seqwater
WATER FOR LIFE




System Leakage Management Plan

Department of Environment and Resource Management Submission

February 2010

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NOTE:

The asset details and much of the other information in this report is sourced from documents available when Seqwater was formed, other documentation and preliminary assessments made by Seqwater.

The information provided is yet to be verified by Seqwater. Future versions of the System Leakage Management Plan will include updated details where available.

Certification of System Leakage Management Plan

This plan is submitted to the Department of Environment & Resource Management for assessment of compliance under the *Water Supply (Safety & Reliability) Act 2008* and for approval of the System Leakage Management Plan (SLMP).

Table 1 Service Provider Information

Service Provider Name	Queensland Bulk Water Supply Authority
Trading Name	Seqwater
Service Provider Number	507

Certification

This System Leakage Management Plan is accurate and appropriate for this Water Service Provider's Infrastructure and registered services.

Certified by the RPEQ

signed: [redacted]

name: Aneurin Hughes

RPEQ No: 4554

Date: 26/02/2010

1. INTRODUCTION

This is the first System Leakage Management Plan (SLMP) prepared by Seqwater in accordance with the requirements of the *Water Supply (Safety and Reliability Act) 2008* and the State Government publication *Guidelines for the Preparation of a System Leakage Management Plan, April 2007.*

1.1 Background

The Queensland Bulk Water Supply Authority (trading as Seqwater) came into being in November 2007. The transfer of ownership and operation of assets took place in several steps up until 1 July 2008.

Seqwater has taken over the:

- The three dams formerly owned by the former SEQ Water Corporation;
- The assets formerly owned by Aquagen;
- The dams, weirs, irrigation and stock watering schemes in the South East Queensland region formerly owned by SunWater;
- Several local assets owned by the former Department of Natural Resources and Water;
- The bulk water supply assets (dams, treatment plants, borefields) formerly owned by local governments in the South East Queensland region.

Seqwater is required to comply with a range of regulatory requirements under the *Water Supply (Safety & Reliability) Act 2008*.

These include the preparation of:

- Customer Service Standards;
- Strategic Asset Management Plan (SAMP);
- System Leakage Management Plan (SLMP); and
- Drinking Water Quality Management Plan (DWQMP).

In addition the Market Rules for the SEQ Water Market requires Seqwater, as a Water Grid participant, to prepare:

- Draft operating protocols;
- A Grid Service Provider Emergency Response Plan;
- A Water Grid Resilience Framework that is to integrate risk management, business continuity, security risk management and emergency response management;
- A Drinking Water Quality Management Plan (DWQMP);
- A Strategic Asset Management Plan (SAMP); and
- A draft Grid Service Provider Performance Standard.

Seqwater's primary focus is:

- Drinking water quality; and
- Asset performance.

This will be delivered through the:

- Drinking Water Quality Management Plan; and
- Strategic Asset Management Plan.

In the case of Seqwater, system leakage loss is related to:

- The condition, performance, operation, maintenance and renewal strategies for its infrastructure; and
- Treatment process configuration (e.g. the degree of recycling occurring at the treatment plants).

In relation to asset performance, the SLMP needs to be incorporated into a SAMP so that Seqwater delivers across all asset issues in a consistent manner based on organisational priorities.

In the case of treatment process configuration, any further initiatives to reduce treatment process water loss need to be balanced against potential increased drinking water quality risks and non-compliance.

2. OVERVIEW OF SCHEMES OPERATED BY SEQWATER

Seqwater provides bulk water supply across South East Queensland. It also operates a number of irrigation and stock watering schemes.

Table 2-1 Services Provided by Catchment

Catchment	Bulk Water Supply & Treatment	Local Non-Potable	Surface Water Irrigation and Stock Watering	Groundwater Irrigation and Stock Watering
Nerang River	x			
Logan / Albert Rivers	x	x	x	
Warrill Valley	x	x	x	
Lockyer Valley	x	x	x	x
Upper Brisbane River	x			
Stanley River	x			
Upper Mary	x	x	x	
Maroochy River	x			
Mooloolah River	x			
Bribie Island Groundwater	x			
Caboolture River	x			
North Pine River	x			
North Stradbroke Island Groundwater	x			
Tingalpa Creek	x			
Lower Brisbane River	x			
Brisbane Groundwater	x			

3. NATURE AND EXTENT OF SERVICE

The total numbers of assets that Seqwater manages are listed in Table 3-1. Details of the facilities are included in the Strategic Asset Management Plan (SAMP), May 2009. Location plans for the assets are included in Appendix A of the SAMP.

Table 3-1 Asset Numbers

Asset Type	Number[1]
Dams	25
Water Treatment Plants	49
Weirs	47
Reservoirs	68
Pump Stations	39
Pipelines	23
Irrigation Channels	11
Off-Stream Storages	3
Lagoons	2
Major River Intakes	2

3.1 Bulk Water Supply and Treatment

The asset register indicates that Seqwater manages nearly 156km of water mains. A breakdown of length by diameter is listed in Table 3-2.

Table 3-2 Length of Mains

Diameter (mm)	Length (km)[2]
<300	34.16
300-600	69.97
675-960	27.60
1000 – 1440	18.16
1670 – 2700	6.61
	156.50

Most of these mains are either raw water mains or mains within the treatment plant boundary. Treated water distribution mains include:

[1] The dams total includes the Bromelton and Nindooninbah Off-Stream Storages, both of which are referable dams under dam safety regulations. These two assets are not counted in the off-stream storage total. The treatment plant total includes all the treatment plants including those denoted as local facilities. For the purposes of this count, North Stradbroke Island WTP has been counted as one facility, whereas Mt Crosby East Bank and Mt Crosby West Bank have been counted as separate facilities. The pipelines total includes only those pipelines listed and as defined in the SAMP.

[2] Excludes mains constructed in the last 2 years (e.g. pipelines from Lander's Shute WTP)

- 5.63km of 600 OD main and approximately 6km of 900/750 mm main from the Landers Shute Water Treatment Plant to the Northern Interconnection Pipeline; and
- The recently constructed 1.29km of DN500 main from the Ewan Maddock WTP;

The Stage 2 water mains from the Lander's Shute WTP, extending from the Northern Pipeline Interconnector into the former Maroochy and Caloundra areas have been excluded as they are still under construction (approximately 21km of mains). Mains from Lander's Shute may still be subject to transfer to LinkWater.

Figure 3-1 illustrates the age of mains by length. Nearly 75% of the mains are less than 40 years old.

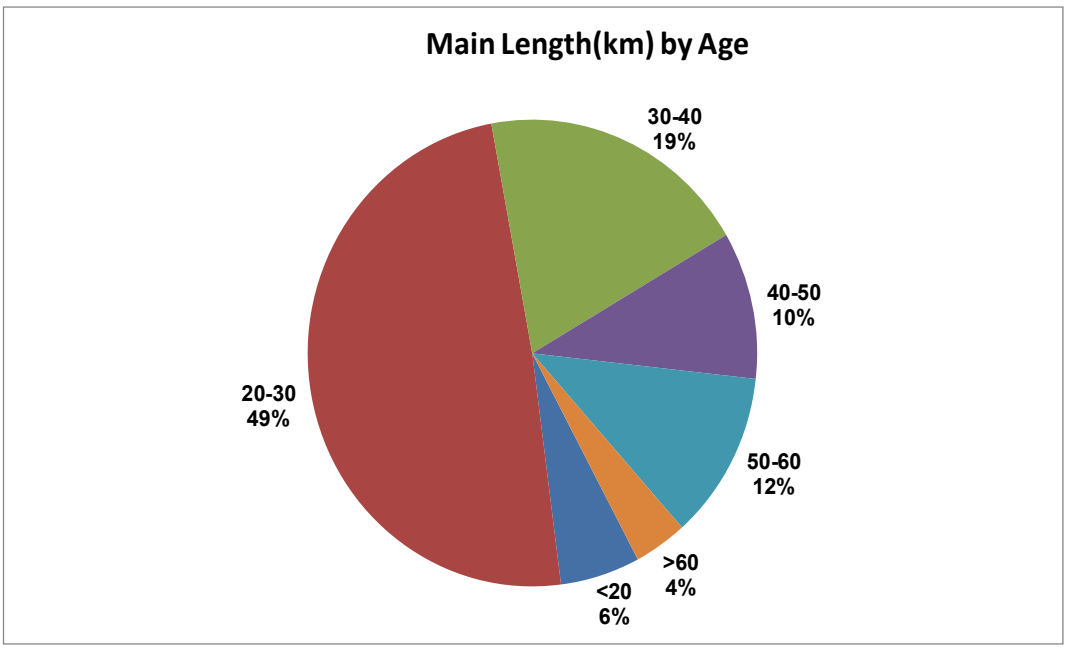

Figure 3-1 Main Length by Age

The water treatment plant capacities are shown in Figure 3-2. The figure indicates that six plants (including Mt Crosby Eastbank & Westbank), which is 12% of Seqwater's treatment plants account for 85% of its capacity. The next nine plants by size account for 12% of capacity. Therefore the largest 15 plants (30% of plants) account for 97% of capacity.

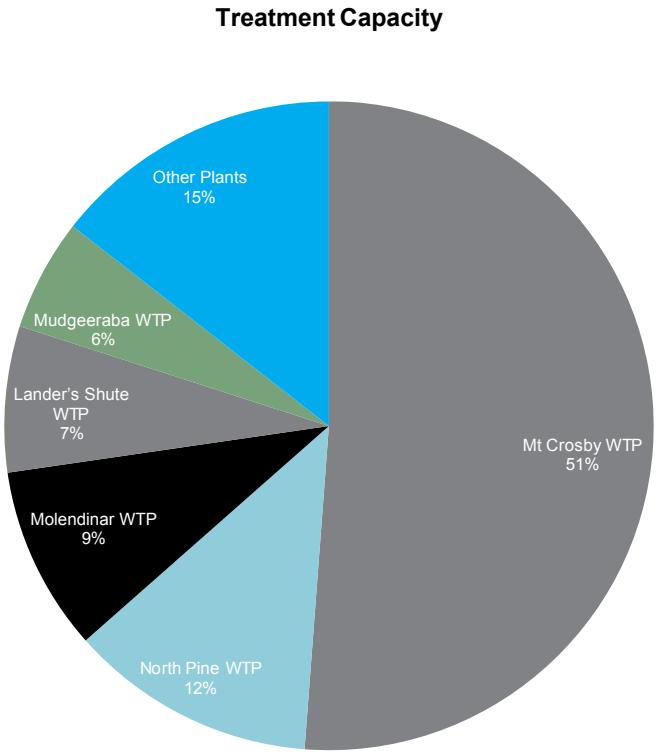

Figure 3-2 Water Treatment Plant Capacities

3.2 Irrigation and Stock Watering

Seqwater manages the irrigation schemes listed in Table 3-3.

Table 3-3 Irrigation Schemes

Catchment	Irrigation Scheme
Lockyer	Central Lockyer Lower Lockyer
Mary River	Pie Creek Diversion
Warrill Valley	Warrill Valley

Central Lockyer Supply Scheme

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. It was built to supplement irrigation, urban, stock and domestic water needs in the Lockyer Valley area. Water loss from surface water will be a gain to groundwater.

The scheme consists of Bill Gunn Dam, (including diversion and return works with Laidley Creek), and Clarendon Dam (including diversion and return works with Lockyer and Redbank Creeks), two pump stations, a pumped distribution system to the Morton Vale area, and a series of diverting, recharging and regulating weirs.

Currently, the Central Lockyer Water Supply Scheme has 219 customers using 661 metered-offtakes and supplies approximately 10,850 ha of land holding 16,541 ML in Water Allocations.

In the Central Lockyer Water Supply Scheme, the only managed distribution infrastructure is the Morton Vale Pipeline.

The Morton Vale Irrigation System consists of 15.5km of concrete and PVC pipes that diminish in diameter as the distance from the supply source increases. The system has no open channels.

The system was originally designed for a total nominal annual allocation of 5,051 ML. IROL Schedule 2 s2.2 shows that only 3507 ML/annum is available.

The Morton Vale Pipeline distribution system was completed in 1997. The bulk meter for this system is a Danfoss Ultrasonic meter, with customer meters being RMC paddle meters. Operators consider both the bulk meter and the customer meters to be accurate.

Lower Lockyer Water Supply Scheme

The Lower Lockyer Water Supply scheme is located west of Lowood in South East Queensland. Its main features are Atkinson Dam, Buaraba Creek Diversion Weir, and Brightview, Sippels, Potters and O'Reillys Weirs. The scheme was designed to supply surface water for irrigation, but it has been shown that some water is lost to recharging the underlying aquifer.

The Lower Lockyer Water Supply Scheme has 171 customers using 227 metered offtakes and supplies water for approximately 4500ha of agricultural land.

In the Lower Lockyer Water Supply Scheme, the Brightview channel system is the only distribution infrastructure.

The Brightview Channel distribution system consists of the Brightview Main Channel and the BR1 Lateral Channel. The Brightview Main Channel is a purpose built 2,440m long open earth channel that has a design capacity of 97 ML/day. Approximately the last 400m of this channel has been converted to pipeline. The Channel cuts through the ridge on the southern side of the Atkinson Dam reservoir, conveying water to Blind Gully, the natural watercourse which is the outlet of Seven Mile Lagoon, and which joins Lockyer Creek within the Brightview Weir pool.

Brightview Main Channel also supplies the BR1 channel that in turn supplies a number of farms without access to water from Lockyer Creek. Brightview Channel can also be supplied by gravity if Atkinson Dam is within 1.2m of full supply level. The BR1 Lateral Channel is of an earth channel construction.

Water loss from surface water will be a gain to groundwater.

Pie Creek Diversion

The Pie Creek Diversion is a small system which provides approximately 360 ML/year of water for use on fodder crops for the local dairy industry. Water is pumped from the Mary River and transferred via a combination of 6.5km of open channel and 9km of pipeline. Releases are made from this infrastructure into small tributaries of the Mary River (Pie Creek, McIntosh Creek, Calico Creek and Eel Creek) from which irrigators pump their supplies. In all, flows in approximately 22km of streams are supplemented via the Pie Creek Diversion.

Pie Creek Pump Station, located at AMTD 192.3km on the Mary River, consists of one submersible pump with a capacity of about 8.4ML/d. A standby skid-mounted pump with a capacity of 6.4ML/day is also utilised during periods of heavy demand.

Warrill Valley Water Supply Scheme

The Warrill Valley Water Supply scheme comprises of Moogerah Dam which regulates water supplies along Reynolds and Warrill Creeks. A series of control weirs and diversion pipelines direct water for rural uses into approximately 90km of water courses, anabranches, pipes and channels. Only 11.3km of the system comprises of pipes and formal open channels.

4. DETAILS OF CURRENT SYSTEM LEAKAGE

4.1 Bulk Water Supply & Treatment

Potential sources of leakage within the Seqwater system are summarised in Table 4-1.

Table 4-1 Potential Sources of Leakage – Bulk Supply

Potential Leakage/Loss	Comment
Leakage in mains	**Possible**. Trunk main lengths are generally short with few fittings/off-takes. The mains are generally quite young with a weighted average age of 33 years. An age profile for the mains is illustrated in Figure 3.1.
Leakage through structures	**Unlikely.** Most structures are above ground and any leakage would be obvious. In some circumstances, it is possible that there may be some leakage through the under-drainage system arising from deterioration of floor joint sealants.
Overflow from reservoirs	**Unlikely.** Most reservoirs have a high level alarm

Table 4-2 provides an indication of water loss in pipelines.

Table 4-2 Typical Water Loss Figures for Mains

	Water Loss (ML/100km/year)	
	NWI Urban Water Performance Report 06/07	Australian Non-Metropolitan Urban Water Performance Monitoring Report 2000/01
Median	92.5	121
Average	119.5	163

By inspection of Table 4-2 a conservative estimate of 120 ML/100km/year water loss in mains is considered appropriate. Based on this figure the estimated Seqwater pipeline water loss would be:

$$120 \times \frac{156.9 \text{ km}}{100} = 188 \text{ ML/annum}$$

The figure is considered conservative as the benchmarking figures relate mainly to utilities that manage extensive reticulation systems which have a greater likelihood of leakage as there are more service connections and fittings such as valves and hydrants.

Water Treatment Plants

Water is lost in the treatment process through de-sludging of clarifiers and backwashing of filters. All Seqwater's largest 15 plants (97% of capacity), except for the Noosa plant, recycle backwash water and sludge supernatant.

There are potential drinking water quality risks associated with recycling of backwash water, sludge thickener supernatant or liquids associated with dewatering processes,

particularly in regard to cryptosporidium and possibly algae. There needs to be a balance between reducing water loss (and costs) and water quality risk.

The 2008/09 water production figures have been analysed using the following assumptions for water loss:

- With backwash and sludge supernatant recycling – 0.8%
- Without recycling – 3%

Based on this analysis, it is estimated that 2187ML/annum is lost from the system.

Total Water Leakage Estimate

The total estimated water leakage from Seqwater's bulk water and treatment systems is summarised in Table 4-3.

Table 4-3 Water Leakage Estimate

	ML/Annum	% Supply
Mains Leakage	188 (estimated)	0.08%
Leakage through structures	To be determined where and when required under the SAMP	
Reservoir overflows	To be determined where and when required under the SAMP	
Process water loss in treatment plant	2187 (estimated)	0.88%
TOTAL	2375 (estimated)	0.96%

The estimated total of 2375 ML/annum is **0.96%** of water production for 2008/09 (247,025ML).

4.2 Irrigation and Stock Watering

4.2.1 Central Lockyer

Over the past 7 years, water levels in Lake Clarendon and Bill Gunn Dam, the two main storages in the Central Lockyer Water Supply Scheme have been significantly lower than historical average. As a result, minimal water has been released into the natural watercourse for extraction downstream for urban use, but no water has been delivered to customers via constructed channels or pipelines.

As the ownership of natural watercourses is vested in the State, it is understood that they are excluded from the System Leakage Management Plan requirements and are not discussed further in this report.

Morton Vale Pipeline

There is no regular annual shutdown for maintenance in this system. Shutdowns are scheduled on a needs basis, with notice periods provided to customers based on the scheme Customer Service targets. With this advance notice, actions can be taken to reduce or prevent any losses due to draining of the pipelines to allow access for maintenance or repairs.

Table 4-4 shows the bulk flow meter and customer flow meter data for the Morton Vale Pipeline System. The data provided up to and including 2007/08 was provided by SunWater. The negative variation is due to rainfall and run-off in the catchment and some inaccuracy in aging meters.

Table 4-4 Morton Vale Pipeline Flows

MORTON VALE DISTRIBUTION SYSTEM			
	Bulk Meter (ML)	Customer Meter (ML)	Variation (ML)
2002/03	0	24	-24
2003/04	204	235	-31
2004/05	0	0	0
2005/06	0	0	0
2006/07	0	0	0
2007/08	145	0	145
2008/09	0	125	-125

4.2.2 Lower Lockyer

During the past 7 years, minimal water has been released into the natural water course for extraction downstream by Council, but no water has been delivered to customers via constructed channels or pipelines. In addition to there being less water available to supply customers during the past 7 years, water lost due to factors considered not to be leakage (i.e. channel soakage), is proportionally higher during periods of low water levels.

Water levels in Atkinson Dam have been significantly lower in the past few years than the historical average.

These abnormally low water levels at the dam, and the resulting low quantities in water being delivered to customers via channels and pipelines make any recent data unrepresentative of the infrastructure's performance during typical years.

Brightview Channel System

The Brightview Channel system includes 6 km of channel. Losses associated with the Brightview Channel System would be predominantly by channel soakage, as this system is often dry and is only utilised when there are sufficient inflows into the Scheme. It is also difficult to accurately quantify losses within this system, as there is currently no flow measuring facility.

There are no regular annual shutdowns for maintenance in the Scheme. Shutdowns are scheduled on a needs basis, with notice periods provided to customers based on the scheme Customer Service targets. With this advance notice, actions can be taken to reduce or prevent any channel losses due to draining of the channel to allow access for maintenance or repairs.

4.2.3 Pie Creek Diversion

There is currently no significant leakage within this section. Pie Creek is having less demand placed on it as the majority of the farms that relied on the system are being subdivided into residential blocks. This makes the system less susceptible to overflows within the distribution system as it is now operating at lower than capacity levels.

The amount of water pumped and diverted into the system is based on the historical release records, the amount of water ordered, the prevailing climatic conditions and the amount of water that needs to be released to supplement Pie Creek.

The Pie Creek Main Channel is a combination of earth channel and enclosed pipeline. Whilst there are some known leakage points with the earth channel, the majority of losses are attributed to relatively low level seepage throughout the channel length. Occasionally some losses can be attributed to irrigators taking a trickle flow from the channel, which causes the customer's offtake meters to under-read. Over recent years, upgraded Propeller actuated meters have been fitted to customer offtakes.

The pipeline sections experience around three or four pipe breaks per year due to movement of the surrounding clay soil.

Distribution losses in the supplemented streams can be quite large and are made up of seepage losses and unauthorised withdrawals by DERM customers along the watercourses. (the DERM customers are meant to only extract during flood harvesting periods.) For example, to supply one supplemented stream customer with 1ML, some 5ML needs to be released to enable the desired 1ML to reach the customer.

Table 4-5 below summarises the quantifiable water losses for the Pie Creek Diversion section:

Table 4-5 Pie Creek Diversion Quantifiable Losses

PIE CREEK DIVERSION SYSTEM	2007/08	2008/09
Operational losses (ML/yr)		
Overflows	2	2
Pipe Breaks	8	8
Other losses (ML/yr)		
Draining for Annual Inspection	32	32
Unmetered Consumption	3	5
Evaporation (average annual)	31	31
Total Quantifiable Losses (ML/yr)	**76**	**78**

These losses are estimates, with the total quantifiable loss figure rounded up prior to its use in the leakage calculation. Table 4-6 shows the bulk flow meter and customer flow meter data for the Pie Creek system, with the quantifiable losses deducted to derive an inferred leakage value. Negative leakage occurs due to rainfall and run-off in the catchment.

Table 4-6 Pie Creek Diversion – Estimated Leakage

PIE CREEK DIVERSION SYSTEM					
	Bulk Meter (ML)	Customer Meter (ML)	Quantifiable Loss (ML)	Inferred Leakage (ML)	Percentage Leakage (%)
2002/03	577	354	80	143	25
2003/04	422	260	70	92	22
2004/05	408	346	70	-8	-2
2005/06	368	276	80	12	3
2006/07	576	416	90	70	12
2007/08	111	52	76	-17	-16
2008/09	64	16	78	-30	-47

The difference in the quantifiable loss from one year to another is due to the different net evaporation rates applicable to each year.

The bulk of the inferred leakage shown is believed to be generally associated with the supplemented stream sections of the distribution system. Customer meters are spread between locations directly off the Pie Creek Main Channel and the supplemented streams. There is currently no ability to directly monitor releases made into each of the five watercourses.

4.2.4 Warrill Valley Water Supply Scheme

Releases made from Moogerah Dam gravitate to customers along a complex 150 Km long network of natural waterways, weirs, lagoons, man-made channels and pipelines. The scheme incorporates 17.6 km of constructed earth channel, 8.2 km of pipeline and 40 km of natural and improved drainage lines to divert water from Reynolds and Warrill Creeks into the low lying areas of the Warrill Creek flood plains.

Up to 50% of the water released from Moogerah Dam channelled through Warrill Creek and up to 35% channelled through Kent's Lagoon Gravity Diversion is lost to the aquifer that underlies the streambeds. Some of this water is subsequently retrieved through bores, but as the area is not a declared groundwater area it cannot be charged.

The operation of the Scheme for water supplies to customer meters relies on customers advising water usage requirements through water ordering, via communicating water orders to Seqwater Operational staff. Operators utilise storage space within the systems various weirs and lagoons to provide timely delivery to customers while maintaining storage space to capture unregulated/natural stream flows.

Recent changes to the supply of water to end of the scheme at Berry's Lagoon where customer water usage has diminished have impacted the ability to utilize end system flows and system losses such as unused water released through the scheme for water orders.

These scheme complexities make calculating system losses extremely difficult, water losses are through evaporation, seepage, underground recharge and overflow. Customer water usage data and water delivery releases data are currently used to provide system efficiency, the accuracy of customer meters and stream flow rates is of high priority.

Managing system leakage reduction through programmed replacement and renewal of customer water meters within the Warrill Valley Water Supply Scheme will be undertaken over a period of 3 years as part of the Seqwater action plan.

4.2.5 Logan Valley Water Supply Scheme

Although not identified as requiring a SLMP for the Logan Scheme, Seqwater will also include the Scheme within the replacement and renewals program for customer water meters. The Scheme has not any irrigation channels or significant lengths of water supply pipelines, less than 1 km.

The Logan Scheme has weir infrastructure which incorporates fish ladders and fish lock transfer systems which are operated for the supply of day to day customer water order supplies and or closed when there are no natural stream flows present, no downstream water orders identified and weir operating water levels are being maintained.

The weirs are also utilized by Operations Staff to capture natural stream flows by maintaining weir pools below FSL at all times possible. Approximately 80% of customer metered water usage is extracted from unregulated stream flows, Maroon Dam making the balance and Bromelton Offstream Storage providing additional capacity for downstream requirements as necessary.

5. LEAKAGE REDUCTION MEASURES

5.1 Bulk Water Supply & Treatment

Table 5-1 provides a summary of the potential measures that can be adopted to reduce leakage. Many of these are considered cost-effective provided they are adopted into on-going operation and maintenance activities which are currently being developed.

Table 5-1 Potential Leakage Reduction Measures – Bulk Water Supply & Treatment

Measure	Infrastructure Type			Comment	Cost Effective	Ongoing Y/N
	Mains	WTP	Reservoirs			
Develop bulk meter database	✓	✓	✓	Develop bulk meter database indicating location of bulk meters in raw water intake, WTP inlet/outlet, recycling/discharge, transfer meters. Note this will require the cooperation of downstream water meter and infrastructure owners.	Y	Y
Undertake water balance calculations	✓	✓	✓	Calculate inflow/outflows from systems to identify % water leakage. Calculation will commence with the 6 largest WTP systems which provide 85% of Seqwater's treatment capacity followed by the remaining plants where feasible. Calculations will then be undertaken on an annual basis.	Y	Y
Audit bulk water meters	✓	✓	✓	All transfer meters have been audited to meet the Water Grid Manager's requirements. Other bulk meters (e.g. raw water meters) will be audited/calibrated on a criticality basis.	Y	Y
Minimise overflows		✓	✓	This will involve confirming that all reservoir overflow alarms exist and are operational. Operational experience suggests that there are currently no problems.	Y	Y
Maintain trunk mains	✓			A maintenance program for some mains is partially in place and will be developed to include regular inspections of pipe routes, air valves, scours, valve exercising and pipeline structures.	Y	Y
Acoustic leak detection	✓			Not considered feasible at this stage. May be implemented later subject to results of water balance calculations.	N	To be determined
Incorporate inspection of structure underdrainage manholes.		✓	✓	Under drainage manhole inspections will be incorporated into O&M procedures for treatment plants and reservoirs.	Y	Y

5.2 Irrigation and Stock Watering

5.2.1 Central Lockyer Water Supply Scheme

With the limited supplies available, minimising water loss is a very important aspect of the management of the Central Lockyer Water Supply Scheme, with Seqwater's operational activities being designed with this as a key focus. One example is that, as a requirement of the IROL, Seqwater must monitor and report on the following:

- Levels in Bill Gunn Dam, Clarendon Dam, and Showgrounds Weir;
- All water diversions to distribution systems;
- Details of announced allocations;
- Water used by each customer;
- Dates and volumes of water diverted into and released from Bill Gunn and Clarendon Dams, together with identification of the zones into which releases were made; and
- Underground water levels in the monitored bores, including the dates when the readings were taken.

Flow and water level monitoring via twelve gauging stations is utilised to manage releases and reduce losses with the data being recorded in site specific operational logs (spreadsheets) located on Seqwater's server. Continuous recorded data is stored on Enviromon which is part of the Bureau of Meteorology data collection network. Seqwater is in the process of consolidating all its storage, streamflow and rainfall databases.

Seqwater will continue the ongoing program of meter replacement to ensure the accuracy and reliability of water usage.

5.2.2 Lower Lockyer Water Supply Scheme

SunWater's operational activities are designed to minimise losses, but one of the issues to be resolved in the future is the regulatory relationship between the surface and groundwater elements of this scheme. It is known that the surface water provides some recharge to the groundwater, but NRW has not moved to date to include groundwater as a part of the scheme. Thus the question of leakage management is moot until there is clarity on the desired relationship.

5.2.3 Pie Creek Diversion

The most readily identifiable means of reducing leakage is the refurbishment of the Pie Creek Pump Station suction and delivery pipework before there is a leakage problem.

5.2.4 Warrill Valley Water Supply Scheme

The Warrill scheme operates by gravity feed throughout the water supply system. 88% of the entire water supply scheme comprises of natural water courses and any measure to improve water losses within the short lengths of pipe and channels will not provide a satisfactory return on investment when significant losses occur in other parts of the water supply scheme.

6. LEAKAGE REDUCTION PROGRAM

6.1 Bulk Water Supply and Treatment

The proposed program is outlined in Table 6-1.

Table 6-1 Action Plan – Bulk Water Supply & Treatment

Measure		Responsibility	Target Date
1.	Develop bulk meter database	Water Delivery	(complete)
2.	Undertake water balance calculations • 6 largest WTPs • Remainder (where feasible)	Water Delivery	 March 2010 June 2010
3.	Audit/calibrate bulk water meters not audited in 2009[3] • 6 largest WTPs • Next 9 largest WTPs (this will address 97% of treatment capacity)	Asset Delivery	 March 2010 June 2010
4.	Check availability/reliability of reservoir high level alarms	Asset Delivery	Dec 2011
5.	Develop and implement a maintenance delivery strategy which minimises mains leakage & losses from structures[4]	Asset Delivery	June 2011

Existing water loss is estimated to be low. The above measures will confirm initial estimates.

6.2 Irrigation and Stock Watering

The proposed program is outlined in Table 6-2. Actions and costs have been extrapolated from the SunWater SLMP. These activities are one-off except for database development and update.

[3] Where these are owned by Seqwater. If not owned then action will be undertaken with the cooperation from downstream meter and infrastructure owners.
[4] Progressed primarily under the SAMP timetable.

Table 6-2 Action Plan – Irrigation and Stock Watering

System	Measure	Responsibility	Target Date	Cost
All	Develop bulk water database	Water Delivery	Jun 2010	-
Lower Lockyer	Progressive replacement of customer meters Year 1 2 3 4	Asset Delivery	 Jul 2010 Jul 2011 Jul 2012 Jul 2013	 $10,000 $10,000 $10,000 $10,000
Central Lockyer	Progressive replacement of customer meters. Year 1 2 2 Progressive replacement of meters in Morton Vale system. Year 1 2 3 Progressive replacement of meters in groundwater area Year 1 2 3	Asset Delivery Asset Delivery Asset Delivery	 Jul 2010 Jul 2011 Jul 2012 Jul 2011 Jul 2012 Jul 2013 Jul 2011 Jul 2012 Jul 2013	 $20,000 $20,000 $20,000 $10,000 $10,000 $10,000 $20,000 $20,000 $20,000
Pie Creek Diversion	Refurbish Pie Creek Pump Station suction and delivery pipework	Water Delivery	July 2010	$40,000
Warrill Valley	Progressive meter replacement Year 1 2 3	Asset Delivery	 Jul 2010 Jul 2011 Jul 2012	 $10,000 $10,000 $10,000
Logan Valley	Progressive meter replacement Year 1 2 3	Asset Delivery	 Jul 2010 Jul 2011 Jul 2012	 $10,000 $10,000 $10,000

7. FINANCIAL ARRANGEMENTS

The cost of implementing SLMP actions will form a component of Seqwater's existing operations and maintenance funding.

The meter asset renewal expenditure for the irrigation schemes will be funded as part of Seqwater's asset renewal budget.

The implementation of the national metering standard under the National Water Initiative may have an impact on the cost estimates provided in this document.

Seqwater's budgets and financial projections are yet to be finalised pending discussions between QWC, SEQ Water Grid Manager and Seqwater, subject to regulated asset, asset performance, water quality and pricing outcomes approved by external agencies.