POINT BOSTON STAGE 1 DEVELOPMENT – WATER CYCLE INFRASTRUCTURE INTERIM SCHEME

Community Plumbing Guide

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Limitations Statement

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The passage of time, manifestation of latent conditions or impacts of future events may require further data analysis, and re-evaluation of the findings, observations and conclusions expressed in this report.

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Revision History

Revision*	Date	Comment	Signatures		
			Originated by	Checked by	Approved by
0	28/10/2013	Issued to the Client	ARM	JW	JW
1	05/11/2013	Issued to the Client following modifications from reviews by DHA, OTR and Hindmarsh Plumbing	ARM	JW	JW
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Note* Refer to Appendix F inside the back cover for details of successive revisions.

POINT BOSTON

COMMUNITY CORPORATION 25691 INC.

WATER AND WASTEWATER

CONTACT NUMBERS AND ADDRESSES

EMERGENCIES

EP Water Treatment, 124 Mortlock Terrace, PORT LINCOLN SA 5606

Telephone: 0427 053 909 (all hours) or (08) 8683 0408

Email: trevor.castley@epwater.com.au

GENERAL ENQUIRIES

Whittles Management Services, 176 Fullarton Rd, DULWICH SA 5065

Telephone: 08 8291 2300

Email: ian.wallis@whittles.com.au

PUBLIC HEALTH RISK INCIDENTS

Drinking water

Department of Health and Ageing, Level 1 CitiCentre, 11 Hindmarsh Square
ADELAIDE SA 5000

Telephone: 1300 558 657 (all hours), (08) 8226 7100 (business hours)

Wastewater and recycled water

Department of Health and Ageing, Level 1 CitiCentre, 11 Hindmarsh Square
ADELAIDE SA 5000

Telephone: 1300 043 215 (all hours)

OR

Manager Wastewater Management Section, Applied Environmental Health
Address as above

Mobile: 0401 997 924 Email: tony.farror@health.sa.gov.au

GENERAL HEALTH AND BUILDING PLUMBING

Leith Blacker, Manager Development and Environmental Services

District Council of Lower Eyre Peninsula, 32 Railway Terrace, CUMMINS SA 5631

Telephone: (08) 8682 1622 Mobile: 0427 864 770 Email: Leithb@dclep.sa.gov.au

ENVIRONMENTAL RISK INCIDENTS

EPA
Level 8, 250 Victoria Square
ADELAIDE SA 5000

Telephone: (08) 8204 2004 (all hours) Email: epainfo@eps.sa.gov.au

PLUMBING INCIDENTS AND GENERAL ENQUIRIES

Office of the Technical Regulator

Level 6, 131-139 Grenfell Street.

ADELAIDE SA 5000

Mobile: 0409 286 919 (incidents and general enquiries).

COMMUNITY CORPORATION 25691 INC.

POINT BOSTON STAGE 1 DEVELOPMENT INTERIM SCHEME WATER CYCLE INFRASTRUCTURE RISK MANAGEMENT RESPONSIBILITIES

The following PBCC personnel responsible for the management and operation and maintenance of the Point Boston Stage 1 Development Interim Scheme Water Cycle Infrastructure acknowledge that they have read and understood the risk management responsibilities in this document with respect to the infrastructure approved by the Department of Health and Ageing as included in Appendix E of Point Boston Stage 1 Development Management and Operation Plan (KBR code AEG214-TD-WE-PLN-0002 Rev. 3).

Position	Name	Signature	Date
Corporation Manager	Ian Wallis		27/01/2014
Portfolio Manager Water	Ian Crossland		27/1/2014
Water Services Operations Manager	Trevor Castley		27/01/2014
Plumbing Compliance Coordinator	Dale Parker		27/01/2014
Site Manager	Andrew Stagg		27/01/2014

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POINT BOSTON STAGE 1 DEVELOPMENT
COMMUNITY PLUMBING GUIDE

PREFACE

Why is this Guide necessary?

Point Boston Stage 1 Development is an innovative benchmark urban water conservation development designed to be over 90% independent of mains water. The water services are owned and operated by Community Corporation 25691 Inc. (Point Boston Community Corporation [PBCC]).

All dwellings in the development have special water conservation services as follows:

- The primary drinking water supply from roof rainwater tanks with a supply pump, micro-filter and ultraviolet (UV) disinfection.
- A trickle feed back-up drinking water supply delivering to the rainwater tanks from an SA Water sourced mains drinking water reticulation in the street.
- A high quality recycled non drinking water supply from a reticulation network in the street for toilet flushing, washing machine cold water, garden drippers and other outside non drinking uses. *[During the interim period before installation of the recycled water filtration plant the non drinking water reticulation will be supplied with mains drinking water.]*
- A Biolytix on-site wastewater treatment unit with a pumped connection to a treated effluent collection network in the street.
- A 4,000 L fire service tank for all houses, filled and maintained by a trickle feed from the mains drinking water reticulation in the street. This tank may be accessed by the Country Fire Service (CFS) in a fire emergency.

In some streets there is a fire service main charged with recycled non drinking water but this is not connected to the household allotment fire service tanks. *[During the interim period before installation of the recycled water filtration plant these fire service mains will be supplied with mains drinking water.]*

Built-in, buried and exposed pipework for the above services is colour differentiated as follows:

- Untreated rainwater – green or green striped black
- Drinking water – blue or blue striped black
- Recycled non drinking water – purple or purple striped black
- Pumped effluent – cream or cream striped black
- Fire tank fittings – red

A colour house water services plumbing isometric representation is included in page 17 and is a useful reference when reading this guide.

The guide is for all householders in the Point Boston Stage 1 Development as well as their plumbers, builders, architects, engineers and landscapers. It aims to ensure proper installation of rainwater tanks for drinking water, recycled non drinking water services and on-site wastewater treatment units and to provide an informative guide for safe use of recycled non drinking water.

The main objective of this guide is to ensure that the drinking water, recycled non drinking water and pumped effluent services are not cross connected within properties. Strict compliance with the above pipe colours and associated signage is essential to achieve this objective. Also, simple cross connection check procedures are included to enable residents to confirm the safety of the supplies on a regular basis. In addition, the PBCC carries out rolling plumbing safety audits on 20% of houses each year and when change of ownership occurs.

The Department of Health and Ageing (DHA) is to be advised immediately of any cross connections and cross contamination incidents, corrective actions taken and consumer health warnings issued. Local residents will also be advised via the PBCC website (www.pointbostoncommunity.com) and telephone.

For the pipe networks and facilities beyond individual property boundaries PBCC has ongoing operation, prevention and check procedures in place to

- guard against the occurrence of cross connections
- maintain the pressure of the recycled non drinking water network above that of the pumped effluent and the pressure of the drinking water above that of the recycled non drinking water to minimise cross contamination risk
- maintain the back-up drinking water and the recycled non drinking water within DHA approved quality limits
- keep residents informed through the PBCC website of all health safety incidents and aspects of the water services systems.

Community water cycle inductions

All owners, residents, and system designers and installers receive an induction by the PBCC to the health risk management of the rain water, drinking water, recycled non drinking water and pressure effluent systems serving all households.

Obtain a copy

Copies of this guide can be downloaded from www.pointbostoncommunity.com.

Water services emergency and general enquiries

Call the PBCC on 0427 053 909 for urgent matters and emergencies and (08) 8291 2300 for general enquiries. For a full list of contacts see page *iii* at the front of this guide.

1. Rainwater and Drinking Water Systems

1.1 Introduction

PBCC is committed to the sustainable use of water and supporting the community to become more water efficient.

Requiring plumbing of rainwater tanks to supplement mains water supply in new housing developments is one of a number of initiatives taken by the South Australian Government to encourage more sustainable water use. In Point Boston this initiative has been extended to require rainwater tanks to be the primary drinking water supply source and to have a mains supplementary drinking water connection as a back-up supply. The objective is for the development to be over 90% independent of mains drinking water.

This section of the guide is to help system users, owners, designers and installers understand the special requirements of the rainwater tank drinking water and mains supplementary drinking water back-up systems and how rainwater may be safely used for drinking water purposes within households.

1.2 Rainwater tank household drinking water supply system features

The residential and non residential buildings within the development collect and make maximum use of rainwater. Each property captures, stores, filters and disinfects rainwater to be used on that property. An illustrative schematic of a typical household water services layout, including the drinking water system, is presented on page 17.

1.2.1 *Minimum rainwater tank volumes*

The minimum total volume of rainwater tanks required for each house based on roof area and the number of bedrooms is provided in *Point Boston House Rainwater Tank Minimum Requirements* (tank schedule). This schedule is included as Appendix A of this guide and is also available from the PBCC office and website. It also forms part of the District Council of Lower Eyre Peninsula (Council) building requirements for the development.

It is essential that all houses have the rainwater tank volumes listed in the abovementioned tank schedule as a minimum, to ensure that water shortages do not occur. The development has only limited access to supplementary mains water via a small bore pipe from the SA Water main in Lincoln Highway. As a result, PBCC will not allow a reduction in the scheduled tank volumes.

Runoff from all roof areas on the allotment shall be collected in interconnected rainwater tanks. The tank selected to supply each individual premises shall be equipped with an electric pump, cartridge micro filter and UV disinfection unit to supply all drinking water quality requirements.

Technical aspects of interconnecting and arranging the tanks are discussed in Section 4.6 of the guide.

1.2.2 *Micro filtration and UV disinfection*

First flush diverters shall be used on downpipes to direct roof litter and dust away from rainwater tank inlets. The harvested rainwater shall be drawn from the final tank and pumped through a micro filter, to remove sediment, bacteria and parasites and then through a UV disinfection unit to make it safe for drinking water uses.

Filtered and UV disinfected rainwater is used for drinking water; all hot water; kitchen water; bathroom showers, baths and basins; laundry troughs; bidets and dishwashers.

Toilet flushing, cold water supply for clothes washing machines and garden dripper irrigation, car washing and other outdoor uses is from a reticulated recycled non drinking water supply.

The UV unit has a visual display monitor and alarm mounted in the house to warn occupants if the unit is not functioning. If the alarm occurs, the drinking water supply valve at the tank shall be turned off until the unit is serviced by a manufacturer authorised service person.

1.2.3 *Mains water back-up*

The reticulated mains water (drinking water) supply (ex SA Water system) is provided for rainwater tank back up supply during low rainfall periods. Houses with a small roof area to bedroom ratio require a higher volume of supplementary water. The mains supplementary drinking water supply is restricted to 0.4 L/minute by a flow controller located on a branch from the property connection service pipe.

In addition to backflow protection at the meter (non testable dual check valves), household supplementary mains water supply connections shall have a backflow protection air gap between the float or level switch control valve inlet and the tank overflow level as detailed in section 4.5.3. Other PBCC approved tank inlet backflow protection devices will be considered in addition to the non testable dual check valves at the meter. PBCC shall replace household domestic non testable dual check valve devices every five years at the time rolling audits are undertaken.

1.2.4 *Tank arrangements (including fire service tank)*

Where a property has a buried final tank supplying the drinking water pump, filter and UV unit, a testable backflow protection device is required on the supplementary mains water supply line to the tank in addition to a non testable dual check valve at the meter. The plumber is required to investigate the backflow protection requirements as set out in Sections 4.10.3 to 4.10.5 of the guide.

All allotments in the development are on sloping ground. As such, it may not always be convenient to have all tanks at the same full supply level with the same or progressively stepped bottom levels using simple gravity interconnections. In these cases the interconnections will be more complex but stepped full supply levels are possible using level operated valves on gravity interconnections. Details of this arrangement are shown on the house allotment water systems schematic drawing at the end of Section 4 of the guide.

Tanks shall be a minimum of 500 mm below the gutters of the roof areas they service.

A portion of the tank that the drinking water supply pump, micro filter and UV unit is connected to shall be provided as a compartment for the mains supplementary drinking water supply. The compartment shall have a volume of 200 L for each bedroom in the house, (e.g. a three bedroom house shall have a 600 L supplementary mains drinking water compartment).

The 4,000 L fire service tank is filled and maintained by a 2.8 L/minute trickle feed connection from the mains supplementary drinking water connection. The fire service water storage cannot be a compartment within the drinking water tank system. It shall be a separate non combustible tank with a backflow protected connection. This is to prevent the risk of contamination of the mains supplementary drinking water supply by backflow from the fire tanker suction hose, as in almost all cases the fire appliance would be sucking up hill.

The fire service storage tank is installed for fire fighting purposes only. The stored water is there for the fire protection of your property using the specified petrol fuelled pump. It can also be accessed by a CFS tanker for general fire fighting. The water shall not to be used for any other purpose, (e.g. not for drinking or irrigation). The tank shall be located not more than 20 m hose-on-ground distance from the edge of road bitumen.

1.2.5 *Drinking water pump set pressure*

PBCC shall be consulted to advise the set pressure and flow of the pump when the drinking water system is being designed (refer to Section 4.7). This is to ensure that the set pressure is sufficiently above the recycled non drinking water pressure to minimise the risk of cross contamination of the drinking water. The proposed elevation of the pump is necessary to provide required pump performance data.

The pressure difference between the drinking water and the recycled non drinking water systems shall be checked by PBCC during its five yearly rolling audits of household plumbing and when change of ownership occurs. However, residents can request a check of the pressures at any time.

1.2.6 *Cross connection management*

It is recommended that simple cross connection checks be carried out regularly by residents. These are included in Sections 2.4 and 3.5 of the guide. These checks shall also be carried out by the plumber in the presence of the resident/manager after completion of any water services plumbing.

Under no circumstances is there to be a direct pressure connection between the mains water supply and the household drinking water plumbing. Mains water is only permitted to enter via the final rainwater tank serving the drinking water system as outlined in Section 1.2.4.

1.2.7 *Tank and equipment repair and maintenance*

Rainwater tanks need regular maintenance and the water inside the tank may not always be of a good quality. The quality of rainwater can be influenced by a number of different factors including roof and gutter maintenance, tank cleaning and flushing, and first flush device maintenance. Repair and maintenance of all rainwater equipment including

rainwater tanks, pump, micro filter and UV disinfection unit and the fire service tank is the responsibility of the property owner.

The rainwater micro-filter element shall be replaced annually or more frequently as per the manufacturers' recommendations and the UV disinfection unit will need regular maintenance and parts replacement. It is the responsibility of householders to consult with the manufacturers of equipment to determine the frequency of maintenance. The PBCC Plumbing Compliance Coordinator can give general advice on these matters.

1.2.8 *Pipework colour coding*

Pipe and fitting colour coding is one of the best defences against cross connections. The colours applying to the rainwater tank and drinking water pipework, whether exposed, built-in or buried, and fire service tank fittings are:

- Untreated rainwater – green
- Drinking water – blue
- Fire tank fittings – red

Often it is not possible to obtain colour coded fittings and, except for water meters and fire tank fittings, non colour coded fittings are acceptable. However, miscoloured fittings are not acceptable, e.g. purple fittings on blue drinking water pipework. An exception is black polythene fittings which are allowed on blue striped drinking water and purple striped recycled non drinking water polythene pipework.

1.2.9 *Pipe marking and signs at taps*

In addition to colour coding, pipe markings and signs are an important defence against cross connections and misuse of recycled non drinking water and are detailed in Section 4 of this guide. For drinking water it is not usual to have drinking water pipe marking and signs as the water is safe for all purposes. However, for Point Boston properties any outside drinking water taps shall have a sign 'DRINKING WATER – USE SPARINGLY' in blue. Other signage for example is that untreated rainwater taps have a sign 'RAINWATER – DO NOT DRINK' in green and the fire service tank 'FIRE WATER SUPPLY - DO NOT DRINK' in red.

Full information on signage and pipe marking is given in Section 4 of this guide.

1.3 Plumber certification and works approvals

Water services plumbers installing new, or making alterations to existing, rainwater and/or drinking water plumbing are required to be inducted and certified by PBCC before commencing design or installation work on houses within Point Boston development. Plumbing designs shall be submitted to the Council, being the regulatory body for plumbing approvals. Progress inspections shall be booked with the Council's buildings branch. On completion at handover the plumber shall issue a Plumbing Certificate of Compliance as set out in Appendix C of the guide. Copies of the certificate and as-installed drawings of the rain water, drinking water, recycled non drinking water, wastewater and pumped effluent pipework shall be provided to the OTR, the

owner/occupier, the Council and PBCC with the original retained by the plumbing contractor.

PBCC's Plumbing Compliance Coordinator is available to provide assistance at all stages of the water services plumbing implementation, from design through to handover to the owner. However, the plumber retains responsibility for the quality and fitness for purpose of the installed works.

Full details of the above requirements and procedures are included in Section 4 of the guide.

2. Recycled Non Drinking Water Systems

2.1 Introduction

Water recycling, rainwater harvesting and the adoption of Australian native gardens are the three primary water conserving features of the Point Boston water cycle management strategy, resulting in the development being over 90% independent of mains water.

This section of the guide is to help system users, owners, designers and installers to understand the special requirements of the recycled non drinking water systems and how the water may be safely used for non drinking purposes within and outside houses.

An illustrative schematic of a typical household water services layout including the recycled non drinking water system is presented on page 33.

2.2 Source, quality and uses of recycled non drinking water

2.2.1 *Source and quality*

All houses have Biolytix on-site aerobic wastewater treatment units which produce a secondary quality effluent, as detailed in Section 3. The effluent is pumped by a small pump on the outlet of the units through a pumped effluent reticulation to a central water recycling facility (WRF) at the corner of Sullivan Drive and East Bay Drive.

Point Boston Stage 1 Development recycled non drinking water is the highest quality specified in the *Australian Guidelines for Water Recycling Phase 1 (2006)*. This high quality is achieved in two steps. Firstly the Biolytix on-site units serving each dwelling treat the wastewater to a secondary quality and pump it into a reticulation network. Secondly, the portion to be recycled is treated in an advanced membrane filtration and disinfection recycled non drinking water treatment plant at the WRF before being reticulated to all houses through metered connections. *[During the interim period before installation of the recycled water filtration plant the recycled non drinking water reticulation and fire service mains will be supplied with mains drinking water.]*

2.2.2 *Permitted uses*

Permitted and non permitted uses of the recycled non drinking water are detailed in the box on the next page.

2.3 Recycled non drinking water supply system features

The recycled non drinking water system has distinctive features to make it easy to identify. This guide outlines those distinctive features to assist users in the safe use of the recycled non drinking water.

The reticulated recycled non drinking water enters the property through a purple coloured meter mounted in a typical meter bridge arrangement. The meter is adjacent to the blue supplementary drinking water meter. Whilst the drinking water meter has a non testable dual check valve backflow protection device and flow controllers on the branch lines to the drinking water and fire service tanks, the recycled non drinking water meter has

neither. The meters are different shaped models and have different attachment threads to ensure that interchange is not possible, to prevent misconnections.

What can recycled non drinking water be used for?

✓	✗
Recycled non drinking water CAN be used for:	**Recycled non drinking water MUST NOT be used for**
Toilet flushing	Drinking (human and animal consumption)
Clothes washing machine cold water	Cooking and other kitchen purposes
Washing cars*	Dishwashers
Garden irrigation*	Personal washing, such as baths, showers, hand basins and bidets
Filling ornamental ponds*	Evaporative coolers
	Indoor household cleaning
	Swimming pools and spas
	Recreational activities involving water contact (e.g. children playing under sprinklers)
	Washing companion animals

*Water used to wash cars, paths and other outdoor areas should not be drained into the stormwater system but applied such that it is absorbed into the ground within the allotment as an environmental protection measure in accordance with the Environment Protection (Water Quality) Policy 2003, i.e. not applied to sealed areas such as driveways. For details about this policy, contact the EPA on (08) 8204 2004 or visit www.epa.sa.gov.au.

2.3.1 *Colour coding*

All recycled non drinking water pipework is coloured purple whether exposed, built-in or buried. In the case of garden dripper systems the pipework shall be purple to the solenoid valves, downstream of which black polythene garden irrigation pipe and permeable wall pipe of any colour are permitted. Often it is not possible to obtain colour coded fittings and non colour coded fittings are acceptable except recycled non drinking water taps which must be coloured purple. However, miscoloured fittings are not acceptable, e.g.

blue fittings on the purple pipework. An exception is black polythene fittings which are allowed on purple striped recycled non drinking water polythene pipework.

2.3.2 *Pipe marking and signs at taps and fixtures*

In addition to colour coding, pipe markings and signs are an important defence against cross connections and misuse of recycled non drinking water. It is preferred that pipes be marked by the manufacturer at 500 mm intervals 'RECYCLED NON DRINKING WATER – NOT FOR DRINKING'. A sign 'RECYCLED NON DRINKING WATER – DO NOT DRINK' shall be attached to the wall adjacent to toilet and washing machine connections and outdoor taps. Full information on pipe marking and signage is given in Section 4 of the guide.

2.3.3 *System pressures*

The recycled non drinking water mains are operated at a sustained set pressure at the WRF pumping station. The pressures in the reticulation will be greater in the foreshore allotments than in the more elevated areas. The drinking water pressure in the houses shall be maintained above the recycled non drinking water pressure to minimise the risk of the drinking water being cross contaminated. PBCC shall advise the owner/designer/plumber of the required set pressure of the drinking water pump system on application prior to design of the drinking water plumbing being undertaken as detailed in Section 1.2. The pressure difference between the two systems shall be checked by PBCC in its five yearly rolling audits of household plumbing and on change of ownership. However, residents can request a check of the pressures at any time.

If there is a general power failure the pumps at the WRF will stop and pressure in the recycled non drinking water system will drop considerably to the treated water balancing tank level but will still be sufficient to flush toilets.

If the recycled non drinking water treatment plant is shut down for maintenance, mains drinking water will be discharged to the treated water balancing tanks once they reach a low level. In this case there will be no loss of pressure and the recycled non drinking water system will continue operating as normal.

In the first few years of the development there will be insufficient pumped effluent to allow a water recycling filtration plant to be operated and the above-mentioned method of substituting mains drinking water for the recycled non drinking water will be used. (In other dual pipe developments temporary cross connections are made at the allotment meters but this will not be the case for Point Boston Stage 1 Development.) During this period, the recycled non drinking water reticulation will be charged with mains drinking water which will be used for toilet flushing, clothes washing cold water, garden watering and outside uses. The fire service mains will also be charged with mains drinking water. The operating pressures of the two systems will be at the ultimate recycled non drinking water reticulation level, not at the higher drinking water pressure.

2.3.4 *Cross connection checks*

It is strongly recommended that a simple cross connection check be carried out by residents at six monthly intervals. The procedure is included in Section 2.4 below.

If any plumbing, building or landscaping works are undertaken, residents should make sure all water services systems are operating correctly once the work is complete by undertaking the check. If there is uncertainty about any plumbing issue contact PBCC Plumbing Compliance Coordinator.

2.4 Resident cross connection checks

Check your plumbing for cross connections between the recycled non drinking water and the drinking water every six months:

Step 1 Switch off your drinking water pump and close its delivery valve.

Step 2 Turn off the drinking water supply to your property at the stop valve upstream of the blue drinking water meter.

Step 3 Turn on all of your external drinking water taps one by one. If a tap does not run dry after a short time, it is connected to the recycled non drinking water system or the pumped effluent system. **This is a potential health hazard.** Report it to the Plumbing Compliance Coordinator immediately.

Step 4 Flush your toilets: Your toilet cisterns should refill as they are connected to the recycled non drinking water, which is still turned on. If not, report it to the Plumbing Compliance Coordinator immediately and do not use any water until the matter is rectified and a full health clearance is given.

Check your clothes washing machine cold water connection: The washing machine cold water is connected to the recycled non drinking water. Does it start to fill when the cold water is selected? If not, it is not connected to the recycled non drinking water. Report it to the Plumbing Compliance Coordinator immediately.

Step 5 Turn on all inside taps including the kitchen sink, bath and shower taps one by one. The taps should all run dry in a short time. If any tap does not stop running it indicates that there is a cross connection between the recycled non drinking water or the pumped effluent and the drinking water. **This is a potential health hazard.** If it occurs, report it to the Plumbing Compliance Coordinator immediately and do not use any water until the matter is rectified and a full health clearance is given.

Step 6 Turn off all inside taps and then turn the drinking water back on at the meter. Open the pump delivery valve and switch the pump on. Slowly turn on the drinking water tap that is located the furthest from the meter to enable air to be purged from the pipe work while it is being recharged. Turn on several inside taps carefully, firstly releasing trapped air, to check that water is flowing.

Step 7 Dishwashers, washing machine hot water and evaporative air conditioners should be connected to the drinking water supply – but should not be tested with this supply turned off. To check appliances, make sure the drinking water pump is turned on and turn off the purple recycled non drinking water meter. Turn on appliances one by one. These should fill as normal. If they do not fill, they are wrongly connected to the recycled non drinking water system or the pumped

effluent system. **This is a potential health hazard.** If this occurs, report it to the Plumbing Compliance Coordinator immediately and do not use any water until the matter is rectified and a full health clearance is given.

In addition a check shall be made of the rainwater tank and fire water overflow pipe inspection ports to confirm that the mains drinking water level control valves are not leaking.

If you need any help working through these steps or have any queries at all about recycled non drinking water, contact the Plumbing Compliance Coordinator.

2.5 Plumber certification and works approvals

Water services plumbers installing new, or making alterations to existing, recycled non drinking water plumbing are required to be inducted and certified by PBCC before commencing design or installation work on houses within Point Boston Stage 1 Development. Plumbing designs shall to be submitted to the Council, which is the regulatory body for plumbing approvals. Progress inspections shall be booked with the Council's buildings branch. On completion at handover the plumber shall issue a Plumbing Certificate of Compliance as set out in Appendix C of the guide. This will include in the Notes section the completion dates of each of the three commissioning stages of the recycled non drinking water specified in section 4.1.2 of the Guide. Copies of the certificate and as-installed drawings of the rain water, drinking water, recycled non drinking water, wastewater and pumped effluent pipework shall be provided to the OTR, the owner/occupier, the Council and PBCC with the original retained by the plumbing contractor.

PBCC's Plumbing Compliance Coordinator is available to provide assistance at all stages of the water services plumbing implementation, from design through to handover to the owner. However, the plumber retains responsibility for the quality and fitness for purpose of the installed works.

Full details of the above requirements and procedures are included in Section 4 of the guide.

3. Biolytix On-site Wastewater Treatment Units

3.1 System description

The Biolytix BF6 wastewater treatment system is a below ground on-site single tank aerobic treatment unit with a controls box mounted on the top of the unit. The unit receives wastewater via standard sanitary drainage pipework, fittings and fixtures, treats it by aeration and circulation through an aerobic filter comprising layers of organic soil in the below ground chamber. Treated effluent is discharged by a small allotment pump in the Biolytix chamber to a Community Corporation installed boundary kit connected to the pumped effluent reticulation system.

The BF6 unit is approved by the DHA for up to 10 persons in the connected house. In-Sinkerator type grinder units are permitted to be used with this system. The approval includes that a single annual maintenance service by a Biolytix trained and DHA licensed contractor be undertaken. At this service the level of composted waste in the filter is to be checked and any excess above the required space for a further 12 months storage is removed and taken to an EPA approved biosolids disposal site, such as the Port Lincoln Wastewater Treatment Plant. Non biodegradable items such as plastics and syringes are to be also disposed of to an EPA approved landfill or other facility.

3.2 Installation, operation, repairs and maintenance

An illustrative schematic of a typical household water services layout including the Biolytix unit is presented on page 17, and an installation, operation and service guide for the units is included as Appendix D.

Biolytix have accredited installers and servicing companies in the Port Lincoln district. PBCC will provide a list of these to owners, designers and builders on request. The selected accredited installer shall liaise with the Plumbing Compliance Coordinator regarding unit siting requirements for the allotment concerned.

PBCC arranges the annual servicing of the units, the cost of which is added to the annual body corporate fees for the premises concerned.

Electricity use is normally between 1 and 2 kWh a week for continuous occupancy and is supplied from the household distribution box.

The responsibility for callouts and general maintenance lies with the owner or occupier. As well as visual and audible alarms each unit has facility to be continuously monitored by a telemetry alarm system through the building telephone line and if a maintenance alarm is raised the local Biolytix service company will contact the householder to arrange a time for the service work to be undertaken. If the house is vacant the Biolytix service company will contact PBCC to make arrangements for the necessary service. Those units not fitted with telemetry monitoring will rely on occupants, neighbours or PBCC calling the service company.

3.3 Power failures and house vacancies

During power failures and following some maintenance alarms the Biolytix unit stops operating. To provide for these situations the unit has a more than adequate standard

emergency reserve storage of 1,700 L which is sufficient for two to three days' household discharge before the aerobic filter bed is inundated and then a further one to two days' extreme emergency capacity before overflow occurs. On return of power the unit recovers quickly from a standard emergency event and commences pumping down the effluent build-up. Some on-site maintenance work may be necessary following an extreme emergency storage event.

During power failures there is enough residual pressure in the recycled non drinking water reticulation system for toilet flushing so, whilst the household drinking water pump will not work, toilet flushing will be available.

If premises are vacant for several months and the organic filter dries out the unit will take a few days to reach normal operation efficiency. This will have minimal affect on the operation of the overall wastewater management system. In cases where there is concern about the operation of the unit, the local Biolytix representative should be contacted. Contact details are attached to the units' control panel and in the manual provided by the installer.

3.4 Pipework colour coding

The pumped effluent 40 mm connection from the below ground chamber pump to the boundary box is colour coded cream, as is the connection to the reticulation and the reticulation itself. All these pipes are cream striped black polythene.

Upstream sanitary plumbing connections to the below ground chamber shall be standard light grey colour.

No water services pipes of other colours including black and white shall be used for connections to the Biolytix unit.

3.5 Resident cross connection checks

It is recommended that at six monthly intervals and following any plumbing, building or landscaping works being undertaken, residents should ensure water services systems are operating correctly once the work is complete by undertaking cross connection checks.

The Biolytix pumped effluent connection and the street reticulation system operates under a sustained pressure which is well below that of the recycled non drinking water and household drinking water systems. However, there is a small risk of cross contamination in the event of a cross connection between the pumped effluent connection pipework and other services, including the green rainwater pipework. The cross connection check procedure for the Biolytix pumped effluent follows.

Check your plumbing for cross connections between the pumped effluent and the drinking water and/or recycled non drinking water every six months:

Do this check after the recycled non drinking water to drinking water cross connection check listed in Section 2.4.

Step 1 Switch off the Biolytix aerobic treatment unit at the house circuit board for a day to allow the chamber to collect a reasonable volume of effluent.

Step 2 Switch off the drinking water pump and close its delivery valve.

Step 3 Turn off the supplementary drinking water and recycled non drinking water supplies at the stop valves upstream of the blue and purple meters.

Step 4 Turn on all external and internal drinking water and recycled non drinking water taps and leave them turned on. They should stop running in a short time.

Step 5 Flush your toilets: The cisterns should not refill until the recycled non drinking water is turned on.

Step 6 Switch on the Biolytix unit. Inspect all turned on taps and listen for water flowing into the toilet cisterns. If any taps flow or the cisterns begin filling there is a cross connection between the pressure effluent pipe work and either the drinking water or the recycled non drinking water pipe work. **This is an extreme health hazard**. If it occurs advise the Plumbing Compliance Coordinator immediately and do not use any water until the matter is rectified and a full health clearance is given.

Step 7 Turn off all inside and outside taps and then turn the drinking water and the recycled non drinking water back on at the meters and switch on the drinking water pump and open its delivery valve. Slowly turn on the drinking water tap located the furthest from the meter to enable air to be purged from the pipe work while it is being recharged. Do this also for the recycled non drinking water.

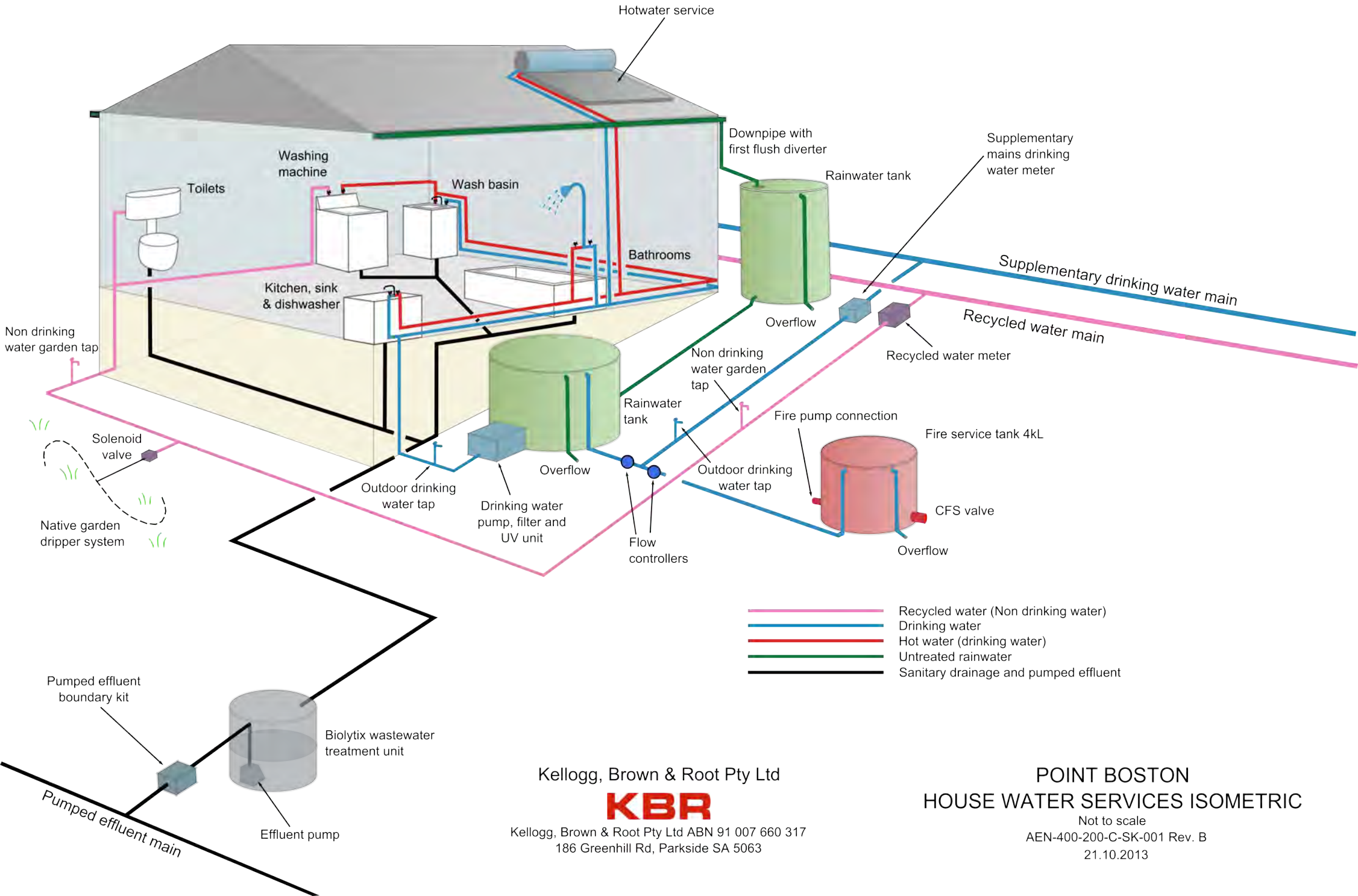
This check shall be undertaken by PBCC on its scheduled five yearly rolling plumbing audits and when a change of occupancy occurs.

If you need any help working through these steps or have any queries at all about recycled non drinking water, contact the Plumbing Compliance Coordinator.

3.6 Plumber certification and works approvals

Water services plumbers installing new, or making alterations to existing wastewater and/or Biolytix pumped effluent plumbing are required to be inducted and certified by PBCC before commencing design or installation work on houses within Point Boston Stage 1 Development. Plumbing designs shall be submitted to the Council which is the regulatory body for plumbing approvals. Progress inspections shall be booked with the Council's buildings branch. On completion at handover the plumber shall issue a Plumbing Certificate of Compliance as set out in Appendix C of the guide. This will include in the Notes section the completion dates of each of the three commissioning stages of the recycled non drinking water specified in section 4.1.2 of the Guide. Copies of the certificate and as-installed drawings of the rain water, drinking water, recycled non drinking water, wastewater and pumped effluent pipework shall be provided to the OTR, the owner/occupier, the Council and PBCC with the original retained by the plumbing contractor. Full details of the above requirements are included in Section 4 of the guide.

PBCC's Plumbing Compliance Coordinator is available to provide assistance at all stages of the water services plumbing implementation from design through to handover to the owner. However, the plumber retains responsibility for the quality and fitness for purpose of the installed works.



Kellogg, Brown & Root Pty Ltd

KBR

Kellogg, Brown & Root Pty Ltd ABN 91 007 660 317
186 Greenhill Rd, Parkside SA 5063

POINT BOSTON
HOUSE WATER SERVICES ISOMETRIC

Not to scale
AEN-400-200-C-SK-001 Rev. B
21.10.2013

4. Plumbing Technical and Certification Requirements

4.1 Purpose of the guide

This guide is for users, designers and installers of the special water services of Point Boston development. The requirements of this guide enable the development to be over 90% independent of mains water and to be a benchmark Australian urban water conservation project.

When it becomes available, recycled non drinking water will provide just over half of the development's water supply. The recycled non drinking water will be sourced from the development's treated wastewater effluent and will be of the highest quality for non drinking residential use in the *Australian Guidelines for Water Recycling*. Whilst the recycled non drinking water is suitable for the domestic non drinking uses of toilet flushing, clothes washing machine cold water, and garden drippers and other outside uses, including skin contact during these uses, it is not safe for drinking, cooking, showering, bathing, household cleaning, filling swimming pools or watering pets.

The two greatest health risks of providing domestic use recycled non drinking water in a housing development are the maintenance of water quality within approved limits and the occurrence of long term cross connections between the recycled non drinking water and the drinking water. For Point Boston there is the further risk of short and long term cross connections between the undisinfected Biolytix pumped effluent system and the disinfected recycled non drinking water and disinfected drinking water.

This guide has been prepared to ensure that residents, designers, installers and operators become participants in, and have a full understanding of, the innovative water cycle initiatives of Point Boston, and particularly the requirements for safe design, installation and operation of the water services systems.

An overview of the dwelling water services systems is given in the introduction to the guide and more detailed descriptions of the drinking water, fire service, recycled non drinking water and wastewater systems are given in Sections 1, 2 and 3 of the guide so are not repeated here.

Page 17 is an illustrative isometric schematic of services for a typical house and page 33 is a detailed engineering schematic of the house plumbing.

4.2 Building and plumbing application requirements

The District Council of Lower Eyre (Council)

32 Railway Tce, (PO Box 41), Cummins SA 5631

Email: mail@dclep.sa.gov.au

Phone: (08) 8676 2106

is responsible for building approvals including initial construction and any modifications of drinking water and recycled non drinking water plumbing, and wastewater drainage systems including the Biolytix unit, i.e. all water services.

PBCC is responsible through its Plumbing Compliance Coordinator for advice on, and confirmation of satisfactory completion of, designs and installations of water services within the development.

The water services designer shall obtain approval of the Council to drawings and specifications of building:

- rainwater, drinking water and fire service plumbing including backflow protection devices
- recycled non drinking water plumbing
- wastewater and Biolytix unit plumbing

The Plumbing Compliance Coordinator is responsible for advising water services designers of the required drinking water supply pump set pressure as detailed in Section 4.7 below. This is essential in order to provide the level of cross contamination protection approved by the DHA.

The water services plumbing contractor is responsible for:

- making application and paying all Council and PBCC fees for assessment and approval of water services plans and specifications
- coordination with the accredited Biolytix unit installer selected by the owner
- obtaining from the Plumbing Compliance Coordinator the schedule of hold point inspections

- booking Council inspections prior to backfilling
- on Practical Completion of the work, issuing to the owner at handover, and within seven days to OTR, Council and PBCC:
    - an OTR Plumbing Certificate of Compliance covering the rainwater, drinking water, recycled non drinking water and wastewater services as per Appendix C of this guide, including if applicable, the Backflow Prevention Device commission, inspection and maintenance report, any additional conditions of Council; and the special requirements of Point Boston Stage 1 Development included in this guide.
    - a certificate of compliance of the Biolytix pumped effluent connection with the Pressure Sewerage Code of Australia (WSA–07) supplied by the Biolytix unit installer
    - a statement that the three stage cross connection integrity testing has been completed in accordance with the procedure in Section 4.12.1 below
    - operation and maintenance manuals of all equipment installed and evidence that the owner/occupier of the premises has received adequate training in the operation and maintenance of all equipment installed, including the Biolytix unit, and the recommended six monthly cross connection check procedures in Sections 2.4 and 3.5 of this guide.

Note that only recycled non drinking water dripper irrigation systems are permitted within the development and the above application, approvals and certifications do not apply to the installation of irrigation systems.

4.3 Plumber certification

Due to the unique features of the water services at Point Boston, all plumbing contractors must complete an induction course and be certified by the Plumbing Compliance Coordinator to perform installation and maintenance work within the development.

The Plumbing Compliance Coordinator is available to provide assistance at all stages of the water services plumbing implementation from design through to handover to the owner. However, the plumber retains responsibility for the quality and fitness for purpose of the installed works.

4.4 Compliance codes and standards

This guide does not override the requirements of:

- *National Construction Code* 2013
- *Plumbing Code of Australia* 2013
- AS/NZS 3500: *Plumbing and Drainage Code*
- WSA-02: *Sewerage Code of Australia*
- WSA-03: *Water Supply Code of Australia*

- WSA-07 *Pressure Sewerage Code of Australia*
- OTR *Backflow Prevention Device commission, inspection and maintenance report*
- Any OTR, DHA and CFS requirements in addition to the above.

In the case of any differences between the guide and the above codes or agency requirements the matter is to be referred to the Plumbing Compliance Coordinator whose decision shall be final.

4.5 Pipework, fittings and fixtures colour coding and signs

Only products certified under the National Plumbing Product Approval Scheme are permitted to be used for rainwater, recycled non drinking water and drinking water services within the Point Boston development.

All water quality warning signage shall comply with AS 1319 *Safety Signs for the Occupational Environment*.

4.5.1 *Rainwater prior to filtering and disinfection: GREEN*

- Colour: Green colour, green striped, green sheathed, or green painted (neatly to approval). Fittings plain if not available in green. All balancing pipes and transfer pipes between tanks shall be green pipe. No undisinfected rainwater shall be connected to the drinking water supply system.
- Pipe marking: 'RAINWATER – DO NOT DRINK' in 20 mm black letters on green background at 500 mm intervals by adhesive label tape, obtainable from PBCC. Above ground adhesive labels shall be UV resistant.
- Pipes exposed to view and above ground: Copper Type B.
- Pipes built into walls or ceilings: Cross Linked Polyethylene PE-X PN20.
- Pipes installed below ground: Polyethylene PE PN16 in PE100.
- Fittings: Proprietary pipe, fittings and jointing system shall be installed to manufacturers' requirements.
- Tank overflow pipe: Shall have an inspection port as detailed in drawing House Allotment Water System Schematic included at the end of this guide.
- Valves and outlets: Valves, and taps and other outlets shall have a sign 'RAINWATER – DO NOT DRINK' in 20 mm white letters on green background, obtainable from PBCC.

4.5.2 *Drinking water (filtered and UV disinfected rainwater) hot and cold: BLUE*

- Colour: Blue colour or blue striped or blue sheathed or painted (neatly to approval). Fittings plain if not available in blue.

- Pipe marking for drinking water: ‘DRINKING WATER’ in 10 mm black letters on blue background at 500 mm intervals by adhesive label tape, obtainable from PBCC.
- Pipe marking for hot drinking water: ‘HEATED DRINKING WATER’ in 10 mm black letters on red background with blue edging at 500 mm intervals by adhesive label tape, obtainable from PBCC.
- Pipes exposed to view and above ground: Copper Type B.
- Pipes built into walls or ceilings: Cross Linked Polyethylene PE-X PN20.
- Fittings: Proprietary pipe, fittings and jointing system shall be installed to manufacturers' requirements.
- Insulation: Insulation of pipe work shall be blue.
- Installation: Blue pipe shall be installed downstream of the UV disinfection unit.
- Signage: External drinking water taps shall have a sign ‘DRINKING WATER – USE SPARINGLY’ in 20 mm white letters on blue background, obtainable from PBCC.

4.5.3 *Mains drinking water tank supplementation supply: BLUE*

- Colour: Blue colour or blue striped or blue sheathed or painted (neatly to approval). Fittings plain if not available in blue but fitting boxes and water meter must be blue. (Note that the drinking water meter shall be a different model and shape to the recycled non drinking water meter with different threads to prevent interchange of the meters).
- Pipes exposed to view and above ground: Copper Type B.
- Pipes built into walls or ceilings: Not permitted.
- Pipes installed below ground: Polyethylene PE PN16 in PE100.
- Fittings: Proprietary pipe, fittings and jointing system shall be installed to manufacturers' requirements. These are not required to be colour coded except where the pipe is painted.
- The supply pipe from the meter shall:
  - have an external drinking water tap with a sign ‘DRINKING WATER – USE SPARINGLY’ in 20 mm white letters on blue background, obtainable from PBCC.
  - be connected to the tank supplying the building’s drinking water via a 0.4 L/minute Maric flow controller through a float or level switch control valve with a 50 mm air gap between the end of the inflow pipe and the tank cover and a further 155 mm air gap between the tank cover and the invert of the tank overflow pipe for backflow protection. The penetration in the tank cover shall be 50 mm diameter and covered with mosquito mesh. This arrangement does

not require registration in the 'Registered break tank & air gap device' section of the OTR *Backflow Prevention Device Commission, inspection and maintenance report* included as Appendix C of this Guide.

- be connected to the 4,000 L fire service tank via a 2.8 L/minute Maric flow controller through a float or level switch control valve with a 155 mm air gap for backflow protection between the valve outlet and the tank overflow level, as shown on the house plumbing schematic drawing on page 33 of this Guide. This arrangement requires that the details of the backflow protection be included in the 'Registered break tank & air gap device' section of the OTR *Backflow Prevention Device Commission, inspection and maintenance report* included as Appendix C of this Guide. Acceptable alternatives are the same arrangement as the drinking water tank or the inclusion of a non testable dual check valve device in the inlet line outside the tank.

- Signage: The mains drinking water meter stop valve shall have a tag attached stating 'FIRE FIGHTING WATER SUPPLY' in 8 mm red letters, obtainable from PBCC.

4.5.4 *Recycled non drinking water (not for drinking - NDW): PURPLE*

- Colour: Purple colour or purple striped or purple sheathed or painted (neatly to approval). Fittings plain if not available in purple except that taps, valves, fitting boxes and the meter must be purple. (Note that the recycled non drinking water meter supplied by PBCC is a different model and shape to the drinking water meter with different threads to prevent interchange of the meters).

- Pipe marking: 'RECYCLED NON DRINKING WATER – DO NOT DRINK' in 10 mm black letters on purple background at 500 mm intervals by adhesive label tape, obtainable from PBCC. Above ground adhesive labels to be UV resistant.

- Pipes exposed to view and above ground: Copper Type B and painted purple.

- Pipes built into walls or ceilings: Cross Linked Polyethylene PE-X PN20.

- Pipes installed below ground: Polyethylene PE PN16 in PE100.

- Fittings: Proprietary pipe, fittings and jointing system shall be installed to manufacturers' requirements.

- Internal and external valves, taps and outlets including toilet cistern supply and washing machine cold water connections: Shall have an adjacent sign 'RECYCLED NON DRINKING WATER - DO NOT DRINK' obtainable from PBCC. External valves, taps and outlets shall be painted purple.

4.5.5 *Pumped effluent DN40 PE (from pump to boundary point): CREAM*

- Colour: Cream colour or cream striped black. Fittings plain if not available in cream and fitting and valve boxes must be cream.

- Pipes exposed to view and above ground: Cream striped PN16 PE100 polythene.

- Pipes installed below ground: Cream striped PN16 PE100 polythene.
- Fittings: Proprietary pipe, fittings and jointing systems shall be installed to manufacturers' requirements.

4.5.6 *CFS fire service tank connections: FIRE ENGINE RED*

- Fire water tank: A dedicated 4,000 L non combustible tank for fire fighting purposes only shall be provided, in accordance with the CFS requirements and to the Minister's Specification details.
- Colour: Paint fire service tank supply pipe work connection from the house drinking water plumbing red in colour. Do not paint the tank or the CFS feed connection.
- The filling and level maintenance supply from the mains supplementary drinking water connection shall be as detailed in Section 4.5.3.
- Fittings: Plain brass/bronze/stainless steel - 1 x 65mm nominal bore London round thread rigid feed CFS tank connection. Install a hatch in the tank cover for access by CFS personnel. Install a tank contents indicator visible from the street and the house.
- Pipes exposed to view and above ground: Medium galvanized steel painted red.
- Supply stop valve: Required to have its handle removed and the valve to be in the permanently open position. (The valve is to be closed only during fire tank maintenance.)
- Overflow pipe: To have an inspection port as detailed in drawing House Allotment Water System Schematic shown on page 33 of this guide.
- Signage: 'WATER FOR FIRE FIGHTING' on the side of the tank and 'FIRE WATER SUPPLY - DO NOT DRINK' in 100mm high white lettering on red background on the side of the tank adjacent to the London connection valve, obtainable from PBCC. Above ground adhesive labels to be UV resistant.

4.6 Minimum rainwater tank requirements

The minimum total volume of rainwater tanks for each house based on roof area and the number of bedrooms is provided in *Point Boston House Rainwater Tank Minimum Requirements* (tank schedule) included as Appendix A of this guide. The schedule is also included in the Council building requirements for the development and also available from PBCC office and website.

PBCC has limited access to supplementary mains water from the SA Water regional distribution network in Lincoln Highway which is delivered by a 6,200 m long 51 mm bore pipe to the mains water storage tanks at the corner of Sullivan Drive and East Bay Drive. It is essential that all houses have the rainwater tank volumes listed in the tank schedule as a minimum, to ensure that water shortages do not occur. PBCC shall not allow a reduction in the scheduled tank volumes.

Rainwater tanks are to be a minimum of 500 mm below connected roof gutters.

In general, several tanks are required to make up the total volume scheduled. The tanks are normally interconnected by gravity but pumped interconnections are permitted, as per note 2 of the schedule, to allow siting flexibility. The tank selected to supply the premises shall be equipped with an electric pump, cartridge micro filter and UV disinfection unit as detailed in Section 4.7 below.

4.7 Drinking water pump, micro filter and UV unit

The sustained hydraulic grade level (HGL) of the supplementary drinking water mains reticulation is set at the drinking water pumping station at the WRF. The level can be set at any point between 69 and 77 m AHD, at least 9 m head above the recycled non drinking water sustained hydraulic grade. It is therefore necessary to set the shut off pressure of the drinking water pump on each property to reflect 77 m AHD. The required shut off pressure of a household property pump would then be equal to 77 m AHD minus the elevation of the pump. For example, if a pump is to be located at 20 m AHD, the pump shut off pressure would be 77 – 20 m AHD = 57 m head (~570 kPa). It is necessary for the pump to have a discharge capacity of 5 L/min at this head.

The pump shall be capable of a normal operating duty of at least 38 L/min @ 35 m head (~350 kPa) in addition to 5 L/min at the determined shut-off pressure.

The Plumbing Compliance Coordinator shall be consulted to advise the set shut-off pressure of the pump when the drinking water system is being designed. This is to ensure that the set pressure is sufficiently above the recycled non drinking water HGL range of 60 to 68 m AHD to minimise the risk of cross contamination of the drinking water.

The pressure difference between the drinking water and the recycled non drinking water systems shall be checked by PBCC in its five yearly rolling audits of household plumbing and at change of ownership. However, residents can request a check of the pressures at any time.

Pressures in the pumped effluent system operate to a sustained HGL of 50 m AHD in the surplus effluent main in Sullivan Drive and to 45 m AHD in the land division areas, so the pressure difference with the drinking water is a very safe 19 to 32 m head.

The micro filter shall be a Puratec 10 micron DP series DP10 MP2 with an MP202 housing or equal.

The UV unit shall be a Puratec ULV series UV5000 with alarm or equal. The alarm panel shall be mounted inside the house.

4.8 Rainwater sourced drinking water plumbing

Rainwater sourced drinking water installations must comply with AS/NZS 3500 and SA variations and the following:

(1) All piping systems delivering rainwater to taps, fixtures or appliances in the building must be installed by a licensed plumber certified by PBCC to undertake work within the development.

(2) Only approved materials shall be used for the plumbing associated with rainwater supply systems. (WaterMark Certification).

(4) There shall not be under any circumstances any interconnection between undisinfected (not for drinking) rainwater and micro filtered and UV disinfected (drinking water) rainwater.

(5) All kitchen sink and dishwasher taps, shower taps, basin taps, bidet taps, laundry taps, hot water tap for washing machines and connections to hot water units shall be supplied with micro filtered and UV disinfected (drinking water) rainwater.

4.9 Water efficient fixtures and tap ware

4.9.1 *Water Conservation Strategy*

To reduce water consumption throughout the Pt. Boston development all tap ware and fixtures shall be flow controlled to the following maximum flow rates.

Residential building installations shall comply with the following maximum flow rates for tap ware and fixtures to be installed within each building.

All new tap ware and fixtures shall meet WELS (National water efficiency labelling and standards scheme) providing high water efficiency. Manufacture shall comply with AS 6400-2005: 'Water efficient products - Rating and labelling' and amendments 1, 2 and 3 - 2006.

Fixtures and tap ware shall have the following maximum flow rates

- Shower heads shall be flow controlled to 6 L/minute.
- Basin mixer taps shall be flow controlled to 4 L/minute.
- Sink and trough mixer taps shall be flow controlled to 6 L/minute.
- Hose taps shall be flow controlled to 6 L/minute.
- Water closets shall be reduced water use cisterns with 4.5/3 L dual flush option.

Designers and plumbers shall submit a schedule of fixtures and tap ware, including the efficiency rating and maximum flow rates for the drinking water and recycled non drinking water pressure applying at the particular premises, to the Plumbing Compliance Coordinator for approval prior to finalising designs.

4.9.2 *Efficiency ratings of other tap ware and fixtures*

If tap ware and fixtures other than those listed in Section 4.9.1 are to be used, the approval of the Plumbing Compliance Coordinator shall be obtained at the building design stage based on their water efficiency ratings.

4.10 Backflow protection

When applying to PBCC for a new water connection the plumber must assess and provide information relating to the potential backflow hazard level of the proposed on site activity, e.g. either a low, medium or high hazard.

4.10.1 *20 mm metered mains water connections*

- PBCC shall install a low hazard containment non testable dual check valve backflow protection device at the meter assembly on all new 20 mm drinking water meters. These shall be replaced by PBCC when five yearly plumbing audits are undertaken.

- 20 mm drinking water connections that have a hazard rating greater than low shall have a containment backflow protection device supplied and installed by the plumber at the owner's cost at the property boundary adjacent to the water meter. Testable backflow protection devices are to be tested annually by a licensed backflow tester who must forward the completed OTR *Backflow Prevention Device commission, inspection and maintenance report* included in Appendix C of this guide to OTR, Council and PBCC within 14 days.

4.10.2 *25 mm and larger mains water metered connections*

- Metered drinking water supplies greater than 20 mm shall have an appropriate backflow protection device at the owner's cost based on the potential hazard level of the proposed site activity. The backflow protection device is to be situated at the property boundary adjacent the water meter. Testable backflow protection devices are to have upstream and downstream isolation valves and shall be tested annually by a licensed backflow tester who must forward the completed OTR *Backflow Prevention Device commission, inspection and maintenance report* included in Appendix C of this guide to OTR, Council and PBCC within 14 days.

Alternative backflow protection devices (in addition to the domestic non testable dual check valves discussed above) will be considered for approval by PBCC provided that the devices comply with AS/NZS 3500 and SA variations.

4.10.3 *Backflow protection requirements for rainwater and fire service tanks*

The rainwater tank supplying the building drinking water pump, micro filter and UV disinfection unit and the fire service tank are connected to the mains supplementary drinking water supply and require air gap backflow protection on the tank supply inlets as specified in Section 4.5.3.

4.10.4 *Backflow protection requirements for buried tanks*

As a minimum for houses with above ground, on-ground or partially buried tanks, a backflow protection device must be installed to protect PBCC mains water supply from potential contamination by the rainwater supply, e. g. a non testable dual check valve located at the property boundary at the mains drinking water meter. This is standard for all property connections.

Where a property has a buried tank, a testable backflow protection device is required on the mains water supply line to the tank in addition to the non testable dual non return valve at the meter. The plumber shall obtain a *Buried Tank Hazard Assessment Report Form* (included as Appendix B in this guide) from the Plumbing Compliance Coordinator and complete a hazard assessment for the installation.

Work shall not commence until the Plumbing Compliance Coordinator has approved the proposed level of backflow protection. The device is to be tested annually by a licensed backflow tester who must forward the completed OTR *Backflow Prevention Device commission, inspection and maintenance report* included in Appendix C of this guide to OTR, Council and PBCC within 14 days. Alternative arrangements to avoid the need for a testable backflow preventer will be considered by PBCC, such as mains supplementary drinking water supply supplying the below ground tank through a tun dish with a backflow protection air gap. Factors to be considered in any assessment of the proposed arrangement shall be as per Section 4.10.5.

4.10.5 *Hazard reduction assessment for buried and partly buried rainwater tanks*

The following risk assessment shall be undertaken and the level of backflow hazard reduced depending on the following criteria:

(a) The risk to tank rainwater quality from air pollution is low.

(b) The risk to tank rainwater quality from groundwater and/or surface water contamination is low. In assessing this risk the permeability of the tank and piping materials and joints to groundwater contaminants should be addressed.

(c) Precautions in the design and installation of the rainwater collection system have been taken to reduce impacts to tank rainwater quality from the roof collection and delivery system. Such measures include, but are not restricted to, appropriate materials, gutter guards, filters, first flush devices, dry inlets, guards to exclude vermin and mosquitoes, and the quality of tank maintenance programs.

(d) Precautions in the design and installation of the rainwater tank have been taken to reduce impacts to tank rainwater quality from groundwater and surface water pollution.

Such measures include, but are not limited to:

- Location and topography.
- Structural integrity of the tank including installation factors such as bedding, embedment, compaction and geotechnical specifications.
- Water tightness of the tank including all penetrations, connections, access covers and joints.
- Prevention of the ingress of vermin through the overflow, e. g. by provision of a reflux valve, self sealing valve, trap non return valve.

To determine the feasibility of a non-testable device being installed where a testable device would otherwise be required a risk assessment shall be undertaken and the details submitted to PBCC for assessment and approval.

Any introduction of another water source or change in the site activity on the property may alter the hazard level of the backflow protection requirements. A reassessment of the level of protection will depend on the size of the water connection and the level of hazard as assessed by the plumber in consultation with the Plumbing Compliance Coordinator.

4.11 Water meter assemblies

The recycled non drinking water meter assembly is purple in colour. The meter shall be fitted above ground in the position of the existing 'prelaid' water service point on the property.

- Prior to the commencement of building construction, the plumber, builder or owner is required to lodge a building site and floor plan and make payment for the drinking water, recycled non drinking water and pumped effluent service connection fees to the Council and PBCC.
- PBCC shall supply both the drinking water and recycled non drinking water meters on application.
- The recycled non drinking water meter shall be locked in the closed position until the recycled non drinking water and pumped effluent services have been completed, inspected by PBCC and deemed suitable for activation.
- The meter components used for recycled non drinking water are different to those for drinking water to prevent interchange of the meters.
- A non testable dual check valve backflow protection device shall be provided by PBCC as part of the 20 mm drinking water meter assembly. Situations with a hazard rating greater than low shall have a testable backflow protection device determined by the plumber to the approval of the Plumbing Compliance Coordinator. This device is to be provided at the owner's cost. The backflow devices are to remain visible and accessible.
- Drinking water supplies greater than 20 mm require testable backflow protection device installed by a licensed plumbing contractor and passed by a licensed backflow protection tester as per section 4.10.2 of this guide. The devices are to be provided at the owner's cost.
- Alteration to the existing recycled and/or drinking water connection shall require an application to be made to the Council and PBCC.
- Property service connections from the boundary point to the main, including the water meters, are the responsibility of PBCC.

4.12 Three stage integrity commissioning of the system

It is the responsibility of the installing plumber to contact the Council and the Plumbing Compliance Coordinator to audit each stage of the commissioning of the installation of the three hydraulic services before handover and use by the home owner. The pipework must be visible at each stage for inspection.

On the successful completion of the commissioning, the Plumbing Compliance Coordinator shall attach a recycled non drinking water label to the inner side of the electricity meter box door.

The following commissioning procedures for the recycled non drinking water shall be followed by the plumber and the completion dates of each of the three commissioning stages included in the Notes section of the Plumbing Certificate of Compliance included as Appendix C of this guide.

4.12.1 *Household recycled non drinking water plumbing cross connection integrity commissioning*

Stage 1 **Commissioning the recycled non drinking water system**	**Stage 2** **Commissioning the recycled non drinking water system**	**Stage 3** **Commissioning the recycled non drinking water system**
First Fix in Ground	**First Fix in Wall**	**Final Fix**
Recycled non drinking water service/first fix in ground.	Recycled non drinking water service in ground completed.	Firstly turn off the tank drinking water supply at its connection point to the house plumbing. Secondly turn off the supplementary reticulated drinking water supply at the blue meter on the property boundary. Check that the recycled non drinking water supply is working by turning on a purple garden tap and noting that the purple meter is registering. Turn off the garden tap.
Isolate/disconnect any fixtures or appliances that may be damaged by a high test pressure.	Isolate/disconnect any fixtures or appliances that may be damaged by a high test pressure.	Turn on all sink, laundry trough, washing machine hot water, bath, shower and hand basin taps one by one. All taps should run dry after a short period of time.
Connect test bucket at a convenient point to enable testing of piping.	Connect test bucket at a convenient point to enable testing of piping.	After taps have run dry, flush all toilets. Toilet cisterns should refill as normal to show that they are connected to the recycled non drinking water supply. Check that the washing machine commences filling (with recycled non drinking water) when set to cold water.
Cap all open ends	Cap all open ends	Turn on all outside taps. External drinking water taps, if any, should run dry. Taps that continue to run are connected to the recycled non drinking water supply and should be clearly identified via appropriate warning signs and purple colour.
Fill system with drinking water	Fill system with drinking water	To check appliances within the home such as dishwashers and washing machine hot water, turn off the recycled non drinking water service and turn the drinking water supply back on. Run the recycled non drinking water service dry via the outside taps or toilet flushing.
Isolate recycled non drinking water service if connected to mains supply	Isolate recycled non drinking water service if connected to mains supply	Turn on internal/external drinking water supply appliances. If the appliances do not fill, they are connected to the incorrect supply.
Pressure test system to 1,500 kPa *with test bucket* for not less than 30 minutes. Does the pressure hold at 1,500 kPa?	Pressure test system to 1,500 kPa *with test bucket* for not less than 30 minutes. Does the pressure hold at 1,500 kPa/	Turn the recycled non drinking water service back on at the meter. Slowly turn on the recycled non drinking water tap furthest away from the meter on slowly so that all air is purged from the pipe work.
Yes No Locate and repair leaks Retest at 1,500 kPa for 30 minutes	Yes No Locate and repair leaks Retest at 1,500 kPa for 30 minutes	

Stage 1 Commissioning the recycled non drinking water system	Stage 2 Commissioning the recycled non drinking water system	Stage 3 Commissioning the recycled non drinking water system
First Fix in Ground	**First Fix in Wall**	**Final Fix**
If possible ensure the recycled non drinking water service is pressurised during concealment prior to commissioning	If possible ensure the recycled non drinking water service is pressurised during concealment prior to commissioning	

4.12.2 *Pumped effluent cross connection integrity commissioning*

It is important that the cream coloured pumped effluent discharge line from the Biolytix on-site unit pump to the property boundary point has no cross connections to the drinking water or the recycled non drinking water.

This line shall be pressure tested in accordance with the procedures in Section 21.4 of the *WSAA Pressure Sewerage Code of Australia* (ref. WSA 07-2007). The testing is to be undertaken after the above household drinking water and recycled non drinking water cross connection integrity testing has been completed. The passing of the pumped effluent discharge line test is to be included in the Notes section of the Plumbing Certificate of Compliance included as Appendix C of this guide.

4.13 Glossary

AS 1319 – Safety Signs for the Occupational Environment.

AS/NZS 3500 – The Australian and New Zealand Plumbing and Drainage Standard.

Approved materials – Plumbing materials that have undergone testing to obtain WaterMark certification.

Appliance – A piece of equipment designed to connect to a plumbing system to perform a specific task.

Backflow – The unintended flow of water from a potentially polluted source into a drinking water supply or from a dedicated lower quality water supply to one of a dedicated higher quality.

Non return valve – A valve that prevents the flow of water in the opposite direction of the intended flow.

Drinking water – Water that is suitable for human consumption, food preparation, utensil washing and oral hygiene.

Double check valve – A testable medium hazard backflow protection device

Dual check valve – A low hazard non testable backflow protection device.

Fixture – A piece of equipment specifically designed so that its use results in discharge to the sanitary plumbing system.

Non testable backflow device – A low hazard valve that does not require annual testing.

Rainwater tank – A storage vessel that is purpose-designed to collect rainfall runoff from roofs. A variety of rainwater storage vessels are available including traditional stand-alone, modular and in-ground tanks.

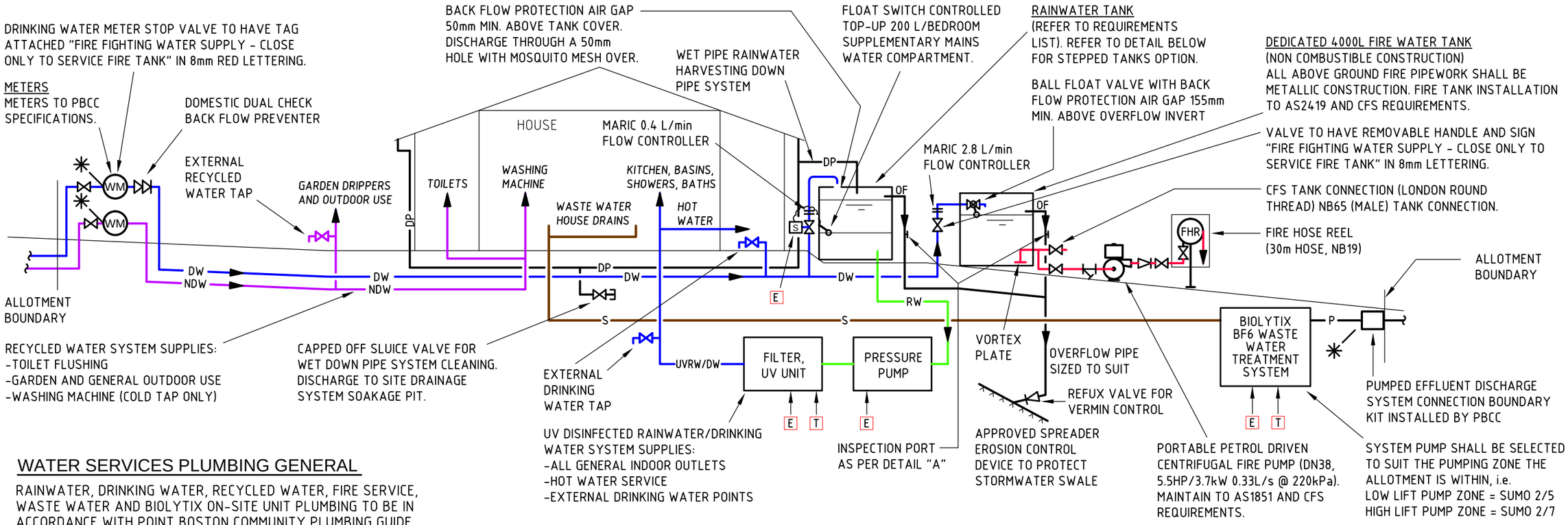
Reduced pressure zone device – A high hazard testable backflow protection device.

SA variations – South Australian additions and/or provisions to the National Plumbing and Drainage Standard AS/NZS 3500 or other code or standard.

Testable device – A medium or high hazard backflow protection device that is required to be tested annually by a licensed backflow protection tester.

WaterMark – The minimum certification mark required under the National Plumbing Products Certification Scheme for plumbing products.

TYPICAL HOUSE ALLOTMENT WATER SYSTEMS LAYOUT



WATER SERVICES PLUMBING GENERAL

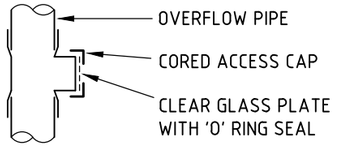
RAINWATER, DRINKING WATER, RECYCLED WATER, FIRE SERVICE, WASTE WATER AND BIOLYTIX ON-SITE UNIT PLUMBING TO BE IN ACCORDANCE WITH POINT BOSTON COMMUNITY PLUMBING GUIDE AVAILABLE FROM THE COMMUNITY CORPORATION

RAINWATER & FIRE WATER TANK REQUIREMENTS

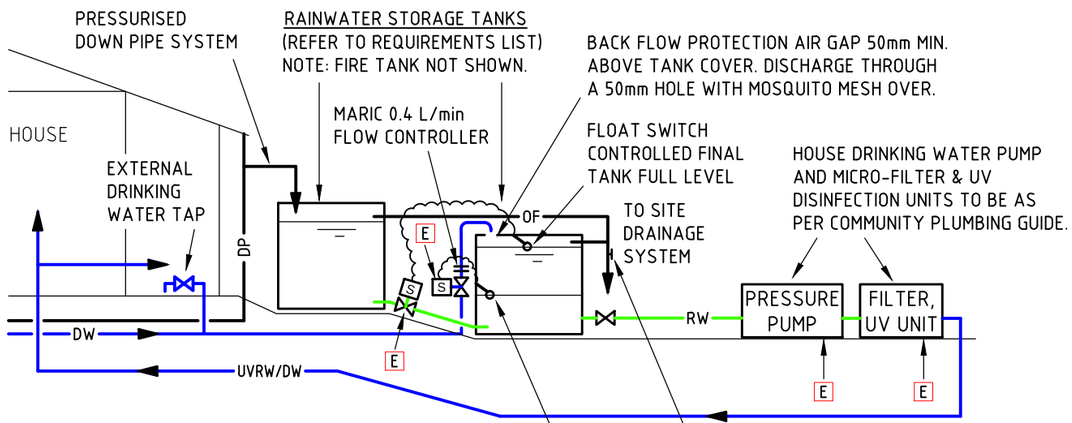
QUANTITY	:	REQUIREMENT VARIES, COMPLY WITH THE "HOUSE POTABLE WATER TANK MINIMUM REQUIREMENTS" SCHEDULE PREPARED BY KBR (CODE AEN400-200-C-CAL-009 Pt 2)
FIRST FLUSH DIVERTER	:	EACH TANK SHALL BE COMPLETE WITH A FIRST FLUSH WATER DIVERTER.
MAXIMUM TANK HEIGHT	:	INSTALL TANKS TO A MAXIMUM HEIGHT OF 500 BELOW THE LOWEST CONNECTING GUTTER.
DEDICATED FIRE FOR FIGHTING TANK	:	4000L DEDICATED NON COMBUSTIBLE TANK IS REQUIRED FIRE FIGHTING PURPOSES ONLY. SET MAINS DRINKING WATER TOP UP CONTROL SWITCH TO SUIT. TANK TO BE LOCATED NOT MORE THAN 20m HOSE ON-GROUND DISTANCE FROM EDGE OF ROAD BITUMEN.

LEGEND

NDW	NON DRINKING WATER (RECYCLED WATER) PIPEWORK (PURPLE COLOUR)
DW	DRINKING WATER PIPEWORK (BLUE COLOUR)
FS	FIRE SERVICE PIPEWORK (RED COLOUR)
RW	RAINWATER PIPEWORK (GREEN COLOUR)
UVRW/DW	UV DISINFECTED RAINWATER/DRINKING WATER PIPEWORK (BLUE COLOUR)
P	PUMPED EFFLUENT DISCHARGE PIPEWORK (BLACK COLOUR)
S	SANITARY DRAINAGE PIPEWORK
OF	OVERFLOW PIPEWORK - TO SITE DRAINAGE SYSTEM
DP	DOWN PIPE ROOF CONNECTION PIPEWORK
E	ELECTRICAL SUPPLY
T	TELEPHONE OR HOUSE MONITOR CONNECTION
✳	TERMINATION POINT OF ALLOTMENT SERVICES WORK



DETAIL "A" TANK OVERFLOW PIPE INSPECTION PORT



RAINWATER STORAGE TANKS - STEPPED TANKS OPTION

(REFER TO TYPICAL HOUSE SYSTEMS LAYOUT ABOVE FOR FIRE WATER STORAGE TANK AND GENERAL REQUIREMENTS)

REV.	DESCRIPTION	DATE

Gascoigne Consultants
ABN: 77 152 764 324
276 Flinders Street
Adelaide SA 5000
Telephone (08) 8232 3737
Facsimile (08) 8232 4588
Email admin@gascoigneconsultants.com

JOB
POINT BOSTON PENINSULA

DRAWING
HYDRAULIC SERVICES
HOUSE ALLOTMENT
WATER SYSTEMS SCHEMATIC

SCALE	NTS	@ SHEET SIZE	A3
DESIGNED	A.W.	DRAWN	M.B.
CHECKED			

JOB No.	DRAWING No.	REV.
04042	HSK8	10

FILE NAME 04042-HSK8
No. IN SET 1 OF 1

CADFILE: G:\2004\04042 Pt Boston\Drawings\HSK8.dwg, PLOTDATE: Mon 21 Oct 2013

5. WATER SAVING INFORMATION AND ACKNOWLEDGEMENTS

5.1 For more information

Other than the Point Boston Community Corporation the following organisations provide a range of information related to water quality, conservation and efficiency:

Department of Health and Ageing for information on the safe use of rainwater and recycled non drinking water, management of water quality, and mosquito control:
Telephone: (08) 8226 7100
www.health.sa.gov.au

Environment Protection Authority
Telephone: (08) 8204 2000
www.epa.sa.gov.au

Department of Environment & Heritage
Telephone: (08) 8204 9000
www.environment.sa.gov.au

Plumbing Industry Association of SA
Telephone: (08) 8292 4000
www.plumbingindustry.com.au

Planning/local government authorities regarding the legislative requirements for new residential buildings and alterations:
www.lowereyrepeninsula.sa.gov.au
www.planning.sa.gov.au
www.health.sa.gov.au

5.2 Acknowledgements

The PBCC acknowledges SA Water, the Department of Health and Ageing, the Office of the Technical Regulator, the Plumbing Industry Commission of Victoria and the Plumbing Industry Association of SA for the provision of material used in this guide.

Appendix A

POINT BOSTON HOUSE RAINWATER TANK MINIMUM REQUIREMENTS

POINT BOSTON STAGE 1 DEVELOPMENT
WATER CYCLE INFRASTRUCTURE

KBR

HOUSE RAINWATER TANK MINIMUM REQUIREMENTS[1]

House type	Storeys	Bedrooms	Connected roof area[2] and minimum tank[3] volume		Tank combination[6]
Detached	1	2	156 sq m[4]	16.0 kL	2 x 8 kL
			186 sq m	14.4 kL	1 x 9 kL, 1 x 5.4 kL
			235 sq m	13.5 kL	1 x 9 kL, 1 x 4.5 kL
			295 sq m	12.5 kL[5]	1 x 8 kL, 1 x 4.5 kL
Detached	1	3	270 sq m[4]	44.0 kL	2 x 22 kL
			275 sq m	40.5 kL	1 x 27 kL, 1 x 13.5 kL
			290 sq m	31.0 kL	1 x 22 kL, 1 x 9 kL
			325 sq m	26.0 kL	2 x 9 kL, 1 x 8 kL
			402 sq m	24.0 kL[5]	3 x 8 kL
Detached	1	4	366 sq m[4]	62.5 kL	1 x 27 kL, 1 x 22 kL, 1 x 13.5 kL
			369 sq m	57.5 kL	2 x 22 kL, 1 x 13.5 kL
			373 sq m	54.0 kL	2 x 27 kL
			377 sq m	49.0 kL	1 x 27 kL, 1 x 22 kL
			390 sq m	44.0 kL	2 x 22 kL
			400 sq m	40.5 kL	1 x 27 kL, 1 x 13.5 kL
			429 sq m	36.0 kL	1 x 27 kL, 1 x 9.0 kL
			433 sq m	35.5 kL[5]	1 x 22 kL, 1 x 13.5 kL
Detached	2	2	157 sq m[4]	16.0 kL	2 x 8 kL
			192 sq m	14.4 kL	1 x 9 kL, 1 x 5.4 kL
			250 sq m	13.5 kL	1 x 9 kL, 1 x 4.5 kL
			310 sq m	12.5 kL[5]	1 x 8 kL, 1 x 4.5 kL
Detached	2	3	265 sq m[4]	66.0 kL	3 x 22 kL
			267 sq m	62.5 kL	1 x 27 kL, 1 x 22 kL, 1 x 13.5 kL
			271 sq m	57.5 kL	2 x 22 kL, 1 x 13.5 kL
			273 sq m	54.0 kL	2 x 27 kL
			276 sq m	49.0 kL	1 x 27 kL, 1 x 22 kL
			280 sq m	44.0 kL	2 x 22 kL
			295 sq m	40.5 kL	1 x 27 kL, 1 x 13.5 kL
			314 sq m	36.0 kL	1 x 27 kL, 1 x 9.0 kL
			317 sq m	35.5 kL	1 x 22 kL, 1 x 13.5 kL
			322 sq m	32.4 kL	1 x 27 kL, 1 x 5.4 kL
			352 sq m	31.0 kL[5]	1 x 22 kL, 1 x 9.0 kL
Detached	2	4	330 sq m[4]	35.5 kL	1 x 22 kL, 1 x 13.5 kL
			331 sq m	32.5 kL	1 x 27 kL, 1 x 5.4 kL
			347 sq m	30.0 kL	1 x 22 kL, 1 x 8 kL
			364 sq m	27.5 kL	1 x 22 kL, 1 x 5.4 kL
			373 sq m	26.5 kL	1 x 22 kL, 1 x 4.5 kL
			386 sq m	26.0 kL[5]	2 x 9 kL, 1 x 8 kL
Duplex (1 tenement)	1	3	130 sq m[4]	24.0 kL	3 x 8 kL
			140 sq m	22.0 kL	1 x 22 kL
			150 sq m	22.0 kL	1 x 22 kL
			160 sq m	13.5 kL	1 x 13.5 kL
			170 sq m	9.0 kL[5]	1 x 9 kL
Medium density unit	N/A	2	110 sq m[4]	12.5 kL	1 x 8 kL, 1 x 4.5 kL
			115 sq m	10.8 kL	2 x 5.4 kL
			120 sq m	9.9 kL	1 x 5.4 kL, 1 x 4.5 kL
			130 sq m	8.0 kL[5]	1 x 8 kL

POINT BOSTON STAGE 1 DEVELOPMENT
WATER CYCLE INFRASTRUCTURE

Notes:

1. This schedule shall be read in conjunction with the Point Boston Stag1 1 Development Community Plumbing Guide. Tank volumes are based on combinations of the Team Poly range and are the minimum required for the roof area stated and apply up to the next larger roof area. Tanks of other manufacture are permitted and tank volumes for intermediate roof areas are to be interpolated.
2. The connected roof area is to include the house, garage, shed and any other outbuilding. House roof areas shall be directly connected by gravity to the potable water tank(s). Other buildings may be connected by pumping from a 0.5 kL collection tank on the ground (in-ground shall not be used due to the risk of contamination). Each pump shall transfer to the main tank(s) at a rate of not less than 20 L/minute. The pipe shall not be less than 25 mm nominal diameter.
3. The required tank volumes as scheduled include the following provision for mains water supplementation:
   - 2 bedrooms 0.4 kL
   - 3 bedrooms 0.6 kL
   - 4 bedrooms 0.8 kL

   The mains drinking water level control valve shall have the above 0.4 kL to 0.8 kL provision and no more between the valve shut off level and the potable supply offtake to the house.
   The supplementary mains drinking water supply to the rainwater tank serving the house is controlled to 0.4 L/minute.
4. This is the minimum roof area to be connected to the tank(s) for this housing category.
5. This is the minimum tank volume for this housing type.
6. A 4 kL non combustible fire tank maintained full at all times from the mains drinking water supply is not included and is additional to all the combinations. To prevent cross contamination from the fire tanker hose connection, this tank cannot be a compartment in the potable water tanks. It shall be located not more than 20 m hose on-ground distance from the edge of road bitumen.

Appendix B

BURIED TANK RISK ASSESSMENT FORM

POINT BOSTON COMMUNITY CORPORATION 25691 INC

POINT BOSTON STAGE 1 DEVELOPMENT
WATER CYCLE INFRASTRUCTURE INTERIM SCHEME

RISK ASSESSMENT FOR PARTIALLY BURIED OR BURIED RAINWATER TANKS

Date of lodging form: .....

Location of rainwater tank installation:

Street address: .....

Allotment number: .....

The purpose of this risk assessment is to determine if a low hazard backflow prevention device can be installed in lieu of a testable device as determined by the AS/NZS 3500 National Plumbing and Drainage Standard including SA Variations.

It is the plumbing contractor's responsibility to conduct the risk assessment below and to certify that the installation complies with the relevant standards.

Plumbing Contractor: ..... Phone number: .....

Address: .....

Name of Owner: ..... Phone number: .....

Address: .....

Tank fully in ground: **Yes / No**

If not fully in ground, minimum height of tank wall above finished ground level: .....mm

HAZARD REDUCTION ASSESSMENT	HIGH	MEDIUM	LOW
The risk to tank rainwater quality from air pollution			
The risk to tank water quality from groundwater and/or surface water contamination			

The following design and installation components have been provided in the rainwater collection system:

Item	Yes	No
Gutter guards		
Filters		
First flush devices		
Dry inlets		
Mosquito protection		
Vermin protection (reflux valve on overflow)		
Watertightness of tank (sealed penetrations, access covers, connections and joints)		
Tank maintenance program		
Other (please specify)		

I certify that I have conducted a risk assessment as per the criteria set out in AS/NZS 3500 National Plumbing and Drainage Standard including SA Variations.

Backflow protection device installed: .....

Model Number: ..... Licence number: .....

Print Name: ..... Signed: ..... Date: .....

Approved: ..... Point Boston Plumbing Compliance Coordinator

Please return <u>four</u> copies of the completed form to the Plumbing Compliance Coordinator of the Point Boston Community Corporation

A copy of the signed and approved form will be included with the Plumbing Certificate of Compliance provided to the owner, District Council of Lower Eyre Peninsula, the OTR and the Community Corporation at handover of the work.

Appendix C

PLUMBING CERTIFICATE OF COMPLIANCE AND BACK FLOW PREVENTION DEVICE COMMISSION, INSPECTION AND MAINTENANCE REPORT

Office of the Technical Regulator and
South Australian Councils

PLUMBING CERTIFICATE OF COMPLIANCE

SANITARY PLUMBING
SANITARY DRAINS
WATER PLUMBING

Book of official forms published under the authority of the Technical Regulator

Government of South Australia

Preface

This form, the Plumbing Certificate of Compliance (also referred to as the "Certificate of Compliance") is to be used by the plumbing industry to verify that plumbing and equipment (including water services, sanitary plumbing and drainage systems), complies with the *Water Industry Act 2012* (the Act) and/or the *Public and Environmental Health Act 1987* including regulations and standards thereunder as applicable, and that the work falls within the terms of the plumbing contractor's licence and the plumbing worker's registration.

This form is issued pursuant to a scheme under section 69(2) of the Act.

This form replaces previous forms.

This form has also been adopted by the Department for Health and Ageing (DHA) and South Australian Councils. This form comes as a set of four certificates. The first certificate must be completed and provided to the Office of the Technical Regulator (OTR) where plumbing and equipment are connected to SA Water's water/sewerage infrastructure, or not connected to SA Water's sewerage infrastructure although a connection point is available. The second must be provided to the owner or occupier of the property on which the work was carried out. The third (where applicable) must be provided to the relevant authority (Council or DHA) where the plumbing and equipment are not connected to SA Water's water/sewerage infrastructure. The fourth must be retained by the licensed plumbing contractor.

Licensed Plumbing Contractor's responsibilities regarding Certificates of Compliance

The licensed plumbing contractor must give due notice to the OTR where plumbing and the equipment installed is:

1. connected to SA Water's water/sewerage infrastructure; or
2. not connected to SA Water's sewerage infrastructure although a connection point is available.
3. in other cases as required by the Technical Regulator.

Otherwise, in regions where there is no SA Water sewerage infrastructure, due notice must be given to the relevant authority (usually the local council) where the plumbing or equipment is installed or altered.

Such due notice may only be given by a plumbing contractor licensed under the *Plumbers, Gas Fitters and Electricians Act 1995* and the work may only be carried out by a registered plumbing worker as prescribed.

The licensed plumbing contractor and the registered plumbing worker must fill in and both sign the certificate of compliance.

The *Public and Environmental Health (Waste Control) Regulations 2010* *require that approval must be obtained from the relevant authority (usually the local council) before any part of a waste control system (including wastewater collection, treatment and disposal systems) is installed or altered. This also includes systems connected to off-site disposal schemes such as community wastewater management schemes (CWMS). This work may only be carried out by a suitably qualified person licensed under the *Plumbers, Gas Fitters and Electricians Act 1995* and the work may only be performed by a registered plumbing worker as prescribed.

*The *Public and Environmental Health Act 1987* and the *Public and Environmental Health (Waste Control) Regulations 2010* will be superseded by the *South Australian Public Health Act 2011* and regulations.

Government of South Australia

Office of the Technical Regulator

PLUMBING CERTIFICATE OF COMPLIANCE

under the *Water Industry Act 2012*

BOOKING No: ..... **CERTIFICATE No**: ..... A

☐ **INSTALL**	☐ **ALTER**	☐ **REPLACE**	☐ **SERVICE OR TEST**
☐ Sanitary Plumbing	☐ Drains	☐ Heated Water	☐ Backflow Prevention
☐ Recycled water	☐ Rainwater	☐ Cold Water	☐ On-site wastewater system
☐ On-site recycled water	☐ CWMS/Other		

OWNER/CLIENT: ..... **COUNCIL NAME:** .....

INSTALLATION ADDRESS: .....

TYPE OF PREMISES: ..... **Notes:** (continue on separate sheet if required) .....

.....

SANITARY PLUMBING:

☐ W/C ☐ Kitchen
☐ Bathroom ☐ En-suite
☐ Soil Stack ☐ Laundry
☐ Trade Waste ☐
☐ Replacement of sanitary fixtures only

HEATED WATER: ☐ New Installation ☐ Replacement

Make of water heater/Capacity in litres .....

☐ Mains/Controlled pressure ☐ Electric
☐ Cistern fed ☐ Gas
☐ Instantaneous ☐ Solar
☐ Heat Pump water heater

☐ **FIRE SERVICE:** (a fire service installation report must be included with this form)

ON-SITE WASTEWATER DISPOSAL: ☐ Sub-surface disposal system

☐ Septic Tank ☐ Aerobic or other treatment system ☐ On-site recycled water irrigation

TEMPERATURE CONTROL: ☐ Tempering valve ☐ Thermostatic mixing valve ☐ Other

BACKFLOW PREVENTION DEVICE: (the Backflow Prevention Device Commission, inspection and maintenance report and associated location plans must be included)

Device type, size, serial no: .....

Part A - PLUMBING WORKER: I certify that the plumbing and equipment referred to above, complies with the *Water Industry Act 2012* and/or the *Public and Environmental Health Act 1987* including Regulations and Standards thereunder as applicable, and the work falls within the terms of my registration, under the *Plumbers, Gas Fitters & Electricians Act 1995* (PGE Act).

Name: .....

Signature: ..... Lic/.Reg No: ..... Date: .....

Part B - PLUMBING CONTRACTOR: I certify that the plumbing and equipment referred to above, complies with the *Water Industry Act 2012* and/or the *Public and Environmental Health Act 1987* including Regulations and Standards thereunder as applicable, and the work falls within the terms of my licence under the PGE Act. (If the Plumbing Worker and the Plumbing Contractor are the same person, that person must fill in both parts.)

Print name: ..... Trading name: .....

Signature: ..... Licence No: ..... Date: .....

Address: .....

Telephone: ..... Mobile: ..... Email/Fax: .....

OFFICE OF THE TECHNICAL REGULATOR COPY:

This certificate is to be provided to Office of the Technical Regulator within 7 days of completing the work.

Government of South Australia

Office of the Technical Regulator & South Australian Councils/Department for Health and Ageing

PLUMBING CERTIFICATE OF COMPLIANCE

under the *Water Industry Act 2012*

BOOKING No: ..... **CERTIFICATE No**: ..... A

☐ **INSTALL**	☐ **ALTER**	☐ **REPLACE**	☐ **SERVICE OR TEST**
☐ Sanitary Plumbing	☐ Drains	☐ Heated Water	☐ Backflow Prevention
☐ Recycled water	☐ Rainwater	☐ Cold Water	☐ On-site wastewater system
☐ On-site recycled water	☐ CWMS/Other		

OWNER/CLIENT: ..... **COUNCIL NAME:** .....

INSTALLATION ADDRESS: .....

TYPE OF PREMISES: ..... **Notes:** (continue on separate sheet if required) .....

.....

SANITARY PLUMBING:

☐ W/C ☐ Kitchen
☐ Bathroom ☐ En-suite
☐ Soil Stack ☐ Laundry
☐ Trade Waste ☐
☐ Replacement of sanitary fixtures only

HEATED WATER: ☐ New Installation ☐ Replacement

Make of water heater/Capacity in litres .....

☐ Mains/Controlled pressure ☐ Electric
☐ Cistern fed ☐ Gas
☐ Instantaneous ☐ Solar
☐ Heat Pump water heater

☐ **FIRE SERVICE:** (a fire service installation report must be included with this form)

ON-SITE WASTEWATER DISPOSAL: ☐ Sub-surface disposal system

☐ Septic Tank ☐ Aerobic or other treatment system ☐ On-site recycled water irrigation

TEMPERATURE CONTROL: ☐ Tempering valve ☐ Thermostatic mixing valve ☐ Other

BACKFLOW PREVENTION DEVICE: (the Backflow Prevention Device Commission, inspection and maintenance report and associated location plans must be included)

Device type, size, serial no: .....

Part A - PLUMBING WORKER: I certify that the plumbing and equipment referred to above, complies with the *Water Industry Act 2012* and/or the *Public and Environmental Health Act 1987* including Regulations and Standards thereunder as applicable, and the work falls within the terms of my registration, under the *Plumbers, Gas Fitters & Electricians Act 1995* (PGE Act).

Name: .....

Signature: ..... Lic/.Reg No: ..... Date: .....

Part B - PLUMBING CONTRACTOR: I certify that the plumbing and equipment referred to above, complies with the *Water Industry Act 2012* and/or the *Public and Environmental Health Act 1987* including Regulations and Standards thereunder as applicable, and the work falls within the terms of my licence under the PGE Act. (If the Plumbing Worker and the Plumbing Contractor are the same person, that person must fill in both parts.)

Print name: ..... Trading name: .....

Signature: ..... Licence No: ..... Date: .....

Address: .....

Telephone: ..... Mobile: ..... Email/Fax: .....

CUSTOMER COPY: ***This certificate is to be provided to the owner/occupier of the property on which the work was carried out within 7 days of completing the work.***

Government of South Australia

Office of the Technical Regulator & South Australian Councils/Department for Health and Ageing

PLUMBING CERTIFICATE OF COMPLIANCE

under the *Water Industry Act 2012*

BOOKING No: ..... **CERTIFICATE No**: ..... A

☐ **INSTALL**	☐ **ALTER**	☐ **REPLACE**	☐ **SERVICE OR TEST**
☐ Sanitary Plumbing	☐ Drains	☐ Heated Water	☐ Backflow Prevention
☐ Recycled water	☐ Rainwater	☐ Cold Water	☐ On-site wastewater system
☐ On-site recycled water	☐ CWMS/Other		

OWNER/CLIENT: ..... **COUNCIL NAME:** .....

INSTALLATION ADDRESS: .....

TYPE OF PREMISES: ..... **Notes:** (continue on separate sheet if required) .....

.....

SANITARY PLUMBING:

☐ W/C ☐ Kitchen

☐ Bathroom ☐ En-suite

☐ Soil Stack ☐ Laundry

☐ Trade Waste ☐

☐ Replacement of sanitary fixtures only

HEATED WATER: ☐ New Installation ☐ Replacement

Make of water heater/Capacity in litres .....

☐ Mains/Controlled pressure ☐ Electric

☐ Cistern fed ☐ Gas

☐ Instantaneous ☐ Solar

☐ Heat Pump water heater

☐ **FIRE SERVICE:** (a fire service installation report must be included with this form)

ON-SITE WASTEWATER DISPOSAL: ☐ Sub-surface disposal system

☐ Septic Tank ☐ Aerobic or other treatment system ☐ On-site recycled water irrigation

TEMPERATURE CONTROL: ☐ Tempering valve ☐ Thermostatic mixing valve ☐ Other

BACKFLOW PREVENTION DEVICE: (the Backflow Prevention Device Commission, inspection and maintenance report and associated location plans must be included)

Device type, size, serial no: .....

Part A - PLUMBING WORKER: I certify that the plumbing and equipment referred to above, complies with the *Water Industry Act 2012* and/or the *Public and Environmental Health Act 1987* including Regulations and Standards thereunder as applicable, and the work falls within the terms of my registration, under the *Plumbers, Gas Fitters & Electricians Act 1995* (PGE Act).

Name: .....

Signature: ..... Lic/.Reg No: ..... Date: .....

Part B - PLUMBING CONTRACTOR: I certify that the plumbing and equipment referred to above, complies with the *Water Industry Act 2012* and/or the *Public and Environmental Health Act 1987* including Regulations and Standards thereunder as applicable, and the work falls within the terms of my licence under the PGE Act. (If the Plumbing Worker and the Plumbing Contractor are the same person, that person must fill in both parts.)

Print name: ..... Trading name: .....

Signature: ..... Licence No: ..... Date: .....

Address: .....

Telephone: ..... Mobile: ..... Email/Fax: .....

COUNCIL/DHA COPY:

This certificate is to be provided to the relevant Council/DHA within 28 days of completing the work.

Government of South Australia

Office of the Technical Regulator & South Australian Councils/Department for Health and Ageing

PLUMBING CERTIFICATE OF COMPLIANCE

under the *Water Industry Act 2012*

BOOKING No: ..... **CERTIFICATE No**: ..... A

☐ **INSTALL**	☐ **ALTER**	☐ **REPLACE**	☐ **SERVICE OR TEST**
☐ Sanitary Plumbing	☐ Drains	☐ Heated Water	☐ Backflow Prevention
☐ Recycled water	☐ Rainwater	☐ Cold Water	☐ On-site wastewater system
☐ On-site recycled water	☐ CWMS/Other		

OWNER/CLIENT: ..... **COUNCIL NAME:** .....

INSTALLATION ADDRESS: .....

TYPE OF PREMISES: ..... **Notes:** (continue on separate sheet if required) .....

.....

SANITARY PLUMBING:

☐ W/C ☐ Kitchen

☐ Bathroom ☐ En-suite

☐ Soil Stack ☐ Laundry

☐ Trade Waste ☐

☐ Replacement of sanitary fixtures only

HEATED WATER: ☐ New Installation ☐ Replacement

Make of water heater/Capacity in litres .....

☐ Mains/Controlled pressure ☐ Electric

☐ Cistern fed ☐ Gas

☐ Instantaneous ☐ Solar

☐ Heat Pump water heater

☐ **FIRE SERVICE:** (a fire service installation report must be included with this form)

ON-SITE WASTEWATER DISPOSAL: ☐ Sub-surface disposal system

☐ Septic Tank ☐ Aerobic or other treatment system ☐ On-site recycled water irrigation

TEMPERATURE CONTROL: ☐ Tempering valve ☐ Thermostatic mixing valve ☐ Other

BACKFLOW PREVENTION DEVICE: (the Backflow Prevention Device Commission, inspection and maintenance report and associated location plans must be included)

Device type, size, serial no: .....

Part A - PLUMBING WORKER: I certify that the plumbing and equipment referred to above, complies with the *Water Industry Act 2012* and/or the *Public and Environmental Health Act 1987* including Regulations and Standards thereunder as applicable, and the work falls within the terms of my registration, under the *Plumbers, Gas Fitters & Electricians Act 1995* (PGE Act).

Name: .....

Signature: ..... Lic/.Reg No: ..... Date: .....

Part B - PLUMBING CONTRACTOR: I certify that the plumbing and equipment referred to above, complies with the *Water Industry Act 2012* and/or the *Public and Environmental Health Act 1987* including Regulations and Standards thereunder as applicable, and the work falls within the terms of my licence under the PGE Act. (If the Plumbing Worker and the Plumbing Contractor are the same person, that person must fill in both parts.)

Print name: ..... Trading name: .....

Signature: ..... Licence No: ..... Date: .....

Address: .....

Telephone: ..... Mobile: ..... Email/Fax: .....

PLUMBING CONTRACTOR'S COPY: ***This certificate is to be retained as your record.***

Licensed Plumbing Contractor's responsibilities regarding Certificates of Compliance (Continued)

It is the plumbing contractor's responsibility to notify the relevant authority having jurisdiction when work has been installed and is ready for inspection. The Office of the Technical Regulator or relevant Council/DHA will determine whether an inspection of the installation will be performed or not. The work is not to be covered unless the plumbing contractor has been informed by the relevant authority having jurisdiction that an inspection will not occur.

Any person contravening the Act or regulations is liable to a penalty.

Extent of work

All sections of the Certificate of Compliance must be filled in.

Distribution of Copies of Certificate of Compliance

On completion of the installation, and after the Certificate of Compliance has been filled in, and signed, the plumbing contractor must distribute the copies as follows:

First copy - Office of the Technical Regulator

Where applicable, this copy is to be forwarded to the Office of the Technical Regulator within seven (7) days of completing the work together with (where applicable) an 'Internal sanitary drain as constructed drawing' showing the position and dimensions of the pipe, fittings and equipment associated with sanitary drains.

The completed Certificate of Compliance and all supporting documentation should be sent to -
The Office of the Technical Regulator - Plumbing, GPO Box 1264, Adelaide, SA 5001

Please do not staple any supporting documentation to the Certificate of Compliance.

Second copy - Customer

This copy is to be forwarded to the owner/occupier of the property on which the work was carried out within seven (7) days of completing the work together with (where applicable) a copy of all supporting documentation.

Third Copy - Council/DHA

Where applicable, this copy is to be forwarded to the relevant Council/DHA within twenty eight (28) days of completing the work together with (where applicable) a drawing showing the position and dimensions of the pipe, fittings and equipment associated with sanitary drains and on-site wastewater system details (where applicable).

Fourth copy - Plumbing Contractor

This copy (including all supporting documentation) is to remain with this book as the plumbing contractor's copy. It must be retained for not less than 5 years.

Note: Certificates of Compliance are non transferable and are recorded against a plumbing contractor's licence.

EXAMPLE OF INTERNAL SANITARY DRAIN AS CONSTRUCTED DRAWING

RECORD COMPLETE YES/NO

OWNER : *C.D. Petersen*

HOUSE NO : *223* LOT NO : *100*

STREET : *Tapleys Hill Road*

SUBURB : *Henley Beach South*

LICENSED PLUMBING CONTRACTOR

PRINT NAME : *George Wrench*

DATE SUBMITTED : .....

TRADING NAME : *Wrench Plumbing*

TELEPHONE / MOBILE : *0414 414 977*

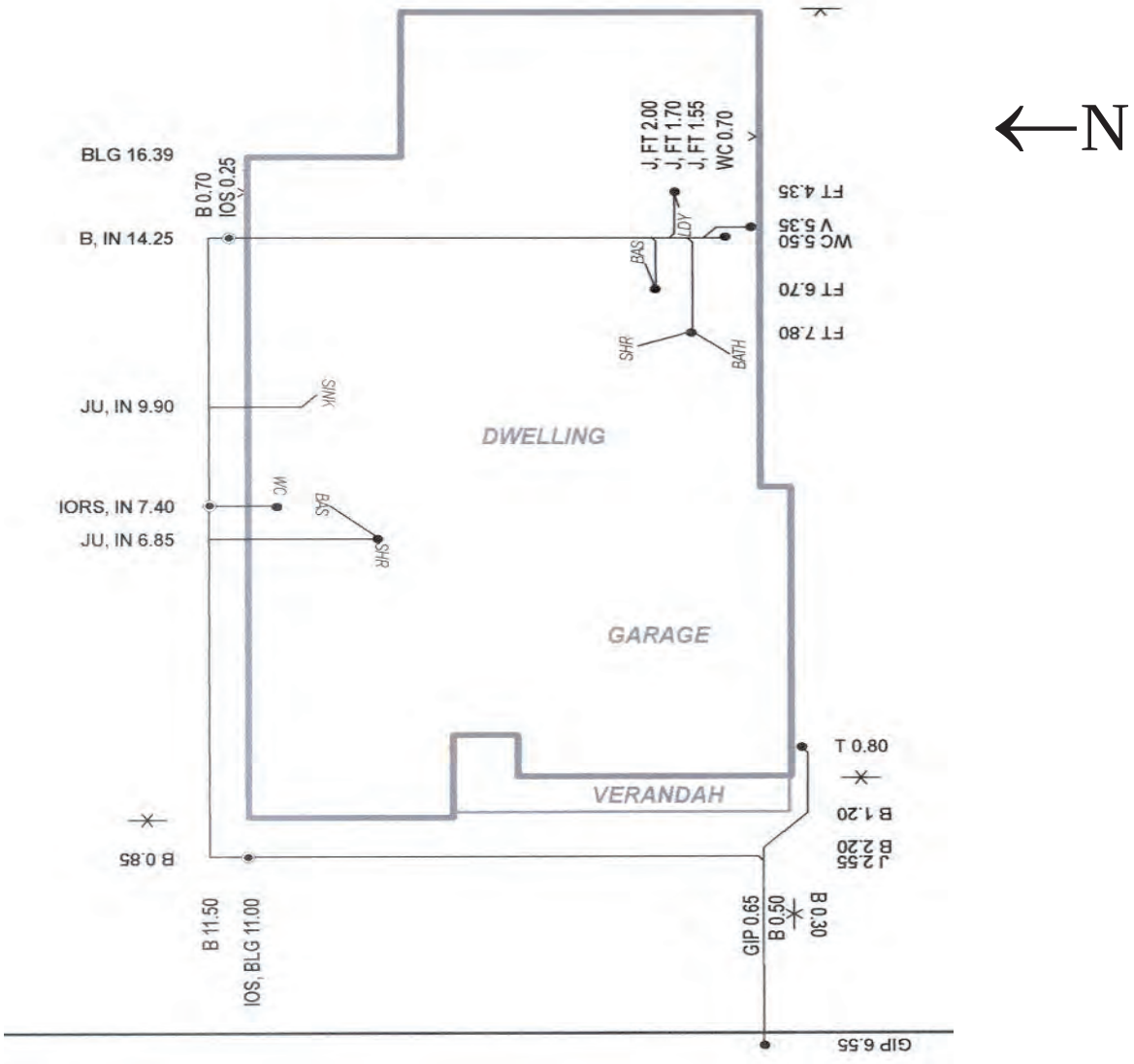
TIE TO CROSS STREET : *3 North of Johnson Street on East Side*

LICENCE NUMBER 3 5 6 8 4 2

CERTIFICATE NUMBER 6 6 7 7 2 4 A

I certify that this plan shows the layout and dimensions to the property sewer constructed by me or under my supervision at the address shown above.

Licensed Plumbing Contractor's Signature : *G Wrench* **Date:**



TAPLEYS HILL ROAD

Bend (in drain)	B	Building	Bld	Reflux Valve	RV	Line	L
Dead End	DE	Fenceline	f	Waste Stack	WS	Join (to existing drain)	Join
Floor Trap	FT	Gov Inspection Point	IP	Soil Stack	SS	Junction	J
Inspection Opening	IO	Inspection Opening Riser	IOR	Trap	T	Jump Up	JU
Inspection Opening Surfaced	IORS	Into Building (line of drain)	In	Water Closet (toilet)	WC	Vent (all sizes)	V

DATE RECEIVED BY THE OTR : ...../...../.....

IMPORTANT : USE BLACK BALLPOINT PEN ONLY
FORWARD DRAWING AND CERTIFICATE TO THE OTR

Notice books and drawing pads can be purchased from the following locations:

Service SA Customer Service Centres

ADELAIDE
EDS Building
108 North Terrace
Adelaide SA 5000

BERRI
29 Vaughan Terrace
Berri SA 5343

CHRISTIES BEACH
111 Beach Road
Christies Beach SA 5165

ELIZABETH
Shop 42 North Mall
Elizabeth Shopping Centre
Playford Boulevard
Elizabeth SA 5112

GAWLER
Northern Market Shopping Centre
Corner Murray and Cowan Streets
Gawler SA 5118

KADINA
10 Digby Street
Kadina SA 5554

MARION
483 Morphett Road
Oaklands Park SA 5046

MITCHAM
15 –17 Princes Road
Torrens Park SA 5062

MODBURY
116 Reservoir Road
Modbury SA 5092

MOUNT GAMBIER
11 Helen Street
Mount Gambier SA 5290

MURRAY BRIDGE
19 Seventh Street
Murray Bridge SA 5253

NARACOORTE
14 Butler Terrace
Naracoorte SA 5271

PORT ADELAIDE
64 Dale Street
Port Adelaide SA 5015

PORT AUGUSTA
9 Mackay Street
Port Augusta SA 5700

PORT LINCOLN
73–75 Tasman Terrace
Port Lincoln SA 5606

PORT PIRIE
Shop 7-8 Flinders Arcade
72-80 Ellen Street
Port Pirie SA 5540

PROSPECT
North Park Shopping Centre
264 Main North Road
Prospect SA 5082

REGENCY PARK
13 Kateena Street
Regency Park SA 5010

TRANMERE
172 Glynburn Road
Tranmere SA 5073

WHYALLA
171 Nicolson Avenue
Whyalla Norrie SA 5608

Office of the Technical Regulator

Backflow Prevention Device

Commission, inspection and maintenance report

Please complete using BLOCK letters and tick relevant boxes - All fields are mandatory

Test type: ☐ Initial test ☐ Annual test	
Encumbrance number:	Account number:
Device make:	Model number:
Serial number:	Size (mm):
Exact device location: For initial test attach a location plan and for large sites show adjacent street names and distances from boundaries	
Nature of water use after device:	
Protection: ☐ Containment ☐ Zone	
Site owner:	Site occupier:
Postal address:	Site address:
Suburb:	Suburb:
Postcode:	Postcode:
Contact person:	Phone number:

Reduced pressure zone devices - RPZ

Check valve number 1	Differential pressure	Check valve number 2	Downstream gate valve	Relief valve opens at
☐ Tight ☐ Leaked	..... psi/kPa	☐ Tight ☐ Leaked	☐ Tight ☐ Leaked	..... psi/kPa

Single check valve device or Double check valve

Check valve number 1	Check valve number 2	Downstream gate valve
☐ Tight ☐ Leaked ..... psi/kPa	☐ Tight ☐ Leaked ..... psi/kPa	☐ Tight ☐ Leaked

Pressure Type Vacuum Breaker - PTVB

Check valve	Downstream gate valve	Air inlet valve
☐ Tight ☐ Leaked ..... psi/kPa	☐ Tight ☐ Leaked	☐ not opened opened at ..... psi/kPa

Reset after repair

Check valve number 1	Check valve number 2	Downstream gate valve	RPZ relief valve	PTVB air inlet valve
☐ Tight ..... psi/kPa	☐ Tight ..... psi/kPa testable	☐ Tight ☐ Leaked	opened at ..... psi/kPa	opened at ..... psi/kPa

Registered break tank & air gap device size of inlet orifice (mm) ..... or size of water inlet ..... (mm) Total height (mm overflow invert to inlet orifice invert) ..... Max head (mm from overflow invert to inlet orifice spill level)	Break tank (approx dimensions mm) _____x_____x_____ mm Overflow fitted ☐ yes ☐ no Size of overflow/pipe (mm) ..... Air gap: bridged or bypassed ☐ yes ☐ no
AS2845 requires test equipment used for field testing backflow prevention devices shall be annually calibrated by a registered laboratory. Test kit number: Certification date of calibration:	Contractors name/business stamp:

I certify that I have tested this device and that it meets the performance requirements of AS2845.

Tester's signature: Print name:

Licence number: Mobile number: Date: / /

You must forward the completed form within 14 days to -

The Office of the Technical Regulator - Plumbing, GPO Box 1264, Adelaide SA 5001

Phone: 1300 760 311 Email: otr.plumbbackflow@sa.gov.au

Government of South Australia

Appendix D

BIOLYTIX BF6 INSTALLATION GUIDE

Biolytix BioPod (BF6)

Wastewater Treatment System

Installation, Operation and

Service Guide

Biolytix Limited PO Box 12 499 Penrose Auckland ---0800 700 818 www.biolytix.com

INDEX

Biolytix BioPod (BF6) Wastewater Treatment System

Installation Instructions

Regulatory Approvals & Important Site Checks

Check

1. Local Council Consent has been issued for this installation.

2. Check which BF6 model you are installing (marked on the label attached to the control box on the tank lid). The tank size of BF6 3000 models is 3000 L, that of BF6 4000 models 4000 L.

3. Ensure the chosen location has sufficient fall to allow the sewer pipe to connect to the Filter inlet.

4. That the location of the BioPod:

    (a) Complies with the local Council Consent and the engineering design report;
    (b) Is not in subject to flooding or in a low-lying area where stormwater runoff can flow over the BioPod. If it is, then postpone the installation until a flood zone tank extension kit (a 390mm riser assembly Biolytix code No. 87020) can be installed.
    (c) Is not an area where vehicles may drive over it.

Always comply with appropriate workplace health and safety regulations.

Call Biolytix Ltd (+64 9 579 1080) or E.P. Water Treatment, Port Lincoln (08 86830408) for technical advice if required.

Excavation

5. Locate the position of the excavation where indicated by the engineering design report, however in the DCLEP area there is a minimum distance requirement of 2.5m from a property boundary and / or building

6. Tank inlet invert depth is 650mm for a 3000 Litre tank and 1100mm for a 4000 Litre tank

7. Mark out an area 2.4m x 2.4m square and excavate to a depth of 1.9m (3000 Litre tank) or 2.36m (4000 Litre tank)

8. Batter the sides of the excavation for safety, shore if required. Seek engineering advice if in doubt or in unstable ground conditions

Base Preparation

9. Place and level a 50mm layer of fine crusher dust or sand over the base of the excavation (minimum 0.3 cubic metres)

10. Ensure base is level and free of any large objects

Placement

11. Lift and place the tank using all 8 of the attached hold down cables (On the BF6 4000 a lifting strop will be required to link the eight lifting cables)

12. A tank weighs approximately 450kg and can be lifted by an appropriate excavator

13. Align the tank so that the tank inlet pipe points towards the intended position of the house sewer pipe

14. Carefully lower the tank into the excavation

15. Fill the hold-down pipes with sand/soil/fines and compact it, then tap the caps firmly onto to the ends of the pipes

16. Place the pipes centrally in the loops of the hold-down cables with the cables hanging vertically with no slack

Back-filling the Excavation

17. To minimise the risk of BioPod floatation which could occur on installations with a high water table Biolytix require the following procedure to be followed:

18. Use a stiff mix (low slump) concrete to minimize risk of the tank movement during installation

    Option A: 20MPA (low slump) pre-mix of 2 cubic metres

    Option B: A stiff mix of 2 cubic meters mixed on site at 2 parts cement, 5 parts sand, and 8 parts aggregate.

19. Before concrete is poured, the tank must be filled with 900 litres of water. This provides weight to prevent movement of the tank when the concrete is poured

    a. Evenly place the concrete backfill around the BioPod, to a **height of approx 500mm** (up to the 6th rib from the bottom of the base of the tank) (minimum quantity 2 cubic metres)

    b. Continue backfilling the excavation from the base of the tank with clean material in 200 mm layers compacting each layer evenly with a mechanical compactor to guard against subsidence.

    c. Back fill to the invert of the inlet pipe

    d. Install inlet grommet (Uni-seal) and push the supplied inlet pipe 300mm into the tank (Note that the uni-seal is located inside the electrical control box)

Boundary Kit Connection

Important checks

20. Connect a 25mm MDPE pipe line from the BioPod outlet fitting (25mm female thread labelled 'outlet') to the Boundary Connection kit as provided by the Point Boston Community Corporation.

NEVER install an inline filter (such as a disc or mesh filter) on the BioPod as the internal geofabric is the only filter that is required

- Take a picture of the installation now showing the location and orientation of the pipework to supplement the as constructed drawings

Electrical & Alarm Connections

Electrical Instruction manuals are located inside the electrical control box. Please read, complete and return the appropriate manual to Biolytix.

1. **This work is to be completed by a suitably Registered Electrician to Australian AS 3000 and all other relevant Australian Standards**
2. 20m of 4 core electrical cable is provided. Ensure cable is installed in conduit to Australian electrical requirements
3. Connect the power and alarm cabling at the building according to the schematic diagrams and manuals provided
4. Use a Residual Current Device on the filter circuit for extra safety

The Final Trim

- Backfill around the pipe work with clean sand/fines etc
- Complete backfilling with clean topsoil up to a maximum level of the interface between the black tank body and green tank lid
- Ensure the area is free draining in all directions away from the tank
- **NEVER COVER THE TOP OF THE FILTER LID WITH SOIL**
- We recommend you cover the tank lid with a thin layer of bark mulch (as shown in photo)
- The control box and access hatch must remain exposed and fully accessible (see photo).
- Please tidy up around the installation

Commissioning

If power and water are not available during installation, the installer will need to return to site to commission the BioPod.

Alarm & Pump tests

- Audio-Visual Alarm – Ensure the alarm sounds and light flashes when the high level float is raised, and that it can be muted
- Check pump activates when lower float switch is activated
- Air Pump test: Check that the air pump is running and that good air flow is delivered and all air lines are connected

Ordering the Worms and Inoculating the Filter

Order the worms by calling ***E.P. Water Treatment, Port Lincoln (08 86830408)***

- The inoculation kit should not be ordered or placed in the filter until the BioPod is actually used for two weeks
- Access to the BioPod is via the green central lid and the inoculation kit should be emptied out of the bag onto the filter bed below and slightly to the side of the sewer inlet pipe.
- The worms should look active and not have any decaying smell. If you receive a kit that you are concerned about, please call Biolytix ***E.P. Water Treatment***.

Quality Assurance check Documents

1. Ensure all lids and covers are closed and secured, and no screws are missing
2. **Ensure that the BioPod power is ON (a slight vibration can be felt by placing your hand on the control box)**
3. Complete and sign off on the Quality Assurance document. (These are located in the electrical control box – sample QA document on following page)

Biolytix® Installation Quality Assurance

This form is to be used by approved installers only, who have received specific approval from Biolytix Limited for the use of the abridged form. Scan and email completed form to info@biolytix.com

Installer's Name: _____

Owner's Name: _____

Site Address: _____

_____

Owner's Contact No: _____

Filter Installation Details:

Filter(s) type: _____ Filter(s) Serial No. (s): _____

Installation Date: _____ Inoculation Date: _____

Filter Commissioning Details:

Have you or are you arranging the power connection to the filter? ☐ Yes ☐ No
(If YES please ensure that your electrician supplies a Certificate of Test & Connection to confirm workmanship as per the Electrical Act)

Has the filter been inoculated with worms? ☐ Yes ☐ No

Did you replace the sewage line to the house? ☐ Yes ☐ No

Did you decommission the old septic tank? ☐ Yes ☐ No

Boundary Kit connection checked? ☐ Yes ☐ No

Special Notes:

_____

_____

_____

As an experienced Biolytix® installer and licensed plumber/drainlayer, I, _____ take full responsibility for the installation of this wastewater treatment plant. As such I have installed the equipment in accordance with the Biolytix® standards, Standards Plumbing and Drainage Regulation, the Local Government Approval and have used _____as the licensed electrician, with License No. _____. I completed a Compliance Certificate and have supplied this to the Local Government Approval Authority. Any issues arising from the installation being less than satisfactory and not due to faulty product will be my responsibility.

Installer's Signature: _____ Date: _____

Electrician's Signature: _____ Date: _____

This document is required to be read prior to installation and the Quality Assurance sections completed as a part of the installation process.

Please note that a failure to follow these procedures will void the Biolytix Manufacturer's Warranty.

This manual covers the following:

1. **Owners and contractor details**
2. **Connection of Mains Power**
3. **Connection of an Audio-Visual Alarm**

Contact N2P Control Ltd if you have any uncertainty about the electrical installation.

New Zealand – +64 9 570 1919

A Licensed Electrical Contractor is required to complete this procedure to Australian AS 3000 and all other relevant Australian Standards

The Electrician must complete, sign and date, where applicable the following pages.

This is a Biolytix Quality Assurance document that must be returned to Biolytix immediately on completion, if it is not received the Biolytix Manufacturer's Warranty will be void.

Biolytix does not accept responsibility for workmanship of the Electrical Contractor.

If sub-standard electrical workmanship leads to failures within the Biolytix System, the client will be invoiced for any repairs.

On completion please Scan and Email this document to: info@biolytix.com

Important: Biolytix will not issue a commissioning certificate before the completed documents are received from the client.

Owners Details

Full Name (Owner/Client): .....

Site phone number: .....

Site Address: .....

City/Town: ..... State: ..... Postcode: .....

BioPod Serial No:.....

Date of electrical connection: ..... / ..... / .....

Contractors Details

Electrician Name: .....

License number: .....

Company Name: .....

Mobile number: .....

Contact number: .....

Important: Please note that you must certify your workmanship by signing and dating page 6 of this document.

MAINS POWER CONNECTION INSTRUCTIONS

Precautions:

If it is more than 20m from the house junction box to the BioPod, then a longer 3 core and earth cable will be required. Please contact EP Water Treatment (of Port Lincoln) for the required length of 3 core and earth round cable to be supplied. Only round cable is acceptable to prevent moisture entering the GPO. Failure to use round cable will void the Biolytix Manufacturer's Warranty. The white (alarm) cable on the 3 Core and Earth cable is normally live with 240 Volts.

Procedure:

Unroll the connected to the BioPod and Install it with conduit in a trench from the BioPod in accordance with all relevant Australian standards and connect to the House power circuit.

Photograph the power trench for depth verification.

Backfill the power trench if possible to prevent water being channeled to the excavation for the tank.

Electrical Installation Guide

Refer to attached wiring and circuit diagram when installing the controller. All electrical work must be carried out as per AS 3000

Any problems with installation of the control unit please contact N2P Controls on +64 9 570 1919.

1) Connect the main power supply to the cable provided. Approximately 20m of cable has been provided. If this needs to be extended, please contact Biolytix

2) Install the alarm panel into a flush mounting box.

3) Connect a 240V supply to the alarm panel's **Supply** terminals, **P** for power and **N** for neutral.

   NOTE: This power supply is to be from a different RCBO (residual current device with built-in overload) than what is supplying the controller at the tank.

4) Connect the white alarm wire from the cable that supplies power to the tank to the **Controller No Fault FP** (Fault Power) terminal on the alarm panel.

   *NOTE: There is usually 240V on this wire from the Controller at the tank. Connect a neutral wire to the **Controller No Fault FN** (Fault Neutral) terminal on the alarm panel back to the RCBO that is supplying power to the **tank.***

5) Once installed power up the alarm panel and controller and complete the commissioning of the controller. To commission the system complete the tests below:

   a) Under normal, fault free, conditions the System OK green LED will be **ON** and Red Fault LED **OFF.**

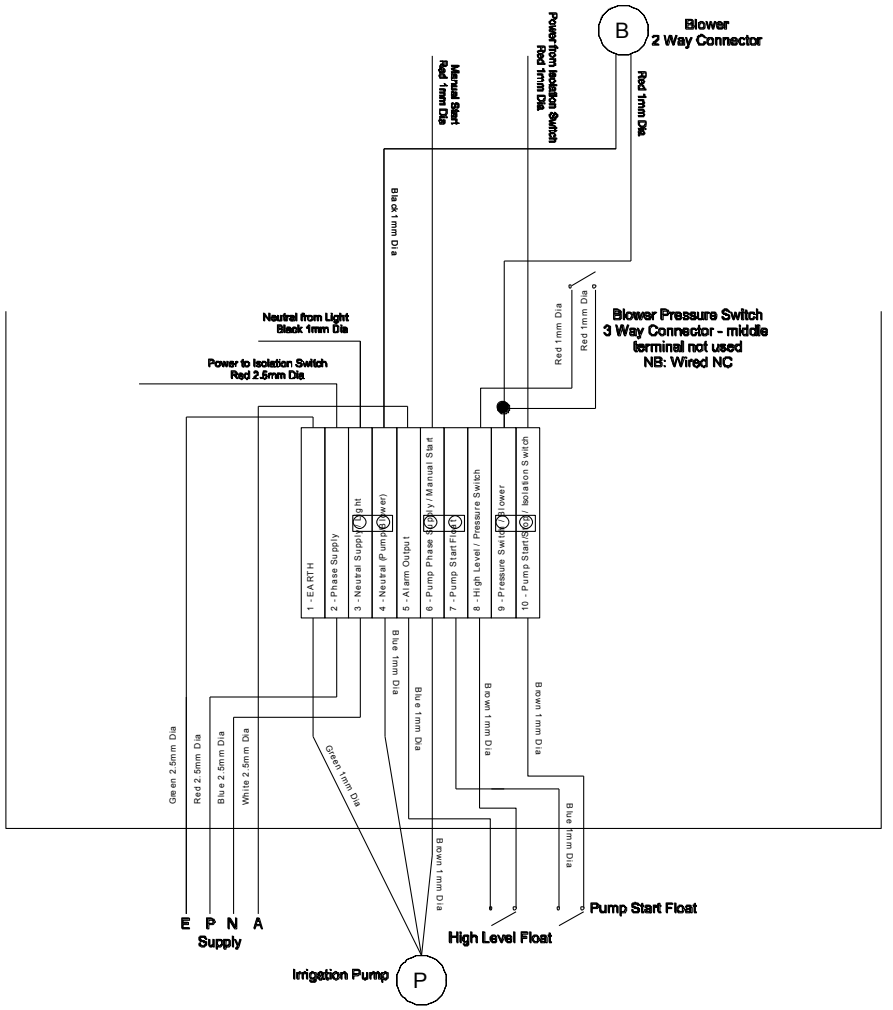
   b) In a fault condition, the *System OK* green LED will be **OFF** and Red Fault LED **ON**. The buzzer will also sound. By pressing the mute button, the buzzer will silence until the alarm resets. A fault indication would be either a high level alarm, loss of air pressure or no power at the treatment plant.

   c) If both the System OK green LED is **OFF** and Red Fault LED is **OFF** there is a fault at the tank and no power at the remote alarm panel.

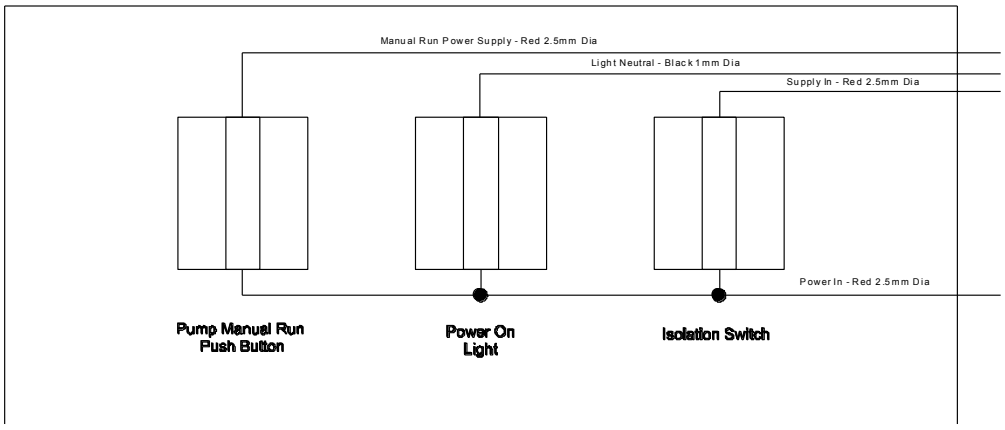
Controller By

BIOLYTIX CONTROLLER WIRING DIAGRAM

Controller Enclosure



Controller Lid

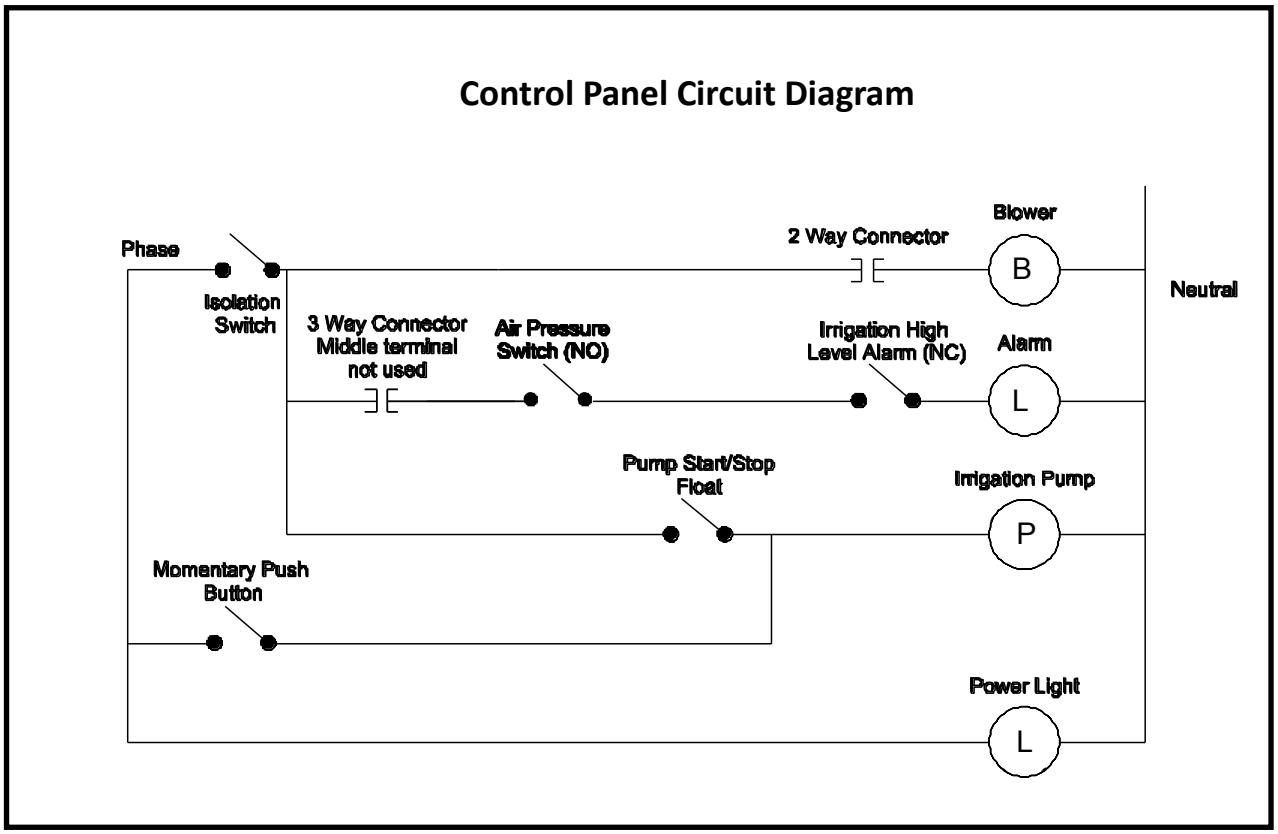


Alarm Panel Wiring Diagram

Power and Neutral Supply from separate RCBO that supplies the tank.

Fault Power (White) wire from Tank and Fault Neutral to the same RCBO that supplies the tank.

Controller By N2P | Controls



Controller By N2P | Controls

Please sign and date this page.

I……..certify that the electrical installation, to the extent it is affected by my electrical work, has been tested to ensure it is electrically safe and is in accordance with the requirements of the wiring rules and any other standard applying to the electrical installations (e.g. AS3000 and others as appropriate) and according to Biolytix instructions.

Signature: …… **Date:** …… / …… / ……

Biolytix Domestic Filter Service Checklist

Client name/s ……..

Street address ……..

Town ……..

Technician's name ……

Contact No ……

Filter Serial No (9 digits) Q ……

Date of Service Visit …… / …… / ……..

NOTE: QC003 Effluent Check to be completed before disturbing the effluent

QC001 Structural Integrity Legend: √ = OK, X = NOT OK, N/A = not applicable or not done	√ / X / N/A
1. Filter Lid not covered by soil?	
2. Filter installed to correct depth?	
3. Control Box Cover drainage opening clear?	
4. Lids and Covers secure (before commencing service)?	
5. No evidence of condensation or moisture in the Control Box and seals appear intact?	
6. 25mm connections to MDPE manifolds intact & secure?	
7. No evidence of leaks or holes to allow water, insects or rodents into or out of the Tank or Control Box?	
8. No evidence of soil subsidence, Tank distortion or movement?	
9. No objectionable odor detectable?	
10. No evidence of surface water runoff or soil into the Tank?	
11. Inlet not distorted, broken or blocked?	
12. No cracks, distortion or ill fitment of Pump-well Cover?	

QC003 Effluent Check	Results	**Offsite tests (only when requested by Biolytix)**	Results
Turbidity	NTU	BOD_5	mg/L
pH		Suspended Solids analysis	mg/L
Effluent Temperature	°C	Faecal Coliforms	CFU
Dissolved Oxygen	mg/L	Total Nitrogen	mg/L

QC004 Filter Bed	√ / X / N/A
1. No prolonged ponding on the surface of the Filter Bed? (more than 5 minutes after a toilet flush)	
2. No blockage of Filter outlet? (record pump flow rate – it must be over 10L/min)	
3. No objectionable odors detectable?	
4. Accumulated plastics removed from Filter Bed?	
5. Accumulated raw solids not touching the Inlet Pipe?	
6. No accumulated sediment in Sump?	
7. Number of top layer drainage bags (DMEs) replaced or reorganized? (No.)	
8. Worm activity satisfactory?	
9. Lower bed Air line fitted? Manometer reading? (mm water head with Schego pump on)	
10. 5 minute series of (12 CFM Air compressor) air blasts performed if manometer reading above is more than 380 mm)	

QC005 Component Check	√ / X / N/A
1. No effluent or sewage bypassing into the Pumpwell?	
2. Electrical installation carried out to Biolytix installation instructions?	
3. Pump operating satisfactorily? (Serial No ; if replaced, new Serial No:)	
4. Float Switches cut in/out at the correct levels consistently and without sticking?	
5. Audio-Visual Alarm – Operating satisfactorily?	
6. Air Pump operating satisfactorily?	
7. Pipe fittings tight, with no obvious leaks?	
Notes:	

NOTE: If anything is unusual, please take a digital photograph and send to service@biolytix.com

Parts used:

Please note that the servicing of each Biolytix unit at Point Boston is the responsibility of the Point Boston Community Corporation who will arrange for the annual inspections to be undertaken on the owners' behalf. All Service Reports will be collated by the Water Services Manager who will forward completed copies of the form to: the District Council of Lower Eyre Peninsular; the Point Boston Community Corporation, and Biolytix.

Office Use ONLY:

☐ *Follow-up required……*

☐ *Unscheduled Visit created - Service Visit No ……*

☐ *Parts ordered: SPO ……...*

☐ *Warranty (no charge)* ☐ *Non-Warranty (charge Service Tech)*

☐ *Non-Warranty (charge Installer)* ☐ *Non-Warranty (Charge Client)*

Biolytix Service Checklist – Revision 1/02/2012

Biolytix BioPod (BF6) Wastewater Treatment System

Service Manual

ONLY to be used by Authorised Biolytix Technicians who have appropriate training.

Un-trained people **must not** attempt to undertake Biolytix Filter servicing.

Hazards

The following list shows the hazards associated with filter servicing.

e. Electrocution hazard.

f. Confined space hazard if entering the filter tank

g. Bio-hazard from potentially infectious material associated with handling wastewater and effluent.

Note: Needles & sharp objects hazard. Appropriate inoculation of workers is advised

h. Trip/fall hazard associated with working on top of a tank with a sloping lid, which could be wet, and over an open filter bed.

i. Environmental contamination hazard from sewerage overflow in the event of filter failure.

j. Low risk potential drowning hazard within the tank during failure conditions.

k. Manual handling/lifting hazard if filter bags need to be moved around in the bed or to remove bags or non-compostable items from the filter bed.

l. Lone worker hazard

Table of Contents

GENERAL INSTRUCTIONS

This manual should be used in conjunction with the Biolytix service report check-sheet. A service report sheet should be completed and a copy returned to Biolytix after either a scheduled service visit to a filter or an unscheduled visit.

Spare parts & equipment

Spare parts Available	Materials	Specifications		Supplier
Flood zone extension ring kit	PP	Everhard Industries		Biolytix
Tank lid with control box	PP	Everhard Industries		Biolytix
Tank Access cover	PP	Everhard Industries		Biolytix
Tank Inspection opening cover	PP	Everhard Industries		Biolytix
Pumpwell lid	PP	Biolytix		Biolytix
Water meter kit	Metal & Plastic	1” BSP with cam lock fittings		Biolytix
Electrical GPO	ABS & metal	10 amp 250V		Biolytix
Air pressure switch box	ABS & metal	250V NC pressure switch		Biolytix
Air pump	Plastic and metal	240V 340l/hr air flow		Biolytix
Transfer pump Pedrollo NKm2/1	Plastic and metal	240V 40m head		Biolytix
Transfer pump Pedrollo NKm2/3 (high head option)	Plastic and metal	240V 70m head		Biolytix
Float switch	Plastic and metal	250 V 10 amp		Biolytix
Float switch swivel assembly	Plastic and metal	Biolytix		Biolytix
Push fit T 6 mm	Plastic and metal	Rated to 10Bar		Biolytix
DME bags	PP & PE	12 L volume		Biolytix

Return faulty parts to Biolytix

You must identify the client, and what your diagnosis of the fault was on the article you are returning.

Disposal pumps that are removed from a Biolytix filter under warranty **must** be returned to E.P. Water Treatment.

Return address: EP WATER TREATMENT, 124 Mortlock Terrace, Port Lincoln, SA 5606

Alarms

The Biolytix system is configured to alarm in the event of any of three conditions:

1. The water level in the pump chamber is high
2. The Air supply to the pressure switch has failed
3. Power to the Biolytix tank has been interrupted

When responding to a phone call from a customer experiencing an alarm condition we recommend asking the following questions:

a. Have you experienced a power outage?

b. Are you turning the power to the filter off?

c. Is there any audible noise?

d. Is there any odour?

e. Has the filter been overloaded due to a party, washing day etc?

f. Has the customer noticed anything that may indicate that there is a problem with their filter?

g. Ask the customer to place their hand on top of the filter electrical box and a slight vibration should be felt to indicate that the air-pump is on.

NOTE If a repeat alarm happens again at a regular interval it may indicate that the disposal pump cannot discharge the effluent fast enough during high loading events such as washing days to avoid triggering the alarm float switch. In this case the disposal pump and connection to the Point Boston Community reticulation system will need to be referred to / and checked by EP Water Treatment for cause (i.e. is the correct head pump installed; boundary kit operating effectively; and / or high reticulation head etc, limiting flow).

Structural Integrity Check

The tank is designed to receive, contain and treat **only** wastewater and it should not have storm-water or groundwater entering it as this may overload the systems treatment capability. Once installed the tank should not move up, down or tilt. Creatures should not enter or leave the tank through cracks or openings. The electrical box equipment must remain dry and isolated from wastewater generated corrosive gases. The sewer pipe entering the tank should grade down evenly to the tank. The pipes and conduits entering the tank must not leak or become kinked or broken.

What can go wrong?

1. Tank is installed too deep in the ground

   (Symptoms: Ground level around the tank is not 50mm below the inspection openings; water has flooded around and or entered the control box)

   a. The ground level must be 70 mm below the inspection openings on the lid and must drain away from the tank lid.

   b. If the water cannot be made to drain away from 70mm below the inspection openings then a flood zone extension riser must be installed on the tank.

2. Tank is not installed level

   (Symptoms: one side of the tank is more than 40 mm lower than the other)

   a. May require the tank to be reinstalled.

3. Poor soil compaction around the tank

   (Symptoms: more than 50 mm subsidence of soil around the tank, inlet pipe can be dragged down so that it has negative fall as it enters the tank, electrical conduits or pipework can be broken or pinched, cables can be stretched or broken, tank can pop out of the ground)

   a. Dig down to at least uncover all pipework and conduits.

   b. Properly compact the soil with a mechanical compactor.

   c. Backfill and compact with soil in 200mm layers to the correct height

   d. Replace mulch to properly finish the tank.

4. Inlet is blocked

   (Symptoms: blockage is present in the inlet; inlet pipe is sloping the wrong way).

   a. Remove any non-biodegradable material and move the buildup of material to the opposite side of the filter.

   b. Use a sewer router if necessary to clear any blockage in the inlet pipe.

   c. If roots are growing into the tank through the inlet pipe then fix the sewer pipe to remove the entry point for root intrusion.

5. Hold downs not installed correctly

   (Symptoms: tank lifts out of the ground in wet conditions)

   a. Reinstall the tank.

6. Lid not fitted correctly

   (Symptoms: water leaking in around the lid seal, roots penetrating in between the tank and the lid)

   a. Remove the access cover.

   b. Using a torch, check for evidence of water leaking in around the tank lid rim (e.g. soil staining or root penetration).

   c. If there is leakage into the tank:

      i. Remove soil from over and around the tank lid so that the lid can be removed, cleaned and resealed onto the tank.

      ii. Remove and clean the lid and seal.

iii. Dry the sealing surfaces and reinstall correctly, if necessary use a fresh neoprene gasket.

iv. Aligning the lid over the tank so that the inspection covers are above the inlet and adjacent to the overflow.

v. Installing the bolts and nuts in pairs on opposite sides of the access lid, ensuring that all screws penetrate the ribs on the tank.

7. Access cover screws stripped

   (Symptoms: Can't screw down the access cover properly or remove it easily)

   a. Install lid threaded inserts

   b. Replace cover with new screws

8. Inspection opening loose or missing

   (Symptoms: Opening in the lid of the tank where rodents/insects can get in and out).

   a. Replace missing inspection covers with new ones. Twist in a clockwise direction to lock in place.

9. Lid or tank cracked or broken

   (Symptoms: Water, roots or creatures penetrating the tank or lid, leaks or wet spots around the tank if the tank is flooded).

   a. Weld or replace the damaged parts. If the tank cannot be repaired it will have to be replaced.

10. Electrical conduits can leak water, water vapor or gasses into the electrical box

    (Symptoms: Evidence of water having entered the control box. Discoloration of the inside of the control box from H_2S gas, condensation on the lid of the control box, air pump failed with water inside it or the felt filter is wet, corrosion of the electrical wires or terminals, conduits not sealed properly with silicone as instructed in installation manual)

    a. Seal conduits properly with silicone sealant (use plenty and ensure it flows around all wires to give a deep and thorough water and gas tight plug.

    b. If the box is seriously damaged replace it.

    c. **DO NOT TIGHTEN LID BOLT WITH TOOLS AS THIS CAN SPLIT CONTROL BOX LID.** Cracked control boxes will not be covered under warranty.

11. Lid is not fitted correctly to the pumpwell

    (Symptoms: Lid is loose fitting and not sealed onto the pump-well. There are organic contaminants in the sump or evidence of leakage of raw wastewater down the side of the pump-well (it should be clean inside the pump-well)

    a. If a pump is installed:

       i. Turn off power at the control box.

       ii. Remove the Camlock fitting and elbow from the pump riser.

       iii. Undo the pump riser gland.

       iv. Remove the cover from the pump well.

    b. Shine a torch down the pump well and visually check that no effluent or wastewater is bypassing into the pump well or over the top rim of the pump well.

    c. If by passing is evident:

       i. Check the loading rate and/or use of toxic chemicals by the operators for the possibility of hydraulic overload or system poisoning.

       ii. If hydraulic overload or system poisoning is suspected, contact Biolytix.

       iii. Ensure the cable glands and cover seal are sound.

    d. Clean the pump intake.

e. Re-install the pump in the reverse order.

12. Complete **Section QC001** on the Biolytix Service Checklist.

Effluent Quality Check

The purpose of the BioPod is to treat wastewater, safely isolate biologically hazardous human waste products it contains, and remove contaminants in it so the water can be safely discharged to the Point Boston Pressure Effluent (PE) system. To ensure trouble free operation of the system an effluent with a BOD below 20 mg/L and a TSS below 30 mg/L is required. Both BOD and TSS are not easy or cheap parameters to test in the field. We have found from experience that Turbidity, Dissolved Oxygen combined with pH and temperature measurements are a low cost and instantly available range of surrogate tests that, if within the limits we specify below, will correlate very well with BOD and TSS.

To collect a sample, refer to the effluent sampling procedure:

1. Measure the turbidity of the sample using the supplied portable turbidity measuring sighting tube.
   - Lock the 2 parts of your turbidity tube together.
   - Hold the tube vertically so you can view downwards.
   - Gradually pour the sample that you have already collected down the inside surface of the tub until the black markings at the bottom of the tube are no longer visible.
   - Record the measurement from the marking on the side of tube and record on the service checklist. BF6 results obtained should be < 10 NTU**.** If the results are greater than or equal to 20 NTU, contact Biolytix as it most likely means there is poor lower bed aeration or overloading or both.
   - Rinse out the tube with fresh water and return to its box to minimize damage to the tube.
2. Measure the **DO** according to the manufacturer's instructions in the supplied kit. Please ensure that you return the instructions to the box for future guidance. Record the DO outcome on the service checklist. (We recommend using a DO meter which can be acquired for about $1500 as these are much quicker and more accurate than DO test kits)
3. Measure the ***pH*** according to manufacturer's instruction in the supplied kit and record the results on the checklist. (Alternatively we recommend using pH meter which can be acquired for about $100 as these are quicker and more accurate than the paper pH strips)
4. Measure the temperature of the effluent sample using the supplied thermometer. (Or for more accurate readings we recommend using a Laser Thermometer as these can give temps for the filter bed and sump from a distance without needing to touch the bed)
5. Complete Section QC005 on the Biolytix Service Checklist.

Parameter	Required range	Troubleshooting	Notes
Temperature	15C - 35C	Cold or hot climates will affect this reading, as may recent use of a dishwasher or hot bath etc.	Many chemical and biological reactions are affected by temp. The effluent temperature does not necessarily indicate the filter bed temperature.
Dissolved Oxygen	Greater than 2	A low DO could indicate a lack of aeration of the filter bed, so in Pre-Sept 2010 units install a lower bed air line in any unit that has a DO of less than 2 mg/L	DO is Temperature dependant - DO decreases as temp increases and oxygen solubility is negatively correlated with the amount of dissolved solids.
Turbidity	Under 20 NTU	This is an indirect indicator for suspended solids and BOD. A high turbidity is an indication that the filter bed performance is compromised. If not already present, Install a lower bed air line and test bed pressure with a manometer. (see Bed Maintenance section below)	A high concentration of light absorbing materials such as activated carbon and dissolved colour causing substances may have a negative interference on turbidity. Suspended and dissolved solids affect turbidity. Perform test in field where possible.
pH	Between 5 & 8.	If less than pH 5 then add 2 kg of ground limestone to the filter bed around the inlet zone. If greater than 8 investigate the use of caustic household cleaners especially dish-washing machine powders, and recommend changing to surfactant based products.	This is the range that worms are able to survive & reproduce. pH is temperature dependant.

Offsite analysis

1. Only take a sample for offsite analysis if the local Regulatory Authority or Consent requires it, or if it has been requested by Biolytix.
2. Record results of analysis in Section QC005 of the Biolytix Service Checklist.

Filter Bed Check

The BioPod filter bed is the most important part of the treatment process. It screens out the solid waste entering the tank and allows the water to pass through. It should always remain open, aerobic and free-draining, and worms and other soil organisms should thrive and breed in the bed. A healthy population of worms will keep excavating small tunnels through the humus that is created from the raw wastes they process it and so the bed becomes a moist sponge like filter media with a large lung like aerobic treatment capacity.

What can go wrong?

1. Bed surface swamped with too much raw organic waste

   (Symptoms: there is a layer of un-decomposed organic/faecal matter over the bed that is slimy and/or non-porous; perhaps with liquid ponding in low points, few if any worms are visible on the surface of the bed, it may also have a significant odour associated with the mass or raw wastes)

   (a) The system may be overloaded;

      i. Investigate the actual organic loading on the system

         A. number of people using the system on a regular basis (10 people max)

         B. number of people using the system for peak events and the number of peak events

         C. Take a digital photo of the bed surface and send the file to service@biolytix.com.

      ii. If the system is clearly overloaded advise the owners that they must upgrade the capacity of the system to suit the loading.

      iii. If the system loading appears to be OK but there are reasonable grounds to doubt the loading information supplied by the owners, then the actual loading may need to be measured using a flow meter and/or BOD load monitoring.

         A. Contact Biolytix to discuss implementing this monitoring

   (b) If there is more than a 30 mm buildup of raw faecal material:

      i. Have the buildup of organic material removed or pumped out in a manner approved by the relevant authority.

      ii. Re-inoculate the bed by placing about 1kg of worms together with supplied bedding material into the inlet side of the tank.

   (c) If there is less than 30mm of faecal material buildup on the bed:

      i. Shovel the excess organic matter to the opposite side to the inlet on top of a layer of DME bags.

      ii. Adjust the HME Bags so that the upper bed is free draining.

      iii. Re-inoculate the bed.

      iv. If the system loading appears to be OK there may be bed conditions that inhibit biological activity – refer to section 2 below.

   (d) The System has a low organic breakdown rate due to poor biological activity:

      i. Further diagnostics are required to determine the reason for poor biological activity.

      ii. Measure the filter bed surface temperature at several points preferably with a digital laser Thermometer as recommended above.

         A. If average filter bed surface temperature is more than 35°C.

            - Too hot for most species of worms who cease to breed and thrive above 35 °C
            - Ensure the system is fully shaded for most of the day.
            - Confirm that the soil temperature at 1m depth in the shade is less than 30 °C for that site.
            - Introduce Sumatran cockroaches (or equivalent organisms that can operate at higher temperatures) into the filter.

B. If the average filter bed surface temperature is less than 15°C:

- The filter bed may be too cold.
- Insulate the Lid of the tank.
- Cover the tank lid and surrounding soil with thick bark mulch or similar outdoor insulation material.
- Provide warmer source water (solar heating) to increase the thermal mass of the wastewater entering the system (this is particularly relevant for schools or public toilets operating off tank water in cold or alpine climates).

iii. Toxic conditions in the filter bed – refer below.

iv. The filter bed may not have enough air available for good respiration – refer below.

v. The system may be too wet for good biological activity - refer to point 2 below as anaerobic decomposition in a flooded filter is very slow.

2. Filter bed may be too wet

(Symptoms: Water ponding on the bed surface for more than a few minutes after a toilet is flushed, bags floating on the surface of the bed, a "tide mark" on the side wall of the tank as evidence of the level of flooding of the system, the alarm log on the installation history should show unresolved alarm events if the alarm has been working)

(a) check that the alarm is working:

i. If not fix the alarm as per alarm section below.

ii. Discuss the responsibility for rectification with Biolytix before further action.

(b) Check that the pump is working correctly:

i. Discharge from the sump will be dependent upon location (i.e. elevation and distance to central Point Boston Community Treatment Facility) but should typically be in the order of 10-15L/min or more, when connected to the PE system.

ii. If not fix the discharge blockage or pump operational fault before proceeding.

(c) The system may be hydraulically overloaded:

i. Number of people using the filter should be 10 or less.

ii. Peak daily hydraulic loading rate should be less than 1600l/day.

iii. Check the water usage in the house (water meter reading is the most reliable if possible).

iv. If hydraulic overloading is suspected then arrange to install a water meter and data logger.

A. Call Biolytix to authorize this first as there may be other factors causing the above symptoms such as:

- Blocked upper bed (See below)
- Blocked geofabric (See below)
- Anaerobic lower bed (See below)

3. Blocked upper bed - Upper bed pores can become blocked with too much fine organic matter washing into the pores faster than the worms present can process them

(Symptoms: surface flooding evident as for section 1 above, or a layer of un-decomposed faecal matter on the surface of the bed is evident as in section 1 above, or bed air flow resistance pressure as measured using a manometer is more than 380 mm water pressure, or effluent being discharged to irrigation has a DO of less than 2 mg/L, or the lower bed is not flooded)

(a) Remove plastic and other non-biodegradable waste that has accumulated in the surface of the bed over time

i. Using thick gloves and a Biohazard bag, remove sanitary pads, synthetic tampons and any other obvious plastic material or non-compostable material that is on the surface of the bed,

and report Misuse of Biolytix tank to EP Water Treatment for further action / owner education.

ii. Dispose of this refuse in a manner approved by the local authority

iii. if this is not removed it will gradually block the bed drainage and aerobic capacity

(b) Adjust the DME & HME bags in the upper bed so that drainage is improved.

(c) Undertake a compressed air blast of the bed.

i. If there is only one air line, install a lower bed air line as described below.

ii. Blast the bed with the full air flow from a standard 12 CFM air compressor (with a 20 L or more compressed air storage tank) directly to the lower bed air line.

iii. Allow the pressure to build in the air compressor tank to the cut out pressure then connect to the air line at the full flow possible through the air line.

iv. Measure the pressure using a manometer.

v. This procedure should be repeated a few times until the manometer reading is no more than 380 mm of water head.

4. The system may have had toxic chemicals put into it at one time or may have an ongoing input of a toxic material.

(Symptoms: little or no worm activity - lift 3 DMEs within 600mm of the inlet and check that there are at least 20 adult worms visible on the underside of each bag, pH is below 5 or above 8, chemical smell in the filter tank, unusually coloured material in the tank, poor drainage through the bed.)

If there is any unusual biological activity, or lack of activity, photograph the area and Send the photos to Biolytix

(a) Worms and other soil life in the ecosystem can be poisoned by toxic chemicals
   i. reduced biological activity and in particular burrowing activity by worms has a negative impact on both drainage and hence bed aeration

(b) Try to determine if there is any toxic material being added to the system.

i. The Owner's Manual lists toxic household chemicals and other pollutants that must not be disposed of into the system. Check that the client is adhering to these instructions.

ii. It is difficult and expensive to analyze for the range of chemicals that could be causing toxicity problems, so your nose and experience with what a normal bed should look and smell like are the best guide.

(c) If toxic chemicals or other problem pollutants were or are being added, make sure the clients are aware that they will have to pay for any repairs to the bed that is necessary.

5. Excess Humus

(Symptoms: Humus build-up to above the surface of the DME layer, inlet pipe can become backed up with organic matter, worms can migrate into the toilet bowl or water traps in the building)

(a) Remove full bags around the inlet zone.
(b) Swap them with opposite side bags.
(c) When all bags on the top layer are full stack them around the outer perimeter of the inside. of the tank and replace them with fresh DME bags.
(d) After 12 months of no direct contact with sewerage they can be removed and the matured worm casts shaken out and buried in a garden bed trench at 300 mm deep (or according to state of local government regulations), then the bags can be reused as DME bags.

Diagnosis and treatment of Filter Bed Blockage (Hydraulic Failure)

The Biolytix filter bed can fail to drain from four main causes, all of which are related to the amount of air available to the biolytic organisms in the filter bed.

Filter overloading - too much water and/or organic matter.
Slow Pump Out - Pump cannot remove the water as fast as it comes into the sump.
Failed Air Supply to the filter bed which becomes anaerobic and slow to drain.
Geofabric Filter Blockage - partially or fully blocked pores in the filter cloth.

1. Filter Overloading Symptoms

i. A large amount of un-decomposed organic matter evident on the surface of the bed.
ii. Water ponding on the surface of the bed or bags floating with or without worms on top of the bags, but with air coming up through the water.
iii. No worm activity present.
iv. Evidence of flooding to well above the level of the pump-well lid and sometimes even into the control box.

Causes of Overload	Action
Too many (more than 10) full time people "Equivalent Persons" (EP) using the system and/or more than 1600 L/d wastewater.	Reduce the number of people using the facility or augment the capacity of the system to cope with the loading
Storm-water ingress through illegally connected down pipes or storm run-off into gully traps or grates.	Change the plumbing to remove all stormwater from the system.
Leaking cistern flush valves (can easily overload the system if not fixed)	Replace faulty cistern parts – saves a lot of water too.
Leaking taps, very long showers. (total water use must be under 1600 L/d	Ask clients to have any leaking taps fixed – Offer to install flow control devices on showers.
Too much food waste being put in (through an Insinkerator only) – more than 250 grams/person/day.	Ask clients to limit the amount of food waste added.
System installed in a flood plain.	Contact Biolytix to discuss options for a tank extension.
Pump discharge line is disconnected inside the tank.	Replace any damaged fittings and refit the discharge line correctly.
No obvious causes but overloading is still the prime suspect.	Install a Severn Trent water meter and Tiny Tag data-logger on the outlet hose and monitor for some months.
Average filter bed surface temperature is less than 15°C – too cold for good worm activity.	Insulate the underside of the tank lid with PU foam and cover it with thick bark mulch to act as insulation
Average filter bed surface temperature is more than 35°C - too hot for good worm activity	Ensure the filter bed is fully shaded for most of the day. Confirm that the soil temperature at 1m depth in the shade is less than 30 °C for that site.
Filter bed may be too toxic for good biological activity.	Audit the chemicals used in the facility using the toxicity audit sheet and advise Biolytix of the outcome
Not enough air for good biological activity	See below under failed air supply

2. Slow Pump Out

If effluent in the sump is repeatedly and periodically above geofabric level of 380 mm (280 mm in pre 2005 units), then a combination of bubble point pressure in the sump, saturated geofabric or slime growth within the geofabric can eventually result in geofabric blockage.

The alarm should go off every time the sump effluent level exceeds 330 mm. If there are alarms experienced almost every day or on "washing day", then urgent attention should be given to determine the true cause of the slow discharge of effluent.

Causes of Slow Pump Out	**Action**
Pump float switch is sticking.	Adjust the float and or pump position to ensure the float and its cable move freely and do not touch the pump-well wall.
The flow through the pump is restricted or stopped. (replace pump if stopped)	Take the base off the pump and clean the impellers and make sure the motor is turning at full power. Failed capacitor or incorrect wiring will lead to greatly diminished pump capacity.
Control float is fitted too high on the pump.	Adjust the cut in height of the control float to be 165 mm (refer to pump replacement in the service manual)
There may be ground water entering the plumbing or the Biolytix filter tank.	A "soil" stain below the overflow relief drain "y" junction will be evident if a torch is shone down the inspection opening if ground water is entering here. There is also a rare possibility of ground water entering through the base of the tank if the Sump Inspection pipe is not inserted correctly into the rubber grommet.
There may be hydraulic overloading of the system.	Refer back to section 1 above to diagnose.
The pump fitted is not correctly sized for the head loss of the pressure as it is designed.	Fit a pump with a higher head that can deliver an appropriate pressure for the pressure sewer system (Pedrollo NKm2/3).

3. Failed Air Supply

The bed relies on air to remain aerobic and support an active worm and microbial population. If the bed becomes anaerobic, then the bed porosity will gradually decline and lead to eventual hydraulic failure. This is because the macro- and micropores in the bed are cleaned and maintained by grazing microbes, mites and worms etc. The geofabric is also continually cleaned by microbes and if the bed or geofabric becomes anaerobic, then it will soon become coated with and impregnated with biofilm slime. If this happens then the slime must be removed or the filter will fail to drain properly.

Causes of Failed Air Supply	Action
Air pump has failed.	Replace the air pump or its diaphragm.
Air line to base has become kinked or blocked.	Follow the work instruction for “installing and commissioning a lower filter bed air line” and then test air flow again.
No air bypassing the geofabric layer into the lowest DME layer.	Fit a new air line down the side of the Biopod tank to the middle of the lowest DME layer. (Ref. “installing and commissioning a lower filter bed air line”)
(A) Repeated flooding of the geofabric layer due to slow pump out.	Fix the slow pump discharge problem see section 2 above.
(B) Bubble point back-pressure below the geofabric prevents effluent from flowing through the filter cloth under gravity	Fit a second air line down the side of the BioPod tank to the middle of the lowest DME layer (Ref. “installing and commissioning a lower filter bed air line”)
Flooding above the geofabric creating an air seal which prevents air escaping from the sump up though the geofabric (short pump cycling will usually be evident in this case).	Test lower bed water level and if more than a 100 mm of water pressure then insert a 25 mm riser spear and use a Helical rotor pump (or other suitable suction pump) to pump down excess effluent in the bed so air can flow through the bed. This may need to be repeated a few times before the beds aerobic status is back to normal levels. DO should be 2 mg/L or higher.
Upper Bed blocked – i.e. Bed air flow resistance is greater than 380mm of water head Ref: “Measuring Bed Blockage” below.	Blast the bed with the full air flow from a standard 12 CFM air compressor (with a 20 L or more compressed air storage tank) directly to the lower bed air line. Allow the pressure to build in the air compressor tank to the cut out pressure then connect to the air line at the full flow possible through the Air line. This procedure should be repeated a few times until the manometer reading is no more than 380 mm of water head.

4. Geofabric Blockage

The geofabric is a self-cleaning filter cloth with an 80 micron pore size. The pores are kept clean through the grazing action of aerobic microbes. If the oxygen levels in the bed and the effluent are high, then the filter cloth will remain free-draining, and only very fine colloidal organic sediment will pass through in very small quantities. It can become blocked if the bed or effluent becomes anaerobic. This promotes the growth and accumulation of anaerobic microbial slime similar to a septic trench biomat. This can lead to effluent ponding on the geofabric and preventing air from getting to the lower filter bed. This is a negative feedback loop and must be corrected through deliberately supplying extra air where it is needed. This can recover the drainage capacity of the geofabric. Similarly if large amounts of grease or oils are applied to the bed, this can overwhelm the aerobic microbes and start to block the pores in the bed and geofabric.

Causes of Geofabric Blockage	Action
Bed air supply failure.	See above table.
Excessive disposal of oil or grease into the Biolytix Filter.	Advise users on correct operation of the BioPod – Ref BioPod User's manual and contact Biolytix
Oil and grease on or embedded in the geofabric material.	Add grease consuming microbes or enzymes to clean the geofabric cloth. This may be effective if the bed is still draining at a high enough flow rate to cope with daily system loading.
Repeated flooding of the geofabric layer due to slow (less than 12 L/min) pump out.	Fix the slow pump discharge problem see section 2 above.
Air pressure can build up in the sump and stop water coming through the geofabric.	Air can be observed "burping" into the pump-well. If not present then fit a second air line down the side of the BioPod tank to the middle of the lowest DME layer. (Ref. "installing and commissioning a lower filter bed air line")
Bed blockage – i.e. Bed air flow resistance is greater than 380mm of water head as measured by a U- tube Water Manometer with air supplied to lower bed using a Schego air pump.	Refer to "installing and commissioning a lower filter bed air line"

Component Check

Pump Operation

The effluent pump is designed to transfer water from the sump to the sewer. The pump should always have power supplied to its level control float. In the up position, power is on and the pump runs. It is critical that the float switch and the pump are both operational at all times. There is a pump over-ride switch on the control box. Pressing this button bypasses the float switch and allows the pump to run irrespective of the water level in the sump. The industrial quality pump Biolytix uses can be fully repaired and refurbished, and so we require all replaced pumps to be returned to our factory for examination and repairs. This enables us to continually improve our product quality and so reduce the life cycle cost of the pumps.

What can go wrong?

Pump is not plugged in or wired in correctly

(Symptoms: Pressing the bypass button doesn't operate the pump or it spins weakly because the phases are not connected correctly.)

(a) Double check the pump is connected correctly.

(b) The capacitor may have failed – replace the pump and return the old one to Biolytix.

Pump intake screen or impellers are blocked or obstructed

(Symptoms: Output pressure is insufficient or low flow rate to the pressure sewer)

(a) Use a pressure gauge to test the actual outlet pressure.

(b) Check and clean the inlet screen so it is not fouled with organic matter that may have entered the pump well (can happen if the pump-well cover is not correctly fitted and the system floods).

(c) Remove the intake screen from the pump base and remove and clean the multistage pump impellers.

Pump bearing is worn out

(Symptoms: Pump impeller shaft is loose. Motor rotor is polling against the case. Motor won't start reliably).

Replace the pump, it must be reconditioned before being redeployed.

Under normal operation, press and hold the pump by-pass button on the control box to activate the pump (ensure the outlet line is attached to the riser and that there is sufficient effluent in the sump)

Check that the level in the sump drops. The minimum discharge rate must typically be measured at more than 10 litres/min using a water meter.

If the pump pressure or flow rate is found to be unsatisfactory, replace it with a stronger pump approved by Biolytix.

Return all failed pumps to EP Water Treatment if under warranty.

Float Switch Operation

The float switch is fitted in a swivel assembly that allows it to move in a controlled arc within the pump-well without fouling on the side of the pump-well or the pump. This Biolytix designed assembly is both simple and highly reliable.

What can go wrong?

1. Float switch can fail

   (Symptoms; will not complete the power circuit so the controlled equipment won't operate in the up position or will not stop operating when the float is in the down position)

   a. Replace the float switch

2. Float switch can leak and fill up with water

   (Symptoms: It may trip any RCD installed, pump voltage is incorrect and will not deliver the full head pressure or flow, you can hear water in the float when shaken, and multi-meter shows 10K Ohms or less

resistance when float is in the up position, the float will not be as buoyant and will switch at the wrong level)

a. Replace the float switch as above.

3. Stainless steel hose clamp is adjusted to the wrong height

(Symptoms: Float does not cut in at 165mm and does not cut out at 60mm, the float cut-out is too low and air sucked into the pump inlet screen before the pump switches off).

a. Loosen the stainless steel hose clamp screw and adjust it up or down as needed then retighten it (the lower edge of the hose clamp should be 150mm up from the pump base plate.

4. Float cable is incorrectly installed in the swivel clip.

(Symptoms: Either the float or the cable catches on the pumpwell wall so that the switch does not operate reliably)

a. Release the swivel clip mechanism and slide the float cable in or out so that it is 20mm from the shoulder of the float to the closest edge of the swivel clip.

b. Shorten the cable loop so that it just clears the pump well during its arc of movement.

5. Float swivel clip can stick

(Symptoms: Feels stiff to rotate and the float may not cut in or out at the correct levels – this is very rare with the Current PP clips).

a. If it does, loosen it by applying silicone grease and working it up and down several times, then replace the swivel and stainless steel M4 screw.

b. If it is the old SS swivel arrangement from 2004, replace with the new PP swivel clip.

6. Stainless steel hose clamp is loose broken

(Symptoms: 316 SS hose clamp may have rusted out or broken. This is usually caused by high concentrations of caustic soda in the effluent or other harsh chemical may have been used.)

a. Carefully check the body of the pump for corrosion or pitting

b. Replace any parts as necessary. This is not covered under warranty as we use only marine grade stainless steel parts and the system must never have harsh corrosive chemicals used in it.

Alarm Operation – Audio/Visual

Warning - this alarm is powered by 240v ac. If problems are encountered when testing, a licensed electrician should carry out repairs, if the unit was produced before December 2010, otherwise the faulty parts can be unplugged, replaced and returned.

1. Activate the high-level alarm float by lifting it up with the float test rod (made by connecting a 1" MF polypropylene elbow to a 900 mm x 1" polypropylene pump riser).
2. Check that an audio/visual alarm occurs at the A/V unit. If an alarm is observed, the float switch is working. No further action is required. Reset unit.
3. Activate the air pressure switch by removing the airline from the switch.
4. Check that an audio/visual alarm occurs at the A/V unit. If an alarm is observed, the air pressure switch is working and no further action is required. Reset unit.
5. If an alarm/s is not registered check that there is power to the A/V unit and that the timer is operational. If satisfactory, split the float and air pressure switch and test for continuity across switch when activated. Replace as necessary.

Air Pump Operation

1. Check for condensation in the Schego air pump and the air filter (located in the base plate of the air pump) for contamination.
2. Check the operation of the air pump by removing the airline and ensuring there is adequate airflow.
3. If operation is un-satisfactory replace pump and if under warranty return the unit to Biolytix.
4. Reconnect airline.
5. Complete Section QC004 on the Biolytix Service Checklist.

Measuring Bed Blockage (by Recording Bed Air Flow Resistance)

The sump air line branch of the Push Fit “T” can be removed and a U tube Water Manometer can be connected to the branch of the "T" to check bed blockage using the air flow resistance method at any time in the future.

Bed Blockage

The pressure required to force air flow up through the bed is critical and should remain low.

If there is more than 380mm of pressure registered in the manometer with the full flow of air from the Schego air pump, then the bed above the geofabric is considered blocked.

This must be corrected immediately by applying the full air flow from a standard 12 CFM air compressor (with a 20 L or more compressed air storage tank) directly to the lower bed air line.

Allow the pressure to build in the air compressor tank to the cut out pressure then connect to the air line at the maximum flow possible through the 6mm air line.

This procedure should be repeated a few times until the manometer reading with the Schego air pump is not more than 380 mm of water head.

Provided air flow through the bed is maintained thereafter, and the tank has an acceptable worm population, the worm activity through the bed will keep the bed pores open and a manometer pressure reading below 380mm of water should be maintained in the future and no further blockage or treatment issues should be encountered. A bed with good worm activity and good air flow will typically have an air flow resistance pressure of less than 200 mm of water head.

If there is bypassing of the air around the newly installed air line, then a false low air flow resistance pressure may be recorded. If it is less than 100mm this should be suspected, so fix the bypassing by settling the bed around both air lines and check that the air is not escaping before re-testing.

Geofabric blockage

Under normal conditions there should be no water ponding over the end of the lower bed air line.

After carrying our Step 1 above, the depth of water that is ponding above the end of the lower bed air line can be measured accurately (provided it is less than the actual bed resistance as measured above).

Using a short length of air line with a tap in it (you can remove the effluent sample tap temporarily for this) gradually increase the air flow until the water level in the manometer remains stable **below** the bed's air flow resistance pressure. This is the level of effluent that is ponding above the end of the lower bed air line.

After completing this bed maintenance procedure, please recommend to the householders to use water very sparingly for a few weeks while the bed recovers its aerobic status and worms re-colonize the bed and the Geofabric's hydraulic flow rate is restored to normal.

Ensure that power is restored and all pumps are operating correctly before you leave the site.

ATTACHMENT

PEDROLLO NKm (SINGLE PHASE)

PROPERTY PUMPS

Biolytix Limited PO Box 12 499 Penrose Auckland ---0800 700 818 www.biolytix.com

Blank

NK

Multi-stage submersible pumps

Property pumps specified for the Point Boston Biolytix on-site treatment units discharging to the pumped effluent reticulation.
Low pressure zone NKm 2/1 single phase.
High pressure zone NKm 2/3 single phase.

PERFORMANCE RANGE

- Flow rate up to **120 l/min** (7.2 m^3/h)
- Head up to **105 m**

APPLICATION LIMITS

- Maximum liquid temperature **+40 °C**
- Maximum sand content **50 g/m^3**
- **20 m** maximum immersion depth
- Continuous service **S1**

CONSTRUCTION AND SAFETY STANDARDS

➠ Complete with **20 m** long power cable

EN 60335-1
IEC 60335-1
CEI 61-150

EN 60034-1
IEC 60034-1
CEI 2-3

CE

CERTIFICATIONS

CERTIFIED QUALITY MANAGEMENT SYSTEM ISO 9001:2008 SINCERT DNV

АИ30

INSTALLATION AND USE

As a result of their high efficiency and reliability they are suitable for use with clean water in domestic, civil and agricultural applications such as the distribution of water in combination with pressure sets, for the irrigation of gardens and allotments and for pressure boosting, etc.

OPTIONALS AVAILABLE ON REQUEST

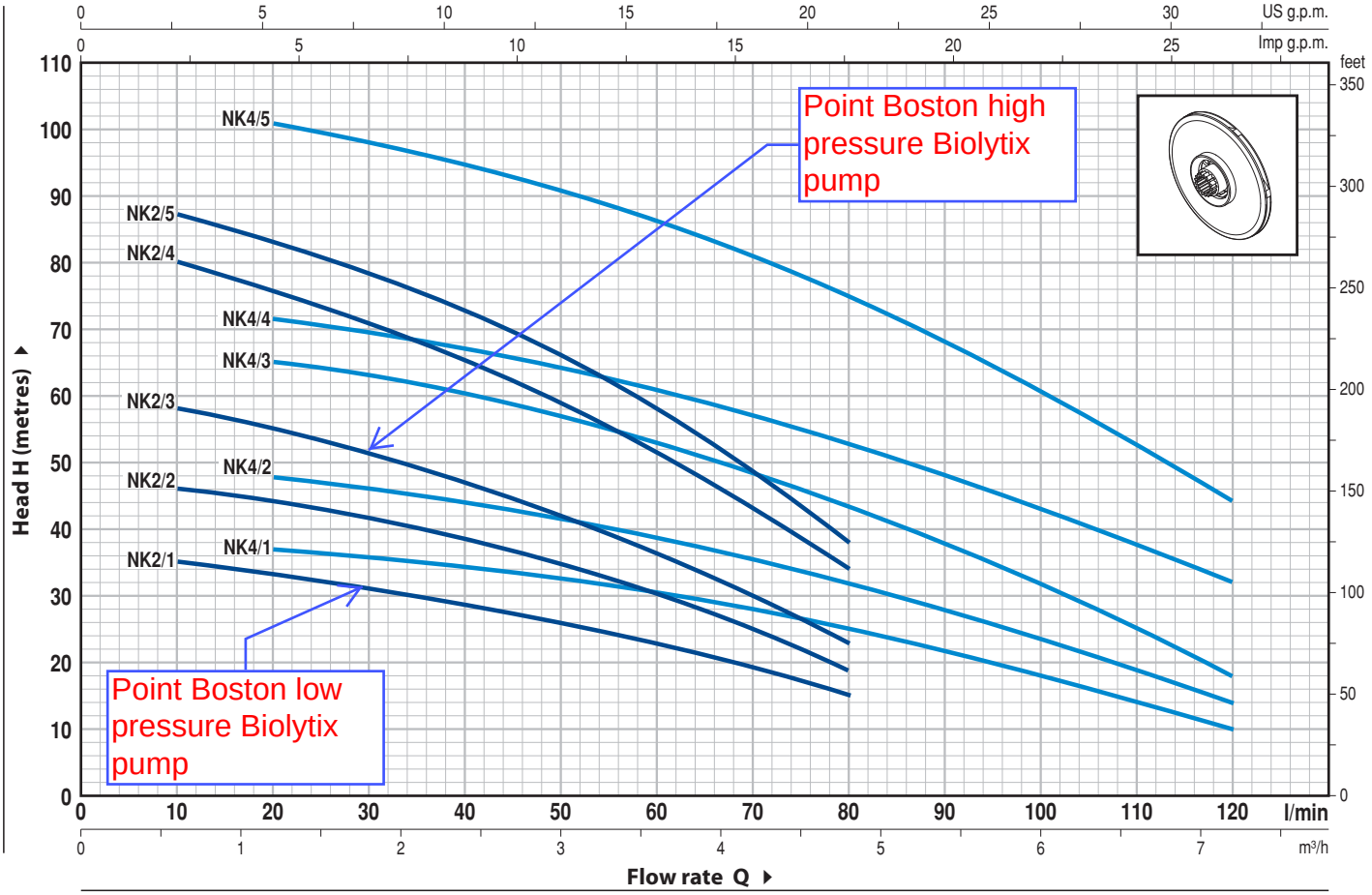
- Pumps fitted with power cables of other lengths
- Other voltages or 60 Hz frequency

GUARANTEE

1 year subject to terms and conditions

CHARACTERISTIC CURVES AND PERFORMANCE DATA

50 Hz n= 2900 1/min



VERSION WITHOUT FLOAT SWITCH

MODEL	POWER		Q													
			m³/h	0	0.6	1.2	1.8	2.4	3.0	3.6	4.2	4.8	5.4	6.0	6.6	7.2
Single-phase	kW	HP	l/min	**0**	**10**	**20**	**30**	**40**	**50**	**60**	**70**	**80**	**90**	**100**	**110**	**120**
LP → **NKm 2/1**	0.45	0.6		36	35	33	31	28.5	26	23	19	15				
NKm 2/2	0.55	0.75		48	46	44	41.5	39	35	30	25	19				
HP → **NKm 2/3**	0.75	1		60	58	55	51	47	42	36	30	23				
NKm 2/4	1.1	1.5		84	80	75	70	65	59	51	42.5	34				
NKm 2/5	1.5	2		90	87	83	78	73	66	58	48	38				
NKm 4/1	0.55	0.75	**H** metres	40	–	37	36	34.5	32.5	30	28	25	21.5	18.5	14.5	10
NKm 4/2	0.75	1		50	–	48	46	44	41	38	35	32	28	24	19	14
NKm 4/3	1.1	1.5		67	–	65	62.5	60	56.5	52	48	44	38	32	25	18
NKm 4/4	1.5	2		75	–	72	69	66	64	60	57	53	48	43	38	32
NKm 4/5	2.2	3		105	–	101	98	94	90	86	80	75	67	60	52	44

"GE" VERSION WITH FLOAT SWITCH

MODEL	POWER		Q													
			m³/h	0	0.6	1.2	1.8	2.4	3.0	3.6	4.2	4.8	5.4	6.0	6.6	7.2
Single-phase	kW	HP	l/min	**0**	**10**	**20**	**30**	**40**	**50**	**60**	**70**	**80**	**90**	**100**	**110**	**120**
NKm 2/1 - GE	0.45	0.6		36	35	33	31	28.5	26	23	19	15				
NKm 2/2 - GE	0.55	0.75		48	46	44	41.5	39	35	30	25	19				
NKm 2/3 - GE	0.75	1		60	58	55	51	47	42	36	30	23				
NKm 2/4 - GE	1.1	1.5		84	80	75	70	65	59	51	42.5	34				
NKm 2/5 - GE	1.5	2		90	87	83	78	73	66	58	48	38				
NKm 4/1 - GE	0.55	0.75	**H** metres	40	–	37	36	34.5	32.5	30	28	25	21.5	18.5	14.5	10
NKm 4/2 - GE	0.75	1		50	–	48	46	44	41	38	35	32	28	24	19	14
NKm 4/3 - GE	1.1	1.5		67	–	65	62.5	60	56.5	52	48	44	38	32	25	18
NKm 4/4 - GE	1.5	2		75	–	72	69	66	64	60	57	53	48	43	38	32
NKm 4/5 - GE	2.2	3		105	–	101	98	94	90	86	80	75	67	60	52	44

Q = Flow rate **H** = Total manometric head

Tolerance of characteristic curves in compliance with EN ISO 9906 App. A.

NK (0.45÷1.1 kW)

POS.	COMPONENT	CONSTRUCTION CHARACTERISTICS
1	**EXTERNAL SLEEVE**	Stainless steel AISI 304, complete with threaded delivery port in compliance with ISO 228/1
2	**SUCTION FILTER**	Stainless steel AISI 304
3	**MOTOR SLEEVE**	Stainless steel AISI 304
4	**IMPELLERS AND DIFFUSERS**	Noryl GFN2V
5	**DIAPHRAGMS**	Stainless steel AISI 304, complete with anti-wear ring
6	**MOTOR SHAFT**	Stainless steel EN 10088-3 - 1.4104

7 TWO MECHANICAL SEALS SEPARATED BY AN OIL CHAMBER

Seal	*Shaft*	*Position*	*Materials*		
Model	***Diameter***		*Stationary ring*	*Rotational ring*	*Elastomer*
MG1-16	**Ø 16** mm	Motor side	Silicon carbide	Graphite	NBR
MG1-15 SIC	**Ø 15** mm	Pump side	Silicon carbide	Silicon carbide	NBR

8 BEARINGS **6303 2RS - C3 / 6203 ZZ - C3**

9 CAPACITOR

Pump	*Capacitance*	
Single-phase	***(230 V or 240 V)***	***(110 V)***
NKm 2/1	**16** µF 500 VL	**30** µF 250 VL
NKm 2/2 **NKm 4/1**	**16** µF 500 VL	**30** µF 250 VL
NKm 2/3 **NKm 4/2**	**20** µF 500 VL	–
NKm 2/4 **NKm 4/3**	**25** µF 500 VL	–

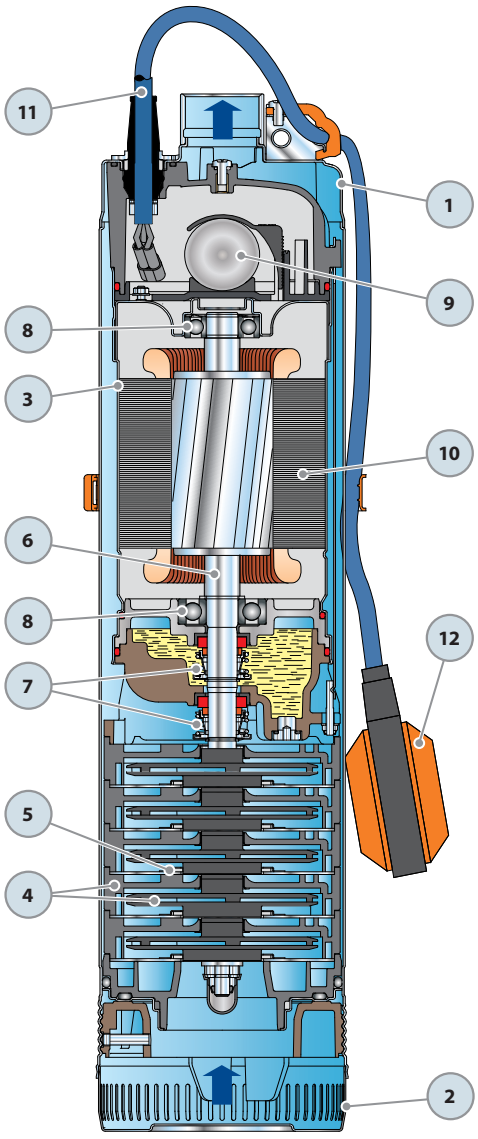
10 ELECTRIC MOTOR

NKm: single-phase 230 V - 50 Hz
with thermal overload protector built-in to the winding.
NK: three-phase 400 V - 50 Hz.
– Insulation: F class.
– Protection: IP 68.

11 POWER CABLE

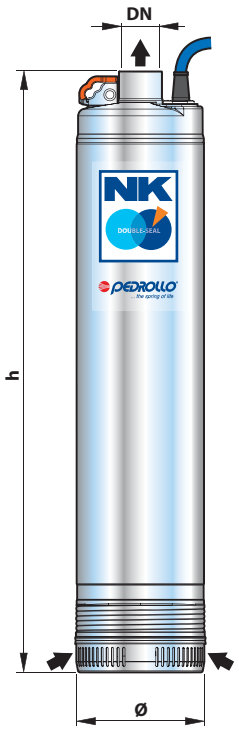
➠ **20 metre long DRINCABLE® for permanent immersion in drinking water**

12 FLOAT SWITCH



DIMENSIONS AND WEIGHT

MODEL		PORT	N° STAGES	DIMENSIONS mm		kg	
Single-phase	Three-phase	DN		Ø	h	1~	3~
NKm 2/1	–		3		495	**13.9**	–
NKm 2/2	–		4		519	**14.5**	–
NKm 2/3	–		5		573	**16.3**	–
–	NK 2/3				543	–	**15.0**
NKm 2/4	NK 2/4	**1¼"**	7	135	621	**18.1**	**18.0**
NKm 4/1	–		4		519	**14.3**	–
NKm 4/2	–		5		573	**16.2**	–
–	NK 4/2				543	–	**15.1**
NKm 4/3	NK 4/3		7		621	**18.1**	**18.0**



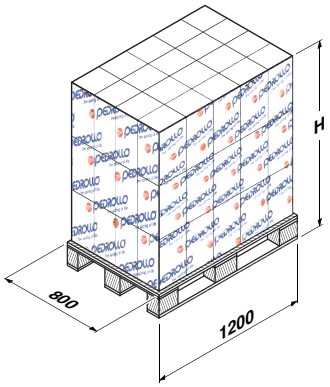
ABSORPTION

MODEL	VOLTAGE (single-phase)		
Single-phase	230 V	240 V	110 V
NKm 2/1	**4.5** A	**4.5** A	**9.0** A
NKm 2/2	**5.0** A	**5.0** A	**10.0** A
NKm 2/3	**6.0** A	**6.0** A	–
NKm 2/4	**7.5** A	**7.5** A	–
NKm 4/1	**5.0** A	**5.0** A	**10.0** A
NKm 4/2	**6.0** A	**6.0** A	–
NKm 4/3	**7.5** A	**7.5** A	–

MODEL	VOLTAGE (three-phase)			
Three-phase	230 V	400 V	240 V	415 V
NK 2/3	**4.5** A	**2.6** A	**4.5** A	**2.6** A
NK 2/4	**5.2** A	**3.0** A	**5.2** A	**3.0** A
NK 4/2	**4.5** A	**2.6** A	**4.5** A	**2.6** A
NK 4/3	**5.2** A	**3.0** A	**5.2** A	**3.0** A

PALLETIZATION

MODEL		GROUPAGE				CONTAINER			
		n°	H	kg		n°	H	kg	
Single-phase	Three-phase	pumps	(mm)	1~	3~	pumps	(mm)	1~	3~
NKm 2/1	–	**30**	1015	434	–	**60**	1890	852	–
NKm 2/2 NKm 4/1	–	**30**	1015	452	–	**60**	1890	887	–
NKm 2/3 NKm 4/2	–	**25**	869	425	–	**40**	1307	670	–
–	NK 2/3 NK 4/2	**30**	1015	–	470	**60**	1890	–	915
NKm 2/4 NKm 4/3	NK 2/4 NK 4/3	**25**	869	469	467	**40**	1307	740	737



NK (1.5÷2.2 kW)

POS.	COMPONENT	CONSTRUCTION CHARACTERISTICS
1	**EXTERNAL SLEEVE**	Stainless steel AISI 304, complete with threaded delivery port in compliance with ISO 228/1
2	**SUCTION FILTER**	Stainless steel AISI 304
3	**MOTOR SLEEVE**	Stainless steel AISI 304
4	**IMPELLERS AND DIFFUSERS**	Noryl GFN2V
5	**DIAPHRAGMS**	Stainless steel AISI 304, complete with anti-wear ring
6	**MOTOR SHAFT**	Stainless steel EN 10088-3 - 1.4104

7 TWO MECHANICAL SEALS SEPARATED BY AN OIL CHAMBER

Seal	*Shaft*	*Position*		*Materials*	
Model	***Diameter***		*Stationary ring*	*Rotational ring*	*Elastomer*
MG1-19	**Ø 19** mm	Motor side	Silicon carbide	Graphite	NBR
MG1-18 SIC	**Ø 18** mm	Pump side	Silicon carbide	Silicon carbide	NBR

8 BEARINGS **6304 2RS - C3 / 6203 ZZ - C3**

9 CAPACITOR

Pump	*Capacitance*
Single-phase	***(230 V or 240 V)***
NKm 2/5 **NKm 4/4**	**35 µF 450 VL**
NKm 4/5	**50 µF 450 VL**

10 ELECTRIC MOTOR

NKm: single-phase 230 V - 50 Hz.
Windings up to **1.5 kW** with built-in thermal overload protector.
➠ The **NKm4/5 2.2 kW** pump is equipped with an external manual reset overload protector housed in the control box.

NK: three-phase 400 V - 50 Hz.

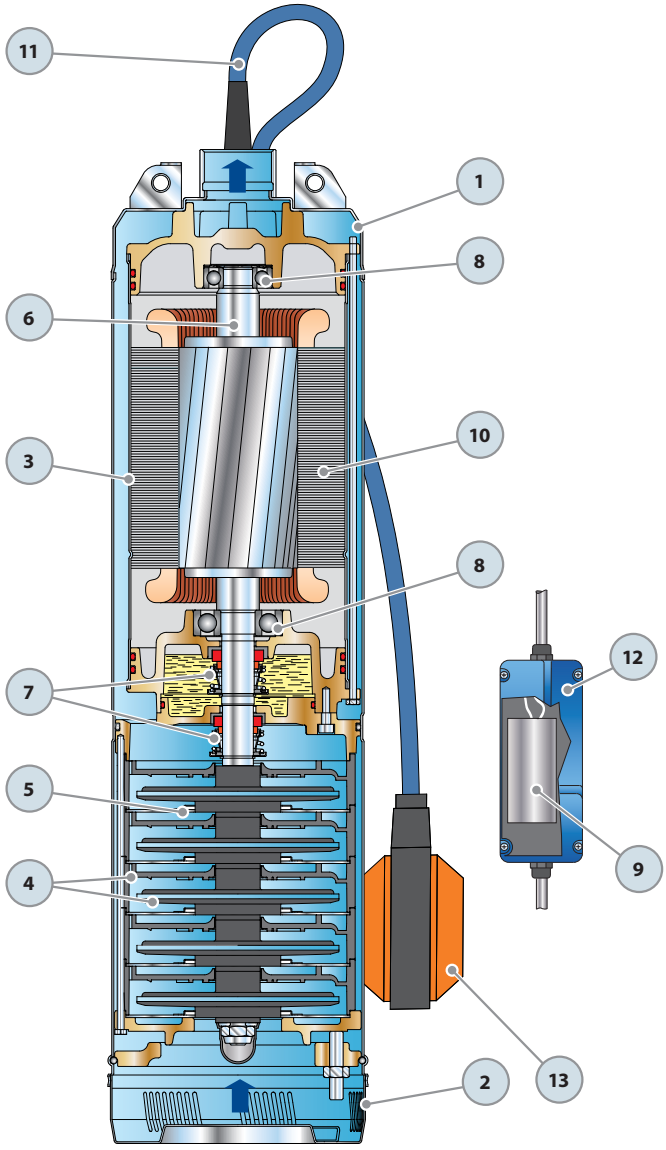
– Insulation: F class.
– Protection: IP 68.

11 POWER CABLE

➠ **20 metre long DRINCABLE® with removable connector for permanent immersion in drinking water**

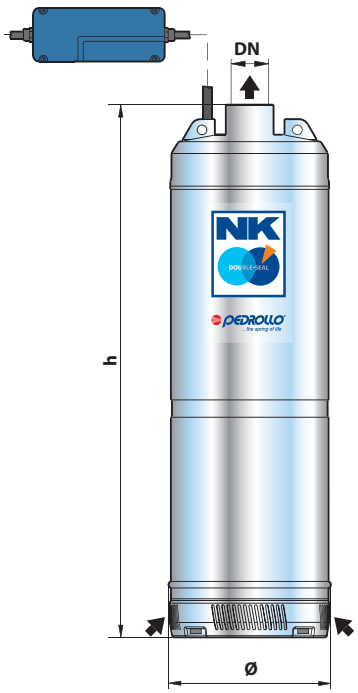
12 CONTROL BOX (for single-phase versions)

13 FLOAT SWITCH



DIMENSIONS AND WEIGHT

MODEL		PORT	N° STAGES	DIMENSIONS mm		kg	
Single-phase	Three-phase	DN		Ø	h	1~	3~
NKm 2/5	NK 2/5	1¼"	6	153	612	**26.7**	**23.8**
NKm 4/4	NK 4/4		5		582	**26.0**	**24.4**
NKm 4/5	NK 4/5		7		642	**30.5**	**28.0**



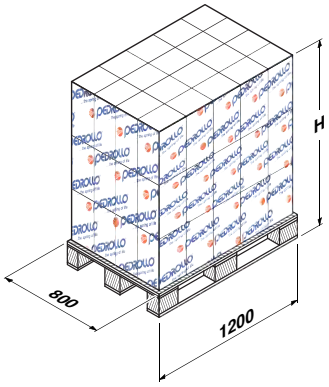
ABSORPTION

MODEL	VOLTAGE (single-phase)	
Single-phase	230 V	240 V
NKm 2/5	**9.0** A	**9.0** A
NKm 4/4	**9.5** A	**9.5** A
NKm 4/5	**14.0** A	**14.0** A

MODEL	VOLTAGE (three-phase)			
Three-phase	230 V	400 V	240 V	415 V
NK 2/5	**6.2** A	**3.6** A	**6.2** A	**3.6** A
NK 4/4	**6.2** A	**3.6** A	**6.2** A	**3.6** A
NK 4/5	**8.5** A	**4.9** A	**8.5** A	**4.9** A

PALLETIZATION

MODEL		GROUPAGE				CONTAINER			
		n°	H	kg		n°	H	kg	
Single-phase	Three-phase	pumps	(mm)	1~	3~	pumps	(mm)	1~	3~
NKm 2/5	NK 2/5	**20**	1100	551	493	**40**	2060	1085	969
NKm 4/4	NK 4/4	**20**	1100	537	505	**40**	2060	1058	993
NKm 4/5	NK 4/5	**20**	1100	627	576	**40**	2060	1237	1136



Appendix E

HINDMARSH PLUMBING SERVICES REVIEW OF COMMUNITY PLUMBING GUIDE

it has to be HINDMARSH PLUMBING

Friday, 1st November 2013

Community Corporation 25961 Manager
Whittles Management Services.
PO Box 309
Kent Town SA 5071

Attention: Mr Ian Wallis.

Dear Sir

RE: Point Boston Water Cycle Infrastructure
Document AEG214-TDWE-REP-001 Rev. 0

We have read the guidelines for the Point Boston project and have found a few spelling errors and incorrect wording, the main concern is the drinking water supply to the Fire Tank. The description has a 155mm air gap from inlet to overflow. As the inlet is inside the tank it would now have to be a " Registered Break Tank " This would mean a backflow test report has to be done in measuring the inlet orifice, the air gap, the spill level and the overflow.

Alternatively this can be avoided by installing a non testable Dual Check Valve on the drinking water supply into the tank. Then the inlet can be internal to the tank and eliminates the requirement for an approved air gap. This could be done with the Rainwater Tank as well.

We have also introduced the "Reduced Pressure Zone" into the Glossary section as this backflow may be required if an inground Rainwater Tank does not pass the site assessment. Also on the commercial properties as there may be High risk situations.

All other aspects of the guide are adequate and clear.

Yours faithfully

Rick Castellan
Project Manager – Service Division
Hindmarsh Plumbing
Ph: 08 7324 5253
Fax: 08 8349 4809
Mobile: 0433 468 049
Email: rcastellan@hindmarshplumbing.com.au

Appendix F

REVISION NOTES

DOCUMENT REVISION NOTES

Revision	Details
Rev. 0 (28/10/13)	The Plumbing Guide had reached rev. 7 as an appendix to the 2009 Management and Operation Plan. It was decided to make it a stand-alone document when submitting it for approval to the Interim Scheme in 2013. It was allocated the KBR code AEG214-TD-WE-REP-0001 for this purpose. The corresponding original format revision number is 9 shown on the bottom RHS of the pages within the guide. Number 8 was issued after the 2009 approval but not submitted for approval. Modifications to the document since 2009 are many but not significant. The main ones are due to the changed governance arrangements whereby responsibility for plumbing compliance changed from SA Water to the Office of the Technical Regulator. The Guide has minor changes reflecting the Interim Scheme before the water recycling filtration plant is installed during which time drinking water is substituted for the recycled non drinking water. As it is intended that houses and street reticulation systems be 'recycled non drinking water ready' for when the plant is installed, there are no differences to the building plumbing or the street reticulation installations for the Interim Scheme, just some operational variations. There is very little difference in the human health risks between the Interim Scheme and the Ultimate Scheme.
Rev. 1 (5/11/13)	Prepared following revision comments from DHA and OTR, and also from Hindmarsh Plumbing the independent reviewer. Document strengthened in relation to backflow prevention.
Rev. 2 (25/11/13)	Minor typographical corrections and alignment of the issue date with the accompanying Risk Management Plan and the Management and Operation Plan. Revision 10 of the original guide.
Rev. 3 (27/1/14)	Changes made at the request of the client following a thorough review of the document by Point Boston Community Corporation representatives responsible for the implementation of the water cycle infrastructure risk management procedures in this document, the Management and Operation Plan and the Community Plumbing Guide. The main requirement was to limit the responsibilities specifically to the works of the Interim Scheme. References to commercial properties and the hotel were removed The title of the document was changed. Revision 11 of the original guide.