5.7. WATER AND WASTEWATER QUARTERLY REPORT FOR THE PERIOD ENDING 31 DECEMBER 2017

GENERAL MANAGER Nicholas Wellwood, General Manager Operations

DEPARTMENT Water and Wastewater

RECOMMENDATION

It is recommended that the Quarterly Report of the Water and Wastewater branch for the period ending 31 December 2017 be received and noted.

EXECUTIVE SUMMARY

This report documents progress on key operational and service delivery areas as well as the regulatory compliance status within the Water and Wastewater Branch for the period 1 October to 31 December 2017.

Notable capital improvements include the upgrade to the Wharf Street DICL and the manhole sealing and rehabilitation program was completed.

BACKGROUND

This report is the second Quarterly Report submitted by the Water and Wastewater Branch during the 2017/18 Financial Year. This report highlights progress against key performance areas required by the Department of Energy and Water Supply and required compliance levels by the Department of Environment and Heritage Protection.

COMMENT

This report enables Councillors and the community to obtain a strategic view of activities within the Water and Wastewater branch.

The Quarterly Report documents progress on key operational and service delivery aspects and regulatory compliance levels.

The Water and Wastewater Quarterly Report does not include comprehensive progress reporting in terms of the Capital Works Programs, Operational Plan and financial statements as these are dealt with in separate Quarterly Reports to Council.

FINANCIAL/RESOURCE IMPLICATIONS

Failure to comply with required standards and to respond quickly and effectively to water and wastewater incidents may result in harm to the community and substantial penalties.

RISK MANAGEMENT IMPLICATIONS

Council, as a registered water service provider, has a statutory obligation to ensure it is able to provide water and wastewater services to customers. Council's reputation would suffer if it is unable to maintain service levels at prescribed standards. This Quarterly Water and Wastewater report provides information on strategies implemented by the Water and Wastewater branch to minimise occupational health and safety risks and risks to Council infrastructure.

SUSTAINABILITY IMPLICATIONS

Economic:	It is essential to adequately maintain water and wastewater infrastructure in order to provide satisfactory services in support of economic development in the Shire.
Environmental:	Failure to provide adequate and compliant water and wastewater services can lead to environmental harm and breaching of licence conditions.
Social:	The Community expects fully operational and compliant water and wastewater services.

CORPORATE/OPERATIONAL PLAN, POLICY REFERENCE

This report has been prepared in accordance with the following:

Corporate Plan 2014-2019 Initiatives:

Theme 5 – Governance

5.2.1 - Provide Councillors and community with accurate, unbiased and factual reporting to enable accountable and transparent decision-making.

5.3.4 - Develop practices and skill levels to ensure safety and wellbeing in the workplace.

Operational Plan 2017-2018 Actions:

3.1.10 - Obtain revised licence for Mossman Wastewater Treatment Plant

3.2.7 - Implementation of a leak detection program

3.2.8 - Obtain an amended licence for the Mossman Water Treatment Plant based on closed system conditions

COUNCIL'S ROLE

Council can play a number of different roles in certain circumstances and it is important to be clear about which role is appropriate for a specific purpose or circumstance. The implementation of actions will be a collective effort and Council's involvement will vary from information only through to full responsibility for delivery.

The following areas outline where Council has a clear responsibility to act:

Asset-Owner	Meeting the responsibilities associated with owning or being the custodian of assets such as infrastructure.
Regulator	Meeting the responsibilities associated with regulating activities through legislation or local law.

CONSULTATION

Internal: Nil

External: Water and wastewater quality parameters are tested by an accredited laboratory and test results and service levels are required to be reported to the Department of Energy and Water Supply and the Department of Environment and Heritage Protection.

ATTACHMENTS

1. Water and Wastewater Quarterly Report for the period ending 31 December 2017 **[5.7.1]**

Water and Wastewater Quarterly Report

1 October 2017 – 31 December 2017

The aim of the Water and Wastewater Quarterly Report is to inform Councillors and the community on the progress of key operational and service delivery areas as well as an update of regulatory compliance status within the Water and Wastewater Branch.

The Water and Wastewater Quarterly Report does not include comprehensive progress reporting in terms of the Capital Works Programs and the Operational Plan which are dealt with in separate Quarterly Reports to Council.

This report highlights aspects of the activities of the Water and Wastewater Branch that are generally industry benchmark indicators as well as key performance areas and compliance monitoring parameters as required by the Department of Natural Resources, Mines and Energy (DNRME) and the Department of Environment and Science (DES).

Water

1. Water reticulation services

General maintenance was carried out on all schemes for this quarter including all intake flushing programs and cleaning/flushing of dead end mains. Maintenance for hydrants and valves and checks for reservoirs and pump stations were also carried out on all schemes.

Leakage and non-revenue water investigation on the water reticulation system from Mowbray to Daintree was surveyed by Detection Services. Approximately 270 km of water pipeline was surveyed to locate and repair leaks in reticulation network and also in domestic and commercial connections. During the survey a total of 82 leak locations were found. Early identification of leakages can help managing environmental risks and create both direct and indirect savings. The number of leaks found in 2017 was lower than last time it was surveyed in 2011, which indicates that a large amount of work has been carried out on the water reticulation infrastructure.

Cert III water management training continued for four members of the Water Team.

The capital works program for Water Reticulation continued with the upgrade to the Wharf Street DICL being almost completed by the end of the reporting period.

Table 1. Water Reticulation Services

Douglas Shire Reticulation (all schemes)	
Settlement Meter Reads	71
New Water Services Connections	7
Service Repairs	183
Water Mains Repairs	10
Water Quality Complaints	3
Flushing Events: Mossman/Port Douglas/ Cooya/ Newell	7
Flushing Events: Whyanbeel/Wonga	6
Flushing Events: Daintree/ De Meio	1

There were 3 water quality complaints during the reporting period.

Table 2. Water Complaints

Address	CRM No & Date	Nature of water complaint	How it was resolved	Response Time
21 Hibiscus Ct Rocky Point	52830 10/10/2017	Chemical taste and smell in water	Issue investigated and it was established the owner had been drinking water from a new plastic hose that had tainted the water taste. Customer satisfied with outcome.	50 mins
61 Front St Mossman	53589 2/11/2017	Discoloured water	Flushed the line until it was clean water. Residuals tested and levels well within acceptable range. Customer satisfied with outcome.	10 mins
26 Wharf St Port Douglas	55145 22/12/2017	Water very warm	Flushed the line until clear and cold. Residual chlorine tested and was at 0.81, being well within the acceptable range. Customer satisfied with outcome.	15 mins

2. Water schemes and potable water consumption

Water Restrictions

Levels 3 and 4 water restriction description details were adopted on 24 October at a Special Council Meeting to enable Council to act if the need to further reduce water consumption was required, particularly with weather patterns showing prolonged dry periods.

Level 2 water restrictions remained in force for the whole of the reporting period. Although there were intermittent scuds of rain throughout the reporting period, these were not substantial enough to replenish the supply to acceptable levels and the Emergency Water Action Group (EWAG) determined that the water restrictions should stay in place until such time as higher volume of rainfall occurs on a regular basis.

All Schemes

Raw water quality remained good in all intakes averaging below 1.0 NTU. Some heavy rain events in December resulted in minor flooding and a number of raw water turbidity events resulting in plant shutdowns.

Throughout the water schemes, all pump stations performed well with no incidents.

The De Meio Drive bore field and non-potable storage reservoir operated at normal production. Craiglie reservoir was fully operational. Both Flagstaff and Rocky Point reservoirs performed well, and the calcium hypo automated dosing facilities maintained stable chlorine levels in the drinking water.

Capital Works projects commenced for the 2017-2018 period. 52 new ultrafiltration (UF) cartridges were fitted and commissioned at the Mossman water plant and orders are in place for major Capital items.

Cert III and Cert IV water industry training continued for two water plant operators.

Mossman/Port Douglas Scheme

An annual audit inspection was undertaken by DES officers on 22 November at the Mossman WTP. There was 1 non-compliance identified during the inspection that involved discharge from an unapproved point, however this was known to be occurring by DES and the matter is currently being assessed as part of the amendment application that is being reviewed by DES.

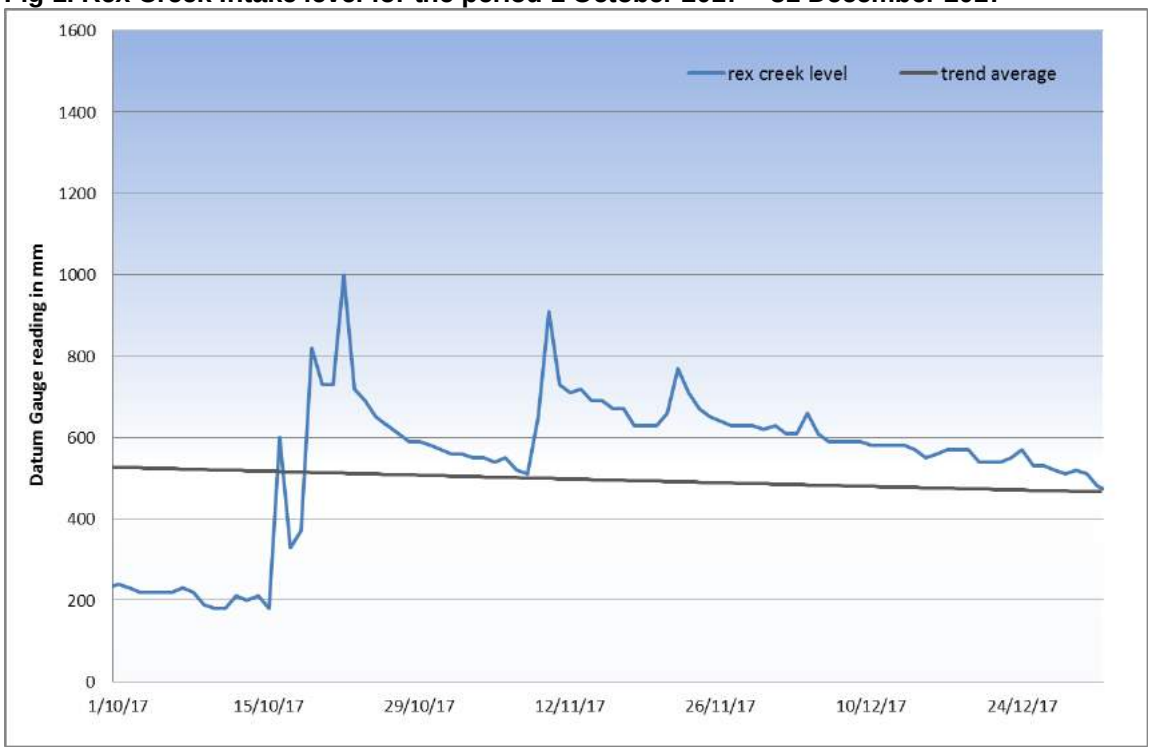
The General Manager Operations and Chief Executive Officer, Douglas Shire Council attended a meeting with DES in Cairns on 19 December to discuss various compliance issues raised by DES, and to assist in improving collaboration between Council and DES. As an outcome of this meeting, a site visit was arranged to occur in January 2018 to assist DES officers in further understanding of Douglas Shire Council's infrastructure and environmental impacts on operational and licensing requirements.

Rex Creek intake levels continued to steadily drop over the quarter due to the continuing dry weather conditions, with the intake height averaging around 0.3m. Maximum instantaneous demand flow rate dropped from the previous quarterly period of 370L/s to 225L/s. This level was very low, particularly in keeping up with demand, and the situation continued to be closely monitored to ensure supply was still able to be met.

All ultrafiltration racks were operational, and maintenance works continued with cartridge repairs to ensure compliance with UF rack integrity test limits. General maintenance works were also undertaken.

There were no water quality reportable incidents in the Mossman/Port Douglas water scheme for the reporting period.

Fig 1. Rex Creek Intake level for the period 1 October 2017 – 31 December 2017

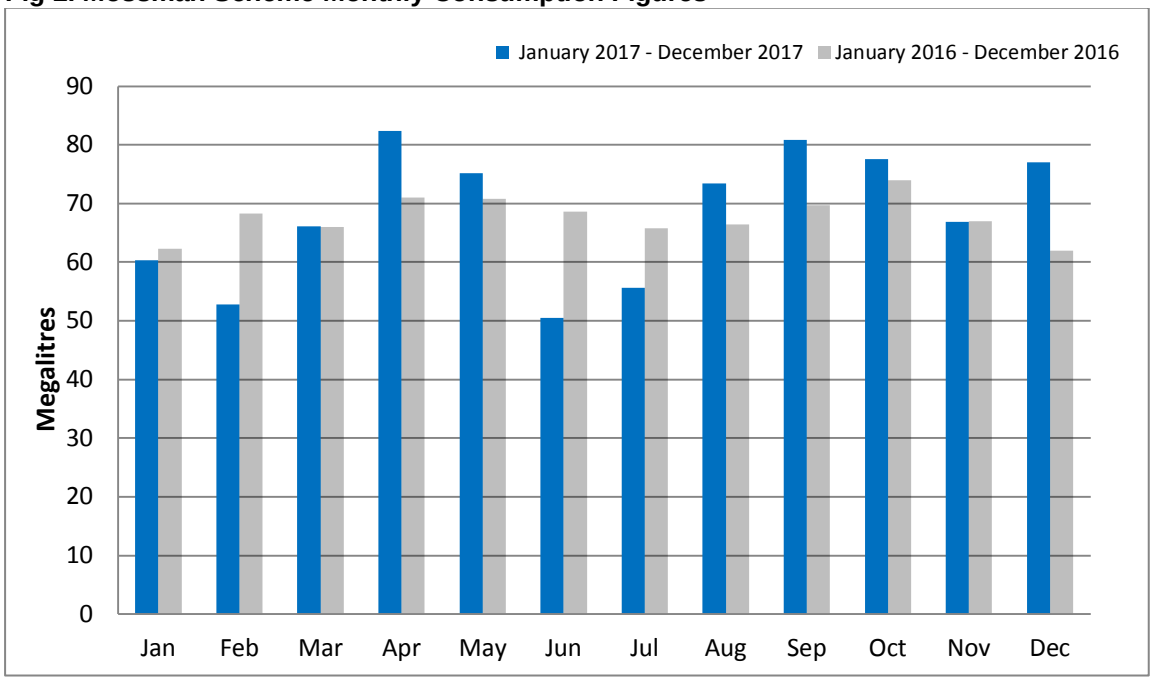


Mossman Water Supply

Mossman Water Treatment Plant met all demand requirements during the reporting period. Consumption trends declined in October and November, but increased slightly in December.

The total monthly consumption of water in Mossman, Cooya Beach and Newell Beach areas can be seen in Figure 2.

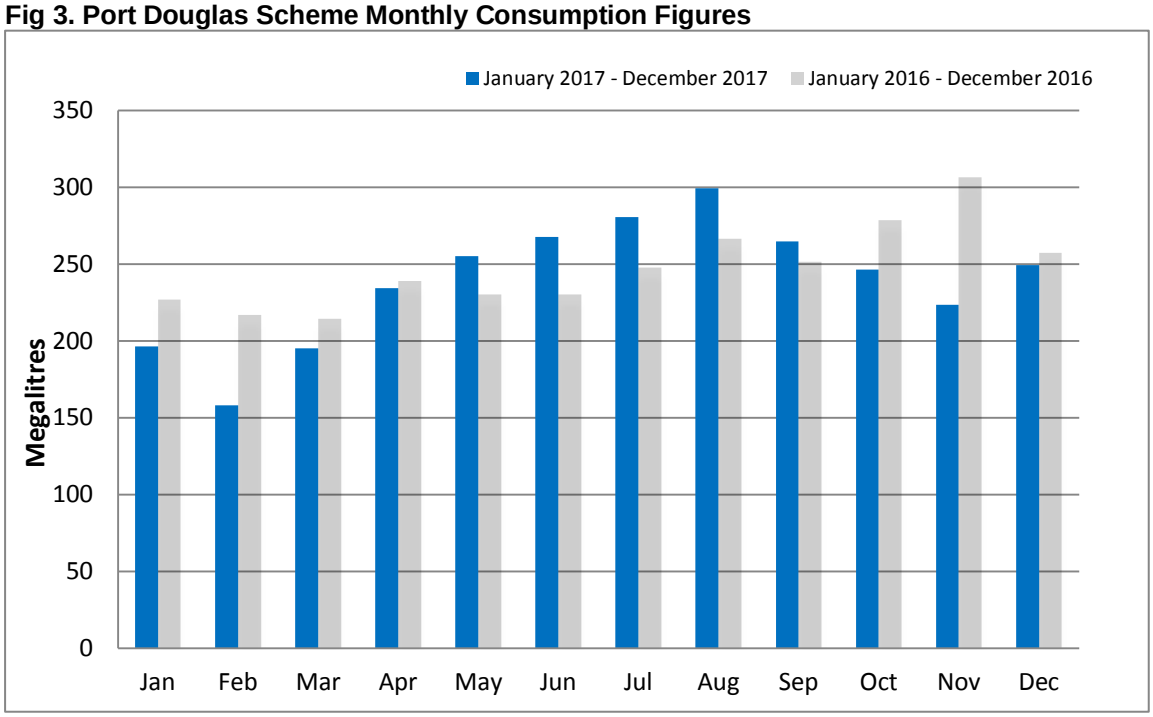
Fig 2. Mossman Scheme Monthly Consumption Figures



Port Douglas Water Supply

Current trends indicate increasing consumption typical of seasonal trends and visitor numbers to the region, and in particular within Port Douglas. The total monthly consumption of water in Port Douglas can be seen in Figure 3.

Fig 3. Port Douglas Scheme Monthly Consumption Figures



Whyanbeel Scheme

Whyanbeel Water Treatment Plant met all demand requirements during the reporting period.

The intake levels continued to drop due to the dry conditions, but were still adequate to meet demand. Reservoir levels remained near capacity to ensure consumer demand was met.

The UF rack was fully operational during the reporting period. To maintain UF filter efficiency, ongoing chemical clean-in-place operations were undertaken, and general maintenance work continued.

The new gas chlorination plant at Whyanbeel is performing well to maintain stable chlorine residual levels in the treated drinking water.

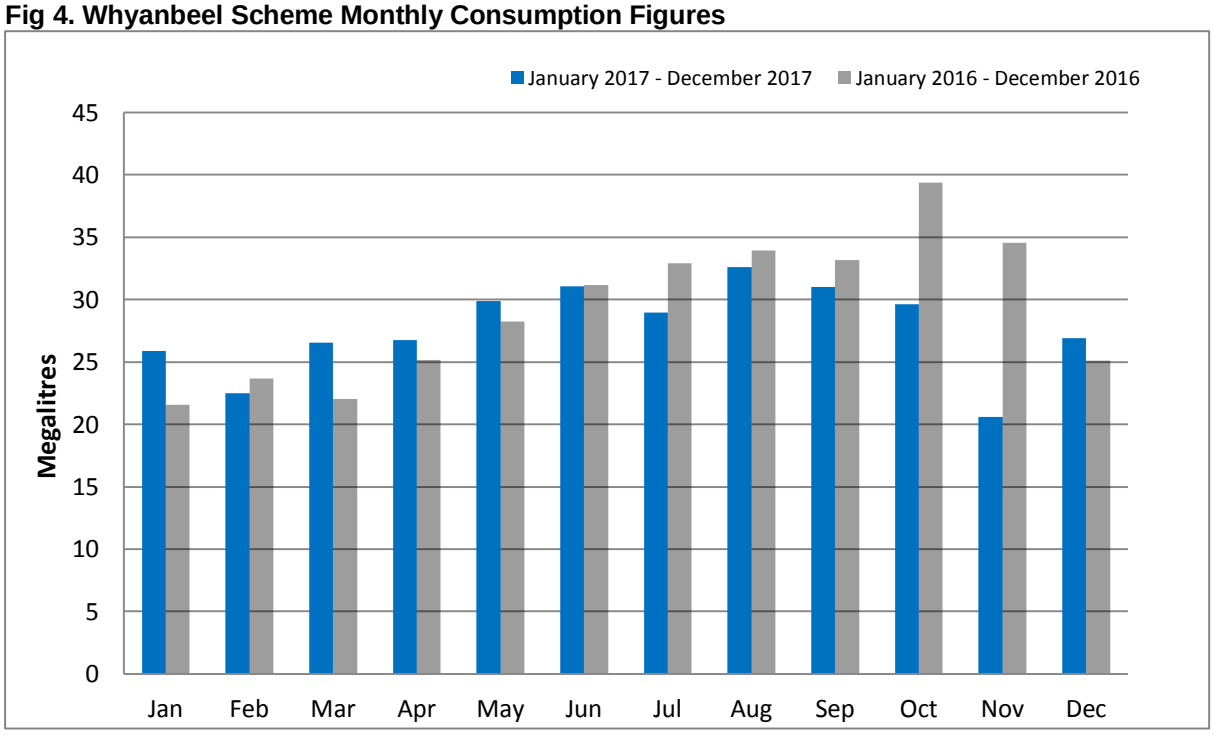
To address low pH levels <6.5 in the drinking water soda ash dosing was commenced at the Whyanbeel water plant in December. The soda ash dosing system comprises of a bulk storage tank 1000L of soda ash (Na_2CO_3) solution, dosing pump and on line pH monitoring equipment which is connected to the SCADA system for remote monitoring and alarming purposes. The dosing system was designed by DSC staff and installed by staff and an electrical contractor. The system is performing well effectively raising pH by one base unit. DNRME was notified of the modification of the treatment process.

There were no water quality reportable incidents in the Whyanbeel water scheme for the reporting period.

Whyanbeel Water Supply

The total monthly consumption of water in the Whyanbeel scheme can be seen in Figure 4.

Fig 4. Whyanbeel Scheme Monthly Consumption Figures



Daintree Scheme

Daintree Water Treatment Plant met all demand requirements during the report period. Intake levels at Intake Creek dropped due to the dry conditions but were still adequate to meet consumer demand.

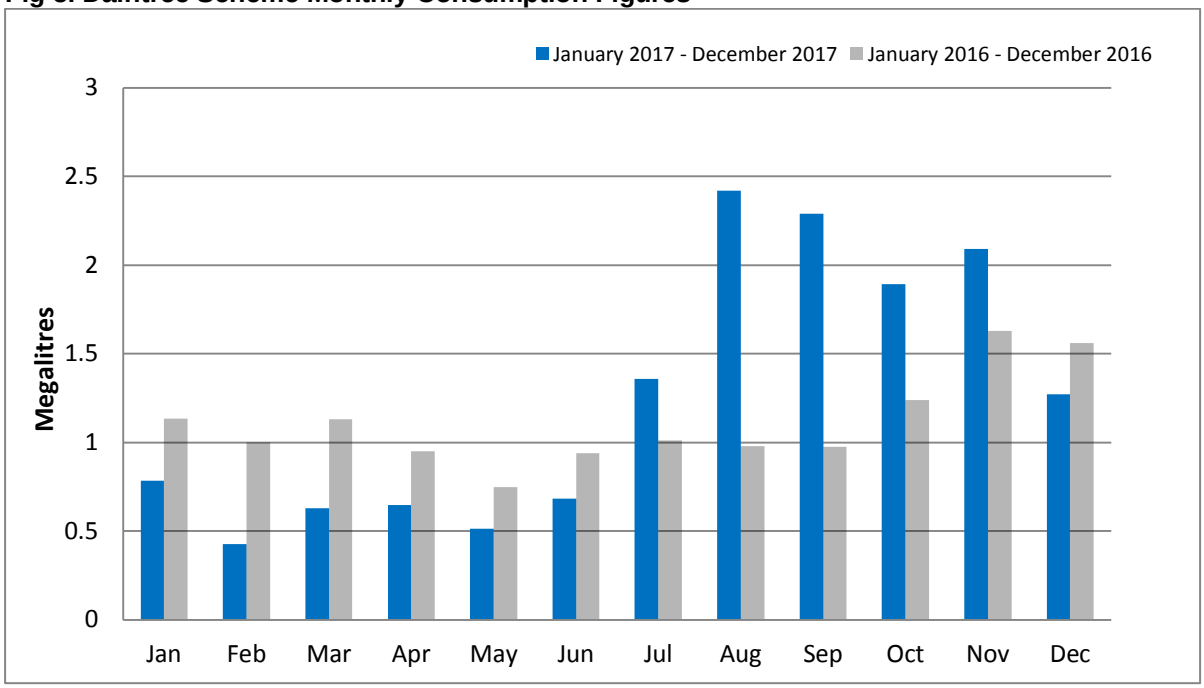
To maintain UF filter efficiency, ongoing chemical clean-in-place operations were undertaken and general maintenance works continued.

There were no water quality reportable incidents in the Daintree water scheme for the reporting period.

Daintree Water Supply

The total monthly consumption of water in the Daintree scheme can be seen in Fig 5.

Fig 5. Daintree Scheme Monthly Consumption Figures



Water quality monitoring and results

Drinking water is sampled at intakes, reservoirs, treatment plants and in the reticulation network to ensure compliance with the Australian Drinking Water Guideline (ADWG).

For the period 1 October 2017 - 31 December 2017, a total of 469 treated and 15 raw water samples were taken in the 3 water supply schemes. A total of 259 samples were tested in the Douglas Water Laboratory and 225 treated and raw water samples were tested by a NATA accredited laboratory for physical, chemical and microbiological parameters. All tested parameters in water samples taken during the reporting period were compliant with Australian Drinking Water Guidelines (ADWG) and standards required by the Water Supply Regulator and Queensland Health.

Mossman/Port Douglas Supply Scheme

Average monthly values for key operational and compliance parameters can be seen in Table 3, 4 and 5 for treated water at the Mossman Treatment Plant, Port Douglas Reservoirs

and Port Douglas/Mossman Reticulation network, respectively. Figure 6 indicates the daily turbidity trends at the intake and treated water as recorded at the Mossman Water Treatment Plant for the period October to December 2017.

Table 3. Average monthly values for key operational and compliance parameters in treated water at Mossman Treatment Plant.

Month	pH	Temp °C	Total Alkalinity mg $CaCO_3$/L	Free chlorine mg/L	Total chlorine mg/L	*E.coli* CFU/ 100ml	Hetero-trophic Plate CFU/mL	Total coliforms CFU/100ml
Standard	6.5-8.5	10-30	0-200	0.1-4.0	Max 5.0	<1	-	0-10
Oct-17	6.4	23	5	1.3	1.3	<1	<1	<1
Nov-17	6.4	23	5	1.3	1.3	<1	<1	<1
Dec-17	6.4	25	<5	1.3	1.4	<1	<1	<1

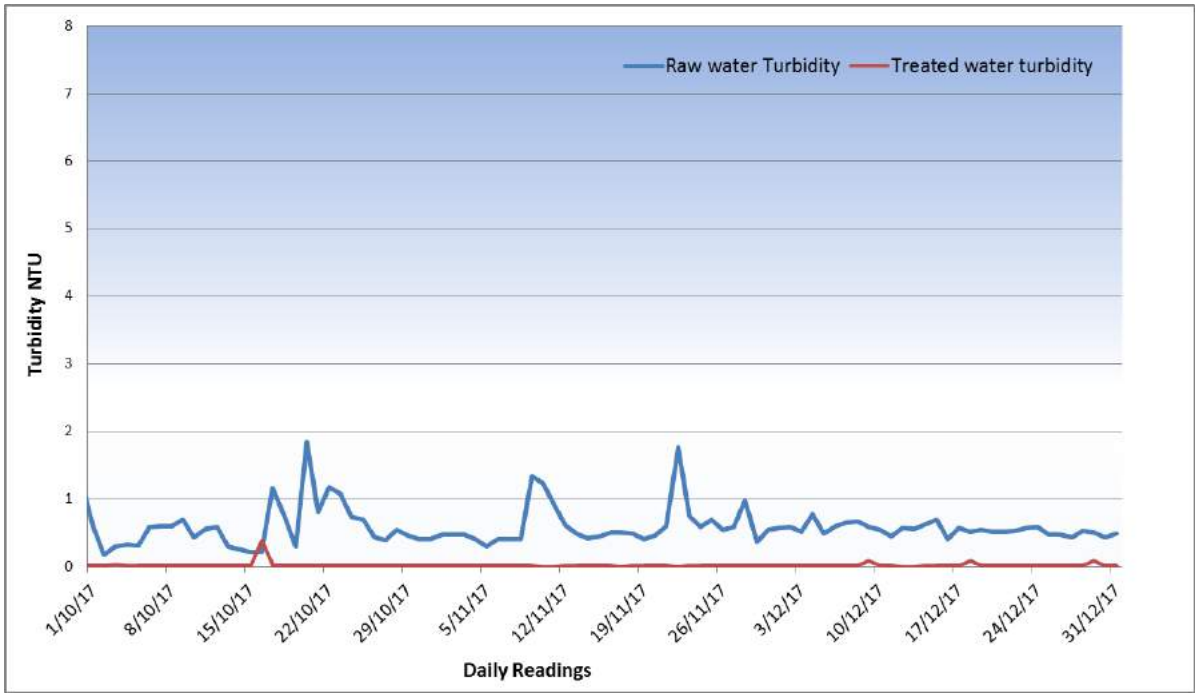
Table 4. Average monthly values for key operational and compliance parameters in the Port Douglas Reservoirs.

Month	pH	Temp °C	Total Alkalinity mg $CaCO_3$/L	Free chlorine mg/L	Total chlorine mg/L	*E.coli* CFU/ 100ml	Hetero-trophic Plate CFU/mL	Total coliforms CFU/100ml
Standard	6.5-8.5	10-30	0-200	0.1-4.0	Max 5.0	<1	-	0-10
Oct-17	6.8	25	5	0.9	0.9	<1	~1	<1
Nov-17	6.7	26	5	0.9	1.0	<1	<1	<1
Dec-17	6.8	27	6	0.9	0.9	<1	<1	<1

Table 5. Average monthly values for key operational and compliance parameters in the Mossman/Port Douglas Reticulation Network.

Month	pH	Temp °C	Free chlorine mg/L	Total chlorine mg/L	*E.coli* CFU/ 100ml	Hetero-trophic Plate CFU/mL	Total coliforms CFU/100ml
Standard	6.5-8.5	10-30	0.1-4.0	Max 5.0	<1	-	0-10
Oct-17	6.9	27	0.7	0.8	<1	~26	<1
Nov-17	6.9	27	0.8	0.8	<1	<1	<1
Dec-17	6.9	29	0.8	0.8	<1	<1	<1

Fig 6. Turbidity trends at the Rex Creek intake and treated water at the Mossman Water Treatment Plant



Whyanbeel Supply Scheme

Average monthly values for key operational and compliance parameters can be seen in Table 5, Table 6 and Table 7 for treated water at the Whyanbeel Treatment Plant/Reservoir and Whyanbeel Reticulation Network, respectively. Figure 7 indicates the daily turbidity trends at the intake and treated water as recorded at the Whyanbeel Water Treatment Plant for the period October to December 2017.

Since the change from liquid to gaseous chlorine at Whyanbeel water treatment plant, the pH of the treated water had lowered outside the aesthetic range. As a result bench scale experiments demonstrated the best option for pH adjustment was to use soda ash. A dosing system for soda ash together with a SCADA alarm and controller was developed and commenced in December 2017. Since the commencement of soda ash dosing, a positive change can be seen within the pH results.

Table 5. Average monthly values for key operational and compliance parameters in treated water at Whyanbeel Treatment Plant

Month	pH	Temp °C	Total Alkalinity mg $CaCO_3$/L	Free chlorine mg/L	Total chlorine mg/L	*E.coli* CFU/ 100ml	Hetero-trophic Plate CFU/mL	Total coliforms CFU/100 ml
Standard	6.5-8.5	10-30	0-200	0.1-4.0	Max 5.0	<1	-	0-10
Oct-17	5.6	24	<5	1.1	1.1	<1	<1	<1
Nov-17	5.3	23	<5	1.2	1.2	<1	~2	<1
Dec-17	5.8	25	<5	1.3	1.3	<1	~1	<1

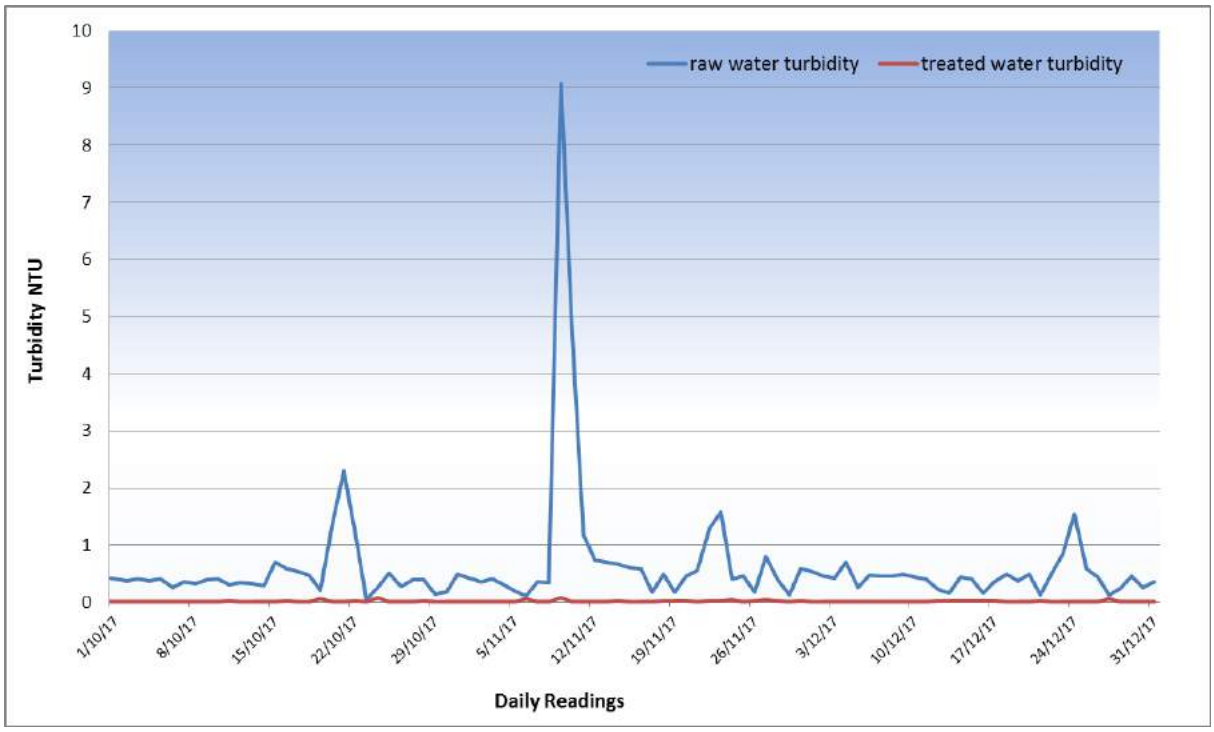
Table 6. Average monthly values for key operational and compliance parameters in the Whyanbeel Reservoir.

Month	pH	Temp °C	Total Alkalinity mg $CaCO_3$/L	Free chlorine mg/L	Total chlorine mg/L	*E.coli* CFU/ 100ml	Hetero-trophic Plate CFU/mL	Total coliforms CFU/100 ml
Standard	6.5-8.5	10-30	0-200	0.1-4.0	Max 5.0	<1	-	0-10
Oct-17	7.0	27	9	0.9	1.0	<1	<1	<1
Nov-17	7.1	27	5	0.9	1.0	<1	~1	<1
Dec-17	7.0	29	7	0.9	0.9	<1	<1	<1

Table 7.Average monthly values for key operational and compliance parameters in the Whyanbeel Reticulation Network.

Month	pH	Temp °C	Free chlorine mg/L	Total chlorine mg/L	*E.coli* CFU/ 100ml	Hetero-trophic Plate CFU/mL	Total coliforms CFU/100ml
Standard	6.5-8.5	10-30	0.1-4.0	Max 5.0	<1	-	0-10
Oct-17	6.8	27	0.7	0.7	<1	~1	<1
Nov-17	6.8	27	0.5	0.6	<1	<1	<1
Dec-17	6.7	29	0.6	0.6	<1	<1	<1

Fig 7. Turbidity trends at the Little Falls Creek intake and treated water at the Whyanbeel Water Treatment Plant



Daintree Supply Scheme

Average monthly values for key operational and compliance parameters can be seen in Table 8 and Table 9 for treated water at the Daintree Treatment Plant and Daintree Reticulation network, respectively. Figure 8 indicates the daily turbidity trends at the intake and treated water as recorded at the Daintree water treatment plant for the reporting period.

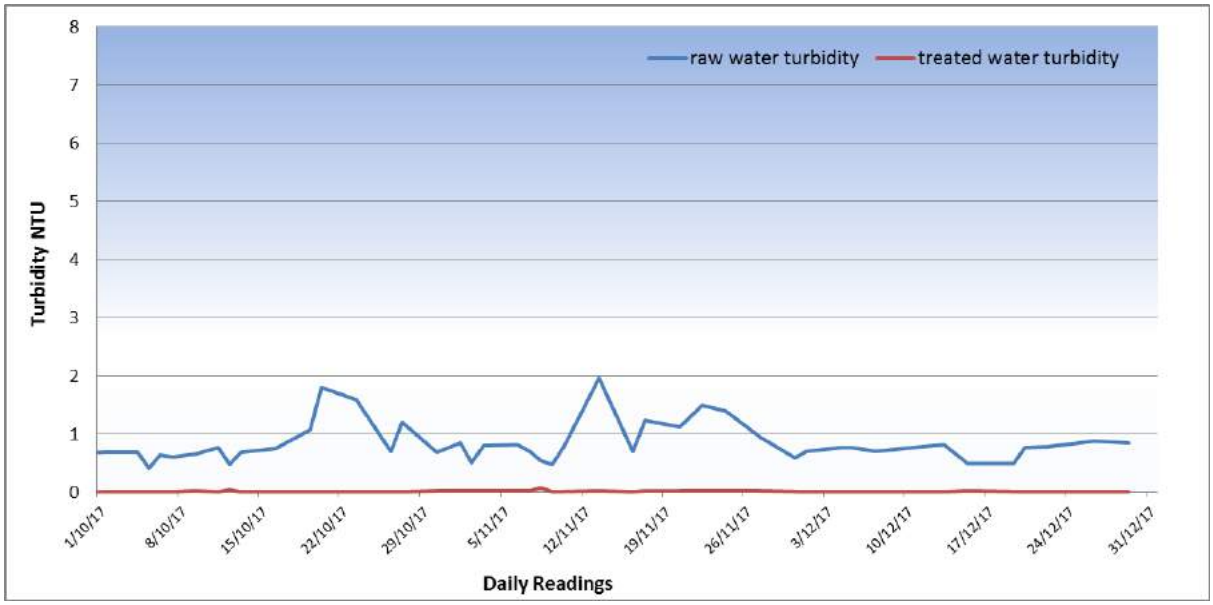
Table 8. Average monthly values for key operational and compliance parameters in treated water at Daintree Treatment Plant.

Month	pH	Temp °C	Total Alkalinity mg $CaCO_3$/L	Free chlorine mg/L	Total chlorine mg/L	*E.coli* CFU/ 100ml	Hetero-trophic Plate CFU/mL	Total coliforms CFU/100ml
Standard	6.5-8.5	10-30	0-200	0.1-4.0	Max 5.0	<1	-	0-10
Oct-17	7.2	27	27	0.9	1.0	<1	~1	<1
Nov-17	7.2	25	27	0.9	1.0	<1	<1	<1
Dec-17	7.0	27	27	1.0	1.0	<1	~6	<1

Table 9. Average monthly values for key operational and compliance parameters in the Daintree Reticulation Network.

Month	pH	Temp °C	Free chlorine mg/L	Total chlorine mg/L	*E.coli* CFU/ 100ml	Hetero-trophic Plate CFU/mL	Total coliforms CFU/100ml
Standard	6.5-8.5	10-30	0.1-4.0	Max 5.0	<1	-	0-10
Oct-17	7.8	25	0.6	0.6	<1	~2	<1
Nov-17	7.8	25	0.5	0.5	<1	<1	<1
Dec-17	7.7	27	0.7	0.8	<1	<1	<1

Fig 8. Turbidity trends at the Intake/Martin Creek intake and treated water at the Daintree Water Treatment Plant



Wastewater

3. Wastewater reticulation services

General maintenance programs were carried out at the reticulation networks and 31 pump stations in the Mossman and Port Douglas catchments. Contractors serviced all major pump stations in the sewerage network to prolong the life of the pumps, and to reduce blockage events.

The Port Douglas WWTP Sed Basin Pre-Treatment project was completed, and the Port Douglas Aeration Blowers were installed completing the project. The Manhole Sealing and Rehabilitation Program were also completed.

Table 11. Wastewater Reticulation Services

	Port Douglas Catchment	Mossman Catchment
Pump Blockages	2	13
Sewer Chokes	2	2
Sewer Main Breaks	0	0
HCB Repairs (House Connection Branch)	2	2
Odour Complaints	2	1

4. Influent and irrigation flows

Port Douglas Wastewater Treatment Plant

A total of 263,804 kL of influent entered the Port Douglas Wastewater Treatment Plant during the reporting period. The average daily flow was 2,867 kL/day. Tanker truck contractors delivered 517.23 kL of septage to the plant and 793.35 kL of leachate from the Killaloe Landfill and Transfer Station.

Influent is treated in a Sequencing Batch Reactor (SBR) which produced compliant effluent during the reporting period. A total of 51.5% of the treated effluent was pumped to two resorts and the remaining discharged into the Dickson Inlet. The Sheraton Mirage received 99,137 kL and Palmer Sea Reef received 36,736 kL of treated effluent during this period.

Total rainfall on site during the reporting period was measured as 442 mm. On 19 October 2017, the highest rainfall on a day was recorded as 174 mm. Daily inflows and total monthly flows for the reporting period are presented in Fig 9 and 10 respectively.

Fig 9. Port Douglas Daily Inflow

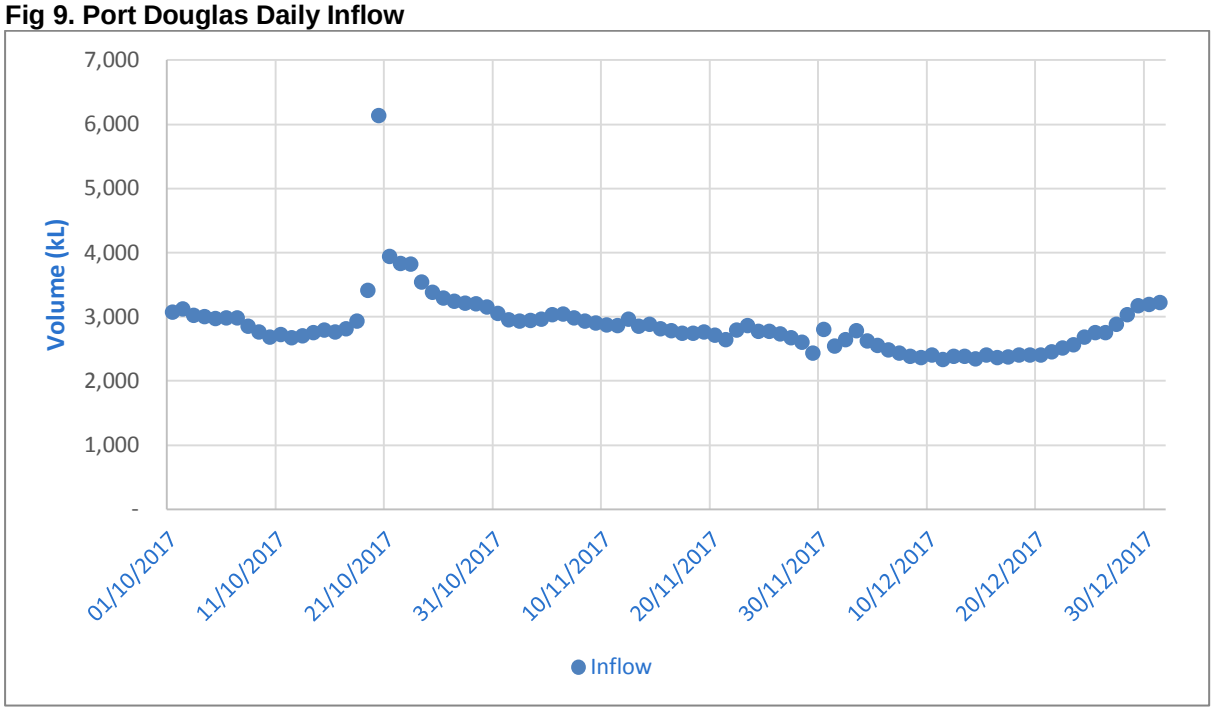
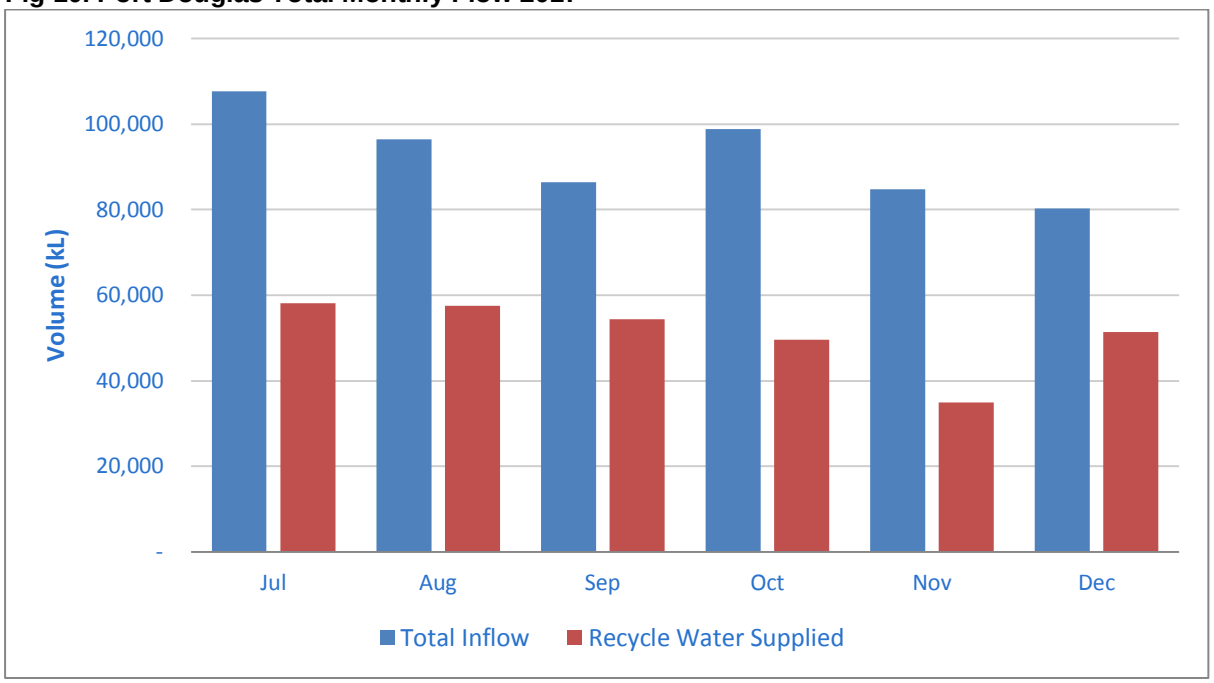


Fig 10. Port Douglas Total Monthly Flow 2017



Mossman Wastewater Treatment Plant

The Mossman Wastewater Treatment Plant received a total influent flow of 83,569 kL during the reporting period. The average daily flow was 908 kL/day. Influent is treated in an Oxidation Ditch system and compliant effluent is discharged into the Mossman River. A total of 680 mm of rain fell on site for the reporting period with the highest daily rainfall measured at 125 mm on 18 October 2017.

Daily flows from the Mossman Wastewater Treatment Plant and total monthly flows for 2017 are presented in Fig 11 and 12 respectively.

Fig 11. Mossman Wastewater Treatment Plant Daily Outflow

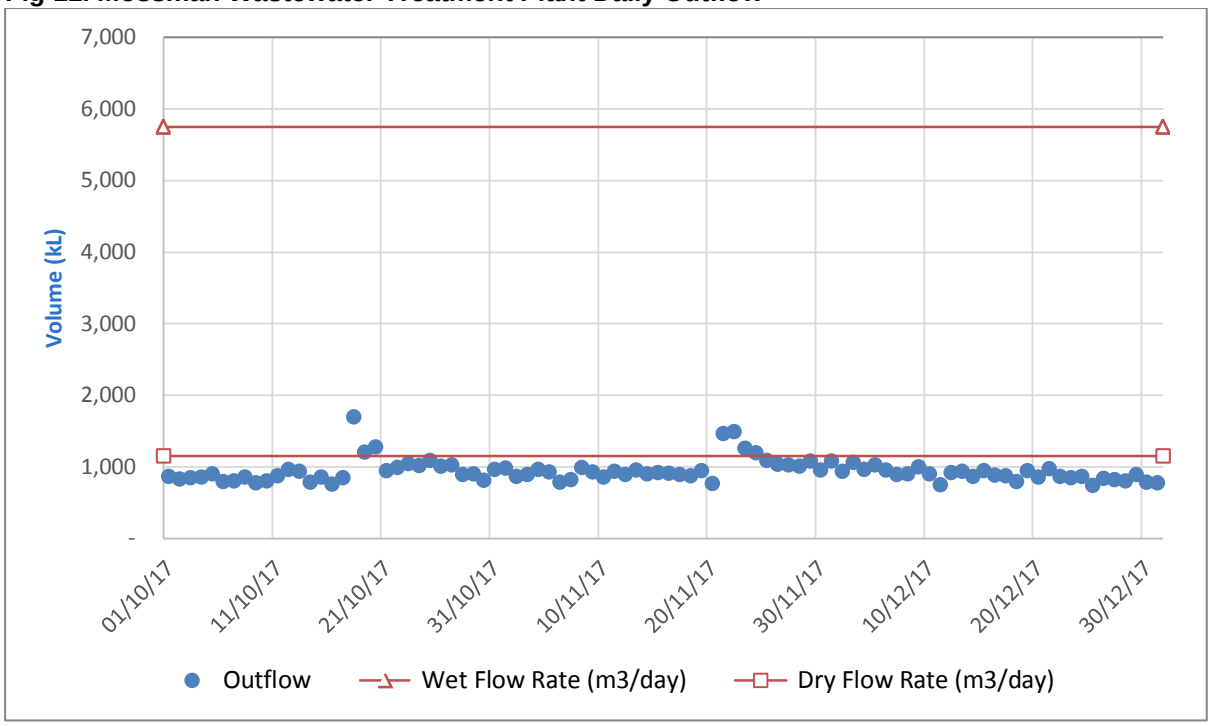
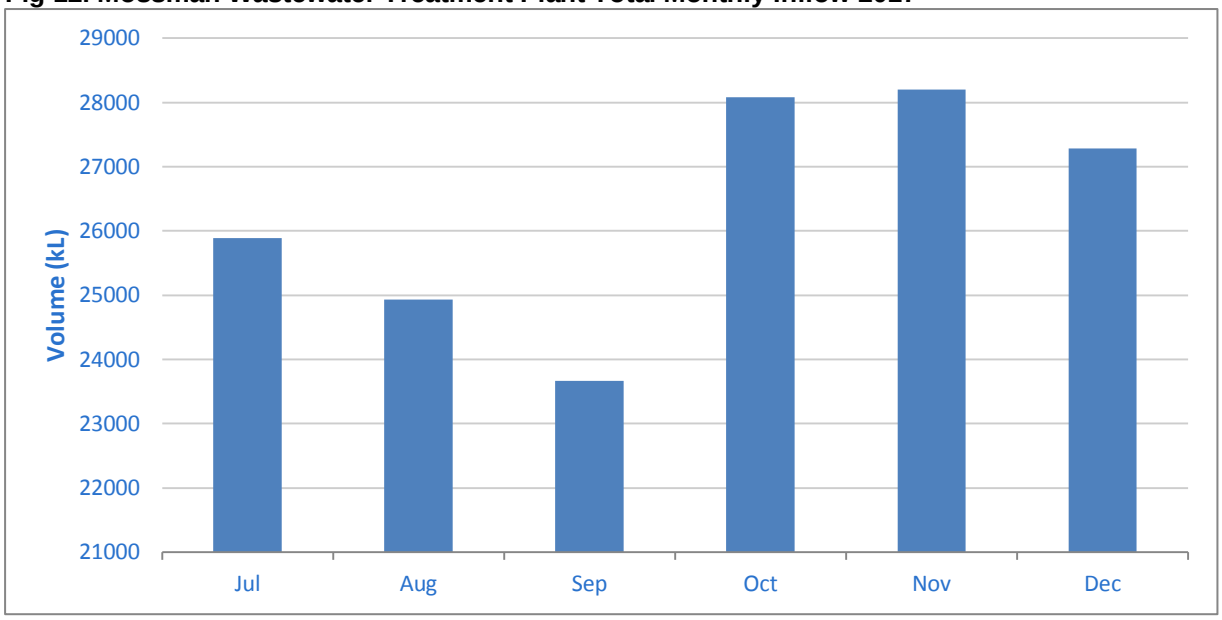


Fig 12. Mossman Wastewater Treatment Plant Total Monthly Inflow 2017



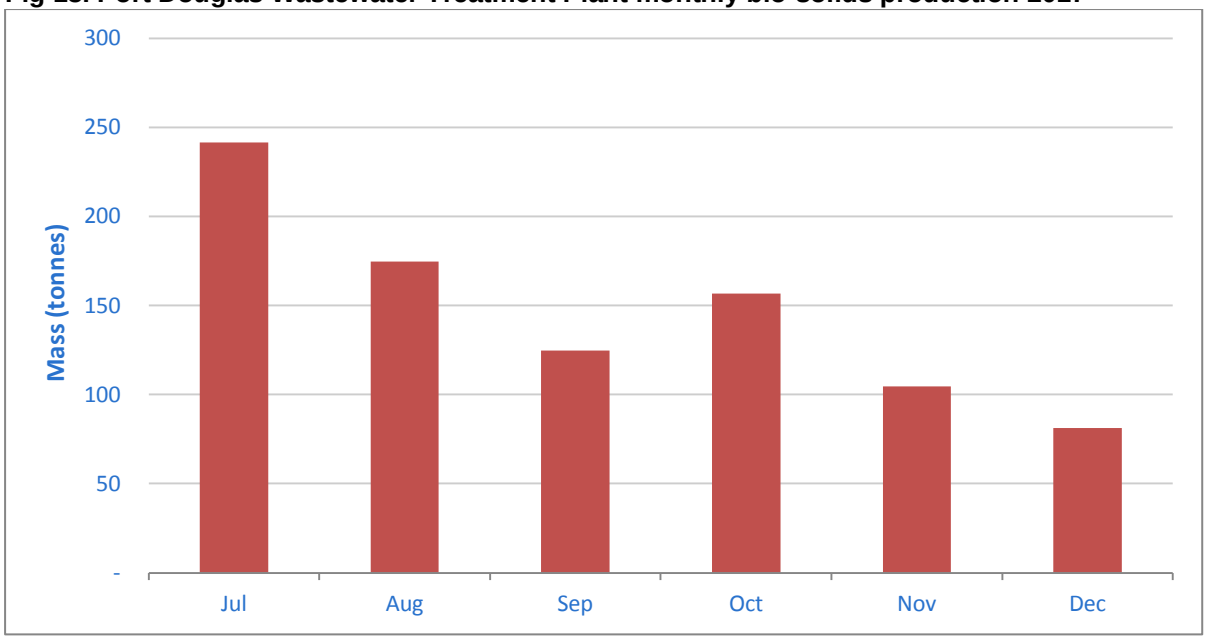
5. Bio-solids Production

Bio-solids were produced at the dewatering plants at Mossman Wastewater Treatment Plant (17% solids) and Port Douglas Wastewater Treatment Plant (12% solids). Bio-solids were transported by Arkwood Organics to Edmonton Farms, Tablelands Regional Farms and Spring Mount Waste Facility for further treatment and beneficial land application as organic fertiliser and soil conditioner.

Port Douglas Wastewater Treatment Plant

At Port Douglas Wastewater Treatment Plant, 342.58 tonnes of wet biosolids were produced during the reporting period and sent to farms for beneficial reuse. This amount of wet Biosolids equates to 42.26 dry tonnes. The monthly bio-solids production trends can be seen in Figure 13.

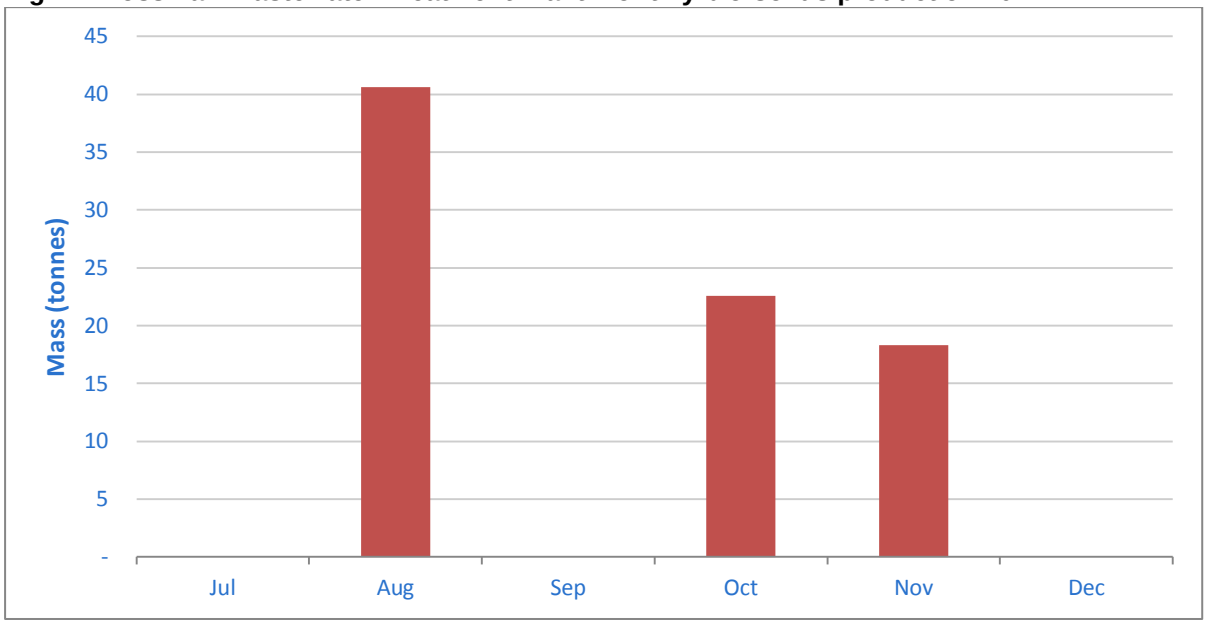
Fig 13. Port Douglas Wastewater Treatment Plant monthly bio-solids production 2017



Mossman Wastewater Treatment Plant

At Mossman Wastewater Treatment Plant, 40.9 tonnes of wet biosolids were produced during the reporting period and sent to farms for beneficial reuse. This amount of wet Biosolids equates to 5.15 dry tonnes. The monthly bio-solids production trends can be seen in Figure 14.

Fig 14. Mossman Wastewater Treatment Plant monthly bio-solids production 2017



***No bio-solids removed in July, September and December 2017**

6. Effluent quality and compliance

During the reporting period a total number of 176 wastewater compliance samples were taken from the treatment processes, bio-solids, final effluent, receiving waters and bores in both wastewater catchments. Samples were tested by a NATA accredited laboratory for physical, chemical and microbiological parameters.

All parameters tested during the reporting period in the Port Douglas and Mossman catchment were compliant with maximum concentrations as per licence definitions and conditions.

The process and compliance is monitored each day by in-house analyses of samples at the plants. Process settings, effluent quality, flow rates, pump stations performance and maintenance aspects are monitored and controlled with SCADA Citect via an extensive telemetry network.

An annual audit inspection was undertaken by DES officers on 30 November 2017 at the Port Douglas WWTP. The inspection was successful, with no non-compliances identified, and staff were commended on their good housekeeping of the treatment plant facilities.

Port Douglas Wastewater Treatment Plant

The results for final effluent key licence compliance parameters (Ammonia, Total Phosphorous, and Total Suspended Solids & BOD_5) are shown in Figures 15, 16, 17 & 18.

Fig 15. Port Douglas Wastewater Treatment Plant Final Effluent Test Results for Ammonia

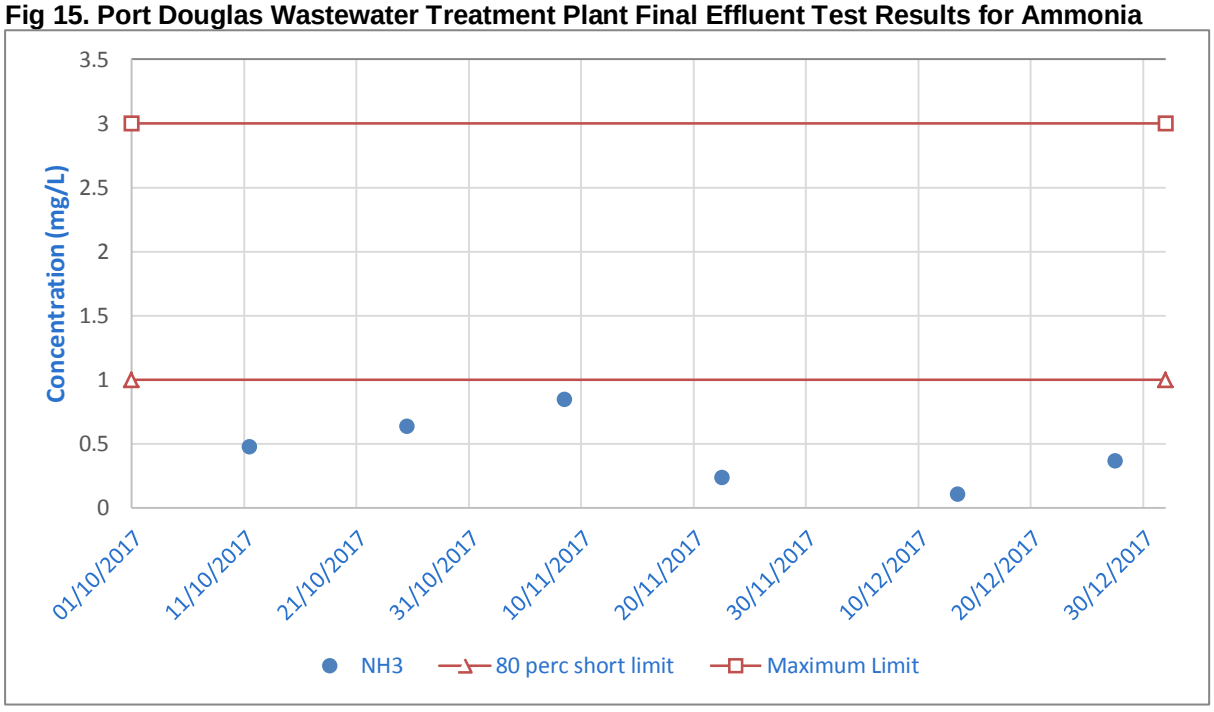


Fig 16. Port Douglas Wastewater Treatment Plant Final Effluent Test Results for Total Phosphorous

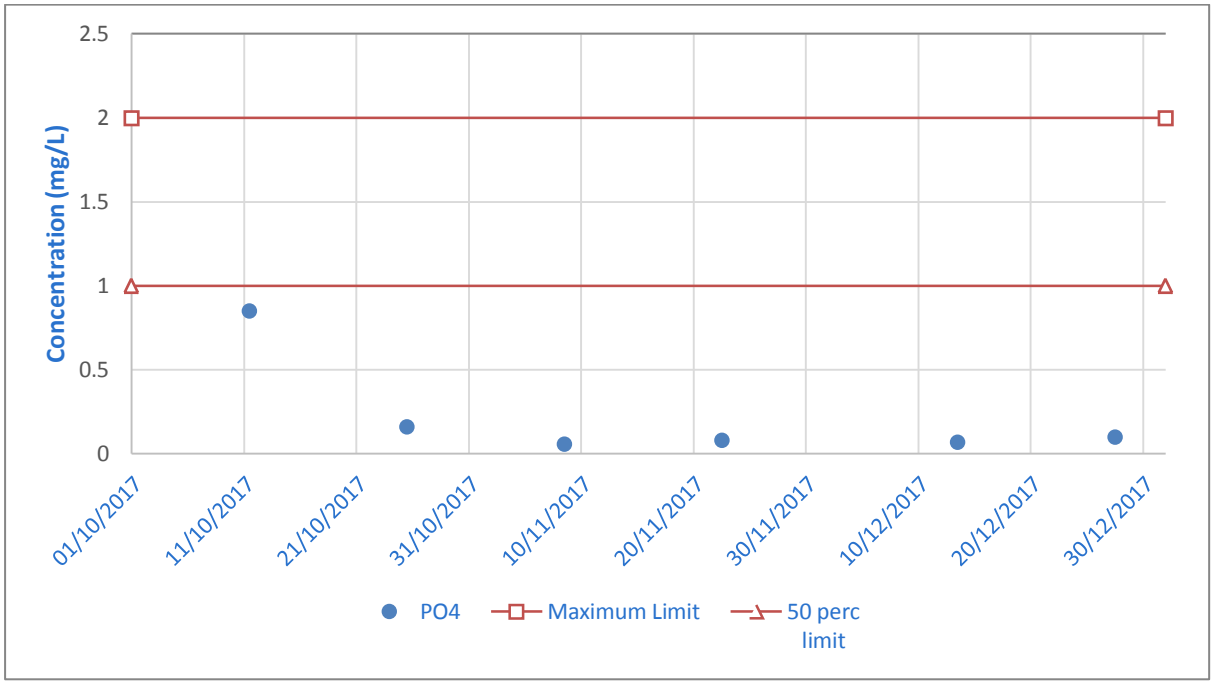


Fig 17. Port Douglas Wastewater Treatment Plant Final Effluent Test Results for Total Suspended Solids

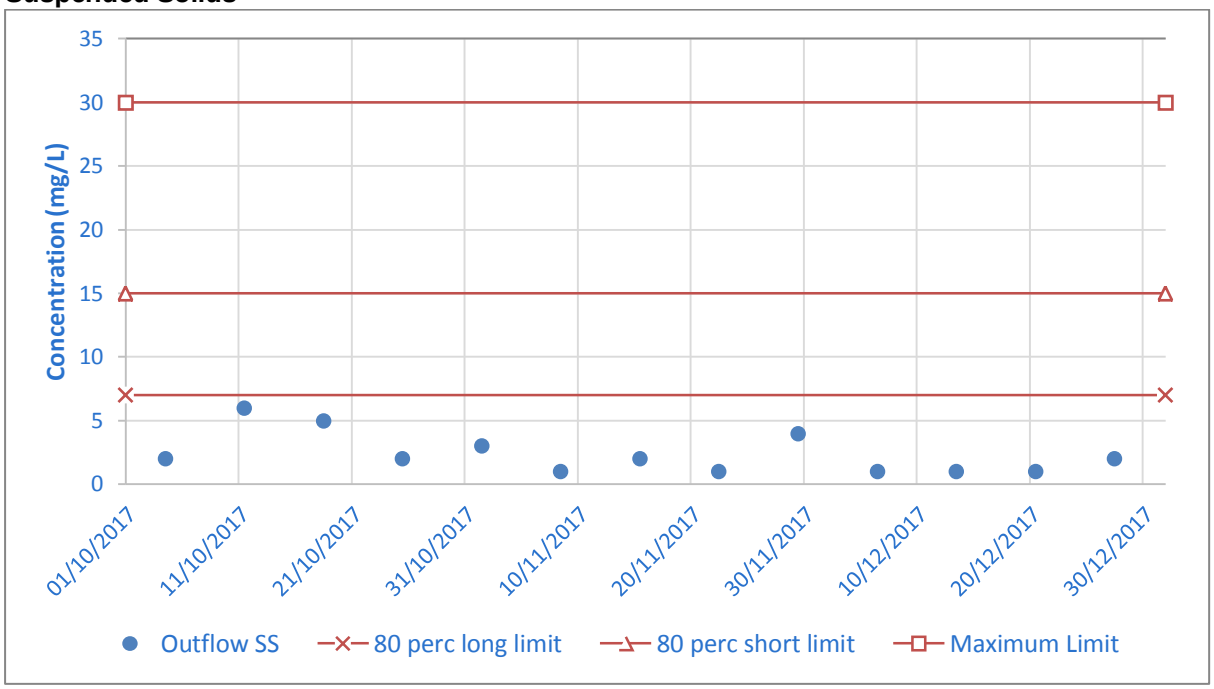
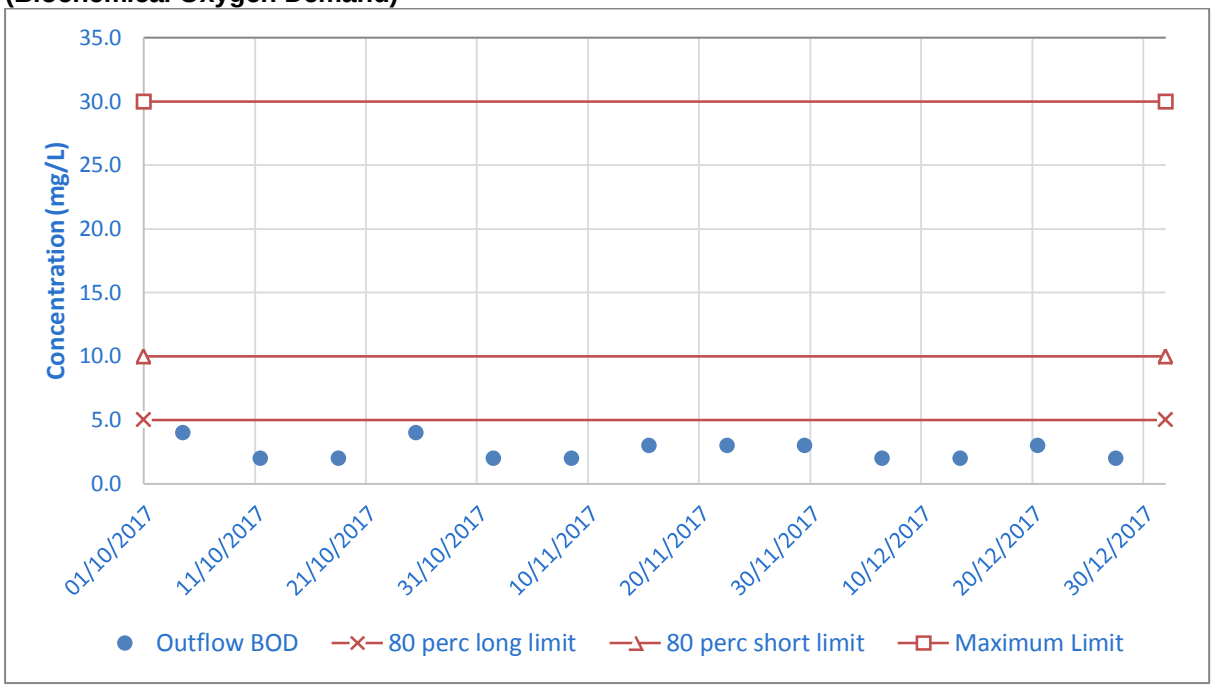


Fig. 18 Port Douglas Wastewater Treatment Plant Final Effluent Test Results for BOD_5 (Biochemical Oxygen Demand)



Mossman Wastewater Treatment Plant

The results for final effluent key licence compliance parameters (Ammonia, Total Phosphorous, Total Suspended Solids & BOD_5) are shown in Figures 19, 20, 21 & 22.

Fig. 19 Mossman Wastewater Treatment Plant Final Effluent Test Results for Ammonia

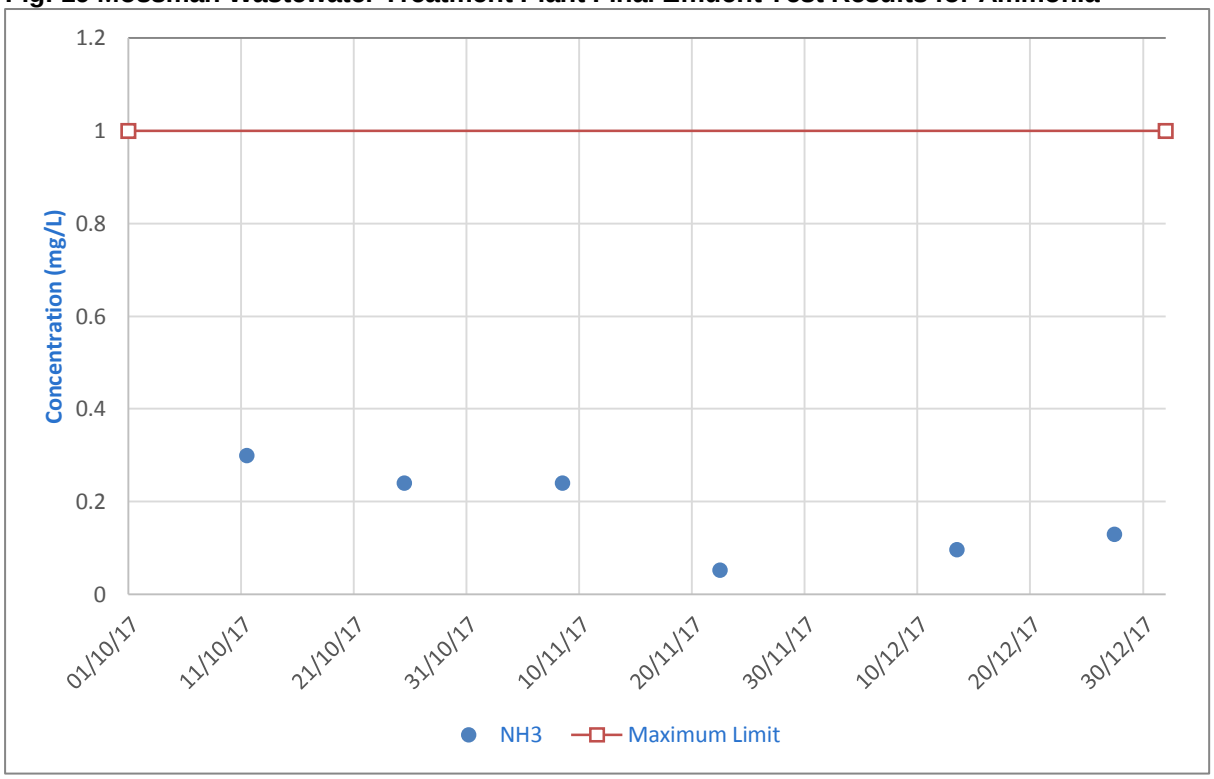


Fig. 20 Mossman WWTP Final Effluent Test Results for Total Phosphorous

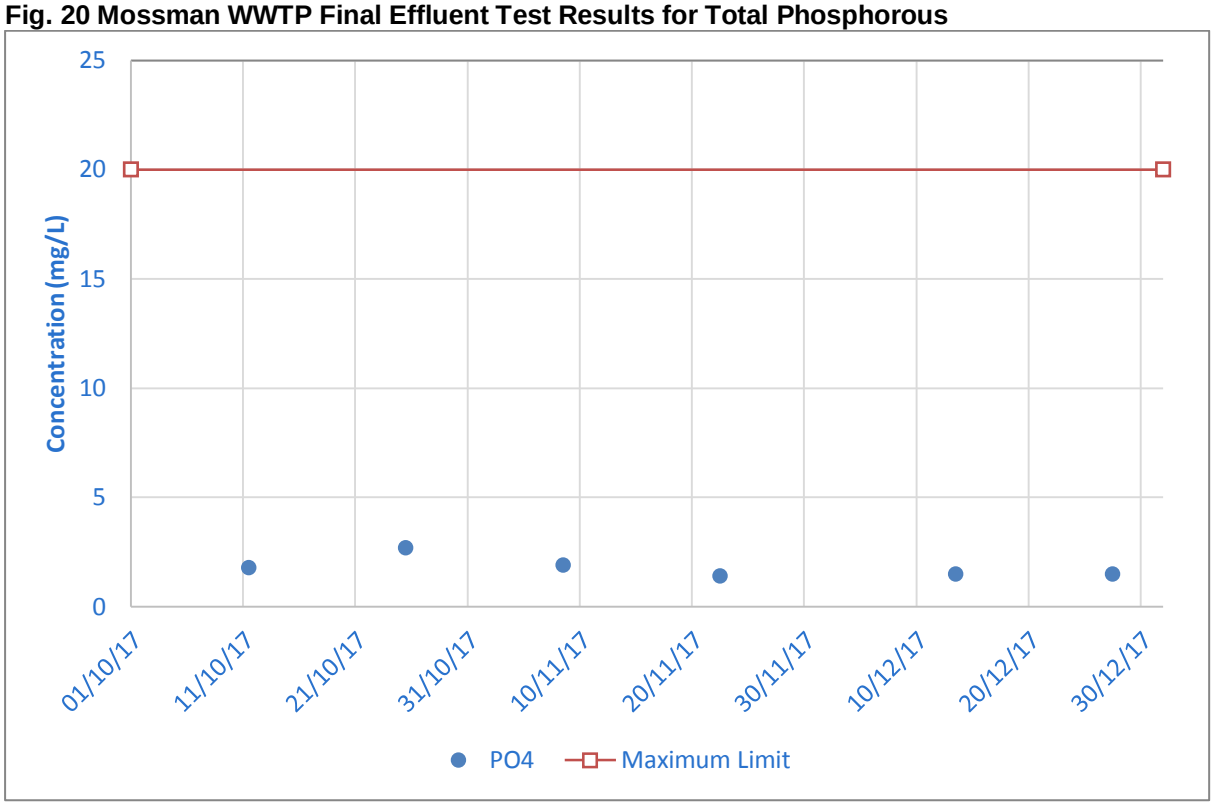


Fig. 21 Mossman WWTP Final Effluent Test Results for Total Suspended Solids

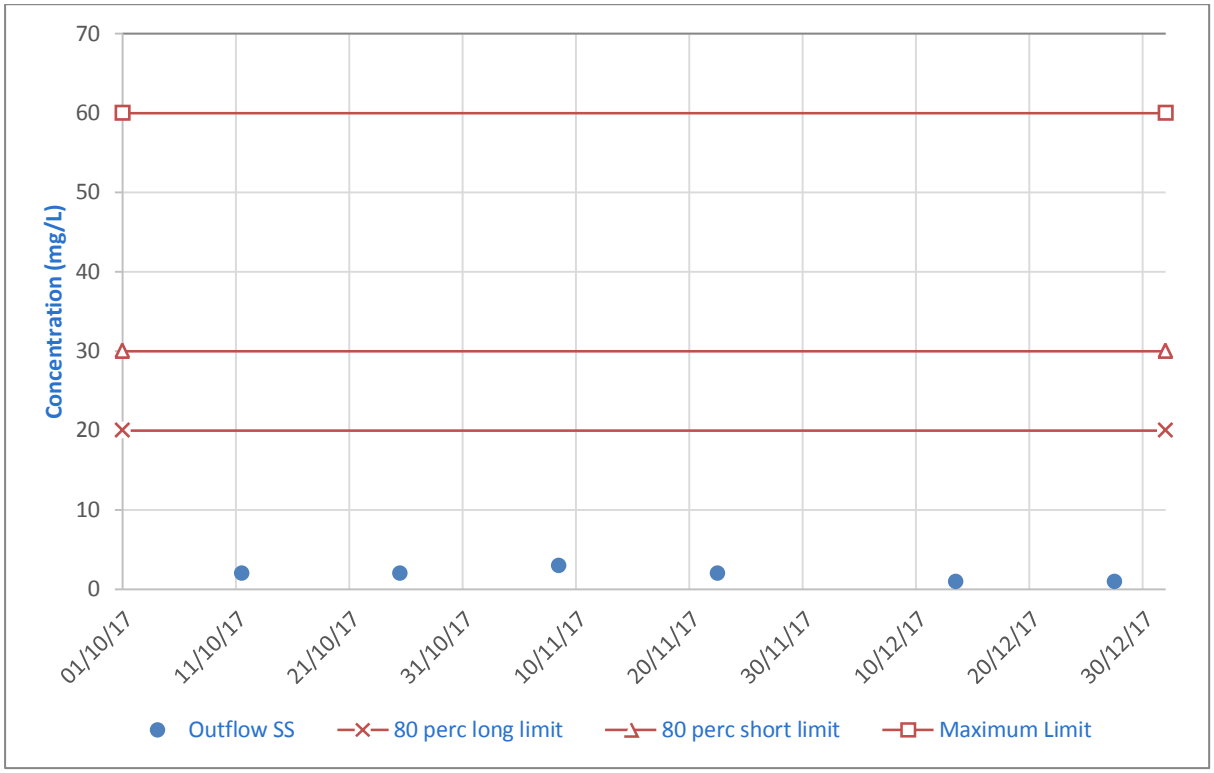


Fig. 22 Mossman Wastewater Treatment Plant Final Effluent Test Results for BOD_5 (Biochemical Oxygen Demand)