QUEENSLAND UrbanUtilities

2015/16 DRINKING WATER QUALITY MANAGEMENT PLAN REPORT

ENRICH QUALITY OF LIFE

ABOUT THIS REPORT

The Queensland Urban Utilities *2015/16 Drinking Water Quality Management Plan Report* showcases our operational performance with respect to drinking water quality, and shows how we have been implementing key improvement actions detailed in our *Drinking Water Quality Management Plan (DWQMP)*.

This report also provides our customers with information about the quality of their drinking water.

This report informs the regulator on how we complied with our DWQMP and its approval conditions. It also allows us to meet our legislative obligations under the *Water Supply (Safety and Reliability) Act 2008*.

Readership

This report aims to communicate comprehensive information to satisfy the needs of individuals and groups who are affected by, or have an interest in, our activities, including:

- our customers,
- the communities we serve,
- current and future employees,
- our shareholders,
- government,
- other utilities, and
- business and industry.

Glossary

A glossary explaining the meaning of words and acronyms can be found on page 41.

Reporting requirements

This report is prepared in accordance with the *Water Industry Regulatory Reform – Drinking Water Quality Management Plan Report* factsheet published by the Department of Energy and Water Supply (DEWS), accessible at www.dews.qld.gov.au.

Interpreter service statement

We are committed to providing accessible services to our customers and stakeholders from culturally and linguistically diverse backgrounds. If you have difficulty in understanding this report, please contact us on 13 14 50 and we will arrange an interpreter to communicate the report to you effectively.

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ISSN: 1838-5575


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CHAPTER 1: ABOUT US

Who we are

On 1 July 2010, Queensland Urban Utilities was established as a statutory body under the *South East Queensland Water (Distribution and Retail Restructuring) Act 2009*, and a service provider under the *Water Supply (Safety and Reliability) Act 2008*.

Our shareholders are the councils of Brisbane, Ipswich, Lockyer Valley, Scenic Rim, and Somerset, and we are governed by an independent Board.

What we do

We are responsible for delivering drinking water, recycled water and sewerage services to over 1.4 million customers in South East Queensland.

Our 14,384km^2 geographic area is made up of the five local government areas of our shareholders: Brisbane, Ipswich, Lockyer Valley, Scenic Rim and Somerset, and equates to around two-thirds of South East Queensland.

We provide our services through the management of an extensive water and sewerage network, including:

- 18,500km of pipeline,
- 147 water pump stations & boosters,
- 332 sewage pump stations,
- 116 water reservoirs, and
- 29 sewage treatment plants.

Our strategic framework

Our purpose

Enrich quality of life.

Our vision

We will be recognised for our excellence in water and sewerage services that meet the evolving needs of our customers and enhance our communities.

Our strategic pillars

Our strategic pillars provide focus for the objectives and strategies that will enable us to achieve our purpose and vision. For 2015/16, our strategic pillars were:

• Customers

We understand our customers and deliver a quality service that meets their evolving needs.

• Shareholders and Communities

We understand our shareholders' aspirations and are accountable to them and their communities.

• Operational Excellence

We innovate to drive operational excellence to achieve outcomes at the lowest long-term cost.

• People

We are safe, adaptable and capable, and committed to achieving our vision and living our values.

Our key partners

Our key partners in the South East Queensland water and sewerage industry are shown in Figure 1.

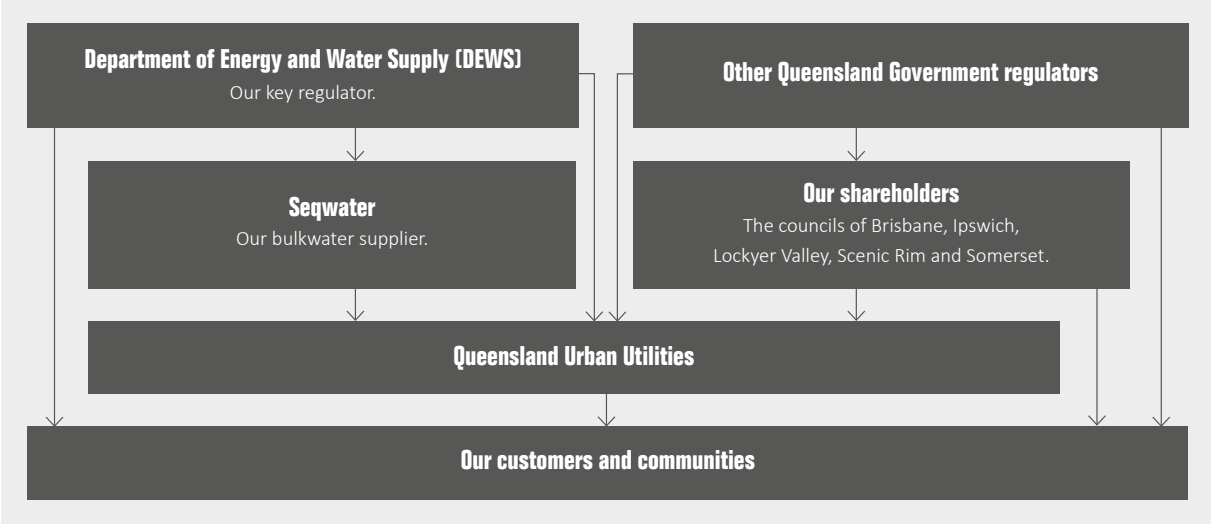

Figure 1: Our key partners.

CHAPTER 2: OUR WATER SUPPLY NETWORK

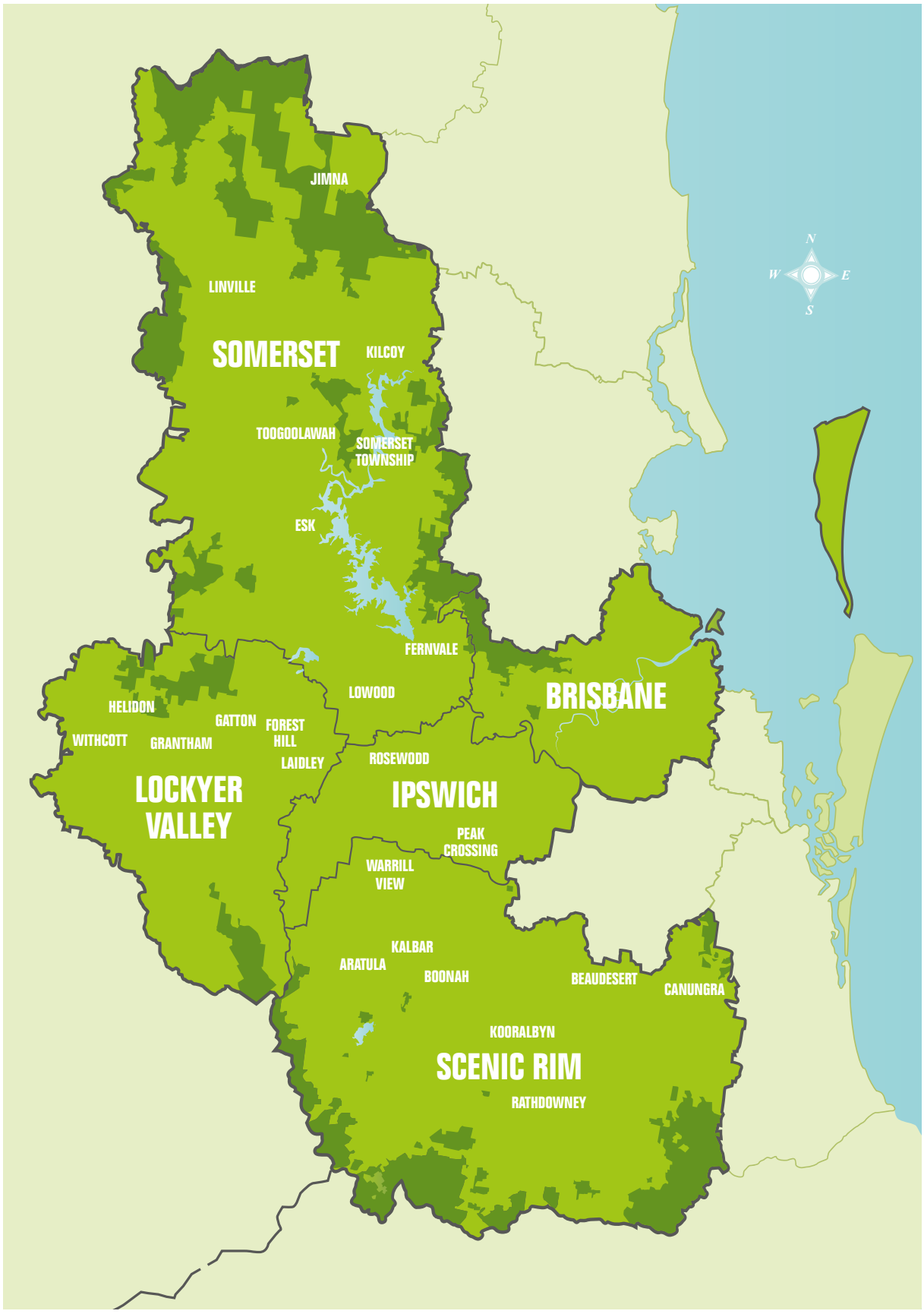

Figure 2 – Queensland Urban Utilities' water supply schemes.

Our network

We supply around 85,000 megalitres of drinking water to approximately 539,000 residential properties and around 45,000 megalitres to approximately 37,000 non-residential properties. Drinking water is delivered to our customers via 12 separate network water supply schemes:

1. Beaudesert,
2. Boonah – Kalbar also servicing Mt Alford and Aratula,
3. Canungra,
4. Esk – Toogoolawah,
5. Jimna,
6. Kilcoy,
7. Kooralbyn,
8. Linville,
9. Lowood – servicing the towns of Fernvale, Lowood, Forest Hill, Gatton, Grantham, Helidon, Laidley, Plainland, and Withcott,
10. Rathdowney,
11. Somerset Township, and
12. South East Queensland (Brisbane and Ipswich) Water Supply System including Marburg, Rosewood, Walloon, Peak Crossing, Harrisville and Warrill View.

These schemes begin at the bulk supply points and reservoirs operated and owned by Seqwater and end at the customer's meter. The schemes include storage reservoirs, pipe networks, pumps, chlorination systems and water meters. Figure 2 (see page 6) shows our water supply network in each local government area.

Our largest water supply scheme, which is concentrated in Brisbane and Ipswich, makes up around 89% of the total water supply network. Schemes in the Lockyer Valley, Scenic Rim and Somerset make up the remaining 11%.

We buy treated bulk drinking water from Seqwater, and distribute this water to our customers in each of our five local government areas.

Brisbane and Ipswich

The South East Queensland Water Supply Scheme supplies drinking water to our customers in Brisbane and Ipswich, as well as those in Peak Crossing, Harrisville and Warrill View in the Scenic Rim.

The South East Queensland Water Supply Scheme is considered as a single scheme based on:

- shared bulk water sources and infrastructure,
- shared operation and management,
- the use of chloramination to disinfect the water, and
- the addition of sodium fluoride to the water at Seqwater water treatment plants (WTPs).

Water supplied to Brisbane is provided mostly from Seqwater's Mount Crosby and North Pine WTPs. When required, the Seqwater Southern and Northern Regional Pipelines can supply water in both directions.

Water supplied to Ipswich is provided from the Seqwater Mount Crosby WTP, and via the Southern Regional Water Pipeline.

Lockyer Valley

In the Lockyer Valley region, water treated at Seqwater's Lowood WTP is distributed to the seven townships of Forest Hill, Gatton, Grantham, Helidon, Laidley, Plainland and Withcott.

Chlorine is used to disinfect the treated water.

Scenic Rim

In Scenic Rim, Seqwater operates WTPs at Beaudesert, Canungra, Kalbar, Kooralbyn and Rathdowney. Each WTP is connected to our network, which supplies water to our customers in these towns. Water from the Kalbar WTP is supplied to Aratula, Kalbar, Boonah and Mount Alford.

Chlorine is used to disinfect the treated water in these schemes.

Somerset

In Somerset, Seqwater operates WTPs at Esk, Jimna, Kilcoy, Linville and Somerset township. Each WTP is connected to our network, which supplies water to our customers in these areas.

The townships of Fernvale and Lowood are supplied from the same Lowood WTP that supplies the Lockyer Valley.

The Esk WTP supplies drinking water to Toogoolawah and Esk.

In 2013, floods contaminated the bore that supplies the Linville WTP. As a result, Seqwater continues to supply water by tanker from Kilcoy to Linville.

Chlorine is used to disinfect the treated water in the Somerset region.

CHAPTER 3:
DRINKING WATER QUALITY PERFORMANCE

Legislative requirements

The supply of safe and reliable drinking water in Queensland is regulated by various state legislation, including the *Water Supply (Safety and Reliability) Act 2008*, the *South-East Queensland Water (Distribution and Retail Restructuring) Act 2009*, and the *Public Health Act 2005*.

Under the *Water Supply (Safety and Reliability) Act 2008*, a drinking water service provider may only carry out a registered drinking water service in accordance with an approved Drinking Water Quality Management Plan (DWQMP).

Under the *Public Health Act 2005*, Queensland Health has regulated the standards for drinking water quality related to *E.coli* and fluoride. These standards, together with the health guideline levels in the *Australian Drinking Water Guidelines 2011 (ADWG)*, have been incorporated under the *Water Supply (Safety and Reliability) Act 2008* as water quality criteria for drinking water in Queensland.

Water quality performance summary

For 2015/16, Queensland Urban Utilities met the prescribed health-related standards for all 12 drinking water schemes.

Table 1 summarises how our drinking water schemes performed over 1 July 2015 to 30 June 2016, against the legislative requirements, detailed above.

Water Quality Performance			
Scheme	***E.coli***	**Health**	**Aesthetic**
Beaudesert	☑	☑	☑
Boonah-Kalbar	☑	☑	☑
Brisbane-Ipswich	☑	☑	☑
Canungra	☑	☑	☑
Esk-Toogoolawah	☑	☑	☑
Jimna	☑	☑	☑
Kilcoy	☑	☑	☑
Kooralbyn	☑	☑	☑
Linville	☑	☑	☑
Lowood	☑	☑	☑
Rathdowney	☑	☑	☑
Somerset	☑	☑	☑

Table 1: Drinking water schemes results 1 July 2015 – 30 June 2016.

CHAPTER 3:
DRINKING WATER QUALITY PERFORMANCE

Verification monitoring program

To verify that we deliver safe drinking water, our Scientific Analytical Services Laboratory collects and analyses water from over 250 dedicated sample points across our service territory, analysing over 110,000 water quality parameters annually. The water quality data is reviewed and analysed against prescribed requirements in the legislation and the ADWG.

As part of our commitment to continuous improvement we are increasing the number of sample points in the network, and optimising our monitoring program.

The *Drinking Water Quality Management Plan* is audited monthly by a nominated external auditing body to ensure compliance between the program and laboratory activities. In 2015/16 we exceeded our compliance targets, and improved the management of water quality sampling. In 2016/17, we will continue to strengthen the management of the activity and implement advanced auditing criteria.

Escherichia coli (E.coli)

We achieved excellent health performance over 2015/16 with 100% of drinking water schemes complying with legislative *E.coli* requirements.

The standard for drinking water in Queensland requires no detection of *E.coli* in 98% of samples collected over a 12 month period. The minimum number of samples required to be taken is detailed in the *Queensland Public Health Regulation 2005 Schedule 3A*.

E.coli water quality compliance details are provided in Appendix A, including the month-by-month performance.

Health-related chemical assessment

All 12 drinking water schemes complied with the health-related chemical limit values defined in the ADWG.

We use a risk management approach to drinking water quality which allows us to identify the substances that may pose a risk to public health. The verification monitoring program analyses these substances which are continuously trended and assessed against ADWG health-related limits and operational control triggers. All our drinking water schemes comply with the health-related limits described in the ADWG using the 95th percentile (95th-%ile) calculation.

Health assessment water quality compliance details are provided in Appendix B.

Aesthetic assessment

Our routine verification monitoring program is important for us to verify we provide safe drinking water to our customers. We take advantage of the program to continuously assess non-health related parameters which contribute to the way our water tastes, smells and appears. We understand these physical aspects of drinking water are important in enriching the quality of life. All 12 drinking water schemes have performed within the aesthetic guideline values detailed in the ADWG over 2015/16.

Aesthetic assessment water quality compliance details are provided in Appendix C.


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CHAPTER 4: NOTIFYING THE REGULATOR

Under sections 102 and 102A of the *Water Supply (Safety and Reliability) Act 2008*, Queensland Urban Utilities is required to immediately inform the Regulator if the quality of water supplied from the drinking water service does not comply with the water quality criteria as specified in the ADWG.

During 2015/16, Queensland Urban Utilities had cause to notify the Regulator on 14 occasions, as shown in Figure 3.

Of these reported notifications, 10 involved the detection of *E.coli* in a water sample. In all cases, the follow-up samples indicated no continued presence of *E.coli*.

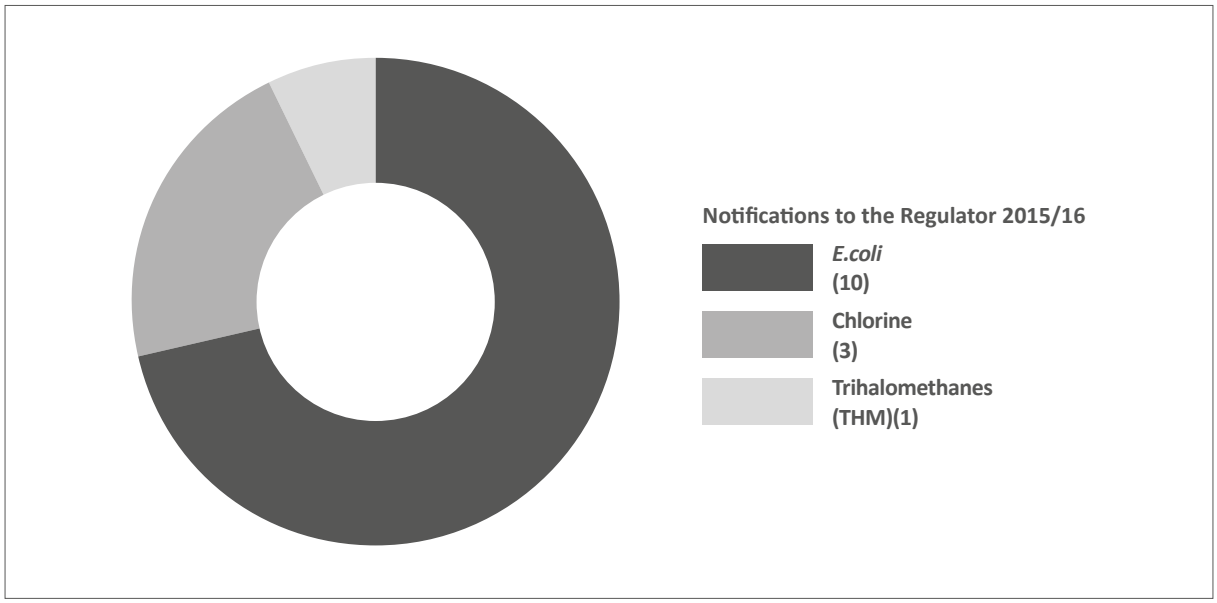

Figure 3: Queensland Urban Utilities' notification to the Regulator by type – 2015/16.

All 14 notifications to the Regulator involved samples that exceeded the ADWG chemical health-based limits. 10 *E.coli* notifications were submitted, with the remaining four Regulator notifications related to three chlorine exceedances, and one for elevated trihalomethanes (THMs).

Seven of the 14 notifications to the Regulator occurred within the South East Queensland Water Supply Scheme, servicing the Brisbane and Ipswich regions. Five were within the network servicing the Lockyer Valley region, and two within the network servicing the Scenic Rim region.

Each time there is a reportable incident Queensland Urban Utilities notifies the Regulator. On detection we immediately initiate further sampling in the affected zone, undertake a comprehensive investigation to determine the factors that may have attributed to the event, and initiate responsive corrective actions e.g. flushing of water mains. All actions are implemented to ensure the continued supply of safe, clean drinking water.

The 23% reduction in reportable incidents from 2014/15 to 2015/16 can be attributed to continued focus on water quality and having a whole-of-business approach and commitment to implementing changes to actively reduce the risk of incidents within our supply network.


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CHAPTER 5: MANAGING WATER SAFETY

Queensland Urban Utilities is committed to providing safe, reliable drinking water. From our bulk supply interface points with Seqwater through to the customer's tap, we ensure a consistent and reliable supply of high quality safe drinking water to our customers.

Drinking Water Quality Management Plan review

Queensland Urban Utilities operates with an approved DWQMP.

In November 2015, we provided the Regulator with a revised DWQMP that incorporated improvements recommend by a regular review. This was approved by the Regulator in March 2016.

During 2016/17 we will undertake an external audit and a regular review of the approved DWQMP.

Risk management approach

The revised and approved DWQMP establishes the framework for the risk management approach adopted by Queensland Urban Utilities to ensure that the drinking water supplied to our customers is reliable and safe.

This structured and systematic approach to drinking water quality management is based on the *ADWG Framework for Management of Drinking Water Quality*, and is the best practice methodology adopted in the water industry to ensure a safe and reliable water supply to customers.

Queensland Urban Utilities will continue to ensure our Drinking Water Quality Management System remains aligned with 12 elements of the ADWG.

Queensland Urban Utilities' risk management approach details the hazards, hazardous events, and potential risks associated with the successful delivery of safe drinking water to our customers.

In the latter half of 2015, as part of the DWQMP review, a detailed risk assessment workshop was undertaken to identify all known potential water quality hazards within our water supply network. Based on the outcomes of this assessment we have further enhanced our water supply safety strategies to ensure only safe drinking water is delivered to your home.

Queensland Urban Utilities continues to improve the robustness and performance of the barriers in place to counter known and potential water quality hazards.

Management of reservoir storage levels

As a consequence of a reduction in water consumption in many supply schemes, more water is being stored in our reservoirs. Whilst we encourage efficient water use, increased storages can lead to water quality deterioration. We continue to optimise our reservoir storages to balance the quantity of water stored with demand trends. Operational plans are implemented to reduce how long water takes to move in the network from reservoirs to customers. These plans ensure we maintain disinfection of the water without compromising security of supply.

Enhanced Condition Assessment Program

Queensland Urban Utilities implemented an enhanced asset condition assessment program in 2015/16 which builds on the methodology developed in 2014/15. This enhanced program now incorporates a detailed technical specification for reservoirs, which standardises the assessment to be adopted and ensures the integrity of the reservoirs with regard to water safety.

Disinfection management

Queensland Urban Utilities completed upgrade works to 10 chlorination units in 2015/16. Improvements also included enhanced alarm systems and reporting capability to ensure any network issue is detected quickly and remedial actions initiated rapidly to maintain water safety integrity.

Queensland Urban Utilities also implemented additional monitoring in high risk disinfection by-product areas of the network during the October 2015 to May 2016 period. This is to ensure proactive measures can be deployed to manage any trend increase and maintain a safe water supply.

Verification Monitoring Program

Queensland Urban Utilities' improved Drinking Water Quality Verification Monitoring Program was implemented in 2015/16 to monitor risks associated with operating a water supply network and to build an understanding of the water quality throughout the network. The program complies with Queensland legislation and uses recommendations in the ADWG.

The program is designed to achieve a consistent approach to drinking water quality monitoring activities across all of our drinking water schemes and will incorporate seasonal variations to enhance data value. The program was optimised at the end of the 2015/16 to assess sampling locations to ensure network coverage.


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CHAPTER 6: IMPROVING DRINKING WATER QUALITY

Queensland Urban Utilities has a philosophy of continual improvement and innovation and will continue to investigate leading practices and technologies to complement our water quality management framework to consistently deliver a safe and reliable drinking water supply.

Network asset improvements

Queensland Urban Utilities continues to invest in upgrades of its assets to ensure the quality and safety of our drinking water.

In 2015/16, this included the rehabilitation of nine reservoirs, including installation of new reservoir roofs and repairs to floor and wall joints. In addition to this work, we installed mixers in an additional nine high priority reservoirs in 2015/16.

During the summer months, the higher temperatures can cause water to form layers and minimise the effectiveness of disinfection. These mixers ensure that water is fully mixed and disinfection maintained.

Our program also included the renewal of 54,000 metres of water mains. This program aims to reduce the likelihood of disruptions to customers' water service, while providing the associated benefit of a reduced risk to the continued quality of the Queensland Urban Utilities drinking water supply.

Network operational improvements

For zones that have historically had reported quality issues, Queensland Urban Utilities has instigated a managed program of flushing the network to maintain water quality for impacted customers. In addition to program, we have trialled enhanced techniques for internally cleaning water mains. This includes:

- ice pigging (using an ice slurry to scrape clean the pipe), and
- re-circulating a high velocity stream of water through sections of the network while filtering clean the water.

To enhance our knowledge of how disinfection decays through our network we have trialled the installation of battery powered devices which we can place in the network to monitor zones. These devices are connected via mobile phone technology and provide instant information on the quality of our disinfection.

Water quality modelling

During 2015/16, we continued to integrate water quality modelling with hydraulic modelling to incorporate water quality issues into our strategic asset planning framework.

We also undertook water quality modelling for the Beaudesert and Lowood water supply schemes to formulate optimal solutions to improve water quality by maintaining adequate disinfection and to minimise water age. Solutions include rezoning of the network, identifying preferred locations to install re-chlorination facilities and installing additional network infrastructure. These outcomes will be integrated into our strategic planning during 2016/17.

Collaborating to optimise the South East Queensland water supply system

In 2015/16, we continued to collaborate with other South East Queensland water supply system operators and in the Secondary Disinfection Options Study to determine the best approach for whole-of-system disinfection. The study aims to optimise the existing secondary disinfection regime on a South East Queensland regional and sub-regional basis.

As a result of the Secondary Disinfection Options Study, participants established agreed learnings about secondary disinfection approaches. Work was also completed on a South East Queensland regional water quality model.

In 2016/17, this model will be used to identify improvement initiatives for secondary disinfection across the regional water supply system.

We have also been actively working with water supply participants in the South East Queensland water supply system to prepare a South East Queensland Partnership Water Quality Plan.

This plan aims to develop best practice in regard to managing water quality from Seqwater's catchment to our customers' taps. This approach provides for cross-organisational risk management across the South East Queensland water supply system.

CHAPTER 6: IMPROVING DRINKING WATER QUALITY

Keeping abreast of emerging water quality issues

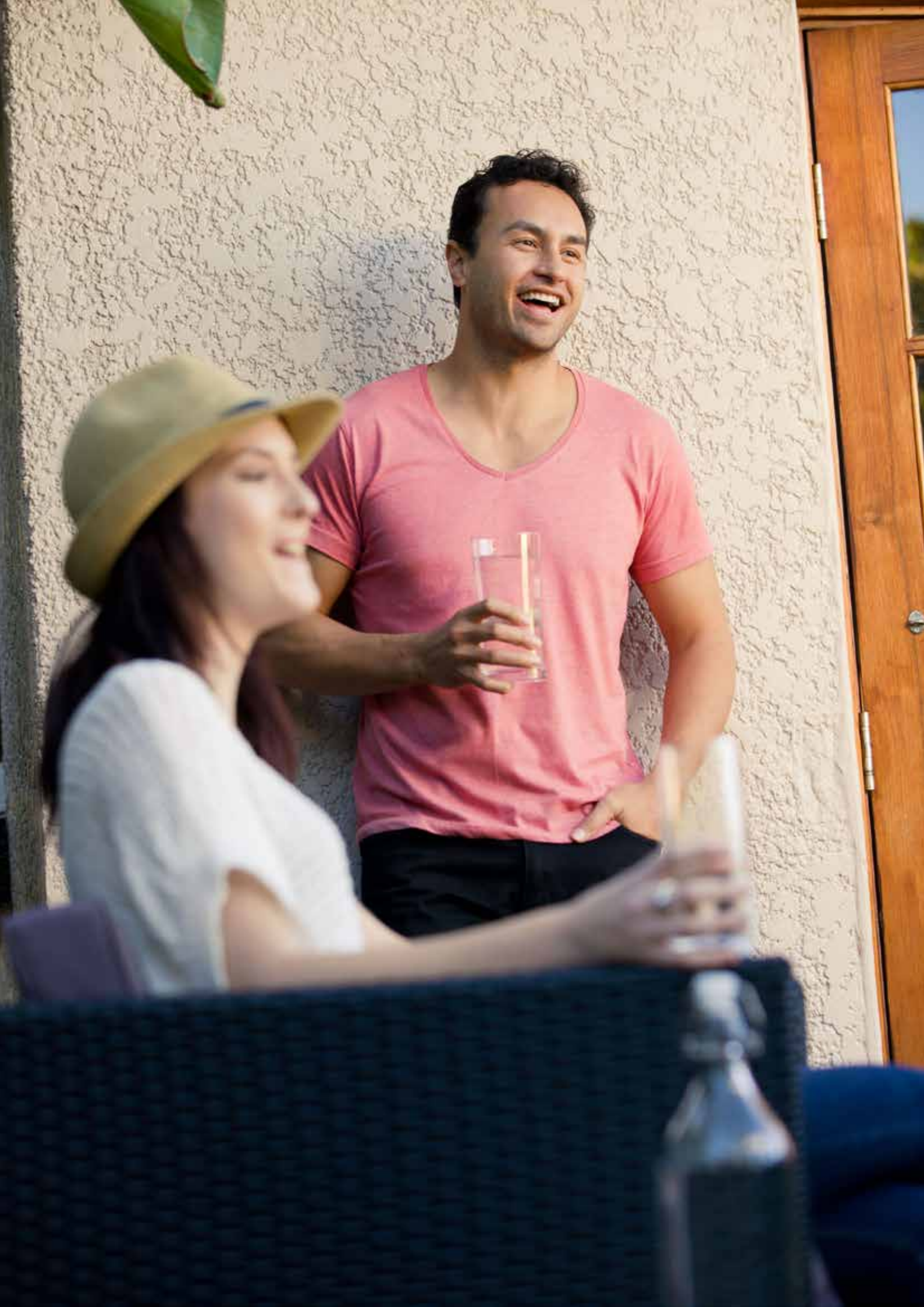
Queensland Urban Utilities recognises that its capacity to create new knowledge is essential to maintaining a modern and sustainable business.

Queensland Urban Utilities uses innovation as a catalyst to adapt to changes in our environment, enabling us to deliver water and sewerage services that meet our customers' evolving needs.

A program of investigative studies has now been established targeting focus areas in regard to water quality monitoring, dosing and enhanced product reliability.

The existing program consists of:

- Conducting systematic reviews of baseline monitoring data to identify emerging problems and trends and to assist in determining priorities for improving drinking water quality.
- Undertaking sampling and chemical analysis for new contaminants of concern.
- Undertaking modelling and full-scale studies to investigate ways to improve mixing of water storages and reservoirs.
- Investigating water quality issues to improve understanding of the loss of chlorine residual during disinfection using chloramination.
- Developing strategic partnerships, networks and collaborations with research providers such as Water Services Association Australia (WSAA), Water Environment Research Foundation (WERF) and American Water Works Association Research Foundation (AWWARF).



CHAPTER 7: MANAGING THE CUSTOMER'S WATER QUALITY EXPERIENCE

Queensland Urban Utilities receives various water quality enquiries throughout the year. When a Queensland Urban Utilities employee is required to meet with a customer to determine if remedial action is required, these enquiries are classified as 'water quality complaints'. These water quality complaints are captured, recorded and monitored to help identify any trends and possible areas of improvement in the operation, maintenance and management of the Queensland Urban Utilities network.

In 2015/16, Queensland Urban Utilities received 957 water quality complaints. This is a 32% reduction in the number of water quality complaints received in 2014/15. The number of water quality complaints recorded for 2015/16 is the lowest number recorded in a financial year since Queensland Urban Utilities formed in mid-2010.

The breakdown of water quality complaints by type and region, for 2015/16 is shown in Figure 5.

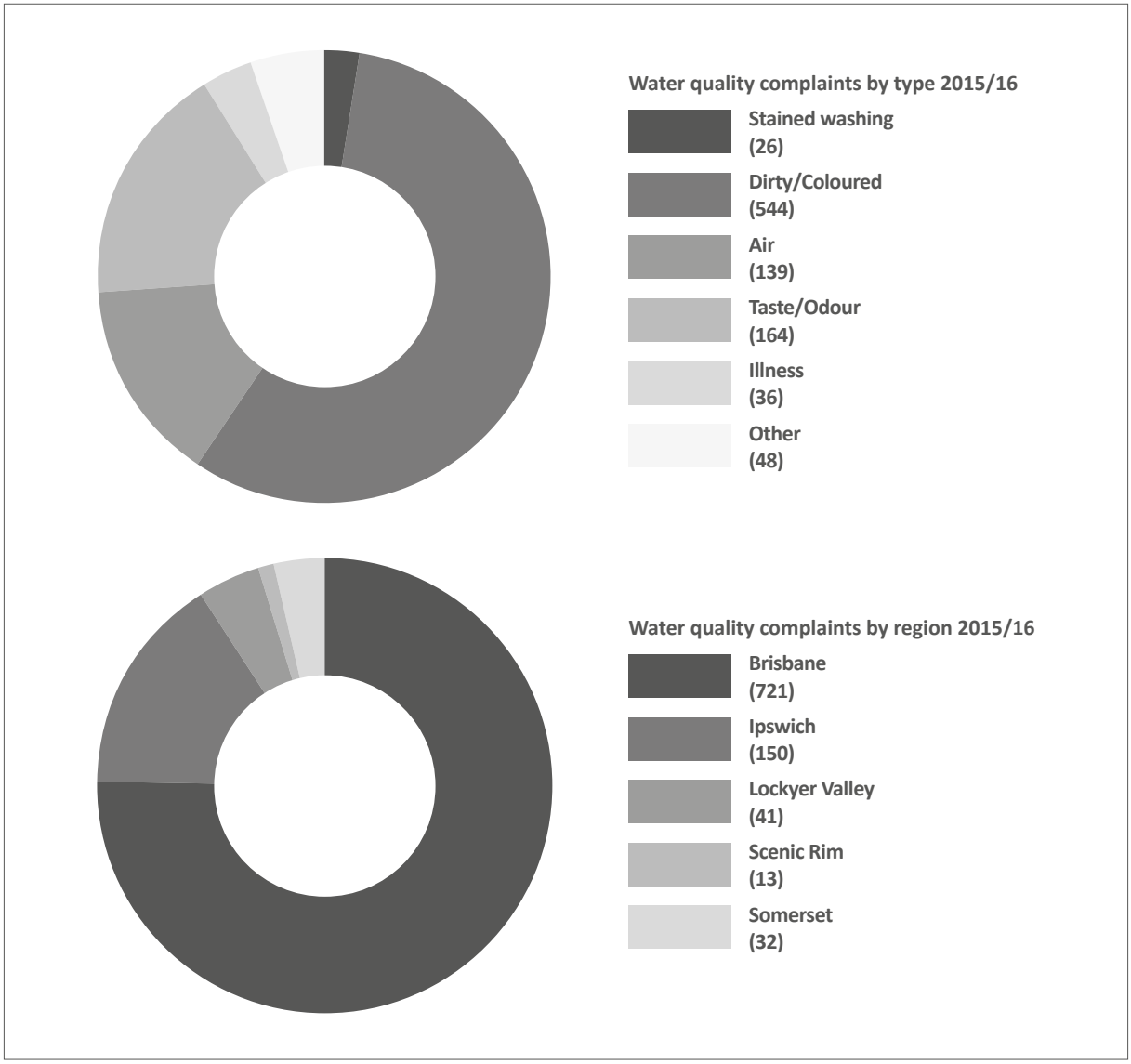


Figure 5: Water quality complaints by type and region – 2015/16.

Correction to previously reported data: As a result of business and management system improvements and associated audit activities, Queensland Urban Utilities has identified the need to correct the water quality complaints data reported in 2013/14 and 2014/15. Refer Appendix C and Appendix D for the corrected data.

APPENDICES

Appendix A: Water quality compliance – *E.coli*

Overall						
Scheme	Number of samples required	Actual number of samples	Number of samples *E.coli* detected	Required performance %	Actual performance %	*E.coli* Compliant
Beaudesert	64	358	0	98	99.8	☑
Boonah-Kalbar	52	371	0	98	99.6	☑
Brisbane-Ipswich	1728	7556	7*	98	99.9	☑
Canungra	52	104	0	98	99.5	☑
Esk-Toogoolawah	52	103	0	98	100	☑
Jimna	12	52	0	98	100	☑
Kilcoy	52	102	0	98	100	☑
Kooralbyn	52	195	1	98	99.6	☑
Linville	12	52	0	98	100	☑
Lowood	124	1464	3	98	99.6	☑
Rathdowney	12	52	0	98	100	☑
Somerset	12	52	0	98	98.5	☑

* Note: While there 11 samples in which *E.coli* was detected, two samples occurred during a single event. As a result, 10 notifications to the Regulator were required (see page 15).

Beaudesert *E.Coli*						
2015-2016 Month	Number of samples required	Actual number of samples	Number of samples *E.coli* detected	Required performance %	Actual performance %	*E.coli* Compliant
July	5	32	0	98	99.5	☑
August	5	28	0	98	99.5	☑
September	6	26	0	98	99.6	☑
October	5	35	0	98	99.6	☑
November	5	27	0	98	99.6	☑
December	6	35	0	98	99.6	☑
January	5	28	0	98	99.6	☑
February	5	35	0	98	100	☑
March	6	28	0	98	100	☑
April	5	28	0	98	100	☑
May	6	35	0	98	100	☑
June	5	21	0	98	100	☑

APPENDICES

Appendix A: Water quality compliance – *E.coli*

Boonah-Kalbar *E.Coli*						
2015-2016 Month	Number of samples required	Actual number of samples	Number of samples *E.coli* detected	Required performance %	Actual performance %	*E.coli* Compliant
July	4	31	0	98	99.1	☑
August	4	29	0	98	99.3	☑
September	5	29	0	98	99.4	☑
October	4	36	0	98	99.4	☑
November	4	29	0	98	99.5	☑
December	5	35	0	98	99.6	☑
January	4	28	0	98	99.6	☑
February	4	35	0	98	99.6	☑
March	5	21	0	98	99.7	☑
April	4	35	0	98	100	☑
May	5	28	0	98	100	☑
June	4	35	0	98	100	☑

Canungra *E.Coli*						
2015-2016 Month	Number of samples required	Actual number of samples	Number of samples *E.coli* detected	Required performance %	Actual performance %	*E.coli* Compliant
July	4	10	0	98	98.9	☑
August	4	8	0	98	98.9	☑
September	5	8	0	98	98.9	☑
October	4	10	0	98	98.9	☑
November	4	8	0	98	99.0	☑
December	5	10	0	98	99.0	☑
January	4	8	0	98	100	☑
February	4	10	0	98	100	☑
March	5	8	0	98	100	☑
April	4	8	0	98	100	☑
May	5	10	0	98	100	☑
June	4	6	0	98	100	☑

Esk-Toogoolawah *E.Coli*						
2015-2016 Month	**Number of samples required**	**Actual number of samples**	**Number of samples *E.coli* detected**	**Required performance %**	**Actual performance %**	***E.coli* Compliant**
July	4	10	0	98	100	☑
August	4	7	0	98	100	☑
September	5	6	0	98	100	☑
October	4	10	0	98	100	☑
November	4	8	0	98	100	☑
December	5	10	0	98	100	☑
January	4	8	0	98	100	☑
February	4	8	0	98	100	☑
March	5	10	0	98	100	☑
April	4	8	0	98	100	☑
May	5	8	0	98	100	☑
June	4	10	0	98	100	☑

Jimna *E.Coli*						
2015-2016 Month	**Number of samples required**	**Actual number of samples**	**Number of samples *E.coli* detected**	**Required performance %**	**Actual performance %**	***E.coli* Compliant**
July	1	5	0	98	100	☑
August	1	4	0	98	100	☑
September	1	3	0	98	100	☑
October	1	5	0	98	100	☑
November	1	4	0	98	100	☑
December	1	5	0	98	100	☑
January	1	4	0	98	100	☑
February	1	4	0	98	100	☑
March	1	5	0	98	100	☑
April	1	4	0	98	100	☑
May	1	4	0	98	100	☑
June	1	5	0	98	100	☑

APPENDICES

Appendix A: Water quality compliance – *E.coli*

Kilcoy *E.Coli*						
2015-2016 Month	Number of samples required	Actual number of samples	Number of samples *E.coli* detected	Required performance %	Actual performance %	*E.coli* Compliant
July	4	8	0	98	100	☑
August	4	8	0	98	100	☑
September	5	6	0	98	100	☑
October	4	10	0	98	100	☑
November	4	8	0	98	100	☑
December	5	10	0	98	100	☑
January	4	8	0	98	100	☑
February	4	8	0	98	100	☑
March	5	10	0	98	100	☑
April	4	8	0	98	100	☑
May	5	8	0	98	100	☑
June	4	10	0	98	100	☑

Kooralbyn *E.Coli*						
2015-2016 Month	Number of samples required	Actual number of samples	Number of samples *E.coli* detected	Required performance %	Actual performance %	*E.coli* Compliant
July	4	16	0	98	100	☑
August	4	14	0	98	100	☑
September	5	14	0	98	100	☑
October	4	18	0	98	100	☑
November	4	15	1	98	100	☑
December	5	20	0	98	99.2	☑
January	4	15	0	98	99.3	☑
February	4	19	0	98	99.3	☑
March	5	16	0	98	99.4	☑
April	4	16	0	98	99.4	☑
May	5	20	0	98	99.4	☑
June	4	12	0	98	99.5	☑

Linville *E.Coli*						
2015-2016 Month	Number of samples required	Actual number of samples	Number of samples *E.coli* detected	Required performance %	Actual performance %	*E.coli* Compliant
July	1	5	0	98	100	☑
August	1	4	0	98	100	☑
September	1	3	0	98	100	☑
October	1	5	0	98	100	☑
November	1	4	0	98	100	☑
December	1	5	0	98	100	☑
January	1	4	0	98	100	☑
February	1	4	0	98	100	☑
March	1	5	0	98	100	☑
April	1	4	0	98	100	☑
May	1	4	0	98	100	☑
June	1	5	0	98	100	☑

Lowood *E.Coli*						
2015-2016 Month	Number of samples required	Actual number of samples	Number of samples *E.coli* detected	Required performance %	Actual performance %	*E.coli* Compliant
July	10	120	0	98	99.5	☑
August	10	107	0	98	99.5	☑
September	11	104	0	98	99.5	☑
October	10	119	2	98	99.3	☑
November	10	139	0	98	99.4	☑
December	11	122	0	98	99.5	☑
January	10	116	0	98	99.6	☑
February	10	124	0	98	99.7	☑
March	11	137	0	98	99.8	☑
April	10	116	1	98	99.8	☑
May	11	129	0	98	99.8	☑
June	10	131	0	98	99.8	☑

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Appendix A: Water quality compliance – *E.coli*

Rathdowney *E.Coli*						
2015-2016 Month	Number of samples required	Actual number of samples	Number of samples *E.coli* detected	Required performance %	Actual performance %	*E.coli* Compliant
July	1	5	0	98	100	☑
August	1	4	0	98	100	☑
September	1	4	0	98	100	☑
October	1	5	0	98	100	☑
November	1	4	0	98	100	☑
December	1	5	0	98	100	☑
January	1	4	0	98	100	☑
February	1	5	0	98	100	☑
March	1	4	0	98	100	☑
April	1	4	0	98	100	☑
May	1	5	0	98	100	☑
June	1	3	0	98	100	☑

South East Queensland Water Supply (Brisbane and Ipswich) *E.Coli*						
2015-2016 Month	Number of samples required	Actual number of samples	Number of samples *E.coli* detected	Required performance %	Actual performance %	*E.coli* Compliant
July	142	675	0	98	99.8	☑
August	142	612	0	98	99.8	☑
September	148	625	0	98	99.9	☑
October	142	596	0	98	99.9	☑
November	142	588	0	98	99.9	☑
December	148	705	0	98	99.9	☑
January	142	581	0	98	99.9	☑
February	142	621	0	98	99.9	☑
March	148	651	4	98	99.9	☑
April	142	627	3	98	99.8	☑
May	148	652	0	98	99.9	☑
June	142	623	0	98	99.9	☑

Somerset *E.Coli*						
2015-2016 Month	Number of samples required	Actual number of samples	Number of samples *E.coli* detected	Required performance %	Actual performance %	*E.coli* Compliant
July	1	5	0	98	98.0	☑
August	1	4	0	98	98.1	☑
September	1	3	0	98	98.1	☑
October	1	5	0	98	98.0	☑
November	1	4	0	98	98.0	☑
December	1	5	0	98	98.0	☑
January	1	4	0	98	98.0	☑
February	1	4	0	98	98.0	☑
March	1	5	0	98	98.0	☑
April	1	4	0	98	100	☑
May	1	4	0	98	100	☑
June	1	5	0	98	100	☑

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Appendix B: Water quality compliance – health assessment

Beaudesert Health Assessment							
Parameter	**Units**	**ADWG Health Guideline**	**Number of tests**	**Exceedance count**	**Maximum result**	**95th %-ile**	**Meets ADWG**
Arsenic	mg/L	0.01	12	0	<0.001	<0.001	☑
Barium	mg/L	2	12	0	0.055	0.051	☑
Cadmium	mg/L	0.002	12	0	<0.001	<0.001	☑
Chlorine (Free)	mg/L	5	358	0	2.7	1.7	☑
Chlorine (Total)	mg/L	5	358	0	3.0	1.8	☑
Chromium	mg/L	0.05	12	0	<0.001	<0.001	☑
Copper	mg/L	2	12	0	0.005	0.005	☑
Fluoride	mg/L	1.5	16	0	1.0	0.93	☑
Lead	mg/L	0.01	12	0	0.001	0.001	☑
Manganese	mg/L	0.5	106	0	0.001	<0.001	☑
Nickel	mg/L	0.02	12	0	<0.001	<0.001	☑
Trihalomethanes (Total)	ug/L	250	60	0	250	230	☑

Boonah-Kalbar Health Assessment							
Parameter	**Units**	**ADWG Health Guideline**	**Number of tests**	**Exceedance count**	**Maximum result**	**95th %-ile**	**Meets ADWG**
Arsenic	mg/L	0.01	13	0	<0.001	<0.001	☑
Barium	mg/L	2	13	0	0.030	0.027	☑
Cadmium	mg/L	0.002	13	0	<0.001	<0.001	☑
Chlorine (Free)	mg/L	5	371	0	2.1	1.4	☑
Chlorine (Total)	mg/L	5	371	0	2.5	1.7	☑
Chromium	mg/L	0.05	13	0	<0.001	<0.001	☑
Copper	mg/L	2	13	0	0.004	0.003	☑
Fluoride	mg/L	1.5	15	0	1.1	1.0	☑
Lead	mg/L	0.01	13	0	<0.001	<0.001	☑
Manganese	mg/L	0.5	210	0	0.005	0.001	☑
Nickel	mg/L	0.02	13	0	<0.001	<0.001	☑
Trihalomethanes (Total)	ug/L	250	31	0	190	180	☑

Canungra Health Assessment							
Parameter	**Units**	**ADWG Health Guideline**	**Number of tests**	**Exceedance count**	**Maximum result**	**95th %-ile**	**Meets ADWG**
Arsenic	mg/L	0.01	12	0	<0.001	<0.001	☑
Barium	mg/L	2	12	0	0.011	0.010	☑
Cadmium	mg/L	0.002	12	0	<0.001	<0.001	☑
Chlorine (Free)	mg/L	5	104	0	2.5	2.0	☑
Chlorine (Total)	mg/L	5	104	0	2.8	2.1	☑
Chromium	mg/L	0.05	12	0	<0.001	<0.001	☑
Copper	mg/L	2	12	0	0.004	0.004	☑
Fluoride	mg/L	1.5	14	0	0.99	0.95	☑
Lead	mg/L	0.01	12	0	<0.001	<0.001	☑
Manganese	mg/L	0.5	53	0	0.008	0.004	☑
Nickel	mg/L	0.02	12	0	<0.001	<0.001	☑
Trihalomethanes (Total)	ug/L	250	12	0	89	86	☑

Esk-Toogoolawah Health Assessment							
Parameter	**Units**	**ADWG Health Guideline**	**Number of tests**	**Exceedance count**	**Maximum result**	**95th %-ile**	**Meets ADWG**
Arsenic	mg/L	0.01	13	0	<0.001	<0.001	☑
Barium	mg/L	2	13	0	0.029	0.028	☑
Cadmium	mg/L	0.002	13	0	<0.001	<0.001	☑
Chlorine (Free)	mg/L	5	105	0	1.9	1.6	☑
Chlorine (Total)	mg/L	5	105	0	2.0	1.8	☑
Chromium	mg/L	0.05	13	0	<0.001	<0.001	☑
Copper	mg/L	2	13	0	0.003	0.003	☑
Fluoride	mg/L	1.5	13	0	0.99	0.99	☑
Lead	mg/L	0.01	13	0	<0.001	<0.001	☑
Manganese	mg/L	0.5	103	0	0.018	0.004	☑
Nickel	mg/L	0.02	13	0	<0.001	<0.001	☑
Trihalomethanes (Total)	ug/L	250	13	0	140	130	☑

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Appendix B: Water quality compliance – health assessment

Jimna Health Assessment							
Parameter	**Units**	**ADWG Health Guideline**	**Number of tests**	**Exceedance count**	**Maximum result**	**95th %-ile**	**Meets ADWG**
Arsenic	mg/L	0.01	13	0	<0.001	<0.001	☑
Barium	mg/L	2	13	0	0.016	0.016	☑
Cadmium	mg/L	0.002	13	0	<0.001	<0.001	☑
Chlorine (Free)	mg/L	5	53	0	2.4	2.0	☑
Chlorine (Total)	mg/L	5	53	0	2.5	2.1	☑
Chromium	mg/L	0.05	13	0	<0.001	<0.001	☑
Copper	mg/L	2	13	0	0.007	0.006	☑
Fluoride	mg/L	1.5	13	0	0.19	0.18	☑
Lead	mg/L	0.01	13	0	0.001	<0.001	☑
Manganese	mg/L	0.5	52	0	0.032	0.023	☑
Nickel	mg/L	0.02	13	0	<0.001	<0.001	☑
Trihalomethanes (Total)	ug/L	250	13	0	140	130	☑

Kilcoy Health Assessment							
Parameter	**Units**	**ADWG Health Guideline**	**Number of tests**	**Exceedance count**	**Maximum result**	**95th %-ile**	**Meets ADWG**
Arsenic	mg/L	0.01	13	0	<0.001	<0.001	☑
Barium	mg/L	2	13	0	0.018	0.017	☑
Cadmium	mg/L	0.002	13	0	<0.001	<0.001	☑
Chlorine (Free)	mg/L	5	104	0	2.0	1.4	☑
Chlorine (Total)	mg/L	5	104	0	2.3	1.6	☑
Chromium	mg/L	0.05	13	0	<0.001	<0.001	☑
Copper	mg/L	2	13	0	0.007	0.007	☑
Fluoride	mg/L	1.5	13	0	1.1	1.0	☑
Lead	mg/L	0.01	13	0	0.002	0.001	☑
Manganese	mg/L	0.5	58	0	0.41	0.009	☑
Nickel	mg/L	0.02	13	0	<0.001	<0.001	☑
Trihalomethanes (Total)	ug/L	250	13	0	120	110	☑

Kooralbyn Health Assessment							
Parameter	**Units**	**ADWG Health Guideline**	**Number of tests**	**Exceedance count**	**Maximum result**	**95th %-ile**	**Meets ADWG**
Arsenic	mg/L	0.01	12	0	<0.001	<0.001	☑
Barium	mg/L	2	12	0	0.037	0.036	☑
Cadmium	mg/L	0.002	12	0	<0.001	<0.001	☑
Chlorine (Free)	mg/L	5	195	0	1.9	1.5	☑
Chlorine (Total)	mg/L	5	195	0	2.0	1.7	☑
Chromium	mg/L	0.05	12	0	<0.001	<0.001	☑
Copper	mg/L	2	12	0	0.002	0.002	☑
Fluoride	mg/L	1.5	14	0	1.0	0.93	☑
Lead	mg/L	0.01	12	0	<0.001	<0.001	☑
Manganese	mg/L	0.5	49	0	<0.001	<0.001	☑
Nickel	mg/L	0.02	12	0	<0.001	<0.001	☑
Trihalomethanes (Total)	ug/L	250	57	0	180	160	☑

Linville Health Assessment							
Parameter	**Units**	**ADWG Health Guideline**	**Number of tests**	**Exceedance count**	**Maximum result**	**95th %-ile**	**Meets ADWG**
Arsenic	mg/L	0.01	13	0	<0.001	<0.001	☑
Barium	mg/L	2	13	0	0.018	0.017	☑
Cadmium	mg/L	0.002	13	0	<0.001	<0.001	☑
Chlorine (Free)	mg/L	5	51	0	2.6	2.0	☑
Chlorine (Total)	mg/L	5	51	0	2.6	2.1	☑
Chromium	mg/L	0.05	13	0	<0.001	<0.001	☑
Copper	mg/L	2	13	0	0.005	0.005	☑
Fluoride	mg/L	1.5	13	0	1.0	1.0	☑
Lead	mg/L	0.01	13	0	<0.001	<0.001	☑
Manganese	mg/L	0.5	51	0	0.003	0.002	☑
Nickel	mg/L	0.02	13	0	<0.001	<0.001	☑
Trihalomethanes (Total)	ug/L	250	13	0	160	130	☑

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Appendix B: Water quality compliance – health assessment

Lowood Health Assessment							
Parameter	**Units**	**ADWG Health Guideline**	**Number of tests**	**Exceedance count**	**Maximum result**	**95th %-ile**	**Meets ADWG**
Arsenic	mg/L	0.01	104	0	<0.001	<0.001	☑
Barium	mg/L	2	104	0	0.031	0.029	☑
Cadmium	mg/L	0.002	104	0	<0.001	<0.001	☑
Chlorine (Free)	mg/L	5	1472	3	>6*	1.8	☑
Chlorine (Total)	mg/L	5	1472	3	>6*	2	☑
Chromium	mg/L	0.05	104	0	<0.001	<0.001	☑
Copper	mg/L	2	104	0	0.019	0.014	☑
Fluoride	mg/L	1.5	115	0	1.1	1.0	☑
Lead	mg/L	0.01	104	0	0.005	0.003	☑
Manganese	mg/L	0.5	588	0	0.084	0.005	☑
Nickel	mg/L	0.02	104	0	<0.001	<0.001	☑
Trihalomethanes (Total)	ug/L	250	140	0	240	200	☑
* chlorination process deviation							

Rathdowney Health Assessment							
Parameter	**Units**	**ADWG Health Guideline**	**Number of tests**	**Exceedance count**	**Maximum result**	**95th %-ile**	**Meets ADWG**
Arsenic	mg/L	0.01	12	0	<0.001	<0.001	☑
Barium	mg/L	2	12	0	0.073	0.070	☑
Cadmium	mg/L	0.002	12	0	<0.001	<0.001	☑
Chlorine (Free)	mg/L	5	52	0	1.5	1.3	☑
Chlorine (Total)	mg/L	5	52	0	1.8	1.5	☑
Chromium	mg/L	0.05	12	0	<0.001	<0.001	☑
Copper	mg/L	2	12	0	0.005	0.005	☑
Fluoride	mg/L	1.5	13	0	0.55	0.41	☑
Lead	mg/L	0.01	12	0	0.002	0.001	☑
Manganese	mg/L	0.5	52	0	0.027	0.016	☑
Nickel	mg/L	0.02	12	0	<0.001	<0.001	☑
Trihalomethanes (Total)	ug/L	250	18	0	180	180	☑

South East Queensland Water Supply (Brisbane and Ipswich) Health Assessment							
Parameter	**Units**	**ADWG Health Guideline**	**Number of tests**	**Exceedance count**	**Maximum result**	**95th %-ile**	**Meets ADWG**
Arsenic	mg/L	0.01	152	0	<0.001	<0.001	☑
Barium	mg/L	2	154	0	0.031	0.025	☑
Cadmium	mg/L	0.002	154	0	<0.001	<0.001	☑
Chlorine (Free)	mg/L	5	4799	0	2.2	<0.1	☑
Chlorine (Total)	mg/L	5	7572	0	3.1	2.1	☑
Chromium	mg/L	0.05	154	0	<0.001	<0.001	☑
Copper	mg/L	2	154	0	0.093	0.026	☑
Dichloroacetic Acid	ug/L	100	216	0	17	11	☑
Fluoride	mg/L	1.5	165	0	1.0	0.97	☑
Lead	mg/L	0.01	154	0	0.002	<0.001	☑
Manganese	mg/L	0.5	2442	0	0.22	0.006	☑
Monochloroacetic Acid	ug/L	150	216	0	<10	<10	☑
Nickel	mg/L	0.02	154	0	<0.001	<0.001	☑
Nitrate	mg/L	50	2445	0	7.5	2.9	☑
Nitrite	mg/L	3	2445	0	1.3	0.76	☑
Trichloroacetic Acid	ug/L	100	216	0	16	12	☑
Trihalomethanes (Total)	ug/L	250	323	0	150	110	☑

Somerset Health Assessment							
Parameter	**Units**	**ADWG Health Guideline**	**Number of tests**	**Exceedance count**	**Maximum result**	**95th %-ile**	**Meets ADWG**
Arsenic	mg/L	0.01	13	0	<0.001	<0.001	☑
Barium	mg/L	2	13	0	0.02	0.02	☑
Cadmium	mg/L	0.002	13	0	<0.001	<0.001	☑
Chlorine (Free)	mg/L	5	53	0	2.8	2.0	☑
Chlorine (Total)	mg/L	5	53	0	2.9	2.2	☑
Chromium	mg/L	0.05	13	0	<0.001	<0.001	☑
Copper	mg/L	2	13	0	0.004	0.004	☑
Fluoride (as F)	mg/L	1.5	13	0	0.14	0.13	☑
Lead	mg/L	0.01	13	0	0.001	0.001	☑
Manganese	mg/L	0.5	52	0	0.33	0.023	☑
Nickel	mg/L	0.02	13	0	<0.001	<0.001	☑
Trihalomethanes (Total)	ug/L	250	19	0	140	130	☑

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Appendix C: Water quality – aesthetic assessment

Parameter	Units	ADWG Aesthetic Guideline Value	Beaudesert	Boonah-Kalbar	Canungra	Esk-Toogoolawah	Jimna	Kilcoy	Kooralbyn	Linville	Lowood	Rathdowney	SEQ Water Supply (Brisbane and Ipswich)	Somerset Township
2-Methyl isoborneol	ng/L	-	<2	<2	<2	<2	<2	2.3	<2	2.3	3.2	<2	2.5	4.9
Aluminium	mg/L	0.2	0.010	0.027	0.019	0.060	0.030	0.034	0.013	0.021	0.026	0.013	0.043	0.028
Ammonia (Total, as N)	mg/L	0.5	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	0.14	NT
Chloride	mg/L	250	95	52	23	55	35	32	80	32	55	110	54	32
Colour (True)	PCU	15	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.83	<0.5
Conductivity	uS/cm	1000	590	400	230	400	410	300	510	300	400	600	410	250
Geosmin	ng/L	-	<2	3.2	<2	<2	<2	<2	<2	<2	2.3	<2	<2	2.6
Iron	mg/L	0.3	0.004	0.010	0.010	0.011	0.005	0.058	0.005	0.009	0.021	0.018	0.018	0.065
Langelier Index	-	-	0.2	-0.55	-0.47	-0.36	-1.0	-0.75	0.42	-0.75	-0.32	0.14	-0.37	-0.85
pH	pH Unit	6.5 - 8.5	8.0	7.4	7.9	7.5	7.4	7.6	8.3	7.7	7.6	8.0	7.8	7.7
Silica	mg/L	80	24	11	24	6.2	10	4.6	25	4.5	7.8	18	7.0	4.1
Sodium	mg/L	180	54	43	16	35	61	29	43	29	31	64	32	24
Sulphate (as SO4)	mg/L	250	8.6	41	1.0	24	70	34	5.5	33	25	9.4	25	24
Temperature	deg C	-	24	24	24	24	21	23	24	23	24	24	24	24
Total Dissolved Solids	mg/L	600	380	260	150	260	270	190	330	190	250	390	270	160
Total Hardness	mg/L	200	170	97	70	110	53	67	150	67	110	150	96	54
Turbidity	NTU	5	<0.1	0.1	0.1	0.2	0.2	0.5	0.1	0.2	0.2	0.2	0.2	0.4
Zinc	mg/L	3	0.004	0.002	0.003	0.003	0.008	0.006	0.002	0.004	0.005	0.008	0.003	0.007
Meets ADWG Guideline			☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑

Appendix D: Managing water quality – correction to 2013/14 data

We record and monitor all water quality related complaints to identify any trends and areas for improvement. In 2013/14, Queensland Urban Utilities received 1,114 water quality related complaints. Figure 6 shows the breakdown of these complaints by type and location, respectively.

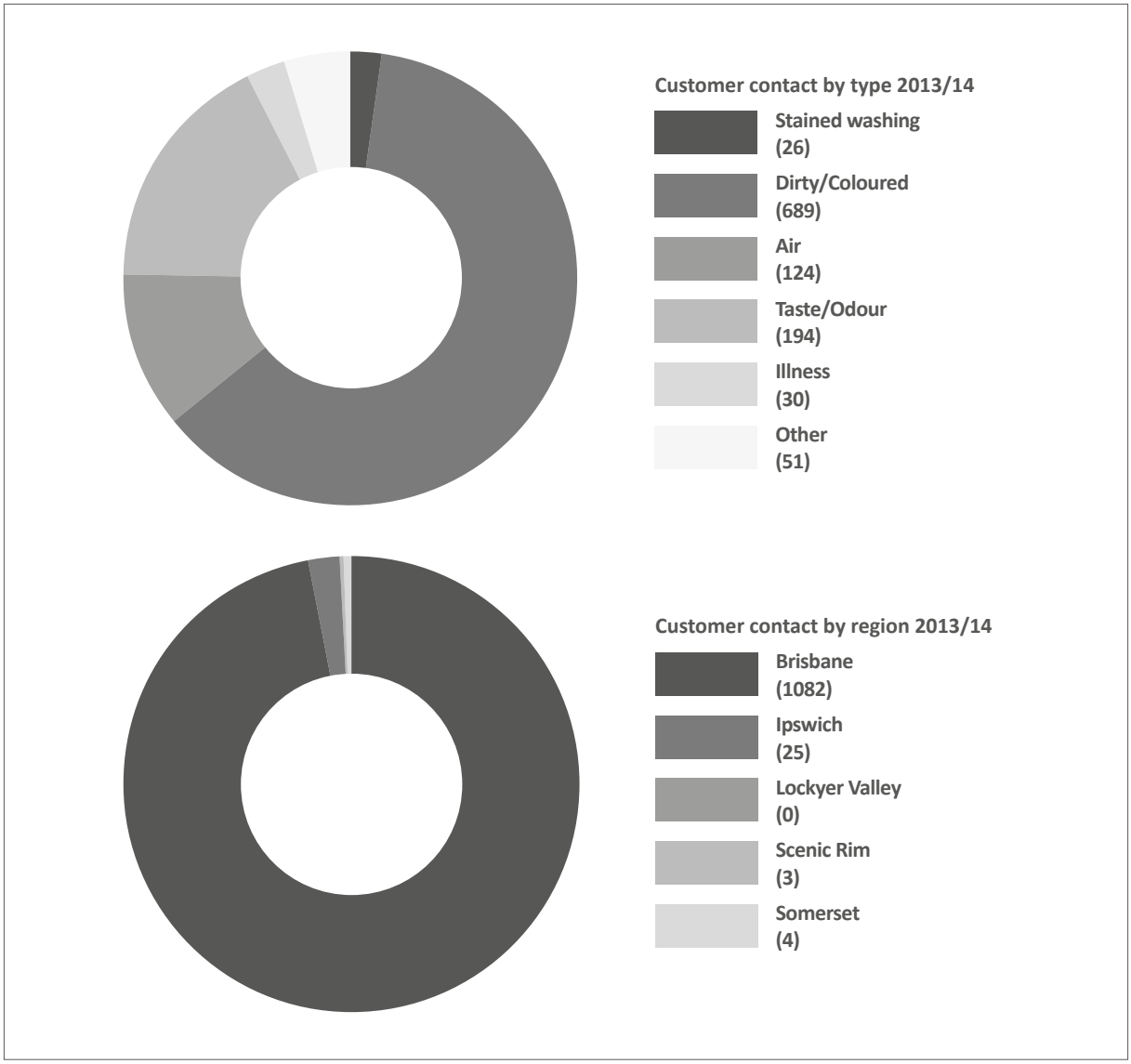

Figure 6: Water quality complaints by type and region – 2013/14.

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Appendix E: Managing water quality – correction to 2014/15 data

We record and monitor all water quality related complaints to identify any trends and areas for improvement. In 2014/15, Queensland Urban Utilities received 1,414 water quality related complaints. Figure 7 shows the breakdown of these complaints by type and location, respectively.

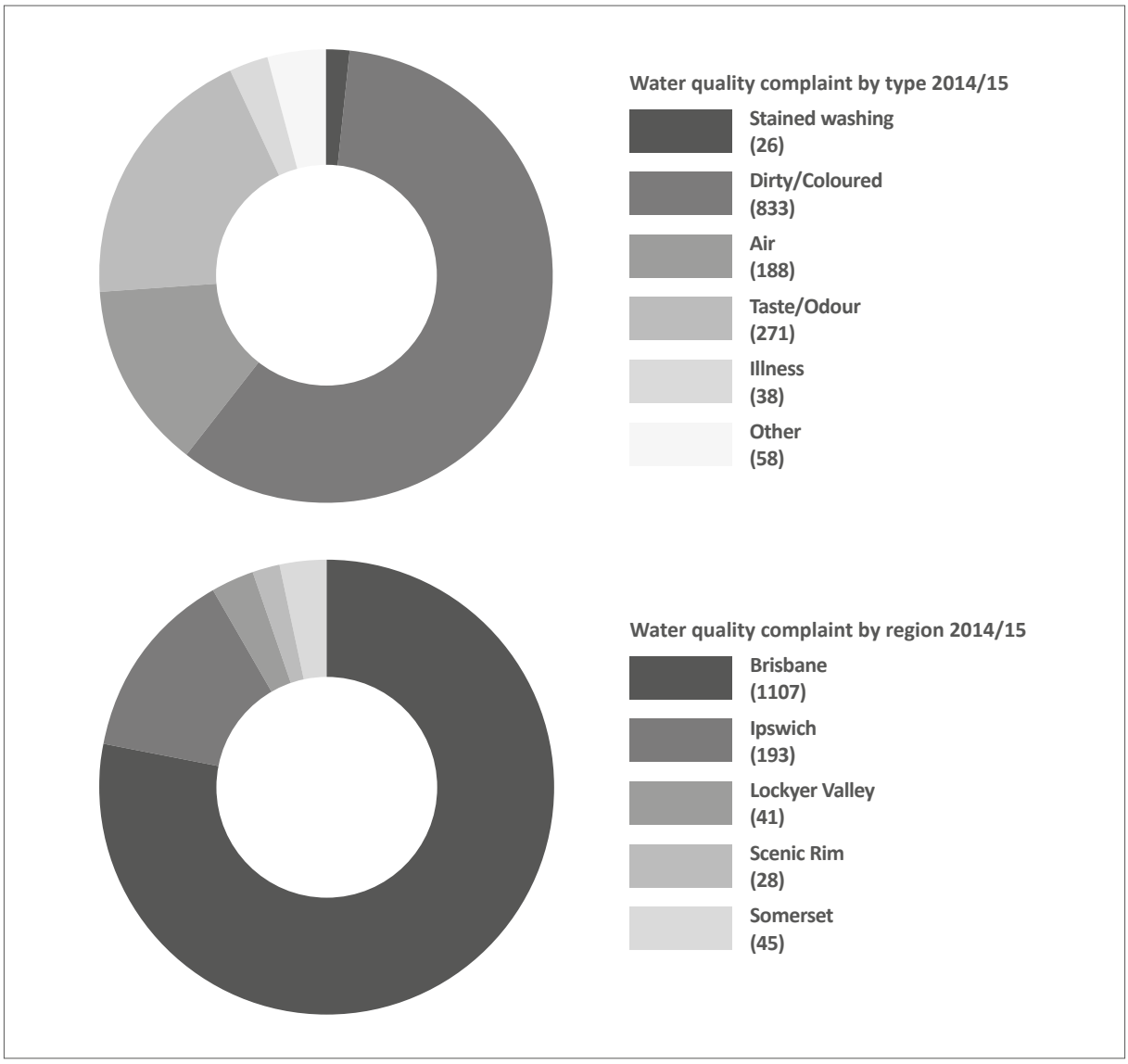

Figure 7: Water quality complaints by type and region – 2014/15.

GLOSSARY

<	Less than.
>	Greater than.
ADWG	*Australian Drinking Water Guidelines 2011* published by the National Health and Medical Research Council of Australia.
Bulk Water	The treated water supplied from the Queensland Bulk Water Authority (Seqwater) to distributor retailers, including Queensland Urban Utilities.
CFU/100mL	Colony Forming Units per 100 millilitres.
DEWS	Department of Energy and Water Supply (Queensland Government).
Disinfectant	An agent that destroys or inhibits the activity of microorganisms which cause disease. Queensland Urban Utilities uses either chlorine or chloramine.
DWQMP	*Drinking Water Quality Management Plan* as required by the *Water Supply (Safety & Reliability) Act 2008*.
E. coli	*Escherichia coli*, a bacterium whose presence in water indicates that the water may be contaminated by faecal matter and therefore there is the potential to cause illness when people drink the water.
km	Kilometre, which is 1,000 metres.
Megalitre (ML)	One million litres.
mg/L	milligrams per litre.
MPN/100mL	Most Probable Number per 100 millilitres.
Network	An arrangement or system of pipes, pumps and reservoirs used for distributing water.
NTU	Nephelometric Turbidity Unit- a measure of turbidity which is the cloudiness or haziness of water caused by particles that are generally invisible to the naked eye. The measurement of turbidity is a key test of water quality.
Reservoir	A water tower or tank used for the storage of treated water within the water distribution system.
SAS Lab	Scientific Analytical Services Laboratory, Queensland Urban Utilities.
Scheme	The system distributing drinking water to customers.
Seqwater	Queensland Bulk Water Supply Authority, trading as Seqwater. The bulk drinking water provider for Queensland Urban Utilities.
Shareholders	Brisbane and Ipswich City Councils, and the Lockyer Valley, Scenic Rim and Somerset Regional Councils.
Stakeholder	All those who are either affected by or who can affect the activities of an organisation, namely customers, governments, regulators, the media, non-government organisations, local residents and employees.
The Regulator	The Department of Energy and Water Supply (DEWS).
TTHMs	Total Trihalomethanes – a group of disinfection by-products that generally form when chlorine is used to disinfect drinking water.
WTP	Water Treatment Plant.

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