Government of **Western Australia**
Department of **Health**
Public Health

Draft Alternate Water Supply Guidelines – Stormwater and Rainwater

April 2009

Initial External Consultation Draft

Keep Water Clean — **Make It Safe** — **Prove It's Safe**

Table of Contents

1 Introduction 4
1.1 Scope of Guidelines 4
1.1.1 Domestic Situations 5
1.1.2 Definitions 5
1.1.3 Governance 7

2 Regulatory Framework 8
2.1 Relevant Sections of Acts 8
2.2 Rights to water 9
2.3 Approval Process 9

3 End-Uses for Alternate Water 10
3.1 Non-Drinking Uses 10
3.2 Surface Irrigation 10
3.3 Sub-Surface Irrigation 10

4 Alternate Water Supply Systems Administration Requirements 11
4.1 Monitoring Requirements 11
4.1.1 Validation Monitoring (Will it work?) 11
4.1.2 Methodology for Validation Monitoring Sampling 11
4.1.3 Operational Monitoring (Is It Working Now?) 12
4.1.4 Verification (Assessable) Monitoring (Did it work?) 12
4.1.5 Monitoring for aesthetic quality 12
4.2 Description of Safeguards and Controls 13
4.3 Stormwater Monitoring versus Roofwater Monitoring 14

5 System Compliance and Reporting Requirements 20

6 Roles and Responsibilities 22
6.1 Roles 22
6.1.1 Suppliers 22
6.1.2 Users 22
6.2 Responsibilities 22
6.2.1 Agreements 23
6.2.2 Warning Signs 23
6.2.3 Compliance with National Plumbing Code 23
6.2.4 Public Education 24
6.2.5 Plumbing for Third Pipe Supplies 25
6.2.6 Access 25
6.2.7 Irrigation Method and Design 25
6.2.8 Occupational Health and Safety 26
6.2.9 Storage Facility 27
6.2.10 Algae 28
6.2.11 Mosquito Management 28
6.2.12 Legionella precautions 29

7 Project Decision Tree 30

8 Roofwater 33
8.1 Permitted Uses 33
8.2 Conditions of Use 33
8.2.1 Organisational support 33
8.2.2 Legal requirements 34
8.2.3 Roof characteristics 34
8.2.4 Inspection and Maintenance 34
8.3 Monitoring and Reporting – Roofwater 36
8.3.1 Open Storages 36
8.4 Water Quality Management Plan 37

9 Stormwater 38
9.1 Permitted Uses 38
9.2 Conditions of Use 38
9.2.1 Organisational support 38
9.2.2 Legal requirements 39
9.2.3 Further Information on Project Implementation for Stormwater 39
9.3 Monitoring and Reporting Requirements - Stormwater 39
9.4 Water Quality Management Plan 39

10 Application Process 40

11 References 41

12 Glossary 42

13 Appendices 44
More Information: 45

Western Australian Alternate Water Supply Guidelines

1 Introduction

In Western Australia (WA), the use of alternative water sources is becoming more prevalent to ease the demand on potable water supplies. Therefore, it is crucial to implement management practices to ensure that the use of such water sources will not pose any harm to health. The objectives of these guidelines are:

- To assist in defining approvals needed for an alternative water scheme;
- To provide guidance on the drafting of Water Quality Management Plans (WQMP);
- To provide guidance on how alternative water sources could be utilised without negatively impacting on public health; and
- To provide guidance on monitoring and reporting requirements.

1.1 Scope of Guidelines

These guidelines cover the quality, safeguards and controls, monitoring and reporting standards for the use and provision of alternate water supplies in Western Australia. This involves the use of water which is not from mains water scheme sources, but not post-human use either.

The water sources covered in this document include;

- Roofwater,
- Stormwater

These guidelines will not refer to wastewater (post-human) sources such as sewerage mining, greywater and sewage effluent. For information on the use of these water sources, please refer to the Australian Guidelines for Water Recycling – Managing Health and Environmental Risks (Phase 1) (from now on referred to as the 'National Guidelines'), or the '*Draft Guidelines for the Use of Recycled Water in Western Australia'* for the proposed WA position.

The end uses which are covered include;

- Irrigation (both exposed to the air and sub-surface),
- Plumbing into the bathroom (showers, baths and sinks),
- Plumbing into washing machines,
- Toilet flushing,
- Garden taps,
- Dust suppression,
- Pools
- Evaporative air-conditioners
- Troughs (laundry and outdoor)
- Water features

Any end uses outside of these guidelines will require consultation with the Department of Health. Please check the 'National Guidelines' beforehand.

These guidelines do not cover the requirements for using alternate water for drinking supplies. The Australian Drinking Water Guidelines 2004 (ADWG) should be referred to in the event of applications to provide drinking water.

These guidelines cover the use of alternate water in situations that dispose of the effluent into communal spaces. They are not intended for use in single dwelling, domestic household situations.

1.1.1 Domestic Situations

Projects that are entirely in-house (where the water collection and distribution is within the boundaries of a single dwelling) is outside of the scope of these guidelines. However, any project which involves plumbing into communal systems (ie: plumbing overflow into the sewer or cross connecting with scheme water for back-up), requires adherence to the AS 3500 plumbing standards and the use of approved systems.

Recommendations on the possible uses and a description of the risks associated with alternate water use in the home (not plumbed), are in Appendix 5.

1.1.2 Definitions

Throughout these guidelines the following terms will be used in these contexts:

- Alternate water – For the scope of this document, 'alternate water' refers to roofwater collected from non-residential buildings (including industrial buildings) and urban stormwater from sewered areas, collected from drains, waterways or wetlands.

- Alternate Water Supplier - means person who operates an alternate water supply system: and

- Communal Use – Water that is supplied to more than one dwelling or place of business. It is exposed to a broader range of people and becomes a public health consideration. Communal water use requires comprehensive systems management and clear lines of responsibility to ensure that it is safe. Communal water can be obtained from more than one point source (ie: several roof-tops, stormwater swales, several bores) all of which require monitoring.
  does not include persons who are operating a system that supplies water solely for his or her domestic consumption.
  a) includes a person with an operating license (water supply service provider); but
  b) includes that person's employees, agents, lessees, and sub-contractors while carrying out the duties in respect of that alternate water system; and

- Non-potable Water – A non-potable water supply is not intended for drinking, food preparation, ice-making or other modes of human consumption. Non-potable water is not treated to a level that is fit for human consumption.

- Potable scheme water – Water that is supplied via the mains water pipes at drinking water quality (usually by the Water Corporation).

- Potable Water – Potable water is water of a quality suitable for drinking, cooking and personal bathing. The standards that define potable water are described in the Australian Drinking Water Guidelines.

- Roofwater – Roofwater is water that is collected from the rooftops of buildings (falling as precipitation). It has had minimal surface contact and is therefore relatively free of impurities.

- Single, Domestic Household Use – Water that is utilised in only one dwelling for residential purposes. It is not to be supplied to an alternate dwelling, used for commercial or industrial purposes, nor used outside of the property's boundaries.

- Stormwater – Refers to the water resulting from rain draining into the stormwater system from roofs (rainwater), roads, footpaths and other ground surfaces. Stormwater carries rubbish, animal faeces, human faecal waste (in some areas), motor oil, petrol, tyre rubber, soil and debris. Initial run-off associated with storms can contain very high concentrations of enteric pathogens (disease causing organisms) and contaminants (both chemical and physical).

- WQMP – Refers to a 'Water Quality Management Plan'. An example is given in Appendix 1, and one is required to be devised as part of an application for an Alternate Water Supply.

1.1.3 Governance

The procedures, conditions and approvals outlined in this document are congruent with the following, over-arching legislation, policies and standards:

Legislation	Policies	Standards
Health Act 1911	2004 Australian Drinking Water Guidelines	AS1319-1994 Safety Signs for the Occupational Environment
Metropolitan Water Supply and Sewerage Act 1909	National Water Quality Management Strategy (NWQMS) – Australian Guidelines for Water Recycling: Managing Health and Environmental Risks (Phase 1)	AS/NZS 3500:2003 National Plumbing and Drainage Standards AS285.1:1998 Water Supply: Backflow Prevention Devices
Rights in Water and Irrigation Act 1914	National Water Quality Management Strategy (NWQMS) – Australian Guidelines for Water Recycling: Managing Health and Environmental Risks (Phase 2) Stormwater Harvesting and Reuse	AS/NZS 3896:2008 Waters—Examination for Legionella spp. including Legionella pneumophila
Public Health Act (2008)	Systems Compliance and Reporting Requirements for Small Community Water Providers (Appendix 3)	HB230:2006 Rainwater Tank Installation Handbook
Water Services Licensing Act (1995)	Western Australian Stormwater Management Objectives and Principles	AS4020 Testing of products for use in contact with drinking water

Table 1.1: Relevant Legislation, Policies and Standards relating to the Western Australian Alternate Water Supply Guidelines.

Note: All underlined sections are hyperlinked for the electronic version of the document.

2 Regulatory Framework

2.1 Relevant Sections of Acts

The Health Act 1911 contains a number of provisions that regulate the use of alternative water sources:

- Section 87 – The power to require water that is likely to be prejudicial to health to be drained, cleansed, covered or filled up.
- Section 91 – Prohibits improper management of stormwater.
- Section 94 – Prohibits chemical refuse or any waste that is injurious to health to be disposed in sewers or drains.
- Section 130 – Riparian rights - Power to prevent water pollution and prosecute people responsible for water pollution.
- Section 131 - The power to close off a water supply that is considered polluted or unfit for human consumption.

The Health Act (Underground Water Supply) Regulations 1959 describes the approvals and conditions required for the use of wells and bores.

The Metropolitan Water Supply and Sewerage Act 1909 contains a number of provisions that regulate the use of alternative water sources:

- Section 54 – Only approved fittings may be used fit-for-purpose for the water supplied.
- Section 55 – People supplied with water are required to keep their fittings in good repair.

The Metropolitan Water Supply, Sewerage and Drainage By-laws 1981 contain details on several provisions for the supply of alternate water:

- Section 3 - Protection of water against pollution.
- Section 4 - Protection of catchment areas and water reserve.
- Section 5 - Protection of public water supply areas and underground water pollution control areas.

The Rights in Water and Irrigation Act 1914 contains a number of provisions that regulate the use of alternative water sources:

- Section 5C – Unauthorised taking of water is prohibited from any watercourse, wetland or underground water source covered by this Act.
- Section 20 – Riparian rights – Right to access and utilise water on riparian land
- Section 21 – Rights to use water from wetlands and watercourses vested in the Crown.

- Section 25A – Rights to take water from non-artesian wells in prescribed areas.

The Water Services Licensing Act 1995 contains a number of provisions that regulate the use of alternative water sources:

- Section 18 – Requirement for licenses from the Economic Regulation Authority (ERA) to supply water.
- Section 19 – Power to exempt people/incorporated bodies from licensing requirements.

2.2 Rights to water

In the Rights in Water and Irrigation Act 1914, under section 5C, unauthorised taking of water from watercourses, wetlands and underground water source is prohibited without a licence from Department of Water Western Australia (DoW).

Unless the applicant has the rights to the stormwater, the owner(s) of the stormwater drainage channel, stormwater storage and disposal system where the stormwater is channelled must be contacted to obtain permission to intercept, divert, retain, store or use water.

2.3 Approval Process

Department of Health (DOH) will not approve the use of any alternative water supply system until the following conditions can be demonstrated:

- A WQMP adequately addressing all areas of health risk associated with the use of the water is put in place;
- That the system owner has the capacity to implement the WQMP while the system remains commissioned;
- Verification that the water quality objectives can be met when the system is in use.
- That the licensing requirements of the Economic Regulation Authority (ERA) are met (if applicable), permission to operate as an unlicensed alternate water supplier, or an exemption obtained from the Department of Water.

The system owner must also consult the organisations or personnel mentioned in Section 2.2 to determine if an approval from them is required. Please see page 39 for specific application processes for the Department of Health.

3 End-Uses for Alternate Water

The resulting water sourced from stormwater and roofwater can be applied to various end uses to reduce the demand on potable scheme water. Water needs to be treated to different quality levels depending on its intended end-use, and in particular, how much contact it will have with the public.

The various end-uses are discussed in this section along with the quality levels that they are required to attain.

3.1 Non-Drinking Uses

Water that is not to be used for drinking or is unlikely to be consumed but still has human contact includes:

- Dedicated laundry taps (plumbed into the machine)
- Pools
- Toilet flushing
- Evaporative air-conditioners
- Garden taps
- Water features

This water needs to meet the standards required that are fit-for-purpose. Please note Table 4.1 which outlines the standards required for different exposures and end-uses.

3.2 Surface Irrigation

Water to be used for watering vegetation using sprinklers, water cannons and drip irrigation with high public contact requires more treatment than irrigation that has restricted public access. Surface irrigation requirements also vary depending on the crop they are used on (ie: food crops, processed versus unprocessed foods, non-edible crops, ornamentals, etc).

3.3 Sub-Surface Irrigation

Water to be used for sub-surface irrigation (where it is not exposed to the air), is not subject to monitoring and quality requirements. However, sub-surface alternate water should *not* be used on root crops, salad or pond vegetables. Due to the likelihood of pathogens in the water, it should be used for non-food crops, greenspace irrigation, fruit trees (where the fruit is not in contact with the soil) and ornamentals.

4 Alternate Water Supply Systems Administration Requirements

In order to establish an Alternate Water Supply System, there needs to be a process of installing particular safeguards and controls, as well as a program of validation, operational and verification (assessable) monitoring. The requirements will vary based on both the waters' source, and its proposed end-use as they are designed to be fit-for-purpose.

4.1 Monitoring Requirements

The aim of the WQMP is to demonstrate that the alternative water supply achieves the required level of treatment for its intended use. The level of monitoring required will depend on the quality of the source water, the reliability of the treatment process, the intended use and the risk to public health.

The monitoring requirements are listed in table 4.1 (pg 15).

Monitoring an alternative water scheme has three core components: Validation Monitoring, Operational Monitoring and Verification (Assessable) Monitoring.

4.1.1 Validation Monitoring (Will it work?)

Validation monitoring will be carried out in the commissioning phase before the scheme goes live and after any substantial changes to the system are made. This will validate the adequacy of the system in treating the water and to confirm that the system is not set up to fail. Depending on the outcome of the test results, the system can then be fine tuned to ensure that the water quality objectives can be achieved.

A few reasons why a system may fail in the validation monitoring criteria are:

- Underestimation of pollutant loads in source water;
- Underestimation of treatment levels required; and
- Failure to account for/prevent a cross-connection of the raw and treated water with pollutants in the natural environment.

Validation monitoring is required not only at the commissioning stage of a system, but also needs to be re-done in the event of a 'substantial change' to the system. A 'substantial change' involves changing one of the primary components of the system (a new pump, a new filtration unit, new pipework) or if the source of the influent changes (switching from roofwater to stormwater, etc).

4.1.2 Methodology for Validation Monitoring Sampling

Validation monitoring is required to take place over enough time to gain 6 samples from the inflow (influent reading) and outflow (effluent reading). This is essential to ensure that the system works to provide the appropriate quality level for the proposed end use and can be safely operated. Samples need to be collected following the AS/NZ 56/67.1:1998 Water Quality Sampling Part 1 Guidance on the

design of sampling programs, sampling techniques and the preservation and handling of samples.

If the system is not meeting the right standards after initial monitoring of the influent and effluent, the major control points will need to be monitored to check where there is a failure or inefficiency. The major control points will vary depending on the type of system in use and what parameter is failing.

EG: Testing for E.coli after a screen is not necessary as screens are not designed to remove E.coli. A higher than acceptable E.coli reading would necessitate an influent and effluent reading from the chlorinator, UV filter (or alternate device used for removing E.coli).

There is a requirement to obtain at 6 samples over time to complete validation monitoring prior to full operation. This is usually done over 7 weeks (once a week with a one week margin for error) or 14 weeks (fortnightly sampling with two weeks as a margin for error). A speeding up of the process is allowed as long as the 6 samples are obtained, however the ability to expedite this process will depend on the risk factors involved on a case-by-case basis.

4.1.3 Operational Monitoring (Is It Working Now?)

Operational monitoring involves the monitoring of treatment performance indicators to show that the system is operating as intended. This is the operator's mechanism to check for system efficiency and failures.

A few attributes that can decrease the efficiency of a system are:

- A change in raw water (influent) quality;
- Wear and tear of the system;
- A breakdown in the system's components; and
- A lack of maintenance to enable optimum performance.

4.1.4 Verification (Assessable) Monitoring (Did it work?)

Verification monitoring is done to ensure that the water supplied complies with the water quality objectives. The results of the tests must be presented in the report to DoH and is subjected to audit (it is the outcomes on which the system is assessed for compliance with the appropriate standards).

A failure during verification (assessable) monitoring is usually indicative of a component malfunction.

4.1.5 Monitoring for aesthetic quality

Although aesthetic quality of the water could indirectly affect health, it is in the best interest of the supplier to monitor for aesthetic quality for the following reasons:

- Protection of reticulation infrastructure from corrosion;
- Protection of plumbing and fixtures; and
- Protection of equipment and items that are exposed to the water.

Several characteristics in the alternative water may lead to corrosion, staining and deposition of residuals on the items exposed to the water. This is essential in protecting the infrastructure and to minimise user complaints. A problem with aesthetic quality is also a sound indicator that something may be amiss and needs to be addressed in the operational monitoring.

The aesthetic criteria in the 2004 Australian Drinking Water Guidelines can be used as a guide to check aesthetic quality.

4.2 Description of Safeguards and Controls

The safeguards and controls listed in table 4.1 (pg 15) are described below for clarity.

First flush divert – A first flush divert is a mechanism which takes the first portion of effluent (the first downfall of rain after a dry spell, the first flow of stormwater which has picked up the debris, etc), and diverts it either to a sewer or to a primary treatment facility for later discharge to a water course.

Assess *e.coli* levels – *E.coli* can be hazardous to human health in large concentrations. Where there is a chance of human exposure to the water, the levels of *e.coli* in the water must be monitored. Should the levels exceed those acceptable for the amount of exposure, the water must be treated.

Exclusion of contaminant sources – Contaminants in catchments should be removed at source in order to prevent costly treatment and provide an exrra assurance of adequate water quality. Examples of catchment contaminants include livestock faeces which are a source of pathogens that can harm humans and petrol and oils from roadways. Water that has come from, or been in contact with, areas that contain livestock faecal matter (ie: paddocks, barn floors, stockyards, etc) or roadways that allow motorised vehicular access will require special attention to mediate the risks.

Legionella precautions – Legionella are found throughout WA water sources and soils, however in high concentrations they can be harmful to humans. Problems with exposure to Legionella can be diminished by not storing non-treated water in hot weather, avoiding exposure of people to the aerosolisation of the water (inhalation of water droplets or vapour is the key infection vector) and chlorination. Compliance with *AS/NZS 3896:2008 Waters—Examination for Legionella spp. including Legionella pneumophila* when undertaking Legionella sampling and testing is required.

Expected (typical) ranges – The expected contaminant levels for various bacteria. metals, nutrients and physicochemicals are an indicator of what is 'typical' from source water. The typical ranges for roofwater (Lognormal Summary Statistics for Roofwater Quality) and stormwater (Lognormal Summary Statistics for Untreated Stormwater Quality – Urban Catchments) can be found in the Phase 2 Guidelines in Appendix 2, Tables A2.1 and Table A2.3 respectively.

4.3 Stormwater Monitoring versus Roofwater Monitoring

Stormwater - Alternate water can be used for high risk/high human exposure purposes (such as bathing, dual reticulation and drinking), as long as it complies with the Australian Drinking Water Guidelines. However, stormwater is subject to an immense variation in quality dependent on source, how long since the last rain, activities and inputs within the catchment area. For this reason, the use of stormwater for high risk/high human exposure purposes is not recommended by the Department of Health.

A possible scenario where stormwater reuse could be practical for these high risk purposes would be where the source surfaces are custom designed and controlled to minimise pollution sources (such as stormwater swales along pedestrian (non-motorised) traffic routes which restrict dog walkers). The majority of hazardous pollutants in this scenario are actively minimised through a combination of design, policy and behavioural modification to make stormwater reuse a safer, more viable alternate water supply option.

Roofwater - Roofwater for non-potable uses does not require ongoing or validation monitoring on a scheduled system. However, in order to ensure that the effluent is safe for its end use (and fit-for-purpose), a standard check of e.coli, BOD, SS, Turbidity and pH after each 'storm event' (see Glossary) is necessary to comply with the standards for the exposure risk level.

Table 4.1: Validation Monitoring Requirements and Safeguards and Controls for Alternate Water Supply Systems

Exposure Risk Level	Potential End Uses	Validation Monitoring – 6 Samples				Safeguards and Controls	
		Parameter	Effluent Compliance Value	Roofwater	Stormwater	Roofwater	Stormwater
High	End uses with a high level of human contact, including: - Residential dual reticulation - Multi-unit dwellings, internal use - Agricultural irrigation – unprocessed foods (e.g. salad crops) - Urban irrigation with unrestricted access and application - Public toilets and designated cold tap washing machines	E.coli	< 1 cfu/100 mL	See Note pg 19.	Applies	Assessment of roof surface (*see section 8.2.3*)	**Not Recommended** *(See note pg 14)* If in use;
		BOD	< 10 mg/L			Development of a WQMP	Legionella precautions
		SS	< 10 mg/L			First flush divert	Development of a WQMP
		pH	6.5 -8.5			Mosquito controls	Standard Drinking Water Assay
		Turbidity	< 2 NTU (95%ile); < 5 NTU (maximum)				First flush divert
		Disinfection	Cl: 0.2-2.0 mg/L residual				Contaminant exclusion within catchment area
		Coliphages (for multi-dwelling internal use only)	>2.5 log_{10} reduction				

Exposure Risk Level	Potential End Uses	Validation Monitoring – 6 Samples				Safeguards and Controls	
		Parameter	Effluent Compliance Value	Roofwater	Stormwater	Roofwater	Stormwater
Medium	End uses with a medium level human contact, including: - Urban irrigation with some restricted access and application - Fountains and water features - Industrial use with potential human exposure	E.coli[1]	< 10 cfu/100 mL	See Note pg 19.	Applies	Assessment of roof surface (*see section 8.2.3*)	First flush divert
							Development of a WQMP
		BOD	< 20 mg/L			Development of a WQMP	Hydrocarbon filter
		SS	< 30 mg/L			First flush divert	Overflow disposal system
		pH	6.5-8.5			Mosquito controls	AS 3500 compliance
		Turbidity	< 5 NTU (95%ile)[2]				Contaminant exclusion within catchment area
		Disinfection	Cl: 0.2-2.0 mg/L residual[1] UV: TBA Ozone: TBA				Development of a WQMP
							Mosquito controls
Low	End uses with a low level of human contact, including: - Residential sub-surface irrigation - Urban irrigation with enhanced restricted access and application irrigation - Agricultural irrigation; processed foods	E.coli[1]	< 1000 cfu/100 mL	See Note pg 19.	Applies	Assessment of roof surface (*see section 4.3.3*)	First flush divert
							Development of a WQMP
		BOD	< 20 mg/L			Development of a WQMP	Gross pollutant trap
		SS	< 30 mg/L			First flush divert	Overflow disposal system
		pH	6.5-8.5			Mosquito controls	AS 3500 compliance
		Disinfection (if used)	Cl: 0.2-2.0 mg/L residual[1] UV: TBA Ozone: TBA				Contaminant exclusion within catchment area
							Mosquito controls
Extra Low	End uses with an extra low level of human contact including; - Woodlots - Subsurface reticulation (non-food crops)	E.coli[1]	< 10,000 cfu/100 mL	See Note pg 19.	Applies		

Table 4.2: Operational and Verification (Assessable) Monitoring Requirements for Stormwater Systems

Exposure Risk Level	Potential End Uses	Monitoring					Notes	
		Parameter	Compliance Value	Recommended Operational Monitoring Frequency	Recommended Verification Monitoring Frequency	Major Control Points		
High	End uses with a high level of human contact, including: - Residential dual reticulation (surface) - Multi-unit dwellings, internal use and external irrigation (surface) - Agricultural irrigation – unprocessed foods (e.g. salad crops) - Urban irrigation with unrestricted access and application* - Communal use - flushing toilets and designated cold tap washing machines	E.coli[1]	< 1 cfu/100 mL	Weekly[a]	Monthly	Chlorinators, UV Filters, Storage tanks	- Audit required once every 12 months. - Plumbing maintenance and alteration audits required once every five years, including backflow and cross-connection auditing. - Random audits may be carried out at any time.	Verification monitoring only requires samples from the influent and final effluent (to be able to see the effectiveness and net result of the system).
		Turbidity	< 2 NTU (95%ile)[2]; < 5 NTU (maximum)	Continuous online	Monthly	Screens, filters, settlement tanks		
		BOD	<10 mg/L	Weekly	Monthly	Ultrafiltration		
		SS	<10 mg/L	Weekly	Monthly	Ultrafiltration		
		Metals		6 Monthly	6 Monthly			
		pH	6.5-8.5	Continuous online	Monthly	Influent and effluent only		
		Disinfection	Cl: 0.2 - 2.0 mg/L residual[1] UV: TBA Ozone: TBA	Continuous online	Monthly			
		Coliphages (multi-dwelling internal use only)	>2.5 $\log_{10}$ reduction	Monthly	Monthly	Ultrafiltration units, Chlorinators.		
		Ongoing monitoring of coliphages is dependant on the outcomes of the validation monitoring. For residential dual reticulation schemes where chlorine is not used as the primary disinfectant, chlorination will be required to provide a measurable residual at the point of use. Chlorine residuals will be sampled at the delivery point of the system to ensure that a chlorine residual is maintained.						

Exposure Risk Level	Potential End Uses	Monitoring					Notes	
		Parameter	Compliance Value	Recommended Operational Monitoring Frequency	Recommended Verification Monitoring Frequency	Major Control Points		
Medium	End uses with a medium level human contact, including: - Urban irrigation with some restricted access and application** - Fountains and water features - Industrial use with potential human exposure - Non-potable water for communal uses	E.coli	< 10 cfu/100mL	Monthly[a]	Monthly	Chlorinators, UV Filters, Storage tanks	- Audit required once every three years. - Plumbing maintenance and alteration audits required once every five years, including backflow and cross-connection auditing. - Random audits may be carried out at any time.	Verification monitoring only requires samples from the influent and final effluent (to be able to see the effectiveness and net result of the system).
		Turbidity	< 5 NTU (95%ile)[2]	Continuous online	Monthly	Screens, filters, settlement tanks		
		SS	30 mg/L	Monthly	Monthly	Ultrafiltration		
		Metals						
		pH	6.5-8.5	Continuous online	Monthly	Influent and effluent only		
		Disinfection	Cl: 0.2-2.0 mg/L residual[1] UV: TBA Ozone: TBA	Continuous online	Monthly			
Low	End uses with a low level of human contact, including: - Residential dual reticulation (sub-surface for fruit trees) - Urban irrigation with enhanced restricted access and application irrigation*** - Agricultural irrigation; processed foods	E.coli	< 1000 cfu/100 mL	Monthly	Monthly	Chlorinators, UV Filters, Storage tanks		
		SS	30 mg/L	Monthly	Monthly	Ultrafiltration		
		pH	6.5-8.5	Monthly	Monthly	Influent and effluent only		
		Disinfection (if used)	Cl: 0.2-2.0 mg/L residual[1] UV: TBA Ozone: TBA		Monthly			
Extra Low	End uses with an extra low level of human contact including; - Woodlots - Subsurface reticulation (non-food crops)	E.coli	<10.000 cfu/100mL	6 monthly	6 monthly	Chlorinators, UV Filters, Storage tanks		

Notes to Tables 4.1 and 4.2

[a] review frequency after 6 months operation

* Urban irrigation with the potential for full public contact, no control to restrict access or minimise spray drift

** Urban irrigation with restricted public access (see definition) during irrigation

*** Urban irrigation with restricted public access (see definition) and a combination of:

- no access after irrigation (nominally 1 to 4 hours or until irrigation are is dry)
- minimum buffer zones to the nearest point of public access
- spray drift controls, e.g. low throw sprinklers, vegetation screening OR
- sub-surface irrigation

[1] Total chlorine residual after a minimum contact time of 30 minutes.

[2] Limit met prior to disinfection.

5 System Compliance and Reporting Requirements

Reports to the Department of Health will be required to demonstrate system compliance for alternate water supply systems. The reporting requirements and relevant monitoring (verification) are listed in Table 4.2, starting page 17.

There is some considerable overlap between government departments on the issue of compliance and reporting. The Phase 1 Guidelines are split between health and environmental considerations, but both inform the other.

Where exactly these divisions should be in the Western Australian policies and procedures is unclear, particularly as to where the concerns of the Department of Health end and the concerns of the Department of Environment and Conservation begin.

Despite the end-uses proposed in this document being for non-potable uses, the best policy and regulatory guidance that the Department of Health currently has in this area is based within the Australian Drinking Water Guidelines. It is for this reason that the table on the next page draws on those requirements, particularly for high risk end uses.

Who to report to, what needs to be reported on, and the System Compliance and Reporting Requirements themselves are up for discussion. Please look at the table on the following page and consider whether these parameters are adequate, top-heavy or inadequate to protect public health, and what parameters you believe come under the Department of Health or the Department of Environment and Conservation.

The table below demonstrates the compliance indicators and reporting formats suggested for alternate water supplies:

Exposure Risk Level	Compliance Indicators	Reporting Requirements
High risk end use	• Small Community Potable Water Supply Sampling Grid (Appendix 4) • WQMP • TPH (for stormwater schemes only) • Refer to Table 4.1 for exact parameters	• System Compliance and Reporting Requirements for Small Community Water Providers. • Refer to Table 4.2 for exact parameters • Annual Report
Medium risk end use	• WQMP • E.coli counts • Turbidity • Chlorine residuals • pH • TPH (for stormwater schemes only)	• Annual report • Model Reporting Format - Alternative water supply for third pipe non-potable schemes • Refer to Table 4.2 for exact parameters
Low risk end use	• WQMP • E.coli counts • SS • Chlorine residuals • pH	• Annual report • Model Reporting Format - Alternative water supply for third pipe non-potable schemes • Refer to Table 4.2 for exact parameters
Extra Low risk end use	• E.coli counts	• Annual report

Table 5.1 – Compliance Indicators and Reporting Requirements for Alternate Water Supply Systems

For all other water supply schemes, it is recommended that the water quality objectives be adhered to at all times. Please contact the Department of Health Water Unit phone 9388 4999 if the system fails to reach the water quality objectives on the interpretation of the guidelines.

6 Roles and Responsibilities

Water suppliers and users have responsibilities to ensure that the water used causes no adverse impact on public health.

6.1 Roles

6.1.1 Suppliers

It is the suppliers' responsibility to ensure that the scheme is managed and operated in accordance with the DOH recommendations and this guideline. It is also the responsibility of the supplier of the water to ensure that the scheme has the necessary approvals mentioned in section 2. The duty of care lies solely upon the water provider.

Suppliers of water have the following responsibilities:

- Adhere to the conditions of approval set by the DOH;
- Deliver water to the user that is of a quality fit for its intended purpose;
- Implement the WQMP;
- Regularly inspect the system to ensure it is operating as intended;
- Ensure proper documentation on the entire system (catchment to use) is recorded and kept up to date in the WQMP;
- Provide each user with relevant information and education on the hazards of water;
- Ensure that only suitably trained personnel operate the water system and that appropriate health and safety measures and procedures are in place to protect operators and any others exposed to the water;
- Maintain the site and system so that the water does not pose a public health risk;
- Keep a register of all users to which they supply the water ;
- Negotiate an agreement of supply with all users and keep to the terms of the agreement.
- Alert each user if any problems relating to the quality or supply occur as soon as practicable; and
- Timely submission of reports on system compliance.

6.1.2 Users

Users of alternative water are expected to adhere to the terms of the Agreement of Supply entered into with the Supplier.

6.2 Responsibilities

The following processes and requirements fall under the responsibility of the roles listed above.

6.2.1 Agreements

In a third pipe scheme, a water supply agreement must be made between the supplier and the user of the water to ensure both parties know their responsibilities. The agreement will be stated in the licence of operation.

The agreement should include:

- Obligations and responsibilities of supplier and user,
- Water characteristics (source, quality, quantity, pressure, flow variations),
- Responsibility for operation, maintenance, monitoring and auditing processes,
- Restrictions on use,
- Reliability of supply,
- Liabilities and insurance,
- Financial arrangements,
- Contract duration and conditions for termination,
- Ownership of facilities,
- Contingency measures when problems arise.

6.2.2 Warning Signs

Wherever water is being used for non-potable applications, erect prominent warning signs indicating, in English and any other primary languages predominately spoken in the area:

"STORMWATER – DO NOT DRINK – AVOID CONTACT"
"UNTREATED WATER – DO NOT DRINK – AVOID CONTACT"

All stormwater detention basins and storage area should also be clearly sign posted. The wording of these signs should state:
"WARNING – STORMWATER – DO NOT DRINK OR SWIM".

These signs must incorporate the following requirements:

- A minimum size of 20cm x 30cm on a white background with black lettering of at least 20mm in height.
- Contain the recommended International Public Information – Drinking Water Symbol with the Prohibition Overlay in RED.
- In compliance with AS1319 – 1994 *Safety Signs for the Occupational Environment.*
- Number of signs and size of wording should be determined on the basis of the visual distance from the observer.

In addition to the irrigation area, individual fixtures and points of access to the water system should have warning signs.

6.2.3 Compliance with National Plumbing Code

To improve distribution reliability, distribution systems (including all pipe work, fittings and drainage of the water) should be designed to meet the following requirements:

- Compliance with AS/NZS 3500:2003 series - National Plumbing and Drainage Standards and other relevant Australian Standards;

- Ensure the separation and prevention of cross connection between alternative water and potable water systems; and
- Incorporation of a mechanism for the disinfection or slug dosing of distribution pipe work with disinfectant or algaecide to control biological solids and bacterial re-growth. This only applies when there are microbiological tolerance levels to monitor.

6.2.4 Public Education

DOH recommends that the public be continually informed, especially potential users, of project status as regulatory and infrastructure decisions are being formulated. This should aid in the public's understanding of the safeguards and rigorous consideration the project is being given and will provide a sense of involvement and inclusion.

Key messages should include:

- Appropriate/acceptable uses of water;
- Inappropriate or potentially unsafe uses of water;
- The risks of inappropriate uses of water;
- The identification of alternate water supply infrastructure versus drinking (potable) water infrastructure;
- Catchment protection strategies; and
- The responsibilities of the water users, for example:
    - The use of water appropriately and responsibly;
    - Advice to visitors of appropriate uses of water;
    - Cross connection tests;
    - Maintenance of water infrastructure on own property; and
    - Where to get further information and advice.

For a third pipe non potable scheme the supplier should provide all users with user-friendly materials and guidance about the third pipe scheme.

Information that should be supplied to users should include:

- Users responsibilities in using the water;
- The use of only licensed plumbers for installation and maintenance of the water systems;
- Suppliers right to enter the customers' property for checking and testing for cross connections and taking meter readings;
- Users use of water in a safe and responsible manner consistent with the suppliers guidance information and DOH guidelines;
- Management of the third pipe scheme including periodic testing for cross connections with the drinking water supply;
- List of permitted uses;
- List of uses not permitted including: human drinking water, washing of driveways, and washing of cars and boats on surfaces having direct discharge to stormwater drains;
- Guidance on safe and efficient use of water including tips on good practice garden watering and maintenance of healthy plants with the water;
- Annual reminders of safe water use; and
- Emergency response procedures and contact details.

6.2.5 Plumbing for Third Pipe Supplies

The fundamental principal in the design of a third pipe non-potable alternative water distribution system is to maintain separation and provide identification of potable water systems and alternative water systems. Separation is required to prevent health risks from cross contamination and possible ingestion of water. If a system is to be connected to the potable water supply system, backflow prevention devices must be installed and the plumbing must be done in accordance with AS 3500. A backflow prevention device is also required at the point of supply.

The following preventive measures must be taken to prevent any possible cross-connections:

- If potable supply is used as top up water for the alternative water supply, an approved air gap which complies with AS2845.1:1998 *Water Supply: Backflow Prevention Devices* must be installed in the potable supply at the point where it enters the alternative water systems.
- Compliance with AS 3500.

All alternative water pipe work must be readily identifiable and distinguishable:

- All pipe work including taps and should be colour coded (purple) in accordance with AS/NZS 3500.5:2000 section 2.16.6.1.
- Visible signs in accordance with AS/NZS 3500.1:2000 must be attached to all fixtures and storage tanks to indicate a non-potable source of water.
- Compliance with AS 3500.

Complete pipe work plans should be maintained and updated to provide a permanent record of the location and depth of the alternative water pipes.

6.2.6 Access

Access control to the irrigation area is required when a non-potable supply of stormwater is used for irrigation purposes

No restriction of public access is required if roofwater is used or when sub-surface irrigation of stormwater is used.

The water user must maintain effective control over public access to the areas being irrigated. This can be achieved by two common methods:

- Night time irrigation commencing after 9.00pm and ceasing at least one hour before sunrise and provision for a withholding period of 1-4 hours to allow the drying of irrigated area before use; and/or
- Simple non-continuous barriers that direct the public towards signage or fencing with lockable gates.

6.2.7 Irrigation Method and Design

The type of irrigation method will determine both the treatment level required and the extent of public access control. The method of irrigation will also determine the design of runoff controls. Sub-surface irrigation is much safer and requires fewer restrictions than water which is irrigated above ground and exposed to the air. Refer to Table 4.1 on the treatment levels and conditions of use.

Irrigation Pipes
Irrigation pipes should be able to be drained or flushed to remove obstructions and/or water which is not of the required standard from the system. This is particularly important after the system has not been in use for an extended period of time or if the flow rate has been reduced over warmer months. Biofilms can build up in the pipes which may allow pathogens to grow without detection. A first flush mechanism is required to either move the first flush of water to a more intensive treatment process or to divert it to sewer.

Spray Drift
Spray drift should be minimised when using non-potable alternative water supply for irrigation purposes to prevent the risks associated with human exposure. The timing of irrigation (during periods when there are either no people around or the wind is at its weakest) and appropriate sprinklers are the best ways to minimise this problem.

Spray drift can also incur complaints if aesthetic values are exceeded. The supplier is expected to attend to each complaint and to alleviate the problem, even if the health guidelines have not being exceeded.

Spray drift into areas accessible by the public can be minimised by using some of the following methods:

- Buffer zones;
- Tree/shrub screens;
- Selection of large droplet design sprays;
- Lower spray height;
- Anemometer switching systems; and
- Irrigating in weather conditions that would not cause spray drift.

Spray drifting onto public drinking fountains, into natural or artificial water bodies, onto buildings, playgrounds and barbeque and picnic table areas is not permitted. Where spray irrigation is used, establish buffer zones (25m), from the edge of the irrigation area to the nearest dwellings or public areas where contact with the alternative water would be likely.

Irrigation systems should be installed and operated so that there is no surface runoff and to ensure that ponding does not occur as this can lead to mosquito problems and a greater risk of human exposure.

6.2.8 Occupational Health and Safety

Suppliers of alternative water must have in place an Occupational Health and Safety plan while the supply remains commissioned.

Suppliers and users of alternative water schemes should ensure that only suitably trained personnel operate the alternative water supply system and any other apparatus associated with its use. Appropriate health and safety measures and procedures must be in place to protect operators and any others exposed to alternative water. Employers should make themselves aware of their responsibilities and duties under the *Occupational Health and Safety Act 1984*.

At a minimum, employee training should cover:

- The principles of risk management;
- Knowledge and awareness of the Water Quality Management Plan (WQMP), including roles, responsibilities and liabilities;
- The alternative water system, including its operation and the control measures that are in place to ensure public health protection;
- The organisation's protocols and policies for the system, such as system management and maintenance, sampling and analysis of water, consumer complaints, or incident and emergency plans;
- Statutory requirements relating to the alternative water system;
- The roles and responsibilities of individuals and agencies that relate to the alternative water system, both internal and external to the organisation; and
- The documentation, reporting and auditing of the system.
- The health and safety responsibilities including the adequate use of personal protection equipment and incident reports etc.

6.2.9 Storage Facility

Storage of alternative water allows the water to be utilised during higher seasonal and/or daily supply demands. Storage also prevents runoff and hydraulic overloading during periods when irrigation is not appropriate, such as extended periods of rain or in the event of system malfunction or inadequately treated water.

Alternative water that is collected into storage facilities should already be treated to the required water quality objectives so that it is suitable for the intended use. There should be separate storage facilities for untreated/inadequately treated overflow so that the water can be further treated or disposed of safely.

Stormwater water supply reservoirs which are closed to the public shall have restricted access (ie: within a fenced area). All alternative water storage facilities shall be identified by the appropriate signage (see section 6.2.2, page 21).

Storage tanks that are used to store alternative water must comply with HB 230 – 2006: Rainwater Tank Design and Installation Handbook.

There are some new technologies being generated which are of an 'egg carton' type construction. These are placed underground (such as under sports fields, green spaces) and used to create an artificial aquifer for storing and distributing non-potable water for irrigation.

It is currently unclear as to whether these types of constructions would be compliant with HB 230 – 2006: Rainwater Tank Design and Installation Handbook and other current standards for water supply storage. It is not however the intent of these guidelines to prevent such technologies (or any similar innovations), from entering the market should they be deemed safe. The requirements for storage may need further consideration.

6.2.10 Algae

The retention of stormwater in open storages at any stage of the treatment or distribution has the potential to promote the growth of algae. These may be harmless green algae, however there is also a risk of potentially toxic blue green algae (cyanobacteria). Algae in stormwater can significantly reduce its quality for many applications. Some species of blue green algae have the potential to produce toxins which can pose a risk to human health.

For schemes subjected to regular algal blooms, a blue green algal emergency response plan should be developed. The emergency response plan should detail:

- Allowance for alternative supply systems;
- Measures to allow the screening or filtering of stormwater before supply or application;
- Suitable mechanisms to clean and flush the distribution system; and
- An algae monitoring program.

6.2.11 Mosquito Management

In Western Australia mosquitoes can be serious pests as well as potential vectors of disease-causing viruses and parasites. Ross River virus disease and Barmah Forest virus disease occur state wide in environmentally-driven cycles and the rare, but the potentially fatal Murray Valley encephalitis occurs in the northern half of the State.

Mosquitoes breed in fresh, brackish, salt and polluted water in natural and artificial situations, as well as artificial containers. Examples of stormwater reuse infrastructure that may support mosquitoes include water storage tanks, open storage facilities, drains, leaking or pooling irrigation systems.

It is essential that the implementation of alternative water use does not enhance mosquito breeding and the transmission of disease. The water supplier must implement a mosquito management program. Information and guidance on mosquito management program planning can be obtained from the Mosquito-Borne Disease Control Branch (MBDCB) at the Department of Health. The contact details for the MBDCB are as below:

- (08) 9385 6001
- http://www.health.wa.gov.au/envirohealth/hazards/mosquitomanagement.cfm

Some key preventative measures that relate to the design and maintenance of infrastructure are discussed below:

- Construction of any infrastructure that holds water must be designed to minimise mosquito breeding.
- Regular ongoing maintenance and monitoring of all structures associated with storage or treatment of water is necessary to minimise mosquito breeding.
- Irrigation systems that will utilise stormwater should be designed to prevent surface ponding by appropriate irrigation scheduling and by ensuring that there is no leakage.

- Holding tanks should be designed and maintained so as to permanently prevent the entry of mosquitoes.
- Larvicides must be used in accordance to manufacturers instructions. (Eg. Methoprene)

6.2.12 Legionella precautions

Legionella organisms are widespread in natural sources of freshwater and may also be found in soils. They occur commonly in man-made water systems, particularly in hot water and cooling water systems.

Legionella spp appear to infect humans by inhalation of infective aerosols and droplet nuclei. Users of stormwater must take the following precautions to minimise the risk of infection of this microorganism:

- Avoid storing stormwater in hot weather
- Control the aerosolisation of stormwater to avoid inhalation by users.
- Use personal protective equipment to avoid direct inhalation of aerosols.
- Do not store water for more than 24 hours.

If you are in doubt of the safety of the water:

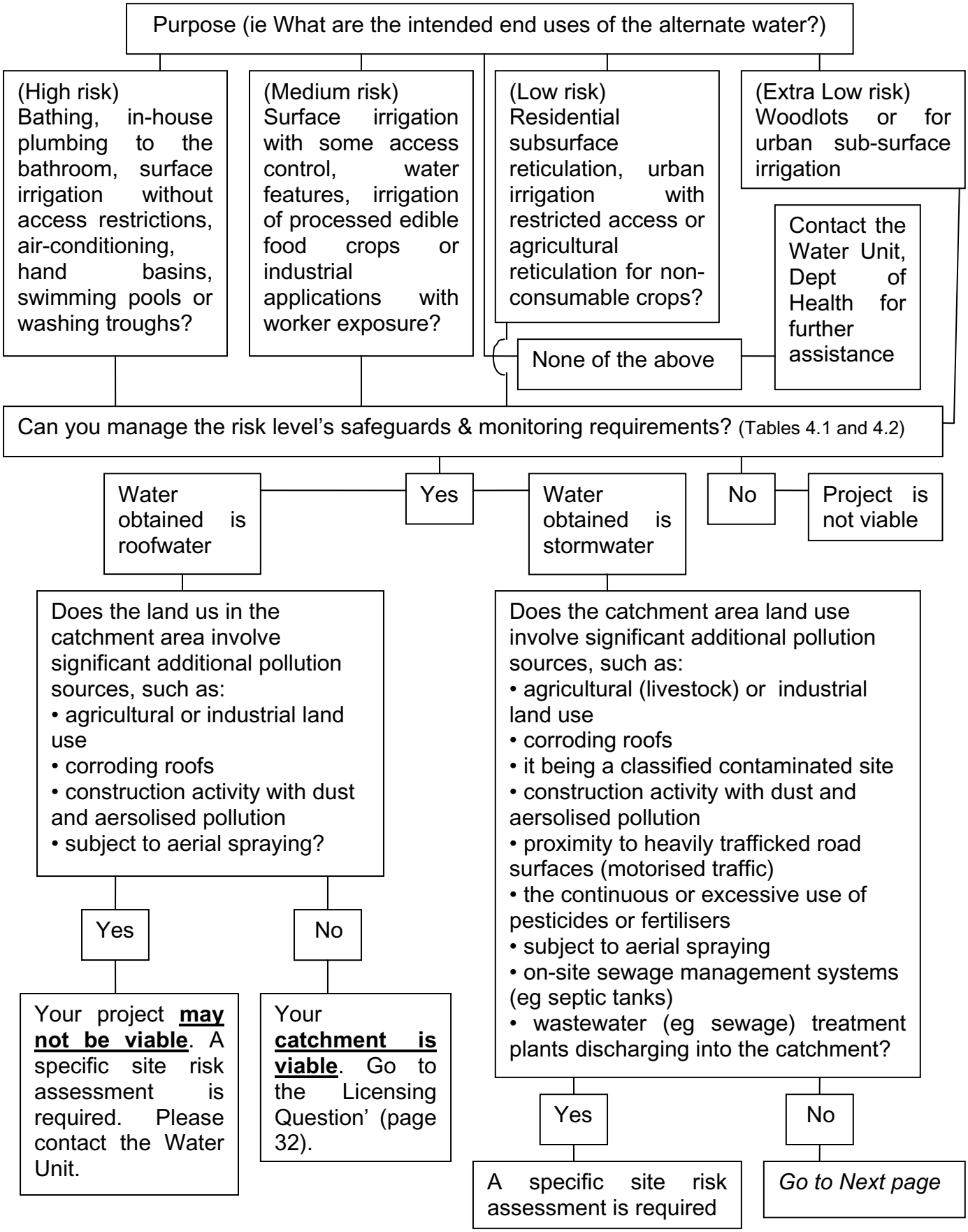
- Do not use the water
- Chlorinate the water to 2-4mg/L chlorine residual; and/or
- Test for Legionella; and/or
- Discard the water.

7 Project Decision Tree

The Project Decision Tree facilitates the process of determining the appropriate procedures that need to be following in order to establish an alternate water reuse scheme.

Before commencing a project, the following questions need to be answered (see next page). Once the Project Decision Tree is completed, there should be a sound knowledge of the appropriate restrictions and compliance requirements for the project to proceed (or the project has been found to need site specific risk assessment). The Project Decision Tree is designed to assist in the applicant's process and project management, however it can be used as part of the application submission to the Department of Health.

Project Decision Tree



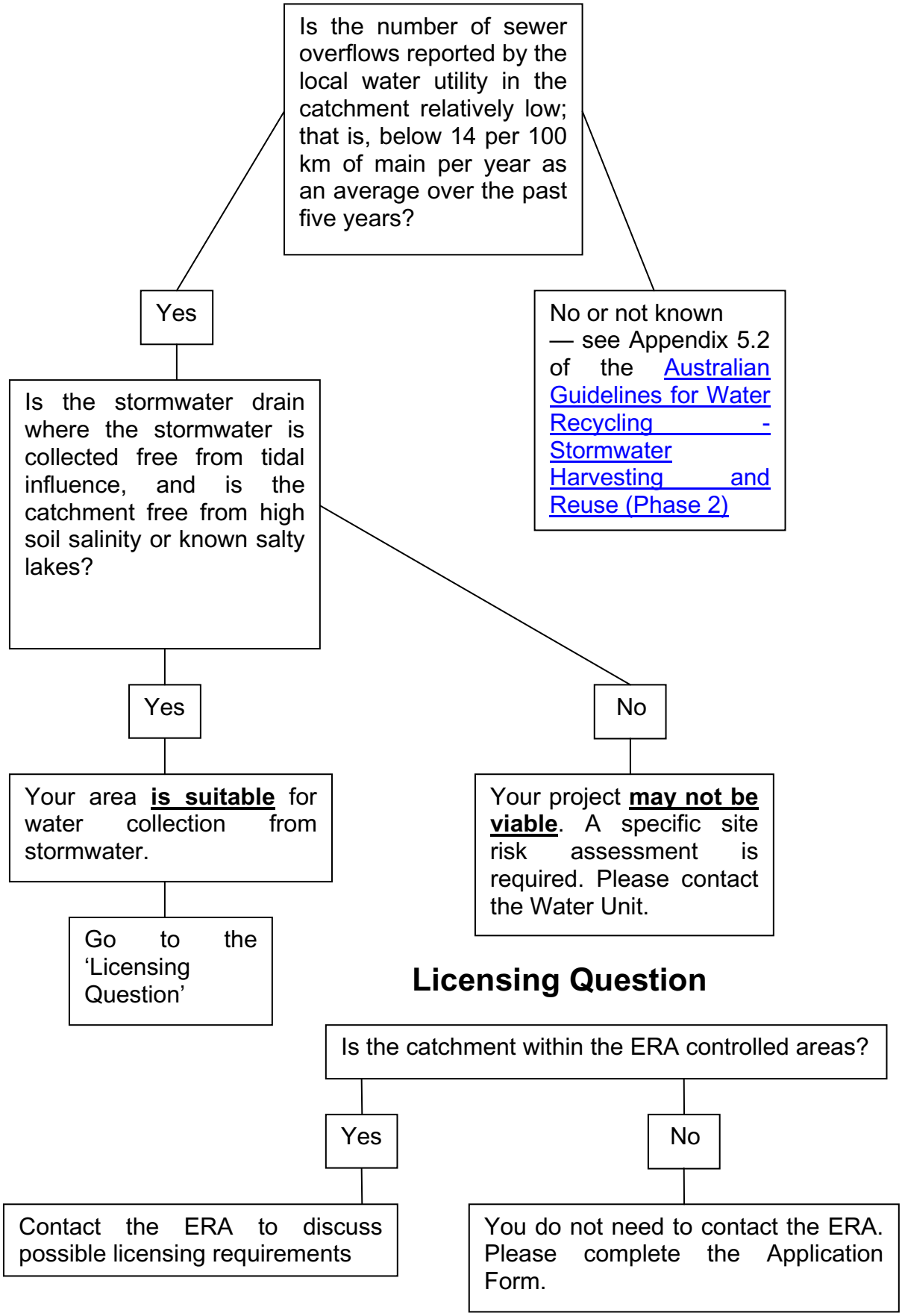


Figure 7.1 – Project Decision Tree

8 Roofwater

The use of roofwater in a public setting requires the following process, monitoring and safeguards in order to assure public health. Please utilise this section for roofwater sourced projects, having worked out your project's scope using the **Project Decision Tree** (page 31).

8.1 Permitted Uses

The permitted uses are based on the risk associated with the use of the water and the susceptibility of the catchment to various contaminants. Roofwater can be used for:

- Garden watering
- Irrigation
- Toilet flushing
- Vehicle washing
- Clothes washing

These uses are available without restriction for water obtained from roofwater stored in a covered tank. There are extra provisions for roofwater from open storage (see Table 8.2 for extra safeguards). Roffwater used for reticulated rainwater systems for drinking water are deemed to be a drinking water supply. Please see the Australian Drinking Water Guidelines.

Please see table 4.1, page 15 for the recommended monitoring and safeguards for permitted uses.

8.2 Conditions of Use

Roofwater can be used for purposes in table 4.1, page 15 providing that the following conditions are met:

8.2.1 Organisational support

The organisation that owns or maintains the building whose roof is to be used to collect roofwater should be committed to the appropriate management of water collection and storage. Maintenance of the roofwater system is required to effectively manage health and environmental risks. Thus, before deciding to proceed with a project, the organisation needs to ensure that adequate funding is allocated for long-term effective maintenance. Such maintenance should be carried out by a nominated suitable person within the organisation or by an external contractor, such as a suitably qualified plumber (adhering to AS/NZS 3500 Standards).

The organisation should also be committed to using monitoring data in order to ensure quality levels and to improve the scheme's performance where required.

8.2.2 Legal requirements

Before starting the project, the local council or other regulatory authority should be contacted to determine whether there are any specific requirements that need to be met for roofwater harvesting schemes. The guidelines in this document do not override state and territory or council requirements. Contacting your local council offices should be the starting point.

8.2.3 Roof characteristics

There are particular characteristics of a roof that affect roofwater quality. Before starting the project, it is recommended that the roof be inspected (see Table 8.1). Ideally, the roof should ***not*** have:

• copper roofing material
• public access (roofs with maintenance access are acceptable)
• vehicular access
• structures above the roof that may rust or corrode (eg unpainted metal or concrete), or provide a resting place for birds
• discharge, overflow or bleed-off pipes from roof-mounted appliances, such as air conditioning units, hot-water services and solar heaters
• a flue from a slow combustion heater that is not installed in accordance with the relevant Australian standard
• a chimney or flue from an industrial process within the building
• exposure to chemical sprays from processes within the building (eg spray painting) that may be deposited on the roof
• significant atmospheric deposition of pollutants (eg from industrial sources or from aerial spraying).

If a roof has these characteristics, roofwater quality should be monitored for relevant contaminants and any associated health and environmental risks should be assessed before proceeding with the project. A validation sampling process is required as well as treatment/disinfection if necessary with verification monitoring to follow each storm event.

Roofwater quality can be further protected by excluding:
• overhanging vegetation that may attract birds and drop debris onto the roof
• bitumen-based materials or lead-based paints
• deteriorated asbestos roofing material
• exposure to preservative-treated wood
• lead flashing that is not painted or sealed.

8.2.4 Inspection and Maintenance

The following maintenance regime is required for roofwater systems. This must be set out in the Water Quality Management Plan (see section 8.4).

Table 8.1 Inspection and maintenance of roofwater reuse systems

Indicative Frequency	Inspection Criteria	Maintenance Action (where required)
Every Year	Check whether any tree branches overhang the roof or are likely to grow to overhang the roof	If safe and where permitted, consider pruning back overhanging branches
	Check that access covers to storage tanks are closed	Secure open access covers to prevent risk of entry
	Check that screens on inlets, overflows and other openings do not have holes and are securely fastened	Repair defective screens to keep out mosquitoes
	Inspect tank water for presence of rats, birds, frogs, lizards or other animals	Remove infestations, identify point of entry and close using gnaw-proof mesh with holes no greater than 2 cm in diameter
	Inspect tank water for presence of mosquito larvae (inspect more frequently based on local requirements in sub-tropical and tropical northern Australia)	Identify point of entry and close with insectproof mesh with holes no greater than 1.6 mm in diameter
	Inspect gutters for leaf accumulation and ponding	Clean leaves from gutters; remove more regularly if required. If water is ponding, repair gutter to ensure water flows to downpipe
	Check signage at external roofwater taps and that any removable handle taps are being properly used	Replace or repair the missing or damaged signage and fittings
	Check for cross-connections and inappropriate tappings by checking visible plumbing fittings, alternatively turning off supplies	Remove cross-connections and inappropriate tappings
	Check first flush diverter if present	Clean first flush diverter, repair and replace if necessary
	Check condition of roof and coatings	Investigate and resolve apparent changes to roof condition, such as loss of material coatings
	Check health of irrigation area and irrigated grass or plants	Investigate observed adverse impacts that could be due to irrigation
Every 3 Years	Drain, clean out and check the condition of the tank walls and roof to ensure no holes have arisen due to tank deterioration	Repair tank defects
	Check sediment levels in the tank	Organise a suitable contractor to remove accumulated sediment if levels are threatening to block tank outlets
	Undertake a systematic review of operational control of risks to the system	Identify the reason for any problems identified and take actions to prevent failures occurring in future
After 10 years and then every 5 years	Monitor soil copper and zinc levels	Stop roofwater irrigation if levels exceed criteria
After 20 years and then every 5 years	Monitor the effectiveness of the irrigation equipment for clogging due to algal growth	Clean or replace clogged equipment

Table 8.1 – Inspection and Maintenance of Roofwater Reuse Systems (derived from the Australian Water Recycling Guidelines (Phase 2)).

8.3 Monitoring and Reporting – Roofwater

The monitoring and reporting recommendations are listed in tables 4.1 and 4.2, starting on page 15. Please use this table in assessing the needs of your alternate water reuse scheme.

8.3.1 Open Storages

If the roofwater is in open storages, there are extra hazards to consider:

- additional inputs of faecal matter into the stored roofwater from water birds
- mosquito breeding in the storage and the resulting risk of mosquito-borne disease
- public safety hazards of an open waterbody
- algal blooms (eutrophication) in the storage
- increased turbidity
- environmental impacts of a storage located directly on a stormwater drain or waterway.

In order to account for these hazards, extra safeguards are required and are listed in Table 8.2.

Table 8.2 Recommended Additional Monitoring for Open Storages of Roofwater

Frequency	Monitoring	Correction
Annually and in response to notifications	Integrity of any netting to prevent waterbird access to storages	Fix holes in netting
	Excessive growth of aquatic plants or water weeds in storages	Remove excessive plants/weeds
Quarterly and in response to notifications	Assess for presence of high numbers of mosquitoes	Mosquito control using appropriate chemicals, assess effectiveness of design features for minimising mosquitoes and correct if required
	Assess the integrity of any fencing around the storage	Repair any defects
Monthly (excluding winter) and in response to notifications	Assess the storage for the presence of any algae	Suspend operations, investigate nature of algae. If toxic, implement management options such as aeration and assess need for nutrient management practices
Monthly and in response to notifications	Visual assessment of turbidity levels	Turbidity monitoring if levels appear excessive, assess effectiveness of control measures such as bank stabilisation and energy dissipators
Monthly	Assess waterbird numbers in storage	If waterbird numbers are significant, undertake health risks assessment, implement practices to reduce attractiveness of storage, or implement additional treatment.
Annually and following major storms	Integrity of spillway and downstream streambank integrity for online storages	Stabilise any eroding areas

Table 8.2 – Recommended Additional Monitoring for Open Storages of Roofwater (derived from the Australian Water Recycling Guidelines (Phase 2)).

8.4 Water Quality Management Plan

A Model WQMP format is shown in Appendix 1. Refer to the model for further details on the extent of information that is required for roofwater-sourced alternate water supplies.

DoH will review the WQMP on a case by case basis and will liaise with the author to ensure all aspects are adequately addressed before the plan is implemented

9 Stormwater

The use of stormwater in a public setting requires the following process and safeguards in order to assure public health. Stormwater is typically utilised for irrigation systems on non-food vegetation (sports fields, ovals, golf courses, etc), due to the diversity and inconsistency of the water quality that is obtained from stormwater collection.

9.1 Permitted Uses

The permitted uses are based on the risk associated with the use of the water and the susceptibility of the catchment to various contaminants. Please see table 4.1, page 15 for the permitted uses.

9.2 Conditions of Use

9.2.1 Organisational support

The organisation that will operate the stormwater scheme should be committed to the appropriate and ongoing management of the health and environmental risks. The organisation should either nominate suitably qualified staff to maintain the system, or arrange for maintenance to be contracted out to suitably qualified contractors. Achieving organisational commitment is simpler where the scheme's operator is also the scheme's developer. If a staff member who is likely to be involved in operating a scheme is also involved in the scheme's development, operational risk management actions are more likely to be appropriate and able to be accommodated within the organisation's operating budget.

An organisation considering a stormwater reuse scheme should also ensure that ongoing funding is available for the proposed scheme's operations and maintenance, before a final decision is made to proceed with the project. Where stormwater schemes are to be constructed as part of a new urban or commercial development project, the developer is normally responsible for the scheme's design and construction.

Responsibility for operations is often transferred to a separate organisation (eg council, water utility, golf course or body corporate) following construction. The scheme's operator should be involved in the development of the scheme, to ensure that the proposed risk management actions for the operational aspects of the scheme and their financial implications are acceptable. The developer and operator should prepare a written agreement detailing risk management roles and responsibilities.

A similar arrangement on agreed risk management roles and responsibilities should be developed in circumstances where one organisation collects, treats and distributes the stormwater for reuse by another organisation.

9.2.2 Legal requirements

Before starting the project, the local council or other regulatory authority should be contacted to determine whether there are any specific requirements for stormwater reuse schemes, including requirements for planning and operational approval. The scheme should be developed and operated to meet any such requirements. These guidelines do not override any state and territory or council requirements.

9.2.3 Further Information on Project Implementation for Stormwater

Stormwater reuse is covered extensively in the 'Australian Guidelines for Water Recycling - Stormwater Harvesting and Reuse (Phase 2)'. For further guidance on implementing a stormwater supply system, please refer to these guidelines.

9.3 Monitoring and Reporting Requirements - Stormwater

The monitoring and reporting requirements are listed in tables 4.1 and 4.2, starting on page 15. Please use this table in assessing the needs of your alternate water scheme.

9.4 Water Quality Management Plan

A Model WQMP format is shown in Appendix 1. Refer to the model for further details on the extent of information that is required for stormwater-sourced alternate water supplies.

DoH will review the WQMP on a case by case basis and will liaise with the author to ensure all aspects are adequately addressed before the plan is implemented.

10 Application Process

In order to commence an alternate water reuse scheme, the following procedure is required by the Department of Health.

- Go through the Project Decision Tree to discover the scope and requirements for your particular project (page 31).
- Draft a Water Quality Management Plan utilising the Model in Appendix 1.
- Complete the Application Form (Appendix 2) and send the Water Quality Management Plan and all supporting documentation to the Water Unit, Department of Health for approval.

11 References

Department of Health, (2008), Systems Compliance and Reporting Requirements for Small Community Water Providers, Government of Western Australia, Australia.

Department of Sustainability and Environment, (2006), A Framework for Alternative Urban Water Supplies, State of Victoria, Melbourne, Australia.

Department of Water, (2008), State Water Recycling Strategy, Government of Western Australia, Australia.

Department of Water, (2007), Western Australia's Implementation Plan for the National Water Initiative, Government of Western Australia, Australia.

Department of Water and Energy, (2008), Interim NSW Guidelines For Management of Private Recycled Water Schemes, NSW Government, Australia.

Government of Western Australia, (1981), Metropolitan Water Supply, Sewerage and Drainage By-laws 1981, as at 27 Aug 2008, Version 05-g0-02, State Law Publishers, Australia.

National Health and Medical Research Council, (2004), Australian Drinking Water Guidelines, Australian Government, Australia.

Natural Resource Management Ministerial Council, Environment Protection and Heritage Council, National Health and Medical Research Council, (2006), Australian Guidelines for Water Recycling – Managing Health and Environmental Risks (Phase 1), Australia.

Natural Resource Management Ministerial Council, Environment Protection and Heritage Council, National Health and Medical Research Council, (May, 2008), Australian Guidelines for Water Recycling - Stormwater Harvesting and Reuse (Phase 2), Australia.

National Water Quality Management Strategy, (1995), Guidelines for Groundwater Protection in Australia, Agriculture and Resource Management Council of Australia and New Zealand, Commonwealth of Australia.

12 Glossary

- ADWG – Australian Drinking Water Guidelines, 2004

- Alternate water – For the scope of this document, 'alternate water' refers to roofwater collected from non-residential buildings (including industrial buildings) and urban stormwater from sewered areas, collected from drains, waterways or wetlands.

- Alternate Water Supplier - means person who operates an alternate water supply system

- Coliphages - Coliphages are considered to be representative of faecally-derived viruses. There are many types of coliphages, and the choice of which to monitor depends on the situation. However, usually one or both of two groups, somatic coliphages and FRNA coliphages, are monitored. If only one of the two groups of coliphage is monitored, the somatic coliphage is generally more conservative than the FRNA coliphages.

- Communal Use – Water that is supplied to more than one dwelling or place of business. It is exposed to a broader range of people and becomes a public health consideration. Communal water use requires comprehensive systems management and clear lines of responsibility to ensure that it is safe. Communal water can be obtained from more than one point source (ie: several roof-tops, stormwater swales, several bores) all of which require monitoring.
  does not include persons who are operating a system that supplies water solely for his or her domestic consumption.
  c) includes a person with an operating license (water supply service provider); but
  d) includes that person's employees, agents, lessees, and sub-contractors while carrying out the duties in respect of that alternate water system; and

- Non-potable Water – A non-potable water supply is not intended for drinking, food preparation, ice-making or other modes of human consumption. Non-potable water is not treated to a level that is fit for human consumption.
- Potable scheme water – Water that is supplied via the mains water pipes at drinking water quality (usually by the Water Corporation).

- Potable Water – Potable water is water of a quality suitable for drinking, cooking and personal bathing. The standards that define potable water are described in the Australian Drinking Water Guidelines.

- Roofwater – Roofwater is water that is collected from the rooftops of buildings (falling as precipitation). It has had minimal surface contact and is therefore relatively free of impurities.

- Single, Domestic Household Use – Water that is utilised in only one dwelling for residential purposes. It is not to be supplied to an alternate dwelling, used for commercial or industrial purposes, nor used outside of the property's boundaries.

- Storm Event – a rainfall event that produces more than 0.1 inch of precipitation and that, which is separated from the previous storm event by at least 72 hours of dry weather.

- Stormwater – Refers to the water resulting from rain draining into the stormwater system from roofs (rainwater), roads, footpaths and other ground surfaces. Stormwater carries rubbish, animal faeces, human faecal waste (in some areas), motor oil, petrol, tyre rubber, soil and debris. Initial run-off associated with storms can contain very high concentrations of enteric pathogens (disease causing organisms) and contaminants (both chemical and physical).

- WQMP – Refers to a 'Water Quality Management Plan'. An example is given in Appendix 1, and one is required to be devised as part of an application for an Alternate Water Supply.

13 Appendices

Appendix 1: Model Water Quality Management Plan
Appendix 2: DRAFT Application Form
Appendix 3: Systems Compliance and Reporting Requirements for Small Community Water Providers
Appendix 4: Small Community Sampling Grid
Appendix 5: DRAFT Domestic Alternate Water Supply Recommendations

More Information:

Water Unit
Environmental Health Directorate
Department of Health
PO Box 8172
PERTH BUSINESS CENTRE WA 6849

Telephone: 08 9388 4999
Facsimile: 08 9388 4910

Printed on: 30 April 2009

S:\EHD\Water Quality\Projects\Alternative Water Guidelines\Alternate Water Supply Guidelines - Internal Consult Copy 121208.doc

Produced by Environmental Health Directorate

DRAFT Model Alternate Water Quality Management Plan

1 General information

1.1 Use of this model as a guide

You are required to provide an 'Alternate Water Quality Management Plan' for **EACH** water source that you intend to utilise (for example, one for rainwater, one for stormwater, etc). Each of the following sections much be addressed in relation to your water source.

1.2 System Layout

Provide the address of the system and a layout diagram for the system. The following must be indicated on the layout diagram:

- Types of water sources (rainwater, stormwater, etc);
- Location where the water is harvested/abstracted;
- Storage apparatus;
- Treatment apparatus;
- Reticulation network; and
- System schematic layout.

1.3 Duty of care holder

Provide the contact details for the personnel (organization and staff member(s)), whom have the duty of care to provide safe water for the intended purposes.

1.4 Water users

Provide details of what the water will be used for (end-uses such as irrigation, flushing toilets, laundry taps, etc).

Provide details of the population using the water and that may be exposed to the water both pre and post-treatment.

Outline the scope of the contractual agreement (if any).

2 Alternate water supply system information

2.1 Water harvesting / abstraction sources and methods

Provide details on the point sources of alternate water harvesting/abstraction, source identification codes, method of harvesting/abstraction and the estimated volume of water that will be harvested /abstracted.

2.2 Storage system

Provide the following details on the storage system:

- Details of storage tank;
- Security (accessibility to public);
- Turnover time;
- Properly sealed? (accessibility to animals/insects);
- Maintenance; and
- Structure soundness (Australian Standards compliance).

2.3 Treatment system

Provide details of the treatment system that will be used to treat the water based on the quality of water required for the end use. Discuss the validation of treatment efficacy to remove contaminants from raw water. Include details of alternative treatment systems and/or contingency plans that will be used in an event of primary treatment system failure.

An initial raw water quality assessment of the assessable characteristics is required (Refer to Small Community Model Assessable Sampling Grid). Refer to Section 4.

2.4 Distribution/reticulation network

Map out the zones of the distribution/reticulation system for the different types of water.

Demonstrate mechanisms in place to keep the water away from human contact, backflow prevention mechanisms and contingency plans to avoid cross-contamination.

2.5 Systems operation

Describe briefly the systems operation from source to distribution/reticulation.

2.6 Operational monitoring and maintenance

Provide details on the operational monitoring and maintenance of all the major apparatus within the drinking water system. Provide the following details:

- Availability of operational monitoring and maintenance manual / procedures / checklists;
- Personnel in-charge of operational monitoring and maintenance; and
- Operational monitoring and maintenance frequencies.

2.7 System operators competency

Provide details on the competency of personnel that will operate the system.

2.8 Materials and Substances in contact with alternate water

Ensure all chemicals, products and any substances that come in contact with the water are compliant with the relevant standards or DoH approved (see Appendix B for relevant AS/NZS Standards).

3 Catchment/sources

3.1 Map of catchment/source collection area

Provide a map of the catchment area. The map should indicate the following items:

- Area where the water is harvested/collected;
- Extent of the recharge area;
- Hydrological flow;
- Location of risks (possible sources of contamination); and
- Catchment protection zones.

3.2 Risk assessment of catchment area/sources

Provide details of the risk assessment of the catchment area identifying all the possible sources of contamination that can be introduced into the system. The following items must be included in the assessment:

- Risks;
- Hazards;
- Management priority (High, Medium, Low);
- Consideration for management;
- Current preventative measures; and
- Recommended protection strategies.

3.3 Catchment monitoring and maintenance

Provide the details on how the catchment area/sources will be monitored and maintained to ensure the detection and removal of any contamination.

4 Monitoring requirements

Refer to the "Small Community Model Assessable Sampling Grid" for the requirements for the ongoing monitoring program.

Before the system is approved, a full assessment of all the characteristics listed on the sampling grid needs to be reviewed by the Department of Health. Exemptions for some characteristics can be given if objective evidence can demonstrate the negligibility of risk for the characteristics. Remember that where two or more water sources or end-uses are involved, the highest risk factors decide the necessary procedures and monitoring requirements.

5 Incidence response procedure

A risk assessment needs to be conducted on the system as well as the catchment. The system risk assessment should include all possible incidences that will affect the water quality. The following items should be addressed in the incidence response procedure:

- Incident giving rise to hazard;
- Possible causes;
- Consequences;
- Risk (Likelihood and consequence);
- Response action and Personnel in-charge;
- Reporting protocols; and
- Preventative measures.

6 Reporting requirements

Refer to the "Systems Compliance and Routine Reporting Requirements for Small Community Water Providers" publication. Your reporting requirements vary largely depending on water sources and end-uses.

7 More information

For more information is available from:

Water Unit
Environmental Health Directorate
Department of Health
PO Box 8172
PERTH BUSINESS CENTRE WA 6849

Telephone: (08) 9388 4999

Last updated: 16 October 2008

Government of **Western Australia**
Department of **Health**

DRAFT APPLICATION FOR APPROVAL OF AN ALTERNATE WATER REUSE SCHEME

Please attach this application form to your submission and post to:

The Manager
Water Unit
Environmental Health Directorate
Department of Health
PO Box 8172
Perth Business Centre WA 6849

Phone: 08 9388 4999
Facsimile: 08 9388 4910

TYPE OF ALTERNATE WATER SYSTEM INSTALLATION

THIS APPLICATION IS FOR: *(Please tick appropriate boxes)*

A new scheme

An extension to existing scheme

Upgrading of existing scheme

Roofwater

Stormwater

APPLICATION DETAILS

NAME OF SCHEME: _____

_____

DESCRIPTION OF SCHEME FOR APPROVAL:

_____

_____

_____

_____

ADDRESS / LOCATION OF PROPOSED SCHEME

Township or Suburb: _____

Local Government: _____

Location of Alternate Water Supply: _____

_____

_____

Location of Alternate Water Storage: _____

_____

_____

Location of Irrigation/ End-uses Areas:

_____

_____

_____

_____

APPLICANT DETAILS

Applicant name: _____ Contact: _____

Address: _____

_____

Phone: _____ Fax: _____

Email: _____Mob No.: _____

OWNER DETAILS

Owner name: _____ Contact: _____

Address: _____

_____

Phone: _____ Fax: _____

Email: _____Mob No.: _____

SUPPLIER(S) DETAILS

1. Supplier name: _____ Contact Person:_____

Address: _____

_____

Phone: _____ Fax: _____

Email: _____Mob No.: _____

2. Supplier name: _____ Contact Person: _____

Address: _____

_____

Phone: _____ Fax: _____

Email: _____Mob No.: _____

3. Supplier name: _____ Contact Person: _____

Address: _____

_____

Phone: _____ Fax: _____

Email: _____Mob No.: _____

OPERATOR(S) DETAILS
(Person/s responsible for scheme operation and maintenance)

1. Operator name: _____

Contact Person:_____

Duties/responsabilities:_____

_____

Level of training/competencies:_____

_____

Address: _____

_____

Phone: _____ Fax: _____

Email: _____Mob No.: _____

2. Operator name: _____

Contact Person:_____

Duties/responsabilities:_____

_____

Level of training/competencies: _____

_____

Address: _____

_____

Phone: _____ Fax: _____

Email: _____Mob No.: _____

SAMPLER(S) DETAILS

1. Sampler name: _____

Contact Person: _____

Level of training/qualifications_____

_____

Address: _____

_____

Phone: _____ Fax: _____

Email: _____Mob No.: _____

2. Sampler name: _____

Contact Person: _____

Level of training/qualifications_____

_____

Address: _____

_____

Phone: _____ Fax: _____

Email: _____Mob No.: _____

APPLICATION REQUIREMENTS

Alternate Water schemes are assessed in accordance with the ***"DRAFT Alternate Water Supply Guidelines for Western Australia"***. These have been devised to comply with the National Water Quality Management Strategy documents ***"Australian Guidelines for Water Recycling: Managing Health and Environmental Risks" (Phase 1) 2006*** and ***"Australian Guidelines for Water Recycling: Stormwater Harvesting and Reuse" (Phase 2) 2008*** as published by the Natural Resource Management Ministerial Council, Environmental Protection and Heritage Council and the Australian Health Ministers Conference, November 2006 and in 2008 respectively.

The ***"Australian Guidelines for Water Recycling: Managing Health and Environmental Risks" (Phase 1) 2006*** and the ***"Australian Guidelines for Water Recycling: Stormwater Harvesting and Reuse" (Phase 2) 2008*** are referred to throughout this document as the 'National Guidelines' and are available from the Environment Protection and Heritage Council website http://www.ephc.gov.au/ephc/water_recycling.html

Alternate water schemes now require the development of a Water Quality Management Plan (WQMP) as per the National Guidelines. In order to apply for the approval of an Alternate water scheme, applicants will need to develop a WQMP based on the attached model (see Appendix 1).

Department of **Health**
Government of **Western Australia**

SYSTEMS COMPLIANCE AND ROUTINE REPORTING REQUIREMENTS FOR SMALL COMMUNITY WATER PROVIDERS

Emergency Reporting Protocols

Routine Reporting Format

Summary of Reporting Requirements

Routine Reporting Periods

Model Reporting Format

1. Emergency Reporting Protocol

Small community water providers are expected to notify the Department of Health in accordance with the following table:

Emergency Reporting Event	Report Due	Report to
• Any thermotolerant coliform (or E.coli) result that exceeds 5 cfu/100ml. • Any thermophilic *Naegleria* tolerant to 42ºC including repeats. • Any pesticide result that exceeds the health value; • Any benzo[a]pyrene concentration greater than 50% of the WHO Guidelines Value but less than of equal to 100% of the WHO Guideline Value. • Any barrier breach such as a disinfection system failure or physical intrusion into or breach of the supply and distribution system. • Any change or event within the water catchment area that may have an imminent effect upon water quality. • Any other drinking water quality incident that the Water Provider considers could represent a public health risk.	**Level 1 Immediate notification by fax, phone or electronic mail.**	**Senior Policy Officer, Water Quality Branch 93884999 (if not available during working hours to the Emergency Duty Officer 94804960)**
• Any thermotolerant coliform count greater than 0 cfu/100mL • Any health related chemical result that exceeds the health guideline value; • Any microbiological result that brings a locality into non-compliance with the rolling annual assessment criteria as set out in the agreed quality management system. • Any repeat sample showing the presence of thermotolerant coliforms. • Any pesticide result that is greater than or equal to 50% of the health value. • Any benzo[a]pyrene concentration greater than the ADWG Health Value but less than of equal to 50% of the WHO Guideline Value • Where the estimated annual radiation dose from radionuclide analysis of radium-226 and radium-228 exceeds 0.5 mSv • Any turbidity result that is greater than 5 NTU, where there is no filtration or clarification and no alternative source.	**Level 2 To be reported within 24 hours by fax or electronic mail**	**Electronic mail to DWAlert@health.wa.gov.au Or Fax to Senior Policy Officer Office of Water Quality 93828119**

2. Routine Reporting Format

The 2004 Australian Drinking Water Guidelines provide the basis for the reporting protocol to the Department of Health. Model reporting formats (Appendix 1) should be read in conjunction with the summary of reporting requirements.

3. Summary of Reporting Requirements

Report No.	Report Title	Page Number	Quarterly	Annually
Administration				
1	Sample Cover Page	i	✓	✓
2	Water Provider Information	1	✓	✓
3	System Information	1	✗	✓
4	Performance Summary	2	✓	✓
Microbial Performance - (Rolling 12 Months Ending)				
5	Microbiological - Exception Notifications	3	✓	✗
6	Microbiological - Compliance By Region/Scheme/Zone/Service Provider (Summary)	4	✓(1)	✓(2)
7	Microbiological - Performance Community Specific	4	✓	✓
8	Microbiological - Charts By Region/Scheme/Zone/Service Provider	5	✓(1)	✓(2)
9	Microbiological Incident Specific Information	6	✓	✗
Chemical - Health Related Performance				
10	Chemical - Health Related - Exception Notifications	7	✓	✗
11	Chemical - Health Related	7	✓	✓ (3)
Chemical - Aesthetic Performance				
12	Chemical - Aesthetic - Charts	8	✓	✓
13	Chemical - Aesthetic - Incident Specific Information	8	✓	✗
Radiological Performance				
14	Radiological - Exception Notifications	9	✓	✗
15	Radiological Performance	9	✓	✓
Sampling				
16	Planned Sample Report	(5)	✗	✓(5)
17	Planned Sample Summary	10	✗	✓
18	Planned Sample Exceptions	10	✓	✓
19	General Notes/Other News	11	✓	✓(4)

Notes:
(1) Rolling twelve month.
(2) Calender Year.
(3) Compilation of quarterly.
(4) Overall trends and performance statements.
(5) Contact DoH for further details

Sections may be subdivided as required. You may include any explanatory text, graphical or tabular representations in addition to those attached that you feel are required to assist the presentation of your report.

4. Routine Reporting Periods

4.1. Quarterly Reports to the Department of Health

Quarterly reports are based upon the quarterly planned sample program cycle. The reports are required within 4 weeks following the designated date for the quarterly planned samples.

4.2. Annual Reports to the Department of Health

Annual reports are based upon a calendar year. Annual reports should be provided to the Department of Health within 8 weeks following the designated date for the annually planned samples.

5. Reporting To

All reports should be sent to either:

Senior Policy Officer
Water Quality Branch
Department of Health
PO Box 8172
PERTH BUSINESS CENTRE WA 6849

Or electronically to

Richard.Theobald@health.wa.gov.au

6. More Information

For additional information regarding the interpretation or implementation of the Australian Drinking Water Guidelines or this reporting protocol please contact:

Mr Richard Theobald
Senior Policy Officer
Water Quality Branch
Department of Health
Ph 08 9388 4967
Fax 08 9388 4910
Richard.Theobald@health.wa.gov.au

Sample Cover Page

Logo

Report to the Department of Health

by the

Insert Name of Water Authority

for the period

Day Month Year to *Day Month Year*

Contents

1.0 WATER PROVIDER INFORMATION 1

1.1 System Information 1

2.0 PERFORMANCE SUMMARY 2

3.0 MICROBIAL PERFORMANCE - (ROLLING 12 MONTHS ENDING) 3

3.1 Microbiological - Exception Notifications 3

3.2 Microbiological - Compliance by Region/Scheme/Zone/Service Provider (Summary). 4

3.3 Microbiological - Performance Community Specific 4

3.4 Microbiological - Charts by Region/Scheme/Zone/Service Provider 5

3.5 Microbiological Incident Specific Information 6

3.5.1 **Region/Scheme/Zone** A 6

3.5.2 **Region/Scheme/Zone** B 6

4.0 CHEMICAL - HEALTH RELATED PERFORMANCE 7

4.1 Chemical - Health Related - Exception Notifications 7

4.2 Chemical - Health Related 7

5.0 CHEMICAL - AESTHETIC PERFORMANCE 8

5.1 Chemical - Aesthetic - Chart 8

5.2 Chemical - Aesthetic - Incident Specific Information 8
5.2.1 **Region/Scheme/Zone** A 8
5.2.2 **Region/Scheme/Zone** B 8

6.0 RADIOLOGICAL PERFORMANCE 9

6.1 Radiological - Exception Notifications 9

6.2 Radiological Performance 9

7.0 PLANNED SAMPLE SUMMARY 10

7.1 Planned Sample Exceptions 10

8.0 GENERAL NOTES/OTHER NEWS 11

1.0 Water Provider Information

Water Provider Contact Details			
Name of Company			
Company Address			
Company Phone		Fax	
Company Email			
Chief Executive Officer			
CEO Email			
DoH Liaison Officer			
DoH Liason Officer Email			

1.1 System Information

Water Provider (Annual Report)						
Locality/Scheme/Service Provider						
Zone Name	Number of Consumers	Average amount of Water Supplied (l/day)	Sources of Water (%Bore/Surface catchment)	Treatment Systems	Length of Mains	Number of Sample points

Notes
(1) Table may be expanded or collapsed according to the number of zones or subdivided to show regions, schemes or service providers

Catchment Details

Distribution System

2.0 Performance Summary

Water Quality Meeting the Drinking Water Guidelines/Minister of Health's Directions						
	Locality/Scheme/Service Provider [1]			Locality/Scheme/Service Provider		
Microbiological Quality[4]	No Assessed [2]	No Within Guidelines	Variance [3]	No Assessed	No Within Guidelines	Variance
Thermotolerant Coliforms/Ecoli						
Amoeba (Thermophilic Naegleria)						
Chemical Quality[5]						
Chemical – Health related[7]						
Chemical – Aesthetic[8]						
Radiological						

Notes
(1)Table may be expanded or collapsed according to the number of localities or service providers
(2) Number of zones in each locality/scheme or service provider
(3) Number of zones that do not comply with the drinking water guidelines.
(4) Microbiological performance is based on a rolling twelve (12) months.
(5) Chemical performance is based on the results of the quarter.
(6) A zone only complies when all analyses for all samples comply with the Guidelines.
(7) See Chemical – Health related – List of chemicals
(8) See Chemical – Aesthetic – List of Non- health related chemicals and properties.

3.0 Microbial Performance - (Rolling 12 Months ending)

3.1 Microbiological - Exception Notifications

Microbiological Water Quality Exceptions							
Region/Scheme/Zone/ Service Provider	Population served	Date	Microbiological Characteristic	MoU Alert Level	Remedial Action	DoH Notified	Close Out Date

3.2 Microbiological - Compliance by Region/Scheme/Zone/Service Provider (Summary).

Region/ Scheme/ Zone	Number of bacteria samples	Thermotolerant Coliforms		Number of amoebae samples	Naegleria tolerant to ≥ 42°C		Naegleria fowleri	
		Failures	% Compliance		Failures	% Compliance	Failures	% Compliance
A								
B								
Total								

NOTES:

1 Microbiological data must contain information on total coliforms, thermotolerant coliforms and Naegleria to 42°C.

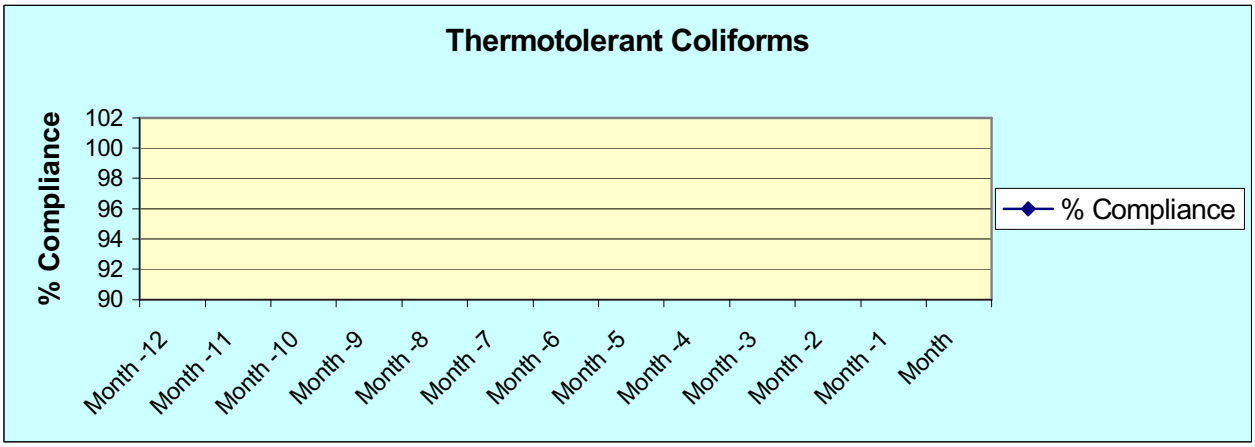
2 Microbiological compliance figures must be calculated for the rolling 12 months to the end of each month for each Region/Scheme/Zone; Thermotolerant Coliforms and Naegleria ≥ 42°C.

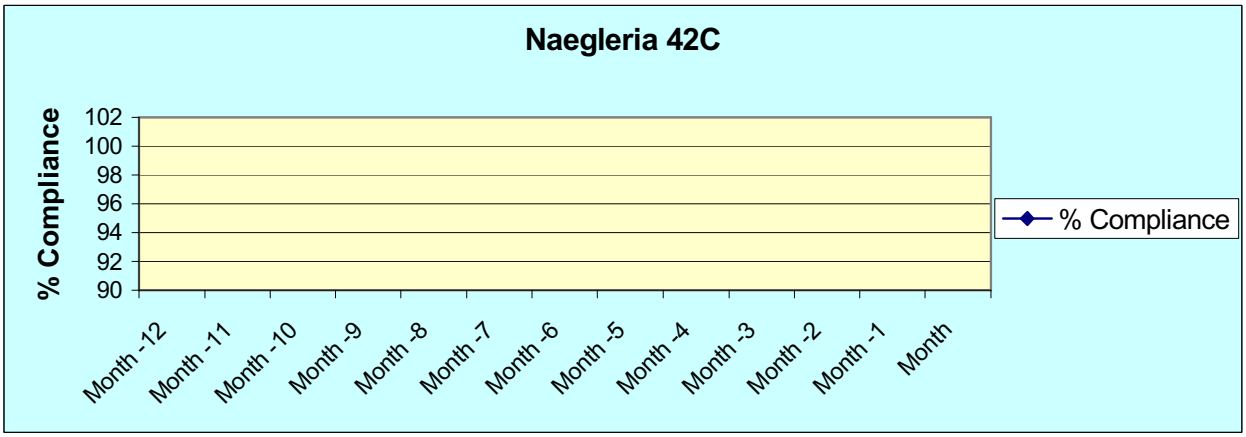
OR

3.3 Microbiological - Performance Community Specific

Community Name	Disinfection Type	No. of Bacteria samples	Thermotolerant Coliforms		No. of Amoeba Samples	Naegleria to >= 42C	Naegleria Fowleri	TTC 12 Mth Roll. Avg. (%)		
			Non Comply	% Comply				Month -2	Month -1	Month

3.4 Microbiological - Charts by Region/Scheme/Zone/Service Provider





Notes for all charts

(1) All results displayed are to be on a rolling twelve (12) month basis to the end of each respective month.

(2) Compliance target must be shown

3.5 Microbiological Incident Specific Information

3.5.1 **Region/Scheme/Zone** A

(Insert text)

3.5.2 **Region/Scheme/Zone** B

(Insert text)

4.0 Chemical - Health Related Performance

4.1 Chemical - Health Related - Exception Notifications

Health Related Chemical Water Quality Exceptions							
Region/Scheme/Zone/ Service Provider	Population served	Date	Health Related Chemical Characteristic	MoU Alert Level	Remedial Action	DoH Notified	Close Out Date

4.2 Chemical - Health Related

Text interpretation by Region/Scheme/Zone of results presented.

5.0 Chemical - Aesthetic Performance

Text interpretation by Region/Scheme/Zone of results presented on

5.1 Chemical - Aesthetic - Chart

Region/Scheme/Service Provider			
Aesthetic Characteristic	No of Analyses	No of Analyses Complying	% Compliance
Aluminium 0.2 mg L			
Chloride 400 mg L			
Colour 15 HU			
Hardness 500 mg L			
Iron 0.3 mg L			
Manganese 0.1mg L			
pH <6.5			
pH >8.5			
Sodium 300 mg L			
Sulphate 400 mg L			
TFSS 1000 mg L			
Turbidity 5 NTU			
Total samples taken			

Notes
(1) Repeat table according to the number of region, schemes or service providers.
(2) Record analyses for the reporting quarter.
(3) Specify method of assessment (either 1987GDWQA or 1996ADWG or 2004 ADWG)

5.2 Chemical - Aesthetic - Incident Specific Information

5.2.1 **Region/Scheme/Zone** A
(Insert text)

5.2.2 **Region/Scheme/Zone** B
(Insert text)

6.0 Radiological Performance

6.1 Radiological - Exception Notifications

Radiological Water Quality Exceptions							
Region/Scheme/Zone/ Service Provider	**Population served**	**Date**	**Radiological Characteristic**	**MoU Alert Level**	**Remedial Action**	**DoH Notified**	**Close Out Date**

6.2 Radiological Performance

Scheme/Service Provider	
Region	% samples within range

Notes
(1) Table may be expanded or collapsed according to the number of regions.

7.0 Planned Sample Summary

Region/ Scheme/ Zone	**Microbiological**			**Chemical**			**Radiological**			**Fluoride**		
	Planned	Taken	% Taken	Planned	Taken	% Taken	Planned	Taken	% Taken	Planned	Taken	% Taken

7.1 Planned Sample Exceptions

Planned Sample Exceptions				
Region/ Scheme/ Zone	Sampling Point	Date Due	Characteristic (Microbiological/Chemical/Radiological)	Reason for missed sample

8.0 General Notes/Other News

This section can include reference to specific programs for maintenance, new additions to the scheme supply or report format or discussion on ongoing problems.

Small Community
Model Assessable Sampling Grid

Definitions:

"Source water sample point"	is water in a storage reservoir, river, stream or underground source;
"Treated water"	is water entering a distribution system after disinfection or clarification,
"Distribution water sample point"	refers to water in the distribution system, but at points well into the distribution system where off-take to consumers has occurred;
"Distribution water sample point"	means water representative of that supplied to consumers and is normally monitored by the water authority outside the consumer's property from a service pipeline directly off the main selected to represent the quality of water supplied to the consumer. Some specific investigations eg. leaching of metals by corrosive water will require sampling from consumer's taps;
"Consumer water sample point"	refers to the point of use within the consumer's property, for example, the kitchen tap.
"Key characteristic"	is identified when either microbiological, chemical or radiological quality levels can be expected to or have exceed maximum recommended levels as stated in the drinking water guidelines.
"Normal characteristic"	is defined by a stable microbiological, chemical or radiological quality measurement that is below the maximum recommended level

				Sampling Frequency								
				Key Characteristic				Normal Characteristic				
Category	**Characteristic**	Health	Aesthetic	Source Water Sample Point (XXX)	Treated Water Sample Point (XXX)	Distribution Water Sample Point (XXX)	Consumer Water Sample Point (XXX)	Source Water Sample Point (XXX)	Treated Water Sample Point (XXX)	Distribution Water Sample Point (XXX)	Consumer Water Sample Point (XXX)	**Comments on Sampling frequency**
Micro-organisms	Thermotolerant coliforms (or E. coli)	98% nil		Weekly			Weekly	Monthly			Monthly	
	Amoeba *(Naegleria fowleri)*	95% nil					Weekly				Monthly	
Physical Characteristics	Dissolved oxygen	.	>85%			Monthly				6 monthly		
	Hardness	.	200mg/l		Quarterly				6 Monthly			
	pH	.	6.5-8.5			Fortnightly				6 Monthly		
	Taste and odour		acceptable to majority				6 Monthly				Annually	
	Temperature	.	no value				6 Monthly				6 Monthly	Assessable frequency shown. Consideration should be given to more frequent operational monitoring.
	Total dissolved solids	.	500mg/l		Quarterly				6 Monthly			
	True colour	.	15HU			Monthly				6 Monthly		
	Turbidity	.	5 NTU			Monthly				6 Monthly		
1. Inorganic Chemicals Disinfection Agents and Inorganic By-products of Disinfection	Chlorine (free)	5	0.6				Weekly				Monthly	
	Trihalomethanes	0.25	.				Monthly				6 Monthly	
1. Organic Chemicals Disinfection By-products A	Chloroacetic Acid	0.15					Monthly				6 Monthly	Normal frequency may be extended to annually if compliance demonstrated.
	Dichloroacetic Acid	0.1					Monthly				6 Monthly	
	Trichloroacetic Acid	0.1					Monthly				6 Monthly	
	2-chlorophenol	0.3	0.0001				Monthly				6 Monthly	
	2,4-dichlorophenol	0.2	0.0003				Monthly				6 Monthly	
	2,4,6-trichlorophenol	0.02	0.002				Monthly				6 Monthly	
	Trichloroacetaldehyde (chloral hydrate)	0.02					Monthly				6 Monthly	
2. Other Inorganic Chemicals	Aluminium (acid-soluble)	.	0.2			Weekly				6 Monthly		
	Ammonia (as NH4)	.	0.5			Monthly				6 monthly		
	Antimony	0.003	.				Quarterly				Annually	
	Arsenic	0.007	.	Quarterly				Annually				
	Asbestos	.	.			Annually				2 Yearly		
	Barium	0.7	.	Quarterly				Annually				
	Beryllium	.	.	Annually				2 Yearly				
	Boron	4	.	Quarterly				Annually				
	Cadmium	0.002	.				Quarterly				Annually	
	Chloride	.	250		Quarterly				Annually			
	Chromium (as Cr(VI)))	0.05	.			Quarterly				Annually		
	Copper	2	1				Monthly				Annually	
	Cyanide	0.08	.			Monthly				Annually		
	Fluoride	1.5	.		Quarterly				Annually			
	Hydrogen sulfide	.	0.05			Monthly				6 Monthly		
	Iodide	0.1		Annually				2 Yearly				Six monthly may be extended to annually if compliance demonstrated.
	Iron	.	0.3				Fortnightly				6 Monthly	
	Lead	0.01					Monthly				Annually	
	Manganese	0.5	0.1			Fortnightly				6 Monthly		
	Mercury	0.001	.	Quarterly				Annually				
	Molybdenum	0.05	.	Quarterly				Annually				
	Nickel	0.02	.				Quarterly				Annually	
	Nitrate	50	.			Monthly				Annually		
	Nitrite	3	.			Monthly				Annually		
	Selenium	0.01	.	Quarterly				Annually				
	Silver	0.1	.	Annually				2 Yearly				
	Sodium	.	180		Quarterly				6 Monthly			
	Sulfate	500	250		Quarterly				6 Monthly			
	Tin	.	.	Annually				2 Yearly				
	Uranium	0.02	.	Annually				2 Yearly				
	Zinc	.	3				Monthly				Annually	
Organic Compounds Treatment Organics (other than Disinfection By-Products)	Acrylamide	0.0002			Quarterly				Annually			
	Carbon tetrachloride	0.003			Quarterly				Annually			
Organic Compounds Industrial Hydrocarbons 1 (other than Disinfection By-Products)	Benzene	0.001	.	Annually				2 Yearly				
	Chlorobenzene	0.3	0.01	Annually				2 Yearly				
	Dichlorobenzenes 1,2-dichlorobenzene (1,2-DCB)	1.5	0.001	Annually				2 Yearly				
	Dichlorobenzenes 1,3-dichlorobenzene (1,3-DCB)	.	0.02	Annually				2 Yearly				
	Dichlorobenzenes 1,4-dichlorobenzene (1,4-DCB)	0.04	0.0003	Annually				2 Yearly				
	Dichloroethanes 1, 1 -dichloroethane	.	.	Annually				2 Yearly				
	Dichloroethanes 1,2-dichloroethane	0.003	.	Annually				2 Yearly				
	Dichloroethenes 1, 1 -dichloroethene (1,1 -DCE)	0.03	.	Annually				2 Yearly				
	Dichloroethenes 1,2-dichloroethene (1,2-DCE)	0.06	.	Annually				2 Yearly				
	Dichloromethane (methylene chloride)	.	.	Annually				2 Yearly				
	Epichlorohydrin	0.0005	.		Annually			2 Yearly				
	Ethylbenzene	0.3	0.003	Annually				2 Yearly				
	Ethylenediamine tetraacetic acid (EDTA)	0.25	.	Annually				2 Yearly				Normal sample frequency dependant upon catchment management monitoring program
	Hexachlorobutadiene	0.0007	.	Annually				2 Yearly				
	Nitrilotriacetic acid (NTA)	0.2	.	Annually				2 Yearly				
	Styrene (vinylbenzene)	0.03	0.004	Annually				2 Yearly				
	Trichlorobenzenes (total)	0.03	0.005	Annually				2 Yearly				
	1,1,1 -Trichloroethane	.	.	Annually				2 Yearly				
	Vinyl chloride	0.0003	.	Annually				2 Yearly				
Organic Compounds Industrial Hydrocarbons 2 (other than Disinfection By-Products)	Organotins dialkyltins	.		Annually				2 Yearly				
	Organotins tributyltin oxide	0.001		Annually				2 Yearly				
	Plasticisers di(2-ethylhexyl) phthalate (DEHP)	0.01					Annually				2 Yearly	
	Plasticisers di(2-ethylhexyl) adipate (DEHA)	.					Annually				2 Yearly	
	Polycyclic aromatic hydrocarbons (PAHs) Benzo-(a)-pyrene	0.00001	.				Annually				2 Yearly	
	Toluene	0.8	0.025			Annually				2 Yearly		
	Xylene	0.6	0.02			Annually				2 Yearly		
Organic Compounds (other than Disinfection By-Products)	Tetrachloroethene	0.05	.	Annually				2 Yearly				
	Trichloroethylene (TCE)	.	.	Annually				2 Yearly				
Pesticides	Aldrin (and Dieldrin)	0.00001	0.0003	Monthly							Annually	
	Amitrole	0.001	0.01	Monthly							Annually	
	Atrazine	0.0005	0.02	Monthly							Annually	
	Chlordane	0.00001	0.001	Monthly							Annually	
	Chlorfenvinphos		0.01	Monthly							Annually	
	Clopyralid	1	1	Monthly							Annually	
	2,4-D	0.0001	0.03	Monthly							Annually	
	DDT	0.00006	0.02	Monthly							Annually	
	Dieldrin (and Aldrin)	0.00001	0.0003	Monthly							Annually	
	Diquat	0.0005	0.005	Monthly							Annually	
	Diuron		0.03	Monthly							Annually	
	Endosulfan	0.0005	0.03	Monthly							Annually	
	Fosamine		0.3	Monthly							Annually	Normal sample frequency dependant upon catchment management monitoring program. If detected or likely to be used in catchment revert to key frequencies.
	Glyphosate	0.01	1	Monthly							Annually	
	Heptachlor	0.00005	0.0003	Monthly							Annually	
	Hexachlorobenzene	0.001		Monthly							Annually	
	Hexazinone	0.002	0.3	Monthly							Annually	
	Lindane	0.00005	0.02	Monthly							Annually	
	Molinate	0.0005	0.005	Monthly							Annually	
	Organophosphates			Monthly							Annually	
	Paraquat	0.001	0.03	Monthly							Annually	
	Pentachlorophenol	0.00001	0.01	Monthly							Annually	
	Picloram		0.3	Monthly							Annually	
	Propiconazole	0.0001	0.1	Monthly							Annually	
	Simazine	0.0005	0.02	Monthly							Annually	
	Temephos	0.3	0.3	Monthly							Annually	
	Triclopyr		0.01	Monthly							Annually	
Radiological Characteristics	Gross Alpha	0.1 Bq/l		Biennually				2-5 Yearly				Sample frequency dependant upon bore or surface source.
	Gross Beta	0.5 Bq/l		Biennually				2-5 Yearly				

Government of **Western Australia**
Department of **Health**
Public Health

Recommendations on Domestic, In-House Alternate Water Use

Alternate water is water that is not post-human use (such as grey, yellow or black water), nor derived from the main scheme supply. It is most commonly sourced from rainwater, roofwater, and stormwater (with some niche projects such as desalinisation and condensation becoming increasingly popular).

From a Public Health perspective, the use of alternate water supplies within a domestic, in-house situation only poses a risk to the owner/operators of the system, and is therefore exempt from licensing and regulation. However, a domestic in-house situation must meet the following requirements to avoid public health risk:

- Avoid cross-connection with the main scheme potable water supply. If you are going to plumb in an alternate water (third pipe) supply and connect it to the main potable scheme supply, you MUST install backflow prevention devices and have all the plumbing in accordance with the appropriate Australian Standard (AS 3500).
- Ensure that irrigation of the garden or greenspaces does not 'pond' and create pools of water which can attract mosquitoes.
- Ensure that excess water from irrigation does not runoff/discharge outside of the property's borders.
- The water must be obtained from within the property's boundaries. There is legislation preventing the diversion of waterways (stormwater drains, roof runoff) in public spaces.

On top of these requirements, the following recommendations should be considered when utilising alternate water:

- Stormwater is highly variable in quality. It is only really safe to use (untreated) for sub-surface irrigation of non-edible crops (lawns and ornamentals).
- If obtaining stormwater, do not use the water from the driveway. Stormwater that is obtained from accessways for motorised vehicles is high in hydrocarbons. Utilise pedestrian garden paths, basketball courts and other surfaces.
- Do not use alternate water in the kitchen where you prepare food. The health risk is greater here than for use in the laundry or toilet flushing.
- Use sub-surface irrigation or direct drippers for gardens to prevent aerosolisation of the water droplets.
- Ensure that any bore-water sources are clear of debris, compost and pesticide use.
- Ensure that roof surfaces being used to collect roofwater are free of debris, overhanging branches and corrosion. Obtaining water from surfaces with chimneys, flues or air-conditioning outlets should also be avoided.