Water Supply

Quality Assurance Program

**This program has been prepared by: (name)**

**This program is for (business name and address):**

**Date:**

**Instructions on using this document**

(Please delete this box when you have developed your QAP)

Use the *NSW Private Water Supply Guidelines* to help you to fill in this template.

<http://www.health.nsw.gov.au/environment/water/Documents/NSW-Private-Water-Supply-Guidelines.pdf>

As you fill in each section of this template you may need to involve other people (e.g. staff, filter suppliers) in discussions about how best to manage your water supply.

You may need to write or develop lists or procedures.

You should amend the tables in this template to suit your water supply. The tables contain words in *italics* as examples.

Additional sections, information or records can be added to those suggested in this template to make your QAP complete.

**Contents**

[Background 3](#_Toc390356242)

[Water Supply Quality Assurance Program 3](#_Toc390356243)

[What to do with the QAP 4](#_Toc390356244)

[1 Basic Information 5](#_Toc390356245)

[1.1 Private water supplier’s details 5](#_Toc390356246)

[1.2 Water supply system monitoring and maintenance personnel details (if different from above) 5](#_Toc390356247)

[1.3 Description of the water supply system 6](#_Toc390356248)

[Component 6](#_Toc390356249)

[Treatment 6](#_Toc390356250)

[Uses 6](#_Toc390356251)

[2 Diagram of the Water Supply System 7](#_Toc390356252)

[3 Risk Assessment of the Water Supply System 8](#_Toc390356253)

[Risk Assessment Template 9](#_Toc390356254)

[4. Management Actions and Record Keeping 10](#_Toc390356255)

[4.1 Planned water supply system inspection and maintenance program 10](#_Toc390356256)

[4.2 Water supply system inspection and maintenance records 11](#_Toc390356257)

[4.3 Equipment details 11](#_Toc390356258)

[4.4 Sign posting 12](#_Toc390356259)

[4.5 Water quality monitoring program 12](#_Toc390356260)

[4.6 Water quality monitoring results 13](#_Toc390356261)

[4.7 Records of water purchased from a water carter 13](#_Toc390356262)

[4.8 Chlorination records 14](#_Toc390356263)

[4.9 Incident records 14](#_Toc390356264)

[5. Contingency and Emergency Planning 15](#_Toc390356265)

[5.1 Contingency plan 15](#_Toc390356266)

[5.2 Emergency contacts 16](#_Toc390356267)

[APPENDIX A Example water supply system diagram 17](#_Toc390356268)

[APPENDIX B Common sources of contamination (hazards) and suggested control measures 18](#_Toc390356269)

[APPENDIX C Identification of risk 19](#_Toc390356270)

[APPENDIX D Possible water supply system inspections 20](#_Toc390356271)

# Background

The *Public Health Act* *2010* and Public Health Regulation 2012 require that all suppliers of drinking water establish and adhere to a Quality Assurance Program (QAP). This template will help private water suppliers develop a QAP, and can be altered to ensure it is relevant to each water supply system.

A QAP must address the Framework for Management of Drinking Water Quality set out in the *Australian Drinking Water Guidelines* (ADWG 2011), in a way that is appropriate to each water supply. The *Australian Drinking Water Guidelines* are available at

<http://www.nhmrc.gov.au/guidelines/publications/eh52>

The *NSW Private Water Supply Guidelines* will also help private water suppliers develop a QAP and are available at

<http://www.health.nsw.gov.au/environment/water/Documents/NSW-Private-Water-Supply-Guidelines.pdf>

Further information can be found by contacting the local Public Health Unit or at

<http://www.health.nsw.gov.au/environment/water/Pages/private-supplies.aspx>

# Water Supply Quality Assurance Program

A water supply system includes everything from the collection of the source water through to the point of use. When developing a Quality Assurance Program (QAP) for a water supply system an operator should ask three questions:

* What problems could occur between the water source and the point of use?
* How can they be prevented or fixed?
* How do you know that the problem has been prevented or fixed?

The answers to these questions will help determine how to:

* assess and protect the quality of the source water
* make sure treatment processes are appropriate, maintained and working properly
* regularly test the water quality
* make the water supply safe if contamination has occurred
* make sure that water users are warned and/or provided with safe drinking water if the normal supply is found to be unsatisfactory or the quality cannot be guaranteed.

Keeping the water supply system safe involves:

* identifying who is responsible for the system and who will respond to issues
* understanding hazards to your water sources
* making sure the water is stored and distributed safely
* treating the water to remove or control any contamination
* monitoring the quality of the water and the integrity of the water supply system
* planning on how to respond to problems in the water supply system.

Your QAP should reflect the type of water supply system you manage, especially the water source and its end uses. While NSW Health recommends that water supplies be monitored regularly, operators may choose not to monitor water quality. If the water supply is not monitored or treated, and is not required to be of drinking water quality (water used in food preparation must be drinking water quality), operators may choose to manage their risk by placing signs at outlets to warn consumers. See the *NSW Private Water Supply Guidelines* for information on signage*.* A QAP must still be developed and should include details on all signage. If you use your water supply to prepare food, please visit the NSW Food Authority link at:

<http://www.foodauthority.nsw.gov.au/_Documents/industry_pdf/non_reticulated_water.pdf>

## What to do with the QAP

You must provide a copy of the completed QAP to your local Public Health Unit for review. To contact your local Public health Unit, telephone 1300 066 055 or visit

<http://www.health.nsw.gov.au/Infectious/Pages/phus.aspx>

The QAP should be a living document that is reviewed regularly. Any changes that occur to the water supply system or any new hazards that are identified from observations, equipment checks, incidents or monitoring should be added to the relevant section of the program.

Your QAP should be kept in a central place that is easily accessible to staff and others who may need to view it, such as officers of NSW Food Authority, your local Council and NSW Health.

**The activities in this QAP are undertaken by this business to ensure safe drinking water and to protect public health.**

# 1. Basic Information

## 1.1 Private water supplier’s details

|  |  |
| --- | --- |
| Property/business name |  |
| Owner/occupier name |  |
| Owner /occupier contact details | Phone  Mobile Phone  Email  Address |
| Business after-hours / emergency contact | Name  Phone  Mobile Phone  Email  Address |

## 1.2 Water supply system monitoring and maintenance personnel details (if different from above)

|  |  |
| --- | --- |
|  | **Roles and responsibilities** |
| **Name and phone number of main person responsible** |  |
| **Name and phone number of any other people responsible** |  |

## 1.3 Description of the water supply system

Describe the details of your water system from source to use. (Delete any that are not relevant)

|  |  |  |
| --- | --- | --- |
| **Tick** | Component | **Description** |
|  | **Water sources** |  |
|  | Groundwater (bore) |  |
|  | Dam |  |
|  | River / creek |  |
|  | Rainwater (roof water) |  |
|  | Carted water |  |
|  | Treatment |  |
|  | Filtration |  |
|  | UV disinfection |  |
|  | Chlorination |  |
|  | First flush diverter (rainwater tanks) |  |
|  | Other |  |
|  | **Distribution** |  |
|  | Storage/header tank |  |
|  | Pipes |  |
|  | Pumps |  |
|  | Other |  |
|  | Uses |  |
|  | Drinking |  |
|  | Food preparation (including washing of produce and cleaning of utensils and equipment) |  |
|  | Personal hygiene (showers, toilets etc.) |  |
|  | Clothes washing |  |
|  | Other |  |

# 2. Diagram of the Water Supply System

Draw a simple diagram of your water supply system. Show the water source, pumps, storage, treatment, pipelines and uses. Include the location of wastewater systems (for example, septic tanks), any possible sources of contamination and the location of physical control measures such as fences, signs, etc. The diagram must reflect the details of the water supply system but does not need to be to scale. An example diagram is included in Appendix A.

# 3. Risk Assessment of the Water Supply System

Understanding the risks to your water supply is a crucial step in ensuring its safety. Actions should be prioritised on the basis of level of risk.

The hazards to the water supply are considered and rated following the advice in the QAP template and the *NSW Private Water Supplies* *Guidelines*. Note all controls which are in place to address the hazards, and actions required to improve the ongoing protection of the water quality. Use the following risk assessment process.

Document your risk assessment in the next template table, using the following steps. Create as many pages as required. It is important to review your risk assessment regularly to ensure any new risks are identified.

**Step 1:** Identify particular hazards in the water supply in the risk assessment template. The table in Appendix B gives examples of some hazards and is provided to assist in completing the “Hazard” column of the Risk Assessment.

**Step 2:** Assign risk rankings. Once all possible hazards are listed, assign a risk ranking to each hazard as low, medium or high in the risk assessment template. Consider the likelihood of the hazard occurring and, if it does, the severity of the consequence. The table in Appendix C may assist in ranking risks.

**Step 3:** Identify controls. Decide whether the hazards identified in the system have controls in place and describe these controls in the risk assessment template. Controls are the ways that risks will be managed, for example excluding animals from dams used for human drinking water, regular inspection and maintenance programs or water treatment. The table in Appendix B gives some more examples of possible controls for various hazards.

**Step 4:** Monitoring of controls is important to ensure they are working effectively. Describe in the risk assessment template how, when and where monitoring will occur, who is responsible, how and where records will be kept and by whom. Consult the *NSW Private Water Supply Guidelines* for information on monitoring.

**Step 5:** Where hazards are identified, consider what could be done to improve safety and reduce the risk of those hazards. List any shortcomings in your water supply system and its management and identify what improvements should be made. Document these improvements in your risk assessment template.

**Step 6:** Prioritise actions that need to be taken to protect the water supply and give them a priority number or time frame in the risk assessment template.

## Risk Assessment Template

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Step 1** | **Step 2** | **Step 3** | | **Step 4** | **Step 5** | **Step 6** |
| **Hazard** | **Risk Rank** | **Is the Hazard Controlled?** | **If Yes what is the control?** | **How is this control monitored?** | **What could be done to improve safety?** | **Timeframe for action** |
| *E.g. Surface water dam – access by farm animals (potential for microbiological contamination)* | *High* | *No* |  |  | *Fencing of dam*  *Installing chlorination system* | *12 months*  *6 months* |
| *E.g. River water dirty looking after heavy rain (probable bacterial contamination)* | *High* | *Yes* | *After >90mm of rain, pump is switched off and water carter called to top up main tank* | *Rain gauge monitored hourly during rainfall. Visual check of river water colour* | *Shut off as soon as rain begins.* | *Currently managed* |
| *E.g. Rodents/animals accessing roof (probably bacterial contamination* | *Medium* | *Partly* | *Trees trimmed so not overhanging roof* | *Visual inspection of trees annually* |  | *Currently managed* |
| *E.g Taste and discoloration of water from leaves entering storage tank* | *Low* | *Yes* | *Overhanging branches trimmed. Gutter guards installed and maintained* | *Inspection and maintenance records* |  |  |
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# 4. Management Actions and Record Keeping

An inspection and maintenance program and a water monitoring program are needed and are described in this section.

In the following tables records will be kept for:

* all inspections, maintenance, carted water or incidents/emergencies. These records include system inspections
* all results of microbial and chemical testing, and chlorine levels (where applicable)
* maintenance to the water system such as tank cleaning, filter change, chlorination
* incidents and corrective actions e.g. dead animal in tank, storms, treatment breakdown
* deliveries of carted water, including date and name of supplier
* the placement and checking of warning signs.

## 4.1 Planned water supply system inspection and maintenance program

An inspection regime should address all aspects of the water supply system. Examples of inspections are included in Appendix D.

Regular inspection and maintenance is essential to maintaining a well functioning and safe water supply.

|  |  |  |  |
| --- | --- | --- | --- |
| What is to be inspected/maintained | How often it is to be inspected/maintained  (frequency or dates) | Who should conduct the inspection/maintenance | Any equipment or procedures needed |
| *Check catchment-roof and gutters* | *monthly* | *Manager* | *Ladder* |
| *Top up fuel for pump* | *weekly* | *Manager* | *Fuel tank, funnel, gloves, pump compound key* |
| *UV treatment*  *Power supply operating*  *UV lamp* | *daily*  *6 monthly* | *Manager*  *Service company technician* | *Key to plantroom*  *Supplied by technician* |
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## 4.2 Water supply system inspection and maintenance records

Make a record every time a supply system item is inspected or maintained.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Date | What was inspected | Notes | Actions to be taken | Person Responsible |
| *3.3.13* | *Roof & gutters* | *Gutter loose near NE cnr of house*  *Down pipe at SW cnr beginning to rust* | *Reconnected loose gutter during inspection*  *Check downpipe next month* | *John Smith* |
| *5.3.13* | *Pump motor* | *Topped up fuel, mowed grass* | *Clean air filter at next visit* | *John Smith* |
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## 4.3 Equipment details

Record details of pumps, parts, treatment systems and chemicals. Include details of manufacturers, supplier and repairers.

The manufacturer’s instructions are attached to the QAP.

|  |  |  |
| --- | --- | --- |
| Part / Equipment | Manufacturer | Supplier/Repairer  Contact Details |
| UV equipment |  |  |
| Water pumps |  |  |
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## 4.4 Sign posting

Signs can be a useful way of communicating with customers. Signs may be permanent or temporary. Examples of warning signs can be found in the *NSW Private Water Supply Guidelines*.

Signs must be checked to ensure they are present and able to be read.

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| --- | --- | --- | --- | --- |
| Sign location | Sign wording | Permanent or Temporary | Inspection Date | Any action taken |
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## 4.5 Water quality monitoring program

Water quality monitoring is important in ensuring controls are effective and in response to concerns. Refer to the *NSW Private Water Supply Guidelines* for information on developing a monitoring program which is suitable for your system.

This table describes the tests that will be made.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| What is to be monitored | How often are tests to be taken (frequency or dates) | Location of tests | Who should perform the test | Equipment needed and procedures for performing the test |
| *On site tests*  *e.g pH, chlorine* | *Daily chlorine levels* | *At tank and at tap in laundry* | *Manager* | *Test Kit*  *Procedures are written on the lid of test kit.* |
| *Microbiological* |  |  |  |  |
| *Chemical* |  |  |  |  |
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## 4.6 Water quality monitoring results

Make a record every time water is tested, detailing what was tested, when, results and actions.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Date | Where test was taken from | Type of test taken | Test Result | Any action taken | Person Responsible |
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## 4.7 Records of water purchased from a water carter

Make a record every time drinking water is purchased from a water carter and added into the water supply system.

|  |  |  |
| --- | --- | --- |
| Date | Name and details of Water Carter | Volume of water purchased |
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## 4.8 Chlorination records

For guidance on the safe use of chlorine see Chapter 5 of the *NSW Private Water Supply Guidelines.*

If chlorine is used, record the details in the table below.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Date | Volume of water treated (litres) | Amount of chlorine added | Free chlorine test result (mg/L) | Person responsible |
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mg/L = milligrams per litre, this is the same as ppm (parts per million)

## 4.9 Incident records

If incidents, issues or emergencies occur that impact on the water quality, record what happened and what was done to rectify the situation. Include any customer complaints about water quality.

|  |  |  |  |
| --- | --- | --- | --- |
| Date | Incident | Notes and corrective actions | Person Responsible |
| *12.5.13* | *e.g. Dirty water noticed coming out of taps after heavy rain* | *Heavy rains after dry spell washed dirt into rainwater tank and resuspended sludge as tank level was low. Potential for bacterial contamination. Tank has not been cleaned recently. Advised customer to boil water before use and supplied bottled water to rooms. Booked tank cleaner and water carter to refill tank. Checked roof and gutters. Checked first flush diverter.* | *John Smith* |
|  |  |  |  |
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# 5. Contingency and Emergency Planning

This is what is planned:

* if there was a problem with an important part of the water supply system
* in response to a failed water quality test
* to ensure all people responsible for the water supply system have the knowledge and skills to run the system, e.g. training temporary managers
* in response to customer complaints regarding water quality
* in response to any other issue.

## 5.1 Contingency plan

|  |  |
| --- | --- |
| Issue | Likely actions that could be taken |
| ***e.g. Algal bloom in dam*** | * *Contact Public Health Unit for advice* * *Signpost all outlets that water supply may be contaminated and not to be used for drinking or bathing* * *Review control measures* * *Test water for toxins* * *Provide an alternative supply* |
| ***e.g. detection of E. coli in a water sample*** | * *Contact Public Health Unit for advice* * *Undertake disinfection, e.g. chlorination* * *Signpost all outlets that water supply is contaminated and not to be used for drinking, food preparation or consumed when cleaning teeth, bathing or showering* * *Review control measures* * *Provide an alternative supply* * *Re test water for E. coli* |
|  |  |
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|  |  |
|  |  |

## 5.2 Emergency contacts

Keep details of who to contact in an emergency, who to call for advice and important local contractors. Keep these details in an easily accessible place.

|  |  |  |
| --- | --- | --- |
| Contact | Name | Contact Details |
| ***Public Health Unit*** |  |  |
| ***Local Council*** |  |  |
| ***Pollution Incident Hotline*** | *NSW Environment Protection Authority* | *131 555* |
| ***Plumber*** |  |  |
| ***Tank Cleaner*** |  |  |
| ***Water Carter*** |  |  |
| ***Chlorine Supplier*** |  |  |
| ***Electrician*** |  |  |
|  |  |  |
|  |  |  |

# APPENDIX A Example water supply system diagram

Creek

Pump

Pump

On site sewage disposal area

downhill of creek

Pump

Shed

**Water supply source 2 - Rainwater**

**Water supply source 1 – Creek water**

Ultraviolet disinfection

Filter

First Flush diverter

Accommodation building

Uses of treated rainwater

* Kitchen taps
* Drinking water taps

Uses of untreated

creek water

* Toilet flushing
* Laundry
* Garden outlets
* Hand basins
* Showers

Warning signs in bathrooms alerting that water is untreated

First Flush diverter

# APPENDIX B Common sources of contamination (hazards) and suggested control measures

|  |  |  |
| --- | --- | --- |
| **Component** | Potential source of contamination | Control measures |
| **Water Source** | **Rain water**  Roof and gutters (e.g. build-up of leaves, dirt  and animal droppings) | • First flush device  • Regular cleaning of roof and gutters  • Removal of overhanging branches  • Regular inspections  • Water treatment (disinfection) |
|  | **Rain water**  Roof material (e.g. lead-based paint, lead  flashing, bitumen-containing products,  treated timber, peeling paint) | • Water not collected from roofs coated or painted with substances  that may leach hazardous materials  • Remove or treat lead flashing  • Seal any exposed treated timber |
|  | **Surface water (dams, creeks and rivers)**  Surrounding land use (e.g. farming,  urban areas, industrial sites and sewage  discharges) | • Protect surface water source against livestock, septic tanks/sewage  overflows and chemical spills  • Water treatment |
|  | **Surface water (dams, creeks and rivers)**  Animal and human activities | • Fence water storage or off-take area  • Don’t permit swimming or public access in off-take area  • Water treatment |
|  | **Groundwater (bore, well, spring)**  Surface water seepage | • Raise bore heads above ground level and mound up ground around  bore head  • Ensure bore covers and casing are intact  • Regular inspections |
|  | **Groundwater (bore, well, spring)**  Sub-surface contamination (e.g. from  industry, farming, landfill, sewage) | • Extract groundwater from places where sub-surface contaminants  are unlikely  • Test the water for chemicals and treat if necessary  • Groundwater source is at least 20 metres from any wastewater  disposal systems  • Water treatment (disinfection) |
| **Water Storage** | Insect, birds and animals in system | Screen all inlets and outlets to the tank  • Regular inspections of tank, roof and gutters |
|  | Build up of sludge in tank, dirt in inlet  strainers or insect screens | Regular inspection, cleaning and maintenance program |
|  | Tank materials (e.g. pH of water in concrete  tanks, high metals from metallic tanks) | • Materials in contact with water comply with relevant Australian  Standards (refer to Appendix 1)  • Chemical adjustment of pH in new concrete tanks may be necessary |
|  | Backflow water (e.g. from animal water  troughs) | • Backflow prevention device |
| **Distribution system** | Pump and plumbing materials | • All materials in contact with water comply with  AS/NZS 4020:2005 |
|  | Leaching from bore casings, pipes or  plumbing materials | • All materials in contact with water comply with  AS/NZS 4020:2005   * Flush standing water at irregularly used fixtures |

# APPENDIX C Identification of risk

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Consequence** | | |
| **Likelihood** | **Minor** | **Moderate** | **Major** |
| **Rare** | Low Risk | Low Risk | Medium Risk |
| **Possible** | Low Risk | Medium Risk | High Risk |
| **Likely** | Low Risk | Medium Risk | High Risk |

To identify a risk as low, medium or high, use the above matrix of likelihood and consequence. As an example: A hazard with rare likelihood but major consequence will be assigned a medium risk. Events that may cause sickness would be assigned a major consequence, for example bacterial contamination of a dam or rainwater tank, or an algal bloom in a dam.

**Likelihood** can be assessed as

* Rare: the hazard may only occur in exceptional circumstances, for example every 2 to 5 years
* Possible: the hazard might occur or should occur at some time, for example 2 to 4 times per year
* Likely: the hazard will probably occur in most circumstances, for example every month

**Consequence** can be assessed as

* Minor: causing a minor impact on a small number of people, some manageable operation disruption, or some increase in operating costs, for example consequences which can be managed by normal operations
* Moderate: causing a minor impact on more people, significant modification to normal operations but manageable, operation costs increased, or increased monitoring, for example consequences that may involve additional time and expense to manage
* Major: causing a major impact for any number of people, system significantly compromised, operation abnormal if operating at all, high level of monitoring required. Any consequence involving consumers falling ill should be considered major

# APPENDIX D Possible water supply system inspections

A range of inspections may need to be conducted on various aspects of the water supply system. Possible inspections include:

**Water source––river, creek, dam and bore water**

* Check upstream for contamination (monthly or after heavy rains)
* Check upstream during warmer months for blue-green algae blooms (weekly)
* Check the intake area (monthly)
* Check the fenced livestock area (monthly)
* Check well head is secure and free from water (monthly or after heavy rains)
* Check maintenance and operation of pump (annually)

**Tank**

* Check inlet and outlet screens (3 monthly)
* Check access covers (3 monthly)
* Clear strainer for debris (3 monthly and after heavy rains)
* Check presence of mosquito larvae in tank water (3 monthly)
* Check structural condition (annually)
* Check sludge level and internal cleanliness (every 2 years or as required)
* Check roof condition and ensure no overhanging trees (3 monthly)

**Distribution system**

* Check plumbing/piping is fully operational and well-maintained (annually)
* Check treatment system is operating as per manufacturers advice
* Replace filters (as per manufacturer’s advice or earlier if a decrease in water flow is noticed)
* Test chlorine level is at or above 0.5 mg/L ( regularly as per *Private Water Supply Guidelines)*
* Check UV light is operating (daily)
* Check UV light is visually free from scum (as per manufacturer’s advice)
* Replace UV light source (as per manufacturer’s advice)
* Other treatment (as per manufacturers advice)