



Drinking Water Quality Assurance Program

Lord Howe Island Board

Date: April 2020

V2.1

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1 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).

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. These guidelines and further information can be found at <http://www.health.nsw.gov.au/environment/water/Pages/private-supplies.aspx>

1.1 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 the operator should examine what hazards the system is subject to, how these can be prevented or fixed; and how to ensure the risk is minimised.

The quality assurance program allows the operator 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
- regularly verify water testing by comparison with a NATA accredited laboratory
- 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/incidents
- 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.

The QAP reflects the type of water supply system managed, 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 adequately it may be assigned as non-potable. See the *NSW Private Water Supply*

Guidelines for information on signage. A QAP must still be developed and should include details on all signage.

1.2 What to do with the QAP

A completed copy of the QAP is to be provided to the local Public Health Unit.

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

The QAP is to be kept in a central place that is easily accessible to staff and others who may need to view it, such as officers of the Lord Howe Island Board and NSW Health.

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

2 Basic Information

2.1 Private water supplier's details

Property/business name	Lord Howe Island Board
Owner/occupier name	Peter Adams
Owner /occupier contact details	Phone: 02 6563 2066 Email: peter.adams@ihib.nsw.gov.au Address: P.O. Box 5 Lord Howe Island NSW 2898
Business after-hours / emergency contact	Name: David Waterhouse Phone: 02 6563 2066 After hours phone: 02 6563 2439

2.2 Water supply system monitoring and maintenance personnel details

Roles and responsibilities	
Name and phone number of main person responsible	Name: Ian Fitzgerald Phone: 02 6563 2066 or Phone: 02 6563 2146 a/h

2.3 Emergency contacts

The emergency contact list for the Lord Howe Island Board Water Supply is listed in Table 2-1.

Table 2-1 Emergency Contact List

Contact	Name	Contact Details
Public Health Unit	Toni Cains	Phone: 02 9382 8333 Fax: 02 9381 8334 Mobile: 0411 458 814
Pollution Incident Hotline	NSW Environment Protection Authority	Phone: 131 555
Plumber	Josh Owens	Phone: 02 6563 2020
	Peter Heck	Phone: 02 6563 2072
	Warren O'Brien	Phone: 02 6563 2283
Chlorine Supplier	Pollard Pools	Phone: 02 6583 3934
Electrician	Greg Higgins	Phone: 02 6563 2080 or Phone: 02 6563 2085 a/h
Laboratory	ALS Environmental	Phone : 02 8784 8555

3 Description of the water supply system

There is no central water supply on Lord Howe Island. The Lord Howe Island Board (the Board) operates a decentralised potable water system of rainwater tanks of potable water for public areas (Table 3-1), non-potable water supply for public areas (Table 3-2), its own operations (Table 3-3) and houses it owns (Table 3-4). Businesses and other residences on the island are responsible for their own water supplies. In drought periods, or other emergency situations such as tank failure, the Board will supply rainwater and bore water to those with insufficient supply. Exposed population is an estimate of the maximum population that would use the water for potable purposes in one day.

Table 3-1 Rain water supplies operated by the Board for public use

Tank location	First Flush	QTY	Volume (ga each)	Vol. Gal. Total	Volume (kL each)	Vol. kL Total	Exposed population (pd) ¹	Access
Airport	Yes	4	5000	20000	22.7	90.8	300	Public
Co-op	Yes	3	5000	15000	22.7	68.1	50	Public
Public Hall	Yes	1	3000	3000	13.6	13.6	150	Public
	Yes	2	5000	10000	22.7	45.4		
	Yes	1	7500	7500	34	34		
Hospital	Yes	4	5000	20000	22.7	90.8	25	Public
Jetty & Cargo Shed	Yes	3	5000	15000	22.7	68.1	25	Public
Depot/Office (Board Admin. Complex)	Yes	1	7500	7500	34	34	40	Public
	Yes	8	5000	40000	22.7	181.6		
Sub-Total		27		138000		626.4		

Table 3-2 Rain water supplies operated by the Board for non-potable uses

Tank location	First Flush	QTY	Volume (ga each)	Vol. Gal. Total	Volume (kL each)	Vol. kL Total	Access
Old Settlement Beach	Yes	1	1000	1000	4.5	4.5	Public
Neds Beach	Yes	1	3000	3000	13.6	13.6	Public
North Bay	Yes	2	1000	2000	4.5	9	Public
Playground	Yes	1	1000	1000	4.5	4.5	Public
Sub-Total		5		7000		31.6	

Table 3-3 Water supplies operated by the Board for its activities

Tank location	First Flush	QTY	Volume (ga each)	Vol. Gal. Total	Volume (kL each)	Vol. kL Total	Exposed population (pd) ¹	Access
Church of England	Yes	3	5000	15000	22.7	68.1	Emergency Supply	Private

Tank location	First Flush	QTY	Volume (ga each)	Vol. Gal. Total	Volume (kL each)	Vol. kL Total	Exposed population (pd) ¹	Access
Airport Hangar	Yes	1	5000	5000	22.7	22.7	Emergency Supply	Private
Bureau of Meteorology	Yes	1	23000	23000	104	104	Emergency Supply	Private
WMF (Waste Management Facility)	Yes	1	8000	8000	36	36	4	Private
New Power House	Yes	1	1000	1000	4.5	4.5	2	Private
	No	1	4000	4000	18	18	Fire Fighting	Private
Old Power House	Yes	1	5000	5000	22.7	22.7	4	Private
Research Facility	Yes	2	5000	10000	22.7	45.4	8	Private
Sub-Total		11		71000		321.4		
TOTAL UNDER MGT				216000		979.4		

Note 1: Exposed population is an estimate of the maximum population that would use the water for potable purposes per day

Table 3-4 Water supplies provided by the Board on residences it owns

Tank location	First Flush	QTY	Volume (ga each)	Vol. Gal. Total	Volume (kL each)	Vol. kL Total
Met House 4	Yes	2	5000	10000	22.7	45.4
Met House 3	Yes	2	5000	10000	22.7	45.4
	Yes	1	3000	3000	13.6	13.6
Board House TC Douglass Drive	Yes	3	5000	15000	22.7	68.1
SEO House	Yes	3	5000	15000	22.7	68.1
Doll's House	Yes	3	5000	15000	22.7	68.1
MEWH House	Yes	2	5000	10000	22.7	45.4
Doctor's House	Yes	3	5000	15000	22.7	68.1
Government House	Yes	3	5000	15000	22.7	68.1
TOTAL AT RESIDENCES		22		108000		490.3

The applicability of the requirements of the *Public Health Act 2010* to the rainwater tanks in Table 3-4 is unclear. Rental properties are not explicitly covered by the Act. The Department of Fair Trading (http://www.fairtrading.nsw.gov.au/Tenants_and_home_owners/Renting_a_home/During_a_tenancy/Safety_and_security.html) advises that "Before renting out a property the landlord should ensure that the tenant is

informed that rainwater is the source of drinking water and that maintenance responsibilities have been discussed”

The Board has maintenance responsibilities for the tanks as a landlord. An information sheet for residences has been developed and included in Appendix E outlining the Board’s maintenance responsibilities.

3.1 Diagram of the Water Supply System

Figure 1 includes a series of schematics of rainwater and ground water bore/well configurations operated by the Lord Howe Island Board. Refer to Table 3-5 for the key for these drawings.

Table 3-5 Key for drawings


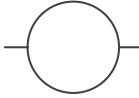
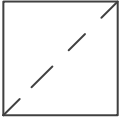
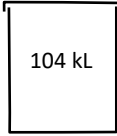
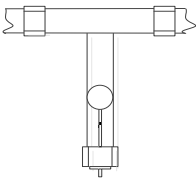
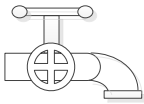
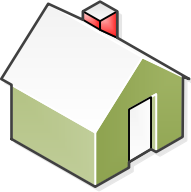

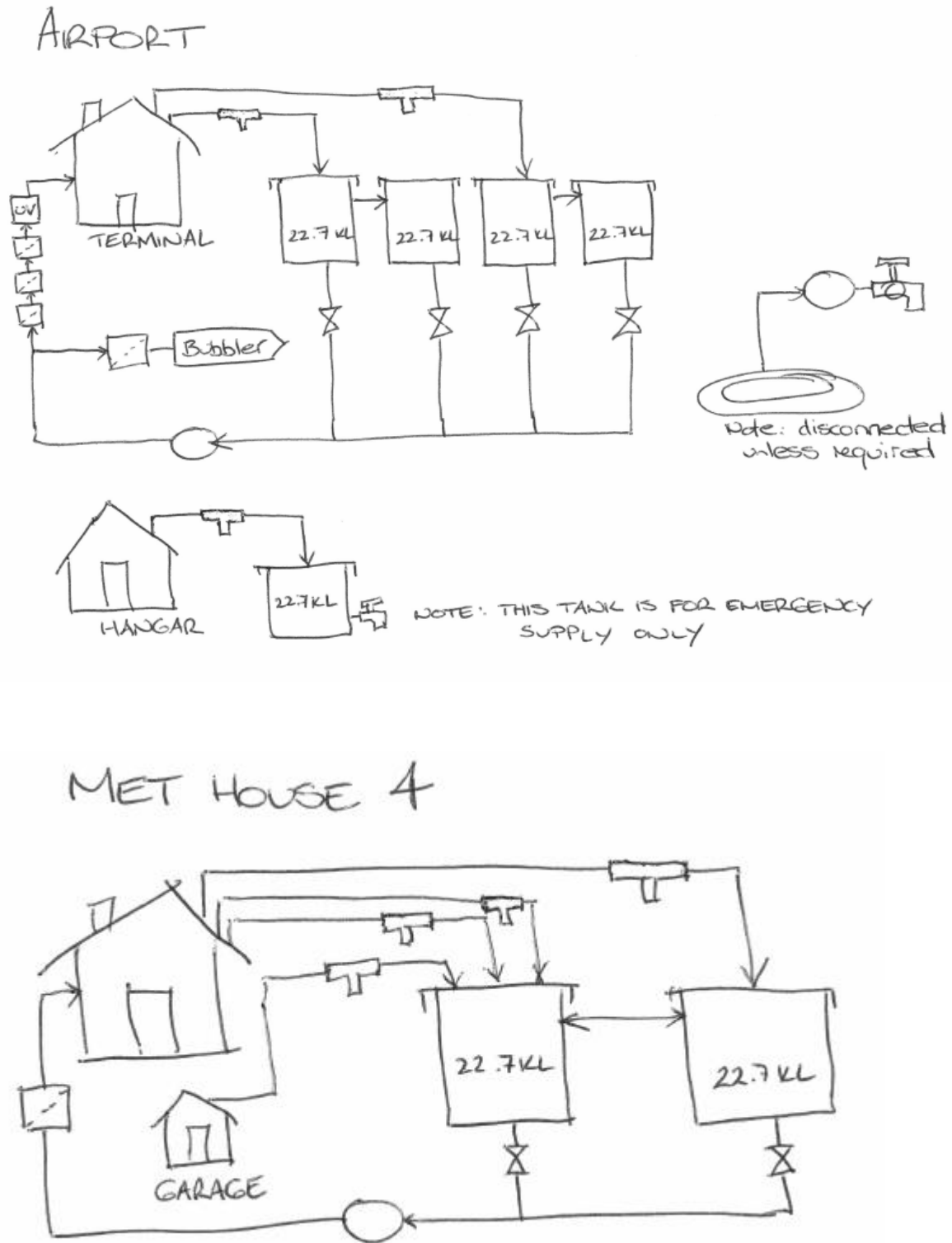
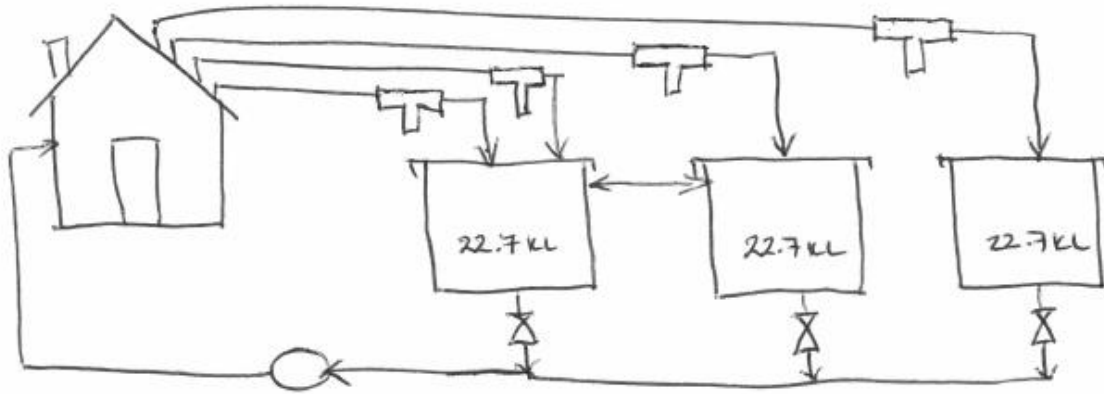
Item	Icon	Item	Icon
Bore		Pump	
Filter		Tank	
First flush device		Valve / Tap/ tap fitting	
House or building		Valve (back-flow prevention device)	

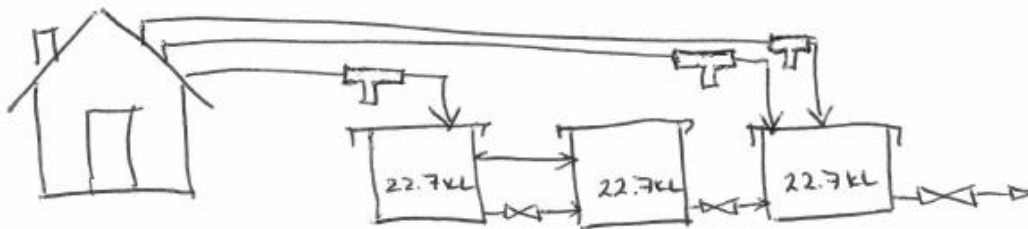
Figure 1 Schematics of LHI Board rainwater tanks and bore holes



BOARD HOUSE TO DOUGLASS DRIVE

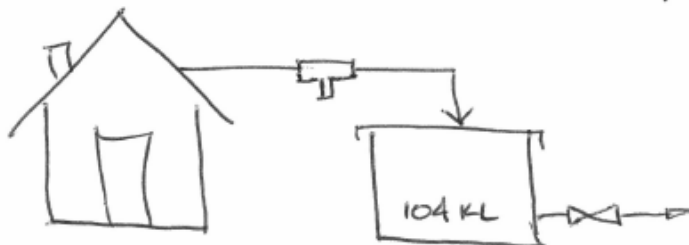


CHURCH OF ENGLAND

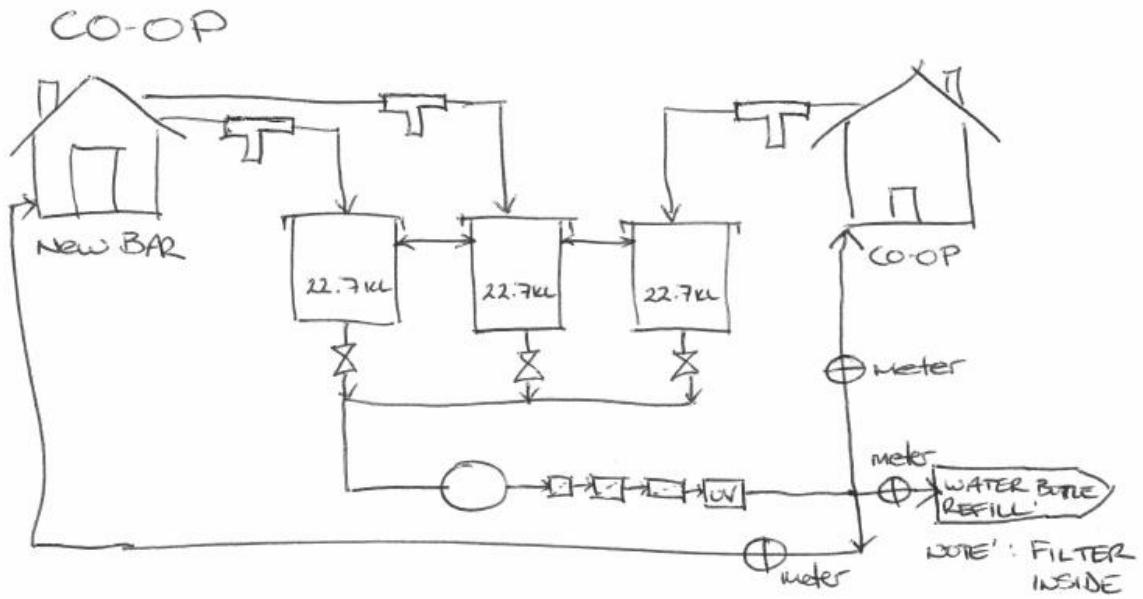


NOTE: THESE TANKS ARE FOR EMERGENCY SUPPLY ONLY

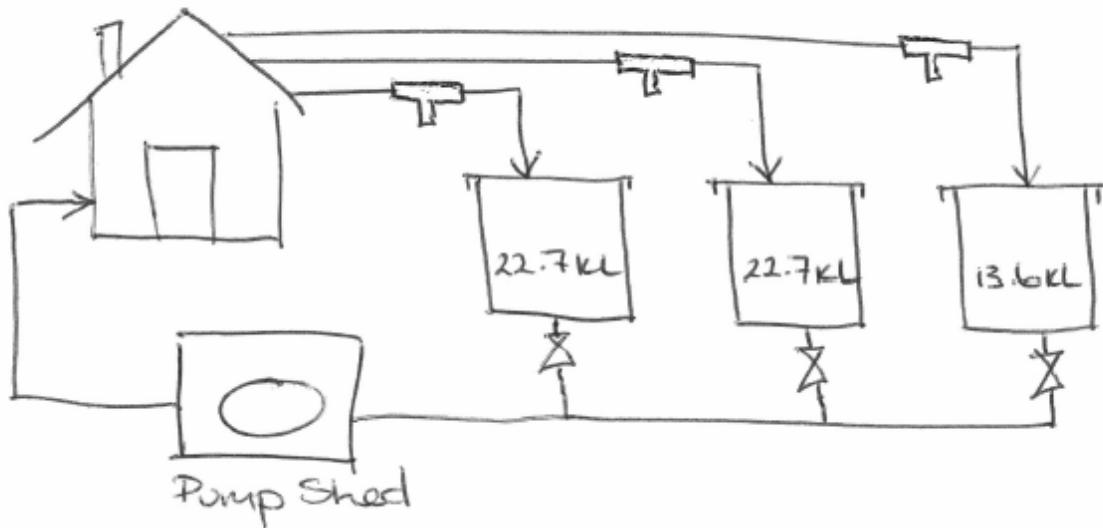
BUREAU OF METEOROLOGY



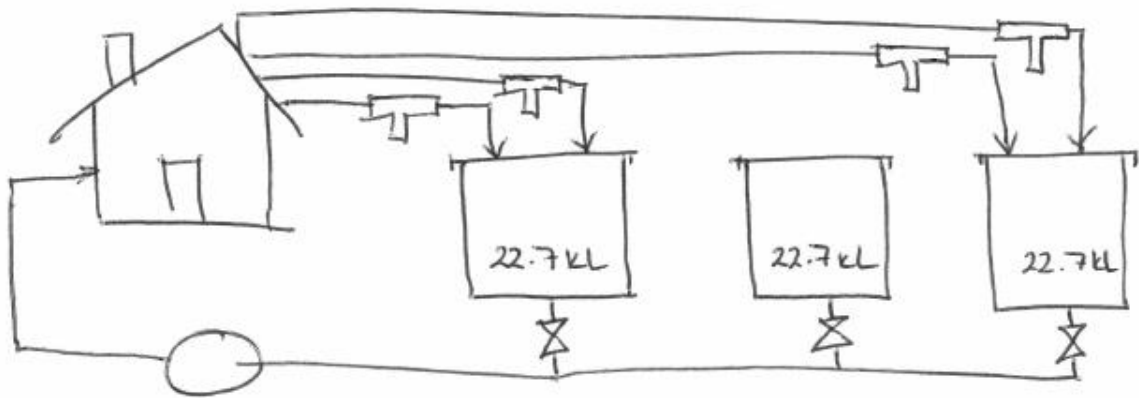
NOTE: THIS TANK IS FOR EMERGENCY SUPPLY ONLY



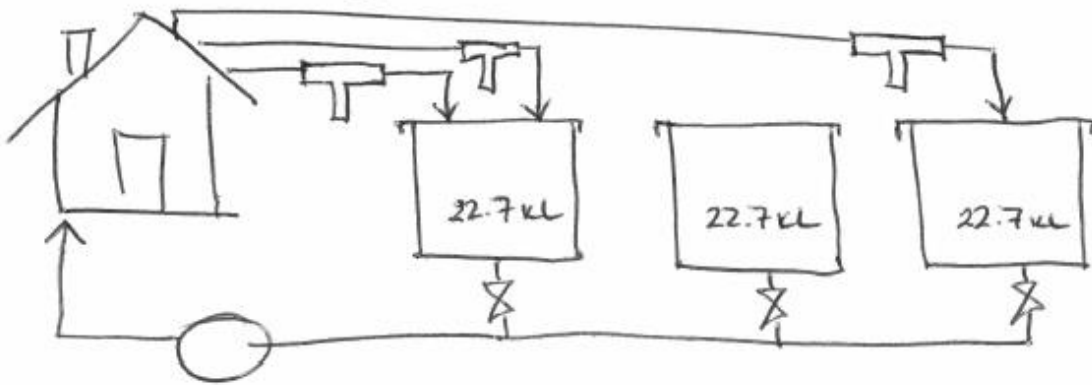
MET HOUSE 3



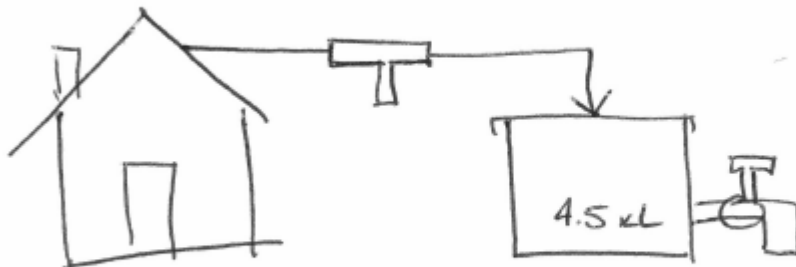
DOCTOR'S HOUSE



DOLL'S HOUSE

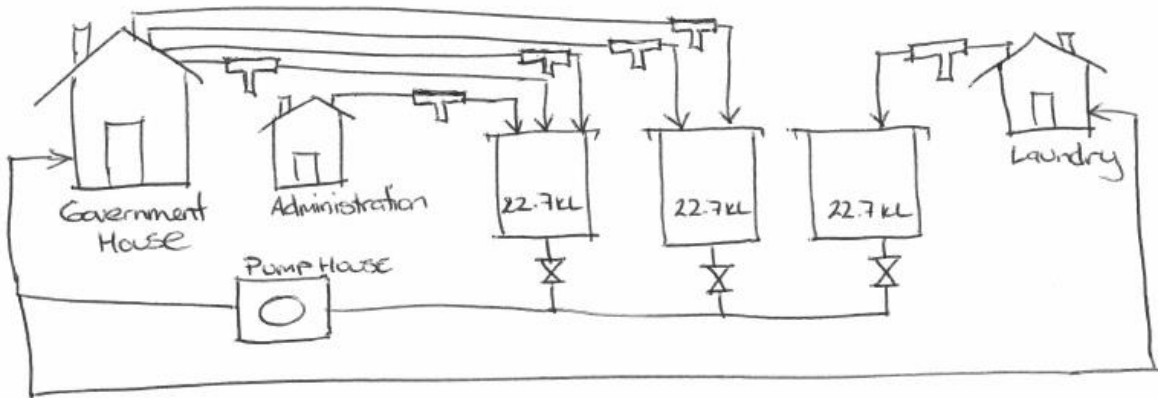


OLD SETTLEMENT BEACH

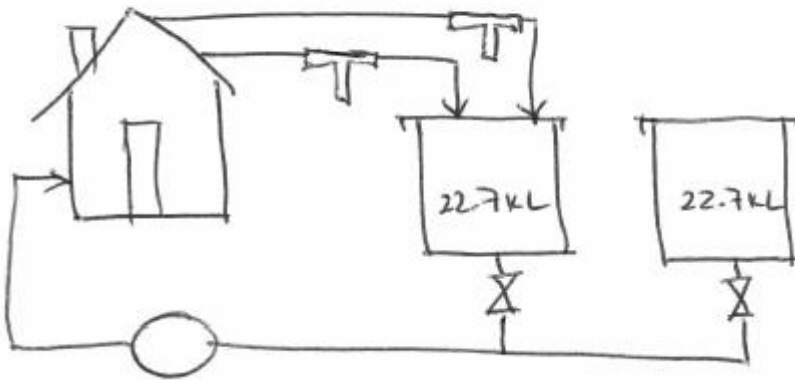


NOTE: SUPPLY AT OLD SETTLEMENT BEACH IS DECLARED NON-POTABLE

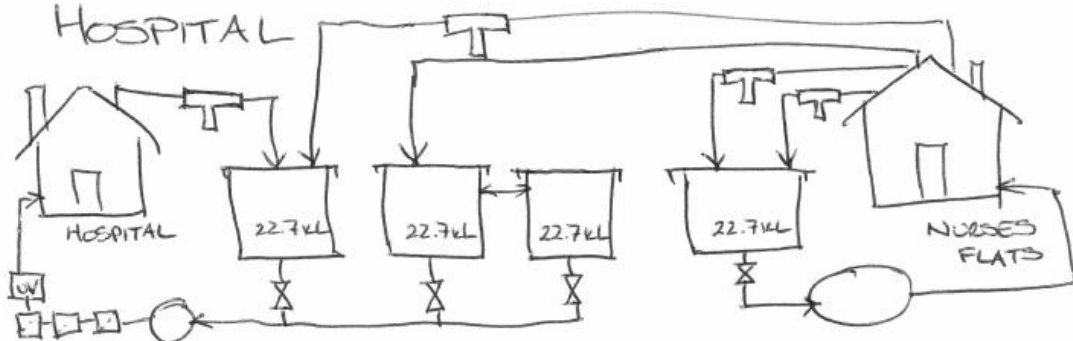
GOVERNMENT HOUSE



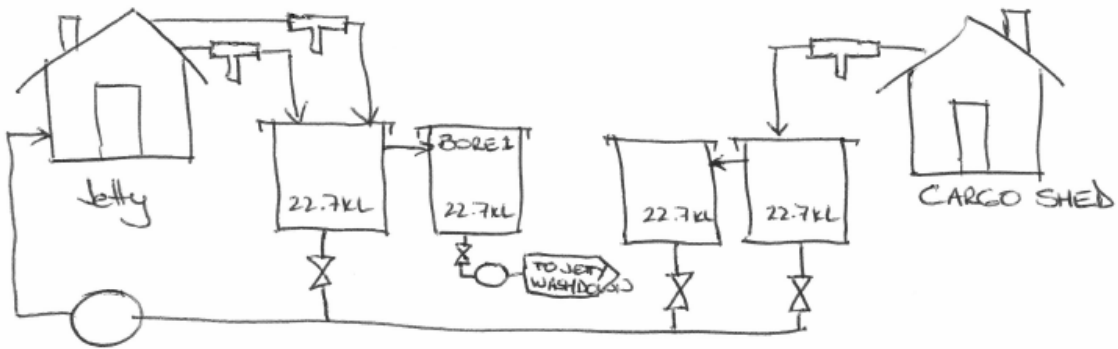
MEWH HOUSE



HOSPITAL

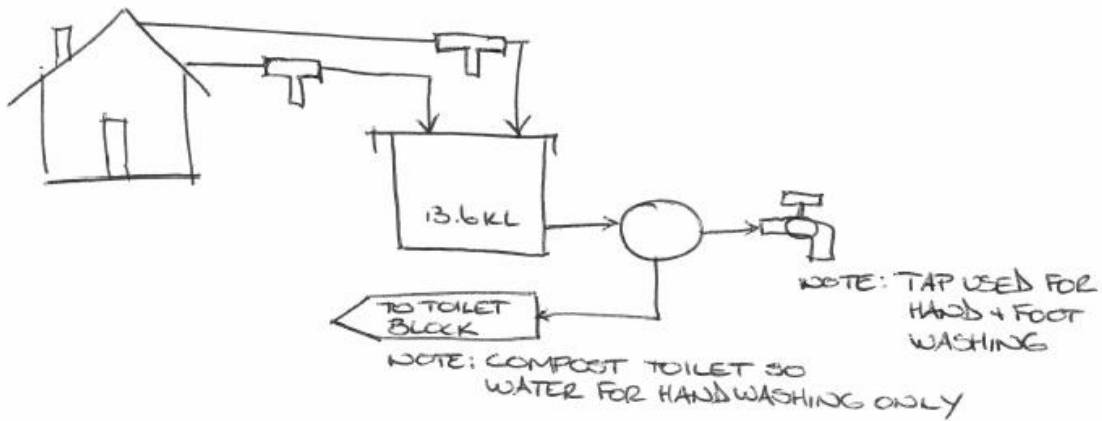


JETTY AND JETTY CARGO SHED



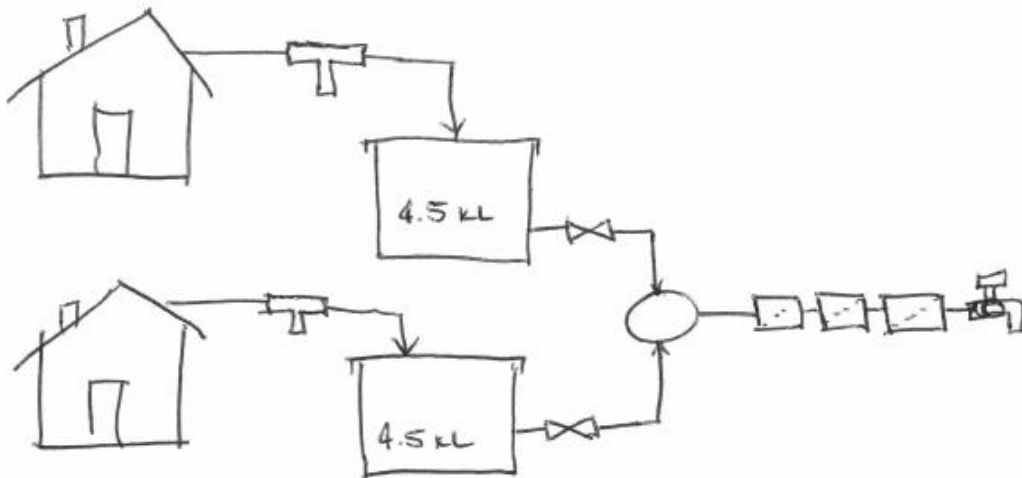
NOTE 1: BORE WATER DELIVERED ON AS NEEDS BASIS.

NEDS BEACH



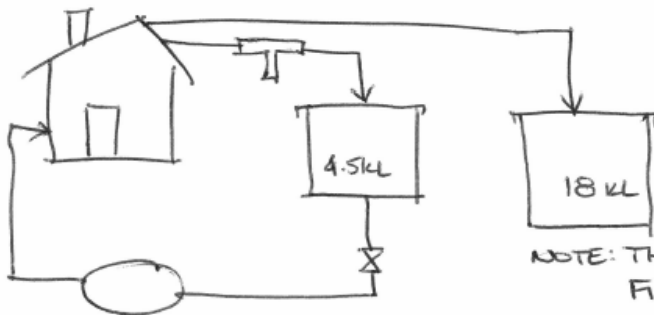
NOTE: THE SUPPLIES AT NED'S BEACH ARE DECLARED NON-POTABLE

NORTH BAY



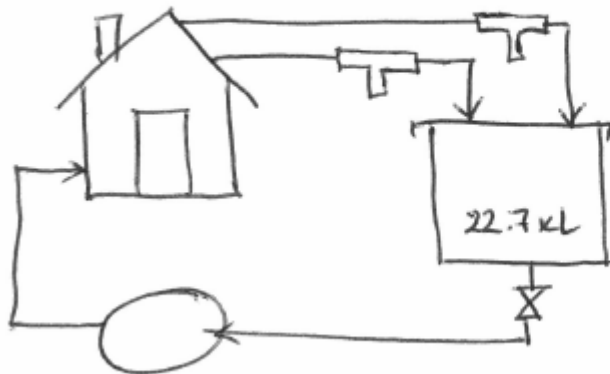
NOTE: THE SUPPLIES AT NORTH BAY ARE DECLARED AS NON-POTABLE. FILTERS ARE INSTALLED AS PER RISK ASSESSMENT AT APPENDIX A.

NEW POWER HOUSE

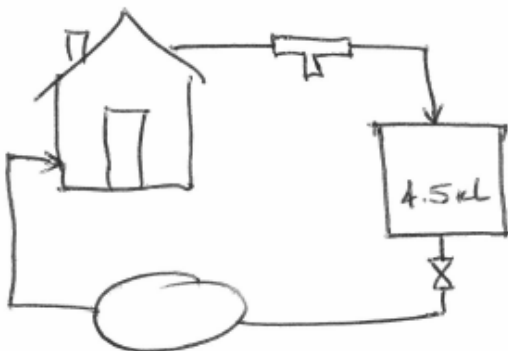


NOTE: THIS TANK IS FOR FIRE FIGHTING AT THE POWER HOUSE

OLD POWER HOUSE / POST OFFICE

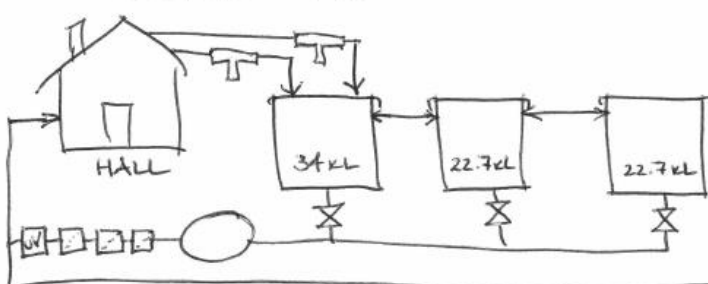


PLAYGROUND



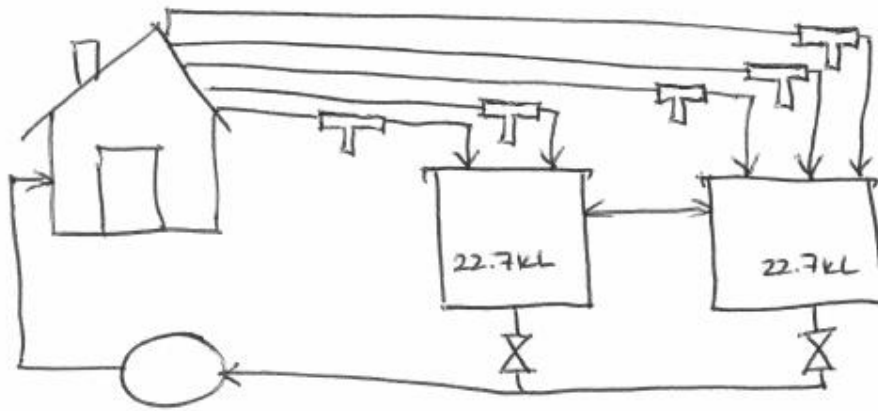
NOTE: THE SUPPLIES AT THE PLAYGROUND ARE DECLARED NON POTABLE

PUBLIC HALL

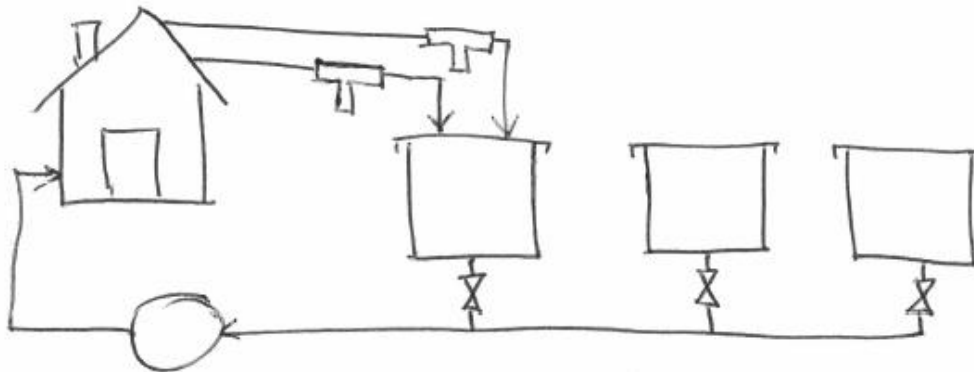


NOTE: THIS TAP IS LOCKED AND USED FOR CLEANING PURPOSES ONLY

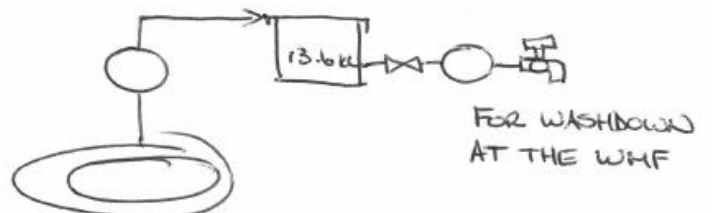
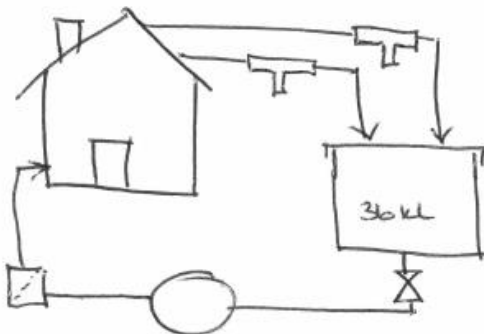
RESEARCH FACILITY



SEO HOUSE

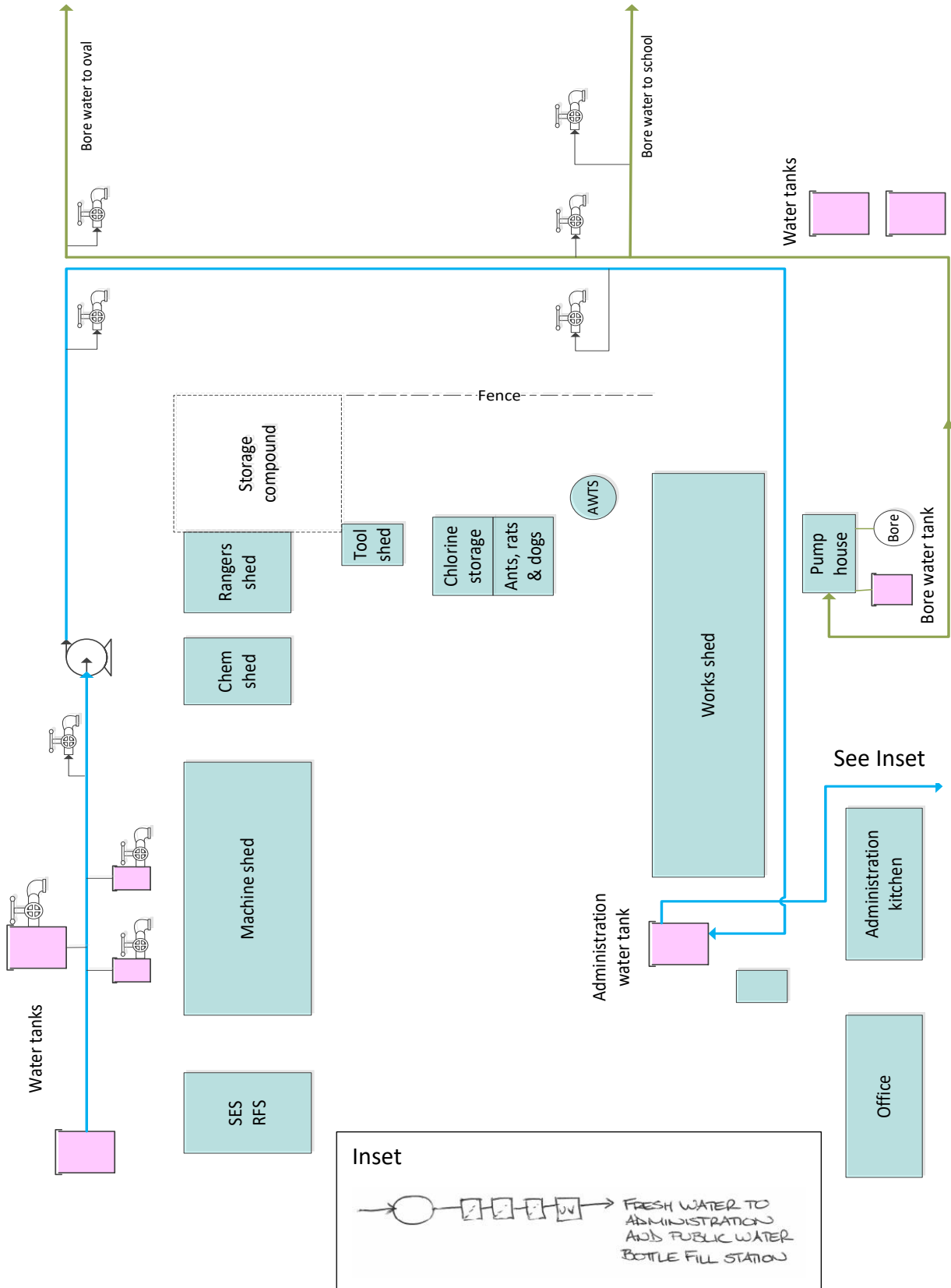


WASTE MANAGEMENT FACILITY



NOTE: THIS BORE IS LOCATED AT THE AIRPORT

LHIB Depot and Administration Complex



Note: All down pipes to tanks have first flush devices installed

4 Procedures

This section describes the routine and non-routine procedures required to be carried out by The Board to manage the water supply system. These procedures have been adapted from the *NSW Private Water Supply Guidelines, Guidance of Rainwater Tanks* and the *NSW Guidance for Water Carters* to reflect the operational activities of The Board.

Routine procedures are described for the maintenance of rainwater tanks and supporting equipment, bore wells and treatment units; UV and filters.

Non-routine procedures include those undertaken following wet weather, contamination and when water carting is required (for the emergency supply of water during drought and emergency).

4.1 Routine procedures

The Board has personnel tasked with monitoring and maintaining the water supply system. Procedures have been documented as part of the development of the QAP for the following:

- Considerations for water collection system maintenance
- Inspections and maintenance
- Equipment maintenance
- Water monitoring program

4.1.1 Considerations for water collection system maintenance

When maintenance is undertaken on a water collection system the following should be considered:

- Runoff surfaces are not painted with lead based paints or primers
- Water should not be collected from roofs painted with products (including primers) containing high lead concentrations e.g. pre-1970s paint. The suitability of the paint should be checked to use to ensure that it meets Australian/NZ Standards relating to food grade products or products for use in contact with drinking water.
- Roofs are not to have exposed treated wood

Pipes and storage systems must comply with the testing requirements of Australian Standard *AS4020 Testing of products for use in contact with drinking water*

4.1.2 Inspections and maintenance

An inspection schedule for monthly and quarterly routine inspections and maintenance is included in Appendix D.3.

Monthly Inspections

Monthly inspections for each tank in Table 3-1 include the following:

- Inspect water for presence of mosquito larvae

- Clear inlet screen/strainer of debris
- Check integrity of inlet and outlet screens (exclude vermin and mosquitoes)
- Check access covers are closed and roof and access hatches are secured
- Check first flush devices and gutters and empty contents if required
- Ensure runoff surfaces have NOT recently been painted with lead based paints or primers
- Ensure roofs have not be modified or subject to exposed treated wood
- Check lamp life and cleanliness of UV filters

Record this activity in the **routine maintenance checklist** found in Appendix D.3.

Quarterly Inspections

Quarterly inspections for each tank in Table 3-1, 3-2 and 3-3 include the following:

- Inspect water for presence of mosquito larvae
- Prune overhanging branches
- Check overflow screens
- Clear inlet screen/strainer of debris
- Check integrity of inlet and outlet screens (exclude vermin and mosquitoes)
- Check access covers are closed and roof and access hatches are secured
- Check first flush devices and gutters and empty contents if required
- Change / clean filtration units (if required)
- Clean roof, gutters and spouting
- Check for runoff surface corrosion
- Ensure that pipe work is protected from cross-connections and separate from septic and sewerage pipes
- Clean or de-sludge tank (if required)

Record this activity in the **routine maintenance checklist** found in Appendix D.3.

Tank Inspections

Tanks should be inspected from the outside:

- Yearly for structural condition
- Every quarter for sludge level and internal cleanliness

Record this activity in the **routine maintenance checklist** found in Appendix D.3.

4.1.3 Equipment Maintenance

UV units

UV units are installed at the Airport, Co-op, Board, Public Hall and Hospital. UV units should be checked daily for operation. The lamp life status and cleanliness should be checked monthly as part of the routine maintenance checklist.

Filtration units

Water filters are installed within the three bubbler / bottle filling stations at the Airport, Co-op and the Board Complex. The Waste Management Facility, Met House 4 and Government House have single filter units installed. North Bay has triple filtration Units installed. Triple filtration units are also installed prior to the UV treatment at the Hospital, Airport, Co-op, Board and Public Hall. Triple filtration for the jetty has been ordered and will be installed once arrived on the Island. Filtration units must be maintained in accordance with manufacturer's instructions. Refer to the manufactures instructions regarding procedures relating to the method and frequency for back-flushing and replacement of filters.

4.2 Water monitoring program

A risk based water monitoring program has been developed using the risk score for each location determined from the risk assessment included in Appendix A.

Routine testing of *E. coli* should be undertaken, at a minimum monthly, with fortnightly testing during the tourist high season (Oct – Apr). External testing of *E. coli* should be undertaken as verification of the routine testing. That is a second sample should be taken at the same time as the routine testing and sent for analysis to a NATA Accredited Laboratory. This will provide confirmation of the reliability of the routine testing. It is noted that external testing has proven to be difficult to achieve due to weight restrictions on aircraft, courier arrangements for the sample to be delivered to the laboratory and holding time exceedances.

Chemical testing for lead, copper and sulfates should be undertaken every 2 years for all sites.

If chlorine dosing is being used, weekly free chlorine monitoring is to be undertaken. Free chlorine levels should be at least 0.5 milligrams per litre. Chlorine dosing procedures are included in Appendix C.1.

Table 4-1 Chemical and microbiological monitoring schedule

Tank location	Risk Score ¹	<i>E. coli</i> testing - Routine	<i>E. coli</i> testing NATA Lab	Chemical testing
Airport	High	Monthly – May - Sep Fortnightly – Oct - Apr	3 times per year	
Co-op	High	Monthly – May - Sep Fortnightly – Oct - Apr	3 times per year	Lead, copper and sulfate every 2 years
Public Hall	High	Monthly – May - Sep Fortnightly – Oct - Apr	3 times per year	
Board Offices	High	Monthly – May - Sep Fortnightly – Oct - Apr	3 times per year	Weekly free chlorine testing ² if chlorine dosing is being used
Hospital	High	Monthly – May - Sep Fortnightly – Oct - Apr	3 times per year	
Jetty & Jetty Cargo Shed	High	Monthly – May - Sep Fortnightly – Oct - Apr	3 times per year	
WMF	Low	Twice Yearly		

New Power House	Low	Twice Yearly
Old Power House	Low	Twice Yearly
Research Facility	Low	Twice Yearly
Airport Hangar	Emergency	Test before supply only
Church of England	Emergency	Test before supply only
Bureau of Met	Emergency	Test before supply only

Note 1: As assessed in Appendix A

Note 2: Free chlorine testing only required if chlorine dosing is being used.

Table 4-2 Microbiological only monitoring schedule

Tank location	Risk Score ¹	<i>E. coli</i> testing - Routine	<i>E. coli</i> testing NATA Lab
Neds Beach	Medium	Twice yearly	NA
North Bay	Medium	Twice yearly	NA
Old Settlement Beach	Low	Twice yearly	NA
Playground	Low	Twice yearly	NA

Note 1: As assessed in Appendix A

Record the date of testing in schedule and results in the **standard results sheet**.

Notify the Public Health Unit of all test results (both non-detects and detected) for Airport, Co-op, Public Hall, Board Offices, Hospital and Jetty).

4.3 Non-routine procedures

Non-routine procedures have been developed for the following:

- Post wet weather procedures
- Contamination procedures
 - Response to microbial contamination
 - Response to metal contamination
- Emergency water supply & water carting procedures
 - Water carting vehicle cleaning
 - Rain water emergency supply
 - Bore water emergency supply

4.3.1 Post wet weather procedures

First flush devices are an important preventative measure in improving water quality. By diverting accumulated dust, bird and animal droppings, leaves and other debris, contaminants are stopped from entering the rainwater tank.

Following a wet weather event the following maintenance procedures should be undertaken:

- Empty first flush diverter (if present)
- Clear inlet screen/strainer of debris

Record these activities in the **post wet weather checklist** found in Appendix D.4.

4.3.2 Contamination procedures

Response to microbial contamination

If a dead animal is found or contamination of water source is detected the following procedures need to be undertaken:

- Rehabilitation of the tank:
 - remove the source of contamination, e.g. bird carcass
 - repair means of access, e.g. torn outlet screen
- Warn water users; replace “Rainwater” signs with “Boil all drinking water” signs, until problem has been resolved
- Notify Public Health Unit
- Consider dosing the tank with chlorine (for guidance on the safe use of chlorine see Chapter 5 of the *NSW Private Water Supply Guidelines* (refer to tables in *NSW Health Private Water Supply Guidelines* or contact PHU or Appendix C.1) and record chlorine dosing
- *E. coli* testing to confirm that problem has been remedied.

Record chlorine dosing in the **chlorine dosing record** found in Appendix D.5.

Record any incidents in the **contamination & incidents record** in Appendix D.6.

Response to metal contamination

Water that has lain in pipes overnight or longer can have an increased concentration of lead and copper from exposure to soldered copper pipes and brass elbows, particularly in ‘soft’ water sourced from rainwater tanks. Users should be advised to:

- As a minimum, flush the water from drinking taps for three minutes if the water has been stagnant for a period of time (e.g. more than 1 week); and
- Preferably, flush the water from drinking taps tap for three minutes first thing in the morning before drinking the water.

If a risk from lead or other metals is identified, the following tasks need to be undertaken:

- Place a temporary sign at the tap advising that the water should not be used for drinking or cooking.
- Replace or cover (paint) lead on the roof (flashings, lead washers etc.)
- Confirm that downpipes are a lead free grade of PVC (not stormwater grade)
- Re-test the water for lead after removing sources from catchment (test a sample collected after tap has been flushed for at least three minutes)

- Record incident.

Record any incidents in the **contamination & incidents record** found in Appendix D.5.

4.3.3 Emergency water supply & water carting procedures

Water carting vehicle cleaning

The following procedure has been adapted from the *NSW Guidance for Water Carters*. Prior to and after emergency water supply, water carting tanks and fittings must be cleaned. Cleaning does not need to be performed if cleaning was performed in the last 72 hours. The procedures for cleaning are as follows:

- Drain container
- Clean exterior and all openings
- Clean inside of tank, hose and fittings
- Rinse clean with drinking water
- Fill with drinking water
- Chlorinate to 5 mg/L. Refer to dosing guide in Appendix C.1.
- Seal securely against dust and sunlight
- Hold for at least 30 minutes
- Measure chlorine level to ensure safety of disposal
- Dispose of water or use for non-potable purposes

If the water carting tanks are to be supplied using a rain water supply, follow the *rain water emergency supply procedures*.

If the water carting tanks are to be filled with bore water, follow the *bore water emergency supply procedures*.

Rain water emergency supply

In the event that rain water is supplied and carted during water shortages, the following procedures are to be followed for each separate supply that water is sourced from:

- Measure the pH and turbidity and perform colilert
- If *E. coli* is present,
 - Signpost tank
 - disinfect source tank with chlorine as appropriate (see Appendix C.1)
- Retest for *E. coli*, turbidity, pH, free chlorine and total coliforms
- If results are acceptable, fill water cart tank.
- Create a record with the following information:
 - The locations of the source water tanks
 - The date and time that water was drawn
 - The name and address of each person supplied with water
 - The place, date and time that water was supplied to that person

- The volume of water supplied to that person
- Details of any substances other than drinking water, transporting in the water tank
- The dates on which any water tank used were cleaned
- Retain record for six months.

Record activity in **water carter record** in Appendix D.7.

If *E.coli* or other contamination is present, **record** incident in contamination & incidents records found in Appendix D.5 which can be photocopied, marked up and filed.

Bore water emergency supply

In the event that bore water is supplied and carted during water shortages, the following procedures are to be undertaken:

- Flush bore for a period of time which is sufficient to discard stagnant water (approx. 10-15 min)
- Perform and *E. coli* testing locally:
 - Fill water carting vessel and disinfect with chlorine as appropriate (see Appendix C.1)
- Refer to chemical testing results (nitrate and sulphate) from routine monitoring program for previous 12 months.
- Create a record with the following information:
 - The locations of the bore
 - The date and time that water was drawn
 - The name and address of each person supplied with water
 - The place, date and time that water was supplied to that person
 - The volume of water supplied to that person
 - Details of any substances other than drinking water, transporting in the water tank
 - The dates on which any water tank used were cleaned.
- Retain record for six months.

Record activity in **water carter record** found in Appendix D.7.

If *E.coli* or other contamination is present, **record** incident in contamination & incidents records found in Appendix D.5.

5 Action Plan

A summary of actions to be undertaken are included in Table 5-1, with further information detailed in the following section.

Table 5-1. Action Plan

Ref	Action	Responsibility	Timeframe	Date completed
A1	Implement chemical monitoring schedule			
A2	Ensure information sheets are in all Board owned houses especially as staff/occupancy changes occur			
A3	Install Triple Filtration at Jetty			

5.1 Water Treatment

Potable water supplied by The Board to public areas with a high risk score have water treatment installed with regular quality monitoring. High risk sites are listed in Table 5-2.

Table 5-2. Locations with water treatment and regular quality monitoring

Tank location	Risk Score ¹
Airport	High
Co-op	High
Public Hall	High
Board Offices	High
Hospital	High
Jetty	High

Note 1: As assessed in Appendix A

Water treatment includes:

- filtration
- chlorine dosing
- UV treatment

Where chlorine dosing is implemented, weekly free chlorine monitoring at taps is undertaken. Free chlorine levels should be at least 0.5 milligrams per litre. Chlorine dosing procedures are included in Appendix C.1.

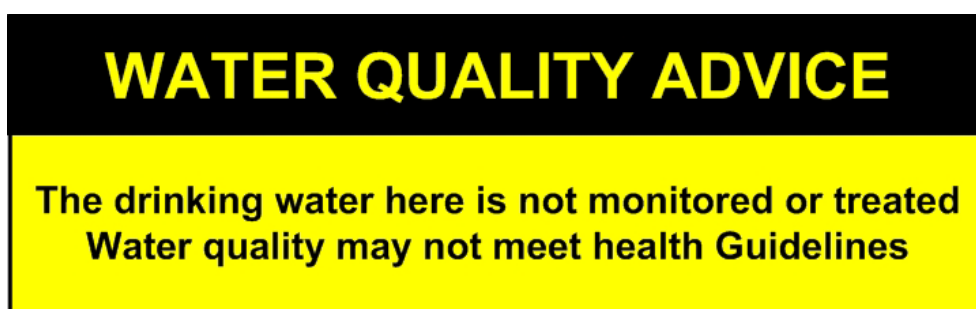
Note: When choosing a treatment device look for certification including AS/NZS 3497:1998 (Plumbing Requirements), AS/NZS 4348:1995 (Performance Requirements – details how to test), NSF/ANSI and EN standards.

5.2 Sign posting

Taps and outlets should be identified in accordance with the following:

1. Treated supplies at the Hospital, Airport, Co-Op, Public Hall, Board Offices and Jetty do not require any signage.
2. Rainwater supplies at Board owned houses and other untreated supplies should have 'RAINWATER' signage installed in accordance with Australian Standard AS 1319 *Safety Signs in an Occupational Environment*. The sign should provide advice that water quality is not monitored.

Table 5-3 Example of a rainwater sign and water quality advice sign



3. Non-potable supplies at the Playground, Ned's Beach, Old Settlement Beach and North Bay will have similar signs to above rainwater sign, in an orange colour, with the wording to the effect that the supply is not suitable for drinking.

Record locations of signage in **sign posting record** in Appendix D.1.

6 References

Department of Health, NSW & Environmental Health Standing Committee. 2010. Guidance on use of rainwater tanks. Online subscription:

<http://www.health.gov.au/internet/main/publishing.nsf/Content/ohp-enhealth-raitank-cnt.htm>

Department of Health, NSW. 2014. NSW Private Water Supply Guidelines. Online subscription:

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

Department of Health, NSW & NSW Food Authority. 2012. NSW Guidelines for Water Carters. Online subscription:

<http://www.health.nsw.gov.au/environment/Publications/nsw-guidelines-for-water-carters.pdf>

Appendix A 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.

A.1 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 Table A-1. Overall Risk assessment

Hazard	Risk Rank	Is the Hazard Controlled?	How is this control monitored?
Faecal contamination from birds and small animals from overhanging branches on roof	Site dependant	Trim branches to prevent animal droppings First flush devices Filtration Routine cleaning of high risk sites	Quarterly inspection Post wet weather procedure
Faecal contamination from birds roosting directly on roof	Site dependant	First flush devices Filtration Routine cleaning of high risk sites	Quarterly inspection Post Wet weather procedure
Faecal contamination from birds and small animals with access to the tank	Low	Screens on the inlet and outlets Tank integrity	Visual Inspection
Lead contamination from lead based paints and primers on roofs or lead flashing	Unknown – likely to be low.	Appropriate selection of roof and plumbing materials	Water quality testing
Chemical contamination from pipework due to water standing in pipe overnight (copper pipes)	Low	If the first use in the morning is for drinking or food preparation, run the tap for several minutes	Water quality testing
Faecal contamination from buried pipework including ingress if contaminated water and potential cross connections	Low	Most pipework is above ground	Water quality testing

The rainwater tanks that make up the water supply under the Public Health Act have been given a priority score for the purposes of water quality testing and other risk based maintenance activities. This score reflects the size of the population that would be affected by a contamination of that system and specific risks of each supply

Appendix Table A-2. Risk ranking of tanks

Tank location	Water Quality	Risk Score	Basis
Airport	No detect of <i>E. coli</i> from all samples done on LHI since May 16	High	The airport has 2 bubblers with one also a bottle filling station and has up to 300 people passing through on busy days
Co-op	No detect of <i>E. coli</i> from all samples done on LHI since May 16	High	The Co-op tanks require regular inspections (undertaken as part of other routine activities) due to the higher than normal leaf litter it accumulated. There is also a bottle filling station in the public area outside the Co-op. The Co-op no longer operates - name remains for consistency

Tank location	Water Quality	Risk Score	Basis
Public Hall	No detect of <i>E. coli</i> from all samples done on LHI since May 16	High	The hall can be used for large groups where the water could easily be used for drinking and food preparation
Board Offices	No detect of <i>E. coli</i> from all samples done on LHI since May 16	High	Up to 40 people may use this source for drinking water during the day. A contaminated source leading to illness may pose significant operational issues for the Board. There is a public water bottle filling station outside the Liquor Store at the Board Offices.
Hospital	No detect of <i>E. coli</i> from all samples done on LHI since May 16	High	Few people are exposed to this supply, however they may be immuno-compromised.
Jetty & Jetty Cargo Shed	No detect of <i>E. coli</i> from all samples done on LHI since May 16	High	Managed as one source. Up to 15 people use this source during ship unloading operations. Yachts resupply potable water using this source.
Neds Beach		Medium	There is limited other drinking water nearby so those who have walked to the beach may drinking or refill containers from the tap.
North Bay		Medium	This supply is difficult to get to, this may reduce the people exposed to it, however it also means that routine maintenance activities may not be undertaken as regularly
Old Settlement Beach		Low	Few people would use this supply for potable use
Playground		Low	Although high use by children, tap arrangements mean it cannot be used to fill water bottles. Only used for hand washing.
Waste Mgt Facility		Low	Not used routinely as a potable source
New Power House		Low	Not used routinely as a potable source
Research Facility		Low	
OPH/Post Office		Low	Not used routinely as a potable source
Airport Hangar		Emergency	Risks to be managed through the emergency rainwater procedures
Church of England		Emergency	Risks to be managed through the emergency rainwater procedures
Bureau of Met		Emergency	Risks to be managed through the emergency rainwater procedures

Appendix B Common sources of contamination (hazards) & 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)	<ul style="list-style-type: none"> • First flush device • Regular cleaning of roof and gutters • Removal of overhanging branches • Regular inspections • Water treatment (disinfection) • Filtration
	Rain water Roof material (e.g. lead-based paint, lead flashing, bitumen-containing products, treated timber, peeling paint)	<ul style="list-style-type: none"> • 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
	Groundwater (bore, well, spring) Surface water seepage	<ul style="list-style-type: none"> • 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)	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • Regular inspection, cleaning and maintenance program
	Tank materials (e.g. pH of water in concrete tanks, high metals from metallic tanks)	<ul style="list-style-type: none"> • Materials in contact with water comply with relevant Australian Standards • Chemical adjustment of pH in new concrete tanks may be necessary
	Backflow water (e.g. from animal water troughs)	<ul style="list-style-type: none"> • Backflow prevention device
Distribution system	Pump and plumbing materials	<ul style="list-style-type: none"> • All materials in contact with water comply with AS/NZS 4020:2005
	Leaching from bore casings, pipes or plumbing materials	<ul style="list-style-type: none"> • All materials in contact with water comply with AS/NZS 4020:2005 • Flush standing water at irregularly used fixtures

Appendix C Procedures

C.1 CHLORINE DOSING REQUIREMENTS

Free chlorine levels should be at least 0.5 milligrams per litre. To calculate the millilitres of 12.5% liquid sodium hypochlorite required to disinfect water in a tank, refer to Appendix Table C-1. For example, to achieve 5 mg/L chlorine in a 1000 L tank, add approximately 40ml of 12.5% liquid sodium hypochlorite.

Note: these values are only an estimate and do not account for the water quality of the water supply.

Appendix Table C-1 Chlorine dosing requirements

Amount of water (L)	Concentration of chlorine required		
	For 1 mg/L, add (ml)	For 2 mg/L, add (ml)	For 5 mg/L, add (ml)
1000	8	16	40
2000	16	32	80
5000	40	80	200

C.2 KEROSENE DOSING REQUIREMENTS

Appendix Table C-2 Kerosene dosing requirements

Tank size (L)	Dose (mL)
1000	5
10,000	15

C.3 PH ADJUSTMENT PROCEDURES

pH should be in the range of 6.5 – 8.5 and ideally 7 for effective chlorination. The following procedures are undertaken for pH adjustment if the water is too acidic i.e. pH below 6.5:

- Add 1 kg of sodium bicarbonate (baking soda)
- Mix
- After one hour check pH
- If pH is not in the acceptable range, add 0.5 kg of sodium bicarbonate in increments while mixing until acceptable range is met.

D.3 ROUTINE MAINTENANCE CHECKLIST

Monthly and quarterly maintenance checklist

Monthly	Quarterly
<ul style="list-style-type: none"> ○ Inspect water for presence of mosquito larvae ○ Clear inlet screen/strainer of debris ○ Check integrity of inlet and outlet screens (exclude vermin and mosquitoes) ○ Check access covers are closed and roof and access hatches are secured ○ Check first flush devices and gutters and empty contents if required ○ Ensure runoff surfaces have NOT recently been painted with lead based paints or primers ○ Ensure roofs have not be modified or subject to exposed treated wood ○ Check lamp life and cleanliness of UV filters 	<ul style="list-style-type: none"> ○ Inspect water for presence of mosquito larvae ○ Clear inlet screen/strainer of debris ○ Check integrity of inlet and outlet screens (exclude vermin and mosquitoes) ○ Check access covers are closed and roof and access hatches are secured ○ Check first flush devices and gutters and empty contents if required ○ Prune overhanging branches ○ Clean roof, gutters & spouting ○ Check for runoff surface corrosion ○ Check overflow screens ○ Ensure that pipe work is protected from cross-connections; and separate from septic & sewerage pipes ○ Change/clean filtration units (if required) ○ Clean or de-sludge tank (if required)

Location	Quarter		
	Month:	Month:	Month:
Airport			
Co-op			
Public Hall			
Hospital			
Depot / Office (Board Administration Complex)			
Jetty and Cargo Shed			
Old Settlement Beach			
Playground			
Ned's Beach			
North Bay			
WMF (Waste Mgt Facility)			
New Power House			
Old Power House / Post Office			

Church of England			
Research Facility			
Bureau of Meteorology			
Airport Hangar			

Annual maintenance checklist

Location	Inspect for Structural Condition	Ensure all equipment associated meets Australian/NZ Standards
Airport		
Hospital		
Old Settlement Beach		
Jetty and Cargo Shed		
Depot / Office (Board Administration Complex)		
Co-op		
Public Hall		
North Bay		
Ned's Beach		
WMF (Waste Mgt Facility)		
New Power House		
Old Power House / Post Office		
Playground		
Church of England		
Research Facility		
Bureau of Meteorology		
Airport Hangar		

D.7 WATER CARTER RECORD

Source details				
Source type (circle appropriate)	Rainwater		Bore	
Location				
Time & date of withdrawal	Date:	Time:	Date:	Time:
Volume of water (L)				

Recipient 1 details				
Name of recipient:				
Name(s) of users:				
Address of recipient:				
Receiving tank location:				
Time & date of receipt:	Date:	Time:		
Volume of water supplied (L)	Volume:	Date:		
Date of last tank clean:				
Notes:				

Recipient 2 details				
Name of recipient:				
Name(s) of users:				
Address of recipient:				
Receiving tank location:				
Time & date of receipt:	Date:	Time:		
Volume of water supplied (L)	Volume:	Date:		
Date of last tank clean:				
Notes:				

Recipient 3 details				
Name of recipient:				
Name(s) of users:				
Address of recipient:				
Receiving tank location:				
Time & date of receipt:	Date:	Time:		
Volume of water supplied (L)	Volume:	Date:		
Date of last tank clean:				
Notes:				

Appendix E Information sheets

E.1 INFORMATION SHEET FOR BOARD OWNED RESIDENCES

Rainwater tank responsibilities

This property is supplied with rainwater. The provision of good quality water depends on correct design and installation followed by sensible maintenance of the rainwater tank and catchment area. The collection of rainwater involves “low maintenance, not no maintenance”.

This information sheet outlines your responsibilities and those of the LHIB for managing the rainwater system.

Occupiers’ responsibilities:

It is good practice for the Occupier to flush any rainwater taps used for drinking or cooking for 2 to 3 minutes at the start of each day. This is because water that has been standing for a period long enough can dissolve metals such as copper and lead from the pipework. This “first-flush” of water can then be used for washing up, watering plants or other non-drinking uses.

Most rainwater tanks are fitted with a first flush device to divert the initial runoff from entering the tank. This will reduce the contaminants including dust, bird droppings and leaves, that can accumulate on roofs, from being washed into tanks. You are responsible for emptying this device between rain events.

Rainwater can be disinfected by bringing to a rolling boil, and allowed to cool before drinking. Regular disinfection should not be necessary (unless required on medical advice). However, if you suspect that water in the tank is contaminated, it can be tested and or chlorinated. See contact details below.

The LHIB’s responsibilities:

The LHIB is responsible for maintenance activities associated with the tank including replacing overflow screens, trimming overhanging branches and roof maintenance.

For any maintenance enquiries or if you want water quality testing undertaken, contact:

Name: Ian Fitzgerald

Phone: 02 6563 2066

For more information see:

http://www.health.nsw.gov.au/environment/water/Documents/rainwater_tanks.pdf

<http://www.health.gov.au/internet/main/publishing.nsf/Content/ohp-enhealth-raintank-cnt.htm>