Water Quality Risk Management Plan

Template

Aquatic facility name

Aquatic facility operator

Date

NORTHERN TERRITORY GOVERNMENT

Document title	Water Quality Risk Management Plan
Contact details	Department of Health, Northern Territory Government
Approved by	Dr Paul Burgess, Acting Chief Health Officer
Date approved	7 August 2025

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1.0	26 March 2025	Nicola Slavin	First Version

Acknowledgment

This document is based on the Victorian, Department of Health, Aquatic facilities in Victoria > Developing a water quality risk management plan for public aquatic facilities 2020 used with the kind permission of the Department of Health, Government of Victoria.

Introduction to template

The *Water quality risk management plan* template is intended to assist managers of aquatic facilities to develop site-specific water quality risk management plans. *The NT Public and Environmental Health Guidelines for Aquatic Facilities* provide guidance on managing public health risks and should be referred to when completing this risk management plan. It is each facility's responsibility to develop and manage its own risk management processes and it is recommended that these processes are documented in a risk management plan using this or a similar template.

<All text highlighted in 'red' throughout this document is to provide guidance around completing the template. The intention is that anything in red is deleted as you complete your information.>

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Purpose

<Outline the purpose of the plan and what this plan aims to achieve.>

About

<Insert facility name>

<Provide a brief outline/summary of the organisation including its structure and/or insert a figure of the organisational structure.>

Scope

<Outline the scope of the plan and who it applies to.>

Staff roles, responsibilities, competencies and training requirements

<Insert the role titles of staff and a brief description of their responsibilities in relation to this plan. Provide an overview of your current training management system and/or how you ensure training and development is provided. Include how you make sure all staff are aware of this plan and are trained in its implementation. Keep a record of staff training.>

Roles and responsibilities

Role/title	Responsibilities	Training requirements for Water Quality Risk Management
e.g. Aquatic facility operator	*e.g.* • *Implement the water quality risk management plan* • *Review and manage the water quality risk management plan* • *Manage training – new or refresher* • *Have oversight and responsibility for water quality and incident response*	*e.g. Aquatic technical operator training*

Facility, source water and treatment systems

Premises Information

General building information	
Age of premises	
Number of aquatic facilities/pools/spas located at premises	
Name of aquatic facility operator	
Address of aquatic facility operator	
Business name of proprietor	
Term of lease (if any)	
Address of premises	
Contact details of aquatic facility operator	

Aquatic facility description

<Complete one for each aquatic facility (i.e. pool, spa, interactive water feature>

Aquatic facility name			Opening Hours		
Max. design bather load		Pool volume in litres		Balance in litres	

Filtration	
Number of filters	
Filter brand and model	
Filter dimensions – diameter, height	
Max. filtration design bather number	
Filter media – sand, glass, precoat	
Coagulant/flocculant used (include chemical, where; how and how much is dosed into the system)	
Instrumentation for control (head loss, turbidity, coagulant dose, filtration rate)	
Number of filters	

Pumps	
Number of circulation pumps	
Are pumps speed-controlled?	
What parameter controls the pump speed?	
Pool circulation rate (kL/hr) – open hours	
Pool circulation rate (kL/hr) – closed hours	

Source	
Type of water used to fill aquatic facility (e.g. rainwater, municipal supply)	
Water supplier	
Treatment process prior to entry to facility	

pH control	
Chemical used to increase pH	
Chemical used to decrease pH	
Supplier	
Average storage time	
pH set point	

Primary disinfection	
Primary treatment – chlorine or bromine	
Chemical used	
Average storage time	
Supplier	
Disinfectant set point	
Contact time	
Continuous dosing system	
Online monitoring system	

Secondary disinfection – e.g. ultraviolet (UV) disinfection	
Is UV disinfection installed?	
Date of installation	
Brand/make/model	
Online monitoring system	
UV operational monitoring parameters as per the validated operating conditions (e.g. flow rate, UV lamp age, UV Transmittance (UVT), UV Intensity (UVI), UV dose)	

Backflow prevention	
Location	

Alkalinity	
Chemical used to increase alkalinity	
Chemical used to decrease alkalinity	
Supplier	
Average storage time	
Operating range in mg/L	

Calcium hardness	
Method of managing calcium hardness levels	
Supplier	
Average storage time	

Backwash	
Are there backwash holding tank(s) in place?	
Capacity of backwash holding tank(s)	
Are tank(s) fitted with an overflow?	
Method/rate of discharge of backwash water to sewer/waste/wash	
If backwash water is reused describe treatment process and uses	
Frequency of backwash	

Schematic and/or process flow diagram

<Insert a schematic or drawing that shows the layout and treatment systems of the facility. Consistent symbols and legends should be used. If the system is complex, multiple flow diagrams may be included. At a minimum, the schematic should include the following:>

- all incoming water sources
- filtration steps
- all aquatic facilities
- primary and secondary disinfection points
- automated chemical dosing points
- automated monitoring points
- sample points for water quality monitoring
- all on-site water storages
- backflow prevention devices
- wastewater removal disposal point.

Water quality targets and treatments objectives

Water quality operational control plan

Aquatic facility name	

Process step	Monitoring type	Sample location	Regulatory value	Target range	Action range	Critical range	Action range corrective action guidance	Person responsible	Critical range corrective action guidance	Person responsible
e.g. Free chlorine	*e.g. Operational*	*e.g. Pool tank*	*e.g.* *Min = ≥ 1 mg/L*	*e.g.* *≥ 3 mg/L*	*e.g.* *≥ 2 mg/L*	*e.g.* *≥1.5 mg/L*	*e.g.* ***Investigate chlorine disinfection system operation*** • *Re-test.* • *Check online monitoring trend line to confirm chlorine has been decreasing over time.* • *Check pH.* • *Check dosing pump operation.* • *Check level of chlorine in the storage tank.* • *Check if there is a split chlorine dosing line.* • *Check if there is an injection point blockage.* • *Re-prime chlorine pump.* • *Check strength of chlorine and storage condition.* ***Rectify any problems*** • *If none, check calibration of auto-dosing, check total chlorine levels.* • *Immediately contact facility manager and inform of actions.* • *Record corrective action.* ***Aquatic facility manager*** • *Ensure appropriate action has been performed.* • *Review past data to identify any other issues.*	*e.g. Aquatic facility operator*	*e.g.* ***Investigate chlorine disinfection system operation*** • *Re-test.* • *Check online monitoring trend line to confirm chlorine has been decreasing over time.* • *Check pH.* • *Check dosing pump operation.* • *Check level of chlorine in the storage tank.* • *Check if there is a split chlorine dosing line.* • *Check if there is an injection point blockage.* • *Re-prime chlorine pump.* • *Prepare to close pool.* ***Rectify any problems*** • *If none, check calibration of auto-dosing, check total chlorine levels.* • *Immediately contact facility manager and inform of actions.* • *Record corrective action.* ***Aquatic facility manager*** • *Ensure appropriate action has been performed.* • *Review past data to identify any other issues.*	*e.g. Aquatic facility manager*

Maximum values of operation may also be included

Hazard identification, risk assessment and control measures

Water quality hazard and risk identification table – refer to Appendix D and E for information on risk assessment methodology.

Water quality hazard	Hazardous event	Current controls	Identified by	Likelihood	Consequence	Risk	Additional possible control measures
MICROBIOLOGICAL	*e.g. Faecal contamination*	*e.g.* • *Faecal incident policy* • *Ill-swimmer exclusion policy* • *Pre-swim shower policy* • *Swim nappy policy* • *Water quality operational control plan*	*e.g.* • *Decrease in chlorine residuals* • *Faecal incident*	*e.g. Possible*	*e.g. Major*	*e.g. High*	• *Incorporating pre-swim showers education in Learn to Swim classes* • *Additional on deck showers*
CHEMICAL							
ENVIRONMENTAL							

Risk register

Date of risk review			
Compiled by		**Date**	
Reviewed by		**Date**	

Risk ID	Risk category	Risk description	Risk assessment			Adequacy of existing controls	Mitigating response	Risk owner	Status	Risk priority
			Likelihood	Consequences	Level of risk					
1	*e.g. Water quality*	*e.g. faecal contamination event in toddler pools*	*e.g. Possible*	*e.g. Major*	*e.g. High*	*e.g. Amber*	*Reduce*	*e.g. Aquatic facility operator*	*e.g. Open/*	*e.g. High*

Note: *Transfer high-priority risks to the risk treatment schedule (Appendix G)*

Operational and verification monitoring

Aquatic facility name			Prepared by		
Location			Date		

	Inspection parameters	Target	Frequency of inspection	No. of inspections required while pool is open	Inspection location(s)	Record location of documents
Inspections	Condition of facility	*e.g. Clean, sanitary*	*e.g. Hourly*	*e.g. 10*	*e.g. Toilets, change rooms*	*e.g. C-drive - Monitoring*
	Clarity of water	*e.g. Lines are visible*	*e.g. Hourly*	*e.g. 10*	*e.g. Pool concourse*	*e.g. C-drive - Monitoring and hard copy printed and located in operation room*
	Filters are operating within specification (e.g. filtrate turbidity)	*e.g. recommended turbidity, if measured immediately post filtration, is not more than 0.2 NTU*	As per manufacturer's instruction manual			*e.g. C-drive - Monitoring and hard copy printed and located in operation room*
	Chlorine dosing equipment is operating with specification (e.g. chlorine dose setpoint)	As per manufacturer's instruction manual				*e.g. C-drive - Monitoring and hard copy printed and located in operation room*
	UV lamps are operating within specification (e.g. flow rate, UV lamp age, UV Transmittance (UVT), UV Intensity (UVI), UV dose)	As per manufacturer's instruction manual	As per manufacturer's instruction manual			*e.g. C-drive - Monitoring and hard copy printed and located in operation room*
	Process control instrumentation has been calibrated	As per manufacturer's instruction manual				*e.g. C-drive - Monitoring and hard copy printed and located in operation room*

	Testing parameters	Target	Frequency of testing	No. of tests required while pool is open	Sample point	Record location of documents
Monitoring	Temperature	*e.g. 35 degrees*	*e.g. 3 hours and/or increase in bather numbers, post incident*	*e.g. 12 hours open minimum 4 tests*	*e.g. Wet deck point 1*	*e.g. 'Monitoring log' located in C-drive and hard copy printed and located in operation room*
	Free chlorine					
	Combined chlorine					
	Total chlorine					
	pH					
	Total alkalinity level					
	Cyanuric acid level					
	Calcium hardness					
	Water balance					
Water quality verification monitoring	Testing parameters	Regulatory targets	Frequency of testing	Number of tests reported to	Sample point(s)	Record location of documents
	Pseudomonas aeruginosa	Not detected in 100 mL	*e.g. Monthly (first Tuesday of each month)*	*e.g. 3 samples* *e.g. Aquatic facility operator*	*e.g. Wet deck point 1* *e.g. 1 m marker* *e.g. 2 m marker*	*e.g. C-drive – 'Laboratory sample results'*
	Escherichia coli	Not detected in 100 mL				
	Heterotrophic colony count	(Less than) < 100 cfu/ mL				
	Additional information: *e.g. Test all water quality parameters when undertaking microbiological verification tests.*					

Incident management and response

<Outline the procedures in place for possible incidents, how you manage incidents and how these are recorded. These procedures can be listed in the below table as detailed below. Provide a statement about training in incident management and outline the staff required to undertake responses in accordance with documented procedures >

Incident	Document response procedure name	Record location	Reviewed	Review date
e.g. Faecal contamination	*e.g. Formed stool and vomit contamination response procedure*	*e.g. C-drive and hard copy printed and located in plant room.*	*e.g. Post incident, annually*	*e.g. 05/05/2021*

Incident response staff and their responsibilities

<Outline the staff required to undertake responses in accordance with documented procedures.>

Response	Responsible person	Contact information
e.g. Faecal contamination	*e.g. Aquatic facility operator* *e.g. Pool closure, facility decontamination, incident investigation/close out etc.*	*Jane Doe* *0411 234 567* *Jane.doe@incident.com.au*

Data recording and reporting

<Outline how the facility manages, maintains and stores all documentation and records relevant to this plan including the water quality risk management plan. Outline the types of records that are managed and stored e.g. training, operational and verification monitoring.>

Records

Document register

<List current policies, procedures and forms relevant to the water quality risk management plan.>

Type	Document	Location	Review date
e.g. Policy, procedure, work instruction, guideline, form, code	*e.g. Aquatic facility operation*	*e.g. C drive - Operations*	*e.g. 12/12/2021*

Reporting

<Provide a summary of the key reporting requirements for the facility.>

Report	Reported to	Frequency	Responsible position
e.g. Non-compliance with microbiological parameters	*e.g. Local council*	*e.g. Notify council within 24 hours of receiving a report from a laboratory with non-compliant results*	*e.g. Aquatic facility operator*

Audit and review

<Outline the frequency of audits, who they are done by and how often this plan and/or relevant components (training, incident management, etc.) will be reviewed.>

Glossary

Glossary of terms and abbreviations

Term	Definition
e.g. WQRMP	*e.g. Water Quality Risk Management Plan*
e.g. Source water	*e.g. Water used to fill the aquatic facility and used as make-up water. Usually town water but could also include rainwater (provided it is introduced into the balance tank first).*

Appendices

a. Risk management team

<This is an optional component which may be beneficial to larger organisations with multiple employees.>

<Include a list of team members who were involved in developing this plan. Record why team members were selected to participate in water quality risk management. Clearly outline the responsibilities of each member of the water quality risk management team.>

Name	Organisation	Position	Water quality risk management responsibilities	Skills/knowledge/experience	Contact details

b. Duties register

<This is an optional component but may make it easier to clarity the accountabilities and responsibilities of each role within the aquatic facility.>

Duty – requirement of regulations	Description	Position e.g. Duty Manager	Position e.g. Senior swim teacher	Position e.g. Swim teacher	Position e.g. Training provider	Penalty
<Insert duty> *(46) Minimise risks*	*<Describe>* *e.g.* • *Undertake risk assessment* • *Prepare WQRMP* • *Develop & implement WQRMP*	*e.g. A*	*e.g. R*	*e.g. I*	*e.g. C*	*20*

R= Responsible A = Accountable C = Consult I =Inform (RACI)

c. Qualitative measures of consequence

<For the purposes of this plan, you are only required to assess a hazard based on the public health consequence. You may concentrate on the impacts in one area only (public health) or on several possible areas of impact. Sample areas such as media, legal, financial and service delivery have been included. Facilities can also use their own qualitative measures of consequence to determine risk.>

Severity level	Public health	Reputation/ media	Legal/regulation	Financia/profit reduction	Service delivery
Insignificant	Isolated aesthetic issue **For water quality** – a water quality incident/event that has no public health impact	Minor adverse local public or medical attention or complaints	Legal issues managed by internal manuals or practices Breach of internal policies or manuals without the need for formal investigation	Loss < $Xk Net cash flow < 1% Budget overrun < 1%	No loss of service Issues rectified with corrective action
Minor	Minor health-related issue such as skin/eye irritation or isolated water quality issue **For water quality** – localised illness (diarrhoea) that does not require medical attention	Attention from media and/or concern from local community	Minor legal issues, non-compliances and breaches of regulation or Matter requires legal advice to address issues; internal breach of policies or manuals requiring a formal investigation	Loss $Xk–Xk Net cash flow 1–X% Budget overrun 1–3%	Service restored within expected timeframes (e.g. ≤ 2 hours)
Moderate	Acute health impact such as a faecal incident or water quality repeatedly non-compliant with regulations **For water quality** – localised illness (diarrhoea) requiring medical attention	Significant adverse state-wide media/public attention	Serious breach of regulation with investigation or report to authority with prosecution and/or moderate fine possible or Required to operate under limited regulatory restrictions or orders; serious incident that requires legal representation	Loss $Xk–Xk Net cash flow 4–20% Budget overrun 3–5%	Short-term disruption to service outside of expected timeframes (e.g. ≤ 12 hours)
Major	Probable health impact such as a diarrhoeal incident or pathogens detected, or facility impacted **For water quality** – widespread illness (more than three confirmed cases) requiring hospitalisation	Serious public or media outcry (national)	Major breach of regulation; major litigation or Significant prosecution and fines; required to operate under significant regulatory restrictions or orders; government inquiry/intervention	Loss $10m–$40m Net cash flow 20–80% Budget overrun 5–10%	Long-term disruption to service with extended resources required to remedy (> 12 hours < 24 hours)
Extreme	A fatality, or long-term or permanent disabling effects on human health (more than one person) **For water quality** – fatality, disease secondary to water-borne illness	Serious public or media outcry (international)	Significant prosecution and fines; very serious ligation including class actions or Criminal charges or civil litigation against the facility and/or personnel; registration revoked	Loss > $40m Net cash flow > 80% Budget overrun > 10%	Complete and indefinite disruption to service (≥ 24 hours)

d. Qualitative descriptions – likelihood and risk

<The below are suggestions only. Facilities can use their own qualitative measures of risk and likelihood.>

Descriptor	Description
Almost certain	Is expected to occur daily to weekly (52–365 times per year)
Likely	May occur weekly (13–52 times per year)
Possible	May occur monthly (2–12 times per year)
Unlikely	Expected to occur annually (once per year)
Rare	May occur less than annually

Risk matrix

	Consequence				
Likelihood	**Insignificant**	**Minor**	**Moderate**	**Major**	**Severe**
Almost certain	**Medium**	**High**	**High**	**Extreme**	**Extreme**
Likely	**Medium**	**Medium**	**High**	**Extreme**	**Extreme**
Possible	**Low**	**Medium**	**Medium**	**High**	**High**
Unlikely	**Low**	**Low**	**Medium**	**Medium**	**High**
Rare	**Low**	**Low**	**Low**	**Medium**	**Medium**

Additional supporting documentation

<The following appendices are forms that can be used to assist you in recording how you are managing, implementing and responding to risk. The documents are intended for aquatic facilities that do not have existing documentation in place>.

e. Risk action plan

Item risk		**Ref.**	
Summary: recommended response and impact			

Action plan

Proposed actions			
Resource requirements			
Responsibilities			
Timing			
Reporting and monitoring required			
Name (position):		**Reviewer**	
Date		**Date**	

f. Risk treatment schedule and plan

Date of risk review			
Compiled by		**Date**	
Reviewed by		**Date**	

The risk in priority order from risk register	Possible risk treatment options	Risk rating after treatment	Result of cost-benefit analysis Accept/reject	Person responsible for implementation of option	Timetable for implementation	How will this risk and the treatment options be monitored?

g. Corrective action form

	pH	Temperature	Free chlorine	Total chlorine	Combined chlorine	Cyanuric acid	Alkalinity	Calcium
Sample name								
Result								

Sample name	Date taken	*Escherichia coli*	Heterotrophic colony count	*Pseudomonas aeruginosa*

Root cause of failure (circle or bold the root cause)						
Disinfection	Operator error	Dosing fault	Bather number	Pump fault	Sample flow	Other (specify):
Notes:						

Preliminary investigation: causes, circumstances, faults, etc.								
Actions taken								
Dosing information								
Follow up action required								
Rectified operational readings	**pH**	**Temperature**	**Free chlorine**	**Total chlorine**	**Combined chlorine**	**Cyanuric acid**	**Alkalinity**	**Calcium**
Water balance (e.g. LSI)								
Meet regulations								
Operator				Signed:			Date:	

h. Training record form

Staff name		**Supervisor**	
Position			
Date employment began		**Date employment ended**	

Existing qualification/training

Name of course	Provider	Date completed	Grade	Verification of training

Proposed training

Name of course	Date training due	Training completed	Training carried out and by whom	Employee's confirmation	Verification of training
Comments					
Review date		**Review by**			

i. Aquatic facility water quality monitoring form

Date		Aquatic facility	<Name of your aquatic facility>	Opening time:	Closing time:

		Free chlorine mg/L	Total chlorine mg/L	Combined chlorine mg/L	pH	Temp °C	Total alkalinity	Cyanuric acid	Calcium hardness	Water clarity	Condition of facility	Filters operating	Are results compliant?	Corrective actions required	Signed by
Check prior to opening	Time														
	Time														
	Time														
	Time														
	Time														
	Time														

Water balance e.g. Langelier Saturation index (LSI) SI = pH + TF + AF + CF – 12.1						
	pH	Temperature factor	Alkalinity factor	Calcium factor	SI result	Performed by
Factor						

Close out			
Name		Position	
Signed		Date	
Supervisor		Signed:	Date:

j. Incident response

Facility name	

Date		Time	
Reported by		Position	
Nature of incident			
Water quality		Other	
Water treatment asset failure			
Environmental pollution			
Details (what happened, contributing factors)			
Immediate actions taken			
Incident management team			
Actions recommended to be taken			

Regulatory authorities notified	Yes	No	Other stakeholders notified Yes No

Time	**Regulatory authority/stakeholder**	**Response**

Actions requiring follow-up						
Has WQRMP been reviewed?	Yes	No	Update to WQRMP required?	Yes	No	N/A

Verification and incident closure		
1. I am satisfied the corrective actions will prevent/reduce the likelihood and severity of the issues recurring and the incident can be closed out. 2. All relevant parties have been advised of the corrective/preventative actions taken or decisions made in relation to this incident.		
Name	Title	Date
System close out		
Name	Title	Date

k. Water quality risk management plan review checklist

Date		**Time**		**Facility**	
Team				**Completed by**	

Requirement	Yes	**No**	Comment
Has the facility been registered with council? (Category 1 facilities only)			
Has a detailed water quality risk management plan been developed?			

Does the water quality risk management plan clearly define:			
1. Staff roles, responsibilities, competencies, and training requirements. • Have key responsibilities been assigned to a staff member? • Are staff trained for their responsibilities and are training records available?			
2. Facility, source water and treatment systems • Includes schematic or treatment systems			
3. Water quality targets and treatment objectives			
4. Hazard identification, risk assessment and control measures			
5. Operational and verification monitoring			
6. Incident management and response • Are incident response procedures available and are staff trained in them?			
7. Data recording and reporting			
Is the water in the facility maintained and tested in accordance with the regulations?			
Are microbiological test results compliant with the regulations (Yes/No)? If No, has the council been notified and corrective actions taken?			
Are all records that detail operational monitoring and verification available (for 12 months from the date the record was made)?			
Does the facility have adequate signage to support all internal policies (e.g. pre-swim shower policy)?			
Are all areas clean?			
Are nappy change areas in the appropriate areas?			

Name		**Position**		**Signed**		**Date**	