

30 Legana STP

30.1 Activity and report details

Activity name	Legana STP		
Activity address	Griffiths Lane, Off Freshwater Point Road, Legana, Launceston		
Permit number	Licence to Operate - 3593	Date of issue	15/12/1988
EPN	7688/2	Date of issue	12/10/2011
Treatment level	Secondary Treatment		
Authorised Dry Weather Flows	540 kL/day		
Key Influent Source	Residential		
Contact person	Kate Westgate		
Report author	George Fitzgibbon		
Contact details	Environment@taswater.com.au		
Date of submission	30 September 2023		

Figure 30--1: Legana Sewage Treatment Plant



30.2 Monitoring and compliance summary

30.2.1 Flow data

Table 30-A: Flow monitoring summary

	Influent	Effluent	Reuse
Location Name	Inlet	Unnamed tributary to the Tamar River	Lovely Banks
Coordinates	E 504843 N 5421288	E 505180 N 5421145	E 505010 N 5421340
Method of Measurement	In line meter	Influent less Reuse	In line meter
Date of last Calibration/Validation (if applicable).	13/07/2022	NA	12/07/2022

Table 30-B: Annual flow and rainfall data

Month	Average Daily Influent Volume (kL/day)	Rainfall (mm/month) BOM Station ID 91340	Discharge to Waters Total Effluent Volume (ML)	Discharge to Reuse Total Effluent Volume (ML)
July 2022	1,278	32.8	0.00	39.63
August 2022	1,826	124.0	47.49	9.13
September 2022	1,449	65.8	43.47	0.00
October 2022	1,855	166.8	57.51	0.00
November 2022	1,172	72.0	24.95	10.21
December 2022	1,221	26.0	0.00	37.62
January 2023	977	61.2	0.00	60.65
February 2023	972	32.8	0.00	61.23
March 2023	978	84.6	0.00	73.43
April 2023	1,053	65.4	0.00	25.79
May 2023	978	33.0	0.00	24.60
June 2023	1,769	147.4	26.53	24.00
Annual 2022-23	1,296	911.8	199.95	366.29
% of Total Discharge	--	--	35.3%	64.7%

2022-23 monthly flow data was submitted directly to the EPA.

30.2.2 Bypass events

There were no bypass events associated with the STP during the reporting period.

30.3 Discharge compliance with permit limits

Table 30-C: Compliance Summary

Parameter	Ammonia	BOD5	Chlorine	Nitrogen	Oil and grease	pH	Phosphorous	E coli	Total suspended solids
Permit/EPN limit	mg/L	mg/L	mg/L	mg/L	mg/L	Units	mg/L	MPN/100ml	mg/L
Maximum	30	50	--	40	10	8.5	10	1000	50
90th percentile	--	--	--	--	--	--	--	--	--
50th Percentile	--	--	--	--	--	--	--	--	--
Minimum	--	--	--	--	--	6.5	--	--	--
Samples analysed									
Number required	12	12	0	12	12	12	12	12	12
Number analysed	12	12	0	12	12	12	12	12	12
Statistical summary									
Max	32.6	118	--	47.8	6.2	8.7	9.0	24196	174.0
90th percentile	32.1	104	--	43.3	5.6	8.6	8.3	7139	98.8
50th percentile	24.9	66	--	34.7	2.4	7.9	5.2	420	46.5
Min	13.5	14	--	19.7	1.0	7.2	3.5	41	7.6
EPN Limit Compliance									
% compliance with Maximum	83%	33%	--	75%	100%	--	100%	58%	50%
% compliance with 90th percentile	--	--	--	--	--	--	--	--	--
% compliance with 50th percentile	--	--	--	--	--	--	--	--	--
% compliance with pH range	--	--	--	--	--	75%	--	--	--

Note: Percentages reflective of complete data set for the year.

Table 30-D: Mass loads to the environment

Parameter	EPN Limit	Frequency	2022-23 result
Nitrogen (kg)	--	Annual	5799.0
Phosphorous (kg)	--	Annual	825.7
Method	Time weighted/Grab sample method		

Table 30-E: Performance Analysis (Discharge to environment)

Effluent compliance parameter	Date(s) of non-compliance	Reasons for non-compliance	Actions to improve performance
E. coli	8/08/2022 19/09/2022 15/06/2023	There is a seasonal trend with elevated E. coli in wet months showing increased flows reducing disinfection performance.	No specific actions undertaken in reporting period.
BOD	19/09/2022 12/10/2022 15/06/2023	The plant is heavily overloaded due to significant growth in the catchment. This results in elevated BOD and TSS level.	Progressing project for additional aeration capacity to be added to supplement existing onsite aeration (planned delivery early FY24).
TSS	19/09/2022 15/06/2023	Non-compliant BOD and TSS samples also correlate to periods of high pH. Elevated pH is an indicator for algal blooms due to CO ₂ uptake during photosynthesis.	Planning initiated for medium term performance improvement before LSIP
Ammonia	15/06/2023	The main nitrogen removal process in lagoon systems is ammonia stripping which occurs at high temperature and pH levels. In colder months when the lagoons pH and temperature drop, ammonia stripping rate drops which can result in effluent non-compliance.	No specific actions undertaken in reporting period.
Nitrogen	15/06/2023		

Effluent compliance parameter	Date(s) of non-compliance	Reasons for non-compliance	Actions to improve performance
pH	19/09/2022 12/10/2022	Algae is believed to be the primary reason for elevated pH due to CO ₂ uptake during photosynthesis. Algae is a source of oxygen and is fundamental to lagoon treatment.	No specific actions undertaken in reporting period.

Note: Non-compliances only identified for the times STP has discharged to water

No other parameters had exceedances in the reporting period.

30.4 Reuse Annual Reporting

The Legana STP supplies recycled water for irrigation purposes to the Legana recycled water scheme located at the Lovely Banks property.

Table 30-F: Reuse Compliance Summary

Parameter	BOD5	pH	E coli
Permit/EPN limit	mg/L	Units	MPN/100ml
Maximum	50	9.0	10000
90th percentile	--	--	--
50th Percentile	--	--	1000
Minimum	--	5.5	--
Samples analysed			
Number required	12	12	12
Number analysed	12	12	12
Statistical summary			
Max	118	8.7	24196
90th percentile	104	8.6	7139
50th percentile	66	7.9	420
Min	14	7.2	41
Summary of results			
% compliance with Maximum	33%	--	92%
% compliance with 90th percentile	--	--	--
% compliance with 50th percentile	--	--	58%
% compliance with pH range	--	100%	--

Note: Percentages reflective of complete data set for the year

Table 30-G: Performance analysis (Discharge to reuse)

Reuse Compliance Parameter	Date(s) of non-compliance	Reasons for non-compliance	Actions to improve performance
E. coli	27/07/2022	There is a clear seasonal trend with elevated E. coli in wet months suggesting reduced HRT due to I/I to be the reason for poor disinfection performance.	No specific actions undertaken in reporting period.
BOD	27/07/2022 1/02/2023 1/03/2023 11/04/2023 24/05/2023	The plant is heavily overloaded to significant growth in the catchment. This results in elevated BOD levels. Non-compliance in warmer months is likely caused by algal blooms.	Progressing project for additional aeration capacity to be added to supplement existing onsite aeration (planned delivery early FY2024).

Note: Non-compliances only identified for the times STP has discharged to reuse

Annual soil sampling was completed at five sites (Site ID LA1, LA2, LA3, LA4 and LA5) at the RWS in April 2023. The annual compliance audit was completed in conjunction with the soil sampling. A summary of the findings of the programs is provided in the below table.

Table 30-H: Annual recycled water scheme compliance audit and soil monitoring summary

Program	Compliance audit	Soil monitoring
Compliance status	Non-compliant: Recycled water storage fencing inadequate (requires repair)	Salinity and sodicity indicators decreased across all sites from 2022 levels. All sites are classified as sodic or borderline sodic, exception of LA 2 which has decreased to within recommended levels. Sites LA 1 and LA 3 are also classified as saline. Topsoil salinity and sodicity at site LA 1 reduced to high levels. Phosphorous levels slightly elevated across all sites. Sulphur levels at sites decreased at sites LA1 and LA2 with LA1 remain excessive and LA2 within recommended levels.
Comments	Through audit process customer advised a significant leak to the recycled water pipe through the creek crossing was identified and repaired by customer.	Topsoil salinity and sodicity remain the primary concern at this location. Elevated salinity and sodicity at this site have been attributed to the location of the site on a river flat and the inundation with highly saline water from the Tamar River during flooding events. TasWater's 2022-23 recycled water quality data indicates the salinity of the recycled water supplied by the scheme is low. The 2022-23 SAR median of 2.54 coupled with current conductivity, indicates only a slight risk of soil permeability loss from the recycled water itself. Irrigation continues to occur in LA1 which has been previously identified as not suitable for irrigation. Reason for the periodic spikes in nutrients across sites is not clear but likely related to fertiliser use.

RWS groundwater site status: Amber - Minor to moderate issues identified

Legana RWS groundwater monitoring network consists of six monitoring bores, ID numbers LEGW1-5 and LEGW7. Monitoring bore ID LEGW5 is located downslope of the Legana STP and on-farm recycled water storage. Annual sampling was completed at four bores (ID's LEGW1, LEGW4-5 and LEGW7) in July 2023. Sampling of the recycled water storage was completed in February 2023. Bore ID's LEGW2 and LEGW 3 where unable to be sampled due to inadequate access due to wet weather.

Amber rating is due to increasing nutrient trends at bore ID LEGW4 and to a lesser extent bore ID LEGW7. Nutrient trends (ammonia N, total Nitrogen and total phosphorus) at groundwater bore ID LEGW4 satisfies all of TasWater's criteria for further investigation (greater than 20% increase of parameters over past three years). Piper diagram suggests recycled water is chemically different from groundwater and cause of trend is unknown. Run-off from stock laneway above sampling bore may be contaminating results.

Annual sampling at the extended analytical suite is scheduled for bore ID's LEGW2, LEGW5 and LEGW7 in addition to the Legana recycled water storage to further investigate chemical characterisation and comparison of groundwater to recycled water at these bores. Annual sampling at standard analytical suite is scheduled for remaining bores.

30.5 Ambient monitoring program

Table 30-1: Program Details

Program	Seasonal Discharge Program - Routine monitoring during discharge to water.
Status	Ambient monitoring completed during discharge events within the reporting period.
Update	Ambient water quality monitoring conducted during seasonal discharge events.
Comments	<p>Monthly ambient water quality monitoring was conducted during effluent discharges into an unnamed creek before discharging into the Tamar Estuary receiving environment. Effluent discharges occurred from August – November 2022 and again in June 2023. Key findings from the ambient water quality monitoring data review were:</p> <ul style="list-style-type: none"> • The Default Guideline Value (DGV) for ammonia was significantly exceeded at the downstream monitoring location during discharges. Nitrate toxicant DGVs were not exceeded at either location. • Upstream and downstream nitrate levels exceed the EPA DGV for the Tamar Catchment during the winter/spring months but both upstream and downstream levels were within the DGV during summer months. There was a general trend of downstream levels with upstream levels. • Total nitrogen levels downstream trended with effluent levels during discharges with downstream concentrations significantly exceeding the EPA DGV. • Total phosphorous levels downstream trended with effluent levels during discharges with downstream concentrations significantly exceeding the EPA DGV. • Enterococci levels were elevated in the October and December 2022 downstream samples and exceeded the NHMRC low risk guideline value for recreational contact. The high October result coincided with elevated effluent levels however the December upstream levels were also elevated suggesting an alternative source further upstream from the STP. <i>E.coli</i> levels downstream trended with upstream levels in addition to likely impacts from effluent discharges. Upstream and downstream <i>E. coli</i> levels were significantly elevated in December 2022 again suggesting an alternative source further upstream from the STP. • Blue-green algae (<i>Microcystis aeruginosa</i> and <i>M. flos-aquae</i>) was detected at elevated levels in the downstream sample in October 2022 coinciding with elevated concentrations in the effluent discharge. <p>Ambient monitoring during seasonal discharge events indicated an occasional upstream source of pathogens but also impacts from the effluent discharge on the downstream unnamed creek due to low river flows and subsequent poor mixing and dilution of the effluent.</p>

30.6 Groundwater monitoring

Site status: Amber – likely STP impact (2022 report)

Legana STP groundwater monitoring network consists of three bores, ID numbers LEGW8-10. Annual sampling was completed at the three monitoring bores in July 2023. Due to timing and resourcing constraints the scheduled second sampling round (annual) was unable to be completed.

The 2022-23 report, complete with hydrogeological review will be available by October 2023. Any actions required to address identified potential issues will be determined following the review.

Biannual sampling at the extended analytical suite is scheduled to recommence at all three monitoring bores during the 2023-24 groundwater monitoring program.

30.7 Inflow and infiltration (I&I)

The latest revision to the TasWater Inflow and Infiltration Management Plan includes details of the actions undertaken statewide to address I&I issues. Update to the actions completed will be provided in the next revision due September 2024.

A Multi Criteria Assessment was undertaken by TasWater in 2022 to prioritise I&I investigation and works state-wide. This catchment was ranked 38 out of 79 in priority.

30.8 Sludge and Biosolids

The latest revision to the Sewage Sludge Management Plan (SSMP) includes full details of the actions undertaken during the reporting period, the most recent sludge profiling results, and upcoming annual desludging program.

This STP was fully compliant with the 2022-23 SSMP.

No stockpiling occurs at this site.

Table 30-J: Desludging status and comments

Desludging Status	Comments
Priority site	Lagoon 1 was desludged in FY2021-22 Desludging Lagoon 2 scheduled to occur in 2025, as per the current prioritisation planning schedule.

30.9 Non-compliance with other permit requirements

Table 30K-: EPN non-compliances

EPN Condition	Description of non-conformance	Future Actions to be taken
M4 Flow monitoring equipment	No Reuse Dam inlet flow meter installed	Requested installation through flow meter program
EF5 Effluent quality limits for discharge to a reuse scheme	Discharge compliance with reuse permit limits	See section 30.4 Reuse Annual Reporting and Performance Analysis
EF3 Effluent quality limits for discharge to water	Discharge compliance with permit limits	See section 30.3 Discharge compliance with permit limits and Performance Analysis
A1 Odorous gases	See section 30.10 Complaints and incident reporting	See section 30.10 Complaints and incident reporting
Q1 Regulatory limits	Plant is hydraulically overloaded. ADWF limit - 540kL/d. Avg. flow is 1001.45kL/day	No Specific action
OP2 Operational Procedures and Maintenance Manual	No contemporary Operational Procedures Manual	New SharePoint based solution for OPMMs currently being developed. First version to be implemented in FY24

30.10 Complaints and incident reporting

Table 30-L: Complaints Reporting

Date	Category	Details	Mitigation actions
2/01/2023	Odour	Strong odour from lagoons	Several mitigation actions, including: <ul style="list-style-type: none"> • Venturi aerator in primary lagoon • Hydrogen peroxide dosing from 1000L IBC container • Daily recording of dissolved oxygen • Air diffusers installed to enhance aeration effectiveness, thus increasing available dissolved oxygen. TasWater is now exploring the viability of a second venturi aerator system in the primary lagoon/Lagoon 1 to complement the current one in place.
2/01/2023			
26/12/2022			
3/01/2023			
21/09/2022			
19/09/2022			
13/09/2022			

No notifiable incidents occurred during 2022-23 reporting period.

30.11 Any other relevant information

Table 30-M: Projects or significant operational events that occurred in FY 2022-23:

Project or significant operational event	Progress
Launceston Sewerage Improvement Program (LSIP).	Legana is currently being investigated for rationalisation to Ti-Tree Bend within LSIP.

For further information on the Legana STP please contact TasWater on 13 6992

www.taswater.com.au