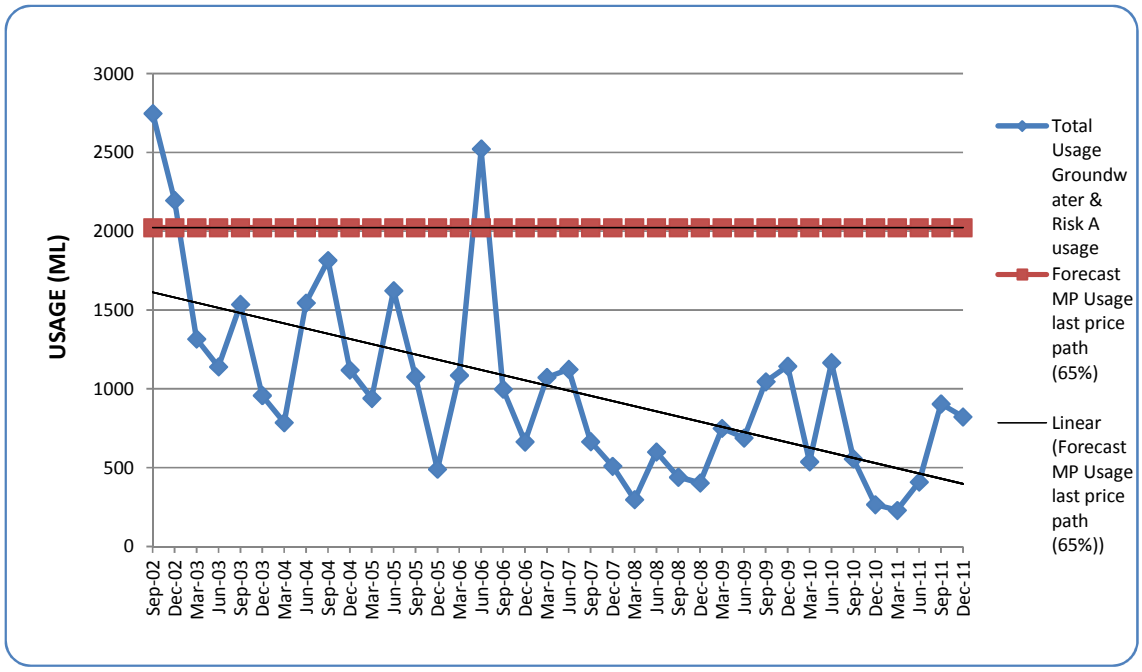
The current irrigation price paths adopted a use forecast at 65% of IWA for Central Lockyer surface water and ground water and 25% of IWA for Morton Vale. The following chart compares Morton Vale actual use to date. As can be seen from the chart, the drought conditions seriously impacted the availability of water from 2002 to 2008.

Figure 2-4. Morton Vale Usage



The following chart compares groundwater and other risk-A and risk-B priority surface water actual usage to date. The water usage trend results mainly from the impact of the drought on water availability.

Figure 2-5. Central Lockyer Groundwater and Risk A Usage



Average annual usage comparison of Medium Priority water

The average annual usage comparison to MP forecast usage for Morton Vale is set out in the table below:

Table 2-5. Forecast vs actual usage – Morton Vale

Forecast annual usage for 2006-11 price path	877 ML/annum
Average actual annual usage for 2006-11 price path	209 ML/annum
Average actual annual usage for 9 years to December 2011	317 ML/annum

The average annual usage comparison to forecast usage for Central Lockyer groundwater and Risk A is set out in the table below:

Table 2-6. Forecast vs actual usage - Central Lockyer groundwater and Risk A

Forecast annual usage for 2006-11 price path	8,096 ML/annum
Average actual annual usage for 2006-11 price path	2,645 ML/annum
Average actual annual usage for 9 years to December 2011	3,935 ML/annum

Temporary transfers

Temporary transfers or seasonal water assignments are useful for meeting additional short-term water needs. Under these transfers or assignments, some or all of the water that may be taken under a water entitlement in any water year can be assigned to another person or place.

In practice, a volume of water from the amount available under the entitlement may only be assigned after the announced allocation. The volume assigned is therefore not affected by any increase in the announced allocation during the water year, the benefits of which go to the holder of the entitlement and not the person to whom the water has been assigned.

The following table sets out the volumes of temporary transfers by year from 1July 2008 to 31 March 2012.

Table 2-7. Temporary transfers

Year	2008-09	2009-10	2010-11	2011-31/3/12
Volume in ML	0	6.14	0	0

Customer service standards

No service targets have been documented for this Scheme.

2006 lower bound costs

The 2006 price review process conducted by SunWater with customer representatives established the lower bound cost for the scheme. These lower bound costs are:

- Operations and maintenance costs;
- Administration costs, including a share of overhead; and
- The cost of asset renewals, via a renewals annuity.

The five year average lower bound cost recovery target established for this Scheme was $1,030,130. The following table sets out the yearly targets and the five year average efficient lower bound costs:

Table 2-8. 2006 Lower Bound Costs

2005/06 IRRIGATION PRICE REVIEW
CENTRAL LOCKYER WATER SUPPLY SCHEME
SCHEME IRRIGATION LOWER BOUND COSTS & REFERENCE IRRIGATION TARIFFS

SCHEME IRRIGATION LOWER BOUND COSTS						
	Year 1	*Year 2*	*Year 3*	*Year 4*	*Year 5*	*5 Year*
Lower Bound Costs	*2006/07*	*2007/08*	*2008/09*	*2009/10*	*2010/11*	*Average*
Operations, maintenance & administration	910,729	869,693	1,166,204	938,719	922,170	961,503
Electricity	36,326	36,326	36,326	36,326	36,326	36,326
Asset refurbishment annuity	174,748	175,355	176,832	176,389	176,646	175,994
Total Lower Bound Costs	1,121,803	1,081,374	1,379,362	1,151,434	1,135,142	1,173,823
less Tier 1 Productivity Adjustment	(108,343)	(119,413)	(184,927)	(151,331)	(154,453)	(143,693)
Total Efficient Lower Bound Costs	1,013,460	961,961	1,194,435	1,000,103	980,689	1,030,130
Community Service Obligations (CSO) & Revenue Offsets						
CSO Offsets						
CSO - Resource operating plan development costs	90,056	59,814	43,198	15,164	15,136	44,674
CSO - Rural water subsidy	600,936	543,001	755,412	552,436	500,039	590,365
Total CSO Offsets	690,992	602,815	798,611	567,600	515,175	635,039
Scheme related revenue offsets (a)	719	719	719	719	719	719
Total CSO & Revenue Offsets	691,711	603,534	799,329	568,319	515,894	635,757
TOTAL SCHEME IRRIGATION NET LOWER BOUND COSTS	321,749	358,427	395,106	431,785	464,795	394,372

The lower bound cost tariff for the Central Lockyer tariff group was established at $52.25 per megalitre by the Tier 1 group in 2006 which translates to $65.36 per megalitre represented in 2012-13 dollars.

The lower bound cost tariff for the Morton Vale tariff group was established at $193.13 per megalitre by the Tier 1 group in 2006 which translates to $241.57 per megalitre represented in 2012-13 dollars.

Current pricing arrangements

The current prices were set with reference to the lower bound cost target above. However it was recognised that the surface water and groundwater irrigators could not have Part A charges levied against their WAE because they are not regulated by volume. Consequently, a CSO agreement was struck between SunWater and the Department of Environment and Resource Management. The CSO agreement was "grandfathered" to Seqwater. A new CSO agreement has been agreed for the financial years 2011-12 and 2012-13.

In the 2006-11 irrigation price review, the Central Lockyer Valley Tier 2 group chose to retain the price cap for both the Central Lockyer surface water and groundwater area and the Morton Vale system. The Tier 2 group opted to take up a drought tariff option for the Morton Vale tariff group.

A price path was determined for the Scheme which increased prices by $2.50 per year. Prices were also increased based on the Brisbane – All Groups Consumer Price Index (CPI) each year.

Seqwater's nominated tariff groups for 2013-14 to 2016-17 are Central Lockyer and Morton Vale.

A two part tariff applied:

- Part A, a fixed charged payable per ML of nominal water entitlement (regardless of use); and
- Part B, which was a consumption charge.

The table below shows the prices for the scheme since 2006-07 to 2011-12 in nominal terms.

Table 2-9. Historical Prices

TABLE 2 - FINAL TARIFFS AS FINALISED AT TIER 2

FINAL IRRIGATION TARIFFS
(based in 2005/06 dollars and subject to cumulative annual indexation on 1 July each year)

	Last Yr 2005/06	Lower Bound Cost Tariff	*Year 1 2006/07*	*Year 2 2007/08*	*Year 3 2008/09*	*Year 4 2009/10*	*Year 5 2010/11*
CENTRAL LOCKYER * (a)							
Part A	$0.00	$31.49	$0.25	$2.75	$5.25	$7.75	$10.00
Part B	$26.59	$20.76	$26.59	$26.59	$26.59	$26.59	$26.59
Total	$26.59	$52.25	$26.84	$29.34	$31.84	$34.34	$36.59
Irrigation customer nominal water allocations (ML)		*12,782*	*12,782*	*12,782*	*12,782*	*12,782*	*12,782*
Water usage forecast		*65%*	*65%*	*65%*	*65%*	*65%*	*65%*
Part A revenue share		*70%*	*1%*	*14%*	*23%*	*31%*	*37%*
Part B revenue share		*30%*	*99%*	*86%*	*77%*	*69%*	*63%*
MORTON VALE * (b) (c)							
'Drought Tariff' Level of Announced Allocation at beginning of each quarter 0% to 30%							
Part A (Adjustment 50%)			$7.09	$7.55	$8.01	$8.47	$8.89
Part B			$24.29	$25.87	$27.45	$29.03	$30.45
Total			$31.38	$33.42	$35.46	$37.50	$39.34
'Drought Tariff' Level of Announced Allocation at beginning of each quarter 31% to 70%							
Part A (Adjustment 100%)			$14.17	$15.09	$16.01	$16.93	$17.76
Part B			$24.29	$25.87	$27.45	$29.03	$30.45
Total			$38.46	$40.96	$43.46	$45.96	$48.21
'Drought Tariff' Level of Announced Allocation at beginning of each quarter Greater than 70%							
Part A (Adjustment 150%)			$21.26	$22.64	$24.02	$25.40	$26.65
Part B			$24.29	$25.87	$27.45	$29.03	$30.45
Total			$45.55	$48.51	$51.47	$54.43	$57.10
'Drought Tariff' Cumulative Threshold Limit	$63,543						
Capital Access Charge (d)	$23.18		$0.00	$0.00	$23.18	$23.18	$23.18
Irrigation customer nominal water allocations (ML)		*3,590*	*3,590*	*3,590*	*3,590*	*3,590*	*3,590*
Water usage forecast		*25%*	*25%*	*25%*	*25%*	*25%*	*25%*
Part A revenue share		*70%*	*70%*	*70%*	*70%*	*70%*	*70%*
Part B revenue share		*30%*	*30%*	*30%*	*30%*	*30%*	*30%*

Footnotes:

(a) The Part A charge is not payable until formal water entitlements are granted to the irrigators. The Central Lockyer surface and groundwater irrigators do not currently have any formal irrigation water entitlements against which a Part A charge could be applied.

(b) The Morton Vale section of the scheme elected for the 'drought tariff' arrangement. The 'drought tariff' provides for a temporary reduction in the Part A charge during periods of lower water availability and in turn includes a higher Part A charge during periods of high water availability. The 'drought tariff' also includes a mechanism to carry forward any under or over payments of Part A charges compared to the Part A target revenue to the next price path, including any accumulated finance charges. A cumulative threshold limit has been set on the 'drought tariff' arrangement so that the scheme avoids establishing a large carryover balance. The cumulative threshold limit has been set to the dollar equivalent of 2 1/2 years of low supply or 10 quarters of announced allocation less than 30%.

(c) The final Central Lockyer - Morton Vale tariff without a 'drought tariff' adjustment is as detailed below.

	Last Yr 2005/06	Lower Bound Cost Tariff	*Year 1 2006/07*	*Year 2 2007/08*	*Year 3 2008/09*	*Year 4 2009/10*	*Year 5 2010/11*
Part A	$15.10	$71.15	$14.17	$15.09	$16.01	$16.93	$17.76
Part B	$23.11	$121.98	$24.29	$25.87	$27.45	$29.03	$30.45
Total	$38.21	$193.13	$38.46	$40.96	$43.46	$45.96	$48.21

(d) The capital access charge will be rebated for two years (2006/07 and 2007/08) as a trade-off for SunWater no longer funding the instillation of a pump on lateral 1.

** Category 3 Tariff (tariff group where it was determined it was too onerous to achieve lower bound pricing during the price path)*

Renewals accounting and forecast ARR balance

A renewals annuity approach applies to the current price paths, and is to continue to apply in accordance with the Ministerial Referral Notice.

The renewals annuity approach requires an accounting system to monitor renewals income and expenditure, to monitor the status of the renewals account or Asset Renewals Reserve (ARR). This balance can be either positive or negative, and is incorporated into the calculation of the renewals annuity itself. Interest is applied to the balance, at the same rate used to determine the original renewals annuity.

In order to calculate lower bound costs from 2013-14, a projected closing ARR balance at 30 June, 2013 must be made. The balance for the Central Lockyer tariff group is forecast to be a positive balance (i.e. surplus) of $457,940. The balance for the Morton Vale tariff group is forecast to be a positive balance of $351,462.

To calculate the respective annuity balances, Seqwater has undertaken the following steps:

- Obtained relevant data for the water supply schemes from SunWater dating back to 2001 when the existing annuity balances were established;
- Established a closing balance at 30 June 2008 based on the renewals expenditure and income over the period the schemes were owned and managed by SunWater. Seqwater sought advice and guidance from SunWater to establish these balances;
- Established a closing balance at 30 June 2011 based on actual renewals expenditure and income since the schemes were transferred to Seqwater;
- Forecast a closing balance at 30 June 2013 based on the budgeted renewals expenditure and irrigation income for the 2011-12 year and the estimated renewals income and expenditure for 2012-13;
- The availability of data necessitated that the ARR balances be calculated on an irrigation only basis prior to being converted to whole of scheme balances for tariff calculation purposes. This approach was adopted to match the availability of data at the time of preparing the draft NSPs; and
- Established unbundled balances for the Morton Vale distribution network to enable unbundled or separate irrigation tariffs to be calculated for bulk supply and distribution services. Seqwater may review this step if further analysis identifies a more suitable methodology than the approach adopted for the preparation of draft NSP ARR balances.

In calculating the closing ARR balance, Seqwater has:

- Obtained actual renewals expenditure from SunWater from 2000-01 to 2007-08 for the Scheme, and included actual expenditure following the transfer of the assets to Seqwater in the 2008-09 year for the period ending 2010-11. Renewals expenditure for 2011-12 and 2012-13 is a forecast only.
- Assigned the following percentages of renewals expenditure, consistent with the cost allocation percentage used to develop irrigation's share of lower bound costs for the 2006-07 to 2010-11 Irrigation Price Path. The 2011-12 and 2012-13 years have been based on the percentages applicable for the 2010-11 year.

Table 2-10. Irrigation Share of Renewals Expenditure applicable to the ARR (%)

Tariff Group	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13
Central Lockyer	99.7	99.7	99.7	99.7	99.7	99.7	99.7
Morton Vale	100	100	100	100	100	100	100

- Obtained the actual irrigation revenue (including CSO) from SunWater for the period 2000-01 to 2007-08 inclusive, along with actual irrigation (including CSO) revenue from 2008-09 until 2010-11 from Seqwater's accounting system. A budget forecast is used for 2011-12 and 2012-13.
- Assigned the following percentages of irrigation revenue (including CSO) to the ARR. This percentage reflects the percentage of the renewals annuity to the total lower bound cost recovery target set for the 2006-07 to 2010-11 Irrigation Price Path. The 2011-12 and 2012-13 years have been based on the percentages applicable for the 2010-11 year.

Table 2-11. Share of Irrigation Revenues applicable to the ARR (%)

Tariff Group	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13
Central Lockyer	18.2	19.1	15.1	17.8	18.1	18.1	18.1
Morton Vale	21.7	21.5	16.7	19.3	19.9	19.9	19.9

- Applied interest to closing balances for the period 2006-07 to 2013-14 at the equivalent rate used to calculate the 2007-2011 price path annuities (7.76% nominal). No interest has been applied to balances between 2000-01 and 2005-06 based on advice from SunWater that the 2001-2006 price path made offsetting adjustments on the account that no interest would apply to ARR balances in that price path.

The following table sets out irrigation renewals expenditure and revenue and the annual change applicable to the ARR for the financial years 2006-07 to 2012-13:

Table 2-12. Annual Change in Irrigation ARR Balances ($)

Tariff Group	Item	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13
Central Lockyer	Expenditure	31,708	57,664	78,940	53,267	85,667	25,260	141,529
	Revenue	(72,691)	(67,355)	(87,184)	(85,452)	(87,063)	(86,475)	(88,543)
	Change	(40,983)	(9,691)	(8,244)	(32,184)	(1,396)	(61,215)	52,986
Morton Vale	Expenditure	0	21,463	3,579	1,430	2,788	0	0
	Revenue	(63,484)	(56,116)	(65,774)	(65,356)	(53,505)	(64,337)	(71,335)
	Change	(63,484)	(34,653)	(62,195)	(63,927)	(50,717)	(64,337)	(71,335)

3. Proposed lower bound costs and tariffs

Lower Bound costs

The following provides a summary of Seqwater's proposed lower bound costs for the Central Lockyer Scheme and Morton Vale Pipeline. In order to determine lower bound estimates for irrigation customers, scheme costs are then attributed to irrigation customers based on an assessment of storage that relates to entitlements. Seqwater has provided more detailed information to the QCA on these costs.

None of these costs vary proportional to water demand. That is, the short run marginal costs in these schemes are $0, and all costs are fixed.

In order to determine lower bound estimates for irrigation customers within the scheme, aggregate scheme costs are attributed to irrigation customers based on an assessment of storage that relates to irrigation entitlements.

Operating costs

Operating activities for this scheme include service provision, compliance, recreation, and other supporting activities:

- Service provision relates to:
  - scheduling and releasing bulk water from storages, surveillance of water levels and flows in the river, and quarterly meter reading; and
  - customer service and account management.
- Compliance requirements relates to:
  - Requirements set out in the Resource Operations Plan (ROP) and Resource Operations Licence;

  - Dam safety obligations under the Water Act 2000;
  - Environmental management obligations to comply with the ROP and Environmental Protection Act 1994; and
  - Land management, workplace health and safety obligations and other reporting obligations.

- Recreation relates to the operation and maintenance of recreation facilities in the Cedar Pocket scheme; and
- Other supporting activities cover a range of services including central procurement, human resources and legal services.

Operating cost forecasting approach

Seqwater has adopted an approach to forecasting whereby operating expenditure for schemes is derived for a representative base year (2012-13) and escalated forward over each year of the regulatory period on the basis of predetermined escalation factors.

The 2012-13 year was adopted as the base year as it provides the best and most current representation of the costs required to deliver Seqwater's service standards and obligations during the regulatory period. Aggregate operating costs for 2012-13 (including costs associated with both grid and irrigation services but excluding costs associated with unregulated activities) were derived as part of Seqwater's 2012-13 grid service charges submission to the QCA. Seqwater has developed its 2012-13 budget on the basis of a zero base build-up, taking into account costs which could be reasonably anticipated at the time of budget development. In addition, the 2012-13 operating expenditure forecasts provided in the grid service charges submission have been reviewed by the QCA for prudency and efficiency.

Further details on the forecasting methodology are provided in the Irrigation Pricing submission provided to the QCA.

The following escalators have been applied to 2012-13 operating costs to derive forecasts for the regulatory period:

- direct labour, materials and contractors' costs and repairs and maintenance were escalated at 4% per annum over the regulatory period; and
- 'other' direct costs and all non-direct costs were escalated at forecast CPI (2.5% per annum).

Details of the direct and non-direct operating expenditure forecasts for the Cedar Pocket scheme are provided below.

Direct operating and maintenance costs

Direct costs are those costs that have been budgeted at the individual asset level.

Operations

Operations relates to the day-to-day costs of delivering water and meeting compliance obligations. The primary activities relate to dam operations and group support (and catchment management).

Dam operations are the largest contributor to direct operating costs. Dam Operations aims to deliver best practice management of dams and water sources while being fully compliant and effective in operating, maintaining and monitoring its water source infrastructure.

Dam operations must meet the regulatory requirements under various Acts including those relating to Dam Safety, Flood Management, Resource Operating Plans, and providing sufficient water to meet standards of service.

Dam operations is relatively labour intensive and expenditure is driven by:

- providing efficient service to irrigation customers in terms of information and management and delivery of service;
- developing robust and acceptable systems to monitor water flows to manage water sources, floods and regulations;
- developing an effective and technically capable and resilient flood operations centre utilising systems of quality standards;
- improving data management to ensure compliance on a wide variety of water management areas;
- ensuring security and safety at our water sources is meeting regulatory and community standards; and
- developing system operating plans to ensure the efficiency and operation of dams, weirs, bores and other water sources.

Group support (and catchment management) has responsibility for the development and delivery of recreation and catchment maintenance services for all operational assets. The team ensures that asset management plans, processes, systems and practices are implemented in accordance with relevant regulatory requirements.

In particular, Seqwater has responsibility for the ongoing management and maintenance of recreation sites transferred from SunWater. While the use of Seqwater assets for recreational purposes are secondary to Seqwater's main function of water supply and

treatment. However, recreation facilities must be managed in a sustainable and environmentally responsible manner to ensure that Seqwater's core responsibilities and accountabilities are not adversely impacted.

Direct operations costs are presented in terms of the type of cost: labour; contractors and materials; and "other".

- labour costs are derived on the basis of budgeted work in the scheme for 2012-13 and the related salary costs for routine activities. Consistent with the current Enterprise Bargaining Agreement for Seqwater and the recommendation of the QCA in its draft SunWater report, Seqwater has escalated internal labour costs at 4% per annum for the regulatory period 2013-14 to 2016-17;
- contractor and materials costs for 2012-13 are based on the quantities required in the work instructions for the scheme. As per the QCA's draft SunWater report, contractor and material costs have been escalated at 4% per annum for the regulatory period; and
- "other" direct operating costs incorporate a range of expenses including plant and fleet hire, water quality monitoring expenses and fixed energy costs. These costs have been escalated at forecast CPI for the regulatory period.

Forecast operations costs are provided below.

Table 3-1. Forecast direct operations costs – Central Lockyer ($000)

Cost	2013-14	2014-15	2015-16	2016-17
Labour	172.5	179.4	186.5	194.0
Contractors and materials	44.0	45.7	47.5	49.4
Other	106.6	109.3	112.0	114.8
TOTAL	**323.0**	**334.3**	**346.1**	**358.2**

Table 3-2. Forecast direct operations costs – Morton Vale Pipeline ($000)

Cost	2013-14	2014-15	2015-16	2016-17
Labour	25.0	26.0	27.0	28.1
Contractors and materials	-	-	-	-
Other	-	-	-	-
TOTAL	**25.0**	**26.0**	**27.0**	**28.1**

Repairs and maintenance

Repairs and maintenance is performed at the scheme in accordance with Seqwater's maintenance system. This system identifies the maintenance requirements for each asset, and then sets out a schedule for maintenance over the year(s) for that asset. In addition, maintenance requirements are developed through Facilities Asset Management Plans and as a result of scheduled inspections.

There is also unplanned maintenance which is required in response to asset breakdown or failure, or where new information emerges about asset condition (e.g. via regular inspections). Expenditure on unplanned maintenance for 2012-13 is derived based on past experience.

Seqwater have set a target ratio of 71:29 for planned maintenance to unplanned maintenance in 2012-13. This ratio has been applied for the forecast period.

Repairs and maintenance for 2012-13 has been escalated at 4% per annum over the regulatory period.

The table below presents a summary of forecast repairs and maintenance costs.

Table 3-3. Forecast repairs and maintenance by expenditure type - Central Lockyer ($000)

Type	2013-14	2014-15	2015-16	2016-17
Planned	320.9	333.7	347.1	361.0
Unplanned	131.1	136.3	141.8	147.4
TOTAL	**452.0**	**470.0**	**488.8**	**508.4**

Table 3-4. Forecast repairs and maintenance by expenditure type – Morton Vale Pipeline ($000)

Type	2013-14	2014-15	2015-16	2016-17
Planned	0.4	0.4	0.4	0.4
Unplanned	0.2	0.2	0.2	0.2
TOTAL	**0.5**	**0.5**	**0.6**	**0.6**

Dam safety inspections

Routine dam safety inspections are carried out to identify and plan maintenance requirements and to provide information for management planning of water delivery assets. These costs are included in forecast operations expenditure.

In addition, more thorough periodic dam safety inspections are carried out on a 5 yearly basis. Costs associated with these inspections have been added to forecast direct operating expenditure in the year in which the expenditure for the Central Lockyer scheme is expected to be incurred. Forecast dam safety inspections expenditure is provided below.

Table 3-5. Forecast dam safety inspections ($000)

Dam	2013-14	2014-15	2015-16	2016-17
Clarendon		26.3		
Bill Gunn				27.6
Total	**-**	**26.3**	**-**	**27.6**

These inspections are based on the dam safety compliance requirements for the dam. The cost estimates are based on actual historic cost of inspection.

The table below presents a consolidated forecast maintenance costs for the Central Lockyer and Morton Vale Pipeline.

Table 3-6. Total repairs and maintenance forecast – Central Lockyer ($000)

Type	2013-14	2014-15	2015-16	2016-17
Planned	320.9	333.7	347.1	361.0
Unplanned	131.1	136.3	141.8	147.4
Dam safety inspections	-	26.3	-	27.6
TOTAL	**452.0**	**496.3**	**488.8**	**536.0**

Table 3-7. Total repairs and maintenance forecast – Morton Vale Pipeline ($000)

Type	2013-14	2014-15	2015-16	2016-17
Planned	0.4	0.4	0.4	0.4
Unplanned	0.2	0.2	0.2	0.2
TOTAL	**0.5**	**0.5**	**0.6**	**0.6**

Metering

Consistent with the Referral Notice to the QCA, capital expenditure (renewals) costs for meter upgrades to meet national metering standards have been excluded. Similarly, operating costs associated with complying with the new standards have not been included in the cost estimates.

Non-direct costs

Non-direct costs are common costs which are not directly attributable to the operations and management of a specific scheme and include both indirect and overhead costs associated with the provision of corporate and other business services. In the absence of suitably disaggregated data at the project level, allocations of non-direct costs to renewals / capital expenditure were not examined. All non-direct costs were therefore allocated to operating expenditure only.

Non-direct costs for 2012-13 were derived at the aggregate level for all schemes and allocated to individual schemes based on the proportion of direct costs attributable to the individual scheme. These costs were then escalated forward to derive forecast non-direct costs for the regulatory period.

Non-direct costs are categorised by type of expenditure:

- Water delivery includes non-direct costs associated with dam operations, infrastructure maintenance, environmental management and recreation and catchment maintenance services;
- Asset delivery costs are associated with project planning and managing the delivery of projects;
- Corporate costs include business services, organisational development and the office of the CEO. These include costs associated with the provision of IT services, finance, procurement, legal and risk, governance and compliance activities; and
- Other costs primarily reflect costs associated with the North Quay facilities and flood control centres.

As discussed, the Logan River scheme was allocated a portion of 2012-13 total business non-direct costs on the basis of direct costs attributable to the scheme. This estimate was escalated by CPI to derive forecasts for each year of the regulatory period.

Forecast non-direct operating costs are provided below.

Table 3-8. Forecast non-direct operating cost – Central Lockyer ($000)

Type	2013-14	2014-15	2015-16	2016-17
Water Delivery	82.0	84.0	86.1	88.3
Asset Delivery	36.6	37.5	38.5	39.4
Corporate	292.9	300.2	307.7	315.4
Other	25.0	25.6	26.2	26.9
TOTAL	**436.4**	**447.3**	**458.5**	**470.0**

Table 3-9. Forecast non-direct operating cost – Morton Vale Pipeline ($000)

Type	2013-14	2014-15	2015-16	2016-17
Water Delivery	2.7	2.8	2.8	2.9
Asset Delivery	1.2	1.2	1.3	1.3
Corporate	9.6	9.8	10.1	10.3
Other	0.8	0.8	0.9	0.9
TOTAL	**14.3**	**14.7**	**15.0**	**15.4**

In addition to non-direct operating costs, Seqwater has allocated costs to the Central Lockyer scheme and the Morton Vale Pipeline associated with the use of non-infrastructure assets, insurance and working capital.

Non-infrastructure assets

The Central Lockyer scheme and Morton Vale Pipeline utilise a range of non-infrastructure assets (buildings and plant and equipment). These assets are not included in the renewals expenditure forecasts. However, it is necessary for costs associated with the use of these assets to be attributed to the Scheme. Seqwater has used depreciation costs as a proxy for the cost associated with use of these assets. However, these depreciation costs are not captured at the scheme level. Accordingly, aggregate non-infrastructure depreciation for 2012-13 has been allocated to schemes on the basis of direct costs. The table below provides a breakdown of non-infrastructure asset costs allocated to the Central Lockyer scheme and Morton Vale Pipeline.

Table 3-10. Non-infrastructure operating cost forecast ($000)

Year	2013-14	2014-15	2015-16	2016-17
Central Lockyer	36.5	37.4	38.3	39.3
Morton Vale Pipeline	1.2	1.2	1.3	1.3

Insurance

Seqwater's annual insurance premium costs for 2012-13 is forecast at $6.96 million. The major components to the premium include industrial special risks, machinery breakdown, public liability, professional indemnity, contract works and directors and officers insurance.[1]

[1] Seqwater also notes the QCA canvassed concerns raised by irrigators about the insurance costs attributable to irrigation services, and accepted SunWater's proposed scope of insurances as reasonable (including professional indemnity). Refer to QCA (2011).pp 106-107

Seqwater is in the process of placing insurances, and proposes to update this forecast once new premiums are set.

Seqwater has allocated its 2012-13 premium to the Central Lockyer scheme and Morton Vale Pipeline using the replacement value of scheme assets. This value has been escalated forward by CPI to determine a premium for each year of the forecast period. The table below shows the forecast premiums for Central Lockyer and Morton Vale Pipeline.

Table 3-11. Insurance Cost Forecast ($000)

Year	2013-14	2014-15	2015-16	2016-17
Central Lockyer	165.3	169.4	173.7	178.0
Morton Vale Pipeline	2.8	2.9	3.0	3.0

Working capital

The QCA has already adopted a methodology for calculating Seqwater's working capital in Grid Service Charges. Seqwater has calculated the working capital allowance using this methodology and the values submitted to the QCA for 2012-13[2], at $5.538M.

Seqwater has allocated a portion of this working capital allowance to the Mary Valley and Pie Creek schemes on the basis of revenue attributable to the scheme. The 2012-13 working capital allowance has then been escalated by CPI to provide a forecast for each year of the regulatory period.

Table 3-12. Working capital forecast ($000)

Year	2013-14	2014-15	2015-16	2016-17
Central Lockyer	11.9	12.2	12.5	12.8
Morton Vale Pipeline	0.1	0.1	0.1	0.1

Total operating costs for the forecast period are provided in the table below.

[2] Seqwater (2012). p146

Table 3-13. Total operating cost forecast – Central Lockyer ($000)

Cost	2013-14	2014-15	2015-16	2016-17
Direct				
Operations	323.0	334.3	346.1	358.2
Repairs and maintenance	452.0	470.0	488.8	508.4
Dam safety	-	26.3	-	27.6
Rates	-	-	-	-
Non-direct	-	-	-	-
Operations	436.4	447.3	458.5	470.0
Non-infrastructure	36.5	37.4	38.3	39.3
Insurance	165.3	169.4	173.7	178.0
Working capital	11.9	12.2	12.5	12.8
Total	**1,425.1**	**1,497.0**	**1,517.9**	**1,594.3**

Table 3-14. Total operating cost forecast – Morton Vale Pipeline ($000)

Cost	2013-14	2014-15	2015-16	2016-17
Direct				
Operations	25.0	26.0	27.0	28.1
Repairs and maintenance	0.5	0.5	0.6	0.6
Dam safety	-	-	-	-
Rates	-	-	-	-
Non-direct	-	-	-	-
Operations	14.3	14.7	15.0	15.4
Non-infrastructure	1.2	1.2	1.3	1.3
Insurance	2.8	2.9	3.0	3.0
Working capital	0.1	0.1	0.1	0.1
Total	**43.9**	**45.4**	**47.0**	**48.5**

Renewals

Renewals forecast

The renewals outlays for the irrigation schemes consist of the same cost elements as their operating costs, namely direct labour, materials and contractors' services, other direct costs (such as rates and land taxes) and miscellaneous administrative costs and non-direct (indirect and overhead) costs.

Seqwater has adopted the same rates for escalation of renewals expenditure as for operating expenditure.

Accordingly, renewal expenditure has been escalated for direct labour, materials and contractors costs at 4% per annum for the years 2013-14 to 2016-17 and forecast inflation thereafter for the remainder of the planning period. All other direct costs and non-direct costs are escalated at forecast inflation for both the regulatory period and the remainder of the planning period.

Inflation is forecast to increase at 2.5% per annum over the forecast period and beyond.

Renewals forecast

Seqwater has proposed a rolling 20 year renewals annuity, consistent with the approach adopted for SunWater's irrigation pricing in the QCA's draft report.

Seqwater has defined renewals as non-maintenance expenditure that is required to maintain the service capacity of the assets.

Seqwater has based its renewals forecast on the more significant and predictable renewals expenditure items. Seqwater has not attempted to include minor renewals projects (less than $10,000), or renewals on water treatment plants at recreation areas, or make any allowance or contingency for renewals expenditure arising from damage or changes in law. This approach has been adopted to focus the renewals forecasting effort on more material items of expenditure.

Seqwater identified renewals needs and the schedule of projects through a range of processes, including:

- the existing Facility Asset Management Plans (FAMPs);
- the existing asset maintenance program;
- reports from site safety inspections and dam safety management program; and
- advice from operators.

Seqwater then evaluated potential projects against criticality and other criteria, and conducted workshops with local staff as well as site inspections to validate and adjust the scope and timing of projects. In many cases, Seqwater has revised the timing of major renewals jobs to a later time where there was not sufficient evidence that the asset required renewal, or renewal of the asset could be deferred at an acceptable risk of failing to meet service standards or compliance obligations.

Forecast renewals expenditure for the regulatory period is provided below.

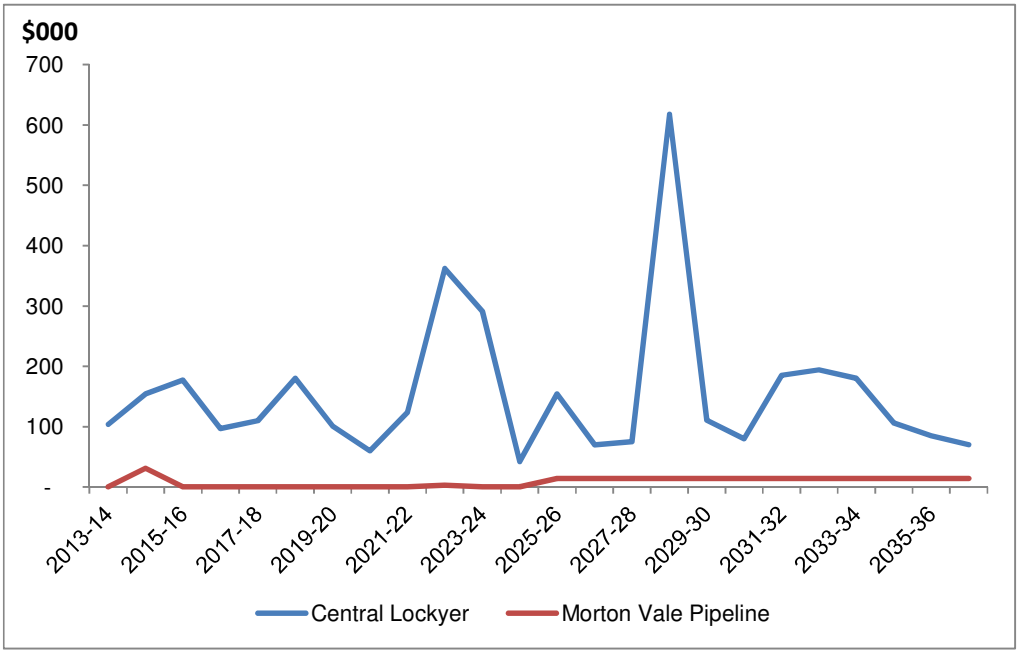
Table 3-15. Forecast renewals expenditure to 2016-17 ($2012-13, $000)

	2013-14	2014-15	2015-16	2016-17
Central Lockyer	104.0	154.0	177.0	97.0
Morton Vale Pipeline	-	31.0	-	-

This excludes any dam safety or meter upgrade expenditure, in accordance with the Referral Notice.

The figure below shows the long term renewals profile for Mary Valley and Pie Creek over a 24 year period.

Figure 3-1: Central Lockyer and Morton Vale Pipeline renewals profile ($2012-13)



The major projects that have a material 10% impact on the annuity are described below:

Table 3-16. Major renewals projects

Asset	Description of Work	Timing of Work	Project Value $'000	Significance*
Clarendon Dam	Replenish/replace rip rap rock on dam wall	2014-15	52	HAV
Clarendon Dam	Replenish/replace rip rap rock on dam wall	2015-16	52	HAV
Clarendon Dam	Replenish/replace rip rap rock on dam wall	2016-17	52	HAV
Clarendon Dam Pump Station	Refurbish electrical control equipment	2013-14	25	HAV
Bill Gunn Dam	Replenish rip rap on embankment	2014-15	25	HAV
Bill Gunn Dam	Replenish rip rap on embankment	2015-16	25	HAV
Bill Gunn Dam	Replenish rip rap on embankment	2016-17	25	HAV
Bill Gunn Dam	Refurbish pump house	2015-16	30	HAV
Bill Gunn Dam – Lake Dywer Diversion - Pipeline	Renewal of RC Pipeline	2037-38	773	IA

Total Lower Bound Costs

The total lower bound costs for the Central Lockyer scheme and Morton Vale Pipeline are set out in the table below.

Table 3-17. Total Lower Bound costs – Central Lockyer ($000)

Cost	2013-14	2014-15	2015-16	2016-17
Direct operations	323.0	360.6	346.1	385.8
Repairs and maintenance	452.0	470.0	488.8	508.4
Non-direct opex*	650.1	666.3	683.0	700.1
Renewals annuity	136.6	142.8	146.6	149.8
TOTAL	**1,561.7**	**1,639.8**	**1,664.6**	**1,744.2**

* Incorporates operations, non-infrastructure costs, insurance and working capital.

Table 3-18. Total Lower Bound Costs – Morton Vale Pipeline ($000)

Cost	2013-14	2014-15	2015-16	2016-17
Direct operations	25.0	26.0	27.0	28.1
Repairs and maintenance	0.5	0.5	0.6	0.6
Non-direct opex*	18.5	18.9	19.4	19.9
Renewals annuity	(27.2)	(26.8)	(26.3)	(25.8)
TOTAL	**16.7**	**18.7**	**20.7**	**22.8**

* Incorporates operations, non-infrastructure costs, insurance and working capital.

Cost allocation to irrigation

In the Central Lockyer, there are four entitlement types (High, High A, High B and medium). Seqwater holds 184ML of high priority, while irrigators hold the vast majority of the remaining WAE. The 2006 pricing review also treated all these irrigation WAE types the same for pricing purposes – for example, the irrigation customer WAE totalled 16,372ML in the Tier 1 report for Central Lockyer and Morton Vale tariff groups.[3] This is comparable to the 16,331ML set out in above.

Also, the 2006 review assigned 99.8% of costs to the irrigation sector, which effectively meant High A, High B and medium were treated the same. Seqwater does not propose to move from this pre-existing arrangement, particularly given the underlying resource management arrangements are yet to be set by DERM codified in a final ROP. For example, water sharing rules are yet to be determined for the majority of WAE in the scheme, making any assessment of relative difference problematic.[4]

Secondly, Seqwater 184ML of High Priority WAE is immaterial (1.1%) of the total WAE in the scheme, and Seqwater does not believe a Headworks Utilisation Factor for the scheme is justified nor would add to the accuracy of the pricing outcomes. Instead, Seqwater propose that nominal WAE % are applied in this scheme until such time as WAE are formalised, which means that non-Seqwater WAE holders account for 98.9% of lower bound costs.

The table below presents the outcomes of this sector cost allocation.

[3] SunWater (2006a). p40

[4] Refer to the IROL, S2.5. http://www.derm.qld.gov.au/water/management/pdf/central_lockyer.pdf

Table 3-19. Total lower bound costs allocated to irrigation sector – Central Lockyer ($000)

Cost	2013-14	2014-15	2015-16	2016-17
Direct operations	319.4	356.6	342.2	381.5
Repairs and maintenance	446.9	464.8	483.4	502.7
Non-direct opex*	642.9	658.9	675.4	692.3
Renewals annuity	135.1	141.2	145.0	148.2
Distribution losses	-	-	-	-
TOTAL	**1,544.3**	**1,621.6**	**1,646.1**	**1,724.8**

* Incorporates operations, non-infrastructure costs, insurance and working capital.

Table 3-20. Total lower bound costs allocated to irrigation sector – Morton Vale Pipeline ($000)

Cost	2013-14	2014-15	2015-16	2016-17
Direct operations	25.0	26.0	27.0	28.1
Repairs and maintenance	0.5	0.5	0.6	0.6
Non-direct opex*	18.5	18.9	19.4	19.9
Renewals annuity	(27.2)	(26.8)	(26.3)	(25.8)
Distribution losses	17.7	18.1	18.6	19.0
TOTAL	**34.4**	**36.8**	**39.2**	**41.8**

* Incorporates operations, non-infrastructure costs, insurance and working capital.

A comparison against the lower bound costs allocated to irrigation in the SunWater 2006 Irrigation Pricing Review is provided below. To facilitate comparison with Seqwater's forecast costs, SunWater's 2010-11 lower bound cost estimates have been indexed forward to $2013-14 by actual and forecast inflation.

Table 3-21. Total Lower Bound Costs allocated to irrigation sector ($000)

Lower bound cost	SunWater 2006 LBC ($2013-14)	2013-14	2014-15	2015-16	2016-17
Central Lockyer	1,250.6*	1,544.3	1,621.6	1,646.1	1,724.8
Morton Vale Pipeline		34.4	36.8	39.2	41.8
TOTAL	**1,250.6**	**1,578.70**	**1,658.40**	**1,685.30**	**1,766.60**

*Includes Morton Vale Pipeline

While indicative, the lower bound cost benchmarks developed for the 2006 SunWater Irrigation Price Review are not directly comparable to the Seqwater forecasts. In particular, the published SunWater cost information:

- does not disaggregate operating costs for each tariff groups e.g. the Morton Vale Pipeline costs were incorporated in the Central Lockyer scheme cost estimates and not separately identified;
- provides aggregate operations, maintenance and administration data, with no breakdown between direct and non-direct costs; and
- applies a productivity adjustment to proposed lower bound costs, but does not identify the adjustment attributable to operating expenditure.

Moreover, these lower bound costs were developed more than 6 years ago and amidst very different conditions. While comparisons between the 2006 benchmarks may be of interest where data is disaggregated, there is little value in attempting to explain departures from the 2006 data given Seqwater had no input to these forecasts and did not have (due to circumstances surrounding its formation) the financial systems to gather and report this data in any case.

Proposed tariffs

Tariff groups

The Referral Notice requires the QCA to adopt the tariff groups as proposed in Seqwater's NSPs.

Seqwater proposes the current tariff groupings continue for the Scheme. That is, a single tariff group will continue to apply.

Tariff structure

As discussed, Seqwater considers that all costs associated with the provision of irrigation services are fixed. Accordingly, Seqwater proposes to apply a single fixed tariff to those Central Lockyer irrigation customers holding WAEs. It is proposed that those irrigators yet to be issued WAEs be subject to an interim volumetric charge until such time as WAEs are issued (see below).

Interim volumetric charge – Central Lockyer WSS

Chapters 3 and 4 discussed the absence of WAE issued at an individual level for most irrigators in the Central Lockyer WSS, namely all irrigators excluding those on the Morton Vale Pipeline:

- 3,115ML of Risk A and Risk B WAE; and
- 9,340ML of medium WAE.

In chapter 4, Seqwater submitted that a volumetric charge should apply alongside a revenue cap in that scheme for the above WAE, for so long as those WAE remain unissued to individuals. While this is not a desirable tariff structure, there is no option but to apply a volumetric charge in these circumstances. To date, these irrigators have only paid the Part B (volumetric) charge, and have not paid the fixed charge. Moreover, Seqwater has not received any CSO funding for the fixed charge revenue.

This situation is not sustainable into the next regulatory period, as it fails to achieve recovery of lower bound costs. Instead, the volumetric charge should be set to recover the same revenue that would have occurred under the fixed charge. This requires a forecast of annual water use until such time as WAE are established.

Seqwater notes that in the draft SunWater report, the QCA forecast water use for the purpose of setting a volumetric charge. This forecast was based on historic data, being the prior 8-years water use with the removal of three anomalous years in that series – effectively the average of five years.[5]

Seqwater has calculated average water use for medium priority and Risk A and Risk B from the start of the current price path, and the 9 years to December 2011.

The average annual usage comparison to forecast usage for Central Lockyer medium priority groundwater and Risk A and Risk B is set out in the table below:

Table 3-22. Forecast vs actual usage - Central Lockyer groundwater and Risk A

Forecast annual usage for 2006-11 price path	8,096 ML/annum
Average actual annual usage for 2006-11 price path	2,645 ML/annum
Average actual annual usage for 9 years to December 2011	3,935 ML/annum

Seqwater notes the QCA's preference to adopt long-term (rather than short-term) averages when calculating water use. Seqwater also notes that the longer, nine-year average is above the short-term average, but well below the forecast used for the 2006 prices.

[5] QCA (2011). SunWater Irrigation Price Review: 2012-2017. Draft Report. pp302-303

On balance, Seqwater submits that the interim volumetric charge for the Central Lockyer medium and Risk A and Risk B WAE is based on the nine-year average.

This results in the following interim volumetric tariffs.

Table 3-23. Central Lockyer interim variable tariff - $/ML ($nominal)

Tariff Group	2013-14	2014-15	2015-16	2016-17
Central Lockyer				
Interim variable tariff based on usage	304.22	311.83	319.63	327.62

Under the proposed revenue cap arrangements, an end of period adjustment would occur with prices in the next regulatory period incorporating the difference between forecast and actual revenue.

Lower bound reference tariffs

Lower bound reference tariffs for Central Lockyer and Morton Vale Pipeline irrigation customers are provided below.

Table 3-24. Forecast Central Lockyer irrigation tariffs

	2013-14	2014-15	2015-16	2016-17
Lower bound cost ($000)	1,544.3	1,621.6	1,646.1	1,724.8
WAE (ML)	16,352	16,352	16,352	16,352
Tariff (smoothed)				
Fixed component ($/ML)	96.15	98.56	101.02	103.55
Variable tariff ($/ML)	304.22	311.83	319.63	327.62

Table 3-25. Forecast Morton Vale Pipeline irrigation tariffs

	2013-14	2014-15	2015-16	2016-17
Lower bound cost ($000)	34.4	36.8	39.2	41.8
WAE (ML)	3,470	3,470	3,470	3,470
Tariff (smoothed)				
Fixed component ($/ML)	10.51	10.77	11.04	11.32
Variable component ($/ML)	-	-	-	-

Price path

The Referral Notice requires the QCA to consider a price path where potential price increases are above inflation.

Supporting documentation

- Irrigation Infrastructure Renewal Projections - 2013/14 to 2046/47 – Central Lockyer Tariff Group
- Irrigation Infrastructure Renewal Projections - 2013/14 to 2046/47 – Morton Vale Pipeline Tariff Group

Appendix A – Asset details

S1.1 BILL GUNN DAM (INCLUDING SADDLE DAM AND ENVIRONMENTAL EMBANKMENT) - LAKE DYER - OFFSTREAM STORAGE

ITEM	DESCRIPTION
1. Description of water infrastructure:	Dam/offstream storage, zoned earth embankment.
2. Storage Capacities:	
a) Total storage capacity	6,950 ML.
b) Commandable storage capacity	6,370 ML.
c) Dead Storage capacity	580 ML. The volume below the level of the operational outlet works (EL 101.09 m AHD) is 580 ML. The volume below the level of the river outlet works (non-operational) (EL 100.00 m AHD) is 210 ML.
3. Physical Dimensions (Main Structure):	
a) Full supply level	EL 110.00 m AHD.
4. Outlet Works/Spillway Arrangement/Diversion Works:	
a) Description of works	Outlet is by a single 1200 mm diameter RC pipeline that receives diverted water from Laidley Creek Diversion Weir for storage and when required is returned by gravity to the Showgrounds Weir. Control at the dam intake structure is by bulkhead gates and at the weir intake by penstock and at the Showgrounds Weir pipeline branch valve pit by butterfly valves. Spillway is by way of 1200 mm diameter combined in the intake structure with the discharge being carried by 1200 mm diameter RC pipe to a dissipater then into an open channel flowing to Laidley Creek downstream of the Showgrounds Weir.
b) Levels	Inlet / outlet pipeline invert at EL 100.00 m AHD. Spillway crest level at EL 110.00 m AHD with a pipe invert of EL 102.22 m AHD.
5. Inlet Works:	
a) Multi level offtakes	Single 1200 mm diameter Inlet/Outlet, flow is controlled manually by bulkhead gates. The offtake is through trash screens (2 off) that are manipulated from EL 112.00 m AHD to EL 103.25 m AHD amongst the removable baulks while retaining the "outlet baulk" at invert EL 99.85 m AHD and the "collapsible baulk" at invert EL 101.55 m AHD.
b) Levels	Inlet/Outlet invert EL 100.00 m AHD.
6. Pass flow requirements:	
a) Environmental provisions	No releases are made specifically for environmental purposes.
b) Volume of first flush currently required to be passed through structure	Not applicable to this type of structure.
c) Riparian/stock and domestic flows	No releases made specifically for stock and domestic purposes.

ITEM	DESCRIPTION
d) Other compensation flows (e.g. for underground water resources)	No releases made specifically for "compensation" purposes.
e) Flow variations	Not applicable to this type of structure.
f) Maximum release rates, actual as agreed for by Resource Protection	Not applicable to this type of structure.
7. Operational constraints:	
a) Minimum operating level/capacity	Minimum draw off level is offtake invert EL 100.00 m AHD.
b) Operation of fabridams	No fabridams exist.
c) Operation of gates	No gates installed.
d) Flood mitigation	No flood mitigating effect.
8. Management of storage water levels and quality:	
a) Water Quality Management, e.g.: Algal Management, multi-level offtakes including release strategies	Blue Green Algae testing is carried out weekly in summer and fortnightly during winter.
b) Minimum operating level for protection of fauna	The minimum operating level of 101.09 m AHD provides for fauna protection. The volume corresponding to 2.5 metres depth of water is 4 ML. Although not agreed, this depth of water has been discussed as an absolute minimum volume for the protection of fauna.
c) Storage fringe margin management	The licensee manages the fringe margin.
9. Operation of fish transfer systems:	No fish transfer system exists.

S1.2 CLARENDON DAM (INCLUDING SADDLE DAMS) - LAKE CLARENDON OFFSTREAM STORAGE

ITEM	DESCRIPTION
1. Description of water infrastructure:	Dam/offstream storage, zoned earthfill embankment.
2. Storage Capacities:	
a) Total storage capacity	24,300 ML.
b) Commandable storage capacity	24,250 ML.
c) Dead Storage capacity	50 ML. The volume below the level of the outlet works for releases to the MortonVale Water Supply System (EL 84.3 m AHD) is 50 ML. The volume below the level of the outlet works for releases to Lockyer Creek (EL 87 m AHD) is 2,600 ML. A volume of 1,000 ML was adopted in hydrologic modelling.
3. Physical Dimensions (Main Structure):	
a) Full supply level	EL 96.00 m AHD.
4. Outlet Works/Spillway Arrangement/Diversion Works:	
a) Description of works	(i) Lockyer Creek Recharge Outlet works (diversion channel). Reinforced concrete channel outlet releases by gravity from FSL 96.00 m AHD to EL 94.00 m AHD through 4000 mm wide lift gate. From EL 94.00 m AHD to floor level EL 86.00 m AHD release is by 500 mm dia relift pump to a 1050 mm dia rising main that delivers downstream of the lift gate to the diversion channel. (ii) Morton Vale outlet discharging into a 1200 mm dia RC pipe conduit that is controlled downstream of the embankment by 900 mm dia wafer valve installed in a reinforced concrete pit. (iii) Spillway. RC crest EL 96.00 m AHD is a lowered section of the embankment with reinforced concrete side training walls upstream, and discharging into an open channel downstream.
b) Levels	(i) Lockyer Creek Recharge Outlet. Minimum gravity offtake of EL 94.00 m AHD (bed of diversion channel). (ii) Minimum pumped offtake of EL 86.00 m AHD (Lake Clarendon floor). (iii) Morton Vale Outlet. Minimum gravity offtake EL 84.30 m AHD (invert of No. 1 offtake). In extreme cases with a portable pump can be reduced to EL 83.85 m AHD (lake bed level), but only with prior DNR approval. (iv) Spillway: crest EL 96.00 m AHD.
5. Inlet Works:	
a) Multi level offtakes	Lockyer Creek Recharge inlet/outlet works (diversion channel). Reinforced concrete channel inlet by gravity through 4000 mm wide lift gate, with minor inflows from the catchment. Morton Vale gravity outlet works. Standalone reinforced concrete inlet structure with three (3) tower offtakes (1500 mm x 2000 mm).
b) Levels	Lockyer Creek Recharge Inlet/Outlet. Bed of diversion channel EL 94.00 m AHD. Morton Vale gravity outlet works: EL 84.30 m AHD.

ITEM	DESCRIPTION
6. Pass flow requirements:	
a) Environmental provisions	No releases made specifically for environmental purposes.
b) Volume of first flush currently required to be passed through structure	Not applicable to this type of structure.
c) Riparian/stock and domestic flows	No releases made specifically for stock and domestic purposes.
d) Other compensation flows (e.g. for underground water resources)	No releases made specifically for compensation purposes.
e) Flow variations	Not applicable to this type of structure.
f) Maximum release rates, actual as agreed for by Resource Protection	Not applicable to this type of structure.
7. Operational constraints:	
a) Minimum operating level/capacity	Minimum operating capacity is dead storage (50 ML) Minimum operating levels are: EL 88.57 m AHD for Lockyer Creek relift. EL 84.30 m AHD for Morton Vale gravity offtake.
b) Operation of fabridams	No fabridams exist.
c) Operation of gates	No gates installed.
d) Flood mitigation	No flood mitigating effect.
8. Management of storage water levels and quality:	
a) Water Quality Management, e.g.: Algal Management, multi-level offtakes including release strategies	Blue Green Algae testing weekly in summer and fortnightly during winter.
b) Minimum operating level for protection of fauna	50 ML. The volume corresponding to 2.5 metres depth of water is 490 ML. Although not agreed, this depth of water has been discussed as an absolute minimum volume for the protection of fauna.
c) Storage fringe margin management	The approval to occupy flood reserve area is issued by the Licensee.
9. Operation of fish transfer systems:	No fish transfer systems exists.

S1.3 JORDAN I WEIR - LOCKYER CREEK - AMTD 65.2 km

ITEM	DESCRIPTION
1. Description of water infrastructure:	Storage Weir / Pumping Pool, mass concrete embankment with "ogee" crest.
2. Storage Capacities:	
a) Total storage capacity	456 ML.
b) Commandable storage capacity	431 ML.
c) Dead Storage capacity	25 ML.
3. Physical Dimensions (Main Structure):	
a) Full supply level	EL 87.20 m AHD. [Crest level of Jordan I Weir is EL 87.2 m AHD. Jordan II and Jordan I weir ponds are connected by a constructed diversion channel. The crest level of Jordan II weir is EL 87.50 m AHD.]
4. Outlet Works/Spillway Arrangement/Diversion Works:	
a) Description of works	Outlet works comprise a welded steel delivery pipeline of 354 mm diameter terminating at a 354 mm diameter valve housed in a reinforced concrete outlet/control valve box of 1200 mm x 1981 mm x 2362 mm on the downstream side of the embankment accessed by ladders from the weir crest. Length of pipeline is 3.86 m. The channel through the north bank to pond in Jordan II weir on Redbank Creek and so supply the Redbank pumps to supply Lake Clarendon. The spillway is the embankment crest.
b) Levels	(i) Outlet Works Invert EL 82.91 m AHD. (ii) Crest: EL 87.20 m AHD.
5. Inlet Works:	
a) Multi level offtakes	Single level offtake.
b) Levels	Outlet Works Invert EL 82.91 m AHD.
6. Pass flow requirements:	
a) Environmental provisions	No releases made specifically for environmental purposes.
b) Volume of first flush currently required to be passed through structure	Not determined at this time. Current operational procedure is to allow the weir to fill and overtop.
c) Riparian/stock and domestic flows	No releases made specifically for riparian/stock and domestic purposes.
d) Other compensation flows (e.g. for underground water resources)	No releases made specifically for compensation purposes.
e) Flow variations	The weir is not used as a regulating structure, downstream flows normally overtop the crest.
f) Maximum release rates, actual as agreed for by Resource Protection	No release rate data available, flows overtop the crest, there are no releases made for resource protection.

ITEM	DESCRIPTION
7. Operational constraints:	
a) Minimum operating level/capacity	(i) Operating level is at the crest level or above, EL 87.20 m AHD (capacity 456 ML). (ii) The creek draw off conduit level is EL 82.99 m AHD (capacity 25 ML). (iii) The diversion channel minimum draw off is bed level EL 85.50 m AHD.
b) Operation of fabridams	No fabridams exist.
c) Operation of gates	No gates installed.
d) Flood mitigation	Weir has no flood mitigating effects.
8. Management of storage water levels and quality:	
a) Water Quality Management, e.g.: Algal Management, multi-level offtakes including release strategies	No water quality control management at the weir.
b) Minimum operating level for protection of fauna	Not determined at this time. No provision made for this purpose.
c) Storage fringe margin management	There is no storage fringe margin management plan.
9. Operation of fish transfer systems:	No fish transfer systems exist.

S1.4 JORDAN II WEIR - REDBANK CREEK - AMTD 0.3 km

ITEM	DESCRIPTION
1. Description of water infrastructure:	Diversion Weir, steel sheet piled with three concrete lined steps.
2. Storage Capacities:	
a) Total storage capacity	30 ML.
b) Commandable storage capacity	No information available.
c) Dead Storage capacity	No information available.
3. Physical Dimensions (Main Structure):	
a) Full supply level	EL 87.20 m AHD. [Crest level of Jordan I Weir is EL 87.2 m AHD. Jordan II and Jordan I weir ponds are connected by a constructed diversion channel. The crest level of Jordan II weir is EL 87.50 m AHD.]
4. Outlet Works/Spillway Arrangement/Diversion Works:	
a) Description of works	(i) The conduit is a 600 mm diameter RC pipe 19.0 m long controlled on the downstream end by a 600 mm diameter butterfly valve. (ii) An outlet box of 900 mm x 2100 mm x 1500 mm. (iii) The spillway is the embankment crest.
b) Levels	(i) Outlet Works: Invert of 600 mm diameter RC conduit at the upstream end EL 84.80 m AHD. (ii) Crest: EL 87.50 m AHD.
5. Inlet Works:	
a) Multi level offtakes	The normal operating level is the crest level of Jordan I Weir (EL 87.20 m AHD) also the conduit offtake (cease to flow) has an invert of EL 84.80 m AHD.
b) Levels	Normal creek drawoff is above the crest level of Jordan I Weir EL 87.20 m AHD. The conduit minimum drawoff is the invert of the conduit at EL 84.80 m AHD on the upstream end.
6. Pass flow requirements:	
a) Environmental provisions	No releases made specifically for environmental purposes.
b) Volume of first flush currently required to be passed through structure	Not determined at this time. Current operational procedure is to allow the weir to fill and overtop.
c) Riparian/stock and domestic flows	No releases made specifically for riparian/stock and domestic purposes.
d) Other compensation flows (eg. for underground water resources)	No releases made specifically for compensation purposes.
e) Flow variations	The weir is not used as a regulating structure, downstream flows normally overtop the crest.
f) Maximum release rates, actual as agreed for by Resource Protection	No release rate data available, flows overtop the crest, there are no releases made for resource protection.

ITEM	DESCRIPTION
7. Operational constraints:	
a) Minimum operating level/capacity	(i) Normal operating level is the crest level of Jordan I Weir or above EL 87.2 m AHD (capacity 30 ML). (ii) The creek outlet draw off level is EL 84.8 m AHD. (iii) Minimum water level for safe pump operation EL 86.77 m AHD.
b) Operation of fabridams	No fabridams exist.
c) Operation of gates	No gates installed.
d) Flood mitigation	Weir has no flood mitigating effects.
8. Management of storage water levels and quality:	
a) Water Quality Management, e.g.: Algal Management, multi-level offtakes including release strategies	No water quality control management at the weir.
b) Minimum operating level for protection of fauna	Not determined at this time. No provision made for this purpose.
c) Storage fringe margin management	There is no storage fringe margin management plan.
9. Operation of fish transfer systems:	No fish transfer systems exist.

S1.5 WILSON WEIR - LOCKYER CREEK - AMTD 61.3 km

ITEM	DESCRIPTION
1. Description of water infrastructure:	Irrigation storage and underground water recharge Weir, mass concrete with ogee crest.
2. Storage Capacities:	
a) Total storage capacity	234 ML.
b) Commandable storage capacity	218 ML.
c) Dead Storage capacity	16 ML.
3. Physical Dimensions (Main Structure):	
a) Full supply level	EL 82.85 m AHD.
4. Outlet Works/Spillway Arrangement/Diversion Works:	
a) Description of works	The outlet is by way of a 405 mm diameter CI pipe set in the concrete and controlled on the downstream side by a gatevalve discharging into the dissipater then overflowing onto the original creek bed.
b) Levels	(i) Outlet Works - EL 79.50 m AHD. (ii) Crest - EL 82.96 m AHD.
5. Inlet Works:	
a) Multi level offtakes	Single level offtake.
b) Levels	Outlet Works - EL 79.50 m AHD.
6. Pass flow requirements:	
a) Environmental provisions	No releases made specifically for environmental purposes.
b) Volume of first flush currently required to be passed through structure	Not determined at this time. Current operational procedure is to allow the weir to fill and overtop.
c) Riparian/stock and domestic flows	No releases made specifically for riparian/stock and domestic purposes.
d) Other compensation flows (e.g. for underground water resources)	No releases made specifically for compensation purposes.
e) Flow variations	The weir is not used as a regulating structure, downstream flows normally overtop the crest.
f) Maximum release rates, actual as agreed for by Resource Protection	No release rate data available, flows overtop the crest, there are no releases made for resource protection.
7. Operational constraints:	
a) Minimum operating level/capacity	(i) Normal operating is at crest or above, EL 84.33 m AHD (capacity 234 ML). (ii) The conduit drawoff level is EL 79.50 m AHD (capacity 16 ML).

ITEM	DESCRIPTION
b) Operation of fabridams	No fabridams exist.
c) Operation of gates	No gates installed.
d) Flood mitigation	Weir has no flood mitigating effects.
8. Management of storage water levels and quality:	
a) Water Quality Management, eg: Algal Management, multi-level offtakes including release strategies	No water quality control management at the weir.
b) Minimum operating level for protection of fauna	Not determined at this time. No provision made for this purpose.
c) Storage fringe margin management	There is no storage fringe margin management plan.
9. Operation of fish transfer systems:	No fish transfer systems exist.

S1.6 CLARENDON WEIR - LOCKYER CREEK - AMTD 57.2 km

ITEM	DESCRIPTION
1. Description of water infrastructure:	Underground water Recharge Weir, steel sheet piled with three concrete lined steps.
2. Storage Capacities:	
a) Total storage capacity	233 ML.
b) Commandable storage capacity	230 ML.
c) Dead Storage capacity	There is no dead storage by way of design purpose (increases ground water recharge). Although there is a volume inaccessible below the invert of the outlet conduit of 3 ML.
3. Physical Dimensions (Main Structure):	
a) Full supply level	EL 78.90 m AHD.
4. Outlet Works/Spillway Arrangement/Diversion Works:	
a) Description of works	(i) Outlet works consists of a 450 mm diameter DICL conduit to the downstream end controlled by a 450 mm diameter gate valve. (ii) The spillway is the embankment crest, the flow continues over the concrete lined steps to the creek bed.
b) Levels	(i) Creek offtake invert (at gate valve on downstream end of conduit) EL 75.18 m AHD. (ii) Weir crest (spillway) EL 78.90 m AHD.
5. Inlet Works:	
a) Multi level offtakes	A top entering reinforced concrete inlet box (internal opening in plan is 900 mm x 788 mm) with trash screens, removable dropboards on the upstream face, and a conduit offtake.
b) Levels	Normal drawoff is above the crest level of EL 78.90 m AHD. The conduit draw off level (with drop boards in place) is the top of the inlet box at EL 76.27 m AHD. The minimum draw off is EL 75.18 m AHD at the invert of the 450 mm diameter DICL conduit at the upstream end with the dropboards removed.
6. Pass flow requirements:	
a) Environmental provisions	No releases made specifically for environmental purposes.
b) Volume of first flush currently required to be passed through structure	Not determined at this time. Current operational procedure is to allow the weir to fill and overtop.
c) Riparian/stock and domestic flows	No releases made specifically for riparian/stock and domestic purposes.
d) Other compensation flows (e.g. for underground water resources)	No releases made specifically for compensation purposes.
e) Flow variations	The weir is not used as a regulating structure, downstream flows normally overtop the crest.

ITEM	DESCRIPTION
f) Maximum release rates, actual as agreed for by Resource Protection	No release rate data available, flows overtop the crest, there are no releases made for resource protection.
7. Operational constraints:	
a) Minimum operating level/capacity	(i) Normal operating is at crest level or above, EL 78.90 m AHD (capacity 230 ML). (ii) The creek outlet drawoff level is EL 75.18 m AHD (capacity 3.0 ML - dead storage).
b) Operation of fabridams	No fabridams exist.
c) Operation of gates	No gates installed.
d) Flood mitigation	Weir has no flood mitigating effects.
8. Management of storage water levels and quality:	
a) Water Quality Management, e.g.: Algal Management, multi-level offtakes including release strategies	No water quality control management at the weir.
b) Minimum operating level for protection of fauna	Not determined at this time. No provision made for this purpose.
c) Storage fringe margin management	There is no storage fringe margin management plan.
9. Operation of fish transfer systems:	No fish transfer systems exist.

S1.7 LAIDLEY CREEK DIVERSION WEIR - LAIDLEY CREEK - AMTD 20.9 km

ITEM	DESCRIPTION
1. Description of water infrastructure:	Diversion and Underground water Recharge Weir, steel sheet piled with three concrete lined steps.
2. Storage Capacities:	
a) Total storage capacity	44 ML.
b) Commandable storage capacity	37.5 ML.
c) Dead Storage capacity	There is no dead storage by way of design purpose (increases ground water recharge). Although there is a volume inaccessible below the invert of the outlet conduit of 0.5 ML.
3. Physical Dimensions (Main Structure):	
a) Full supply level	EL 110.56 m AHD.
4. Outlet Works/Spillway Arrangement/Diversion Works:	
a) Description of works	(i) Outlet works consists of a top entering reinforced concrete inlet box through trash screens with removable dropboards on the upstream face flowing into a 200 mm diameter DI conduit to the downstream end controlled by a 200 mm diameter gate valve. (ii) The spillway is the embankment crest, the flow continues over the concrete lined steps to the creek bed. (iii) Lake Dyer Diversion- reinforced concrete box and separate control structure with penstock.
b) Levels	(i) Outlet Works (with dropboards removed) invert (at intake structure) EL 106.91 m AHD. (ii) Weir crest (spillway) EL 110.56 m AHD. (iii) Lake Dyer Diversion - pipe invert at control structure EL 108.00 m AHD.
5. Inlet Works:	
a) Multi level offtakes	The normal operating outlet is the crest (EL 110.56 m AHD), also, the conduit offtake has a minimum invert of EL 107.76 m AHD at top of the inlet box, that has an opening of 788 mm x 600 mm.
b) Levels	Normal drawoff is above the crest level of EL 110.56 m AHD. The conduit drawoff level is the top of the inlet box EL 107.76 m AHD.
6. Pass flow requirements:	
a) Environmental provisions	No releases made specifically for environmental purposes.
b) Volume of first flush currently required to be passed through structure	Not determined at this time. Current operational procedure is to allow the weir to fill and overtop.
c) Riparian/stock and domestic flows	No releases made specifically for riparian/stock and domestic purposes.

ITEM	DESCRIPTION
d) Other compensation flows (e.g. for underground water resources)	Diversion of water into Lake Dyer may only occur when there is sufficient combined flow in Lockyer and Laidley Creeks (in excess of what is being diverted into Lake Dyer and Lake Clarendon) to overtop Kentville Weir. Generally diversions to Lake Dyer occur above a threshold flow of between 10 and 50 ML/day at the diversion weir, which is the flow range necessary to provide for recharge requirements, irrigation demands, and stock and domestic requirements along Laidley Creek downstream of the diversion weir.
e) Flow variations	The diversion weir is not used as a regulating structure, but to divert flood flows to Lake Dyer, flows normally overtop the crest.
f) Maximum release rates, actual as agreed for by Resource Protection	No release rate data available, flows overtop the crest, there are no releases made for resource protection.
7. Operational constraints:	
a) Minimum operating level/capacity	(i) Normal operating is at crest level or above, EL 110.56 m AHD (capacity 38 ML). (ii) The creek outlet minimum drawoff level is EL 106.91 m AHD (capacity 0.5 ML - dead storage).
b) Operation of fabridams	No fabridams exist.
c) Operation of gates	No gates installed.
d) Flood mitigation	Weir has no flood mitigating effects.
8. Management of storage water levels and quality:	
a) Water Quality Management, eg: Algal Management, multi-level offtakes including release strategies	No water quality control management at the weir.
b) Minimum operating level for protection of fauna	Not determined at this time. No provision made for this purpose.
c) Storage fringe margin management	There is no storage fringe margin management plan.
9. Operation of fish transfer systems:	No fish transfer systems exist.

S1.8 SHOWGROUNDS WEIR - LAIDLEY CREEK - AMTD 17.6 km

ITEM	DESCRIPTION
1. Description of water infrastructure:	Underground water Recharge Weir, steel sheet piled with three concrete lined steps.
2. Storage Capacities:	
a) Total storage capacity	24 ML.
b) Commandable storage capacity	22 ML.
c) Dead Storage capacity	There is no dead storage by way of design purpose (increases ground water recharge). Although there is a volume inaccessible below the invert of the outlet conduit of 2 ML.
3. Physical Dimensions (Main Structure):	
a) Full supply level	EL 101.53 m AHD.
4. Outlet Works/Spillway Arrangement/Diversion Works:	
a) Description of works	(i) Outlet works consists of a top entering reinforced concrete inlet box through trash screens, flowing into a 200 mm diameter DI conduit to the downstream end controlled by a 200 mm diameter gate valve. (ii) The spillway is the embankment crest, with low flows through a vee notch centrally located, the flow continues over the concrete lined steps to the creek bed.
b) Levels	(i) Creek offtake invert (at intake structure with dropboards removed) EL 98.75 m AHD. (ii) Weir crest (spillway) EL 101.53 m AHD and Vee Notch invert EL 101.47 m AHD.
5. Inlet Works:	
a) Multi level offtakes	A top entering reinforced concrete inlet box (internal opening in plan is 900 mm x 788 mm) with trash screens, removable dropboards on the upstream face, and a conduit offtake.
b) Levels	Normal drawoff is above the crest level of EL 101.53 m AHD. The conduit drawoff level (with drop boards in place) is the top of the inlet box EL 99.60 m AHD. The minimum draw off level is EL 98.75 m AHD at the invert of the 200 mm diameter DI conduit at the upstream end with the dropboards removed.
6. Pass flow requirements:	
a) Environmental provisions	No releases made specifically for environmental purposes.
b) Volume of first flush currently required to be passed through structure	Not determined at this time. Current operational procedure is to allow the weir to fill and overtop.
c) Riparian/stock and domestic flows	No releases made specifically for riparian/stock and domestic purposes.
d) Other compensation flows (e.g. for underground water resources)	No releases made specifically for compensation purposes.
e) Flow variations	The weir is not used as a regulating structure. Downstream flows normally overtop the crest.

ITEM	DESCRIPTION
f) Maximum release rates, actual as agreed for by Resource Protection	No release rate data available, flows overtop the crest, there are no releases made for resource protection.
7. Operational constraints:	
a) Minimum operating level/capacity	(i) Normal operating is at crest level or above, EL 101.53 m AHD (capacity 24.0 ML). (ii) The creek outlet minimum drawoff level is 98.75 m AHD (capacity 2.0 ML - dead storage).
b) Operation of fabridams	No fabridams exist.
c) Operation of gates	No gates installed.
d) Flood mitigation	Weir has no flood mitigating effects.
8. Management of storage water levels and quality:	
a) Water Quality Management, e.g.: Algal Management, multi-level offtakes including release strategies	No water quality control management at the weir.
b) Minimum operating level for protection of fauna	Not determined at this time. No provision made for this purpose.
c) Storage fringe margin management	There is no storage fringe margin management plan.
9. Operation of fish transfer systems:	No fish transfer systems exist.

S1.9 CROWLEYVALE WEIR - LAIDLEY CREEK - AMTD 5.5 km

ITEM	DESCRIPTION
1. Description of water infrastructure:	Pumping pool storage weir, reinforced concrete wall with centrally positioned dropboards.
2. Storage Capacities:	
a) Total storage capacity	8 ML
b) Commandable storage capacity	No information available.
c) Dead Storage capacity	No information available.
3. Physical Dimensions (Main Structure):	
a) Full supply level	EL 79.00 m AHD
4. Outlet Works/Spillway Arrangement/Diversion Works:	
a) Description of works	Outlet work is by way of a 300 mm diameter wafer type butterfly valve fitted amongst the dropboards or by overtopping the crest.
b) Levels	No outlet levels are known at this time but are to be surveyed in the future.
5. Inlet Works:	
a) Multi level offtakes	Single level offtake.
b) Levels	No outlet levels are known at this time but are to be surveyed in the future.
6. Pass flow requirements:	
a) Environmental provisions	No releases made specifically for environmental purposes.
b) Volume of first flush currently required to be passed through structure	Not determined at this time. Current operational procedure is to allow the weir to fill and overtop.
c) Riparian/stock and domestic flows	No releases made specifically for riparian/stock and domestic purposes.
d) Other compensation flows (e.g. for underground water resources)	No releases made specifically for compensation purposes.
e) Flow variations	The weir is not used as a regulating structure, downstream flows normally overtop the crest.
f) Maximum release rates, actual as agreed for by Resource Protection	No release rate data available, flows overtop the crest, there are no releases made for resource protection.
7. Operational constraints:	
a) Minimum operating level/capacity	(i) Normal operating is at crest level or above, EL 74.00 m AHD (capacity 8.0 ML). (ii) The creek outlet level is unknown and subject to an upcoming survey.
b) Operation of fabridams	No fabridams exist.
c) Operation of gates	No gates installed.

ITEM	DESCRIPTION
d) Flood mitigation	Weir has no flood mitigating effects.
8. Management of storage water levels and quality:	
a) Water Quality Management, e.g.: Algal Management, multi-level offtakes including release strategies	No water quality control management at the weir.
b) Minimum operating level for protection of fauna	Not determined at this time. No provision made for this purpose.
c) Storage fringe margin management	There is no storage fringe margin management plan.
9. Operation of fish transfer system:	No fish transfer systems exist.

S1.10 GLENORE GROVE WEIR (INCLUDING ANABRANCH STRUCTURE ON GLENORE GROVE LAGOON) - LOCKYER CREEK - AMTD 52.7 km

ITEM	DESCRIPTION
1. Description of water infrastructure:	Underground water Recharge Weir, steel sheet piled with three concrete lined steps.
2. Storage Capacities:	
a) Total storage capacity	339 ML.
b) Commandable storage capacity	314 ML.
c) Dead Storage capacity	There is no dead storage by way of design purpose (increases ground water recharge). Although there is a volume inaccessible below the invert of the outlet conduit of 24.7 ML.
3. Physical Dimensions (Main Structure):	
a) Full supply level	EL 74.00 m AHD. [Main Structure crest level is EL 78.90 m AHD. The crest level of the anabranch diversion structure is 75.67 m AHD.]
4. Outlet Works/Spillway Arrangement/Diversion Works:	
a) Description of works	(i) A 900 mm diameter RC conduit blanked off on the downstream end with a 300 mm diameter gate valve controlling the outlet flows on a 300 mm diameter vertical branch in a 2300 mm x 1250 mm x 2000 mm reinforced concrete outlet box. (ii) The spillway is the embankment crest. The flow tops the crest and continues over the concrete lined steps to the creek bed and downstream. (iii) The anabranch diversion structure consists of reinforced concrete headwalls upstream and downstream connected by a 600 mm dia RC pipe with a 600 mm diameter sluicegate on the upstream end and a flap valve on the downstream end.
b) Levels	(i) Creek offtake invert (at gate valve on downstream end of conduit) EL 69.15 m AHD. (ii) Weir crest (spillway) EL 74.00 m AHD. (iii) Anabranch outlet EL 73.01 m AHD.
5. Inlet Works:	
a) Multi level offtakes	The normal operating outlet is the crest (EL 74.00 m AHD), also, the conduit offtake has a minimum invert of EL 69.15 m AHD also the anabranch diversion has a minimum operating level of EL 73.01 m AHD.
b) Levels	Normal drawoff is above the crest level of EL 74.00 m AHD, minimum creek drawoff is the downstream end of the conduit riser EL 69.15 m AHD and the minimum anabranch diversion offtake is EL 73.01 m AHD.
6. Pass flow requirements:	
a) Environmental provisions	No releases made specifically for environmental purposes.
b) Volume of first flush currently required to be passed through structure	Not determined at this time. Current operational procedure is to allow the weir to fill and overtop.
c) Riparian/stock and domestic flows	No releases made specifically for riparian/stock and domestic purposes.

ITEM	DESCRIPTION
d) Other compensation flows (e.g. for underground water resources)	No releases made specifically for compensation purposes.
e) Flow variations	The weir is not used as a regulating structure; downstream flows normally overtop the crest.
f) Maximum release rates, actual as agreed for by Resource Protection	No release rate data available, flows overtop the crest, there are no releases made for resource protection.
7. Operational constraints:	
a) Minimum operating level/capacity	(i) Normal operating is at crest level or above, EL 74.00 m AHD (capacity 337.0 ML). (ii) The creek outlet minimum drawoff level is EL 69.15 m AHD (capacity 25.0 ML - dead storage).
b) Operation of fabridams	No fabridams exist.
c) Operation of gates	No gates installed.
d) Flood mitigation	Weir has no flood mitigating effects.
8. Management of storage water levels and quality:	
a) Water Quality Management, e.g.: Algal Management, multi-level offtakes including release strategies	No water quality control management at the weir.
b) Minimum operating level for protection of fauna	Not determined at this time. No provision made for this purpose.
c) Storage fringe margin management	There is no storage fringe margin management plan.
9. Operation of fish transfer systems:	No fish transfer systems exist.

S1.11 KENTVILLE WEIR - LOCKYER CREEK - AMTD 46.4 km

ITEM	DESCRIPTION
1. Description of water infrastructure:	Underground water Recharge Weir, steel sheet piled with five concrete lined steps.
2. Storage Capacities:	
a) Total storage capacity	480 ML.
b) Commandable storage capacity	410 ML.
c) Dead Storage capacity	There is no dead storage by way of design purpose (increases ground water recharge). Although there is a volume inaccessible below the invert of the outlet conduit of 50 ML.
3. Physical Dimensions (Main Structure):	
a) Full supply level	EL 69.09 m AHD.
4. Outlet Works/Spillway Arrangement/Diversion Works:	
a) Description of works	(i) Outlet works consists of a 300 mm diameter DI conduit the downstream end controlled by a 300 mm diameter gate valve. (ii) The spillway is the embankment crest, the flow continues over the concrete lined steps to the creek bed.
b) Levels	(i) Creek offtake invert (at gate valve on downstream end of conduit) EL 64.85 m AHD. (ii) Weir crest (spillway) EL 68.70 m AHD.
5. Inlet Works:	
a) Multi level offtakes	Single level offtake at the top of the inlet box that has an opening of 788 mm x 600 mm.
b) Levels	Normal drawoff is above the crest level of EL 68.70 m AHD. The conduit drawoff level is the top of the inlet box EL 65.70 m AHD the invert of the 300 mm diameter DI conduit is EL 64.85 m AHD with the dropboards removed.
6. Pass flow requirements:	
a) Environmental provisions	No releases made specifically for environmental purposes.
b) Volume of first flush currently required to be passed through structure	Not determined at this time. Current operational procedure is to allow the weir to fill and overtop.
c) Riparian/stock and domestic flows	No releases made specifically for riparian/stock and domestic purposes.
d) Other compensation flows (eg. for underground water resources)	No releases made specifically for compensation purposes.
e) Flow variations	The weir is not used as a regulating structure, downstream flows normally overtop the crest.
f) Maximum release rates, actual as agreed for by Resource Protection	No release rate data available, flows overtop the crest, there are no releases made for resource protection.

ITEM	DESCRIPTION
7. Operational constraints:	
a) Minimum operating level/capacity	(i) Normal operating is at crest level or above, EL 68.70 m AHD (capacity 460 ML). (ii) The creek outlet minimum drawoff (with dropboards removed) level is EL 64.85 m AHD (capacity 50.0 ML - dead storage).
b) Operation of fabridams	No fabridams exist.
c) Operation of gates	No gates installed.
d) Flood mitigation	Weir has no flood mitigating effects.
8. Management of storage water levels and quality:	
a) Water Quality Management, e.g.: Algal Management, multi-level offtakes including release strategies	No water quality control management at the weir.
b) Minimum operating level for protection of fauna	Not determined at this time. No provision made for this purpose.
c) Storage fringe margin management	There is no storage fringe margin management plan.
9. Operation of fish transfer systems:	No fish transfer systems exist.

S1.12 OUTLET WORKS FROM LAIDLEY CREEK DIVERSION WEIR TO LAKE DYER DIVERSION PIPELINE - LAIDLEY CREEK - AMTD 20.9 km

ITEM	DESCRIPTION
1. Description of water infrastructure:	Outlet works to diversion pipeline, reinforced concrete structure.
a) Details and dimensions of diversion works, if applicable	(i) outlet structure comprises a 2750 mm x 2750 mm x 2155 mm reinforced concrete box fitted with 2 aluminium trash screens connected to the control structure by a 1290 mm dia MSCL pipe, 11.5 m long. (ii) Control structure is a 3195 mm x 1900 mm x 5700 mm reinforced concrete box housing the batescrew which controls the flow from the 1290 mm dia MSCL pipe to the 1500 mm dia RC diversion pipeline to Lake Dyer. (iii) The pipeline is 1500 mm dia RC pressure pipe with short sections of 1500 mm dia MSCL with an overall length of 3632.57 m.
b) Max. Diversion Capacity	Diversion flow rates range from 51.8 ML/d minimum to 345 ML/d.
2. Purpose of water diversion works:	To divert flood flows in Laidley Creek via a gravity pipeline into Lake Dyer, and for subsequent release back into Laidley Creek upstream of the Showgrounds Weir to recharge the aquifer system.
3. Flow Measurement:	No meters installed.

S1.13 DIVERSION PIPELINE INLET AND OUTLET AT LAKE DYER LAKE DYER OFFSTREAM STORAGE

ITEM	DESCRIPTION
1. Description of water infrastructure:	Inlet / Outlet Works and spillway tower, reinforced concrete structure.
a) Details and dimensions of diversion works, if applicable	Works comprise a reinforced concrete tower of between 5800 mm x 5400 mm (base) and 6800 mm x 3700 mm (top) x 12600 mm high. Two 1200 mm dia RC pipelines are located at the base of the tower, the upper being the spillway the lower being the inlet/outlet. Also located at the tower base are 2 baulks, one for inlet (collapsible) and the other for outlet purposes. Both inlet and spillway trash screens are fitted to the tower.
b) Max. Diversion Capacity	Diversion flow rates range from 51.8 ML/d minimum to 345 ML/d.
2. Purpose of water diversion works:	To divert flood flows in Laidley Creek via a gravity pipeline into Lake Dyer, and for subsequent release back into Laidley Creek upstream of the Showgrounds Weir to recharge the aquifer system.
3. Flow Measurement:	No meters installed.

S1.14 REDBANK CREEK PUMP STATION AND OUTLET WORKS FROM DIVERSION CHANNEL - REDBANK CREEK - AMTD 0.8 km

ITEM	DESCRIPTION
1. Description of water infrastructure:	Pump station and outlet works, reinforced concrete structure.
a) Details and dimensions of diversion works, if applicable	i) Overall dimensions of the pump station are 11150 mm x 8000 mm x 6750 mm. ii) Pump station delivery is by a three barrel rising main, 975 mm dia RC pipes. iii) Delivered to the reinforced concrete channel inlet.
b) Max. Diversion Capacity	i) Delivery to Lake Clarendon - 376 ML/d. ii) Return flows are equal to inflows by gravity (From FSL to EL 94.00 m AHD) at 376 ML/d., but when relifted the flows are reduced to 87 ML/d.
2. Purpose of water diversion works:	The purpose of the diversion works is to augment irrigation supplies by increasing recharge of the aquifer and providing releases for riparian irrigation along Lockyer Creek and a separate pipeline distribution system from the lake provides water to the Morton Vale area.
3. Flow Measurement:	No meters installed.
4. Outlet Works:	The outlet is integral with the pump station and consists of 3 barrels of 975 mm RC pipe.

S1.15 LAKE CLARENDON PUMP STATION AND OUTLET WORKS FROM DIVERSION CHANNEL - OFFSTREAM STORAGE

ITEM	DESCRIPTION
1. Description of water infrastructure:	Pump station and diversion inlet / outlet reinforced concrete structure.
a) Details and dimensions of diversion works, if applicable	The overall size of the structure is 6500 mm x 42000 mm x 2000 mm, gravity flow access by the control gate is 4000 mm wide.
b) Max. Diversion Capacity	Maximum inflow / outflow by gravity is 376 ML/d. When re-lifting, outflow is reduced to 87 ML/d.
2. Purpose of water diversion works:	The stored water is released back to the Lockyer Creek as regulated flow via the open channel.
3. Flow Measurement:	No meters installed.
4. Outlet Works:	The outlet is integral with the pump station and consists of 1050 mm RC pipe.

S1.16 OUTLET WORKS FROM LAKE DYER DIVERSION PIPELINE D2 FOR AUGMENTATION OF SHOWGROUNDS WEIR - LAIDLEY CREEK AMTD 17.6 km

ITEM	DESCRIPTION
1. Description of water infrastructure:	2150 mm x 1950 mm x 1800 mm reinforced concrete outlet box located at the termination of the 1050 mm dia RC pipeline.