5.2. WATER AND WASTEWATER QUARTERLY REPORT FOR THE PERIOD ENDING JUNE 2018

REPORT AUTHOR(S): Peter White, Coordinator Water and Wastewater

GENERAL MANAGER: Michael Kriedemann, Acting General Manager Operations

DEPARTMENT: Water and Wastewater

RECOMMENDATION

That Council receives and notes the Quarterly Report of the Water and Wastewater branch for the period ending 30 June 2018.

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 April to 30 June 2018.

Whilst the results are generally positive the areas for improvement are noted and were the focus of the branch in this quarter.

BACKGROUND

This report is the fourth Quarterly Report submitted by the Water and Wastewater Branch during the 2017/2018 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: Failing 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 3 - Improve Environmental Performance

3.2.3 - Investigate process improvements at Council's wastewater treatment plants to improve wastewater quality, save energy and identify markets for end products.

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:

3.2.1 - Deliver actions as required from the Drinking Water Quality Management Plan (DWQMP) audit from 2016/2017

3.2.2 - Complete a review of the Drinking Water Quality Management Plan (DWQMP)

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

3.2.9 - Develop recycled water business case and strategy

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. 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.

Community: Nil

ATTACHMENTS

1. Water and Wastewater Quarterly Report for the period ending 30 June 2018 **[5.2.1]**

1 April 2018 – 30 June 2018

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 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 certain 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).

An amendment of Drinking Water Quality Management Plan (DWQMP) was submitted to the Department of Natural Resources, Mines and Energy (DNRME) on 5th February 2018 and was approved with conditions on 4th May 2018. The plan was last amended 2015 and is required to be reviewed every four years. The result is a new user friendly health based risk management plan that demonstrates how public health risks are managed. In addition, the plan also describes how Douglas meets the requirements of the environmental authority for the Mossman Water Treatment Plant under the Environmental Protection Act (1994) and Water Licences under the Water Act 2000. DWQMP was assessed within the Council on the 5th of June in the Ordinary Council Meeting and took effect after Council's approval.

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. Hydrant and valve maintenance also continued throughout the schemes. On going hydrant and valve maintenance is continuing on all schemes, regular flushing events are in place across the shire to maintain acceptable chlorine residuals within the schemes.

Regular reservoir and pump station checks and intake maintenance are carried out on all schemes.

Four members of the water reticulation team completed their Chlorine Gas and Confined Space training.

All capital works programs for water reticulation were completed by the end of the financial year and within budget. The capital works program for Water Reticulation involved the Mowbray River water main renewal section, a 300mm water main cut in at Port Douglas pump station which was part of the work required for the reservoir upgrade and the Junction Road bridge water main replacement which were all successfully completed. Council engaged a consultant to do a condition assessment report on Rex Creek water main and reports have been submitted to council. Outcome of the report has indicated that repairs of this critical infrastructure should commence within the next 12 months which will extend the life of this asset a further 30 years.

Table 1. Water Reticulation Services

Douglas Shire Reticulation (all schemes)	
Settlement Meter Reads	104
New Water Services Connections	14
Service Repairs	172
Water Mains Repairs	7
Water Quality Complaints	0
Flushing Events: Mossman/Port Douglas/ Cooya/ Newell	2
Flushing Events: Whyanbeel/Wonga	2
Flushing Events: Daintree/ De Meio	1

There were no water quality complaints during the reporting period.

2. Water schemes and potable water consumption

Water Restrictions

Level 2 water restrictions remained in force for the whole of the reporting period.

All Schemes

Raw water quality has varied, but generally has been good throughout all schemes. In the early part of the reporting period some heavy showers and rain events resulted in a number of plant shutdowns, but in the latter part of the reporting period the weather stabilised and the intake levels were favourable with raw water turbidity averaging below 1 NTU.

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 continued throughout the reporting period with the majority of site works capitalised and within budget.

As part of the new reservoir upgrade a 300mm cut in for the new booster pump station on the main pipeline at Port Douglas was completed during a planned shutdown. Works progressed extremely well and were completed ahead of scheduled outage times.

Certificate IV water industry training is continuing for one water plant operator and three members of the water treatment team completed their Chlorine Gas and Confined Space training.

Mossman/Port Douglas Scheme

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

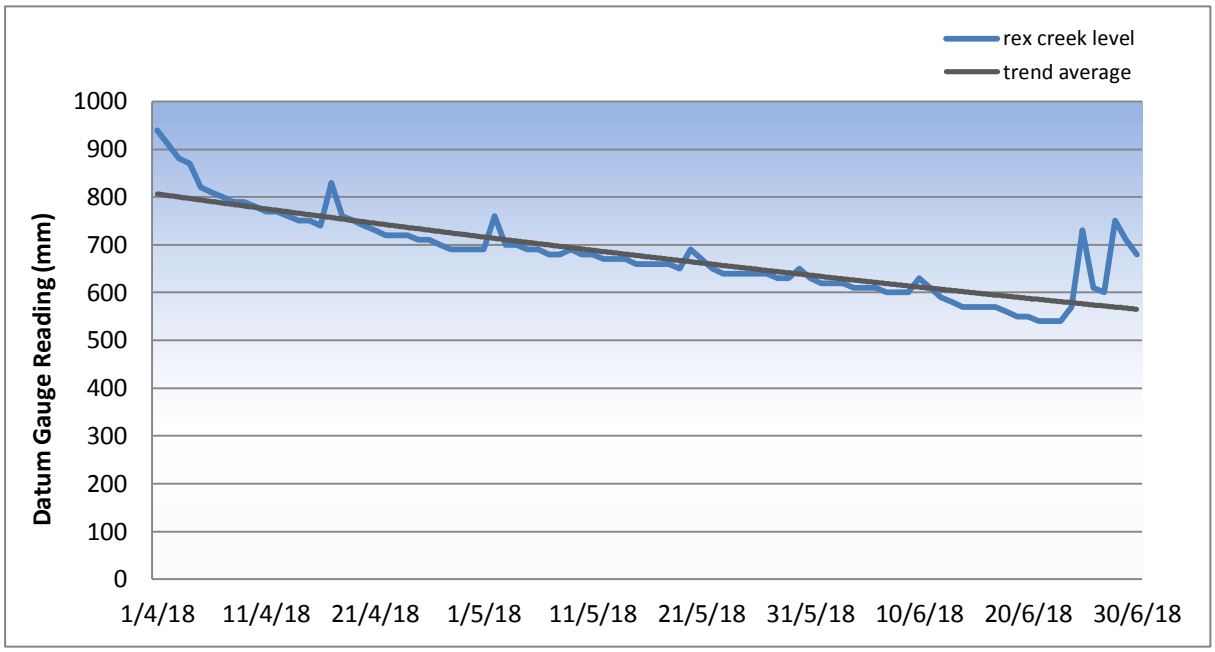
Consumer demand has slowly increased in line with seasonal trends.

Rex Creek intake levels have slowly decreased typical of the dry season averaging around 0.68 metres providing for good available raw water flows with no impact to our maximum instantaneous extraction rate.

All Ultra Filtration (UF) 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.

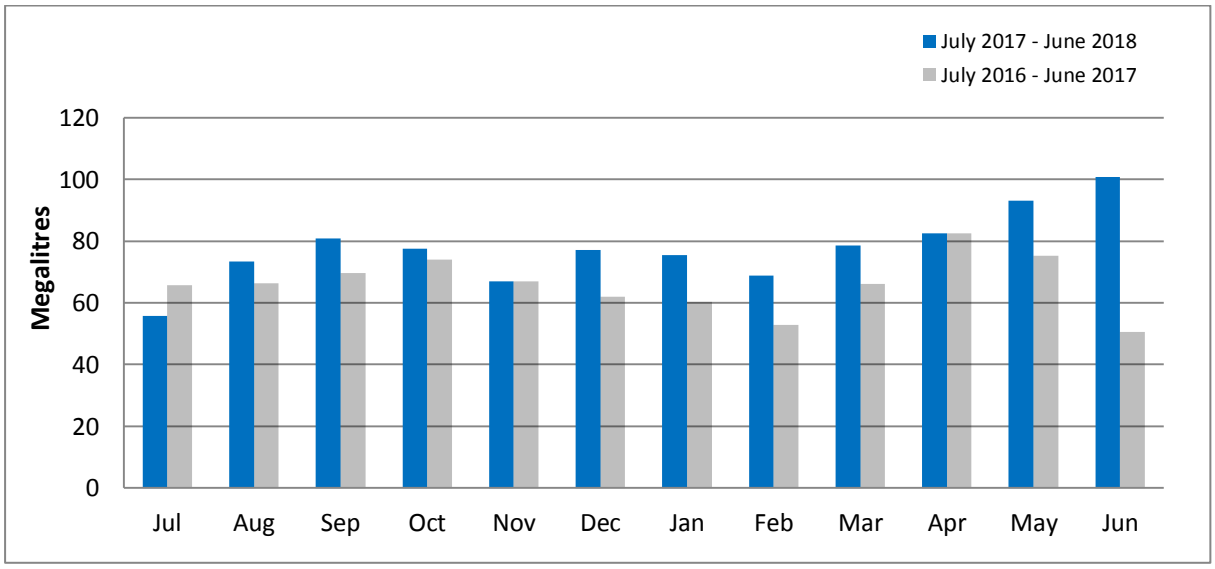
Fig 1. Rex Creek Intake level for the period 1 April 2018 – 30 June 2018



Mossman Water Supply

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

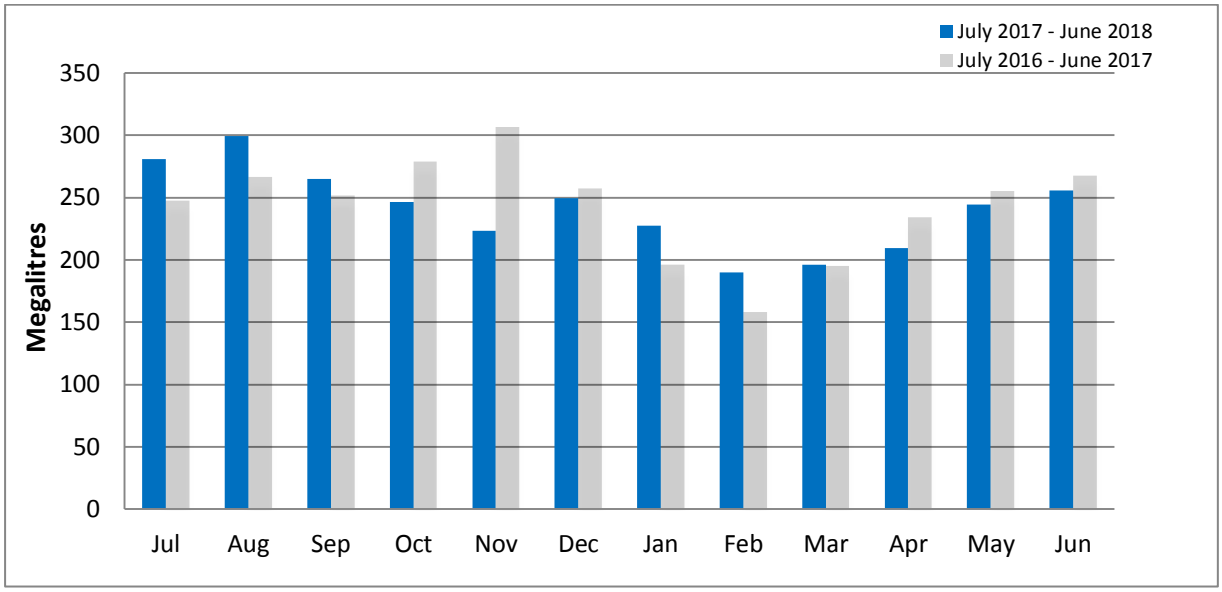
Fig 2. Mossman Scheme Monthly Consumption Figures



Port Douglas Water Supply

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.

Outside of a few storm events the intake level has remained relatively stable with good raw water flows. Reservoir levels remained near capacity to ensure consumer demand was met.

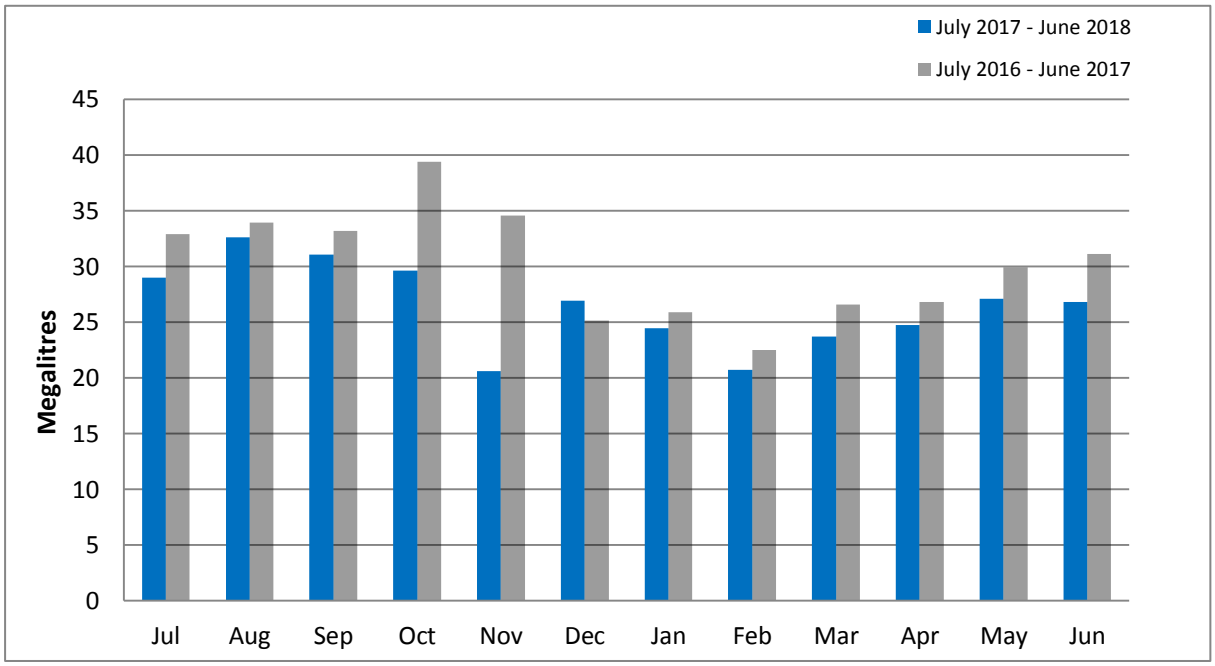
The UF rack was fully operational during the reporting period. To maintain UF filter efficiency chemical clean-in-place operations were undertaken and general maintenance work continued.

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 increased with rain and storm events early in the reporting period, but stabilised outside of these times and were adequate to meet consumer demand.

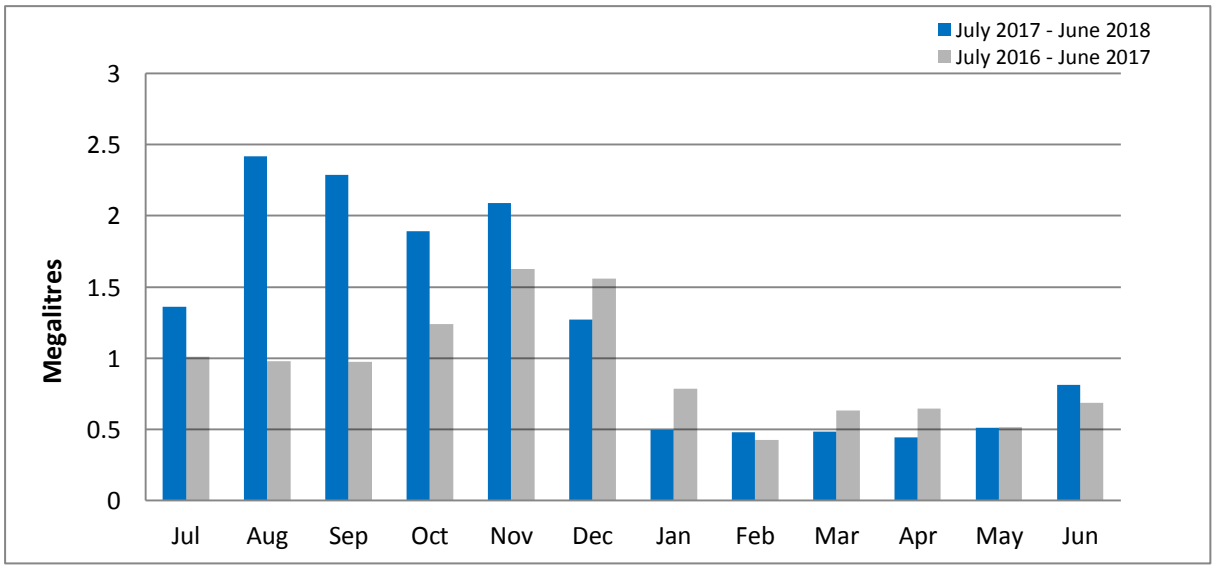
To maintain UF filter efficiency chemical clean-in-place operations were undertaken and general maintenance works continued.

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



3. 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 reporting period a total of 501 treated and 9 raw water samples were taken in the 3 water supply schemes. A total of 285 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 ADWG health guideline values and standards required by the Water Supply Regulator and Queensland Health.

Within the amended DWQMP the drinking water verification monitoring was comprehensively reviewed. The same sampling frequency was maintained for the reporting year 2017-2018 to ease reporting consistency. The new sampling program was started in the beginning of July 2018.

During the reporting period water quality in Mossman River and Saltwater Creek was monitored for DILGP project regarding the additional water extraction site for Mossman water treatment plant. Monitoring included NATA accredited testing together with in-situ monitoring with a total of 26 water quality samples that were tested in the Douglas water laboratory.

Mossman/Port Douglas Supply Scheme

Average monthly values for key operational and compliance parameters can be seen in Table 2, 3 and 4 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 April to June 2018.

Occasionally pH at Mossman Water Treatment Plant has been found to be lower than ADWG aesthetic guideline value 6.5, but pH results at the reticulation network are mostly within guideline values. pH at the Rex Creek Intake is naturally slightly acidic.

Table 2. 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
April-18	**6.4**	23.4	<5	1.1	1.2	<1	<1	<1
May-18	6.5	20.7	<5	1.3	1.3	<1	1	<1
June-18	6.5	18.7	<5	1.3	1.3	<1	<1	<1

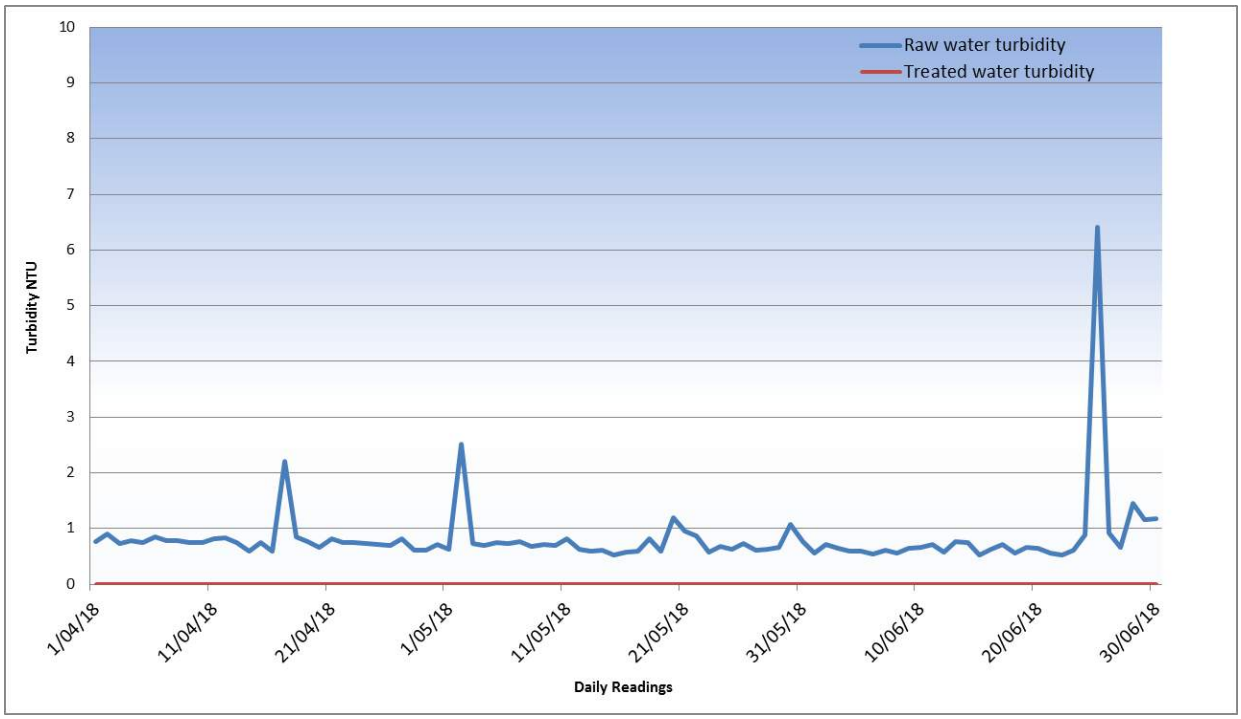
Table 3. Average monthly values for key operational and compliance parameters in the Port Douglas Reservoirs.

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
April-18	6.9	25.8	9	1.1	1.1	<1	<1	<1
May-18	6.8	23.3	6	1.1	1.1	<1	<1	<1
June-18	6.8	21.4	<5	1.1	1.1	<1	<1	<1

Table 4. 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
April-18	7.6	27.9	0.9	1.0	<1	<1	<1
May-18	7.0	25.3	0.9	0.9	<1	<1	<1
June-18	7.0	23.9	0.9	1.0	<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 April to June 2018.

Soda ash dosing commenced in December 2017 which has elevated the pH and total alkalinity within a desired range. Both pH and alkalinity results have been stable within Whyanbeel scheme.

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/100ml
Standard	6.5-8.5	10-30	0-200	0.1-4.0	Max 5.0	<1	-	0-10
April-18	7.0	23.6	10	1.2	1.2	<1	~1	<1
May-18	7.0	21.5	7	1.2	1.2	<1	~1	<1
June-18	7.0	19.4	7	1.2	1.3	<1	<1	<1

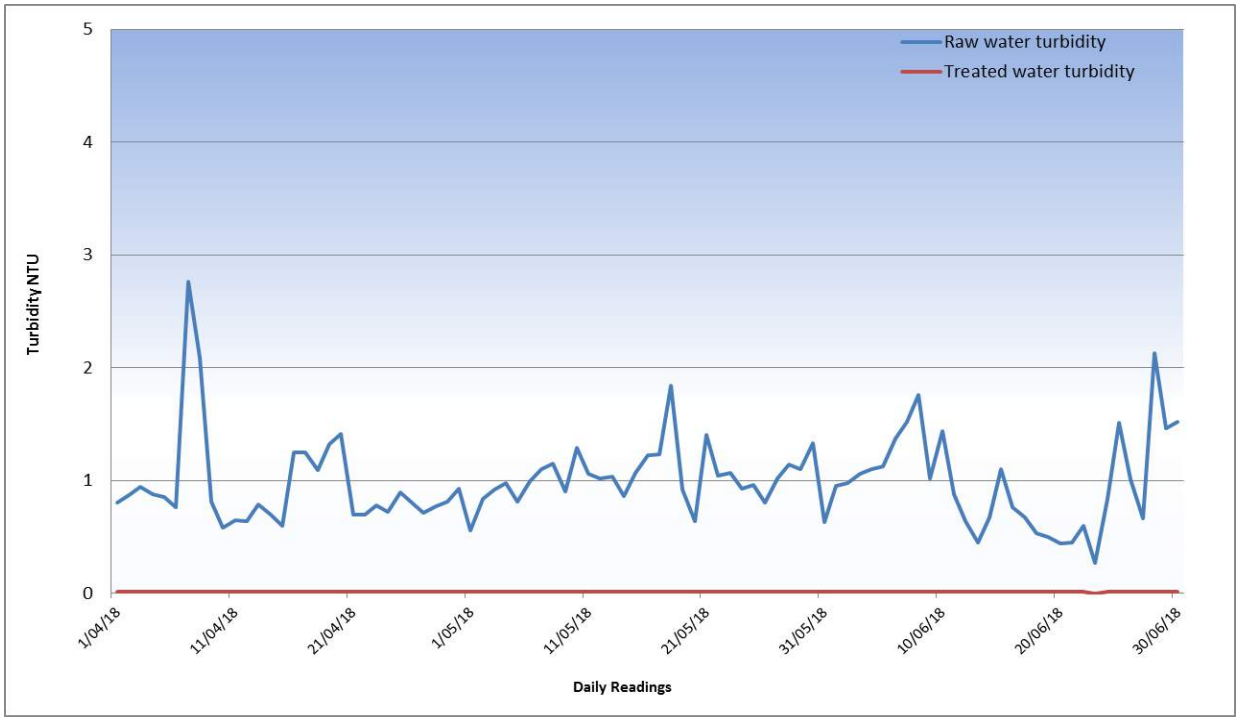
Table 6. Average monthly values for key operational and compliance parameters in the Whyanbeel Reservoir.

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/100ml
Standard	6.5-8.5	10-30	0-200	0.1-4.0	Max 5.0	<1	-	0-10
April-18	7.9	28.1	15	1.0	1.0	<1	<1	<1
May-18	7.6	26.3	12	0.9	1.0	<1	~1	<1
June-18	7.4	24.1	9	1.0	1.0	<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
April-18	7.9	28.2	0.7	0.8	<1	<1	<1
May-18	7.7	26.7	0.8	0.8	<1	<1	<1
June-18	7.5	24.7	0.9	0.9	<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 period April to June 2018.

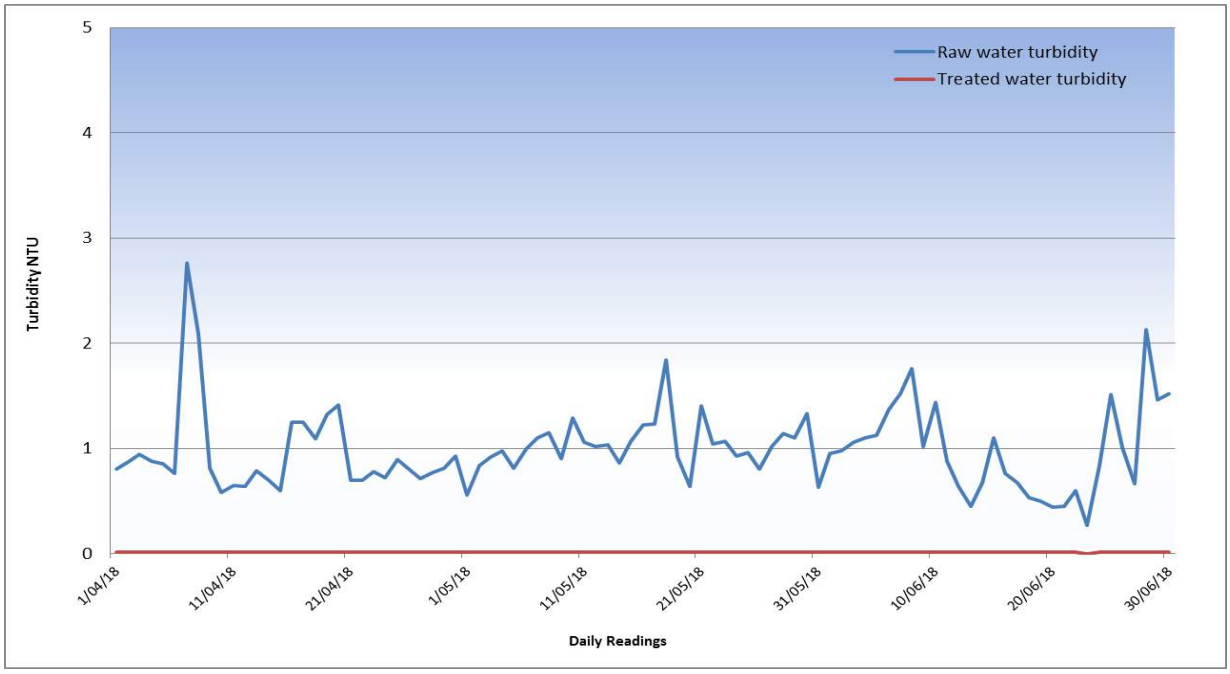
Table 8. Average monthly values for key operational and compliance parameters in treated water at Daintree Treatment Plant.

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
April-18	7.5	26.0	20	1.0	1.1	<1	<1	<1
May-18	7.5	24.0	21	1.1	1.1	<1	~1	<1
June-18	7.5	21.5	22	1.1	1.1	<1	<1	<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
April-18	8.3	26.7	0.9	0.9	<1	<1	<1
May-18	8.2	24.9	1.0	1.0;	<1	~1	<1
June-18	8.1	22.7	1.0	1.0	<1	~4	<1

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



Wastewater

4. Wastewater reticulation services

General maintenance programs were carried out at the reticulation networks and 31 pump stations in the Mossman and Port Douglas catchments. Six members of the Wastewater reticulation team completed their Chlorine Gas and Confined Space training. Table 11 below shows the number of maintenance activities undertaken across all schemes.

Table 11. Wastewater Reticulation Services

	Port Douglas Catchment	Mossman Catchment
Pump Blockages	10	3
Sewer Chokes	1	0
Sewer Main Breaks	0	0
HCB Repairs (House Connection Branch)	5	1
Odour Complaints	1	0

Capital works for Wastewater projects were completed and finalised throughout this quarter.

One of the major capital works project was 50% funded by the state government and 50% contributed from Douglas Shire Council to install and commission a new belt press for the Port Douglas WWTP. Also a replacement Grit classifier was installed at the Port Douglas WWTP.

Major parts of the relining schedule were finalised as well as aerator mixers were installed for the Mossman Wastewater Treatment Plant.

Influent and irrigation flows

Port Douglas Wastewater Treatment Plant

A total of 317,389 kL of influent entered the Port Douglas Wastewater Treatment Plant during the reporting period. The average daily flow was 3,488 kL/day. Tanker truck contractors delivered 745.99 kL of septage to the plant and 3,391 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 38.5% of the treated effluent was pumped to two resorts and the remaining discharged into the Dickson Inlet. The Sheraton Mirage received 89,792 kL and Palmer Sea Reef received 32,403 kL of treated effluent during this period. Total rainfall on site during the reporting period was measured as 121.5 mm. On 17 April 2018, the highest rainfall on a day was recorded as 46 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

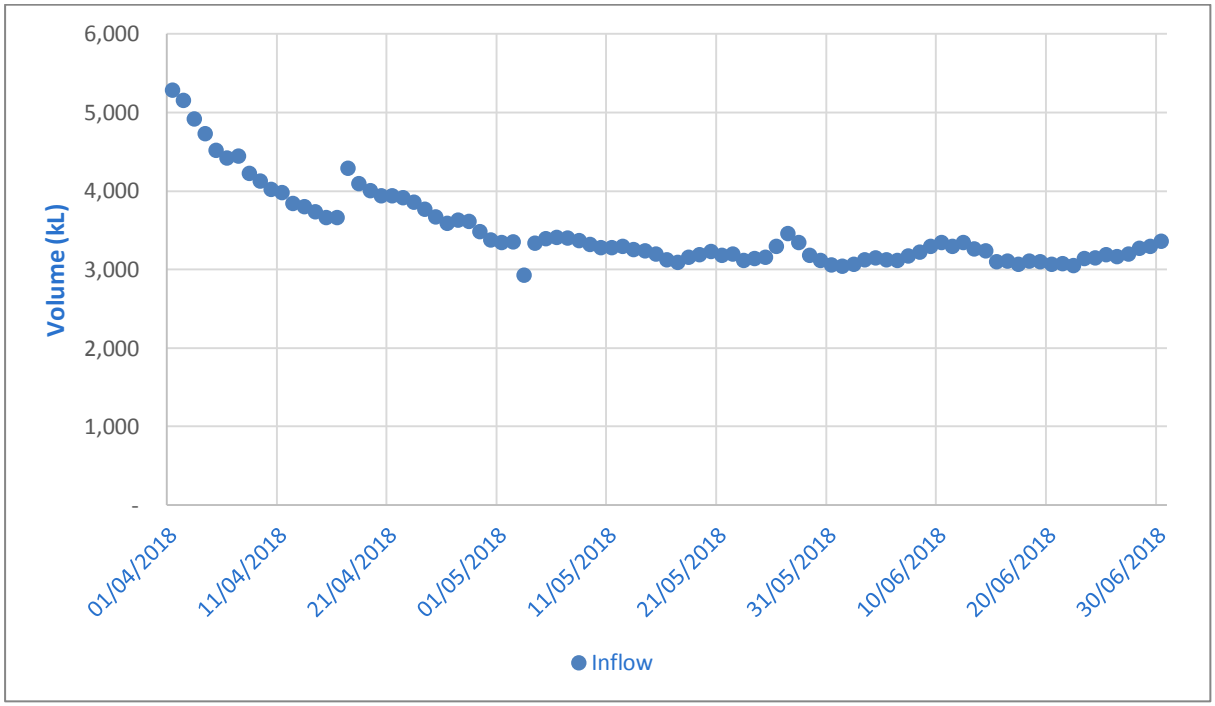
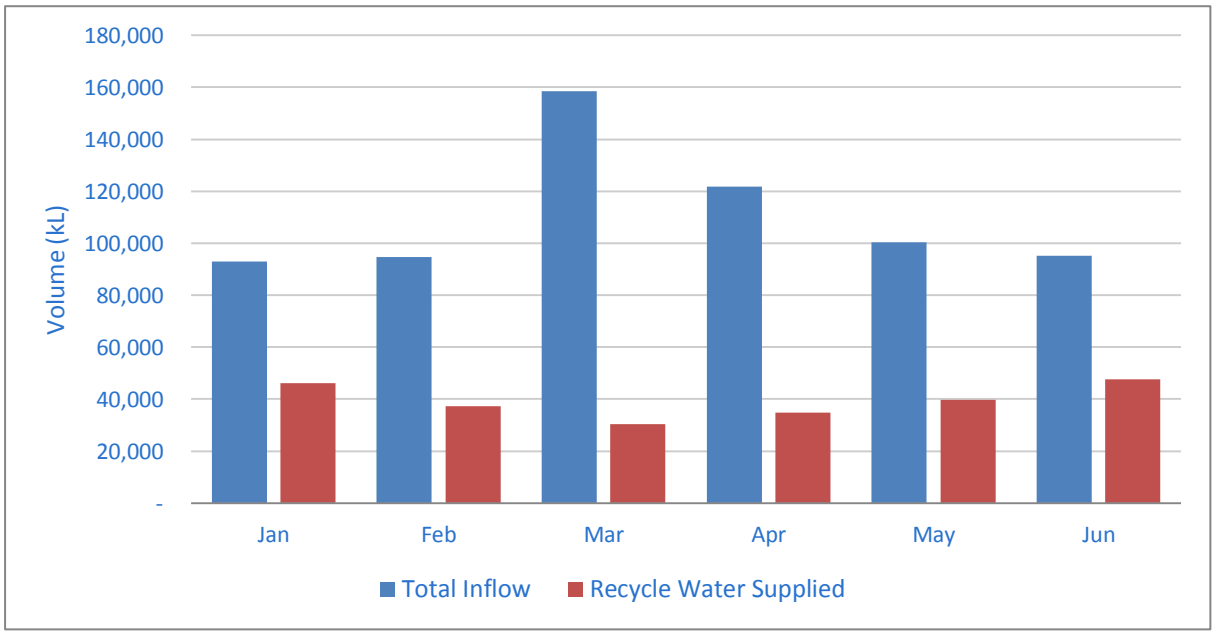


Fig 10. Port Douglas Total Monthly Flow 2018



Mossman Wastewater Treatment Plant

The Mossman Wastewater Treatment Plant received a total influent flow of 99,101 kL during the reporting period. The average daily flow was 1,089 kL/day. Influent is treated in an Oxidation Ditch system and compliant effluent is discharged into the Mossman River. A total of 182 mm of rain fell on site for the reporting period with the highest daily rainfall measured at 51 mm on 26 April 2018.

Douglas Shire Council Environmental Authority Permit EPPR01790513 was amended on 9 March 2018. Within the amendment Mossman wastewater treatment plant outflow limit was removed from the permit. The new amendment includes an inflow limit: Inflows must not exceed the peak design capacity of three times the Design Average Dry Weather Flow (DADWF) of 1.15 ML/day – equating to 3.45 ML/day – on any day unless the standard treatment processes of the plant are bypassed.

Outflow and Inflow data for the reporting period are shown in Fig 11 and 12 respectively.

Fig 11. Mossman Wastewater Treatment Plant Daily Outflow

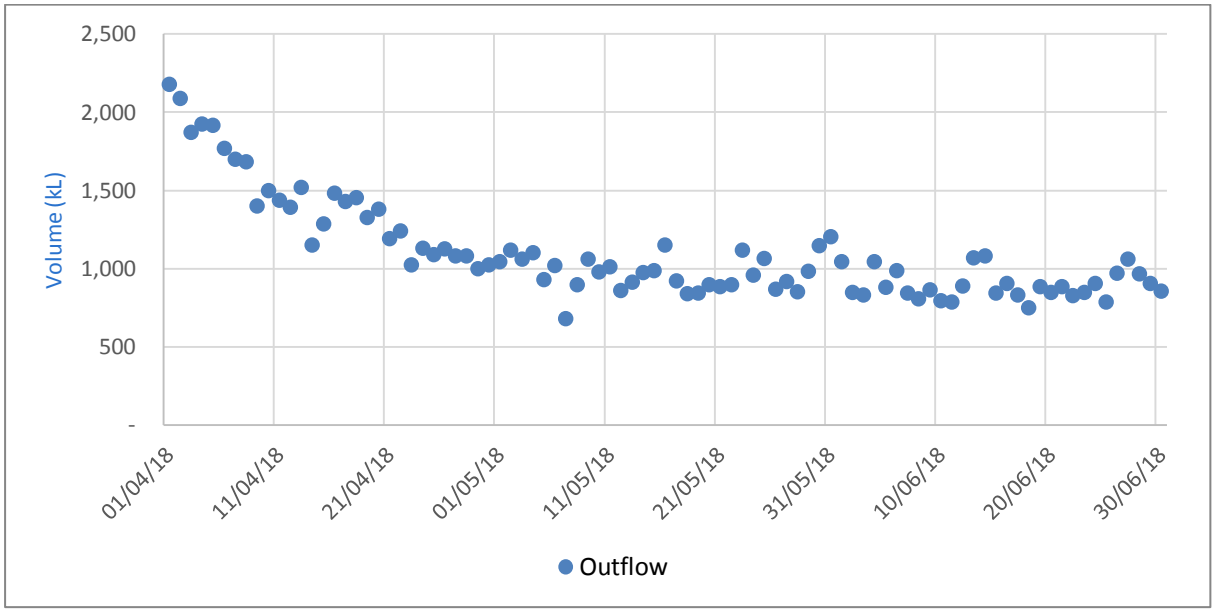
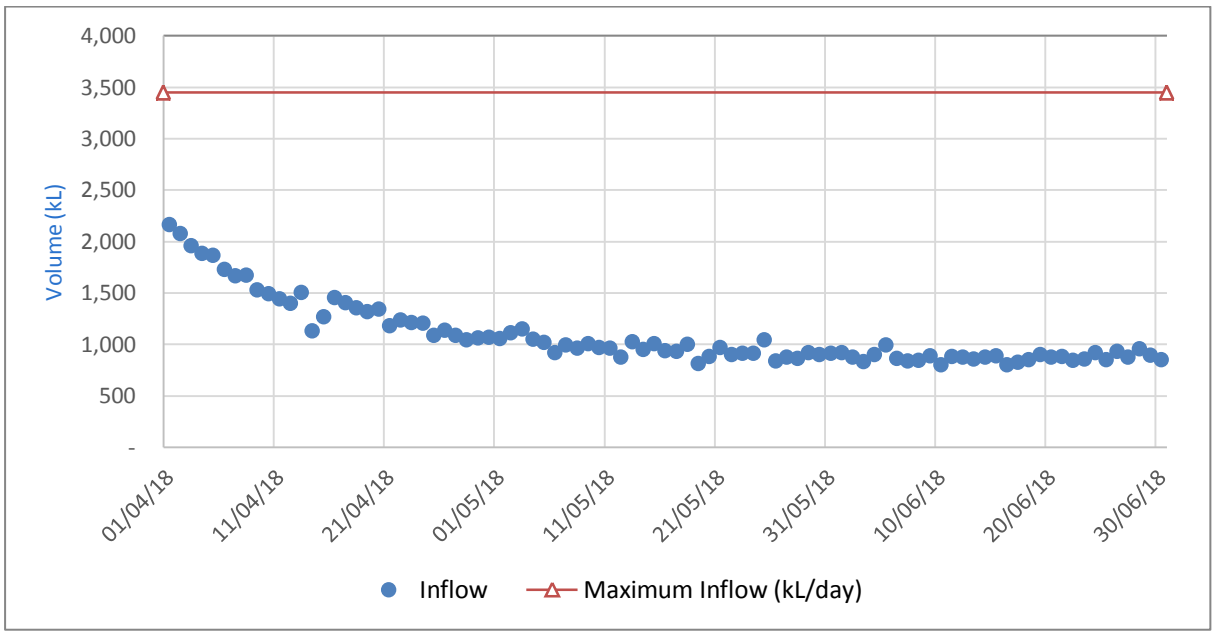


Fig 12. Mossman Wastewater Treatment Plant Total Daily Inflow 2018



5. Bio-solids Production

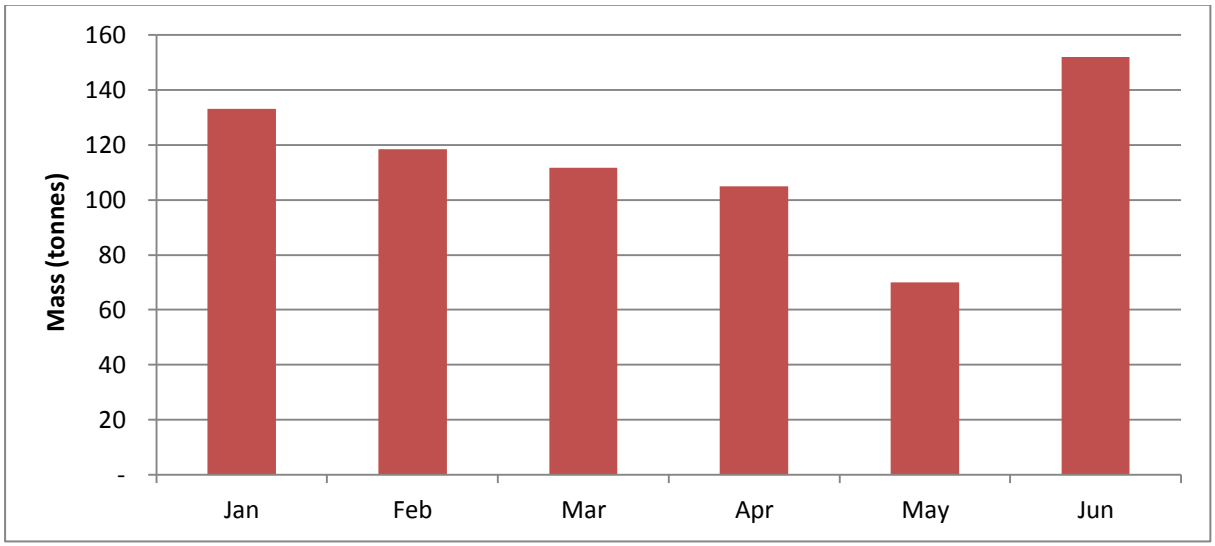
Bio-solids were produced at the dewatering plants at Mossman Wastewater Treatment Plant (12% solids) and Port Douglas Wastewater Treatment Plant (15.1% solids). Bio-solids were transported by Arkwood Organics to Edmonton Farms, Tablelands Regional Farms and Spring Mount Waste Facility for further treatment and beneficial land application as organic fertiliser and soil conditioner.

Port Douglas Wastewater Treatment Plant

At Port Douglas Wastewater Treatment Plant, 335.26 tonnes of wet biosolids were produced during the reporting period and sent to farms for beneficial reuse. This amount of wet Biosolids equates to 50.62 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 2018

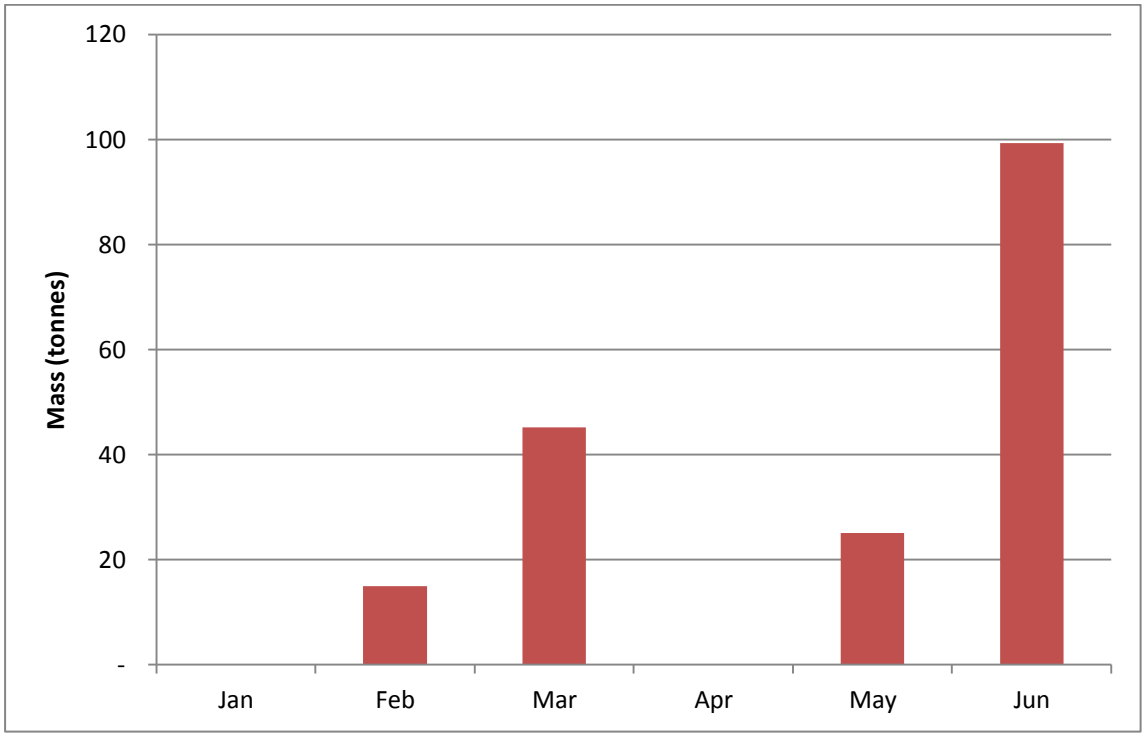


Mossman Wastewater Treatment Plant

At Mossman Wastewater Treatment Plant, 163.02 tonnes of wet biosolids were produced during the reporting period and sent to farms for beneficial reuse. This amount of wet Biosolids equates to 19.56 dry tonnes.

The monthly bio-solids production trends can be seen in Figure 14.

Fig 14. Mossman Wastewater Treatment Plant monthly bio-solids production 2018



***No Bio-solids removed in January and April 2018.**

Effluent quality and compliance

During the reporting period a total number of 219 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.

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 Figure 15, 16, 17 & 18.

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

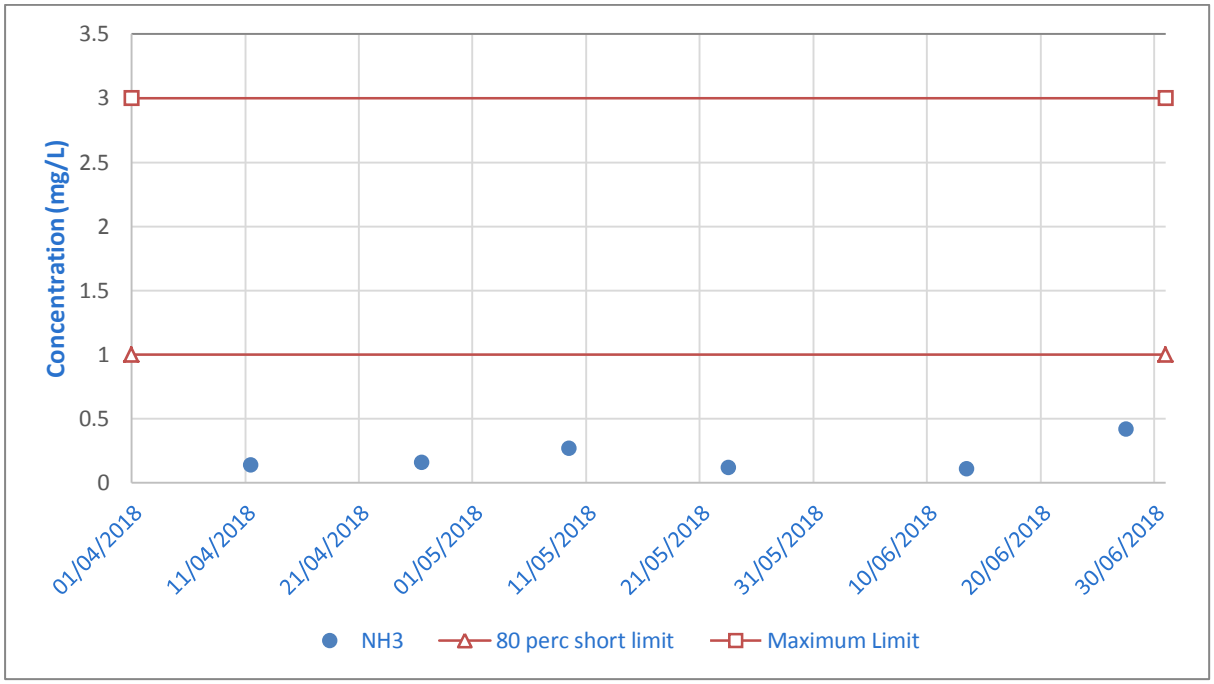


Fig 16. Port Douglas Wastewater Treatment Plant Final Effluent Test Results for Total Phosphorous

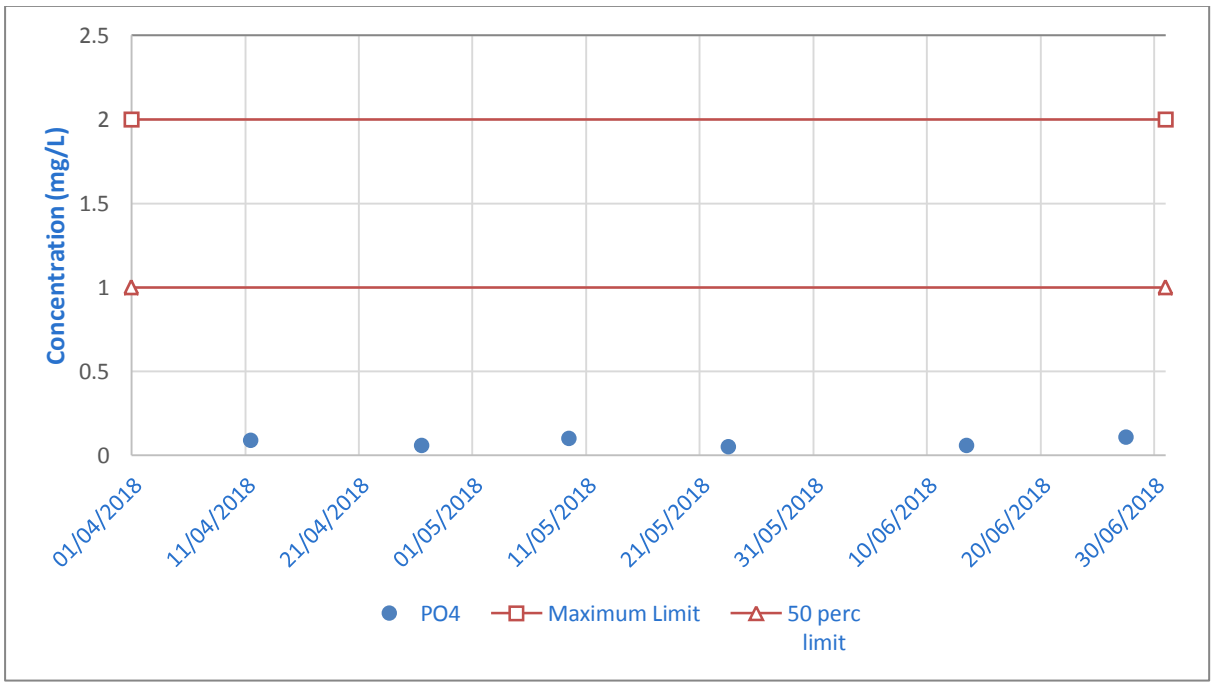


Fig 17. Port Douglas Wastewater Treatment Plant Final Effluent Test Results for Total Suspended Solids

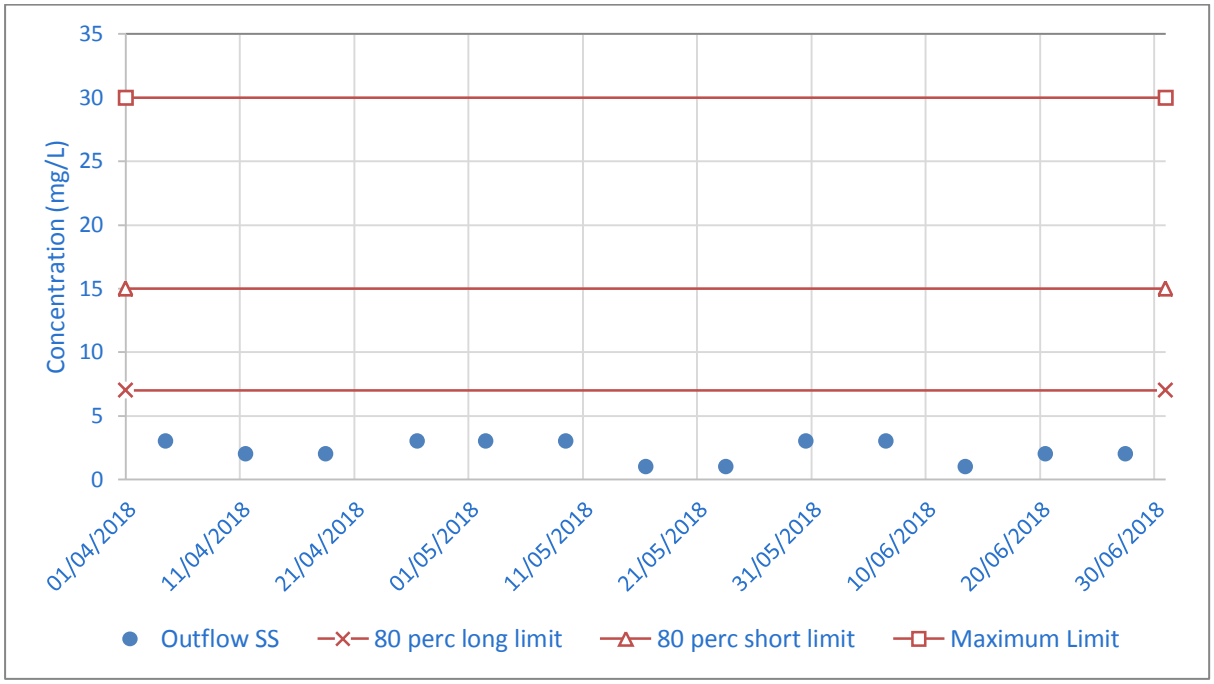
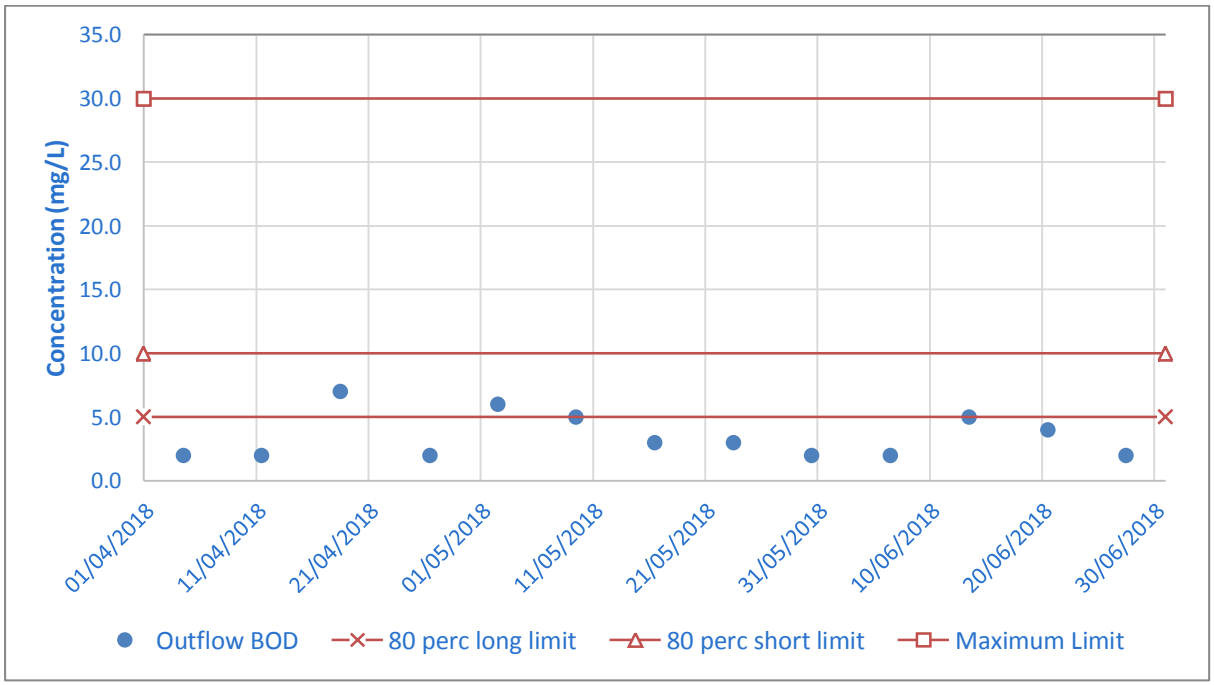


Fig. 18 Port Douglas Wastewater Treatment Plant Final Effluent Test Results for BOD_5 (Biochemical Oxygen Demand)



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

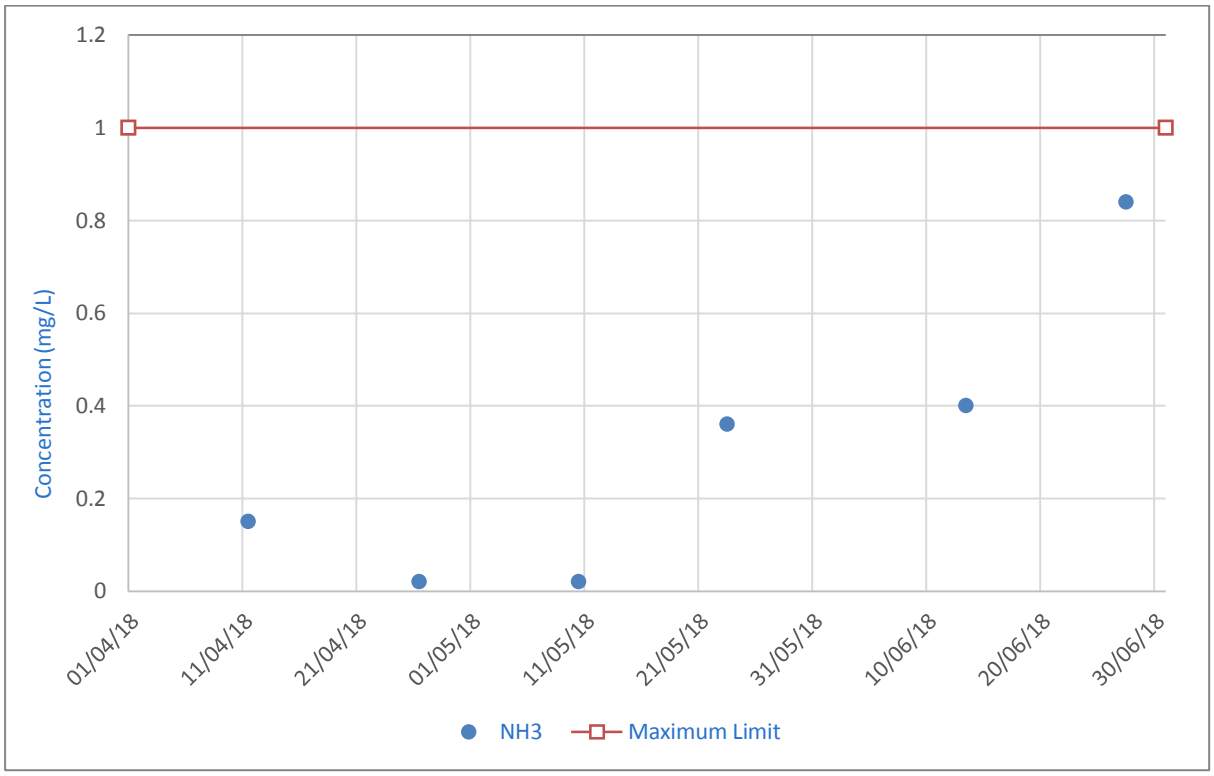


Fig. 20 Mossman WWTP Final Effluent Test Results for Total Phosphorous

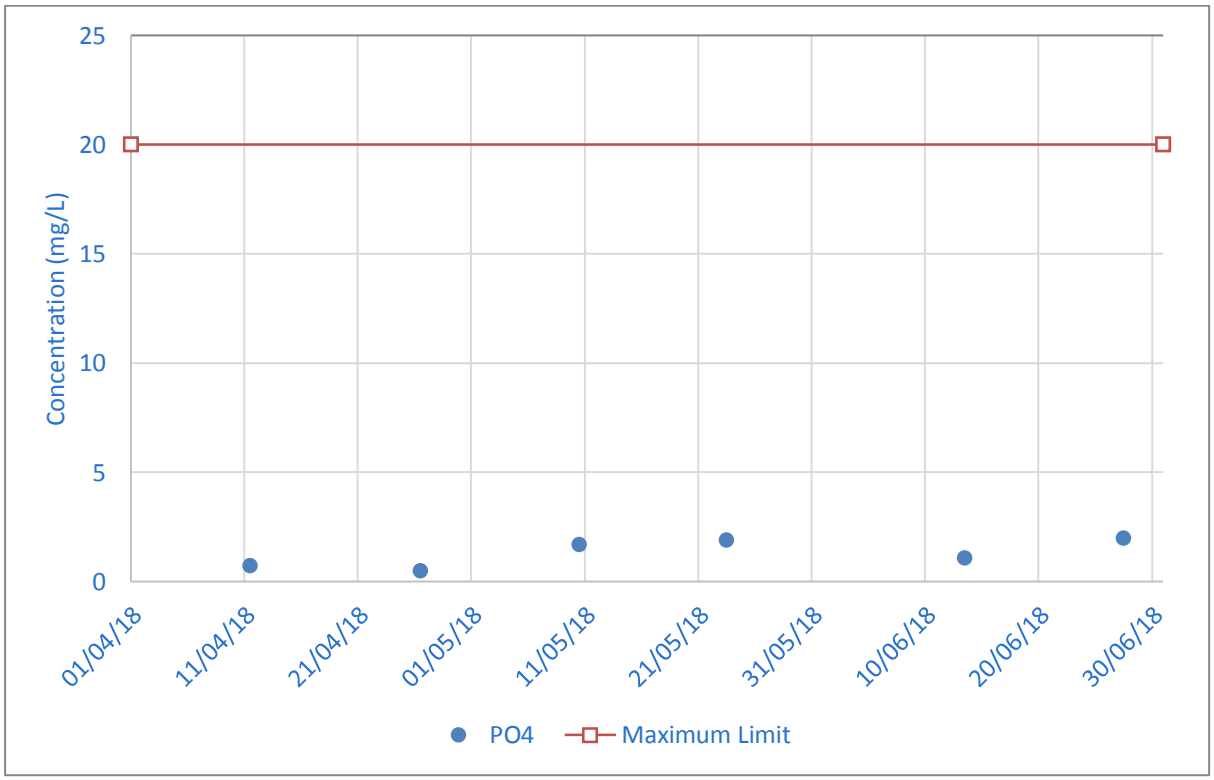


Fig. 21 Mossman WWTP Final Effluent Test Results for Total Suspended Solids

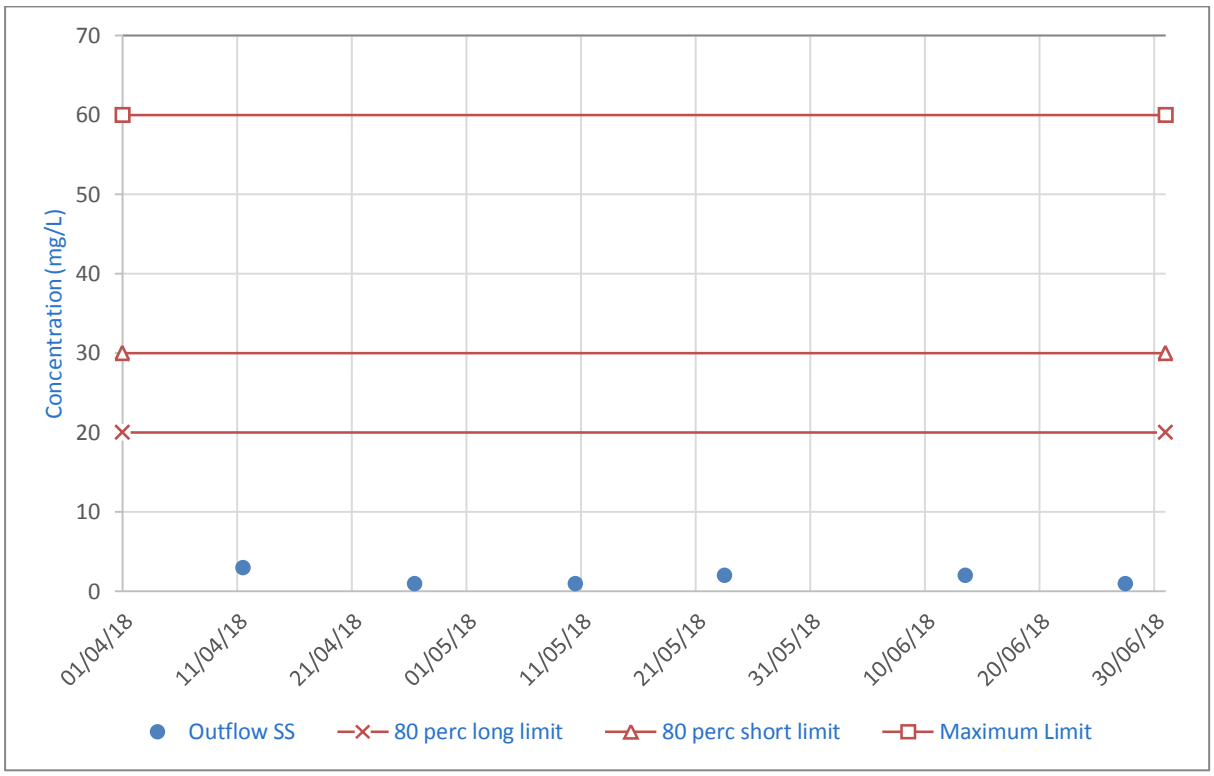


Fig. 22 Mossman Wastewater Treatment Plant Final Effluent Test Results for BOD_5 (Biochemical Oxygen Demand)