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Water reuse guideline

For food businesses in NSW considering reusing water

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Definitions

Adequate supply of water[1]	Potable water that is available at a volume, pressure and temperature that is adequate for the purposes for which the water is used
Blackwater[2]	Wastewater from a toilet or bidet
Direct reuse	Wastewater from a food premises that is reconditioned to meet the *Australian Drinking Water Guidelines* for potable water and is reused within the food premises
Food business[3]	A business, enterprise or activity that involves: (a) the handling of food intended for sale, or (b) the sale of food, regardless of whether the business, enterprise or activity concerned is of a commercial, charitable or community nature or whether it involves the handling or sale of food on one occasion only
Greywater[2]	Includes the household wastewater of baths, showers, basins, laundries and kitchens (including food waste)
Handling of food[3]	Includes the making, manufacturing, producing, collecting, extracting, processing, storing, transporting, delivering, preparing, treating, preserving, packing, cooking, thawing, serving or displaying of food
Industrial wastewater[2]	Wastewater derived from industrial sources or processes (in this case wastewater from a food business)
Indirect reuse	Recycled water discharged directly into groundwater or surface water with the intent of reusing (eg for irrigation)
Potable water[1]	Water that is acceptable for human consumption
Reconditioning[4]	The treatment of water intended for reuse by means designed to reduce or eliminate microbiological, chemical and physical contaminants, according to its intended use
Recycled water[2]	Water taken from industrial wastewater and treated to a level suitable for its intended use
Sewage[2]	Wastewater from greywater and blackwater sources

Definitions taken from:
[1] *Australia New Zealand Food Standards Code - Standard 3.2.2 - Food Premises and Equipment*
[2] *Management of Private Recycled Water Systems. (*Department of Water and Energy, 2007)
[3] *NSW Food Act 2003*
[4] *Proposed draft guidelines for the hygienic reuse of processing water in food plants* (Codex, 2001)

Unsuitable food[3]	Food that: (a) is damaged, deteriorated or perished to an extent that affects its reasonable intended use, or (b) contains any damaged, deteriorated or perished substance that affects its reasonable intended use, or (c) is the product of a diseased animal, or an animal that has died otherwise than by slaughter, and has not been declared by or under another Act to be safe for human consumption, or (d) contains a biological or chemical agent, or other matter or substance, that is foreign to the nature of the food.
Validation[2]	Validation testing assesses whether a recycled water scheme will meet the water quality compliance values
Verification[2]	Verification testing confirms that a system is meeting the water quality compliance values. Once a treatment system has undergone verification testing and met water quality compliance requirements, the water treatment system can be commissioned

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1. Scope

These guidelines are intended for any food business in NSW considering reusing water and explains what the NSW Food Authority will require a businesses to demonstrate.

Any reuse of water must be limited to industrial wastewater from a food production process only. The reuse of blackwater (sewage wastewater) will not be permitted in a food business[5].

These guidelines cover the requirements under food-related legislation only, it is the responsibility of a business to ensure compliance with all regulatory requirements, such as may be required under local planning, environmental or water authority regulations. Food businesses are encouraged to contact these agencies for further information and expertise.

These guidelines align with the validation and verification requirements of the *Australian Guidelines for Water Recycling* (NRMMC, EPHC and AHMC, 2006) and NSW Department of Water and Energy's *Management of Private Recycled Water Systems – Interim NSW Guidelines* (DWE, 2007). While the scope of both documents does not necessarily address the direct reuse of water in a food business, the basic concepts presented in those guidelines are considered applicable for use by a business considering reusing water.

[5] Food businesses are able to use recycled reticulated (town) water supply, provided it has been treated to drinking water quality and has been approved by the relevant water authority for use as drinking water.

2. Guiding principles for water reuse

A food business must demonstrate that the reuse of water will not affect food safety, or the hygiene and sanitation of the food processing area.

Standard 3.2.3 - Food Premises and Equipment of the *Food Standards Code* requires a food business to use potable (drinking quality) water, or else use water in a manner that will not jeopardise the safety and suitability of the food (see Appendix 1). The NSW Food Authority requires businesses to adhere to the following principles when considering reusing water:

- All reuse of water by a NSW food business must comply with the *Food Act 2003* in that it will not adversely affect the safety or suitability of the food handled by the business.
- In addition to not adversely affecting the safety of the food, the reuse of water should not adversely affect the suitability or quality attributes (flavour, colour, texture) of the food product.
- All reused water must be safe for its intended use and must not jeopardise the safety of the product through the introduction of chemical, microbiological or physical contaminants in amounts that represent a risk to the consumer.
- All water reuse by a NSW food business must comply with the requirements of the *Food Standards Code* such that all water used in food businesses must be of a potable standard (drinking water quality). Otherwise, the businesses must be able to demonstrate that the use of non-potable water will not adversely affect the food causing the food to become unsafe or unsuitable.
- Any food business intending to reuse water must apply the principles of Hazard Analysis Critical Control Point (HACCP) and risk assessment to implement appropriate control measures to address the identified hazards.
- A food business must have adequate safeguards in place to ensure that non-potable water cannot be reused (unless previously demonstrated that it is safe to do so), and must have adequate verification measures in place to ensure appropriate reconditioning of wastewater. There should be no physical connection between the potable and non-potable water supply.
- Where a food business reconditions industrial wastewater to a potable standard through the application of appropriate technology for direct reuse, the business must use a multiple barrier approach (ie utilise more than one treatment process to ensure that if one step fails at least one other treatment step will control the identified hazard). The business must provide evidence of adequate validation of treatment methods in accordance with the validation guidelines specified in this document.
- Where reuse of water is for areas of direct contact with food, the record keeping and monitoring systems for the water treatment system must be incorporated into the business's Food Safety Program. The food business must ensure that regular independent audits are made on the suitable operation of the wastewater treatment system.

3. How water can be reused

3.1 Indirect reuse of water

Indirect reuse of water involves discharging treated wastewater into a receiving body such as a reservoir or holding pond. This water may then be re-treated for use within a premises. The advantage to indirect reuse is that the receiving waters may act as a significant control measure through:

- dilution, provided that contaminant levels in the receiving water are lower than those in the recycled water,
- additional treatment through natural processes,
- additional time.

3.2 Direct reuse of water

Direct reuse involves treating or reconditioning wastewater for direct reuse within a premises. Food businesses considering this form of reuse must, at a minimum, meet the following requirements:

- Exclude human sewage (blackwater) from the wastewater to be treated,
- No physical connection between the potable and non-potable water supply,
- Follow HACCP principles for identifying hazards, implementing control measures and validating and verification of Critical Control Points (CCPs),
- Use a multiple barrier approach (ie utilise more than one treatment process to ensure that if one step fails at least one other treatment step will control the identified hazard),
- Have access to a potable water supply in case of failure with the wastewater treatment system,

Treated water must be suitable for its intended use, according to the three basic types of direct water reuse:

- in direct contact with food (eg washing of fresh produce),
- on food contact surfaces (eg cleaning of conveyors), and
- on non food contact areas, (eg cleaning outside areas and in cooling towers).

3.3 Reuse of water in direct contact with food

Where a food business is considering reusing water in direct contact with food, the food safety requirements will be stringent. The water must be of potable quality, to ensure the safety and suitability of the food is not jeopardised and the risk of contamination is minimal. This does not restrict the possibility of a food business implementing technology to recondition their industrial wastewater. All water used in direct contact with food (whether reconditioned or not) must be potable (drinking quality) water as defined in the *Australian Drinking Water Guidelines* (NHMRC & NRMMC, 2004) for microbiological, chemical and physical properties (see Appendix 2).

3.4 Reuse of water on food contact surfaces

The same stringent standards will be applied to the reuse of water on food contact surfaces. The use of non potable water could potentially contaminate the surface, which in turn could lead to cross contamination of the food which comes into contact with the surface. Therefore, all reused water must be of potable quality, as defined in the *Australian Drinking Water Guidelines* (NHMRC & NRMMC, 2004) for microbiological, chemical and physical properties (see Appendix 2), before it can be used on food contact surfaces.

3.5 Reuse of water in non food contact areas

Where water will be reused on non food contact areas, there is less risk for this practice to lead to contamination of food. The *Food Standards Code* allows for the use of non-potable water in a food business, in situations where it will not jeopardise the safety and suitability of the food. Examples where non-potable water could be used include:

- Cleaning of non food contact surfaces (eg outside environment, loading docks, transport vehicles, animal holding yards etc.),
- Water for flushing toilets,
- Cooling towers and evaporative coolers.

4. Determining applications for water reuse

A food business considering reusing water will need to make an application to the NSW Food Authority. The *Protocol for Alternative Procedures and New Technology Approvals* must be completed with all relevant details and submitted to the Authority for consideration.

The Protocol is available by contacting the NSW Food Authority's Consumer and Industry Helpline on 1300 552 406.

The NSW Food Authority will determine the proposal to reuse water from each food business separately. The Authority will look at:

- the adequacy of the water treatment risk assessment and hazard identification,
- where the reused water will be in direct contact with food or food contact surfaces, the adequacy of the wastewater treatment to recondition the water to a potable standard,
- the adequacy of the validation of the wastewater treatment, and the verification monitoring carried out before the system is implemented,
- the adequacy of the ongoing operational monitoring of the water treatment system,
- the adequacy of the proposed corrective action, and
- the adequacy of the incorporation of the water treatment system into a Food Safety Program, including hazard identification and the establishment of Critical Control Points (CCPs) and critical limits.

4.1 Risk assessment process

A food business considering reusing water must conduct a risk assessment. The hazard identification and risk assessment process will help identify the significant risks that may be present in the water. This will dictate the type of wastewater treatment required to recondition the water to a safe and suitable quality for its intended use. The implementation of Hazard Analysis Critical Control Point (HACCP) principles will identify the appropriate control measures for the identified hazards. In addition, it will help to identify which operational parameters will need to be monitored to check the system is working correctly.

A food businesses must undertake a comprehensive risk assessment to identify the potential hazards associated with the reuse of water on their premises

The risk assessment must cover any potential hazards to human health, such as:

- Chemical hazards
  - Veterinary and agricultural chemicals, pharmaceutical, hormones and antibiotics
  - Processing aids such as water treatment additives, disinfectants and disinfection by-products and cleaning chemicals
- Microbiological hazards
  - Bacterial pathogens, viruses and parasites
- Physical hazards to the treatment processes
  - Temperature, turbidity, pH, high organic load

More help on how to perform a risk assessment for water reuse can be found in the *Australian Guidelines for Water Recycling* (Phases 1 and 2).

4.2 Validation of a wastewater treatment system

A food business considering reconditioning (treating) wastewater for reuse will be required to enlist expert assistance in the implementation and validation of wastewater treatment technology.

The wastewater treatment system must provide the level of reconditioning appropriate for the intended water reuse

To ensure that appropriate water treatment systems are selected, a validation process will need to be developed to determine whether the proposed treatment technologies/systems will perform effectively. The validation process should be fully documented, including all procedures for sampling and testing.

Food businesses must utilise a multiple barrier approach to ensure the wastewater treatment is fully effective. As stated in the *Australian Guidelines for Water Recycling,* no single barrier is effective against all conceivable hazards or is completely effective all of the time. Multiple barriers protect against variations in performance of individual barriers.

Validation of a treatment system must include all components of the process, such as treatment technology, balancing tanks, storages, online monitoring and disinfection. Where several water treatments are used in combination, the assumptions and manufacturer specifications for each piece of equipment and each barrier need to be validated for each system to prove that it is effective when combined in the complete system. Further details on methodology of validation and verification for water treatment systems can be obtained from the *Management of Private Recycled Water Schemes - Interim NSW Guidelines* (DWE, 2007) and *Australian Guidelines for Water Recycling (Phase 2).*

Validation must also include a review of the process flow diagram used in the risk assessment against the actual treatment system to ensure all potential hazards and CCPs have been

identified. A re-validation may be required where there are changes to the influent quality, system design and/or technology that may affect the performance of the water treatment system.

Where water treatment systems have been validated, verification testing *in-situ* (see *Verification of a wastewater treatment system* below) is required once the system is commissioned. During both the validation and verification testing periods, the water must not be reused and must go direct to sewer or some other use where the business can demonstrate that it will not affect the safety and suitability of the food.

4.3 Verification of a wastewater treatment system

Verification needs to be carried out to make sure that the water treatment system is performing as planned, and meeting the water quality compliance values. The *Management of Private Recycled Water Schemes - Interim NSW Guidelines* (DWE, 2007) suggest that verification testing of water quality parameters should be undertaken *in-situ* (once the system has been installed) for a minimum of four (4) weeks.

Verification of the water treatment system will assess the overall performance of the treatment scheme, including the operational and limits at the CCPs, and the ultimate quality of the reconditioned water. System-specific verification is essential as variability in influent water quality may have a large impact on the efficacy of the treatment system.

For guidance, Appendix 3 outlines the minimum recommended monitoring requirements for the validation and verification of water treatment systems. Once the water treatment system has successfully undergone verification testing and met the guideline levels for potable water (or as required for its intended use), the system can be fully commissioned and the water reused in the food business.

4.4 Ongoing operational monitoring requirements for a wastewater treatment system

Wastewater treatment systems require a high standard of operation, monitoring and control to maintain the high quality of the end product.

Ongoing operational monitoring of the water treatment system is required to ensure the reconditioned water quality is maintained and the safety and suitability of the food is protected

The frequency of monitoring and testing are dictated by factors such as the quality of the influent water and intended reuse of the water. Where water is reconditioned to a potable quality for use in direct contact with food or food contact surfaces, this will require a greater level of reconditioning (and therefore more frequent monitoring and testing to ensure the water is safe) than reuse on non food contact surfaces.

The risk assessment and application of HACCP will have identified appropriate CCPs for water quality parameters. The target operating range and critical limits for each variable of the treatment process (eg flow rate, pressure, chlorine residual, etc.) should be specified so that

the system will recondition the water to the appropriate standard. The method, location, and frequency for each of the proposed monitoring parameters should be clearly specified in the operational monitoring plan.

Appendix 4 outlines the recommended ongoing operational monitoring requirements for water treatment systems. Over time the sampling frequencies may be reduced based on a satisfactory historical record.

Results consistent with the compliance values should be produced for all operational monitoring. Where guideline values are exceeded, corrective action must be taken and sampling frequencies should be increased. Where sample results are collected from an online sampler, a schedule of online calibrations should be developed and records of the calibration kept.

It is essential that all staff involved in the design, management, operation, monitoring and audit of a wastewater treatment system have sufficient knowledge and skills to carry out their role

Appropriately trained personnel should collect all water quality samples. A National Association of Testing Authorities (NATA) accredited laboratory should be used to carry out all analyses[6].

4.5 Corrective action for a wastewater treatment system

If the ongoing operational monitoring shows that an operational or critical limit is not being met, then the potential exists for the water treatment system to be producing water that is not of a potable quality and not suitable for use.

The system should be designed such that untreated or partially treated wastewater cannot bypass the treatment system and go direct to the point of use. When treated water may be temporarily unsuitable or unavailable, an alternative source (eg the reticulated town water supply) should be made available to avoid disruption to the food production line. There should also be a method of disposal (eg sewer) for unsuitable water, that is approved by the local water authority and Department of Environment and Climate Change (DECC).

Proper maintenance of the wastewater treatment system is critical to avoid having the system become a source of contamination

[6] Laboratories are accredited by NATA for specific methods and can be found using the NATA website at www.nata.asn.au/

4.6 Incorporation of the wastewater treatment system into a Food Safety Program

A food business considering reusing water must demonstrate to the Authority that they have applied HACCP principles and taken appropriate risk management strategies to control the identified hazards. All elements of a wastewater treatment system must be incorporated into a Food Safety Program for the business, including the establishment of Critical Control Points (CCPs) and critical limits, and the ongoing operational monitoring plan.

Regular independent audits must be made on the suitable operation of a wastewater treatment system

For food businesses licensed with the Authority, the wastewater treatment elements of the Food Safety Program may be subject to regular audit by the Authority, in accordance with the normal audit schedule. For food businesses not licensed with the Authority, the business must ensure that periodic audits are carried out by an independent third party auditor.

5. Contact details for water reuse expertise

Food businesses are referred to the appropriate agency for expert advice on water treatment, as the expertise in water treatment systems lay outside the NSW Food Authority. Food businesses must ensure that they comply with all legal requirements (eg planning requirements of Local Council)

Department of Water and Energy (DWE)

Level 17, 227 Elizabeth Street

Sydney NSW 2001

Phone: (02) 8281 7777

Email: information@dwe.nsw.gov.au

Web: www.dwe.nsw.gov.au

Sydney Water – Every Drop Counts (EDC) Business Program

Sydney Water

PO Box 53

Sydney South NSW 1235

Phone: 1800 661 161

Email: EDCBusiness@sydneywater.com.au

Web: www.sydneywater.com.au

NSW Health

PO Box 798

Gladesville NSW 2111

Phone: (02) 9816 0589

Email: nswhealth@doh.health.nsw.gov.au

Web: www.health.nsw.gov.au

Australian Quarantine and Inspection Service (AQIS)

The reuse of water in export registered facilities is regulated by the Australian Quarantine and Inspection Service (AQIS). Water reuse proposals are currently being considered on a case-by-case basis. In export meat premises, the use of "potable recycled water on food and food contact surfaces without the need for a final non-reconditioned water rinse" has been approved for meat to be exported to the USA. AQIS is currently drafting a notice on '*Efficient use of water in export meat establishments*", which includes details on verification and validation.

6. References and further reading

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NSW Health (2007). *Private Water Supply Guidelines*. NSW Health - available for download at www.health.nsw.gov.au

NRMMC, EPHC and AHMC (2006). *Australian Guidelines for Water Recycling: Managing Health and Environmental Risks (Phase 1).* Natural Resource Management Ministerial Council, Environmental Protection and Heritage Council and Australian Health Ministers' Conference - available for download at www.ephc.gov.au

NRMMC, EPHC and AHMC (2008). *Australian Guidelines for Water Recycling: Managing Health and Environmental Risks (Phase 2 – Augmentation of drinking water supplies).* Natural Resource Management Ministerial Council, Environmental Protection and Heritage Council and Australian Health Ministers' Conference - available for download at www.ephc.gov.au

WHO (2004). *Guidelines for Drinking–water Quality.* 3rd Edition, Volume 1. World Health Organisation, Geneva. - available for download at www.who.int/en/

Appendix 1 – *Food Standards Code* requirements

Standard 3.2.2 - Food Premises and Equipment of the *Food Standards Code* requires the following:

4. Water supply

(1) Food premises must have an adequate supply of water if water is to be used at the food premises for any of the activities conducted on the food premises.

(2) Subject to subclause (3), a food business must use potable water for all activities that use water that are conducted on the food premises.

(3) If a food business demonstrates that the use of non-potable water for a purpose will not adversely affect the safety of the food handled by the food business, the food business may use non-potable water for that purpose.

Editorial note:

The *Australian Drinking Water Guidelines* 1996, as amended, of the National Health and Medical Research Council and the Agriculture and Resource Management Council of Australia and of New Zealand (ARMCANZ) may be used by food businesses and authorised officers for guidance concerning what constitutes acceptable water.

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Appendix 2 – Guideline values for water supplies

Microbiological parameters

- ***E. coli*** **(not detected in a 100mL sample)**
    - Used to indicate the presence of faecal contamination
    - This is a requirement in the *Australian Drinking Water Guidelines* (2004)
- **Cyanobacteria**
    - If there is a suspicion of Blue Green Algae (cyanobacteria) contamination, water should be tested.

For each of these parameters, levels should be **below or equal to** the corresponding *Australian Drinking Water Guidelines (2004)* value.

Physical Parameters

For each of these parameters, levels should be **below or equal to** the corresponding *Australian Drinking Water Guidelines (2004)* value (or for pH, **between** 6.5 and 8.5):

Aesthetic characteristics	***Australian Drinking Water Guidelines (2004)* value**
These factors may cause taste or odour complaints in your water or may lead to corrosion or the formation of scale.	
pH	**6.5 - 8.5**
A pH of 7 is neutral, greater than 7 is alkaline, and less than 7 is acidic. Drinking water with increased acidity (pH less than 6.5) can corrode plumbing fittings and pipes. Apart from the damage caused, this can release harmful metals such as lead or copper. Drinking water with increased alkalinity (pH greater than 8.5) can lead to encrustation of plumbing fittings and pipes. A pH greater than 11 may cause corrosion. **A pH greater than 8.0 can decrease the efficiency of chlorine.**	
Total dissolved solids (TDS)	**500 mg/L**
Dissolved material, usually salts, in the water supply can affect the water's taste. It can also develop scale on the inside of plumbing fittings and pipes, or lead to excessive corrosion.	
Total hardness	**200 mg/L**
Hard water can contribute to the formation of scale in hot water pipes and fittings, and makes lathering of soap difficult. Hardness is the measure of calcium and magnesium in the water and comes from the dissolving of these materials from soil and rocks.	
Turbidity	**5 NTU (less than 1 NTU desirable)**
Turbidity is the measure of muddiness or cloudiness of water. It indicates the amount of suspended solids present in the water. This can affect the taste of the water and can make the water look dirty. It can also reduce the efficiency of chemical and UV disinfection. Unusual increases in turbidity can indicate a disturbance in the water supply system.	

Notes:

1. Some laboratories will also provide tests for aluminium, chloride, iron, sodium and zinc, which are of less health concern but have an influence on water quality.
2. Monitoring for additional parameters may be required depending on the presence of particular materials or industrial activities in the catchment.

Chemical parameters

A comprehensive risk assessment must be undertaken to identify potential contaminants in the source water.

Health-based Characteristics	***Australian Drinking Water Guidelines (2004)* value**
Antimony	**0.003 mg/L**
Antimony is a metal that can be harmful in high concentrations. Its harmful effects are limited at lower concentrations. It is rare in source waters, but may leach from antimony solder or be deposited in pollution from smelters.	
Arsenic	**0.007 mg/L**
Arsenic is a harmful element. Long term consumption of water with a high arsenic concentration (greater than 0.3 mg/L) has been shown to increase the likelihood of skin cancers and other diseases. Arsenic is found in soil and rocks, but is also released by the burning of fossil fuels, and in drainage from old gold mines and some types of sheep dip.	
Cadmium	**0.002 mg/L**
Cadmium is a toxic metal that, in cases of long exposure, can cause kidney problems. Cadmium may enter water supplies from impurities in the zinc of galvanised metal, from solders, or from some fertilisers.	
Chromium	**0.05 mg/L**
Chromium is a toxic heavy metal, which can cause cancers. Chromium is found in small amounts in most rocks and soils, and has been used in many industrial processes.	
Copper	**2 mg/L**
Copper is a common metal that can cause ill effects (nausea, abdominal pain and vomiting) in some people. Copper can be found in many rocks and soils, and is also frequently used in plumbing.	
Fluoride	**1.5 mg/L**
Fluoride is important for preventing dental decay, but can also be poisonous at high concentrations. It is found naturally in rocks, and is sometimes present in industrial air pollution.	
Lead	**0.01 mg/L**
Lead is a toxic heavy metal. It may enter a water supply from natural sources or from lead plumbing, solder, or roof flashings.	
Nickel	**0.02 mg/L**
Long term exposure to nickel can cause kidney problems. Nickel may enter water supplies from coal-fired power stations or in small concentrations from nickel-plated tap and plumbing fittings.	
Nitrate **Nitrite**	**50 mg/L** **3 mg/L**
Excessive nitrate or nitrite in water can lead to 'blue baby syndrome' in infants fed with formula made up using the water. The decomposition of organic wastes such as manure can introduce nitrate to water supplies. Nitrite is only likely to be present in water that has not been aerated.	
Aesthetic characteristics	***Australian Drinking Water Guidelines (2004)* value**
These factors may cause taste or odour complaints in your water or may lead to corrosion or the formation of scale.	
Manganese	**0.1 mg/L**
Although poisonous at higher concentrations, the guideline level for manganese is set to avoid an undesirable taste and staining of laundry and plumbing fittings. Manganese is likely to enter water supplies from natural sources or from contaminated sites.	
Sulfate	**250 mg/L**
Although harmful at higher concentrations, the guideline level for sulfate ions is set to avoid an undesirable taste in water. Under some conditions it can also contribute to corrosion of plumbing fittings. Sulfate at levels greater than 500mg/L can have purgative effects. Sulfate ions are likely to enter water supplies from natural sources. The highest concentrations are likely to be seen in groundwater.	

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Appendix 3 – Minimum requirements for validation and verification monitoring

NOTE - The monitoring frequencies described in Appendix 3 and 4 are the minimum required. Food businesses will need to customise their monitoring frequencies to reflect the source of the water, associated hazards and control measures and the end use of the reconditioned water

Reuse of water in direct contact with food or food contact surfaces

End use of water	Parameter	Compliance value	Influent monitoring frequency	Effluent monitoring frequency
Direct contact with food, or Used on food contact surfaces **Exposure risk level = HIGH**	*E. coli*	Not detected in 100 mL	Weekly	2 times / week
	Biological Oxygen Demand (BOD)	< 10 mg/L	Not required	2 times / week
	SS	< 10 mg/L	Not required	2 times / week
	Turbidity	< 1 NTU (95%)[7] < 5 NTU (max)	Continuous online (or weekly)	Continuous online
	pH	6.5 – 8.5	Continuous online (or weekly)	Continuous online
	Disinfection	Chlorine: 0.2 – 2.0 mg/L residual[8]	N/A	Continuous online

Adapted from *Management of Private Recycled Water Systems – Interim NSW Guidelines* (DWE, 2007)

[7] NTU = nephelometric turbidity units. Limit must be met prior to disinfection
[8] Total chlorine residual after a minimum contact time of 30 minutes.

Appendix 4 – Minimum requirements for operational monitoring

Reuse of water in direct contact with food or food contact surfaces

End use of water	Parameter	Compliance value	Monitoring frequency	Audit frequency
Direct contact with food, or Used on food contact surfaces **Exposure risk level = HIGH**	*E. coli*	Not detected in 100 mL	Weekly	Audit required every 12 months
	Turbidity	< 1 NTU (95%) < 5 NTU (max)	Continuous online	
	pH	6.5 – 8.5	Continuous online	
	Disinfection	Chlorine: 0.2 – 2.0 mg/L residual	Continuous online	

Reuse of water on non food contact areas

End use of water	Parameter	Compliance value	Monitoring frequency	Audit frequency
No direct contact with food or food contact surfaces **Exposure risk level = MEDIUM**	*E. coli*	< 10 cfu/100 mL	Monthly	Audit required every 3 years
	Turbidity	< 5 NTU (95%)	Continuous online	
	pH	6.5 – 8.5	Continuous online	
	Disinfection	Chlorine: 0.2 – 2.0 mg/L residual	Continuous online	

Adapted from *Management of Private Recycled Water Systems – Interim NSW Guidelines* (DWE, 2007)

NOTE: If operational monitoring shows values exceeding those listed above, this must be investigated and corrective action taken and documented.

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