Background

Water Carting

*Safe Drinking Water Act 2011*

Standard Drinking Water Risk Management Plan

Under the *Safe Drinking Water Act 2011* (the Act) water providers are required to develop and submit a drinking water Risk Management Plan (RMP). The aim of the RMP is to ensure that safe drinking water is provided to customers.

The development and on-going review of a RMP helps water providers identify hazards and associated risks that may be present in the water supply. A RMP also documents strategies to reduce, eliminate and/or manage the risk and contains a monitoring plan to ensure that the risk management strategies are working.

Section 12 of the *Safe Drinking Water Act 2011* requires the development, implementation and regular review of Risk Management Plans (RMP) by water suppliers. Section 13 of the Act provides further detail on what information must be included in the RMP and this includes:

* A detailed description of the system of supply
* Identification of risks to the quality of the water and risks that may be posed by the water quality
* An assessment of the identified risks
* How these risks will be managed including the development and implementation of preventative strategies
* Monitoring and testing requirements associated with the quality of the water (the Monitoring plan)
* Incident identification, notification and response procedures (Incident identification and notification protocol)
* Maintenance schedules

**Monitoring plans and incident identification and notification protocols must be provided to the Department for Health and Ageing (DHA) for approval.**

This Standard RMP template has been designed for use by water carters who receive water from a mains water supplier such as SA Water, or provide their own drinking water supply such as a bore or rainwater. Carting of untreated surface water is not recommended and for further advice please contact the Water Quality Unit on 8226 7100.

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How to use this document

This document is a standard drinking water risk management plan (RMP) for a water carting business. A number of water sources are covered including:

* Water from another water supplier such as SA Water (Mains water including desalinated water)
* Rain water
* Bore water

Other sources of water, such as surface water, are not included in this template and for further advice on preparing RMPs for these sources contact the Water Quality Section.

If you already have existing documentation available for your business, such as delivery log books and/or Standard Operating Procedures for cleaning, these may be used in place of corresponding sections in this template. Otherwise each section in this document should be filled out.

If your business only uses one water source delete the other sources of water from the document. If your business uses multiple sources of water each of these needs to be addressed.

This document satisfies the minimum requirements of the Act. Please note that while all the information in this document is important, only components of the sections below need to be filled out.

**Please notify the Water Quality Unit that you are using this document.**

Document control and review

Regular review of RMPs is a requirement under section 12 of the Act. Regular review is an important part of the risk management process as it allows any changes that may have occurred with the system to be captured. The RMP should be reviewed on a minimum annual basis or more frequently if required.

Under Regulation 9(1) the RMP includes all documents relied on in the implementation of the RMP, such as operating manuals and standard operating procedures. Copies of previous RMPs as well as any documentation related to or generated as part of the plan (such as inspection reports, incident reports and notifications, water quality test results) must be kept for at least 5 years as per Regulation 9(5).

|  |  |
| --- | --- |
| Prepared by |       |
| Date prepared |       |
| Version number |       |
| Next revision date |       |

Key contacts

Business Details

List relevant contact details as provided in the drinking water provider registration form in the table below. Regulation 9(1)(a) requires that any changes to the full name and contact details of the drinking water provider must be recorded in the table below within 14 days of the change being made.

Note: any changes/updates to this information must be forwarded to the Department for Health and Ageing.

|  |  |
| --- | --- |
| Business name |       |
| Contact person |       |
| Contact details e.g. Phone numbers, email, website |       |
| Address |       |
| Operator (responsible person) (if different from above) |       |
| Operator contact details |       |

Incident reporting

Contact the Department for Health and Ageing:

Water Quality Unit

Phone: 1300 558 657

Fax: 8226 7102

Email: waterquality@health.sa.gov.au

Incident reporting forms are available on the SA Health website:

[www.sahealth.sa.gov.au/safedrinkingwateract](http://www.sahealth.sa.gov.au/safedrinkingwateract)

Other contacts (if applicable)

|  |  |
| --- | --- |
| **Name** | **Phone Number** |
| Local Council Name:      |       |
| Water Testing LaboratoryName:      |       |
| Water Treatment CompanyName:      |       |
| Tank Cleaning CompanyName:      |       |

Section 1: Description of system

Water source

List the water source used. If there are multiple sources please record a description for each one. Sources could include: mains (including SA Water supply or other registered water provider), rain, bore, other or a combination.

|  |  |
| --- | --- |
| Type(s) of water: |       |
| Mains water supplier (if mains water is used): |       |

Flow diagram (system description)

For mains water supplies please list the location of the extraction points used and the name of the water supplier (eg SA Water).

If the water is collected from a privately owned supply, provide a description of the water supply system (a flow chart) including infrastructure such as pumps, storage tanks, treatment (if any), pipelines and sample points. If multiple sources are used (e.g. bore and mains water) each source needs to be listed. Additional pages may be used as required.

|  |
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|  |

Water cart information

Provide a description including details of the water tank, volume, fittings used and compliance with relevant standards such as use of materials with drinking water.

Best practice would include clearly marking the tank with the words “Drinking Water”.

Tanks and surfaces that come into contact with water including fittings should be constructed of food grade materials, be able to be fully drained, have an access point for cleaning, be fitted with appropriate backflow devices and have an inspection point.

|  |
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Section 2: Management of drinking water supply

There are a number of hazards and risks that have the potential to affect the quality and safety of carted drinking water. Appropriate preventative measures are required to reduce the likelihood of occurrence and the impacts on the users of the supply.

Hazardous events, risks and preventative measures are identified in the tables below. The type of hazard, either health or aesthetic, are defined. Please note that an aesthetic hazard will affect the physical characteristics such as the taste or odour while a health hazard affects the safety of the water.

The General water carting hazards and risks table (below) applies to ALL water carting businesses, regardless of the source of water. If you are using rain or bore water please include the additional tables (on pages 12 to 16) as applicable.

General water carting hazards and risks (including mains water supply)

| **Hazardous event** | **Hazard type –Aesthetic or Health** | **Risk** | **Preventative Measure** |
| --- | --- | --- | --- |
| Poor source water quality | Health or Aesthetic | Aesthetic or health issues | * Only use water from a registered water provider or from a supply that has been shown to meet ADWG
 |
| No chlorine residual in water supply | Health | Reduced protection from recontamination during transport | * Measure chlorine residual in supply (if mains water supply) and add additional chlorine if required
 |
| Too much chlorine added to water during chlorination | Health | Irritation of skin and mucous membranes | * Measured the amount of chlorine prior to adding to the water and measure residual prior to delivery to customer
 |
| Contamination of mains water during filling | Health | Illness due to ingestion of harmful pathogens | * Install appropriate backflow prevention device on tank
 |
| Contamination of drinking water during transportation | Health | Illness due to ingestion of harmful chemicals, pathogens or changes to water quality | * Check all tank openings are closed prior to transport
* Only use water carts that are suitable for use with drinking water
* Regularly clean tank
* Do not allow water to stand in tankers for long periods of time
* If possible only use trucks dedicated to carrying drinking water. If non-drinking water previously carted clean and disinfect cart prior to filling with drinking water (see Note below)
* Ensure that appropriate hygiene procedures are in place
 |
| Contamination of customer tank during filling | Health | Illness due to ingestion of harmful pathogens or chemicals | * Keep hoses clean at all time
* Maintain an air gap between the water in the tank and the hose during filling of container
* Ensure that appropriate hygiene procedures are in place
* Do not allow hose openings to contact the ground
 |

Note: Carts that have been used for recycled, wastewater, septic waste, pesticides or anything that may contaminate drinking water must not be used for carting drinking water, even after cleaning. If unsure, please contact the Water Quality Unit, SA Health.

Rainwater supply hazardous events and risks

| **Hazardous event** | **Hazard type – Health or aesthetic** | **Risk** | **Preventative Measure** |
| --- | --- | --- | --- |
| Animal access to tank and/or faecal contamination from birds and small animals | Health | Illness due to ingestion of harmful pathogens | * Tree branches should be pruned to reduce access to roof catchment and tank
* Keep roof catchment area well maintained
* Install a first flush device
* Inlets, overflows and other openings should be protected to prevent entry by small animals and birds
* Maintain the tank in good condition
* Consider use of treatment devices such as UV disinfection
 |
| Faecal contamination due to surface water ingress into below ground tank | Health | Illness due to ingestion of harmful pathogens | * Ensure tank is protected from surface water or subsurface flows
* Ensure tank walls are intact
 |
| Mosquitoes | Health | Nuisance and possible transmission of arbovirus (e.g. Ross River virus) | * Protect all inlets, overflows and other openings with mosquito-proof mesh
 |
| Lead flashing, lead-based paint, preserved/treated timber or bitumen-based products on roof or gutter catchment | Health | Illness due to ingestion of chemicalsIncrease in turbidity/colour/taste of water | * Lead flashing or preserved/treated timber should be painted over, replaced or excluded from the catchment area
* Rainwater should not be collected from bitumen-treated roofs
 |
| Leaching of compounds due to inappropriate tank materials and coatings | Health or aesthetic | Illness due to ingestion of chemicalsTastes and odour issues | * Ensure that materials comply with AS/NZS 4020 – Products for use in contact with drinking water or are of food grade quality. Reputable manufacturers can provide evidence of compliance.
 |
| Backflow from household plumbing devices or water storages can contaminate drinking water systems | Health or aesthetic | Illness from ingestion of harmful pathogens.Health or aesthetic impact of chemicals | * Where mains water is also connected, backflow prevention devices should be installed in accordance with the plumbing code (AS/NZS 3500)
 |
| Anaerobic growth in accumulated sediment at the bottom of tank | Aesthetic | Odour issues:Sulphide/rotten egg/sewage odours, particularly during warmer weather | * Tank should be regularly inspected and cleaned to prevent accumulated sediment
 |
| Slimes and stagnant water in pipework | Aesthetic | * U-bends or underground pipework that can hold stagnant water should be avoided where possible. If not drainage points should be installed on pipework
 |
| Accumulated material on roofs and gutters (including pollen) | Aesthetic | Taste and odour issues:Musty or vegetable type taste and odours, colouration of water | * Overhanging branches should be pruned
* Gutters should be cleaned out regularly
* Leaf protection devices should be installed on gutters
* Install a first flush device
 |
| Algal growth due to light penetration into tank or pipework | Aesthetic | Taste and odour issues:Musty, vegetable or fishy type taste and odours | * Tank roof should be intact and impervious to light
* Pipework including inlets to tanks should be impervious to light (i.e. metal, dark plastic or painted a dark colour)
 |
| Accumulated damp leaves in gutter | Aesthetic | Coloured water | * Gutters should be kept clean and leaf protection devices installed on gutters
 |
| Hydrocarbon contamination from wood-fire flues | Aesthetic | Tastes and odour issues | * Install flues in accordance with Australian Standards
* Operate heaters to the manufacturer’s instructions
* Use appropriate types of wood for fuel, e.g. do not use treated pine
 |
| Unpleasant tastes* Bitter taste (concrete tanks)
* Metallic taste (galvanised tanks)
* Plastic taste (plastic tanks)
* Detergent taste associated with newly painted roof
 | Aesthetic  | New tank | * Use water from first fill for non-drinking purposes such as garden watering or toilet flushing. Taste will reduce with subsequent fills and age
 |
| Aesthetic | Newly painted roof | * Avoid collected water from first 2-3 rain events after painting roof. Taste will improve with paint age
 |

Bore water supply hazardous events and risks

| **Hazardous event** | **Hazard type (Health or aesthetic)** | **Risk** | **Preventative Measure** |
| --- | --- | --- | --- |
| Livestock entry to bore protection zone | Health | Illness from ingestion of harmful pathogens contained in livestock waste | * Bore should be protected from livestock access by fencing to allow at least a 50 metre radius around the bore
 |
| Leakage from sewage collection system | Health | Illness from ingestion of harmful pathogens contained in human waste | * Bore should be protected from human waste by not discharging septic waste within 50 metres of the bore (this is a formal requirement under the Public and Environmental Health (Waste Control) Regulations
* Septic tanks should be well maintained
 |
| Toxic chemicals leaching into groundwater | Health | Health or aesthetic impact of chemicals | * Agricultural chemicals, diesel and petrol should not be stored or used within the minimum protection zone, e.g. 50 metres
* Storages should be protected with physical barriers to contain spills
 |
| Groundwater may contain microbiological contaminants or health-related chemicals,  | Health | Illness from ingestion of harmful pathogens or chemicals (e.g. arsenic, fluoride) | * Bore water should be tested for microbiological and chemical quality prior to use for drinking, food preparation, use in swimming pools or watering edible plants
 |
| Entry of birds and small animals into tank (if present) | Health | Illness from ingestion of harmful pathogens contained in faecal material or from dead animals | * All tank openings should be sealed or covered with mosquito-proof mesh
* Tank/tank roof integrity should be maintained to prevent access points
 |
| Mosquitoes breeding in tank (if present) | Health | Nuisance and potential transmission of arbovirus ( e.g. Ross River Virus) |
| Backflow from household plumbing devices or water storages can contaminate drinking water systems | Health or aesthetic | Illness from ingestion of harmful pathogens.Health or aesthetic impact of chemicals | * Backflow prevention devices should be installed in accordance with the plumbing code (AS/NZS 3500)
 |
| Surface water entering the bore can cause contamination (human or animal waste) and/or increase turbidity and colour of water (If UV light disinfection is used, turbidity will reduce effectiveness) | Health or aesthetic | Illness from ingestion of harmful pathogens contained in animal wasteAesthetic concerns with water (e.g. increased turbidity) | * Bores should be constructed to prevent the entry of surface water and to protect the groundwater supply against contamination
* Pumps and water outlets should not allow entry of surface water
* Bores should be surrounded with a concrete slab/plinth at least 1 metre in diameter sloping away from the borehead
* The space between the casing and the borehole should be sealed
 |
| Algal growth in pipework or tank (if present) | Aesthetic | Appearance, taste and odour of water may be adversely affected | * Light access into tank should be prevented (e.g. ensure tank is completely roofed)
* Ensure pipework is impervious to light (white or opaque pipes can allow light penetration)
 |

Identification of additional hazards, risks and preventative measures

Common hazards, associated risks and preventative measures were identified in the previous section. The lists included in this document are not exhaustive and further hazards may apply to your drinking water system. A thorough risk assessment of the drinking water supply system should be undertaken from the source water through to the customer tap. Once identified, additional hazards should be recorded in the table below along with associated risks and preventative measures that have been identified to mitigate these risks.

| **Hazardous event** | **Hazard type – Health or aesthetic** | **Risk** | **Preventative Measure** |
| --- | --- | --- | --- |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |

Section 3: Monitoring program –Operational monitoring (inspection and maintenance)

Under section 13 and 14 of the *Safe Drinking Water Act 2011*, a RMP must include a monitoring program approved by DHA. The monitoring program is composed of two sections; operational monitoring and verification of drinking water quality. The following operational monitoring programs are taken to be approved where adopted by a water carter.

General water cart monitoring

Inspection of the following areas should occur **at least every 3 months**. Inspection dates and any corrective actions should be recorded along with any corrective actions undertaken. A blank monitoring sheet can be found in Appendix A.

| **Area** | **Inspection** | **Corrective Actions** |
| --- | --- | --- |
| Tank interior | Inspect interior of tank for cleanliness and in hygienic condition | * Clean and disinfect interior of water cart
 |
| Inspect interior of the tank for any rust, damage to linings or any foreign matter | * Clean or repair as required
* Flush out any foreign matter in the tank
 |
| Tank/trailer exterior surfaces | Check external surfaces are in good order | * Repair external surfaces as required
 |
| Delivery hoses and pipes | Check hoses are in good order and free from slime | * Repair/replace hoses if structurally unsound
 |
| Chlorination | Ensure adequate supplies of chlorineCheck use-by date of chlorine | * Dispose of out of date chlorine and replace as required
 |

Rainwater

Inspection of the following areas should occur **at least every 6 months**. Inspection dates should be recorded along with any maintenance undertaken. A blank monitoring sheet can be found in Appendix A.

| **Area** | **Inspection** | **Corrective Actions** |
| --- | --- | --- |
| Gutters | * Inspect for presence of accumulated debris such as leaf and other plant material
 | * Clean and repair as necessary
* If large amounts of leaf material or other debris are present, the frequency of inspection and cleaning may need to be increased
 |
| Roof | * Inspect for presence of accumulated debris such as leaf and other plant material
 | * Clear any accumulated matter from the roof and prune overhanging branches
 |
| Tank inlets and overflowsInsect proofing Leaf filters | * Inspect for accumulated material or damage
 | * Clean and repair as necessary
 |
| Tank & tank roof | * Check structural integrity of tank including roof and access cover
 | * Repair any holes or gaps as necessary
 |
| Tank | * Internal inspection to check for evidence of access by animals, birds or insects
 | * If present, identify and close access points
* Remove bird /animal carcass and empty and clean tank. Chlorinate if emptying/cleaning tank is not possible
 |
| * Internal inspection for presence of mosquitoes or larvae
 | * If present, seal access points/ repair mosquito-proof screens to prevent escape of mosquitoes and further entry
* If larvae present, treat tanks with a small amount of kerosene or paraffin
 |
| * Internal inspection to check for algal growth
 | * If there is evidence of algal growth (green), find and close the points of light access and replace any pipework which allows light penetration
 |
| Pipework | * Check for structural integrity
 | * Repair pipework as necessary
 |
| Filters (if present) | * Maintain as per manufacturer’s recommendations to avoid problems associated with clogging and microbial growth
 | * Clean filters as required
* Replace or repair filters as required
 |
| UV treatment(if present) | * Maintain as per manufacturer’s recommendations
* Where UV unit does not include an alarm, minimum weekly checking is required to ensure unit is operational
* Check that UV lamps have been replaced as required and that sleeves have been cleaned (more frequent maintenance may be indicated for some products)
 | * Clean sleeves and replace lamps as necessary
 |

In addition to the 6 monthly inspection and maintenance actions, the rainwater tank should be inspected **every 2 years** for the presence of accumulated sediment. A blank monitoring sheet can be found in Appendix A.

|  |  |  |
| --- | --- | --- |
| **Area** | **Inspection** | **Corrective Action** |
| Tank | Internal inspection to check for accumulated sediment | * If the bottom of the tank is covered with sediment the tank should be cleaned
 |

Bore water

Inspection of the following areas should occur **at least every month**. Inspection dates should be recorded along with any maintenance undertaken. A blank monitoring sheet can be found in Appendix A.

|  |  |  |
| --- | --- | --- |
| **Area** | **Monitoring** | **Corrective Actions** |
| Bore protection zone | * Inspect the area in the vicinity (e.g. 50 m) of the borehead for signs of human or livestock activity and the use or storage of agricultural chemicals or fuels
 | * Restrict animal access via mechanisms such as fences, etc.
* Investigate and remove potential sources of contamination, e.g. chemicals/fuel
 |
| Bore | * Check integrity of bore plinth and casing and any other mechanisms installed to ensure that the borehead is water-tight and protected from surface water flows
 | * Repair or replace any faulty mechanisms designed to prevent the entry of surface water
* Repair damaged bore casing and slab/plinth
 |

Inspection of the following areas should occur **at least every six months**. Inspection dates should be recorded along with any maintenance undertaken. A blank monitoring sheet can be found in Appendix A.

| **Area** | **Monitoring** | **Corrective Actions** |
| --- | --- | --- |
| Bore protection zone | Check structural integrity of fencing, gates, locks, etc. | * Repair any faults
 |
| Pump | Maintain/service pump on an annual basis or as per the manufacturers recommendations | * Repair/replace pump as required
* If the pump is removed for maintenance, ensure the top of the bore is blocked to prevent entrance by small animals and other debris
 |
| Tank and tank roof (if present) | Check structural integrity of tank including roof and access cover | * Repair any holes or gaps as necessary
 |
| Tank (if present) | Internal inspection to check for evidence of access by animals, birds or insects including the presence of mosquito larvaeInternal inspection to check for algal growth | * If present, identify and close access points
* Remove bird /animal carcass and empty and clean tank. Chlorinate if emptying/cleaning tank is not possible
* If there is evidence of algal growth (green), find and close the points of light access and replace any pipework which allows light penetration
 |
| Chlorination | Ensure adequate supplies of chlorine for emergency chlorination and check use-by dates of supplies | * Dispose of out of date chlorine and replace as required
 |
| Filters (if present) | Maintain as per manufacturer’s recommendations to avoid problems associated with clogging and microbial growth | * Clean filters as required
* Replace or repair filters as required
 |
| UV treatment (if present) | Maintain as per manufacturer’s recommendations Where UV unit does not include an alarm, minimum weekly checking is required to ensure unit is operational\*Check that UV lamps have been replaced as required and that sleeves have been cleaned (more frequent maintenance may be indicated for some products) | * Clean sleeves and replace lamps as necessary
 |

Section 4: Monitoring program –Verification of drinking water quality

Mains water

If water is sourced from a registered water provider (such as SA Water) it will need to be tested to demonstrate that there is adequate chlorine residual (see section 5 for further information). The chlorine residual should be recorded in the delivery details log sheet.

Further testing for chemicals or *E.coli* is not required.

Rainwater

*E.coli* testing

Provided that routine operational monitoring is undertaken and that chlorine residuals at the point of delivery are recorded further testing for chemicals or *E.coli* is not required.

Bore water

Bore water should be tested for microbiological (*E.coli*) and chemical water prior to use, including where previous history of the bore is known. If at any stage there are changes in the appearance, odour or taste of the water, additional water quality testing is advised. Additional testing should also be undertaken after any change to the water supply (e.g. addition of water storage tank, change to a different bore) that may impact on water quality.

Regular *E.coli* testing

The frequency of testing for microbiological quality will depend on the type of bore and previous regular test results. Shallow unprotected bores should be tested for *E.coli* every 3 months. This frequency may be reduced in consultation with the Department for Health and Ageing if it can be demonstrated that the bore is consistently free of *E.coli*. Deep protected bores may be tested for *E.coli* annually.

*E.coli* is used as an indicator of faecal contamination and should not be detected in bore water. Any detection of *E.coli* should be investigated immediately as this indicates that there is faecal contamination in the bore. The detection of *E. coli* indicates that maintenance and/or treatment is inadequate. Copies of water quality test results should be filed with the RMP and a blank verification monitoring sheet can be found in Appendix B.

Regular chemical testing

As a general guide, bore water that is provided to the public should be tested for chemical quality every 2 years (see Appendix C for the list or contact the Water Quality Unit on 82267100). Health-related chemical parameters should be less than the ADWG values. A blank verification monitoring sheet can be found in Appendix B and copies of water quality test results should be filed with the RMP. If there is an exceedance of the chemical guideline values in the table above, advice on further action and corrective responses should be sought from your local council or Department for Health and Ageing.

Section 5: Disinfection

All water supplied for drinking should be disinfected prior to the point of supply to the receiving premises. This provides protection against contamination introduced during the filling of the water tanker and during supply to the customer.

There are two forms of chlorine that may be used for disinfection: liquid sodium hypochlorite or solid calcium hypochlorite. Liquid Sodium hypochlorite is typically available in a 12.5% chlorine solution. This form of chlorine has a short shelf-life and must be used before the use-by date. Calcium hypochlorite is available as a solid in 70% concentration and should be dissolved in water prior to addition to the tank. Always follow the manufacturer’s directions and appropriate safety procedures when handling and storing chlorine. If the tank has a recirculation system it should be operated to provide mixing after the addition of chlorine and prior to discharge into the receiving storage.

A method for calculating the volume of water in a tank may be found in Appendix D. Chlorination doses for various volumes of water are located in Appendix E.

Chlorine can be measured using a swimming pool chlorine test kit that measures free chlorine. Suggested chlorine doses for various uses are outlined below.

Do NOT use stabilised chlorine or chlorine that contains cyanuric acid and NEVER mix solid and liquid chlorine.

Mains water supply

Mains water is typically supplied filtered and chlorinated. Provided that the water has a minimum free chlorine of 0.5 mg/L measured at the point of delivery to the customer then further chlorination is not required. If the chlorine residual is less than 0.5 mg/L chlorine should be added and total free chlorine should not exceed 1 mg/L.

Achieve a free chlorine of up to 1 mg/L.

If the water is chloraminated extra chlorine should NOT be added and advice should be sought from SA Health.

Once-off use or unchlorinated supply

The following chlorine doses may be used for bore or rain water.

First load and subsequent loads

In tankers not dedicated to carting drinking water the first load should be dosed at:

* 20 mL of 12.5% liquid sodium hypochlorite per 1000 Litres of water, or
* 3.5 grams of calcium hypochlorite per 1000 Litres of water.

Achieve a free chlorine of 2.5 mg/L.

Note: Carts that have been used for recycled, wastewater, septic waste, pesticides or anything that may contaminate drinking water must not be used for carting drinking water, even after cleaning. If unsure, please contact the Water Quality Unit, SA Health.

Subsequent loads or dedicated water cart

In tankers not dedicated to carting drinking water:

* 8 mL of 12.5% liquid sodium hypochlorite per 1000 Litres of water, or
* 1.4 grams of calcium hypochlorite per 1000 Litres of water.

Achieve a free chlorine of 1 mg/L.

Cleaning procedure

Maintenance of equipment is critical as equipment in poor condition may affect or contaminate water quality. Water carts that are used continuously should be cleaned at least once every 3 months. Carts that are being used for the first time or carts that have not been used for some time will need to be cleaned prior to use.

The cleaning procedure should be documented and a maintenance record for each cart should be maintained. An example cleaning procedure is included in the text box below.

Sample cleaning procedure

1. Physically clean inside of the tank with a soft brush or cloth using a solution of 10 mg/L free chlorine water. If this is not possible use a high pressure hose to clean the inside of the tank. Clean the outside of tanks and all fittings, particularly near to the fill point. Flush the tank with clean drinking water after cleaning
2. Fill the tank (full) with water containing chlorine residual of at least 2.5 mg/L and keep the chlorinated water in tank for at least 30 minutes
3. Drain the tank and rinse with clean drinking water
4. Refill with clean water for delivery OR empty the tank and close all openings to stop dust, other contaminants or sunlight from entering the tank. If the tank will not be used immediately store all fittings in a manner that will prevent contamination.

Section 6: Management of incidents and emergencies

Under section 13 and 14 of the *Safe Drinking Water Act 2011*, a RMP prepared by a drinking water provider must include an approved incident identification and notification protocol. The following incident identification and notification protocol is taken to be approved where adopted by a drinking water provider.

Please note that an incident notification form is available at [www.sahealth.sa.gov.au/safedrinkingwateract](http://www.sahealth.sa.gov.au/safedrinkingwateract). Details should be provided via this form and submitted to the Water Quality Unit within the period specified below.

General incident notification criteria

|  |  |  |
| --- | --- | --- |
| **Parameter** | **Criteria** | **Notification Requirements**  |
| Odours / taste / discolouration | Direct observation or customer complaints due to odour, taste or colour of water | Notification within 24 hours to the Department for Health & Ageing through the submission of the incident notification form |
| Chlorination failure | Chlorination failure (including under dosing) that leads to consumers receiving undisinfected water (determined by loss of chlorine residual) | N/A. Correct dose of chlorine must be added before supplied to customer. |
| Chlorination | Chlorination over-dose in water that is delivered (determined by chlorine residual) > 5 mg/L | N/A. Water is NOT to be delivered |
| Unsafe water | Officers of drinking water providers, auditors and inspectors that believe that a water supply is unsafe must report their concerns | Immediate notification by telephone to the Department for Health & Ageing and within 24 hours by the submission of the incident notification form |
| Undefined incident | Any other incident (not defined above) or where specific concerns exist over the quality of the drinking water supply | Immediate notification by telephone to the Department for Health & Ageing and within 24 hours by the submission of the incident notification form |

Rainwater supply incident notification criteria

| **Parameter** | **Criteria** | **Notification Requirements** |
| --- | --- | --- |
| UV failure (if present) | Any failure of the UV unit | Notification by next business day to the Department for Health & Ageing by telephone and through the submission of the incident notification form |
| Contamination of rainwater supply | Suspected contamination of drinking water supply due to: * wastewater discharge, flooding or other surface water ingress (where underground tank or pipework is present)
* dead animal in storage tank
 | Immediate notification by telephone to the Department for Health & Ageing and within 24 hours by the submission of the incident notification form |

Bore water supply incident notification criteria

| **Parameter** | **Criteria** | **Notification Requirements**  |
| --- | --- | --- |
| *E.coli*  | Detection of *E.coli* in a minimum 100 mL sample of bore water | Notification within 24 hours to the Department for Health & Ageing by telephone and through the submission of the incident notification form |
| UV failure(if present) | Any failure including substantial under dosing (< 50% of the normal dosing applied) for > 10 minutes | Immediate notification by telephone to the Department for Health & Ageing and within 24 hours by the submission of the incident notification form |
| Health-related chemicals | Any exceedence of the ADWG values | Immediate notification to the Department for Health and Ageing by telephone and incident form to be submitted within 24 hours |

Additional information

To establish a more comprehensive drinking water risk management plan, access the Community Water Planner at <http://www.communitywaterplanner.gov.au>.

Copies of the *Safe Drinking Water Act 2011* and regulations and other related resources are available on the SA Health website at <http://www.sahealth.sa.gov.au/safedrinkingwateract>.

Rainwater

Information regarding rainwater tank maintenance is available from the Public Health website at <http://www.dh.sa.gov.au/pehs/Default.aspx> (follow the links to Environmental Health then Drought Package).

This information has been reproduced in part from ‘*Guidance on the use of rainwater tanks’* by enHealth Council which can be accessed at <http://enhealth.nphp.gov.au/council/pubs/pdf/rainwater_tanks.pdf> for more detailed guidance.

Bore water

Information regarding the use of bore water is available from the Public Health website at <http://www.dh.sa.gov.au/pehs/> (follow the links to Environmental Health then Drought Package).

Further information on bore construction is available in the ‘Minimum construction requirements for water bores in Australia’ at <http://www.derm.qld.gov.au/water/management/pdf/minimum-const-req.pdf>.

Appendix A: Operational monitoring record sheets

These record sheets have been developed to record operational monitoring. These should be performed as per the frequency specified for the supply, filled out and filed with the RMP.

A sample filled-out record is included below. This record sheet corresponds to the Monitoring program (operational monitoring) included on page 16. Each of the areas identified in the Monitoring program must be inspected and the inspections listed in the table should be performed (text in blue). Any corrective actions required should be recorded as per the example below (in red).

**Example: 3 monthly maintenance record sheet**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Area** | **Tank interior** | **Tank/trailer exterior surfaces** | **Delivery hoses and pipes** | **Chlorination** |
| **Inspection** | Inspect interior of tank for cleanliness and in hygienic conditionInspect interior of the tank for any rust, damage to linings or any foreign matter | Check external surfaces are in good order | Check hoses are in good order and free from slime | Ensure adequate supplies of chlorineCheck use-by date of chlorine |
| **Date** | **Name** |
| 12/1/12 | Joe Bloggs | Cleaned and disinfected interior of water tank | ✓ | Flushed hoses | ✓ |
| 13/04/12 | Joe Bloggs | Cleaned and disinfected interior of water tank | ✓ | Flushed hosesCrack in hose repaired | ✓ |
| 11/7/12 | Mike Smith | Cleaned and disinfected interior of water tank | ✓ | ✓ | Out of date chlorine replaced  |
| 8/10/12 | Joe Bloggs | Cleaned and disinfected interior of water tank | ✓ | ✓ | ✓ |

General water carting operational monitoring: 3 monthly record sheet (use with page 18)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Area** | **Tank interior** | **Tank/trailer exterior surfaces** | **Delivery hoses and pipes** |  **Chlorination** |
| **Inspection** | Inspect Interior of tank for cleanliness and in hygienic conditionInspect interior of the tank for any rust, damage to linings or any foreign matter | Check paintwork is in good order | Interior structures of hoses are in good order and free from slime | Ensure adequate supplies of chlorineCheck use-by date of chlorine |
| **Date** | **Name** |
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Rainwater

Rainwater operational monitoring: 6 monthly record sheet (corrective actions are on page 19-20)

| **Area** | **Inspection** | **Date** | **Date** |
| --- | --- | --- | --- |
| **Name** | **Name** |
| Gutters | Inspect for presence of accumulated debris such as leaf and other plant material |  |  |
| Roof | Inspect for presence of accumulated debris such as leaf and other plant material |  |  |
| Tank inlets & overflows, Insect proofing, Leaf filters | Inspect for accumulated material or damage |  |  |
| Tank & tank roof | Check structural integrity of tank including roof and access cover |  |  |
| Tank | Internal inspection to check for evidence of access by animals, birds or insects |  |  |
| Internal inspection for presence of mosquitoes or larvae |  |  |
| Internal inspection to check for algal growth  |  |  |
| Pipework | Check for structural integrity  |  |  |
| Filters (if present) | Maintain as per manufacturer’s recommendations to avoid problems associated with clogging and microbial growth |  |  |
| UV treatment(if present) | Maintain as per manufacturer’s recommendations Where UV unit does not include an alarm, minimum weekly checking is required to ensure unit is operational\*Check that UV lamps have been replaced as required and that sleeves have been cleaned (more frequent maintenance may be indicated for some products) |  |  |

\*Documentation should be kept to demonstrate how often the UV unit is checked – a separate weekly checklist can be developed and kept with the RMP.

Rainwater operational monitoring: 2 yearly record sheet (use with page 20)

|  |  |
| --- | --- |
| **Area** | **Inspection** |
| **Inspection** | Internal inspection to check for accumulated sediment |
| **Date** | **Name** |
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Bore water

Bore water operational monitoring: monthly record sheet (use with page 21)

|  |  |  |
| --- | --- | --- |
| **Area** | **Bore protection zone** | **Bore** |
| **Monitoring** | Inspect the area in the vicinity (e.g. 50 m) of the borehead for signs of human or livestock activity and the use or storage of agricultural chemicals or fuels | Check integrity of bore plinth and casing and any other mechanisms installed to ensure that the borehead is water-tight and protected from surface water flows |
| **Date** | **Name** |
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Bore water operational monitoring: 6 monthly record sheet (use with page 21-22)

| **Area** | **Monitoring** | **Date** | **Date** |
| --- | --- | --- | --- |
| **Name** | **Name** |
| Bore protection zone | Check structural integrity of fencing, gates, locks, etc. |  |  |
| Pump | Maintain/service pump on an annual basis or as per the manufacturers recommendations |  |  |
| Tank and tank roof (if present) | Check structural integrity of tank including roof and access cover |  |  |
| Tank (if present) | Internal inspection to check for evidence of access by animals, birds or insects including the presence of mosquito larvaeInternal inspection to check for algal growth |  |  |
| Chlorination | Ensure adequate supplies of chlorine for emergency chlorinationCheck use-by dates of supplies |  |  |
| Filters (if present) | Maintain as per manufacturer’s recommendations to avoid problems associated with clogging and microbial growth |  |  |
| UV treatment(if present) | Maintain as per manufacturer’s recommendations Where UV unit does not include an alarm, minimum weekly checking is required to ensure unit is operational\*Check that UV lamps have been replaced as required and that sleeves have been cleaned (more frequent maintenance may be indicated for some products) |  |  |

\*Documentation should be kept to demonstrate how often the UV unit is checked – a separate weekly checklist can be developed and kept with the RMP.

Appendix B: Verification monitoring record sheets

Bore water

Bore water monitoring: Microbiological

| **Sample location** | **Date collected** | **Name** | **Result (org/100mL)** | **Corrective Actions** |
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Bore water monitoring: Chemicals (2 yearly)

| **Sample location** | **Date collected** | **Name** | **Compliant? List exceedance** | **Corrective Actions** |
| --- | --- | --- | --- | --- |
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Appendix C: ADWG values

Health-related chemical parameters should be less than the ADWG values (below).

| **Chemical**  | **ADWG value (mg/L)** |
| --- | --- |
| Antimony | 0.003 |
| Arsenic | 0.01 |
| Barium | 2 |
| Beryllium | 0.06 |
| Boron | 4 |
| Cadmium | 0.002 |
| Chromium | 0.05 |
| Copper | 2 |
| Fluoride | 1.5 |
| Lead | 0.01 |
| Manganese | 0.5 |
| Mercury | 0.001 |
| Molybdenum | 0.05 |
| Nickel | 0.02 |
| Nitrate | 50 |
| Selenium | 0.01 |
| Silver | 0.1 |
| Sulfate | 500 |
| Uranium | 0.017 |

For further information about guideline values please see the ADWG <http://www.nhmrc.gov.au/guidelines/publications/eh52>.

Appendix D: Determining the size of installed tanks for chlorination

To calculate the volume of a rectangular tank, use the formula:

Volume (in litres) = depth (cm) x width (cm) x length (cm) ÷ 1000

To calculate the volume of a cylindrical tank either use the formula:

Volume (in litres) = π x diameter2 (cm2) x depth (cm) ÷ 4000

(π = 22 ÷ 7)

**OR** use one of the following methods:

 Diameter (cm)

water depth

(cm)

**FORMULA 1**: Volume (in litres) = 0.8 x water depth (cm) x diameter2 (cm2) ÷ 1000

Circumference (cm)

Use a string or tape to measure circumference

Water depth

(cm)

**FORMULA 2**: Volume (in litres) = 0.08 x water depth (cm) x circumference2 (cm2) ÷ 1000

Only calculate the volume of water in the tank and not the volume of the tank

Appendix E: Chlorination doses

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Free chlorine Concentration** | **0.5 mg/L** | **1.0 mg/L** | **2.5 mg/L** | **10 mg/L** |
| **Tank Volume (L)** | **12.5% liquid Sodium Hypochlorite** | **70% granular Calcium Hypochlorite** | **12.5% liquid Sodium Hypochlorite** | **70% granular Calcium Hypochlorite** | **12.5% liquid Sodium Hypochlorite** | **70% granular Calcium Hypochlorite** | **12.5% liquid Sodium Hypochlorite** | **70% granular Calcium Hypochlorite** |
| **mL** | **g** | **mL** | **g** | **mL** | **g** | **mL** | **g** |
| 1000 | 4 | 0.7 | 8 | 1.4 | 20 | 3.5 | 80 | 14 |
| 2000 | 8 | 1.4 | 16 | 2.8 | 40 | 7 | 160 | 28 |
| 3000 | 12 | 2.1 | 24 | 4.2 | 60 | 10.5 | 240 | 42 |
| 4000 | 16 | 2.8 | 32 | 5.6 | 80 | 14 | 320 | 56 |
| 5000 | 20 | 3.5 | 40 | 7 | 100 | 17.5 | 400 | 70 |
| 6000 | 24 | 4.2 | 48 | 8.4 | 120 | 21 | 480 | 84 |
| 7000 | 28 | 4.9 | 56 | 9.8 | 140 | 24.5 | 560 | 98 |
| 8000 | 32 | 5.6 | 64 | 11.2 | 160 | 28 | 640 | 112 |
| 9000 | 36 | 6.3 | 72 | 12.6 | 180 | 31.5 | 720 | 126 |
| 10000 | 40 | 7 | 80 | 14 | 200 | 35 | 800 | 140 |
| 11000 | 44 | 7.7 | 88 | 15.4 | 220 | 38.5 | 880 | 154 |
| 12000 | 48 | 8.4 | 96 | 16.8 | 240 | 42 | 960 | 168 |
| **Free chlorine Concentration** | **0.5 mg/L** | **1.0 mg/L** | **2.5 mg/L** | **10 mg/L** |
| **Tank Volume (L)** | **12.5% liquid Sodium Hypochlorite** | **70% granular Calcium Hypochlorite** | **12.5% liquid Sodium Hypochlorite** | **70% granular Calcium Hypochlorite** | **12.5% liquid Sodium Hypochlorite** | **70% granular Calcium Hypochlorite** | **12.5% liquid Sodium Hypochlorite** | **70% granular Calcium Hypochlorite** |
| **mL** | **g** | **mL** | **g** | **mL** | **g** | **mL** | **g** |
| 13000 | 52 | 9.1 | 104 | 18.2 | 260 | 45.5 | 1040 | 182 |
| 14000 | 56 | 9.8 | 112 | 19.6 | 280 | 49 | 1120 | 196 |
| 15000 | 60 | 10.5 | 120 | 21 | 300 | 52.5 | 1200 | 210 |
| 16000 | 64 | 11.2 | 128 | 22.4 | 320 | 56 | 1280 | 224 |
| 17000 | 68 | 11.9 | 136 | 23.8 | 340 | 59.5 | 1360 | 238 |
| 18000 | 72 | 12.6 | 144 | 25.2 | 360 | 63 | 1440 | 252 |
| 19000 | 76 | 13.3 | 152 | 26.6 | 380 | 66.5 | 1520 | 266 |
| 20000 | 80 | 14 | 160 | 28 | 400 | 70 | 1600 | 280 |

Appendix F: Delivery details log sheet

Operator details:

Name:

Date:

Signature:

Date:

Fill time commenced:

Type of water delivered (e.g. mains/spring/bore):

If Mains, fill location (standpipe):

Chlorine measured at source:

Chlorine added (if any):

Customer name:

Customer address:

Point of delivery to customer (e.g. tank at house):

Volume delivered:

Time/date of delivery:

Chlorine residual at delivery:

Comments: