

**Sarina Water Recycling Facility
Department of the Environment
and Energy Annual Report 01 July
2017 to 30 June 2018**

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Annual Report Sarina Recycled Water Recycling Facility EPBC 2011-6005 for the reporting period 01 July 2017 – 30 June 2018

Introduction

Construction of the Sarina Water Recycling Facility (SWRF) commenced on 04 February 2013. The first inflow into the plant commenced on 01 August 2014 with the first releases to Plane Creek on 09 August 2014. The plant was formally handed over to council on 14 November 2014.

The SWRF replaced the 40-year-old Sarina Sewage Treatment Plant which used an outdated Biological Trickle Filter treatment process. The SWRF is an 8,000 EP biological nutrient removal plant utilising a membrane bioreactor process. The main plant comprises of inlet works, a biological reactor and a submerged membrane reactor. The sludge handling is by aerobic digestion and centrifuge dewatering.

Additional and peripheral plant includes the chemical dosing systems for sodium hypochlorite, alum, caustic soda, citric acid and polymer additions, dewatering plant, chemical storage, switchroom and transformer, and the associated support equipment for the central process area. With the addition of an integrated membrane system, the plant can meet effluent pathogen quality requirements and also provides for tertiary filtration, allowing the effluent to be utilised for supply to recycled water schemes.

Annual Report Submission

This is the annual report as per EPBC Authorisation EPBC 2011/6005 for the twelve-month period from 01 July 2017 to 30 June 2018. This report was submitted to the Department of the Environment and Energy and uploaded to council's website as per Condition 2 of the authorisation.

01 July to 30 June is an amended reporting period and was requested by Mackay Regional Council to bring the EPBC reporting into line with other statutory reporting periods. The Department of the Environment and Energy approved the amendment to the reporting period on 02 August 2016.

Average Dry Weather Flow and Maximum Peak Weather Flow

The maximum average dry weather flow for the reporting period was 0.59 megalitres per day (ML/day) which is below the maximum EPBC approval limit of 2.16 ML/day (as per Condition 5 of EPBC 2011/6005). The maximum peak weather flow for the reporting period was 6.98 ML/day which is less than the maximum EPBC approval limit of 9.2 ML/day (as per Condition 5 of EPBC 2011/6005).

Total Nitrogen and Total Phosphorus

The maximum concentrations of Total Nitrogen and Total Phosphorus for treated effluent released to Plane Creek during the reporting period are represented in Table 1 and graphically in Figures 1 and 2.

Table 1: SWRF Treated Effluent Total Nitrogen and Total Phosphorus (01 July 2017 to 30 June 2018)

Sample date	Total Nitrogen		Total Phosphorus	
	Result	Maximum*	Result	Maximum*
7/07/2017	2.5	15	0.34	3
13/07/2017	3.7	15	0.12	3
15/07/2017	4.1	15	0.2	3
23/07/2017	2.9	15	0.23	3
31/07/2017	3.3	15	0.44	3
8/08/2017	2.8	15	0.51	3
16/08/2017	2.8	15	0.32	3
24/08/2017	2.4	15	0.26	3
1/09/2017	3.8	15	0.033	3
8/09/2017	3.3	15	1.62	3
17/09/2017	3.4	15	0.39	3
25/09/2017	3.3	15	0.23	3
3/10/2017	3.6	15	0.46	3
11/10/2017	3.7	15	0.33	3
19/10/2017	2.5	15	0.5	3
27/10/2017	4.8	15	0.58	3
4/11/2017	4.2	15	0.23	3
12/11/2017	3.9	15	0.91	3
20/11/2017	4	15	0.74	3
28/11/2017	3.2	15	0.46	3
30/11/2017	3.3	15	0.39	3
6/12/2017	2.6	15	0.47	3
14/12/2017	5.8	15	5.2	3
20/12/2017	3.2	15	2.07	3
28/12/2017	3.2	15	1.25	3
7/01/2018	4.6	15	0.48	3
15/01/2018	3.7	15	0.62	3
23/01/2018	4.3	15	0.64	3
31/01/2018	5.3	15	0.44	3
8/02/2018	3.1	15	0.59	3
16/02/2018	5.1	15	0.35	3
24/02/2018	2.3	15	0.34	3
28/02/2018	2.1	15	0.5	3
4/03/2018	3.8	15	0.4	3
12/03/2018	1.5	15	0.35	3
20/03/2018	3.5	15	0.35	3
28/03/2018	2.7	15	0.28	3

Sample date	Total Nitrogen		Total Phosphorous	
	Result	Maximum*	Result	Maximum*
5/04/2018	2.4	15	0.4	3
13/04/2018	3.5	15	0.17	3
21/04/2018	4	15	0.43	3
29/04/2018	3.9	15	0.41	3
8/05/2018	3.8	15	0.17	3
14/05/2018	4.3	15	0.27	3
23/05/2018	3.6	15	0.29	3
31/05/2018	3.7	15	0.45	3
8/06/2018	3.4	15	0.18	3
16/06/2018	3.7	15	0.37	3
24/06/2018	3.5	15	0.51	3

* as per Condition 6 of EPBC Approval 2011/6005

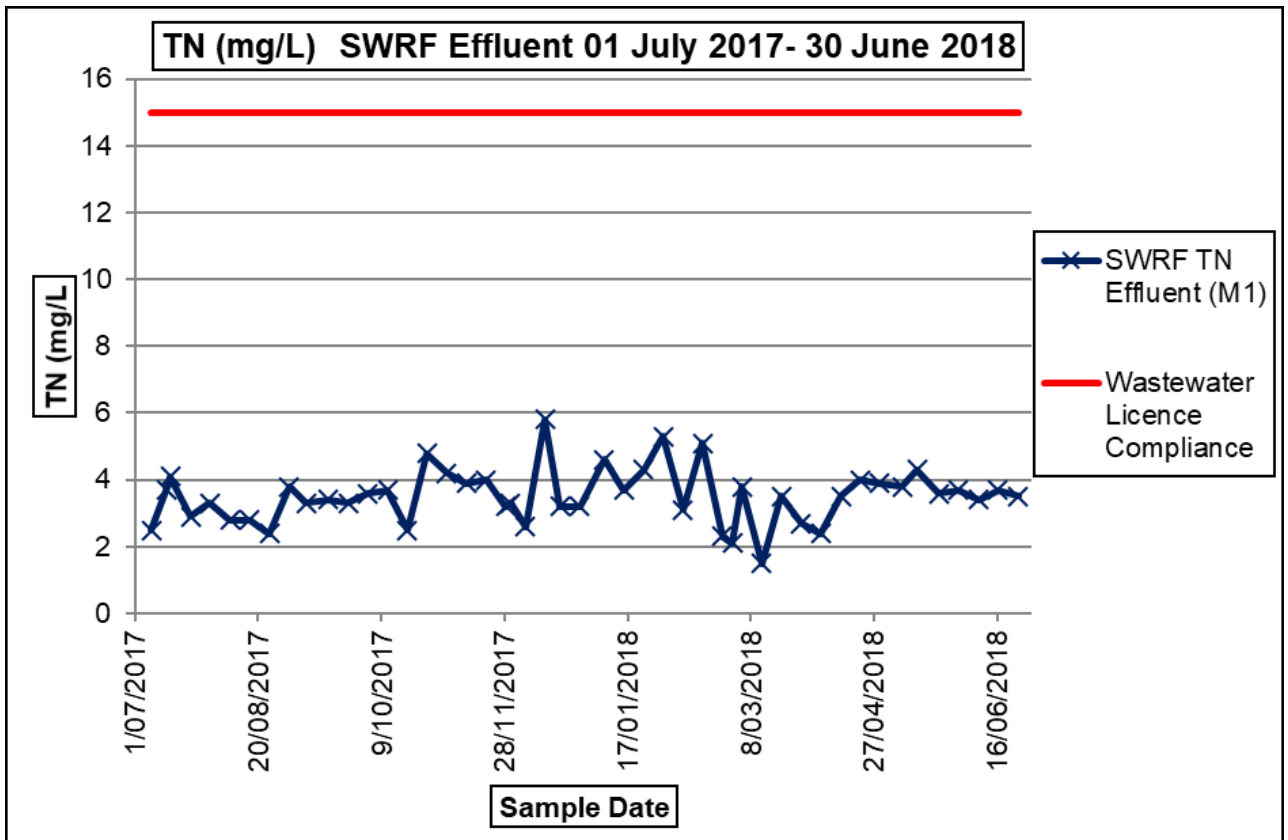


Figure 1: SWRF Treated Effluent Total Nitrogen (01 July 2017 to 30 June 2018)

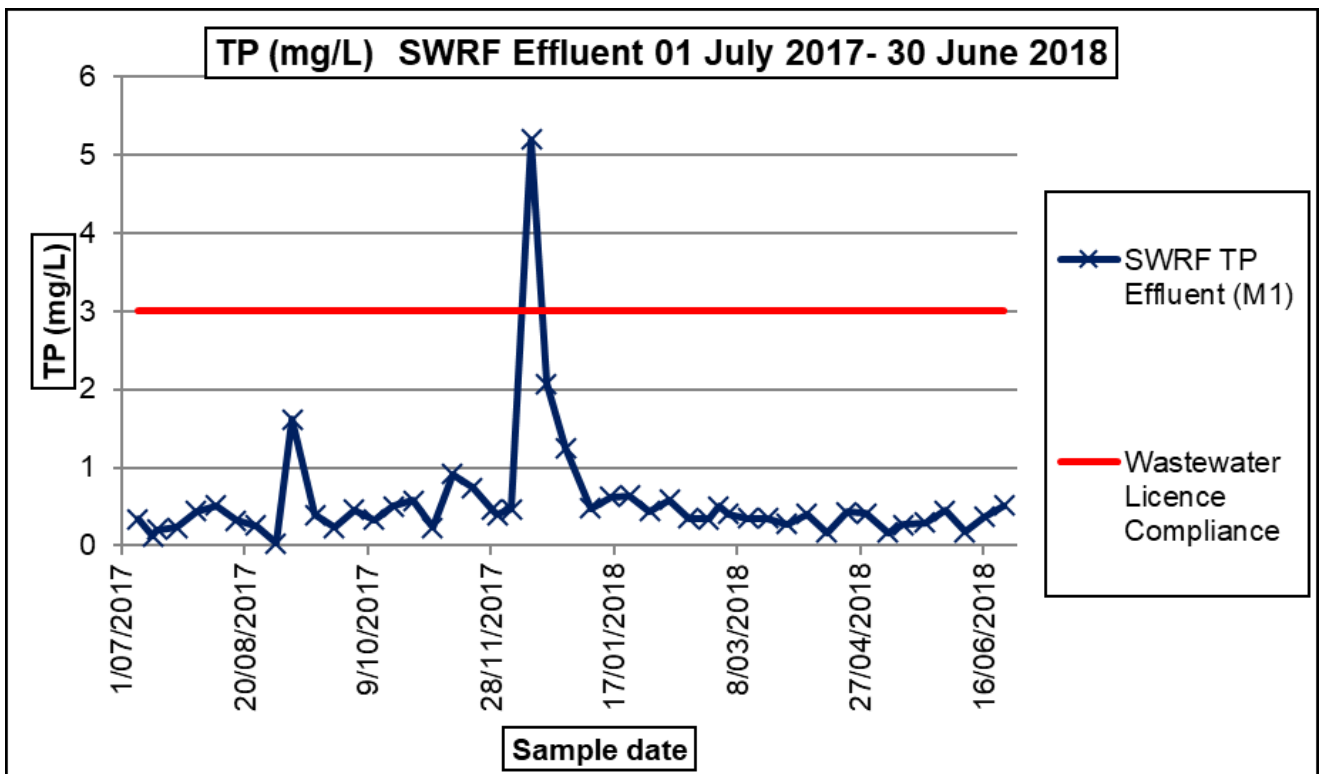


Figure 2: SWRF Treated Effluent Total Phosphorous (01 July 2017 to 30 June 2018)

Annual Mass Loads

Table 2 below shows the annual mass loads released to Plane Creek for the reporting period for both Total Nitrogen and Total Phosphorous. To bring the mass load calculation into line with annual NPI reporting, the NPI formula was used to determine the mass loads of Total Nitrogen and Total Phosphorous.

Both Total Nitrogen and Total Phosphorous mass loads were below the limits stipulated in Condition 7 of EPBC Approval 2011/6005.

Table 2: Mass Loads Total Nitrogen and Total Phosphorous SWRF (01 July 2017 to 30 June 2018)

	Mass Load (kg)	Limit (kg)
Total Nitrogen	569	4,338
Total Phosphorous	92	868

There have been no reports of any slick or visible evidence of oil or grease, litter or other objectionable matter at the release point M1.

Non-compliance with EPBC approval 2011/6005

There were two non-compliances with EPBC approval 2011/6005 within the reporting period:

- Total phosphorous breach - 14 December 2017; and
- Uncontrolled by-pass - 25 May 2018.

These non-compliances were reported to the Department of the Environment and Energy within the required timeframes. Investigation reports submitted to the department outlined the details of the non-compliances including the cause, impacts and mitigation measures. A summary of the non-compliances is provided below.

Total phosphorous breach – 14 December 2017

Results from treated effluent sampling undertaken on 14 December 2017 revealed a total phosphorus level of 5.2mg/L, exceeding the release limit of 3 mg/L. The incident was the result of many factors:

- Bioreactor mixers and a-recycle pumps failing;
- No SMS alerts set up to inform operators of a failure; &
- MBR trains not cycling through their operational sequence due to the backpulse valve missing due to repairs.

The interlocks were cleared and the mixers and a-recycle pumps were restarted. Further sampling was undertaken and confirmed treatment effluent quality came back within the release limits.

Uncontrolled by-pass – 25 May 2018

The root cause of the incident was a failure in the coding within the programmable logic controller (PLC), Membrane Bioreactor (MBR) duty arbiter. The duty arbiter is simply a switch that ensures a treatment train is always available.

The MRAS channel quickly emptied and the level in the bioreactor quickly rose eventually backing up the system resulting in the bypass of approximately 1.34 kL to Plane Creek. To rectify the issue new coding was downloaded to the PLC on 30 May 2018.