

Guidelines for the Preparation of an Annual Environmental Review for Wastewater Treatment Plants

August 2017



ENVIRONMENT PROTECTION AUTHORITY

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1 Introduction

The purpose of this guideline is to support consistency and a high standard in annual performance and environmental management reporting by operators of Level 2 Wastewater Treatment Plants (WWTPs) in Tasmania. Annual performance and environmental management reporting in the form of an Annual Environmental Review (AER) is required under Permit and Environment Protection Notices (EPNs) for each L2 WWTP. An AER allows the person responsible to demonstrate they are monitoring the performance of the WWTP, managing to ensure compliance, and to explore opportunities to improve environmental outcomes.

The guideline provides a framework to ensure AERs are to the satisfaction of the Director, EPA. In addition, since AERs must be made available to the public, the guideline helps ensure public disclosure of WWTP performance and management information is clear and accurate.

2 Objectives of an Annual Environmental Review (AER)

To provide the Director, EPA and the public with a report which:

- Concisely documents key features of any Level 2 WWTPs currently operating in Tasmania and any significant changes over the reporting period.
- Documents environmental performance and compliance of a Level 2 WWTP during the reporting period against requirements imposed on the activity by a Permit or EPN.

3 Submission and Assessment of an AER

Unless otherwise approved by the Director, an AER must be submitted to the Director, EPA each year within three (3) months of the end of the reporting period. Typically, the reporting period is the financial year ending 30 June.

EPA Tasmania will review the AER against reporting criteria specified in this guidelines. If an AER meets the reporting criteria, EPA Tasmania will recommend to the Director that he/she advise the person responsible that the AER is accepted.

4 Formatting and Design of the AER

While AERs must contain all the information specified in the guideline, layout and design is at the discretion of the person responsible so that they may meet, for example, organisational publishing requirements.

Submission of data in formatted tables is not required. However, Appendix I contains examples of tables that may assist in preparing an AER.

5 Consolidated AER Covering Multiple WWTPs

Currently, operators of L2 WWTPs are required under the relevant Permit or EPN to submit an AER for each WWTP. The Director, EPA, has determined that in the case of organisations that operate more than one L2 WWTP, this requirement can be set aside and instead, a consolidated AER covering multiple WWTPs may be submitted. This determination is intended to reduce the administrative regulatory burden on organisations that operate more than one Level 2 WWTP.

A consolidated AER may reflect categories of the organisation's choosing. For example, AERs covering multiple WWTPs may be categorised by region, risk level, operational activity, or plant capacity. In addition, a single AER document that includes all Level 2 WWTPs operated by the person responsible is also acceptable. In addition to observing advice contained in this guideline, a person responsible intending to submit a consolidated AER for the first time, should contact EPA Tasmania beforehand to ensure it is fit-for-purpose.

6 Report Contents

6.1 Activity Details

For each WWTP, provide the following:

- Activity name
- Street address
- Permit and/or EPN number(s) and date of issue, and
- Treatment level
- Summary of main influent to the WWTP, including significant trade waste or tankered waste inputs.

For each AER, provide the date of submission and contact details of the author.

6.2 Monitoring and Compliance Summary

6.2.1 Flow Data

Effluent quantity, quality and discharge location are key indicators for measuring performance of WWTPs. A summary must be provided which includes:

- Authorised Average Dry Weather Flow expressed as kL/day
- Monthly rainfall totals for area of the sewerage network connected to the WWTP

For each flow monitoring point (i.e. influent, Discharge to Waters, and Discharge to Reuse):

- Discharge location name
- Method of measurement
- Date of last validation of measurement
- Average monthly and annual flow (influent), expressed as kL/day
- Total monthly and annual flow (effluent)

Note: If monthly flow monitoring data has not already been submitted electronically to EPA Tasmania, it must be included in the AER.

Refer to Table I in Appendix I.

6.2.2 Bypass Events

Provide details regarding all treatment bypass events that occurred over the reporting period. Details to include are:

- Date of event
- Discharge location including co-ordinates
- Duration of discharge
- Volume discharged
- Level of effluent treatment
- Response actions
- Cause/s of the bypass event
- Mitigation actions to prevent future bypass events

Refer Table 2 in Appendix I.

6.2.3 Discharge Compliance with Permit Limits

Provide an analysis of monitoring data that assesses compliance with discharge limits specified in the relevant Permit or EPN. The analysis should discuss reasons for non-compliance, and provide actions to improve performance and prevent reoccurrence.

It is important to consider the mass load of nutrients discharged from a WWTP to a waterway refer to Appendix 2 for guidance on how to correctly calculate mass loads.

All parameters with limits specified in any Permit or EPN must be considered. Table 3 in Appendix 1 provides an example of a statistical analysis that may be appropriate.

To further assist, EPA Tasmania can provide an Annual Environmental Review Calculation Tool on request.

If discharge monitoring requirements have not been met (e.g. missed effluent sampling, invalid test results, incomplete data submission) provide information about the non-compliance. For each non-compliance, include *all* of the following details:

- Condition of Permit/EPN not complied with
- Date/Time of events when the non-compliance occurred
- Cause of non-compliance
- If relevant, reference to existing contingency/management plan and how this was implemented
- Action taken to prevent a reoccurrence of non-compliance (including time frames if necessary)

6.3 Reuse Annual Reporting

If a WWTP discharges to a recycled water scheme, a review of the scheme's operation for the year and any plans for the improvement must be submitted. The review may be incorporated into the AER or submitted as a separate reuse scheme annual environmental report.

If a separate report was submitted, provide a reference to the report in this section.

6.4 Ambient Monitoring Programs

If an ambient monitoring program is required, provide an update (e.g. commenced, not yet commenced, expected commencement, or completed).

If it was necessary to alter or delay an approved program, provide a description of the circumstances and refer to any consideration by the Director, EPA, of program changes or extended timelines.

6.5 Groundwater Monitoring

If groundwater monitoring is required, provide a review of the monitoring program, including a summary of key findings. The may be incorporated into the AER or submitted as a separate report.

If a separate report was submitted, provide a reference to the report in this section.

6.6 Inflow and Infiltration (I&I)

Provide a summary of any actions taken in the catchment serving the WWTP to address inflow and infiltration issues, in accordance with any I&I Management Plan approved by the Director.

6.7 Sewage Sludge and Biosolids

If operating under an approved Sewage Sludge Management Plan, provide a statement on adherence to the plan. If necessary, provide an update of the plan for Director's approval, or a date when the updated plan will be provided.

Provide the following for each WWTP for the reporting period:

- Quantity of sewage sludge removed from the premises
- Destination and end use of sludge removed from the premises
- Quantity and classification of sewage sludge and biosolids stored at the premises
- Contaminant and stabilisation grading and overall classification of biosolids produced
- Results of sludge profiling of all WWTP lagoons, detailing levels of accumulated sludge and desludging program. Include the estimated quantity of sludge accumulated within lagoons
- Provide a summary of any issues regarding sludge treatment, analysis, storage and end use, including any recommendations for further action.

Refer to Appendix I, Table 5, Table 6 and Table 7

6.8 Non-Compliance with Other Permit Requirements

This section of the AER must summarise the level of compliance with remaining Permit/EPN requirements, not already addressed but excluding environmental incidents. This covers operational requirements, specific reporting and upgrade requirements, often including a submission date or deadline for completion. For each WWTP, supply details of each non-compliance and, as relevant, include *all* of the following details:

- Summary of particulars of non-compliance
- Actions taken, or future action to be taken, to address non-compliance and/or mitigate any adverse effects due to the non-compliance
- An update on any required changes to be undertaken at the WWTP, such as installation of monitoring equipment, or modifications to treatment process
- Any overdue reports. If not providing the report, provide a statement detailing why the report will not be provided and how the non-compliance will be addressed
- Action taken to prevent a reoccurrence of non-compliance

6.9 Complaints and Incident Reporting

Complaints: Provide a summary of all complaints received during the reporting period. If necessary, append any report that gives further details of the complaint, and actions taken to resolve it. Do not name or otherwise identify complainants. This information may be tabulated. Refer to Table 8 in Appendix I.

Incidents: Provide a summary of each notifiable incident. As a minimum include:

- date of occurrence
- category (*noise, odour, spill, other...)
- details of the incident (#including as relevant, duration, volume) and
- any mitigating actions

This information may be tabulated. Refer to Table 9 in Appendix I.

6.10 Any Other Relevant Information

Provide any other relevant information about the performance and environmental management of the WWTP, including any actions undertaken to improve performance against Permit or EPN requirements. Noteworthy changes that may be listed here include, but are not limited to:

- modifications to the process by installation or removal of treatment equipment
- changes in influent due to significant changes in the catchment such as the addition of a significant trade waste customer or during the shutdown phase of an industry

Appendix I: Example Tables for data requirements

The following tables are provided as a guide to the reporting requirements for an AER.

Table I: Flow Data

Authorised Average Dry Weather Flow (kL/day)	
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Flow Monitoring Summary				
Month	Average Daily Influent Volume (kL/day)	Rainfall (mm/month)	Discharge to Waters Total Effluent Volume (ML)	Discharge to Reuse Total Effluent Volume (ML)
Location Name				
Method of Measurement				
Date of last Calibration/Validation (if applicable).				
Jul-(YY)				
Aug-(YY)				
Sep-(YY)				
Oct-(YY)				
Nov-(YY)				
Dec-(YY)				
Jan-(YY)				
Feb-(YY)				
Mar-(YY)				
Apr-(YY)				
May-(YY)				
Jun-(YY)				
Annual (YY)				
% of Total Discharge				

Table 2: Bypass Events

Date	Discharge Location	Easting (GDA94)	Northing (GDA94)	Volume Discharged (kL)	Level of Effluent Treatment	Cause and Mitigation Actions

Table 3: Discharge to Waters Effluent Quality and Compliance

Name of Monitoring Point:									
Parameter	BOD ₅	SS	T.C.	O&G	TN	NH ₃ / NH ₄	TP	pH	TR Cl ₂
Unit of Measurement	mgO ₂ / L	mg/L	cfu/ 100ml	mg/L	mg/L	mg/L	mg/L		mg/L
Permit/EPN Limits									
Maximum									
90th %ile									
50th %ile									
Minimum									
No. of Samples Analysed									
No. of Samples Required									
Statistical Summary of Results									
Maximum									
90th %ile									
50th %ile									
Minimum									
Compliance Calculations									
No. of Samples Complying With Maximum									
% Compliance Maximum									
No. of Samples Complying With 90th %ile									
% Compliance 90th %ile									
No. of Samples Complying With 50th %ile									
% Compliance 50th %ile									
No. of Samples Complying With Minimum									
% Compliance Minimum									
Mass Load									
Mass Load (kg/year)									
Permit/EPN Mass Load Limit (kg/year)									

Table 4: Discharge to Land/Reuse Effluent Quality and Compliance

Name of Monitoring Point			
Parameter	BOD₅	T.C.	pH
Unit of Measurement	mgO ₂ /L	cfu/100ml	
Reuse/50 th ile/EPN Limit			
Reuse/Maximum/EPN Limit			
Reuse Minimum/ EPN Limit			
No. of Samples Collected and Analysed			
No. of Samples Required by Permit/EPN			
Statistical Summary of Results			
Maximum			
90th %ile			
50th %ile			
Minimum			
Compliance Calculations			
No. of Samples Complying With Maximum			
% Compliance Maximum			
No. of Samples Complying With 90th %ile			
% Compliance 90th %ile			
No. of Samples Complying With 50th %ile			
% Compliance 50th %ile			
No. of Samples Complying With Minimum			
% Compliance Minimum			

Table 5: Sewage Sludge and Biosolids Summary

Date	Quantity (DST)	Solids content % w/w	Stabilisation Method	Stabilisation Grade	Contamination Grade	Biosolid Classification	End use/Fate & Location

Table 6: Sludge (biosolids) Contaminant Statistics and Grading

Contaminant - mg/kg DMB	As	Cd	Cr (Total)	Cu	Pb	Hg	Ni	Se	Zn	DDT/DDD/DDE	Aldrin	Dieldrin	Chlordane	Heptachlor	HCB	Lindane	BHC	PCBs
Number of Samples																		
Maximum																		
Mean																		
Minimum																		
BACC																		

Table 7: Sludge Level Assessment

	Lagoon 1	Lagoon 2	Lagoon 3	Lagoon 4
Date of Last Lagoon Sludge Level Assessment				
Estimated sludge accumulation (% of lagoon capacity)				
Estimated sludge accumulation (DST)				
Proposed Date of Next Lagoon Sludge Level Assessment				
Proposed Date of Next Desludging				

Table 8: Complaints Reporting

Date	Complaint category*	Mitigation Actions

Table 9: Incident Reporting

Date	Incident category*	Details of Incident#	Mitigation Actions

* odour, noise, spill, other (specify)

including duration, volume as relevant

Appendix 2: Calculation of Mass Loads

General

Actual loads of air and water pollutants emitted over a given period can be determined by monitoring the volume of emissions over that time and the pollutant concentration (pollutant mass per unit volume) in the emission:

$$\text{Pollutant load} = \text{pollutant concentration} \times \text{volume}$$

Volume normally needs to be measured continuously, and flow-weighted composite sampling is the 'best practice' expectation in relation to flow monitoring for most Tasmanian WWTPs. In the case of sewage lagoons however, grab sampling is considered appropriate as effluent quality should be relatively consistent throughout the lagoon. Pollutant concentration, provided it does not vary widely, can be established via a statistically rigorous sampling regime.

Monitoring of Discharge Concentration

Effluent sampling must be undertaken in accordance with the environmental conditions of the permit. Depending on the type of wastewater treatment system and the date of issue of the environmental conditions, the specified method may be composite sampling (time- or flow-weighted) or grab sampling.

Flow Monitoring

For the purpose of mass load calculation, outflow measurement is the preferred method for monitoring flow. However, if outflow volumes are not measured and this measurement is not required under the environmental conditions of the permit, inflow data may be used. In this case, evaporation losses must be measured or estimated and deducted from the inflow data in accordance with the following calculation:

$$\text{Estimated discharge} = \text{inflow} - \text{sum of } [(\text{evaporation} - \text{rainfall}) \times \text{pond or lagoon surface area}]$$

Calculating Actual Pollutant Loads Discharged to Waters

On the basis of the concentration results for the two parameters of concern, Total Nitrogen and Total Phosphorus, and volume data in relation to the discharge of effluent to waters, use the steps below to calculate the actual load of the pollutant discharged. Choose the method that is consistent with the sampling technique.

Please note that missing sampling results affect the statistical accuracy of the calculations. If the number of sampling results available for a parameter is less than 50% of results required, the results are not considered relevant.

Time-weighted composite or grab sampling

Step 1:

Calculate the observed load on each day a pollutant concentration sample is collected:

$$L_d = C_d \times V_d / 1000$$

Where

L_d = day's observed load of the pollutant (kg)

C_d = concentration of the pollutant on the day (mg/L)

V_d = day's total volume of discharge (kL)

Step 2:

Sum the observed daily loads (kg).

Step 3:

Divide the total from Step 2 by the total volume (kL) for those days. The result is the flow-weighted concentration (kg/kL).

Step 4:

Multiply the flow-weighted concentration (kg/kL) from Step 3 by the total volume of treated effluent discharged during the reporting period (kL).

Repeat the procedure for each pollutant in relation to a mass load limit is specified in the environmental conditions.

Flow-weighted composite sampling

Step 1:

Calculate the observed load on each day a pollutant concentration sample is collected:

$$L_d = C_d \times V_d / 1000$$

Where

L_d = day's observed load of the pollutant (kg)

C_d = concentration of the pollutant on the day (mg/L)

V_d = day's total volume of discharge (kL)

Step 2:

Sum the observed daily loads (kg).

Step 3:

Divide the total from Step 2 by the number of sampling events and multiply by 365. This will provide the annual pollutant load in kg.

Step 4:

Repeat the procedure for each pollutant in relation to a mass load limit is specified in the environmental conditions.

Glossary: Explanation of Table Terms and Abbreviations

Table 1

Average Dry Weather Flow: Reported as kilolitres per day, inflow during periods of dry weather.

Rainfall: Reported as millimetres per month, as recorded on the relevant gauging station.

Discharge to Waters: The total effluent volume in mega litres discharged to waters in the given month.

Discharge to Reuse: The total effluent volume in Megalitres discharged to reuse in the given month.

Tables 3 & 4

BOD₅: 5 day Biochemical Oxygen Demand measured milligram of Oxygen per litre.

SS: Suspended Solids measured as milligram per litre (mg/L).

T.C.: Thermotolerant Coliforms measured as cfu/100ml.

O&G: Oil & Grease measured as milligrams per litre.

TN: Total Nitrogen measured as milligrams per litre

NH₃/NH₄: Ammonia/Ammonium measured as milligrams per litre, also referred to as Total Ammoniacal Nitrogen (TAN).

TP: Total Phosphorus measured as milligrams per litre.

TR Cl₂: Total residual chlorine measured as milligrams per litre.

Table 5

Quantity (DST): Amount of sludge recorded as dry solid tonnes.

Solids Content: Reported as a percentage, measured as weight of solids divided by the total weight of wet biosolids.

Stabilisation Method: As determined using *Tasmanian Biosolids Reuse Guidelines 1999 (TBRGs)*.

Stabilisation Grade: As determined using *TBRGs*.

Contamination Grade: As determined using *TBRGs*.

Biosolid Classification: As determined using *TBRGs*.



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