

5.10. WATER AND WASTEWATER QUARTERLY REPORT FOR PERIOD ENDING 31 DECEMBER 2020

REPORT AUTHOR	Peter Tonkes, Manager Water and Wastewater
DEPARTMENT	Water and Wastewater
MANAGER	Mark Stoermer, Chief Executive Officer

RECOMMENDATION

It is recommended that the Quarterly Report of the Water and Wastewater branch for the period ending 31 December 2020 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 01 October to 31 December 2020.

In this reporting period the level 1 water restrictions remained in place, there was sporadically bouts of heavy rain events which boosted the intake levels. The Water and Wastewater capital work projects are progressing well and are on target for completion in the 2021 financial year. Most of the carry over projects have also been finalised such as the lime dosing shed, refurbishment of the Craiglie Reservoir and Cooya Beach Reservoir pipeline design assessment.

BACKGROUND

This report is the second Quarterly Report submitted by the Water and Wastewater Department during the 2020/2021 Financial Year. This report highlights progress against key performance areas required by the Department of Natural Resources, Mines and Energy (DNRME) and required compliance levels by the Department of Environment and Science (DES).

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 2019-2024 Initiatives:

Theme 3 - Leading Environmental Stewardship

Goal 2 - *We will implement programs that reduce and offset our environmental footprint.*

Goal 3 - *We will continue to build water infrastructure so that the Douglas Shire may enjoy water security and water quality.*

Goal 4 - *We will partner with the community to educate and monitor.*

Theme 5 - Robust Governance and Efficient Service Delivery

Goal 3 - *We will make sound financial decisions by ensuring robust strategic planning, financial management and reporting.*

Goal 4 – *We will work with our communities to ensure they are informed, empowered and supported so that they are resilient to the impacts of disaster events. Through our leadership and capabilities we will plan, prepare, respond and recover from events so as to minimise the impact on people, property, the environment, and our economic stability.*

Operational Plan 2020-2021 Actions:

3.3.1 – *Progress the intake as a matter of urgency.*

3.3.2 – *Develop options for long-term water storage capacity of at least one billion litres.*

3.4.1 – Implement an education campaign targeting schools and residential properties within the Shire to raise awareness of water security, how it is produced, impacts on the reef and how to live a more water efficient life.

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:

Builder/Owner	Council makes a significant investment every year in the infrastructure that underpins the Shire through its capital works program. Council will manage its assets with appropriate frameworks and deliver its projects through robust project management.
Regulator	Council has a number of statutory obligations detailed in numerous regulations and legislative Acts. Council also makes local laws to ensure that the Shire is well governed. In fulfilling its role as regulator, Council will utilise an outcomes based approach that balances the needs of the community with social and natural justice.

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 Science.
Community:	Nil

ATTACHMENTS

1. Water and Wastewater Quarterly Report for the period ending 31 December 2020
[5.10.1 - 22 pages]

1 October to 31 December 2020

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 Department.

The Water and Wastewater quarterly report does not include comprehensive progress reporting in terms of Capital Works or Operational Plan; these are dealt with in separate quarterly reports to Council.

This report highlights certain aspects of the activities of the Water and Wastewater Department that are 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 Education

As a water service provider, water education is a high priority, particularly when we are faced with changing climate conditions and reduced rainfall events within our shire. In this reporting period, National Water Week commenced 19 October 2020. The theme for 2020 is Reimagining our Water Future. As our population grows, this will put more stress on our water resources, so how can we reimagine the way we use and reuse water to ensure there's enough of it in the future? How can we rethink our current water practices to help conserve valuable water resources? What can we do as individuals and as communities to inspire a more sustainable water future? Schools were notified within our shire and encouraged to take part in all the different activities being promoted for this year's National Water Week.

The Water and Wastewater teams took part in a film shoot around the region to demonstrate what it takes to deliver clean and healthy water to our consumers, and to show how much work is involved in treating the wastewater. Many budding actors showcased their talents on camera and worked hard to ensure that they delivered as much as they could to aid the educational aspects of the videos. Editorial works of the video for A Water Journey (i.e. from source to tap and tap to sea) are planned to be completed by end January 2021.

Development of graphic design images to assist with key messaging is progressing well. The design images are intended to be used for council media posts and publications.

A water presentation was delivered to the Community Health Seniors Group on 5th November at the Mossman CWA Hall. The presentation focused on how water is delivered to residents in the Shire. The seniors group particularly enjoyed learning about how our water is extracted, treated and delivered, and trying to guess which pictures belonged to the various microorganisms that are removed in the treatment process. The group also committed to sharing this knowledge to family and friends, and they were keen to learn more about Council operations.

A capital works project for this financial year is to implement a smart water meter program, which will assist in early leak detection, reduce water losses and inform consumer choice in relation to their water consumption.



Wastewater and Water staff acting in the video for water education

2. Water reticulation services

General maintenance was carried out on all schemes for this quarter including all intakes. Hydrant and valve maintenance was performed two days each week to identify their locations, ensure accessibility and attend to any maintenance issues. The water reticulation team continued recording the number of water service renewals and Dial Before You Dig service locations (DBYD). There were 15 new water service renewals and 188 DBYD in this reporting period. Water service renewals are replacing water services which have reached their life expectancy and are at risk of failing. Providing DBYD service locations on council infrastructure assists in preventing damage and disruption to water, sewer and drainage services within the Douglas Shire. Water flushing programs were implemented due to the maintenance and functionality of hydrants, water quality complaints that related to aesthetic issues and for maintaining acceptable chlorine residuals within the schemes. Response/reaction time for all water reticulation incidents was within the customer service standards. See table 1 showing results on water reticulation maintenance activities across all schemes.

Regular reservoir and pump station checks and intake maintenance was performed on all three schemes.

Table 1. Water reticulation services maintenance activities undertaken across all schemes

Douglas Shire Reticulation (all schemes)	
Settlement Meter Reads	137
New Water Services Connections	15
Service Repairs	111
Water Mains Repairs	18
Water service renewals	26
Water Quality Notifications (Complaints)	3(0)
Dial before you dig	188
Flushing Events: Mossman/Port Douglas/Cooya/ Newell	24
Flushing Events: Whyanbeel/Wonga	7
Flushing Events: Daintree	10

There were three water quality notifications plus one enquiry within a non-potable water supply area during the reporting period. All water quality notifications were handled under customer service standards. Issues were rectified by investigating the situation, testing the water quality and flushing of the reticulation system. Water and Wastewater team views all water quality notifications and complaints seriously and endeavour to achieve outcomes where customer satisfaction is priority.

Table 2 below details the nature of the notification, how it was resolved and the response time. All water quality parameters measured were within the health guideline limits in the Australian Drinking Water Guidelines (ADWG).

Table 2. Water Quality Notifications

Address	CRM No & Date	Nature of water complaint	How it was resolved	Response Time
Kingston Rd, Whyanbeel	91348/2020 02/11/2020	Tap water was milky	Air in water main, water main was flushed and water quality tested. Customer satisfied with the outcome.	30 mins
Gorge Rd, Mossman Gorge	92083/2020 24/11/2020	Rusty stains in sinks and toilets from water	Internal issue caused by old galvanised water pipes on property. Customer to organise a private plumber and was happy with Council officer advice.	15 mins
Davidson St, Port Douglas	92997/2020 21/12/2020	Discoloured water	Tested water quality and is within drinking water quality guidelines. Advised resident the discoloured water could be from old internal pipework.	10 mins
Non-potable water supply area De Meio Dr, Lower Daintree	92405/2020 03/12/2020	Smelly and discoloured water	Non potable water supply, all owners are issued a boil alert notice annually.	10 mins

The new financial year 2020/2021 capital works programme is well under way and works are progressing as scheduled within water quality and reticulation. Project scoping, designs, procurement contracts and purchasing of new assets are currently being obtained for the valve pits safety improvements, UF cartridge renewal, process control renewal and the water network service renewal programs.

Water schemes and potable water consumption

This reporting period is the start of our summer season. From the beginning of October all intake levels had been on a steady decline, approximately 10mm per day at Rex Creek intake due to the lack of rain in the catchment. Level 1 water restrictions were still in place during this reporting period and occasional rainfall events occurred in October and November to keep up with the consumption demand. Capital works upgrade conducted in the previous year to the Rex Creek intake has resulted in less operator attendance during heavy rain events ensuring continued supply and lower operational costs. There were heavy rainfall events in the latter part of this reporting period which supplied a well needed boost to the water levels at all the intakes.

The Bureau of Meteorology has declared a La Niña phase and forecasted the far tropical north to have a wetter than average wet season during the months December 2020 to February 2021.



Rex Creek Intake after a rainfall event photo taken 30 November 2020

The average water consumption for the Mossman/Port Douglas scheme for the months October to December was **8.58 ML/day** for the Port Douglas network and **3.19 ML/day** for the Mossman network. The graph below displays the comparison use between Mossman and Port Douglas networks and Rex Creek intake level.

The Figure 1 displays the comparison use between Mossman and Port Douglas treated water supply and Rex Creek intake levels.

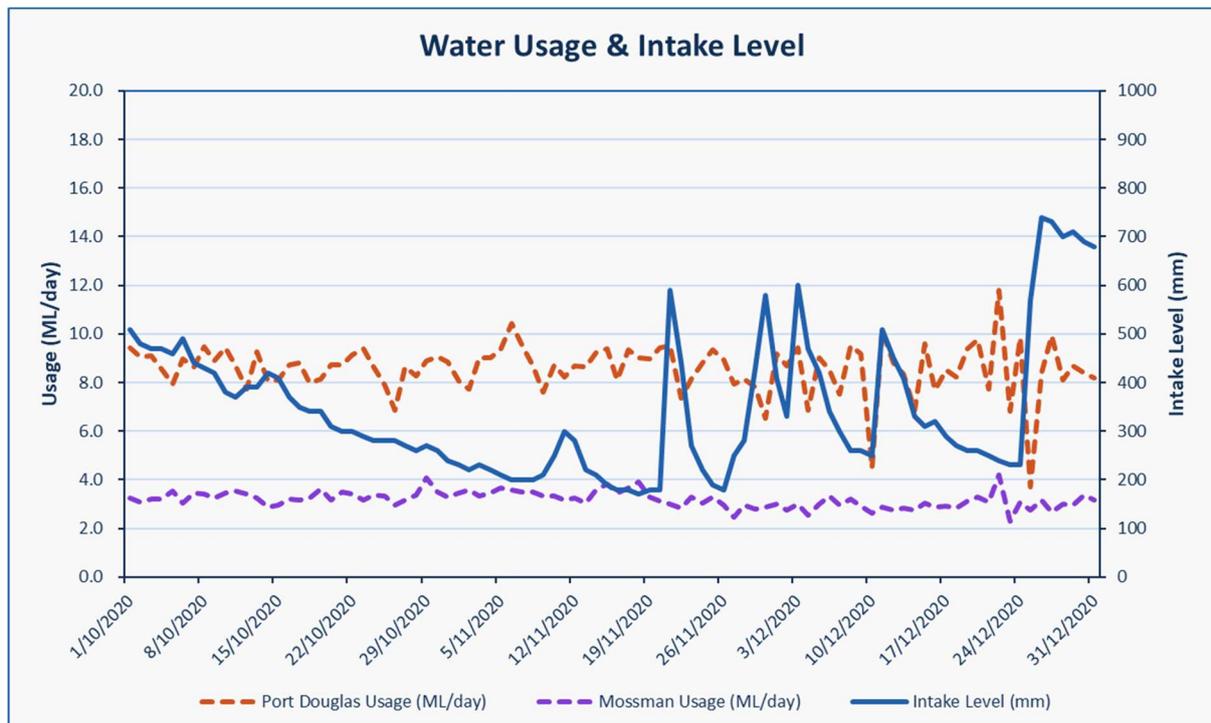


Fig 1. Mossman and Port Douglas water usage and Rex Creek intake levels for the period 1 October to 31 December 2020

All Schemes

Water quality operations within all schemes have been performing well throughout this reporting period with the raw water turbidity averaging below 1 NTU. All water scheme pump stations performed well with no incidents.

During the reporting period, general maintenance works and routine service inspections were performed at all water treatment plants for efficient operations. Annual services were carried out on all gas chlorine plant equipment and clean in place (CIP) were undertaken throughout the reporting period to maintain efficiency of ultrafiltration rack operations and maintain integrity test limits.

In this reporting period 3 staff from water and wastewater department attended the FNQ regional mini conference on 8 October 2020 in Atherton hosted by Qldwater. The event brought members, regulators and water industry together to network and exchange information through interesting and interactive sessions to help inform and influence qldwater priorities.

All operators within the water quality team have successfully completed face to face Breathing Apparatus training and chlorine gas certification. Two water quality staff members completed their gas training remotely due to COVID-19, with their work readiness assessments being delivered by video. All water quality operators can now completely carry out checks and gas cylinder replacements.

Mossman/Port Douglas Scheme

All operations were undertaken as well as all general service works, routine inspections and maintenance within the Mossman/Port Douglas Scheme.

Mossman water treatment plant met all consumer demand requirements throughout this reporting period. Ultra-filtration (UF) cartridges were ordered to replace older cartridges. Integrity checks remain within acceptable levels with zero breakthrough occurrences. CIP chemical cleans were undertaken on all five modules at the Mossman water treatment plant to maintain efficient operations and to remove organic and inorganic fouling on the cartridges.

The water treatment plant backwash recovery system failed in November 2020 due to engineering issues, on investigation the issue has been reoccurring. A plumber contractor has been engaged and is waiting on parts to finalise the repair to the pipe fittings and pipework.

There were no water quality reportable incidents in the Mossman water scheme within this reporting period. High water levels were maintained in all reservoirs in the Mossman/Port Douglas Scheme. The refurbishment of Craiglie reservoir has been completed with a new electro-chlorination dosing system to replace the gas chlorine system. The reservoir will be commissioned throughout January to ensure compliance with our Drinking Water Quality Management Plan.

Mossman Water Supply

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

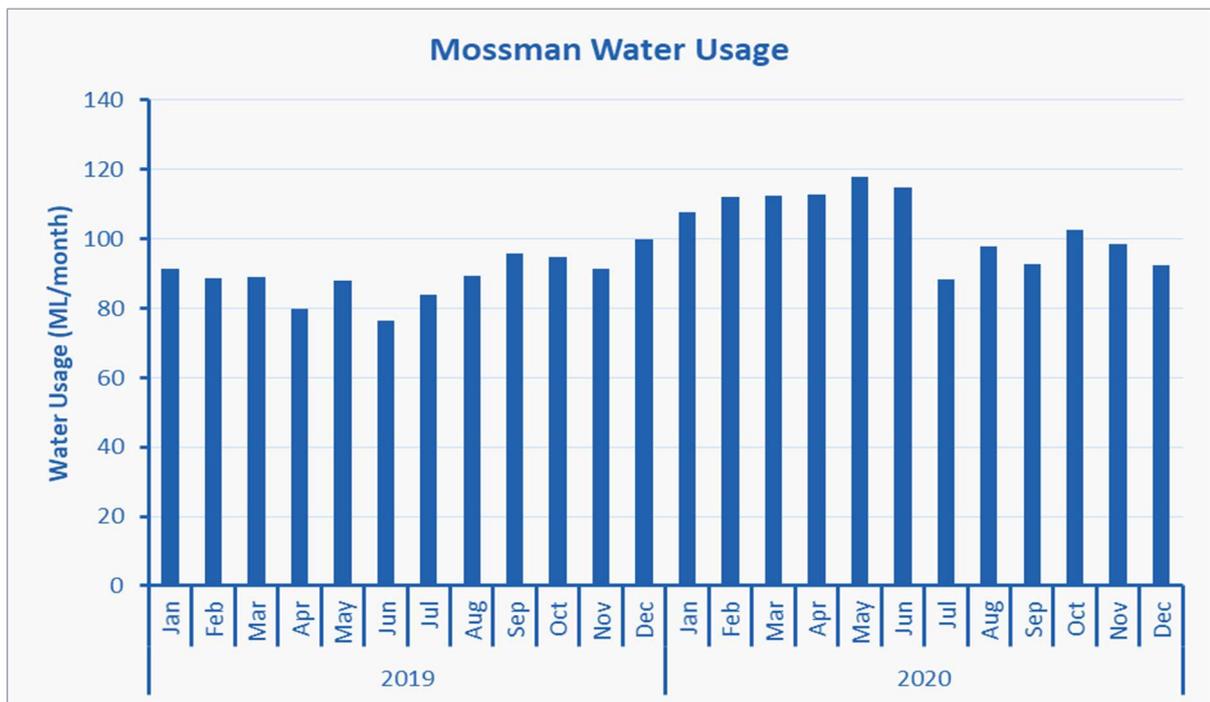


Fig 2. Mossman Scheme Total Monthly Consumption Figures

Port Douglas Water Supply

The total monthly consumption of water in Port Douglas, Craiglie and Mowbray areas can be seen in Figure 3.

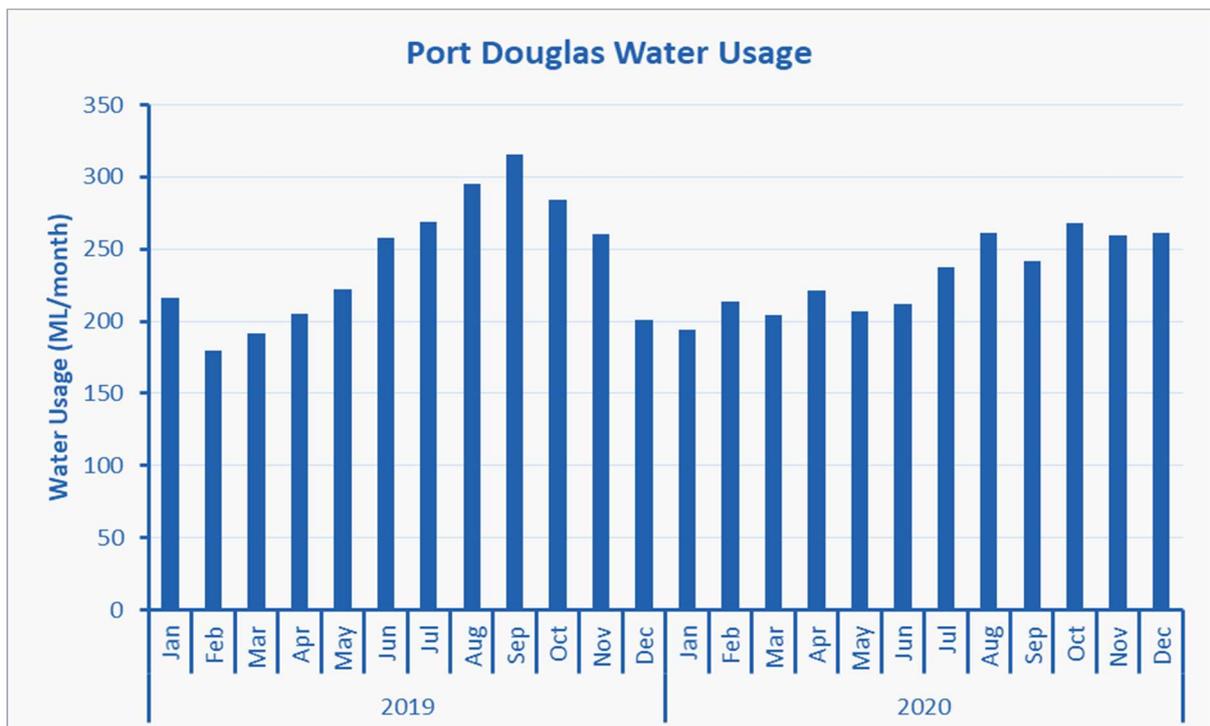


Fig 3. Port Douglas Scheme Total Monthly Consumption Figures

Whyanbeel Scheme

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

The UF rack was operational during the reporting period. To maintain UF filter efficiency chemical CIP operations were undertaken, general service and maintenance works continued to maintain efficient operation of the plant. The backwash water pH correction/treatment upgrades are in progress.

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

A large water main break that occurred on 7 August 2020 within the Whyanbeel water scheme, occurred again within the same vicinity in October 2020. A quick response from the water quality and water reticulation team repaired the break swiftly, as well as kept water losses and interruption of supply to the consumers at a minimum. These water main breaks are due to the inferior class of product which has come to its end of asset life. The 225 diameter water main pipe has been earmarked for design and replacement in the 2020/2021 capital works program.

The total monthly consumption of water in Whyanbeel, Wonga Beach, Miallo, Rocky Point, Syndicate and Bamboo can be seen in Figure 4.

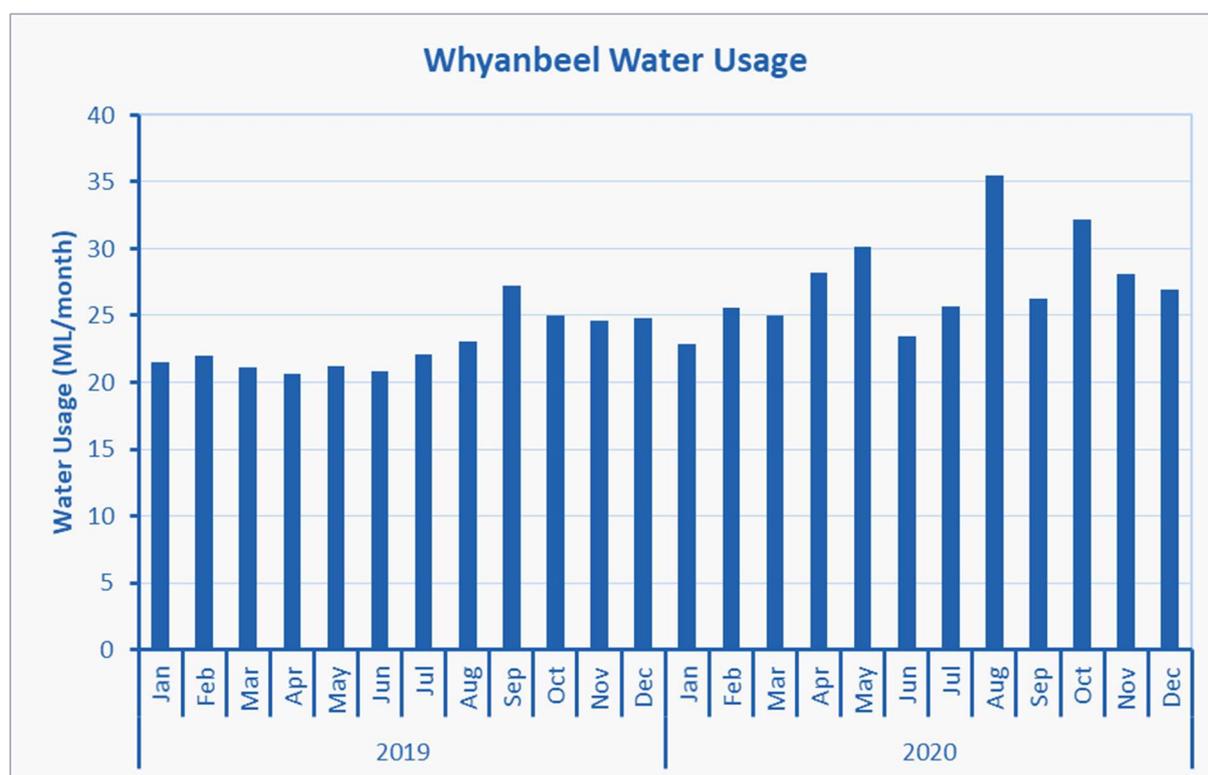


Fig 4. Whyanbeel Scheme Total Monthly Consumption Figures

Daintree Scheme

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

To maintain UF filter efficiency chemical CIP operations were undertaken, general maintenance and service works continued to maintain efficient operation of the plant.

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

Process control changes have been put in place with the handling of sodium hypochlorite at the Daintree water treatment plant.

The total monthly consumption of water in Daintree can be seen in Figure 5.

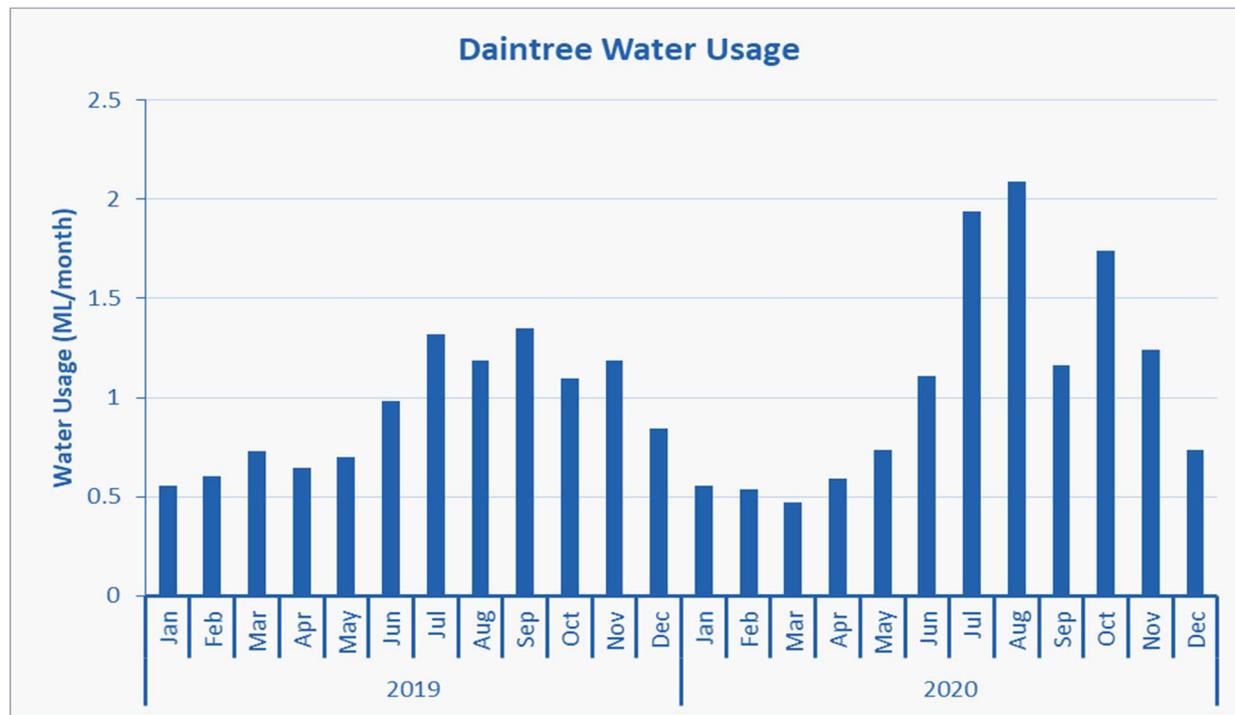


Fig 5. Daintree Scheme Total Monthly Consumption Figures

3. Water quality monitoring and results

Drinking water sampling occurs at intakes, reservoirs and in the reticulation network to ensure compliance with the ADWG.

Water quality verification monitoring includes regular testing of individual reticulation zones with monthly sampling at the reservoirs. Supporting programs for the verification of drinking water quality include;

- Water treatment plants and reservoirs that have SCADA alarms for action and critical limits and are operated under critical control points,
- Reservoir inspections that are done regularly to ensure that the reservoirs are intact and that any points of ingress are repaired, and
- Network operations that have a flushing program that ensures the chlorine residual is above 0.2 mg/L.

For the reporting period, a total of 78 treated water E.Coli compliance samples were taken in the three drinking water schemes. A total of 34 E.Coli samples were tested in the Douglas water laboratory and 44 in a NATA accredited laboratory. Other parameters monitored allow the Water and Wastewater Department to observe trends in water quality through the schemes.

All tested parameters in drinking water samples during the reporting period were compliant with ADWG health guideline values and standards required by the Water Supply Regulator and Queensland Health.

Water Quality had a request from the Dive Club film production team to conduct some water quality sampling at Aniches Bridge as part of their risk assessment, prior to filming on location. A sample was collected and analysed for E.Coli in the Council Laboratory and the results sent through the next day.

In addition, raw water quality was monitored at all of the intakes and Daintree Bore site, including 18 raw water E.Coli samples. Raw water sampling assists us to understand the treatment plant needs and the health-based targets.

Mossman/Port Douglas Supply Scheme

Average monthly values for key operational and compliance parameters are detailed in Tables 3 and 4 for treated water at 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 2020.

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 Cl mg/L	Total Cl mg/L	E.coli MPN
Standard	6.5 - 8.5	10 - 30	0 - 200	0.2 - 5.0	0.2 - 5.0	<1
Oct-20	7.2	26.5	5.6	1	1.08	<1
Nov-20	7.1	26.4	5.4	1.03	1.1	<1
Dec-20	7.1	28.0	5.4	0.93	1.0	<1

Table 4. Average monthly values for key operational and compliance parameters in the Mossman/Port Douglas Reticulation Network.

Month	pH	Temp °C	Free Cl mg/L	Total Cl mg/L	Colour PCU	Cu mg/L	Fe mg/L	Mn mg/L	E.coli MPN
Standard	6.5 - 8.5	10 - 30	0.2 - 5.0	0.2 - 5.0	<15	<1	<0.3	<0.1	<1
Oct-20	7	26.7	0.9	1.0	<1	0.011	0.009	<0.0002	<1
Nov-20	6.9	27.5	0.9	0.9	<1	0.008	<0.015	<0.0002	<1
Dec-20	6.9	28.5	0.6	0.7	<1	0.017	0.017	<0.0003	<1

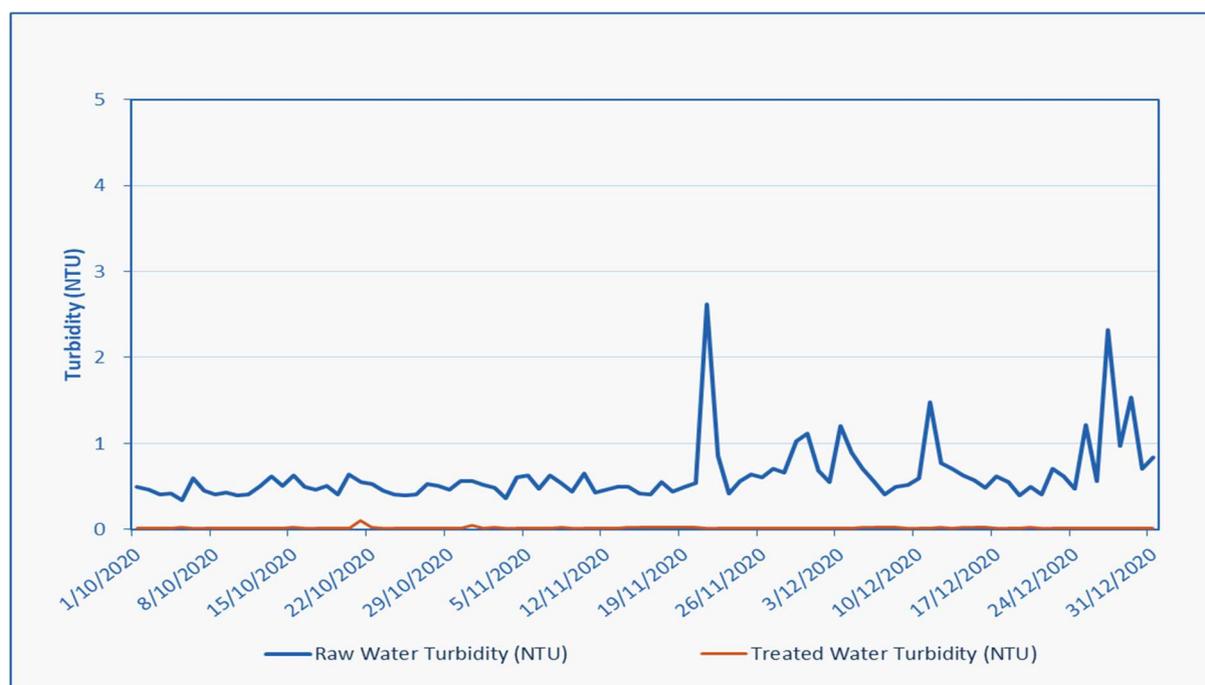


Fig 6. Turbidity trends at the Rex Creek intake and treated water at the Mossman Water Treatment Plant

Whyanbeel Supply Scheme

Average monthly values for key operational and compliance parameters are detailed in Tables 5 and 6 for treated water at the Whyanbeel 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 2020.

Table 5. Average monthly values for key operational and compliance parameters in the Whyanbeel Reservoir.

Month	pH	Temp °C	Total Alkalinity mg CaCO ₃ /L	Free Cl mg/L	Total Cl mg/L	E.coli MPN
Standard	6.5 - 8.5	10 - 30	0 - 200	0.2 - 5.0	0.2 - 5.0	<1
Oct-20	8	27.5	10	1.02	1.03	<1
Nov-20	8.2	28.7	13	1.01	1.08	<1
Dec-20	8.4	29	11	0.9	1.01	<1

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

Month	pH	Temp °C	Free Cl mg/L	Total Cl mg/L	Colour PCU	Cu mg/L	Fe mg/L	Mn mg/L	E.coli MPN
Standard	6.5 - 8.5	10 - 30	0.2 - 5.0	0.2 - 5.0	<15	<1	<0.3	<0.1	<1
Oct-20	7.9	26.9	0.9	1.01	<1	0.002	0.013	0.0004	<1
Nov-20	7.9	28.6	1.0	1.01	<1	0.0015	<0.015	0.0003	<1
Dec-20	7.9	28.9	0.5	0.73	<1	0.003	0.024	0.0004	<1

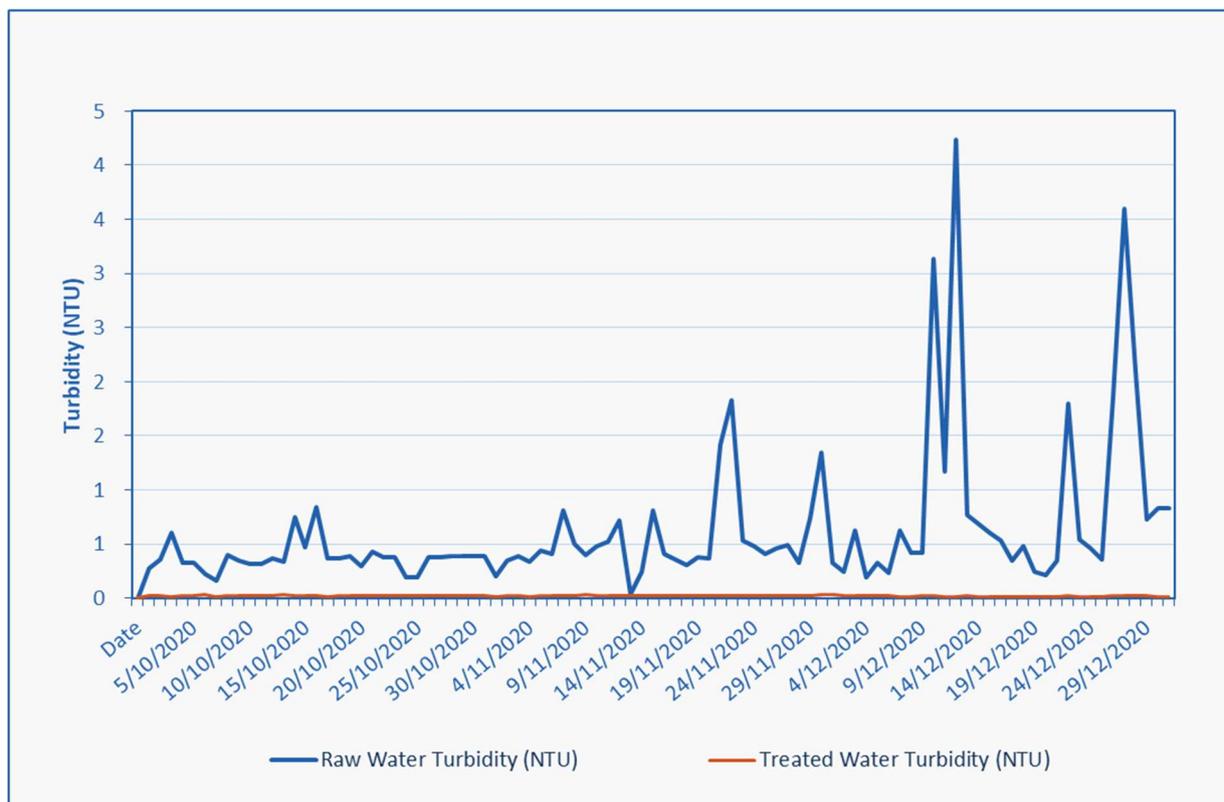


Fig 7. Turbidity trends at the Little Falls Creek intake and treated water at the Whyanbeel Water Treatment Plant.

Daintree Supply Scheme

Average monthly values for key operational and compliance parameters are detailed in Table 7 for treated water at Daintree Reticulation network. Figure 8 indicates the daily turbidity trends at the intake and treated water as recorded at the Daintree water treatment plant for the period October to December 2020.

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

Month	pH	Temp °C	Free Cl mg/L	Total Cl mg/L	Colour PCU	Cu mg/L	Fe mg/L	Mn mg/L	E.coli MPN
Standard	6.5 - 8.5	10 - 30	0.2 - 5.0	0.2 - 5.0	<15	<1	<0.3	<0.1	<1
Oct-20	7.9	26.9	0.87	1.01	<1	0.002	0.013	0.0004	<1
Nov-20	7.5	27.5	0.61	0.7	<1	0.005	0.029	0.0011	<1
Dec-20	7.4	28.3	0.66	0.7	<1	0.005	0.038	0.0039	<1

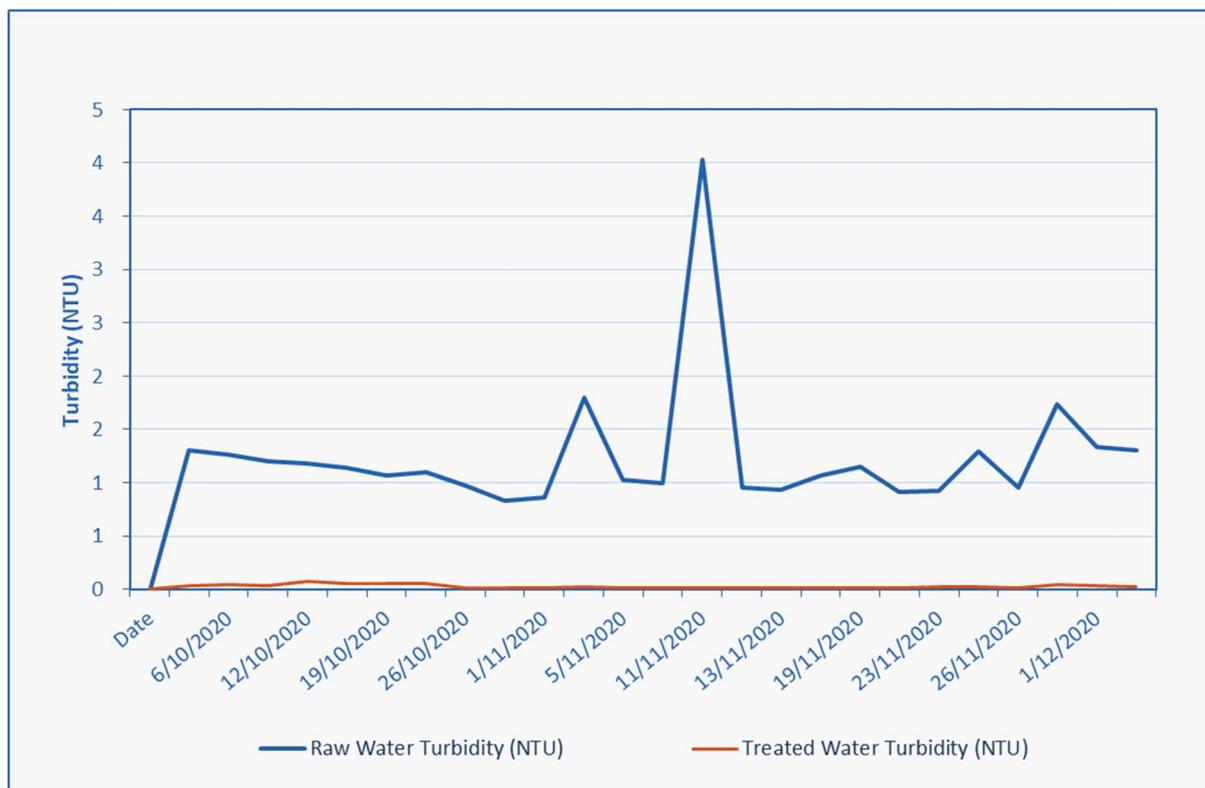


Fig 8. Turbidity trends at the Intake/Martin Creek intake and treated water at the Daintree Water Treatment Plant.

Wastewater

4. Wastewater reticulation services

General maintenance programs continued on the reticulation networks and 32 pump stations in the Mossman and Port Douglas catchments. Wastewater Treatment Plants operated within license requirements throughout this period. Completed capital work projects include the lime dosing shed and the manhole raise and reseal program.

All other capital works within wastewater are progressing well and on track for completion within the 20/21 financial year. Such as, the Port Douglas Wastewater aerator/diffusers project that has been awarded and the purchasing of new pumps for the pump renewal program.

Table 8 below shows the number of maintenance activities undertaken across all schemes.

The wastewater complaint in Mossman was due to a contractor cleaning a sewer line with a high-pressure water-jetter which created toilet spray inside the property owner’s bathroom. The wastewater team offered professional cleaning services however the owners had already cleaned the bathroom. The wastewater team explained the operational procedure of cleaning sewer lines and offered an apology for the incident, the customer was satisfied with the explanation and outcome. The wastewater complaint at a Port Douglas property occurred in October where grass was removed to perform sewer repairs. The wastewater team seeded the area with lawn seed and re-inspected once grass was established. The option of re-turfing the area was not an option due to hot and dry October weather conditions.

The two odour complaints were related to a manhole located near the Mossman Pool. The wastewater team inspected the area and resealed the manhole to avert the sewer odour. The customer was satisfied with the outcome.

Table 8. Wastewater Reticulation Services

	Port Douglas Catchment	Mossman Catchment
Pump Blockages	11	5
Sewer Chokes	1	3
Sewer Main Breaks	0	0
HCB Repairs (House Connection Branch)	4	3
Odour Notifications	0	2
Wastewater Complaints	1	1

Influent and irrigation flows

Port Douglas Wastewater Treatment Plant

A total of 190,959 kl of influent entered the Port Douglas Wastewater Treatment Plant during the reporting period. The average daily flow was 2,076 kL/day. Tanker truck contractors delivered 487 kl of septage to the plant and 823 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 87% of the treated effluent was pumped to two resort golf courses for irrigation purposes and the remaining discharged into the Dickson Inlet. The Sheraton Mirage received 136,412 kL and Palmer Sea Reef received 90,617 kL of treated effluent during this period. Total rainfall on site during the reporting period was measured as 302 mm. On 11 December 2020, the highest rainfall on a day recorded was 68 mm at the Port Douglas Wastewater Treatment Plant.

From December 2020, Queensland Health have commenced a state-wide wastewater surveillance program for COVID-19. The program will run until 30th June 2021 and has strong support from the Chief Health Officer. The Wastewater team will be assisting Queensland Health by conducting weekly wastewater sampling from the Port Douglas Wastewater Treatment Plant. Results from the testing will be used within Queensland Health to inform public health efforts.

Daily inflows, outflows and recycled water supplied for the reporting period are presented in Fig 9 and 10 respectively.

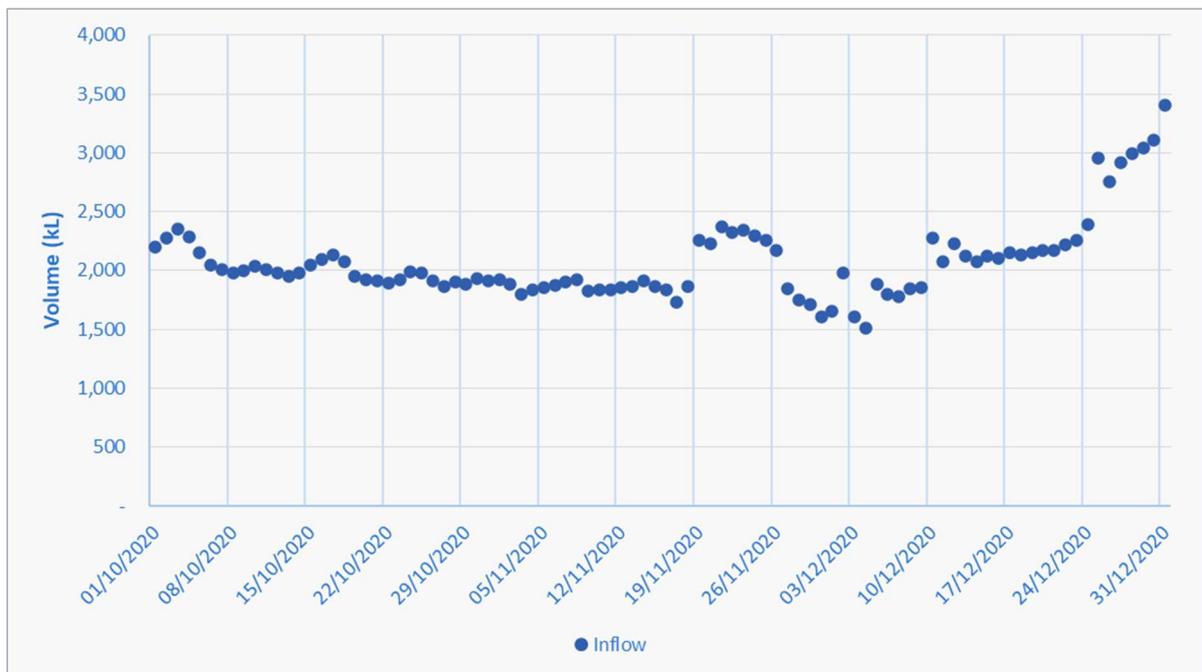


Fig 9. Port Douglas Daily Inflow

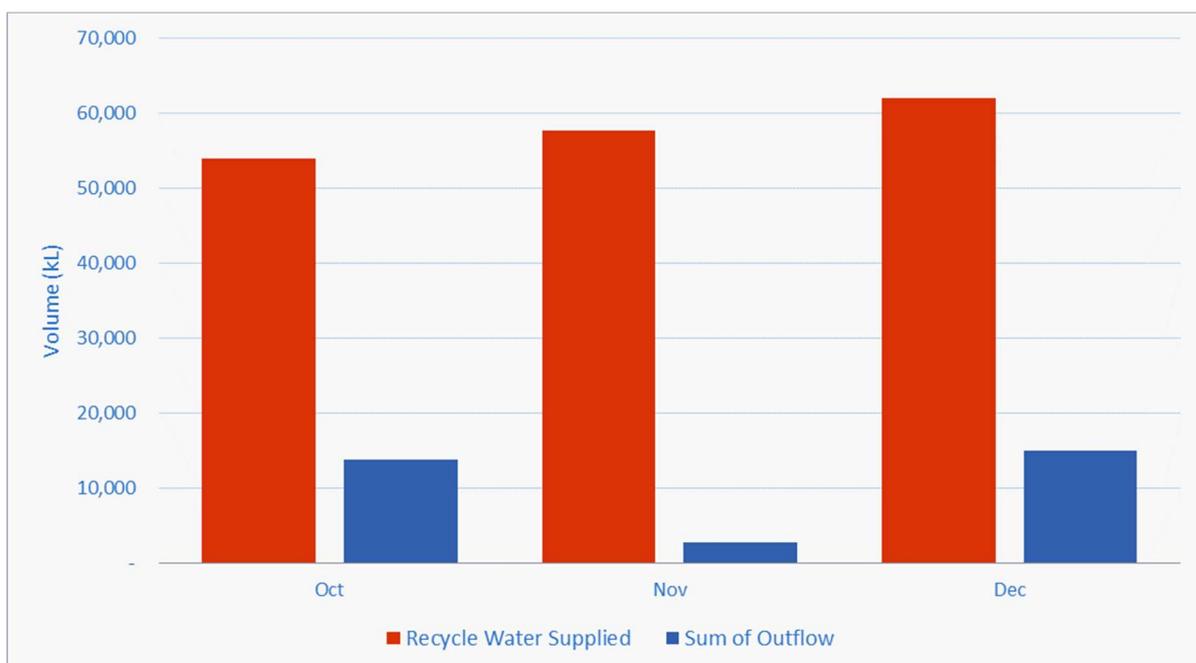


Fig 10. Port Douglas Total Monthly Outflow 2020

Mossman Wastewater Treatment Plant

The Mossman Wastewater Treatment Plant received a total influent flow of 86,293 kl during the reporting period. Influent is treated in an Oxidation Ditch system and compliant effluent is discharged into the Mossman River.

A total of 370 mm of rain fell on site for the reporting period with the highest daily rainfall measured at 61 mm on 12 December 2020 at Mossman Wastewater Treatment Plant.

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

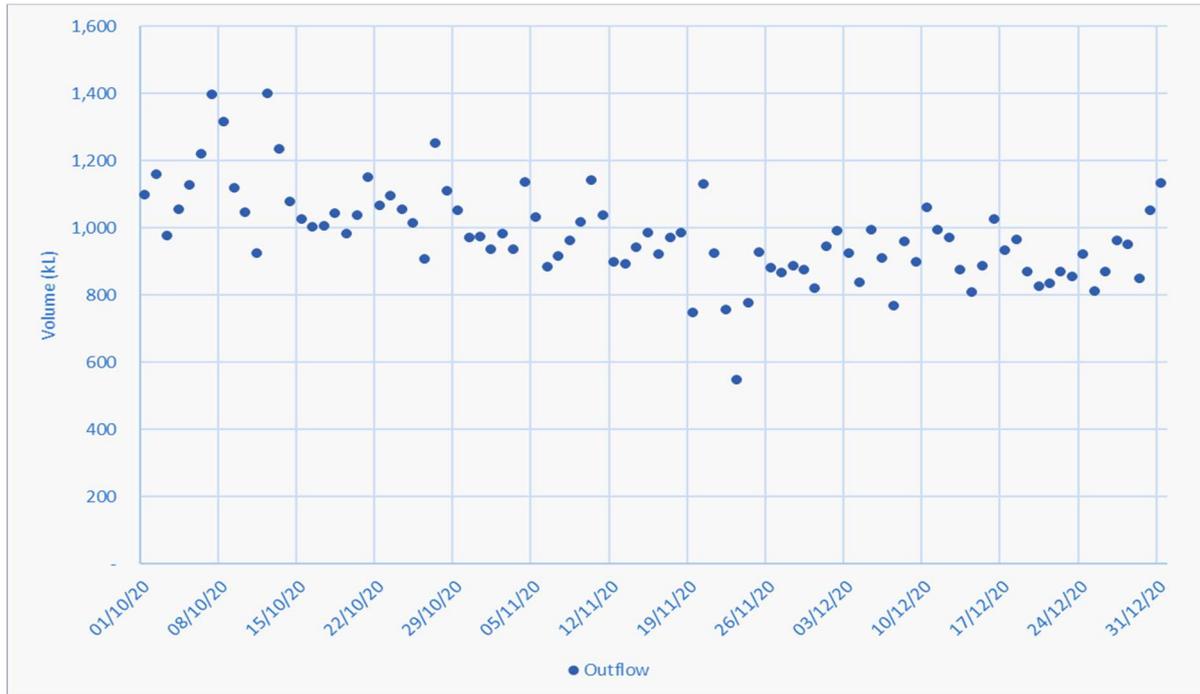


Fig 11. Mossman Wastewater Treatment Plant Daily Outflow



Fig 12. Mossman Wastewater Treatment Plant Total Daily Inflow 2020

5. Bio-solids Production

Bio-solids were produced at the dewatering plants at Port Douglas Wastewater Treatment Plant (11.42% solids) and Mossman Wastewater Treatment Plant (11.3% 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 366.27 tonnes of wet bio-solids were produced during the reporting period and sent to farms for beneficial reuse. This quantity of wet bio-solids equates to 41.81 dry tonnes.

The monthly bio-solids production trends can be seen in Figure 13.

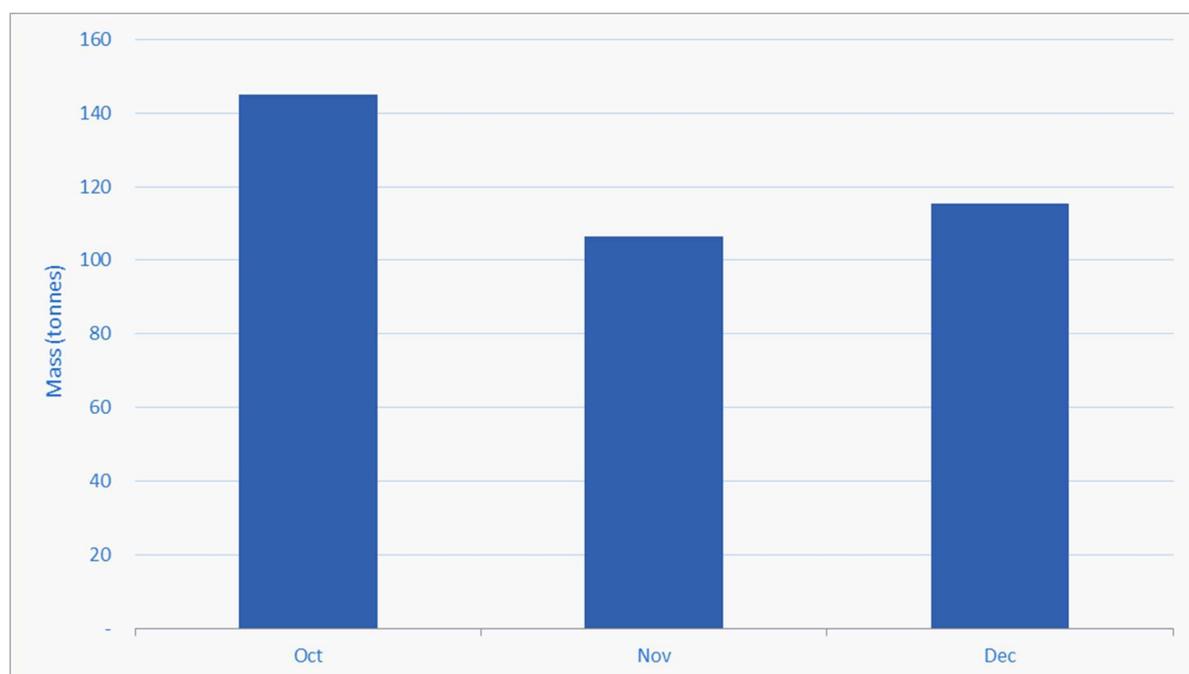


Fig 13. Port Douglas Wastewater Treatment Plant monthly bio-solids production 2020

Mossman Wastewater Treatment Plant

At Mossman Wastewater Treatment Plant, 69.92 tonnes of wet bio-solids were produced during the reporting period and sent to farms for beneficial reuse. This quantity of wet bio-solids equates to 7.79 dry tonnes.

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

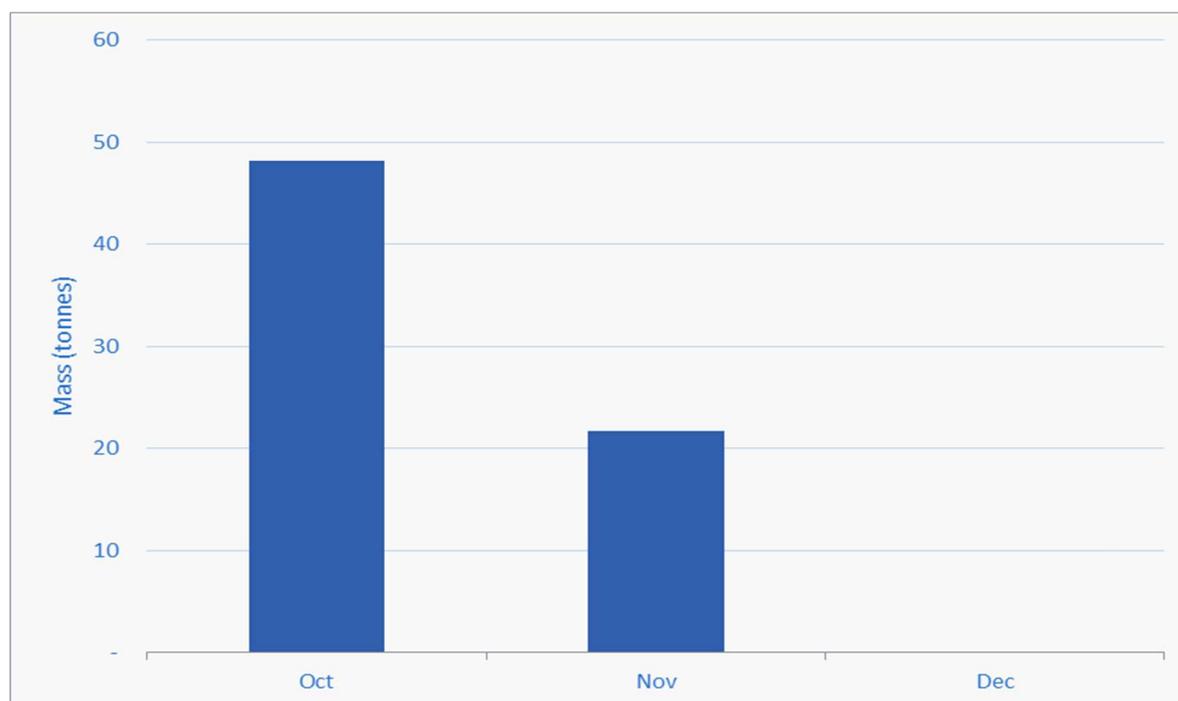


Fig 14. Mossman Wastewater Treatment Plant monthly bio-solids production 2020 (nil production in December 2020)

Effluent quality and compliance

During the reporting period compliance sampling was performed as per EPPR01790513 license conditions, see Table 9.

Table 9. Monitoring of contaminant releases to waters as per Environmental Authority EPPR01790513

Characteristics Determination	PDWWTP Frequency	MWWTP Frequency
5-day Biochemical Oxygen Demand	weekly	fortnightly
Suspended Solids	weekly	fortnightly
pH	weekly	weekly
Dissolved Oxygen	weekly	weekly
Ammonia Nitrogen	fortnightly	fortnightly
Total Nitrogen	fortnightly	fortnightly
Total Phosphorus as P	fortnightly	fortnightly
Oil and Grease	fortnightly	fortnightly
Faecal Coliforms (Organisms/100ml)	fortnightly	fortnightly
Free residual chlorine	-	fortnightly

Additionally, more samples are taken from the treatment processes, bio-solids, receiving waters and bores. Samples are tested by a NATA accredited laboratory for physical, chemical and microbiological parameters. All parameters tested during the reporting period from the Port Douglas and Mossman wastewater treatment plants were compliant.

Treatment process and compliance monitoring is carried out each day by in-house analyses of samples at the wastewater treatment 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, Total Suspended Solids, BOD₅ & Total Nitrogen) are shown in Figure 15, 16, 17, 18 & 19.

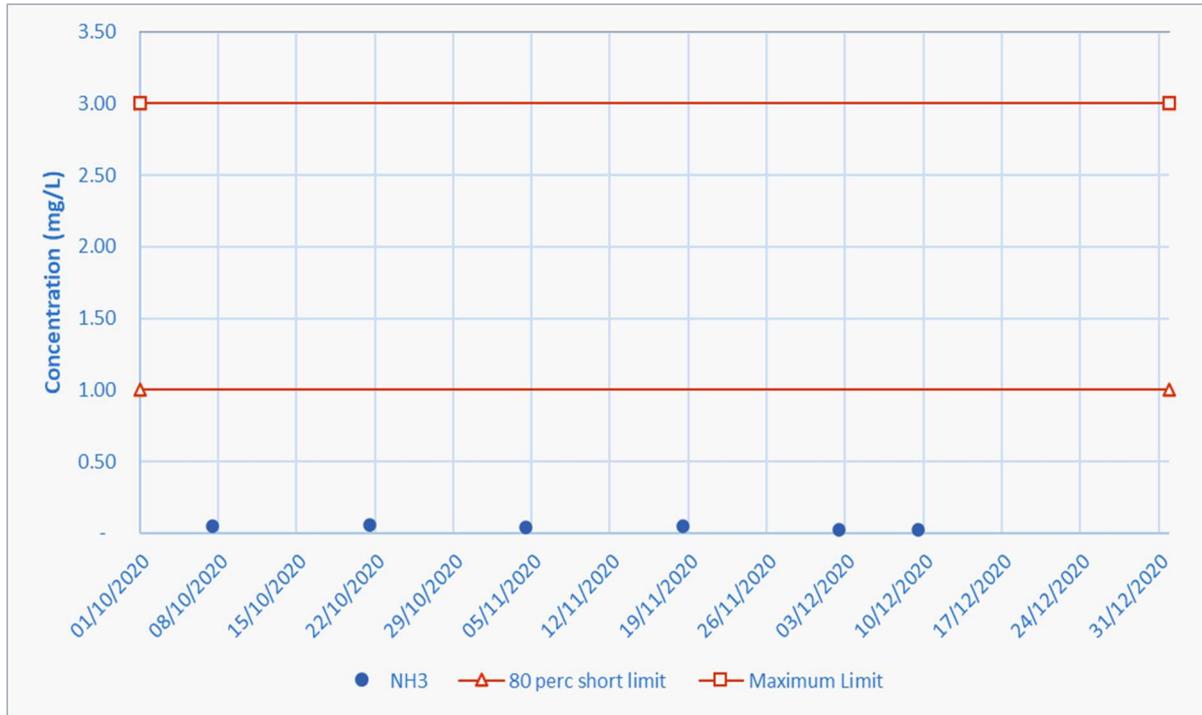


Fig 15. Port Douglas Wastewater Treatment Plant Final Effluent Test Results for Ammonia

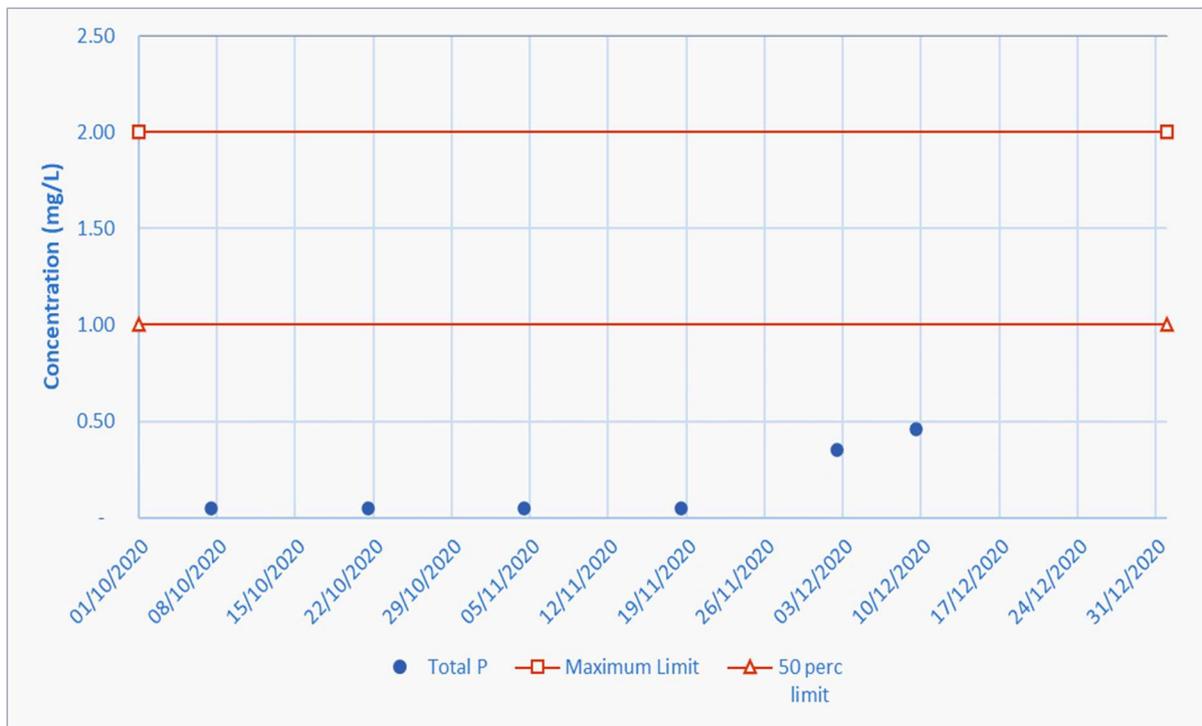


Fig 16. Port Douglas Wastewater Treatment Plant Final Effluent Test Results for Total Phosphorous

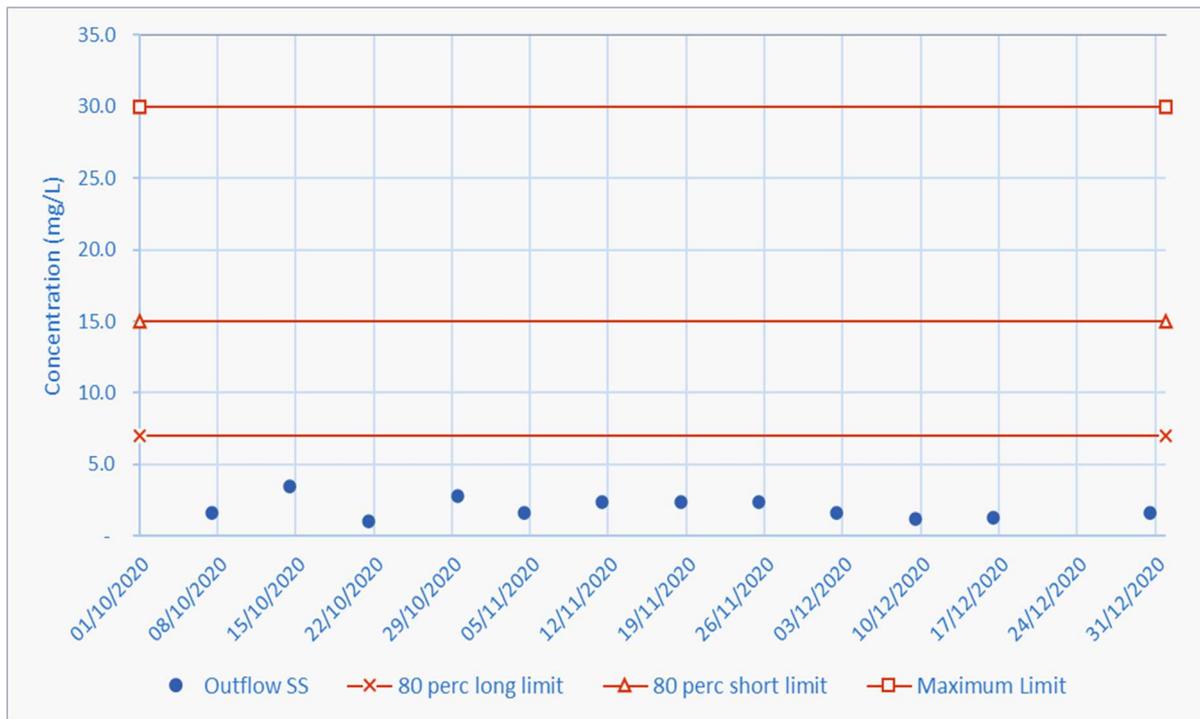


Fig 17. Port Douglas Wastewater Treatment Plant Final Effluent Test Results for Total Suspended Solids

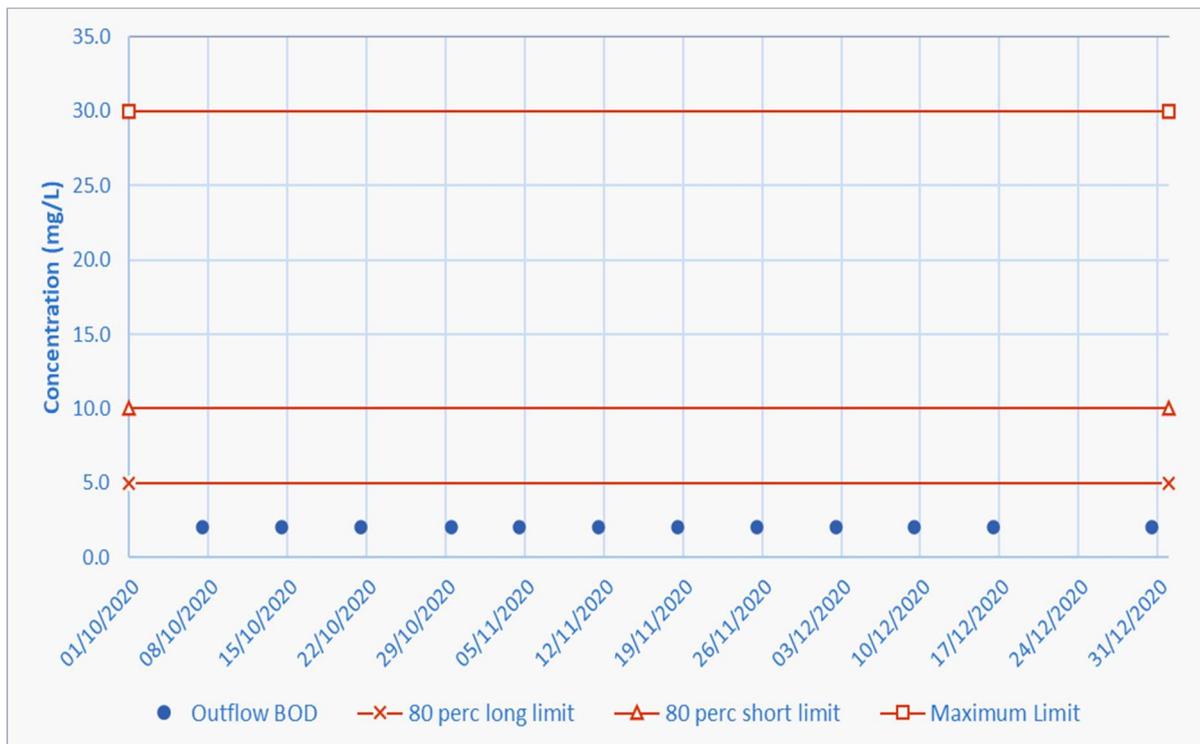


Fig 18. Port Douglas Wastewater Treatment Plant Final Effluent Test Results for BOD₅ (Biochemical Oxygen Demand)

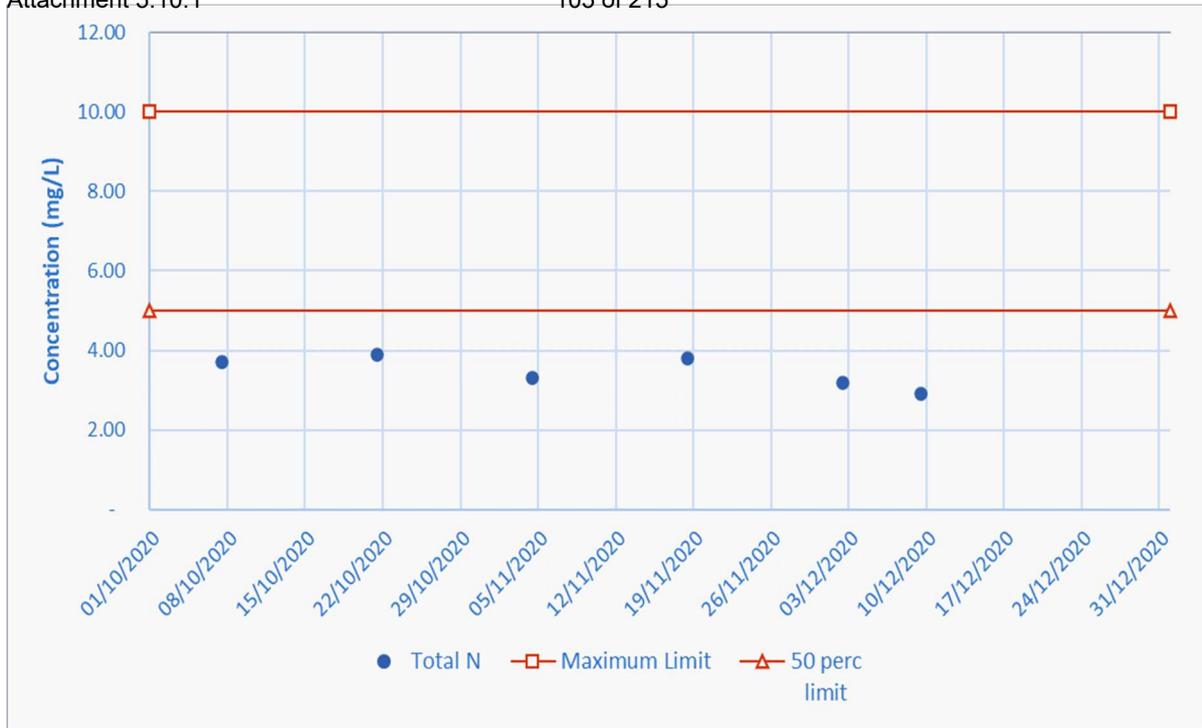


Fig 19. Port Douglas Wastewater Treatment Plant Final Effluent Test Results for Total Nitrogen

Mossman Wastewater Treatment Plant

The results for final effluent key licence compliance parameters (Ammonia, Total Phosphorous, Total Suspended Solids, BOD₅ & Total Nitrogen) are shown in Figures 20, 21, 22, 23 & 24.

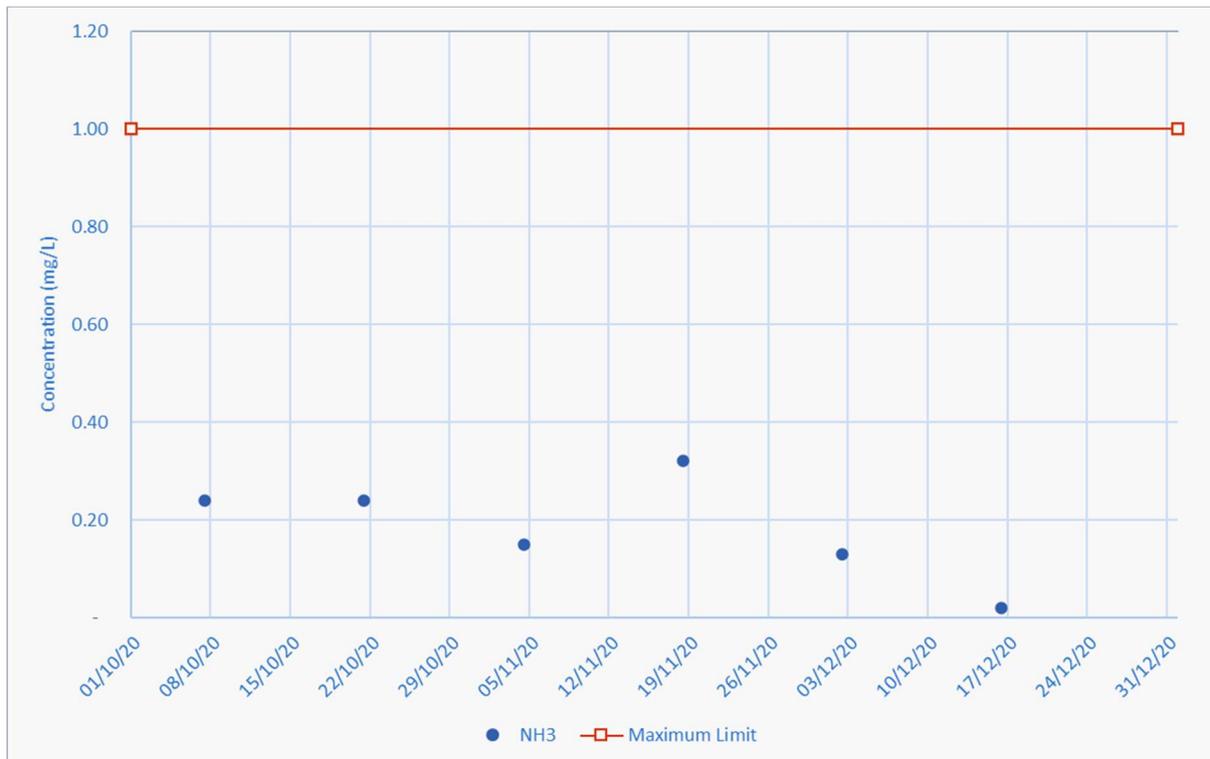


Fig 20. Mossman Wastewater Treatment Plant Final Effluent Test Results for Ammonia

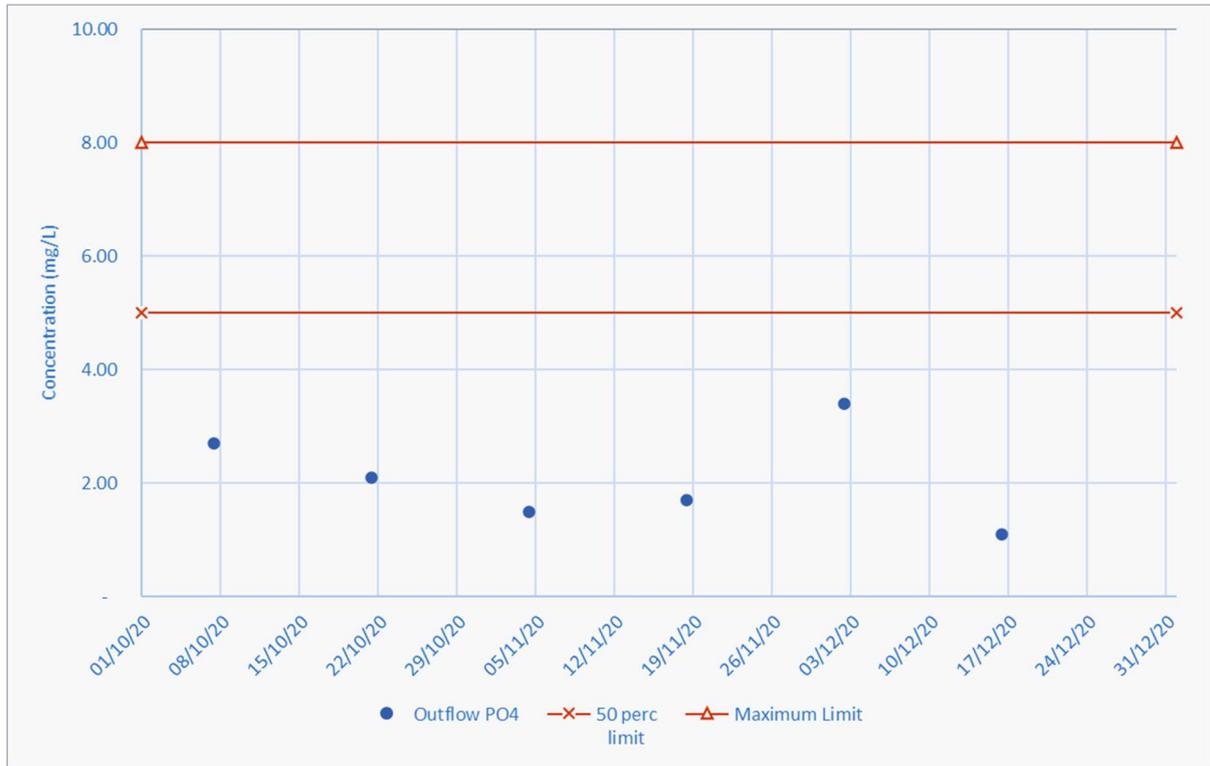


Fig 21. Mossman WWTP Final Effluent Test Results for Total Phosphorous

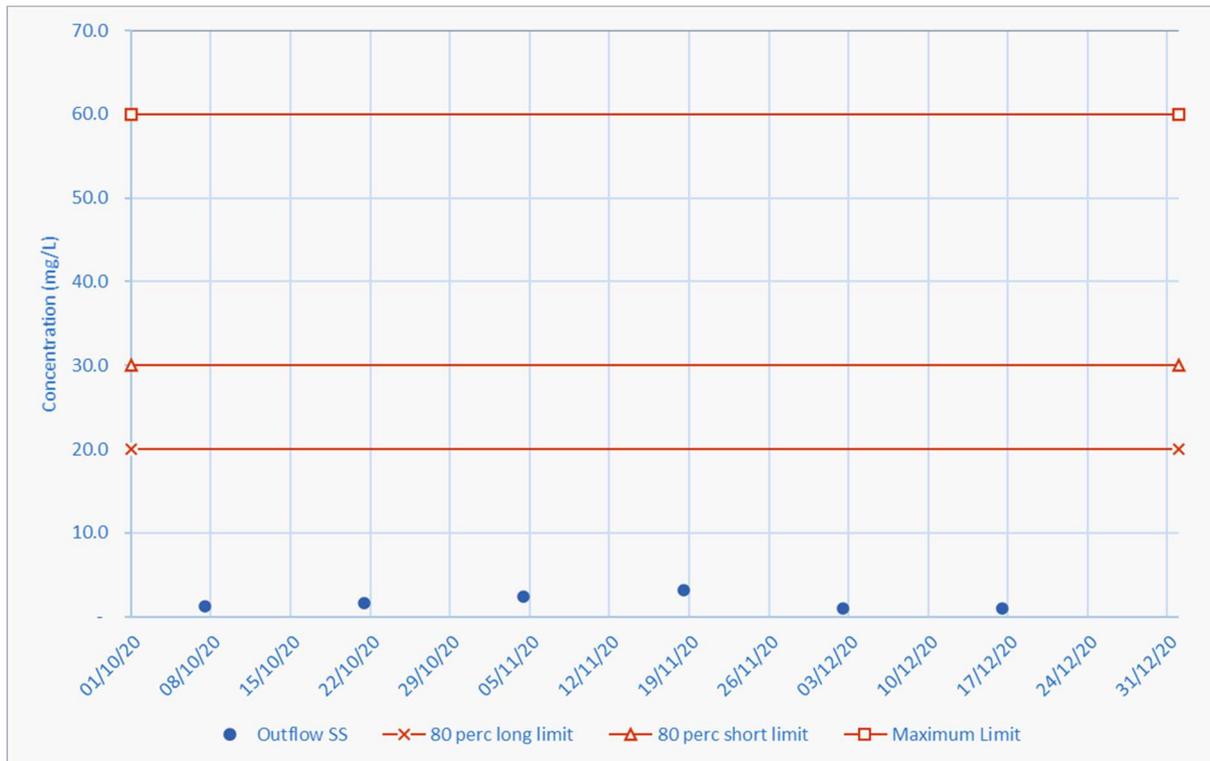


Fig 22. Mossman WWTP Final Effluent Test Results for Total Suspended Solids

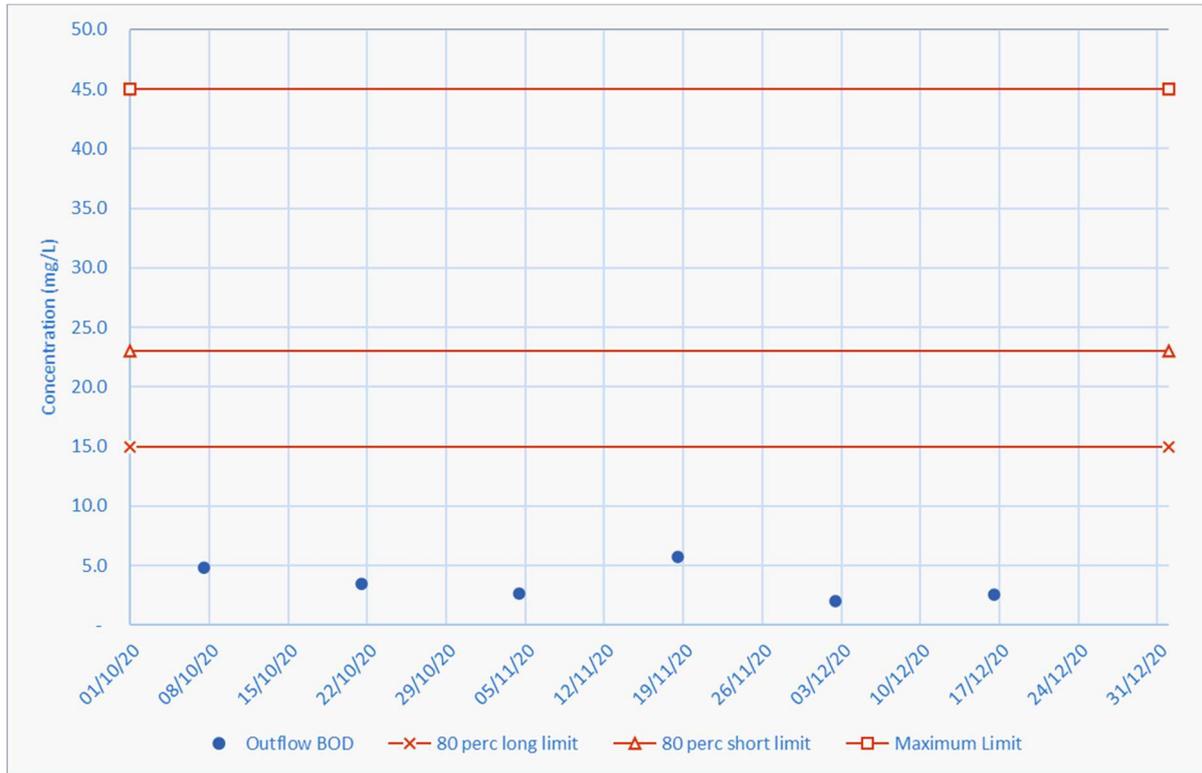


Fig 23. Mossman Wastewater Treatment Plant Final Effluent Test Results for BOD₅ (Biochemical Oxygen Demand)

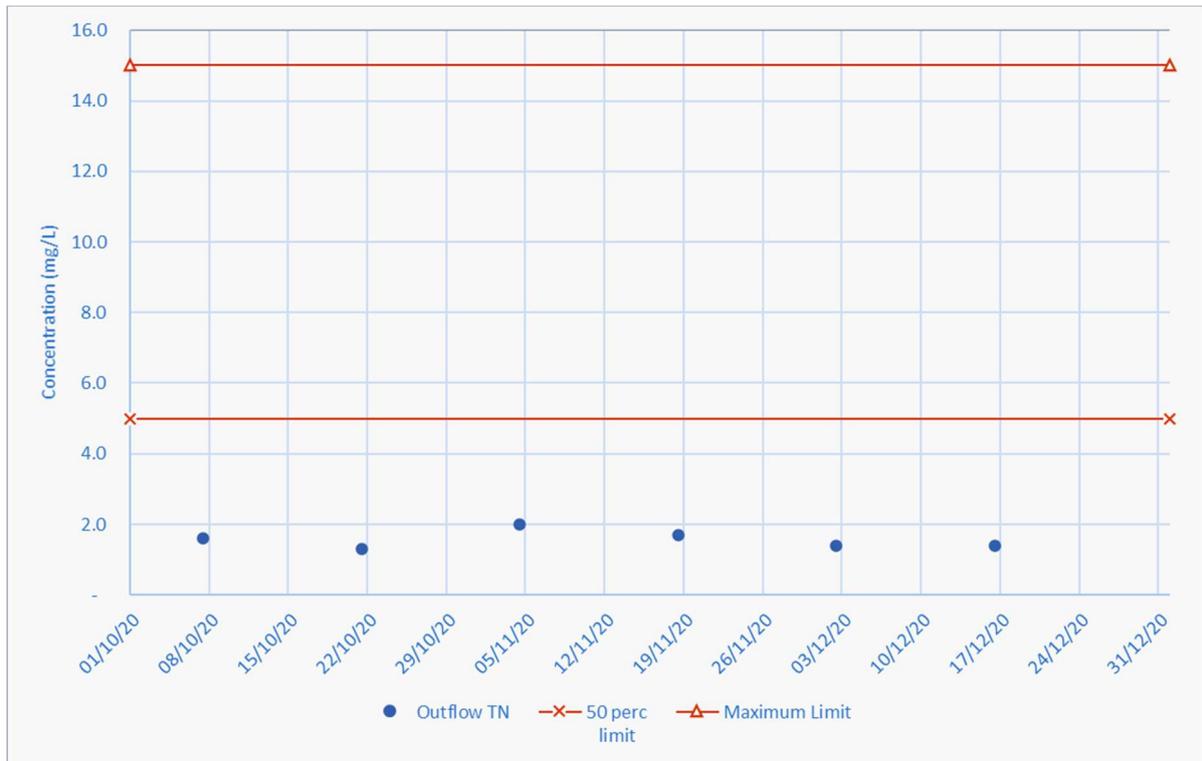


Fig 24. Mossman Wastewater Treatment Plant Final Effluent Test Results for Total Nitrogen