

# Alternate and Recycled Waters

Water Unit



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

# When Should Alternate Water Resources be Used?



The use of non-drinking water:

- Should not:

- Present a risk to public health- can it be reliably managed in the long term?

- Lead to an increase in the overall amount of water used - i.e. maintain the water balance.

- But should:

- Reduce the demand for drinking water supply.

- Increase the volume of urban water that is recycled and reused.

- Deliver cost-effective solutions that take account of environmental and social factors.

- Be sustainable.

- Available and secure for the long-term.

- Only be provided when it can be demonstrated to deliver a net benefit to the community.



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# Health Impact

- Water-related diseases:

*Waterborne* - directly from drinking contaminated water (ingestion exposure). E.g.: cholera, enteric fevers and diarrhoeal diseases.

*Water-washed* - indirectly by coming into contact with contaminated water (dermal exposure). E.g.: scabies, typhus, trachoma, louse infestation, Leishmaniasis, and amoebic meningitis from swimming pools.

*Water-based* - where a vector (aquatic organisms that spend part of their life-cycle in water and another part as parasites of animals) enters the intestines through contaminated drinking water and infection occurs internally (ingestion exposure). E.g.: Schistosomiasis and Dracunculiasis (guinea worm disease).

*Water-related* - mosquito vector-borne exposure.

E.g.: malaria, dengue fever and Ross River virus.



# Definitions



- Drinking Water  
water intended primarily for human consumption, either directly (tap), indirectly (beverages, ice, or foods) and other domestic purposes (bathing and showering)
- Sewage  
Sewage, nightsoil, faecal matter or urine and any waste composed wholly or in part of liquid. (grey, yellow, black, wastewater. Ex-human use.
- Recycled Water  
From sewage (including greywater, yellow, black and industrial wastewater) treated to provide fit for purpose water for its beneficial use.
- Alternate Water  
Roofwater, urban stormwater, borewater. Not Drinking water, not sewage, not ex-human use.
- Communal use  
Water service to more than one house, one family (sole occupancy), 6 persons\* or a single lot.



# Legislation

- Health Act 1911

- Drinking water

- Pollution of a Water Supply

- Closure of water supply

- Sewage/recycled water.

- Provides for Sewerage Schemes and connection/disposal requirements

- Head of power for design construct and install or apparatus

- Alternate water

- as a source for drinking water

- Construction and maintenance of drains

- drainage of stagnant water & low lying land

- Stormwater to be allowed its natural channel



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# National Water Quality Guidelines

NWQMS Policies & Principles (1994)

Groundwater Protection (1995)

Water Quality  
Monitoring (2000)

Fresh and Marine  
Water Quality (2000)

Drinking Water (2004)

Water Recycling - Phase 1 (2006)  
Water recycled from effluent, greywater

Water Recycling - Phase 2 (2007/8)

Recycled Water  
for Drinking (2a)

Managed Aquifer  
Recharge (2c)

Storm Water (2b)



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# Australian Guidelines for Water Recycling



- Phase 1 - using recycled water as a replacement for drinking water, surface and ground water but not addition. (Completed & endorsed by Min for Health)
- Phase 2 a/b/c - planned addition of either treated stormwater or sewage to augment drinking water supplies. Into: River, Stream, Reservoir or Aquifer to be abstracted, retreated and supplied as drinking water. (Completed & endorsed by Min for Health)
- Unplanned addition is covered by the 2004 Australian Drinking Water Guidelines.



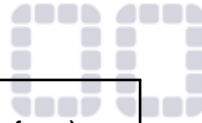
# Alternate Water



- Not just Phase 2b Stormwater
- Roofwater, urban stormwater, borewater. (ASR, ASTR, WSUD)
- DoH is not immediately interested in single residential owner consumer use.
- DoH is interested in single residential collection, treatment systems design & build.
- DOH is interested in communal systems.
- Phase 1 and/or 2 ('Lite plus' risk version)







Source Uses	Rainwater (Roof Runoff)			Groundwater (Superficial Aquifers)			Stormwater (Roads/Impermeable Surfaces)		
	Health Risks Infection route	Single House	Public Use	Health Risks Infection route	Single House	Public Use	Health Risks Infection route	Single House	Public Use
<b>Potable Application s:</b> <b>Drinking water, shower, bath, basins, troughs, pools, evaporative air conditioner s.</b>	Dermal, nasal, oral Microbiologic al infecti on Poisoning	Like: Possib le Cons: Moder ate Risk: <b>High</b> <u><b>Note 1, 2</b></u>	Like: Possib le Cons: Major Risk: <b>Extrem e</b> <u><b>Note 3</b></u>	Dermal, nasal, oral Microbiologic al infectio n Poisoning	Like: Possib le Cons: Major Risk: <b>Extrem e</b> <u><b>Note 1, 4</b></u>	Like: Possib le Cons: Major Risk: <b>Extrem e</b> <u><b>Note 3</b></u>	Dermal, nasal, oral Microbiologic al infecti on Poisoning Potential carcin ogens	Like: Almost certain Cons: Major Risk: <b>Extrem e</b> <u><b>Do not use</b></u>	Like: Almost certain Cons: Major Risk: <b>Extrem e</b> <u><b>Do not use</b></u>
<b>Industrial use with potential human exposure</b>	Dermal, nasal Infection Microbiologic al infecti on	N/A	Like: Unlikely Cons: Moder ate Risk: <b>Moder ate</b> <u><b>Note 5, 6</b></u>	Dermal, nasal Microbiologic al infectio n Poisoning	N/A	Like: Possib le Cons: Moder ate Risk: <b>High</b> <u><b>Note 5, 9</b></u>	Dermal, nasal Microbiologic al infecti on Poisoning Potential carcin ogens	N/A	Like: Likely Cons: Major Risk: <b>Extrem e</b> <u><b>Note 5, 7, 11</b></u>
<b>Industrial use with no human exposure - closed systems:</b>	Dermal Microbiologic al infecti on	N/A	Like: Unlikely Cons: Minor Risk: <b>Low</b> <u><b>Note 6, 8, 10</b></u>	Dermal Microbiologic al infectio n	N/A	Like: Unlikely Cons: Minor Risk: <b>Low</b> <u><b>Note 8, 10</b></u>	Dermal Microbiologic al infecti on	N/A	Like: Possib le Cons: Moder ate Risk: <b>High</b> <u><b>Note 7, 8, 10</b></u>
<b>Non-potable application s:</b> <b>Washing machine, spray irrigation, garden tap.</b>	Dermal, nasal Microbiologic al infecti on	Like: Unlikely Cons: Minor Risk: <b>Low</b>	Like: Possib le Cons: Minor Risk: <b>Moder ate</b>	Dermal, nasal Microbiologic al infecti on	Like: Unlikely Cons: Minor Risk: <b>Low</b>	Like: Possib le Cons: Minor Risk: <b>Moder ate</b>	Dermal, nasal Microbiologic al infecti on	Like: Possib le Cons: Moder ate	Like: Likely Cons: Moder ate Risk: <b>High</b>

# Standard Requirements for Schemes

- Risk Identification (HACCP) & Catchment Management.
- Alternate/Recycled Water Quality Management Plans.
- AS 3500 Compliance.
- Plumber/Operator competency/training.
- Failsafe systems/backflow prevention devices.
- Monitoring, management, maintenance and response systems.
- Distribution system maintenance.
- Crossover responsibility/contracts.
- Community Information packages (ongoing).



# Alternate Water Approval No 1

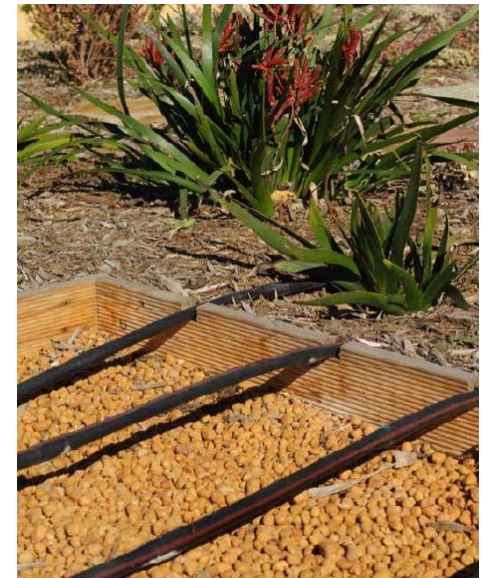
- Brighton
  - Centrally managed sub soil irrigation system (no CI)
  - Water abstracted from the Leederville aquifer
  - Water Corporation operated
  - Health Risk Management Plan

Catchment controls required

DoH notification when:

E.Coli +

Chemical (health) above 2004 ADWG



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# Alternate/Recycled Water Schemes

- Brighton (A)
- Kwinana Wastewater Recycling Plant (R)
- Hopetown (R)
- Somerville Eco Village (A)
- Evermore (A)
- Banksia Grove (A)
- Leighton Beach (A)
- BHP Finucane Island (R)
- Margaret River (R)
- China Green Subiaco (R)
- Armadale Redevelopment Authority (A/R ?)
- WAMIA Livestock (A)
- Witchcliffe (R)
- Gracetown (R)
- Fremantle x2 (A)
- Peppermint Grove Library (A/R)
- Bishops See (R)
- Durack House (R)

A= Alternate. R= Recycled



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# Other Thoughts



- Recycled/alternate water is a resource not a waste.
- It has value - but who owns it and who gains?  
E.g. Could/should suppliers be paid based on production of “waste water”?
- Will there be competition for supplies? Are supplies secure?
- Catchment Management requirements?
- Water balance - Climate change?
- Risk - (one mans risk is another's dare)



# Other thoughts



- Steady supply/delivery may be required for or limited by equipment/services.

Long term variations (reductions) due to future product efficiency gains may not be possible.

Commercial users of treated waste water may close suddenly. Are classic sewers & ocean outfalls still required?

- Do you need a plumber or an irrigator?
- Is there a budget for the lawnmower?



# Challenge for DoH (& Government)

- Diffuse supply systems - variety of (small) systems & uses located throughout the community.
- Varying levels of initial & ongoing operator competency/capacity to protect public health.
- Difficult to determine long term capability for start up organizations. Water supply systems sustainability.
- Novel systems usually add complexity / potential to fail.
- Reliance on alternate water systems that may not be controlled by Government but may still fall back in the event of collapse.
- Diminished capacity of 'classic systems' to supply or remove water.
- Increased standards, public knowledge, expectation & outrage in the event of failure.
- Inter agency definitions.



# More information

- [www.public.health.wa.gov.au](http://www.public.health.wa.gov.au)

Draft Alternate Water Supply Guidelines – Stormwater and Rainwater

Draft Guidelines for the Use of Recycled Water in Western Australia

- [www.ephc.gov.au](http://www.ephc.gov.au)



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