

**Townsville City Council**

**Townsville Water**

**Drinking Water Quality Management Plan  
Annual Report**

2014/2015

SPID 506  
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# 1 Executive Summary

Townsville City Council's Drinking Water Quality Management plan was approved in August 2012. Included in the approval notice was a requirement to submit an annual water quality report to outline the performance of Townsville Water against their DWQMP as required under the *Water Supply (Safety and Reliability) Act 2008*.

Townsville Water has met all requirements under its Drinking Water Quality Management Plan, the Australian Drinking Water Guidelines 2011 and *Public Health Regulation 2005* for the 2014/2015 financial year.

Overall compliance for *E.coli* for each scheme was

| Drinking Water Scheme | No. of samples | % of compliance |
|-----------------------|----------------|-----------------|
| Townsville            | 2786           | 99.9%           |
| Paluma                | 79             | 100%            |
| Cungulla              | 106            | 98.1%           |

Table 1. Percentage compliance for *E. Coli* for Townsville Water's three drinking water schemes.

**\* It must be noted that there was only one incident resulting in non-compliant *E.coli* samples for Cungulla for the 14/15 financial period**

A boil water notice was put in effect for Paluma Water Supply in June 2015. On 10<sup>th</sup> June 2015 *Giardia* was detected in the raw water supply at Paluma Weir. As chlorination is the only treatment at Paluma, Townsville Water placed the Township on a boil water notice. After a sanitary survey and four clear resamples the boil water notice was lifted on the 10<sup>th</sup> July. Townsville Water continues to monitor for *Giardia*.

Seven notifications of non-compliance were submitted to the Regulator. Three of which were *Escherichia coli*, one for Trihalomethanes, two for chlorates and one for *Giardia*. There is no health guideline limit for chlorates under the Australian Drinking Water Quality Guidelines; instead Townsville Water set a self-reporting limit of 0.7mg/L

There were 95 water quality complaints, 8 of which were owner's side issues.

Townsville Water notified DERM of one research project currently being undertaken; *Potable Water Chlorate Investigation*.

There have been no amendments made to the DWQMP for the 2014/2015 financial year.

Townsville Water was awarded 1<sup>st</sup> and 2<sup>nd</sup> place in the North Queensland Regional Final of the 2015 Ixom Best of the Best Queensland Water Taste Test on 23<sup>rd</sup> June 2015.

## 2 Overview

Townsville City Council's DWQMP was submitted to the Office of the Water Supply Regulator on 21<sup>st</sup> June 2011. It was approved with conditions on 29 August 2012. The plan underwent a review from April – June 2014 and was submitted for approval to the Office of the Water Supply Regulator with Townsville City Council's Drinking Water Quality Management Plan Annual Report on December 2014.

Townsville Water services a population of 192,038 with 70,973 water meter connections, in three drinking water schemes; Townsville Drinking Water Scheme, Paluma Drinking Water Scheme and Giru/ Cungulla Drinking Water Scheme. 63,516 ML of water was produced in the financial year. Townsville Water maintains 2 dams, 23 water pumping stations, 41 reservoirs (water storage facilities) and 2,554 km of water distribution mains.



### 3 Actions taken to implement the DWQMP

A review of the DWQMP was undertaken mid-2014. No new amendments were made to the plan for this financial year.

There were no hazards or hazardous events that affected water quality during the financial year.

Townsville Water has a widespread yet targeted operational and verification monitoring program that is managed by the Water Treatment Engineer and the Water Quality Officer. Their role is to monitor, regulate and improve water quality for Townsville. They deal with all water quality non-compliances, water quality complaints/ queries from consumers, and monitor all Critical Control Points, the water sampling plan and the subsequent data it generates. They are part of a broader Water Quality Team which includes the Manager Water Operations, Water Operations Engineer, Commercial Compliance Officer, Bulk Water Maintenance Officer and the Water Operators.

Hunter H2O was engaged to undertake investigation and prepare a scoping (conceptual) design and technical specification in relation to Townsville Water's procurement process for the Paluma Township Water Treatment Plant.

No water infrastructure upgrades occurred at any of the Water Treatment Plants. One new reservoir was brought online, Roseneath Reservoir (0.03 ML) to meet increasing water demand and supply.



## 4 Research Activities

### 4.1 Potable Water Chlorate Investigation

Townsville Water completed a project to assess the levels of Chlorates in the Townsville system 2013/2014. Operational amendments were made throughout Townsville's Drinking Water Schemes and reductions in chlorate formation were achieved. As a result of this project Townsville Water set a reportable value for chlorates. Ongoing breaches of this value (as outlined in section 5) and subsequent investigations suggested that further review of chlorates throughout the system was required.

A project as acknowledged by DERM on 25<sup>th</sup> March 2015 is currently underway in which Townsville Water proposes to:

- » Identify any further contributing factors to the current chlorate levels not ascertained by the previous project.
- » Identify further opportunities to reduce chlorate levels.
- » Using this information re-assess the reportable value determined by the previous chlorate project.

A completion date of 29<sup>th</sup> Feb 2016 (depending upon data quality) has been set.

### 4.2 Biofilm Investigation Project

This project is ongoing. High HPC and total coliform counts show biofilm occurs in the section of pipe that was being studied (non-potable water). As the decay of chlorine along the distribution main downstream of the chlorinator is contributing to bacterial regrowth, Townsville Water will re-chlorinate the pipe at the reservoir and use the current re-chlorination point (Mt Jack Chlorinator) as a trim doing system. The scope of the project has been updated to include installing a solar powered chlorinator at the inlet of Brookhill Reservoir.

### 4.3 Northern Organics Risk Assessment

High levels of geosmin in late 2012 & 2013 and the corresponding customer complaints resulted in a project being undertaken to locate the source of geosmin and identify any suitable techniques for inhibiting taste and odour compound contamination in NWTP. To date the source of Geosmin has not been determined due to being hindered by the relative decline of geosmin in January 2014. This project has been put on hold until the geosmin reoccurs; with Townsville Water continuing a scaled back monitoring program.

## 5 Information supplied to the Regulator regarding non-compliances and/ or prescribed incidents.

There have been seven non-compliances with water quality criteria for drinking water for the 14/15 financial year. The following describes the non-compliance and how it was addressed

### DWI-7-506-00031 **Cungulla Drinking Water Scheme**

Incident Description: Detection of *E.coli* at Cungulla on 30<sup>th</sup> December 2014 at both the reservoir sample and the house sample (4 org/100ml).

Corrective and Preventative actions: The Cungulla reticulation system was flushed. Sodium Hypochlorite stock was replenished. Subsequent resampling at these sites yielded negative results for *E.coli*.

### DWI-7-506-00032 **Paluma Drinking Water Scheme**

Incident description: Detection of chlorates Paluma Reservoir (0.797 mg/L) and Paluma house sample (0.753mg/L) on 20<sup>th</sup> December 2014 (results received from the Lab on 2<sup>nd</sup> January 2015). It is worth noting that there is no health (or aesthetic) guideline value for chlorates in the ADWQ guidelines. Instead Townsville water has a self-imposed target value of <0.7mg/L.

Corrective and Preventative Actions: Optimisation of the chlorination system by moving the existing chlorinator to the inlet of the reservoir. This results in reduced residence time for disinfection by-product formation while still providing adequate contact time for chlorine in the reservoir itself. The sodium hypochlorite is now kept in a fridge as our research study has shown temperature has an effect on chlorate formation. Subsequent re-sampling has shown a reduction in chlorate formation.

### DWI-7-506-00033 **Paluma Drinking Water Scheme**

Incident description: Detection of Trihalomethanes (THMs) (286 µg/L) in Paluma House sample on 7<sup>th</sup> January 2015. Recent high rainfall stirred up water in Paluma Weir, resulting in a higher organic load which resulted in an increased chlorine demand to maintain adequate disinfection.

Corrective and Preventative Actions: The Paluma reticulation system was flushed. As above moving the existing chlorinator to the inlet of the reservoir will result in reduced residence time for THM formation while still providing adequate contact time for chlorine in the reservoir itself. All subsequent sampling has shown THMs back within guideline limits.



### DWI-7-506-00034 Cungulla Drinking Water Scheme

Incident description: Detection of chlorates (0.708 mg/L) on 6<sup>th</sup> January 2015 at Cungulla Reservoir. As above it is worth noting that there is no health (or aesthetic) guideline value for chlorates in the ADWQ guidelines. Instead Townsville water has a self-imposed target value of <0.7mg/L.

Corrective and Preventative Actions: The Cungulla reticulation system was flushed. Fresh hypo was restocked.

### DWI-7-506-00035 Townsville Drinking Water Scheme

Incident description: Detection of *E.coli* (3cfu/100ml) at Roseneath Reservoir on 17<sup>th</sup> February 2015. It had residual chlorine of 0.66mg/L.

Corrective and Preventative Actions: Disinfection process was reviewed with no fault found. Sampling procedure was audited and again no fault found. The sample tap location and height was questioned by the laboratory. Improvements were made to the sampling tap location and height as per picture below. Further resamples and subsequent sampling has all shown negative results for *E.coli*.



### DWI-7-506-00036 Paluma Drinking Water Scheme

Incident description: Detection of Giardia (1 cysts/10L) at Paluma Weir (raw water supply) on June 1<sup>st</sup> 2015. A boil water notice was put in effect due to chlorination being the only treatment at Paluma. A further positive result (3cysts/10L) was received on 13<sup>th</sup> June 2015.

Corrective and Preventative Actions: A sampling regime was instigated. A sanitary survey was undertaken. *E.coli* results were monitored to ascertain if a specific contamination event had occurred. These showed no specific contamination had occurred. After the receipt of four clear samples over a two and half week period the boil water notice was lifted. Further sampling has not detected Giardia

## DWI-7-506-00037 Townsville Drinking Water Scheme

Incident description: Detection of *E.coli* (14cfu/100ml) at Crestbrook Park, Townsville 9<sup>th</sup> June 2015. It had a residual chlorine level of 0.93mg/L.

Corrective and Preventative Actions: Chlorine residuals and pH were adequate for disinfection and there were no *E.coli* detections elsewhere in the system. It is suspected that as the sample was taken in the rain, rainwater poured from the building roof and contaminated the sample. The sample tap was changed to a dedicated sample point. The resample and subsequent sampling has not detected *E.coli*.



## 6 Compliance with Water Quality Criteria for Drinking Water

All samples are taken and analysed by Townsville Laboratory services which are NATA accredited. Reports/ results are emailed to the water quality team and the team have access to Laboratory Information Management System to obtain results as required. All data is monitored and trends analysed throughout the year by the Water Quality Officer, Water Treatment Engineer and Water Treatment Graduate Engineer.

We have been largely compliant with the water quality criteria with seven water quality incidents as outlined above occurring through the year. The *Public Health Regulation 2005* that requires 98 per cent of samples taken in a 12 month period should contain no *E.coli* has been complied with for the three schemes. There have been no failures to meet sampling frequencies and all locations have been sampled.

Overall compliance for *E.coli* for each scheme was

| Drinking Water Scheme | No. of samples | % Compliance |
|-----------------------|----------------|--------------|
| Townsville            | 2786           | 99.9         |
| Paluma                | 79             | 100          |
| Giru/ Cungulla        | 106            | 98.1         |

Table 1. Percentage compliance for *E. Coli* for Townsville Water's three drinking water schemes.

\* It must be noted that there was only one incident resulting in non-compliant *E.coli* samples for Cungulla for the 14/15 financial period

A boil water notice was issued for Paluma Water Supply due to detection of *Giardia* in the raw water supply at Paluma Weir. As chlorination is the only treatment at Paluma, Townsville Water placed the Township on a boil water notice. The boil water notice was lifted one month later as:

- » 4 clear resamples within a two and a half week period were obtained
- » Moderate rainfall occurred which would have served to flush the weir
- » A sanitary survey of the immediate area was undertaken and no obvious sign of contamination e.g. overflowing septic was found
- » The *E.coli* results for the Paluma Raw Water were analysed and there was no trend to indicate that a specific contamination event had occurred

We continue to monitor for *Giardia*.

There were seven notifications of non-compliance to the Regulator as outlined in chapter 5.

The attached spread sheet "Water Quality Annual Report" summarises the results of the verification monitoring plan.

## 7 Details of complaints made to the provider about the drinking water service supplied to customers.

Townsville City Council experiences 5 main types of water quality complaint; dirty water, taste/odour, geosmin, suspected illness and owner's side issues. All Water Quality complaints as dealt with as per "The Water Quality complaints flowchart".

| Type of Water Quality Complaint | Dirty Water | Taste/ Odour | Geosmin | Suspected illness | Owners Side | Calcium |
|---------------------------------|-------------|--------------|---------|-------------------|-------------|---------|
| Number of Complaints            | 57          | 26           | 0       | 2                 | 7FM 1 OS    | 2       |

Table 2. Number of Water Quality Complaints for Townsville.

The majority of water quality complaints received every year are for Dirty Water/ Milky Water. Dirty water occurs when sediment becomes stirred up from the bottom of the pipe. Milky water is caused by trapped air inside pressurised water pipes converting to tiny air bubbles, which gives the appearance of milky/ white water. A plumber flushes the main and the customer is called back the following day to ensure the issue has been rectified.

We had no geosmin complaints this year. Geosmin causes periodic issues in the Northern Beaches area.

We had 8 Owners side issues, 7 caused by flick mix (FM) tap rubber degradation and 1 with internal plumbing, in this case copper corrosion. Flick Mix issues are discussed with the customer over the phone where it is advised a private plumber will be required. In the copper corrosion case a plumber was dispatched to the house to provide advice and note the urgency that a private plumber would be required. The Water Quality Officer also contacted the Customer who advised a private plumber was being engaged.

Taste and odour resulted in 26 complaints which were rectified by flushing the mains and the customer's meters. They tend to be linked to dirty water events or high/ low chlorine. Chlorine is tested onsite and samples are generally taken to Townsville Laboratory Services for testing to ensure water quality is within guideline limits. Return phone calls to customers ensures the issue is resolved.

Two complaints of suspected illness were received last year. In these instances we analyse samples at Townsville Laboratory Services and liaise one on one with the customer. In both instances it was shown reticulated water supply was fully compliant with our standards.

## 8 Outcome of Review and findings/ recommendations of Audit

The DWQMP was reviewed mid-2014, the next review is due mid-2016.

The first regular audit of the plan must be conducted by 1 August 2016, with further audits required to be completed every four years from that date.



Townsville City Councils (SPID 506)  
**ANNUAL WATER QUALITY REPORT**  
 for the reporting period  
 1st July 2014 - 30 June 2015



**TOWNSVILLE DRINKING WATER SCHEME**

|  |                                  |
|--|----------------------------------|
| Drinking Water Service Provider                                | Townsville City Council          |
| SPID   | 506                              |
| Drinking Water Scheme  | Townsville Drinking Water Scheme |
| Names of Towns, communities or regions serviced by this scheme | Townsville                       |
| Population Serviced by this scheme                             | 192,038                          |
| Reporting Year   | July 2014- June 2015             |
| Laboratory Name  | Townsville Laboratory Services   |
| Reporting Year   | July 2014- June 2015             |
| Laboratory Name  | Townsville Laboratory Services   |

| Scheme Name    | Name place | Scheme Component                                     | Parameter Category       | Parameter                | Unit of Measure | Limit of Reporting (LOR) | Count | # of Samples Detected | # DW Guidelines Value | Min Value | Max Value | Avg Value | 95th %tile | Comments |
|----------------|------------|--|--------------------------|--------------------------|-----------------|--------------------------|-------|-----------------------|-----------------------|-----------|-----------|-----------|------------|----------|
| Townsville DWS | Townsville | Source Water<br>Ross River Dam                       | Thermotolerant Coliforms | Total Coliforms          | org/100ml       | 1                        | 36    | 36                    | 0                     | 801       | 15400     | 5945.58   | 15100      |          |
|                |            |  | Thermotolerant Coliforms | Thermotolerant Coliforms | org/100ml       | 1                        | 82    | 82                    | 0                     | 2         | 1700      | 54.67     | 98.25      |          |
|                |            |  | Turbidity                | Turbidity                | NTU             | 0.1                      | 211   | 211                   | 0                     | 2.1       | 20.8      | 5.15      | 9.55       |          |
|                |            |  | pH                       | pH                       | pH Units        | 2                        | 269   | 269                   | 0                     | 7.11      | 8.14      | 7.64      | 8.01       |          |
|                |            |  | Metals                   | Iron, Total              | mg/L            | 0.005                    | 220   | 220                   | 0                     | 0.07      | 1.30      | 0.19      | 0.34       |          |
|                |            |  | Metals                   | Manganese, Total         | mg/L            | 0.001                    | 220   | 220                   | 0                     | 0.01      | 0.59      | 0.03      | 0.08       |          |
|                |            | Anions   | Nitrate                  | mg/L                     | 0.01            | 211                      | 33    | 0                     | <0.01                 | 0.07      | 0.00      | 0.01      |            |          |
|                |            | Source Water<br>Paluma Dam                           | Thermotolerant Coliforms | Thermotolerant Coliforms | org/100ml       | 1                        | 23    | 23                    | 0                     | 2         | 130       | 21.47     | 86         |          |
|                |            |  | Turbidity                | Turbidity                | NTU             | 0.1                      | 142   | 142                   | 0                     | 0.80      | 11.40     | 2.56      | 4.3        |          |
|                |            |  | pH                       | pH                       | pH Units        | 1                        | 142   | 142                   | 0                     | 5.64      | 7.42      | 6.40      | 7.11       |          |
|                |            |  | Metals                   | Iron, Total              | mg/L            | 0.005                    | 140   | 140                   | 0                     | 0.16      | 6.70      | 0.88      | 2.71       |          |
|                |            |  | Metals                   | Manganese, Total         | mg/L            | 0.001                    | 140   | 140                   | 0                     | 0.002     | 0.17      | 0.03      | 0.06       |          |
|                |            |  | Anions                   | Nitrate                  | mg/L            | 0.01                     | 104   | 7                     | 0                     | <0.01     | 0.04      | 0         | 0.01       |          |
|                |            | Water Treatment<br>Plant<br>Douglas WTP<br>Raw Water | Thermotolerant Coliforms | Total Coliforms          | org/100ml       | 1                        | 53    | 52                    | 0                     | 0.00      | 6970.00   | 1266.90   | 4938       |          |
|                |            |  | Thermotolerant Coliforms | E.coli                   | MPN/100ml       | 1                        | 53    | 5                     | 0                     | 0         | 50        | 1.377     | 3          |          |
|                |            |  | Turbidity                | Turbidity                | NTU             | 0.1                      | 365   | 365                   | 0                     | 1.17      | 9.41      | 3.40      | 5.87       |          |
|                |            |  | pH                       | pH                       | pH Units        | 2                        | 365   | 365                   | 0                     | 7.29      | 8.06      | 7.65      | 7.86       |          |
|                |            |  | Anions                   | Sulphate                 | mg/L            | 0.5                      | 12    | 10                    | 0                     | <0.5      | 1.80      | 1.02      | 1.58       |          |
|                |            |  | Metals                   | Iron, Total              | mg/L            | 0.005                    | 53    | 53                    | 0                     | 0.03      | 0.35      | 0.12      | 0.22       |          |
|                |            |  | Metals                   | Manganese, Total         | mg/L            | 0.001                    | 53    | 52                    | 0                     | <0.001    | 0.04      | 0.02      | 0.03       |          |
|                |            |  | Geosmin/ MIB             | Geosmin                  | ng/L            | 1                        | 12    | 7                     | 0                     | <1        | 3.00      | 1.11      | 2.84       |          |
|                |            |  | Geosmin/ MIB             | MIB                      | ng/L            | 1                        | 12    | 12                    | 0                     | 1.4       | 9.80      | 4.47      | 8.26       |          |
|                |            |  | Fluoride                 | Fluoride                 | mg/L            | 0.02                     | 52    | 49                    | 0                     | <0.02     | 0.20      | 0.10      | 0.15       |          |
|                |            |  | Metals                   | Arsenic                  | mg/L            | 0.001                    | 4     | 2                     | 0                     | <0.001    | <0.001    | <0.001    | <0.001     |          |
|                |            |  | Metals                   | Selenium                 | mg/L            | 0.001                    | 4     | 0                     | 0                     | <0.001    | <0.001    | <0.001    | <0.001     |          |
|                |            |  | Metals                   | Mercury                  | mg/L            | 0.006                    | 4     | 0                     | 0                     | <0.006    | <0.006    | <0.006    | <0.006     |          |
|                |            |  | Metals                   | Cadmium                  | mg/L            | 0.001                    | 4     | 1                     | 0                     | <0.001    | 0.001     | <0.001    | <0.001     |          |
|                |            |  | Metals                   | Nickel                   | mg/L            | 0.001                    | 4     | 0                     | 0                     | <0.001    | <0.001    | <0.001    | <0.001     |          |
|                |            |  | Metals                   | Chromium                 | mg/L            | 0.002                    | 4     | 0                     | 0                     | <0.002    | <0.002    | <0.002    | <0.002     |          |
|                |            |  | Giardia                  | Giardia                  | cysts/100ml     | 1                        | 4     | 0                     | 0                     | 0         | 0         | 0         | 0          |          |
|                |            | Cryptosporidium                                      | Cryptosporidium          | oocysts/10L              | 1               | 4                        | 0     | 0                     | 0                     | 0         | 0         | 0         |            |          |

| Scheme Name    | Name place       | Scheme Component                                      | Parameter Category       | Parameter        | Unit of Measure | Limit of Reporting (LOR) | Count  | # of Samples Detected | # DW Guidelines Value | Min Value | Max Value | Avg Value | 95th %tile | Comments   |  |
|----------------|------------------|---|--------------------------|------------------|-----------------|--------------------------|--------|-----------------------|-----------------------|-----------|-----------|-----------|------------|--|--|
| Townsville DWS | Townsville       | Water Treatment Plant<br>Douglas WTP<br>Treated Water | Thermotolerant Coliforms | Total Coliforms  | org/100ml       | 1                        | 106    | 11                    | 0                     | 0         | 21        | 1         | 2          |  |  |
|                |                  |   | Thermotolerant Coliforms | E.coli           | MPN/100ml       | 1                        | 105    | 0                     | 0                     | 0         | 0         | 0         | 0          | 0  |  |
|                |                  |   | Disinfection By-product  | Chlorine, free   | mg/L            | 0.05                     | 724    | 724                   | 0                     | 2         | 3.2       | 2.66      | 3.1        |  |  |
|                |                  |   | Turbidity                | Turbidity        | NTU             | 0.1                      | 730    | 730                   | 0                     | 0.055     | 0.19      | 0.108     | 0.14       |  |  |
|                |                  |   | pH                       | pH               | pH Units        | 2                        | 730    | 730                   | 0                     | 7.43      | 7.68      | 7.56      | 7.64       |  |  |
|                |                  |   | Anions                   | Sulphate         | mg/L            | 0.5                      | 24     | 22                    | 0                     | <0.5      | 1.7       | 1.08      | 1.66       |  |  |
|                |                  |   | Anions                   | Nitrate          | mg/L            | 0.01                     | 24     | 24                    | 0                     | 0.02      | 0.11      | 0.0579    | 0.08       |  |  |
|                |                  |   | Metals                   | Iron, Total      | mg/L            | 0.005                    | 210    | 6                     | 0                     | <0.005    | 0.01      | 0.000271  | <0.005     |  |  |
|                |                  |   | Metals                   | Manganese, Total | mg/L            | 0.001                    | 105    | 15                    | 0                     | <0.001    | 0.006     | 0.000429  | 0.003      |  |  |
|                |                  |   | Metals                   | Aluminium        | mg/L            | 0.002                    | 711    | 647                   | 0                     | <0.002    | 0.16      | 0.012     | 0.017      |  |  |
|                |                  |   | Fluoride                 | Fluoride         | mg/L            | 0.02                     | 730    | 730                   | 0                     | 0.639     | 0.763     | 0.695     | 0.73       |  |  |
|                |                  |   | Metals                   | Copper           | mg/L            | 0.001                    | 24     | 8                     | 0                     | <0.001    | 0.003     | 0.001     | 0.002      |  |  |
|                |                  |   | Metals                   | Zinc             | mg/L            | 0.005                    | 24     | 1                     | 0                     | <0.005    | 0.005     | <0.005    | <0.005     |  |  |
|                |                  |   | Metals                   | Arsenic          | mg/L            | 0.001                    | 4      | 0                     | 0                     | <0.001    | <0.001    | <0.001    | <0.001     |  |  |
|                |                  |   | Metals                   | Selenium         | mg/L            | 0.001                    | 4      | 0                     | 0                     | <0.001    | <0.001    | <0.001    | <0.001     |  |  |
|                |                  |   | Metals                   | Mercury          | mg/L            | 0.006                    | 4      | 0                     | 0                     | <0.006    | <0.006    | <0.006    | <0.006     |  |  |
|                |                  |   | Metals                   | Cadmium          | mg/L            | 0.001                    | 4      | 0                     | 0                     | <0.001    | <0.001    | <0.001    | <0.001     |  |  |
|                |                  |   | Metals                   | Nickel           | mg/L            | 0.001                    | 4      | 0                     | 0                     | <0.001    | <0.001    | <0.001    | <0.001     |  |  |
|                |                  |   | Metals                   | Chromium         | mg/L            | 0.001                    | 4      | 0                     | 0                     | <0.001    | <0.001    | <0.001    | <0.001     |  |  |
|                |                  |   | Disinfection By-product  | Trihalomethanes  | ug/L            | 2                        | 103    | 103                   | 0                     | 23        | 81        | 40.340    | 66.2       |  |  |
|                |                  | Thermotolerant Coliforms                              | Total Coliforms          | org/100ml        | 1               | 53                       | 29     | 0                     | <1                    | 300.000   | 21.774    | 57.6      |            |  |  |
|                |                  | Thermotolerant Coliforms                              | E.coli                   | MPN/100ml        | 1               | 53                       | 3      | 0                     | <1                    | 10.000    | 0.245     | 0.4       |            |  |  |
|                |                  | Turbidity   | Turbidity                | NTU              | 0.1             | 364                      | 364    | 0                     | 0.338                 | 16.400    | 1.115     | 1.9       |            |  |  |
|                |                  | pH  | pH                       | pH Units         | 2               | 364                      | 364    | 0                     | 10.06                 | 11.50     | 10.59     | 10.85     |            |  |  |
|                |                  | Anions  | Sulphate                 | mg/L             | 0.5             | 12                       | 9      | 0                     | <0.5                  | 0.900     | 0.538     | 0.89      |            |  |  |
|                |                  | Metals  | Iron, Total              | mg/L             | 0.001           | 53                       | 53     | 0                     | 0.030                 | 0.330     | 0.161     | 0.304     |            |  |  |
|                |                  | Metals  | Manganese, Total         | mg/L             | 0.001           | 53                       | 49     | 0                     | <0.001                | 0.010     | 0.004     | 0.12      |            |  |  |
|                |                  | Geosmin/ MIB  | Geosmin                  | ng/L             | 2               | 15                       | 11     | 0                     | <2                    | 14        | 4.927     | 11.2      |            |  |  |
|                |                  | Geosmin/ MIB  | MIB                      | ng/L             | 2               | 15                       | 4      | 0                     | <2                    | 4         | 1         | 3.76      |            |  |  |
|                |                  | Fluoride  | Fluoride                 | mg/L             | 0.002           | 47                       | 28     | 0                     | <0.002                | 0.008     | 0.022     | 0.05      |            |  |  |
|                |                  | Metals  | Arsenic                  | mg/L             | 0.001           | 4                        | 0      | 0                     | <0.001                | <0.001    | <0.001    | <0.001    |            |  |  |
|                |                  | Metals  | Selenium                 | mg/L             | 0.001           | 4                        | 0      | 0                     | <0.001                | <0.001    | <0.001    | <0.001    |            |  |  |
|                |                  | Metals  | Mercury                  | mg/L             | 0.006           | 4                        | 0      | 0                     | <0.006                | <0.006    | <0.006    | <0.006    |            |  |  |
|                |                  | Metals  | Cadmium                  | mg/L             | 0.001           | 4                        | 0      | 0                     | <0.001                | <0.001    | <0.001    | <0.001    |            |  |  |
|                |                  | Metals  | Nickel                   | mg/L             | 0.001           | 4                        | 0      | 0                     | <0.001                | <0.001    | <0.001    | <0.001    |            |  |  |
|                |                  | Metals  | Chromium                 | mg/L             | 0.001           | 4                        | 0      | 0                     | <0.001                | <0.001    | <0.001    | <0.001    |            |  |  |
|                |                  | Giardia   | Giardia                  | cysts/100ml      | 1               | 1                        | 0      | 0                     | 0                     | 0         | 0         | 0         |            |  |  |
|                |                  | Cryptosporidium                                       | Cryptosporidium          | oocysts/10L      | 1               | 1                        | 0      | 0                     | 0                     | 0         | 0         | 0         |            |  |  |
|                |                  | Thermotolerant Coliforms                              | Total Coliforms          | org/100ml        | 1               | 53                       | 0      | 0                     | 0                     | 0         | 0         | 0         |            |  |  |
|                |                  | Thermotolerant Coliforms                              | E.coli                   | MPN/100ml        | 1               | 53                       | 0      | 0                     | 0                     | 0         | 0         | 0         |            |  |  |
|                |                  | Turbidity   | Turbidity                | NTU              | 0.1             | 365                      | 365    | 0                     | 0.023                 | 0.520     | 0.045     | 0.072     |            |  |  |
|                |                  | pH  | pH                       | pH Units         | 2               | 365                      | 365    | 0                     | 7.44                  | 7.67      | 0.67      | 7.63      |            |  |  |
| Anions         | Sulphate         | mg/L  | 0.5                      | 12               | 12              | 0                        | 0.56   | 2.20                  | 0.93                  | 1.6       |           |           |            |  |  |
| Anions         | Nitrate          | mg/L  | 0.01                     | 14               | 13              | 0                        | <0.01  | 0.08                  | 0.044                 | 0.074     |           |           |            |  |  |
| Metals         | Manganese, Total | mg/L  | 0.001                    | 53               | 41              | 0                        | <0.001 | 0.009                 | 0.002132              | 0.006     |           |           |            |  |  |
| Metals         | Iron, Total      | mg/L  | 0.001                    | 105              | 13              | 0                        | <0.001 | 0.030                 | 0.001438              | 0         |           |           |            |  |  |
| Metals         | Aluminium        | mg/L  | 0.002                    | 365              | 293             | 0                        | <0.005 | 0.144                 | 0.0097                | 0.01      |           |           |            |  |  |
| Fluoride       | Fluoride         | mg/L  | 0.02                     |                  |                 |                          |        |                       |                       |           |           |           |            |  |  |
|                |                  |   |                          |                  |                 |                          | 351    | 351                   | 0                     | 0.623     | 0.761     | 0.698     | 0.733      | Fluoride Dosing system was off for routine maintenance for 2 weeks. A notice of period of Non operation was sent to Queensland Health. |  |

| Scheme Name    | Name place | Scheme Component                                 | Parameter Category       | Parameter        | Unit of Measure | Limit of Reporting (LOR) | Count | # of Samples Detected | # DW Guidelines Value | Min Value | Max Value | Avg Value | 95th %tile | Comments         |
|----------------|------------|--|--------------------------|------------------|-----------------|--------------------------|-------|-----------------------|-----------------------|-----------|-----------|-----------|------------|------------------|
| Townsville DWS | Townsville | Water Treatment Plant Northern WTP Treated Water | Metals                   | Copper           | mg/L            | 0.002                    | 12    | 11                    | 0                     | <0.002    | 0.006     | 0.002833  | 0.005      |                  |
|                |            |  | Metals                   | Zinc             | mg/L            | 0.005                    | 13    | 1                     | 0                     | <0.005    | <0.005    | <0.005    | <0.005     |                  |
|                |            |  | Metals                   | Arsenic          | mg/L            | 0.001                    | 2     | 0                     | 0                     | <0.001    | <0.001    | <0.001    | <0.001     |                  |
|                |            |  | Metals                   | Selenium         | mg/L            | 0.001                    | 2     | 0                     | 0                     | <0.001    | <0.001    | <0.001    | <0.001     |                  |
|                |            |  | Metals                   | Mercury          | mg/L            | 0.006                    | 2     | 0                     | 0                     | <0.006    | <0.006    | <0.006    | <0.006     |                  |
|                |            |  | Metals                   | Cadmium          | mg/L            | 0.001                    | 2     | 0                     | 0                     | <0.001    | <0.001    | <0.001    | <0.001     |                  |
|                |            |  | Metals                   | Nickel           | mg/L            | 0.001                    | 2     | 0                     | 0                     | <0.001    | <0.001    | <0.001    | <0.001     |                  |
|                |            |  | Metals                   | Chromium         | mg/L            | 0.001                    | 2     | 0                     | 0                     | <0.001    | <0.001    | <0.001    | <0.001     |                  |
|                |            |  | Disinfection By-product  | Trihalomethanes  | ug/L            | 2                        | 52    | 52                    | 0                     | 10        | 53        | 29        | 48         |                  |
|                |            | Transmission Reservoirs                          | Thermotolerant Coliforms | Total Coliforms  | org/100ml       | 1                        | 990   | 15                    | 0                     | 0         | 200       | 0.540     | 0          |                  |
|                |            |  | Thermotolerant Coliforms | E.coli           | MPN/100ml       | 1                        | 990   | 1                     | 1                     | 0         | 3         | 0         | 0          | DWI-7-506-00035  |
|                |            |  | Disinfection residual    | Chlorine, free   | mg/L            | 0.05                     | 954   | 952                   | 0                     | 0         | 2.8       | 1.22      | 1.9        |                  |
|                |            |  | Disinfection residual    | Chlorine, total  | mg/L            | 0.05                     | 953   | 953                   | 0                     | 0.17      | 3.31      | 1.58      | 2.3        |                  |
|                |            |  | Turbidity                | Turbidity        | NTU             | 0.1                      | 951   | 821                   | 0                     | 0         | 4         | 0.29      | 0.8        |                  |
|                |            |  | pH                       | pH               | pH Units        | 2                        | 951   | 951                   | 0                     | 6.47      | 8.46      | 7.65      | 7.98       |                  |
|                |            |  | Metals                   | Iron, Total      | mg/L            | 0.005                    | 932   | 321                   | 0                     | <0.005    | 1.5       | 0.0078    | 0.03       |                  |
|                |            |  | Metals                   | Manganese, Total | mg/L            | 0.001                    | 932   | 266                   | 0                     | <0.001    | 0.05      | 0.0011    | 0.006      |                  |
|                |            |  | Disinfection By-product  | Trihalomethanes  | ug/L            | 2                        | 926   | 926                   | 0                     | 5         | 199       | 77.58     | 129        |                  |
|                |            |  | Disinfection By-product  | Chlorates        | ug/L            | 15                       | 114   | 114                   | 0                     | 5         | 973       | 179.9     | 399.2      |                  |
|                |            | Reticulation Houses                              | Thermotolerant Coliforms | Total Coliforms  | org/100ml       | 1                        | 2118  | 44                    | 0                     | 0         | 88        | 0.183     | 0          |                  |
|                |            |  | Thermotolerant Coliforms | E.coli           | MPN/100ml       | 1                        | 2121  | 1                     | 1                     | 0         | 14        | 0.0066    | 0          | DWI-7-506- 00038 |
|                |            |  | Disinfection residual    | Chlorine, free   | mg/L            | 0.05                     | 2099  | 2098                  | 0                     | <0.05     | 3.27      | 1.06      | 1.7        |                  |
|                |            |  | Disinfection residual    | Chlorine, total  | mg/L            | 0.05                     | 2094  | 2094                  | 0                     | 0.1       | 4.03      | 1.4       | 2.15       |                  |
|                |            |  | Turbidity                | Turbidity        | NTU             | 0.1                      | 596   | 540                   | 0                     | 0         | 13.8      | 0.335     | 0.7        |                  |
|                |            |  | pH                       | pH               | pH Units        | 1                        | 2118  | 2118                  | 0                     | 6.07      | 8.37      | 7.56      | 7.97       |                  |
|                |            |  | Metals                   | Iron, Total      | mg/L            | 0.005                    | 379   | 114                   | 0                     | 0         | 0.16      | 0.004     | 0.06       |                  |
|                |            |  | Metals                   | Manganese, Total | mg/L            | 0.001                    | 117   | 117                   | 0                     | 0.001     | 0.07      | 0.0053    | 0.02       |                  |
|                |            |  | Fluoride                 | Fluoride         | mg/L            | 0.02                     | 375   | 375                   | 0                     | 0.48      | 0.76      | 0.70      | 0.74       |                  |
|                |            |  | Disinfection By-product  | Trihalomethanes  | ug/L            | 2                        | 371   | 371                   | 0                     | 13        | 154       | 77.008    | 119        |                  |
|                |            | Disinfection By-product                          | Chlorates                | ug/L             | 15              | 54                       | 54    | 0                     | <15                   | 670       | 183.3889  | 405.8     |            |                  |



Townsville City Councils (SPID 506)  
ANNUAL WATER QUALITY REPORT  
for the reporting period  
1st July 2014 - 30 June 2015



PALUMA DRINKING WATER SCHEME

Drinking Water Service Provider  
SPID  
Drinking Water Scheme  
Names of Towns, communities or regions serviced by this scheme  
Population Serviced by this scheme

Townsville City Council  
506  
Paluma Drinking Water Scheme  
Paluma  
25-140

Reporting Year  
Laboratory Name

July 2014- June 2015  
Townsville Laboratory Services

| Scheme Name             | Name place      | Scheme Component                 | Parameter Category       | Parameter            | Unit of Measure | Limit of Reporting (LOR) | Count | # of Samples Detected | # DW Guidelines Value | Min Value | Max Value | Avg Value                              | 95th %tile | Comments   |  |
|-------------------------|-----------------|----------------------------------|--------------------------|----------------------|-----------------|--------------------------|-------|-----------------------|-----------------------|-----------|-----------|--|------------|--|--|
| Paluma DWS              | Paluma          | Source Water<br>Paluma Weir      | Thermotolerant Coliforms | E.coli               | MPN/100ml       | 1                        | 13    | 13                    | 13                    | 20        | 1600      | 419.69                                 | 1325       |  |  |
|                         |                 |                                  | pH                       | pH                   | pH Units        | 1                        | 13    | 13                    | 0                     | 5.91      | 7.4       | 6.5                                    | 7.2        |  |  |
|                         |                 |                                  | Metals                   | Iron                 | mg/L            | 0.005                    | 21    | 21                    | 0                     | 0.34      | 2         | 0.86                                   | 1.4        |  |  |
|                         |                 |                                  | Metals                   | Manganese            | mg/L            | 0.001                    | 21    | 21                    | 0                     | 0.001     | 0.07      | 0.02                                   | 0.05       |  |  |
|                         |                 |                                  | Turbidity                | Turbidity            | NTU             | 0.1                      | 13    | 13                    | 0                     | 3.8       | 16.2      | 6.29                                   | 10.74      |  |  |
|                         |                 |                                  | Cryptosporidium          | Cryptosporidium      | cells/10 Li     | 1                        | 6     | 0                     | 0                     | 0         | 0         | 0                                      | 0          |  |  |
|                         |                 |                                  | Giardia                  | Giardia              | cells/10 Li     | 1                        | 6     | 2                     | 2                     | 0         | 3         | 0.667                                  | 2.5        | After the detection of Giardia in June a boil water notice was put in place for Paluma for a month until four clear samples were returned. |  |
|                         |                 | Transmission<br>Paluma Reservoir | Thermotolerant Coliforms | Total Coliform       | org/100ml       | 1                        | 20    | 1                     | 0                     | 0         | 1         | 0.05                                   | 0          |  |  |
|                         |                 |                                  | Thermotolerant Coliforms | E.coli               | MPN/100ml       | 1                        | 20    | 0                     | 0                     | 0         | 0         | 0                                      | 0          |  |  |
|                         |                 |                                  | Disinfection Residual    | Chlorine (free)      | mg/L            | 0.05                     | 7     | 7                     | 0                     | 0.17      | 2.93      | 1.58                                   | 2.3        |  |  |
|                         |                 |                                  | Disinfection Residual    | Chlorine (total)     | mg/L            | 0.05                     | 94    | 94                    | 0                     | 1.31      | 2.72      | 1.96                                   | 2.53       |  |  |
|                         |                 |                                  | pH                       | pH                   | pH Units        | 1                        | 7     | 7                     | 0                     | 5.68      | 7.85      | 6.81                                   | 7.6        |  |  |
|                         |                 |                                  | Turbidity                | Turbidity            | NTU             | 0.1                      | 7     | 7                     | 0                     | 0.1       | 9.1       | 4.6                                    | 8.98       |  |  |
|                         |                 |                                  | Disinfection By-product  | Chlorates            | µg/L            | 15                       | 17    | 17                    | 0                     | 254       | 1745      | 870.76                                 | 1620.7     | As per Chlorate project proposal submitted 16/2/2015 , explanation contained in the Annual report  |  |
|                         |                 | Disinfection By-product          | Trihalomethanes          | µg/L                 | 2               | 11                       | 11    | 0                     | 36                    | 189       | 95        | 184                                    |            |  |  |
|                         |                 | Reticulation<br>Paluma Houses    | Thermotolerant Coliforms | Total Coliform       | org/100ml       | 1                        | 24    | 1                     | 1                     | 0         | 25        | 1.04                                   | 0          |  |  |
|                         |                 |                                  | Thermotolerant Coliforms | E.coli               | MPN/100ml       | 1                        | 24    | 0                     | 0                     | 0         | 0         | 0                                      | 0          |  |  |
|                         |                 |                                  | Disinfection Residual    | Chlorine (free)      | mg/L            | 0.05                     | 13    | 13                    | 0                     | 0.1       | 2.09      | 1.10                                   | 2.05       |  |  |
|                         |                 |                                  | Disinfection Residual    | Chlorine (total)     | mg/L            | 0.05                     | 13    | 13                    | 0                     | 0.41      | 2.28      | 1.34                                   | 2.25       |  |  |
|                         |                 |                                  | pH                       | pH                   | pH Units        | 2                        | 24    | 24                    | 0                     | 6.48      | 8.94      | 7.40                                   | 7.35       |  |  |
|                         |                 |                                  | Turbidity                | Turbidity            | NTU             | 0.1                      | 24    | 24                    | 0                     | 0.1       | 14.2      | 5.17                                   | 11.14      |  |  |
|                         |                 |                                  | Metals                   | Iron                 | mg/L            | 0.005                    | 24    | 24                    | 0                     | 0.36      | 1.7       | 1.04                                   | 1.69       |  |  |
|                         |                 |                                  | Metals                   | Manganese            | mg/L            | 0.001                    | 24    | 24                    | 0                     | 0.004     | 0.06      | 0.017                                  | 0.04       |  |  |
|                         |                 |                                  | Metals                   | Aluminium            | mg/L            | 0.005                    | 24    | 24                    | 0                     | 0.072     | 0.432     | 0.258                                  | 0.4158     |  |  |
|                         |                 |                                  | Fluoride                 | Fluoride (naturally) | mg/L            | 0.02                     | 24    | 24                    | 0                     | 0.03      | 0.11      | 0.0866                                 | 0.1085     |  |  |
|                         |                 |                                  | Disinfection By-product  | Chlorates            | µg/L            | 15                       | 32    | 32                    | 0                     | 251       | 1778      | 898.41                                 | 1703.50    | As per Chlorate project proposal submitted 16/2/2015 , explanation contained in the Annual report  |  |
| Disinfection By-product | Trihalomethanes |                                  | µg/L                     | 2                    | 42              | 42                       | 1     | 42                    | 286                   | 118.41    | 230.70    | As per incident report DWI-7-506-00033 |            |  |  |

Townsville City Councils (SPID 506)  
ANNUAL WATER QUALITY REPORT  
for the reporting period  
1st July 2014 - 30 June 2015



**GIRU/ CUNGULLA DRINKING WATER SCHEME**

Drinking Water Service Provider Townsville City Council  
 SPID 506  
 Drinking Water Scheme Giru/ Cungulla Drinking Water Scheme  
 Names of Towns, communities or regions serviced by this scheme Cungulla  
 Population Serviced by this scheme 288

Reporting Year July 2014- June 2015  
 Laboratory Name Townsville Laboratory Services

| Scheme Name           | Name place       | Scheme Component                                | Parameter Category       | Parameter                | Unit of Measure | Limit of Reporting (LOR) | Count  | # of Samples Detected | # DW Guidelines Value | Min Value | Max Value | Avg Value | 95th %tile        | Comments  |
|-----------------------|------------------|---|--------------------------|--------------------------|-----------------|--------------------------|--------|-----------------------|-----------------------|-----------|-----------|-----------|-------------------|---|
| Giru/Cungulla DWS     | Giru             | Source Water<br>Giru Raw Water (Haughton River) | Thermotolerant Coliforms | Total Coliform           | org/100ml       | 1                        | 9      | 9                     | 0                     | 10        | 890       | 174.22    | 630               |   |
|                       |                  |   | Thermotolerant Coliforms | Thermotolerant Coliforms | org/100ml       | 1                        | 36     | 36                    | 0                     | 2         | 10        | 4.666     | 10                |   |
|                       |                  |   | Thermotolerant Coliforms | E.coli                   | MPN/100ml       | 1                        | 12     | 8                     | 8                     | 0         | 10        | 3.166     | 10                |   |
|                       |                  |   | Turbidity                | Turbidity                | NTU             | 0.1                      | 43     | 43                    | 0                     | 0.2       | 42        | 4.5       | 13.62             |   |
|                       |                  |   | pH                       | pH                       | pH Units        | 1                        | 44     | 44                    | 0                     | 4.31      | 8.84      | 7.83      | 8.655             |   |
|                       |                  |   | Metals                   | Iron, Total              | mg/L            | 0.005                    | 44     | 44                    | 0                     | 0.006     | 1.1       | 0.094     | 0.224             |   |
|                       |                  |   | Metals                   | Manganese, Total         | mg/L            | 0.001                    | 42     | 42                    | 0                     | 0         | 0.09      | 0.014     | 0.03              |   |
|                       |                  |   | Cryptosporidium          | Cryptosporidium          | cells/10 Li     | 1                        | 1      | 0                     | 0                     | 0         | 0         | 0         | 0                 |   |
|                       |                  |   | Giardia                  | Giardia                  | cells/10 Li     | 1                        | 1      | 0                     | 0                     | 0         | 0         | 0         | 0                 |   |
|                       |                  |   | Thermotolerant Coliforms | Total Coliform           | org/100ml       | 1                        | 45     | 7                     | 0                     | 0         | 200       | 8.66      | 10.6              |   |
|                       |                  | Thermotolerant Coliforms                        | E.coli                   | MPN/100ml                | 1               | 45                       | 1      | 1                     | 0                     | 1         | 0.022     | 0         | Non-Potable Water |   |
|                       |                  | Turbidity                                       | Turbidity                | NTU                      | 0.1             | 44                       | 43     | 0                     | 0                     | 2.2       | 0.36      | 1.28      |                   |   |
|                       |                  | pH  | pH                       | pH Units                 | 1               | 44                       | 44     | 0                     | 6.55                  | 7.92      | 7.38      | 7.75      |                   |   |
|                       |                  | Metals  | Iron, Total              | mg/L                     | 0.005           | 44                       | 13     | 0                     | <0.005                | 0.17      | <0.006    | <0.01     |                   |   |
|                       | Metals           | Manganese, Total                                | mg/L                     | 0.001                    | 44              | 16                       | 0      | <0.001                | 0.005                 | <0.0009   | <0.005    |           |                   |   |
|                       | Cungulla         | Transmission<br>Cungulla Reservoir              | Thermotolerant Coliforms | Total Coliform           | org/100ml       | 1                        | 54     | 1                     | 0                     | 0         | 165       | 3.06      | 0.00              |   |
|                       |                  |   | Thermotolerant Coliforms | E.coli                   | MPN/100ml       | 1                        | 54     | 1                     | 1                     | 0         | 4         | 0.07      | 0                 | As per incident DWI-7-506-00031   |
|                       |                  |   | Turbidity                | Turbidity                | NTU             | 0.1                      | 53     | 49                    | 0                     | <0.1      | 2.1       | 0.34      | 0.80              |   |
|                       |                  |   | pH                       | pH                       | pH Units        | 2                        | 53     | 53                    | 0                     | 6.58      | 8.09      | 7.61      | 8.00              |   |
|                       |                  |   | Metals                   | Iron, Total              | mg/L            | 0.005                    | 52     | 5                     | 0                     | <0.005    | 0.03      | 0.00125   | 0.01              |   |
|                       |                  |   | Metals                   | Manganese, Total         | mg/L            | 0.001                    | 54     | 18                    | 0                     | <0.001    | 0.02      | 0.00125   | 0.005             |   |
|                       |                  |   | Disinfection Residual    | Chlorine (free)          | mg/L            | 0.05                     | 52     | 52                    | 0                     | 0.15      | 2.00      | 1.41      | 1.80              |   |
|                       |                  |   | Disinfection Residual    | Chlorine (Total)         | mg/L            | 0.05                     | 52     | 52                    | 0                     | 0.42      | 2.91      | 1.79      | 2.50              |   |
|                       |                  |   | Disinfection By products | Chlorates                | µg/L            | 15                       | 14     | 14                    | 0                     | <50       | 1200.00   | 358.00    | 880.00            | As per chlorate project brief. Further explanation contained in the Annual Report |
|                       |                  |   | Disinfection By products | Trihalomethanes          | µg/L            | 2                        | 51     | 51                    | 0                     | 15.00     | 130.00    | 50.55     | 79.50             |   |
|                       |                  | Reticulation<br>Cungulla Houses                 | Thermotolerant Coliforms | Total Coliform           | org/100ml       | 1                        | 54     | 2                     | 0                     | 0         | 165       | 3.074     | 0                 |   |
|                       |                  |   | Thermotolerant Coliforms | E.coli                   | MPN/100ml       | 1                        | 54     | 1                     | 0                     | 0         | 4         | 0.07      | 0                 | As per incident DWI-7-506-00031   |
|                       |                  |   | Turbidity                | Turbidity                | NTU             | 0.1                      | 53     | 49                    | 0                     | 0.00      | 0.80      | 0.28      | 0.60              |   |
| pH                    |                  |   | pH                       | pH Units                 | 1               | 53                       | 53     | 0                     | 6.76                  | 8.11      | 7.62      | 7.96      |                   |   |
| Metals                | Iron, Total      | mg/L  | 0.005                    | 52                       | 12              | 0                        | <0.005 | 0.11                  | 0.004                 | 0.02      |           |           |                   |   |
| Metals                | Manganese, Total | mg/L  | 0.001                    | 52                       | 17              | 0                        | <0.001 | 0.02                  | 0.001                 | 0.007     |           |           |                   |   |
| Disinfection Residual | Chlorine (free)  | mg/L  | 0.05                     | 52                       | 52              | 0                        | 0.16   | 1.99                  | 1.19                  | 1.76      |           |           |                   |   |
| Disinfection Residual | Chlorine (Total) | mg/L  | 0.05                     | 52                       | 52              | 0                        | 0.26   | 2.75                  | 1.52                  | 2.39      |           |           |                   |   |