Recycled Water Management System

RWMS Template

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| **Document title** | Recycled Water Management System |
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| **Approved by** |  |
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| Version | Date | Author | Changes made |
| 1.0 | 4 November 2020 | Peter Rogers |  |

# Element 1: Commitment to responsible use and management of recycled water quality

The AGWR requires the actions listed within the boxes to be addressed to implement its Framework.

## Responsible use of recycled water

| AGWR Framework Actions: |
| --- |
| * Involve agencies (i.e. stakeholders) with responsibilities and expertise in protection of public and environmental health
* Ensure that design, management and regulation of recycled water schemes is undertaken by agencies and operators with sufficient expertise.
 |

**Document the activities to meet the above actions.**

## Regulatory and formal requirements

| AGWR Framework Actions: |
| --- |
| * Identify and document all relevant and formal requirements
* Identify governance of recycled water schemes for individual agencies, designers, installers, operators, maintainers, owners and users of recycled water
* Ensure that responsibilities are understood and communicated to designers, installers, maintainers, operations employees, contractors and end-users
* Review requirements periodically to reflect any changes.
 |

**Document the activities to meet the above actions.**

## Partnerships and engagement of stakeholders (including the public)

| AGWR Framework Actions: |
| --- |
| * Identify all agencies with responsibilities for water resources and use of recycled water; regularly update the list of relevant agencies
* Establish partnerships with agencies or organisations as necessary or where this will support the effective management of recycled water schemes
* Identify all stakeholders (including the public) affecting, or affected by, decisions or activities related to the use of recycled water
* Develop appropriate mechanisms and documentation for stakeholder commitment and involvement.
 |

**Document the activities to meet the above actions.**

## Recycled water policy

| AGWR Framework Actions: |
| --- |
| * Develop a recycled water policy, endorsed by senior managers, to be implemented within an organisation or be participating agencies
* Ensure that the policy is visible and is communicated, understood and implemented by employees and contractors.
 |

**Include the recycled water policy and how this is communicated to staff.**

# Element 2: Assessment of the recycled water system

## Source of recycled water, intended uses, receiving environments and routes of exposure

| AGWR Framework Actions: |
| --- |
| * Identify source of water
* Identify intended uses, routes of exposure, receiving environments, endpoints and effects
* Consider inadvertent or unauthorised uses.
 |

**The above points should be addressed in the risk assessment output paper (attached as an appendix) and summarised in this section.**

## Recycled water supply system analysis

| AGWR Framework Actions: |
| --- |
| * Assemble pertinent information and document key characteristics of the recycled supply system to be considered
* Assemble a team with appropriate knowledge and expertise
* Construct a flow diagram of the recycled water supply system from source to the application or receiving environments
* Periodically review the recycled water system analysis.
 |

**The above points should be addressed in the risk assessment output paper. A summary, including the flow diagram, should be included in this report.**

## Assessment of water quality data

| AGWR Framework Actions: |
| --- |
| * Define the approach and methodology to be used for hazard identification and risk assessment considering both public and ecological health
* Periodically review and update the hazard identification and risk assessment to incorporate any changes
* Identify and document hazards, sources and hazardous events for each component of the recycled water system
* Estimate the level of risk for each identified hazard or hazardous event
* Consider inadvertent and unauthorised use of discharge
* Determine significant risks and document priorities for risk management
* Evaluate the major sources of uncertainty associated with each hazardous event and consider actions to reduce uncertainty.
 |

**The above points should be addressed in the risk assessment output paper (attached as an appendix) and summarised in this section.**

**The log reduction requirements estimates for the scheme should be summarised in the table below.**

Table 1: Log reduction requirements

|  |  |  |  |
| --- | --- | --- | --- |
| Results | Protozoa(Cryptosporidium) | Virus(Rotavirus / Adenovirus) | Bacteria(Campylobacter) |
| **Treatment Barriers** |
| Treatment 1 |  |  |  |
| Treatment 2 |  |  |  |
| Treatment 3 |  |  |  |
| Total Treatment LRV |  |  |  |
| **Non-Treatment Barriers** |
| Non-treatment 1 |  |  |  |
| Non-treatment 2 |  |  |  |
| Total Non-Treatment LRV |  |  |  |
| **Total Scheme LRV** |
| Required LRV |  |  |  |
| Required Water Quality Objective |  |  |  |

# Element 3: Preventive measures for recycled water quality management

## Preventative measures and multiple barriers

| AGWR Framework Actions: |
| --- |
| * Identify existing preventive measures system-wide (including treatment and non-treatment barriers) for each significant hazard or hazardous event, and estimate the residual risk.
* Identify alternative or additional preventive measures that are required to ensure risks are reduced to acceptable levels.
 |

**A summary of key preventive measures for the system identified in the risk assessment should be listed in this section.**

## Critical control points

| AGWR Framework Actions: |
| --- |
| * Assess preventive measures throughout the recycled water system to identify critical control points.
* Establish mechanisms for operational control.
* Document the critical control points, critical limits and target criteria.
 |

**The critical control points identified in the risk assessment workshop should be summarised in Appendix C.**

# Element 4: Operational procedures and process control

This section covers the operational procedures and processes that formalise activities essential for ensuring that recycled water of an acceptable quality is consistently provided.

## Operational procedures

| AGWR Framework Actions: |
| --- |
| * Identify procedures required for all processes and activities applied within the whole recycled water system (source to use).
* Document all procedures and compile into an operational manual.
 |

**Document the activities to meet the above actions. Reference may be made to the locations (physical or electronic) where procedures are.**

| Item | Response |
| --- | --- |
| Source: | *e.g. trade waste* |
| Treatment: | *e.g. O&M manual, daily checklist and their location* |
| End Use: | *e.g. checks undertaken relating to the recipients and end-users* |

## Operational monitoring

| AGWR Framework Actions: |
| --- |
| * Develop monitoring protocols for operational performance of the recycled water system, including the selection of operational parameters and criteria, and the routine analysis of results.
* Document monitoring protocols into an operational monitoring plan.
 |

**Document the activities to meet the above actions. Reference may be made to locations (physical or electronic) where information is stored.**

Table 2: Operational monitoring schedule for treatment barriers

| Parameter | Location | Frequency | Limit / Range | Units | Responsibility |
| --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |

Table 3: Operational monitoring schedule for non-treatment barriers

| Non-treatment Barrier | What is monitored or observed | Frequency | Responsibility |
| --- | --- | --- | --- |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |

## Operational corrections

| AGWR Framework Actions: |
| --- |
| * Establish and document procedures for corrective action where operational parameters are no met.
* Establish rapid communication systems to deal with unexpected events.
 |

**List documentation relating to corrective actions.**

## Equipment capability and maintenance

| AGWR Framework Actions: |
| --- |
| * Ensure that equipment performs adequately and provides sufficient flexibility and process control.
* Establish a program for regular inspection and maintenance of all equipment, including monitoring equipment.
 |

**Document the activities to meet the above actions.**

## Materials and chemicals

| AGWR Framework Actions: |
| --- |
| * Ensure that only approved materials and chemicals are used.
* Establish documented procedures for evaluating chemicals, materials and suppliers.
 |

**Document the activities to meet the above actions.**

# Element 5: Verification of recycled water quality and environmental performance

## Recycled water quality monitoring

| AGWR Framework Actions: |
| --- |
| * Determine the characteristics to be monitored.
* Determine the points at which monitoring will be undertaken.
* Determine the frequency of monitoring.
 |

## Application site and receiving environment monitoring

| AGWR Framework Actions: |
| --- |
| * Determine the characteristics to be monitored and the points at which monitoring will be undertaken.
 |

## Documentation and reliability

| AGWR Framework Actions: |
| --- |
| * Establish and document a sampling plan for each characteristic, including the location and frequency of sampling, ensuring that monitoring data is representative and reliable.
 |

**Document the monitoring to meet the above actions. This could be documented in the table below.**

Table 4: Recycled water quality monitoring schedule

| Parameter | Location | Frequency | Limit / Range | Units | Responsibility |
| --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |

Table 5: End-user water quality monitoring schedule

| Parameter | Location | Frequency | Limit / Range | Units | Responsibility |
| --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |

## Satisfaction of users of recycled water

| AGWR Framework Actions: |
| --- |
| * Establish an inquiry and response program for users of recycled water, including appropriate training of people responsible for the program.
 |

**Document the activities to meet the above actions.**

## Short-term evaluation of results

| AGWR Framework Actions: |
| --- |
| * Establish procedures for the short-term review of monitoring data and satisfaction of users of recycled water
* Develop reporting mechanisms internally and externally, where required.
 |

**Document the activities to meet the above actions.**

## Corrective responses

| AGWR Framework Actions: |
| --- |
| * Establish and document procedures for corrective responses to non-conformance or feedback from users of recycled water
* Establish rapid communication systems to deal with unexpected events.
 |

**Document the activities to meet the above actions.**

# Element 6: Management of incidents and emergencies

The AGWR requires the actions listed within the boxes to implement its Framework.

## Communication

| AGWR Framework Actions: |
| --- |
| * Define communication protocols with the involvement of relevant agencies and prepare a contact list of key people, agencies and businesses
* Develop a public and media communications strategy.
 |

**Document the activities to meet the above actions.**

## Incident and emergency response protocols

| AGWR Framework Actions: |
| --- |
| * Define potential incidents and emergencies and document procedures and response plans with the involvement of relevant agencies
* Train employees and regularly test emergency response plans
* Investigate any incidents or emergencies and revise protocols as necessary.
 |

**Document the activities to meet the above actions.**

# Element 7: Operator, contractor and end-user awareness and training

## Operator, contractor and end-user awareness and involvement

| AGWR Framework Actions: |
| --- |
| * Develop mechanisms and communication procedures to increase operator, contractor and end-user awareness of, and participation in, recycled water quality management and environmental protection.
 |

**Document the activities to meet the above actions.**

| AGWR Framework Actions: |
| --- |
| * Ensure that operators, contractors and end-users maintain the appropriate experience and qualifications
* Identify training needs and ensure resources are available to support training programs
* Document training and maintain records of all training sessions.
 |

**Document the activities to meet the above actions.**

# Element 8: Community involvement and awareness

## Consultation with users of recycled water and the community

| AGWR Framework Actions: |
| --- |
| * Assess requirements for effective involvement of users of recycled water and the community
* Develop a comprehensive strategy for community consultation.
 |

**Document the activities to meet the above actions.**

## Communication and education

| AGWR Framework Actions: |
| --- |
| * Develop an active two-way communication program to inform users of recycled water and promote awareness of recycled water quality issues
* Provide information on the impacts of unauthorised use
* Provide information on the benefits of recycled water use.
 |

**Document the activities to meet the above actions.**

# Element 9: Research and development

The AGWR requires the actions listed within the boxes to implement its framework.

## Validation of processes

| AGWR Framework Actions: |
| --- |
| * Validate processes and procedures to ensure they control hazards effectively.
* Revalidate processes when variations in conditions occur.
 |

**Document the information that shows that the process will produce water of appropriate quality. This may include desktop calculations or validation certification.**

## Design of equipment

| AGWR Framework Actions: |
| --- |
| * Validate the design of new equipment and infrastructure to ensure continuing reliability.
* Develop a validation and verification plan.
 |

**Document the information that shows that the equipment will produce water of appropriate quality. This may include desktop calculation for pre-validated equipment. Document the verification plan (and validation plan if required).**

## Investigation of studies and research monitoring

| AGWR Framework Actions: |
| --- |
| * Establish programs to increase understanding of the recycled water supply system, and use this information to improve management of the recycled water supply system.
 |

**Document the activities to improve the management of the recycled water system.**

# Element 10: Documentation and reporting

## Management of documentation and records

| AGWR Framework Actions: |
| --- |
| * Document information pertinent to all aspects of recycled water quality management, and develop a document control system to ensure current versions are in use
* Establish a records management system and ensure that employees are trained to complete records
* Periodically review documentation and revise as necessary.
 |

**Document the activities that council undertakes that meets the above conditions.**

## Reporting

| AGWR Framework Actions: |
| --- |
| * Establish procedures for effective internal and external reporting
* Produce an annual report to be made available to customers, regulatory authorities and stakeholders.
 |

**Document the activities that council undertakes that meets the above conditions.**

# Element 11: Evaluation and audit

The AGWR requires the actions listed within the boxes to implement its framework.

## Long-term evaluation of results

| AGWR Framework Actions: |
| --- |
| * Collect and evaluate long-term data to assess performance and identify problems
* Document and report results.
 |

**Document the activities to meet the above actions.**

## Audit of recycled water quality management

| AGWR Framework Actions: |
| --- |
| * Establish processes for internal and external audits
* Document and communicate audit results.
 |

**Document the activities to meet the above actions. A sample audit schedule is shown below.**

Table 6: Preliminary internal audit schedule

| Item verified | Method | Frequency | Responsibility | Objectives | Reference |
| --- | --- | --- | --- | --- | --- |
| Critical control points | Internal audit of operational activities identified in the CCP protocol | Quarterly |  | Implementation of CCPs and documented responses including investigative follow-ups to any exceedances and near hits | Internal audit findings and summary |
| Critical limit monitoring instruments | Review of calibration testing of critical limit monitoring instruments through cross checking | Quarterly |  | Ensure routine and annual calibration is occurring as scheduled | Calibration sheets |
| RWMS | Internal review of all 12 Elements in the RWMS, with a risk-based approach to the selection of procedures and processes to be verified. | Annually |  | Conformity between RWMS and practices | Internal audit findings and summary |
| Improvement plan | Review progress of improvement actions | Annually |  | Progress of implementation improvements action plan | Improvement action plan |

# Element 12: Review and continuous improvement

The AGWR requires the actions listed within the boxes to implement its framework.

## Review by senior management

| AGWR Framework Actions: |
| --- |
| * Senior managers review the effectiveness of the management system and evaluate the need for change.
 |

**Document the activities to meet the above actions.**

## Recycled water quality management improvement plan

| AGWR Framework Actions: |
| --- |
| * Develop a recycled water quality management improvement plan
* Ensure that the plan is communicated and implemented, and that the improvements are monitored for effectiveness.
 |

**Document the activities to meet the above actions.**

# Appendices

| If not included elsewhere in the RWMS, attach the following: |
| --- |
| * Recycled water policy
* Risk assessment paper
* Critical control point tables
* Improvement plan
* User agreement summary
* Site suitability or environmental management plans
* Any additional supporting information.
 |

**Use the guidance and the various DoH information sheets where relevant.**