

Guide for the completion of a Recycled Water Quality Management Plan

For Class A water recycling schemes

About this guide

In Victoria, all Class A water recycling schemes, i.e. those that have a high potential for direct human contact with recycled water, require endorsement from the Department of Human Services (DHS). The regulatory arrangements for such water recycling schemes are described in the Victorian Environment Protection Authority *Guidelines for Environmental Management: Use of Reclaimed Water* (GEM 464.2), and the *Guidelines for Environmental Management: Dual Pipe Water Recycling Schemes* (GEM 1015).

This guide is designed to help recycled water scheme proponents develop a Recycled Water Quality Management Plan (RWQMP) for Class A recycled water schemes.

How to use this guide

This guide is designed as a RWQMP template for Class A recycled water scheme proponents, such as water authorities and their consultants. Highlighted boxes in each section of the guide should be completed taking into consideration the comments in each section of the relevant EPA guidelines and the *Australian Guidelines for Water Recycling 2006* (AGWR).

What are the DHS timelines for assessing a RWQMP?

DHS will provide comments on one draft of a RWQMP prior to submission of the final version. Feedback on the draft RWQMP will be provided within 6 weeks of receipt.

The final RWQMP will be assessed within 4 weeks of receipt and endorsement will be provided within this period provided that the RWQMP meets all requirements detailed in this guide.

Once a RWQMP has been endorsed by DHS, EPA Victoria will be informed of DHS endorsement of the plan.

EPA is responsible for the final approval of the water recycling scheme.

For more information contact:

Department of Human Services
Environmental Health Unit
1300 761 874
www.health.vic.gov.au/environment

1 Introduction

1.1 Purpose of the RWQMP

This section needs to make a statement that describes the purpose and scope of the RWQMP.

Typically a RWQMP would:

- Address the responsibilities of the recycled water supplier;
- Cover the production and supply of recycled water that is fit-for-purpose. At a minimum it extends from the catchment of the system (including system inputs), through to the end of the treatment process;
- Include detailed information on the validation of treatment processes; and
- Identify process control and monitoring that is necessary to produce water of an appropriate quality for the proposed end-uses.

1.2 Description of the scheme

This section needs to provide a brief description of the water recycling scheme.

Include:

- The location of the scheme.
- The size of the scheme (design capacity, expected minimum and maximum flows and flux).
- A description of the catchment, describing system inputs.
- The proposed end-uses of recycled water.
- A site plan showing the general arrangement of the treatment facility, a process flow diagram, and process instrumentation diagram.
- A schematic of the scheme—including location of treatment processes, storages, pipelines and end-uses.

1.3 Management commitment

This section needs to provide a statement of management commitment to health and safety.

Describe how the organisation responsible for the recycled water scheme has demonstrated that they are committed to the responsible use and management of recycled water through the implementation of preventive risk management.

For further assistance refer to AGWR Section 2.1

2 Roles and responsibilities

This section needs to describe the responsibilities of each stakeholder involved in the recycled water scheme.

2.1 Supplier

The Supplier is the body responsible for the RWQMP and the producer of recycled water for a scheme. This may be achieved via the nominated Supplier sub-contracting components of the design and operation of the system, however, one entity should be identified as the recycled water Supplier (in most cases this will be a Water Authority).

Describe the specific responsibilities of the Supplier. These should include:

- Developing, implementing and reviewing the RWQMP that underpins the production of recycled water that is safe for use.
- Obtaining DHS endorsement for Class A RWQMP.
- Supplying recycled water to one or more Scheme Managers.
- Ensuring any Scheme Managers using Class A recycled water from the Supplier have an EPA approved Environment Improvement Plan (EIP) or Health and Environmental Management Plan (HEMP).

Identify sub-contractors and their responsibilities. (Note: This should include communication arrangements in the event of system failure—refer to section 11.3)

2.2 Scheme Manager

The Scheme Manager is the body responsible for engagement with recycled water users. The Scheme Manager is also typically responsible for the management of the recycled water delivery system, although the delineation of responsibility between Scheme Managers and Suppliers may vary on a scheme-to-scheme basis. The responsibilities of the Scheme Manager are predominantly addressed in the scheme EIP or HEMP. However, any specific responsibilities that involve interaction with the recycled water Supplier should be identified in the RWQMP.

Identify the Scheme Manager(s) who receive recycled water from the Supplier and detail their specific responsibilities in relation to the RWQMP.

2.3 Users

A recycled water User is a person, organisation or community group that uses recycled water. Recycled water Users will typically interact with the Scheme Manager rather than the Supplier, and therefore their responsibilities will be detailed in the HEMP or EIP for the scheme.

List responsibilities of end users if water is supplied directly to end users. The supplier must ensure that these users have an approved EIP or HEMP.

3 Water quality objectives

This section needs to describe how water quality objectives are met to protect human health.

3.1 Microbial

Treatment processes must have measurable removal efficiency for target organisms that can be verified through operational monitoring. The LRV attributed to each TPU will be limited by the sensitivity of operational monitoring, as demonstrated through validation (refer to Section 5).

Describe water quality objectives and why they are appropriate for intended uses (include reference to relevant guidelines or a specific risk assessment that has been undertaken to determine water quality objectives).

Tabulate treatment plant performance objectives, expressed in log reduction values (LRV) attributed to specific treatment process units (TPU), for example:

Organisms	Target LRV	TPU 1	TPU 2	TPU 3
Virus	a+b+c	≥a	≥b	≥c
Protozoa	x+y+z	≥x	≥y	≥z

For further assistance refer to GEM 1015 Chapter 5 and AGWR Section 3

3.2 Chemical

Chemicals are not generally envisaged to be a human health risk where wastewater is derived from largely domestic catchments, and recycled water is not used for drinking.

However, for schemes where chemical inputs from the catchment are considered to be significant, then specific water quality objectives should be identified through a risk assessment.

Describe the likely significance of chemical contaminants for the recycled water scheme.

For further assistance refer to GEM 1015 Chapter 5 and AGWR 3.5.4 and 3.5.5

4 System assessment

Include an overview of the recycled water system, identifying potential sources of risk that will require control.

Describe the approach taken to assess and identify management controls for these risks (a preventive risk management system such as Hazard Analysis and Critical Control Point (HACCP) should be used for undertaking this assessment). The HACCP plan for the treatment process should be referred to.

For further assistance refer to GEM 1015 Chapter 4 and Appendix C, and AGWR Section 2.2 and 2.3

5 Validation of treatment processes

Validation is a critical component of treatment process management. Validation ensures that the required water quality objectives will be achieved. As such, it is essential that individual processes, within the treatment train that will be relied upon to provide pathogen reduction, are validated. Each process unit should be addressed separately and validation studies should be undertaken according to best practice (consult DHS for further information).

Include an analysis of the validation reports for each treatment process unit, and the conclusions that relate to the log reductions of viruses and protozoan parasites achieved by each treatment process unit.

Include analysis and conclusions from validation reports that relate to the operational monitoring that must be undertaken in order to confirm the required log removal is being achieved (this will need to relate to Section 6, where monitoring activities, critical limits and corrective actions are addressed).

Append validation reports to the RWQMP.

6 Operational monitoring and process control

6.1 Monitoring and corrective actions

This section needs to refer to the HACCP plan, and must identify the following information (this is best presented in a table—refer to example below):

- Critical control points (CCPs) (treatment process units that are relied upon to provide pathogen reduction).
- Parameters monitored at each CCP to demonstrate process efficacy (operational monitoring).
- Critical limits for each operational monitoring parameter that have been established during the validation activities.
- Corrective actions that will be taken if a critical limit is breached.
- Verification records to confirm that monitoring and corrective actions have been undertaken.

CCP x	Treatment Process Unit (e.g. UV disinfection)				
	Parameter a	Parameter b	Parameter c	Parameter d	Parameter e
Critical limits/Alert limits					
Alert					
Critical					
Monitoring procedures					
What					
How					
When					
Where					
Who					
Corrective actions¹					
What					
How					
When					
Where					
Who					
Verification records					

¹ Refer to relevant Standard Operating Procedures

For further assistance refer to AGWR Section 2.4 and Section 5.2.4

6.2 Standard Operating Procedures

Standard Operating Procedures (SOPs) must be developed for all monitoring at CCPs. These must include the critical limits and corrective actions described in the RWQMP. Information on when the system can be brought back online after a shut-down must be included. These SOPs, or the operations manual in which they reside, must be referenced for each CCP. SOPs do not need to be appended to the plan.

List SOPs, or the operation manual in which they reside for each CCP treatment process unit.

7 Verification monitoring

Verification monitoring assesses the overall performance of the system and compliance with the overall water quality objectives. It is independent of the routine operational monitoring of the system.

The specific parameters monitored should relate to the water quality objectives for the system, and should be developed in consultation with DHS.

Detail the verification monitoring for the system including what, where, when, who, and how.

For further assistance refer to AGWR Section 2.5 and 5.2.5

8 Prerequisite Programs

Prerequisite programs are systems and procedures that should be in place to ensure optimal process operation underpin the effectiveness of the preventive risk management system. They may include:

- Trade waste management
- Operation and maintenance procedures
- Quality assurance for installation of treatment components (e.g. configuration of UV reactors, factory pressure tests for membrane systems, product specifications for replacement parts)
- Calibration of monitoring instrumentation
- Chemical quality assurance
- Overarching organisational quality management systems that the RWQMP will be linked to

Include a summary of prerequisite programs.

9 Incidents and emergencies

Detail incident and emergency protocols specific to the production and supply of recycled water including response actions, roles and responsibilities and communication arrangements.

Refer to GEM 1015 Chapter 9 AGWR Section 2.6

10 Employee awareness and training

Employees including plant operators and contractors should have a sound knowledge base from which to make effective operational decisions. This requires training in the methods and skills required to perform their tasks efficiently and competently. Employees need to be aware of the potential consequences of system failures, and of how their decisions can affect the safety of the scheme.

Detail employee training needs and programs.

Refer to GEM 1015 Chapter 10 AGWR Section 2.7

11 Documentation and reporting

11.1 Documentation

Records should be kept for:

- CCP monitoring results and analyses.
- Breaches of critical limits and corrective actions taken.
- Verification monitoring.
- Incidents and emergencies and corrective actions taken.
- Inspection and maintenance activities relevant to water quality.

Detail how, where and by whom these records are kept.

Refer to GEM 1015 Chapter 12 and AGWR Section 2.10

11.2 Reporting

An annual report must be prepared and submitted to EPA and DHS.

Detail when this report will be prepared and who is responsible for its development and submission.

Refer to GEM 1015 Chapter 12 and AGWR Section 2.10

11.3 Notifications

The Supplier must immediately notify all Scheme Manager/Users (where applicable) of any incident that potentially places public health at risk. If the Supplier sub-contracts any aspects of recycled water production to other entities, then arrangements need to be in place for the notification of any incidents that may affect the safety of the scheme.

The following must be immediately notified to the Environmental Health Unit of DHS (Telephone 1300 761 874):

- *A system failure that may potentially impact on the users of the recycled water.*
- *An emergency or incident that potentially places public health at risk.*
- *Any changes to the RWQMP or operation of the treatment process that may potentially impact achieving the required water quality objectives.*

Detail the arrangements and procedures for notification of incidents.

Refer to GEM 1015 Chapter 12 and AGWR Section 2.10

12 Auditing

Periodic auditing of compliance with the RWQMP (as part of the HEMP auditing process) is essential for ensuring that the supplier meets their obligations under the RWQMP.

Describe the audit process and frequency.

Refer to GEM 1015 Section 13.1 AGWR Section 2.11.2

13 Review and improvement

Detail the process for reviewing and updating the RWQMP (note that any changes to the RWQMP or operation of the treatment process that may impact achieving the required water quality objectives will need to be endorsed by DHS).

Refer to GEM 1015 Section 13.2

14 Commissioning the RWQMP

The Supplier should provide written confirmation that:

- All operational monitoring, critical limit alarms and corrective actions within the RWQMP have been tested and verified, by an **independent** third party.

This written confirmation should be included with the final RWQMP that is submitted to DHS for endorsement.

Glossary

AGWR:	Australian Guidelines for Water Recycling: Managing health and environmental risks
CCP:	Critical Control Point
DHS:	Department of Human Services
EIP:	Environment Improvement Plan
EPA:	Environmental Protection Agency
GEM:	Guidelines for Environmental Management
HACCP:	Hazard Analysis and Critical Control Point
HEMP:	Health and Environment Management Plan
LRV:	Log Reduction Value
RWQMP:	Recycled Water Quality Management Plan
SOP:	Standard Operating Procedure
TPU:	Treatment Process Unit