Ecogent
Environmental Engineering Solutions

15th December, 2019

Our Ref#: ECO1141-07

Far North District Council
Private Bag 752
Kaikohe 0440

CC: [redacted]
Bay of Islands Planning Limited

Proposed Wastewater Management System Upgrade for Kingfish Lodge
Kingfish Cove, Whangaroa Harbour

Kingfish Lodge 2016 Ltd approached Ecogent Ltd in 2018 interested in a Biolytix wastewater management system to upgrade the existing wastewater infrastructure to support the refurbishment of existing buildings and the replacement of the main lodge at Kingfish Lodge. Ecogent visited site and based on our findings presented options including a new wastewater treatment plant adjacent to the lodge pumping to land disposal up behind the lodge, a pump station adjacent to the lodge and wastewater treatment and disposal both on land behind the lodge. The preferred option was several individual Biolytix wastewater tanks located around the lodge buildings pumping via the existing pump station to the consented deep bore disposal on the land behind the lodge. Each Biolytix tank would receive domestic type wastewater from a different source, treat to a secondary effluent quality and pump to a common pump station which pumps to the boreholes. Biolytix and their technology offered several benefits to the Lodge development including:

- No odour & no noise
- Reliable high quality treated effluent
- Low energy requirements
- Low maintenance requirements
- Flexible modular design concept able to be upgraded for any future stages of development
- Ability for Biolytix to supply and contribute to design, consent assistance and installation
- Competitive capital cost and low operating costs (annual maintenance cost and electricity use)
- Relatively compact technology. Ability to access difficult sites with less earthworks required to install. The system is housed in lightweight injection moulded polypropylene tanks (compliant with ASNZS 1546.1)
- Generates minimal sludge (biosolids) which can be managed by the maintenance provider
- Independently tested at trials run by Environment Bay of Plenty (OSET-NTP) and SAI Global
- 100% NZ manufactured by a NZ owned and operated company

Additional information on the Biolytix wastewater technology is attached and can be found at: www.biolytix.com

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info@ecogent.co.nz

The existing wastewater infrastructure operates under a Northland Regional Council discharge permit. As the proposed development at the lodge reduces the potential occupancy of the property and because the proposed Biolytix wastewater system upgrade improves the quality of treated effluent no change is being sought to the existing NRC discharge permit.

The Biolytix wastewater management concept proposed for Kingfish Lodge has been designed in accordance with the following documents:

- Australia/New Zealand Standard AS/NZS 1547:2012 On-site Domestic Wastewater Management
- Permitted Activity Rule 15.1.4 from the Regional Water & Soil Plan for Northland (Northland Regional Council)
- Permitted Activity Rule C.6.1.3 from the Proposed Regional Plan for Northland (Northland Regional Council)
- Auckland Regional Council Technical Publication No. 58 (3rd Edition 2004) On-site Wastewater Systems Design and Management Manual (TP58).

Wastewater Volume

We have sized the wastewater system for the estimated volume of wastewater from the following sources:

- Existing 8 x 1 bedroom accommodation units (North accommodation wing & captain's suite)
- Existing 1 x 3 bedroom cottage (manager's house)
- New 4 bedroom main lodge
- New 2 bedroom boathouse
- Lodge kitchens for guests & staff food preparation
- Bar/conference room for guests and visitors

Design wastewater flow volumes have been estimated in line with recommendations in the Australia New Zealand Standard for On-site Domestic Wastewater Management AS/NZS 1547:2012 (Table H4) as follows:

North accommodation wing:

Each of the rooms is assumed to have a maximum occupancy of two guests. Table H4 recommends an allowance of 220 litres per guest per day for motels/hotels. However given the laundry is done off site (estimated at least 30 litres per person per day) and there are no in room cooking facilities (estimated at least 30 litres per day), we have reduced the per guest allowance to 160 litres per guest per day.

Manager's House:

The three bedroom cottage has an assumed maximum occupancy of five people. For a household with standard water reduction fixtures and bore water supply Table H3 recommends an allowance of 165 litres per occupant per day.

Main Lodge

The new lodge has four double suites and a maximum occupancy of eight guests. We have assumed the same per guest flow allowances as calculated above for the north accommodation wing of 160 litres per guest per night.

Lodge Kitchen

For the lodge kitchen we have assumed the maximum amount food preparation is for the total diners are the 16 potential guests at the north wing, the eight potential guests at the lodge and up to four staff at the boat house. We have allowed 30 litres per diner per day in accordance with the recommendations in Table H3.

Boat House

The Boat House has two double bedrooms and a maximum occupancy of four. Intended use is for staff accommodation and would only reach full occupancy when the lodge was busy. We have assumed boathouse water use would be typical of a household with standard water reduction fixtures and bore water supply for which Table H3 recommends an allowance of 165 litres per occupant per day.

Conference Room & Bar

For the conference room and bar we have assumed up to 20 visitors not staying at the lodge or accommodation wing. We have assumed water use consistent with a 'bar trade' for which Table H4 recommends an allowance of 20 litres per person.

The table below summarises the flow estimations.

Source	*Maximum occupancy per unit*	*Total occupancy*	*Water use per capita*	*Total Wastewater*
8 x 1bdrm unit	2	16	160	2,560
1 x 3bdrm unit	5	5	165	825
1 x 4bdrm lodge	8	8	160	1,280
1x 2bdrm boat house	4	4	165	660
Lodge kitchen		28	30	840
Conference room/bar		20	20	400
TOTAL DAILY WASTEWATER				**6,565 L/day**

Total wastewater volume is estimated at 6,565 litres per day. Rates are conservative and consistent with Australia NZ Standard 1547:2012. We note that the estimated daily wastewater volume is significantly less than the current discharge permit of 10,000 litres per day.

Wastewater Treatment

Total wastewater volumes will be managed by six separate Biolytix BioPod treatment tanks referred to as Biolytix Tanks (BT) 1 to BT6. The Biolytix BioPod are capable of treating domestic effluent to secondary wastewater treatment levels. The Biolytix system has partaken in the OSET trial of package treatment plants at the Rotorua Wastewater Treatment Plant and has comfortably met the standards prescribed in ARC TP58 for secondary quality effluent which is a Biochemical Oxygen Demand (BOD) of <20mg/L and a Total Suspended Solids (TSS) of < 30mg/L. The system also had low power consumption relative to other package treatment plants trialled. The Biolytix system was included in the (2013/2014) OSET NTP Trial #9 with results published in February 2015 (Refer appendix) confirming the Biolytix produced an effluent standard of BOD5 <10mg/L and TSS <20mg/L with 100% performance for both parameters for the full 37 test results, and accordingly also meets the secondary effluent quality requirement of AS/NZS 1547:2012. Supporting information on the proposed Biolytix BioPods is attached to this document.

The maximum capacity of the Biolytix BioPod is 1,500 litres per day and each source identified below has a design flow rate is within the capacity of the BioPod.

Our recommendations for BioPod tank locations are as follows:

The North Accommodation Wing Units

We recommend that a single standalone Biolytix BioPod is provided for every four of the one-bedroom units in the North Wing as shown on the attached concept plan. Indicative tank locations are shown and would be amended to best suit existing drainage configurations and final landscaping. Each tank would receive all the wastewater from the units via standard 110mm gravity drainage with a single entry into each tank. The 8 North Wing units will therefore require 2 tanks – BT1 & BT2. If the units are to have high volume baths or outdoor showers we would recommend an additional greywater system to irrigate this greywater directly to surrounding vegetation rather than hydraulically overloading Biolytix BioPods.

Managers House

We recommend that the existing 3 bedroom cottage drains to a single BioPod tank, BT3. Again, if there are large volume baths or outdoor showers at the cottage then we would recommend an additional greywater system to irrigate this greywater directly to surrounding vegetation rather than hydraulically overloading Biolytix tanks.

If there is to be a commercial kitchen included at the cottage and available for guest use then kitchen wastewater (kitchen sink only) should drain to an underground multi chamber grease trap. The outlet from the grease trap would drain to the BT3.

Conference Room, Bar & Toilets

Wastewater from the conference room and adjacent toilets would drain to small pump chamber which would pump to a single Biolytix BioPod, BT4.

Lodge Kitchen

The lodge kitchen wastewater (from the kitchen sink only) would drain to an underground multi-chamber grease trap. The outlet from the grease trap would drain to BT4.

Main Lodge

Wastewater from the four bedrooms of the main lodge would drain to a single Biolytix BioPod, BT5.

Boat House

Wastewater from the Boat house would drain to a single Biolytix BioPod, BT6.

BioPod Loading Rates

The estimated loadings on each Biolytix BioPod would be as follows:

BioPod	*Wastewater Source*	*Estimated Loading (L/day)*
BT1	North Wing	1280
BT2	North Wing	1280
BT3	Manager's House	825
BT4	Conference room, toilets & lodge kitchen	1240
BT5	Lodge	1280
BT6	Boat House	660
	TOTAL	**6565**

Therefore the estimated loading rates on all BioPod are less than the rated treatment capacity of a Biolytix (1500 litres per day).

Laundry

In accordance with discussions on laundry no allowance has been made for wastewater originating from any commercial laundry. It has been assumed that all laundry is undertaken off site and that there are no laundry facilities at the lodge or in any of the units.

Biolytix Tank & Grease Trap Locations

Possible locations for all the Biolytix tanks have been identified on the attached concept plan. When finalising locations for each tank the following requirements should be considered:

- Tank locations need to be confirmed to ensure adequate drainage gradients falls and compatibility existing drainage
- Tank locations should be discreet so as not to create a visual nuisance for guests
- Tanks should be installed away from guest areas as much as practical (e.g. living areas, pools & decks)
- Tanks must not be installed in any area prone to flooding
- Tanks must not be completely buried. Maximum invert is 650mm below ground level
- No permanent landscaping (decks etc) should be placed on tanks
- Tanks need to be accessible for maintenance

Disposal of Secondary Treated Wastewater

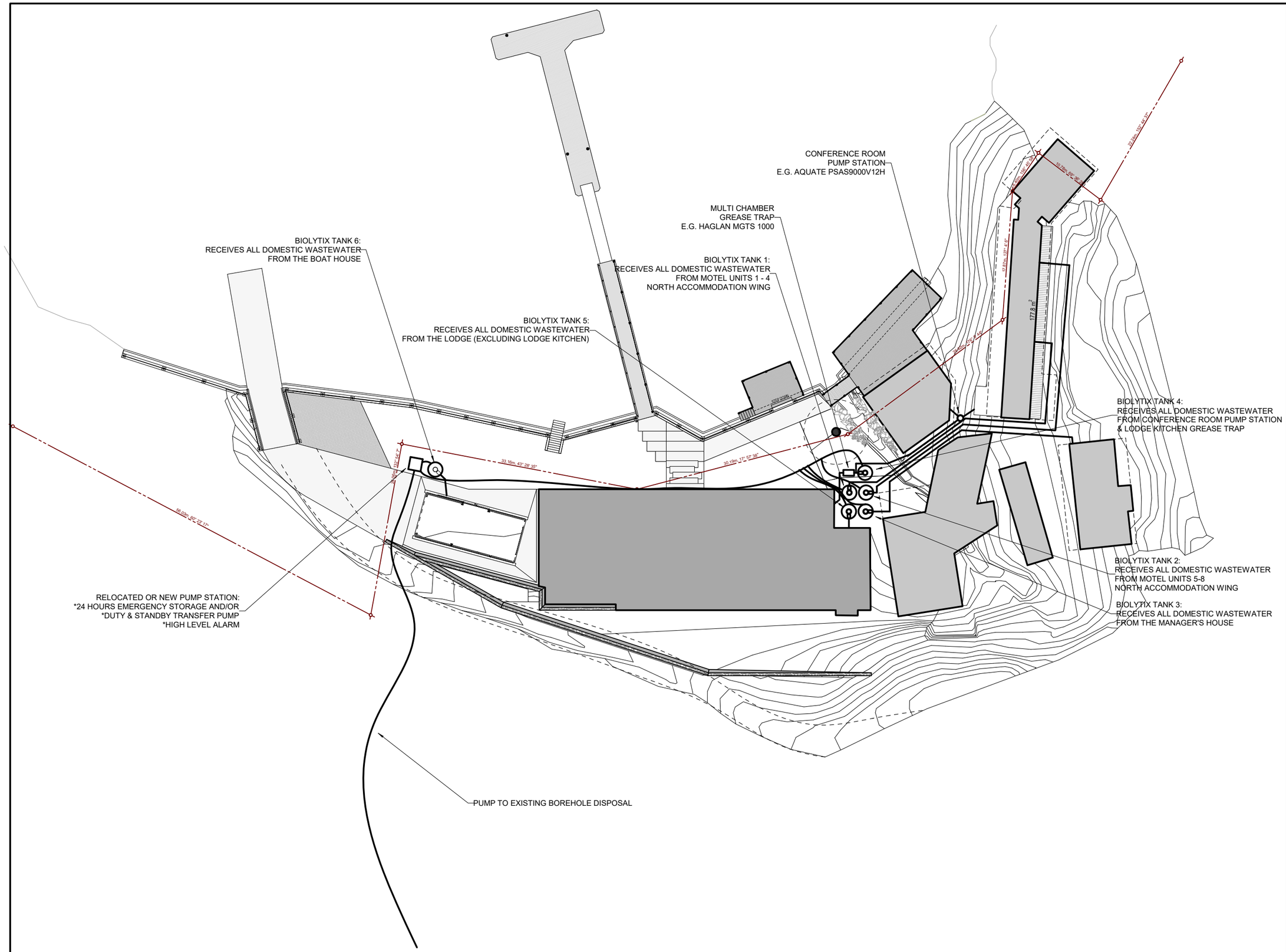
Treated effluent from the Biolytix secondary treatment plants would be pumped to a pump station located adjacent to the Boat House. The pump station should have:

- A duty and standby pump sized to convey effluent up the hillside via a polyethylene pipeline to the existing boreholes
- At least 24 hours emergency storage capacity
- Audible and visual high level and fault alarms

We trust we have provided sufficient information in these documents to support the upgrade of the Kingfish Lodge wastewater management system. Please contact us if additional information is required or if we can be of further assistance.

Yours sincerely

ECOGENT LTD
Engineer



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CLIENT

KINGFISH LODGE 2016 LTD

PROJECT

KINGFISH LODGE
WASTEWATER MANAGEMENT

TITLE

PROPOSED WASTEWATER
MANAGEMENT SYSTEM
LAYOUT

DATE	22/11/19	
DRAWN	MR	
DESIGN	MR	
CHECKED	MB	

JOB No.	SCALE.
ECO1141	1:500@A3

DWG No.	REV.
ECO1141-06	A

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Biolytix BioPod (BF6) Wastewater Treatment System

Specifications

The Biolytix BioPod (BF6) is an onsite treatment system designed to treat wastewater from domestic sources. It uses a single tank configuration based on an enhanced trickling filter process which mimics a natural soil habitat. The BF6 is certified to comply with AS/NZS 1546.3:2008 and must be operated in accordance with this standard.

Effluent Quality

The BF6 wastewater treatment system generates secondary treated effluent of the following quality:

- 5-day Biochemical Oxygen Demand (BOD_5) <20 mg/L
- Suspended solids <30 mg/L

The effluent must be disposed of as stipulated by the local Territorial Authority. AS/NZS 1547:2012 describes discharge options for secondary-treated effluent. However, the Territorial Authority regulations applying to a specific site may be different and more stringent and should be consulted before making a decision.

Maximum Loading

- Flow rate: 1600 L per day
- Organic loading as BOD_5: 700 g per day
- Suspended solids loading: 700 g per day

Important: The actual maximum loading of an installed BF6 is limited by the capacity of the dispersal system it discharges to. For example, if the BF6 is connected to a land dispersal system with a capacity of 800 L/day, then the BF6 must not be loaded at more than 800 L/day.

Operation

- Emergency storage capacity: 1650 L
- Temperature and humidity: Operates under normal temperature and humidity conditions experienced in New Zealand and the Pacific Islands.
- Noise < 40 dB L_{Aeq} at a distance of 1 m
- Electricity consumption (per year): Treatment process 44 kWh; effluent pump typically 165 kWh (per year). Effluent pump power use can vary significantly depending on the size and location of the dispersal system and the actual household water usage.
- Maintenance: Requires at least an annual service (Note: Some Regional Authorities require at least two services per year regardless of the type of on-site wastewater system)
- Minimum serviceable life: 15 years

Treatment Process

The BF6 filter bed (Figure 1) is contained in an injection moulded high grade polypropylene tank and consists of six layers of drainage elements and peat/drainage elements. All layers contain plastic trickling filter media contained in open-mesh bags. In the filter bed there is in excess of $2m^3$ of plastic filter media with a high porosity and a high specific surface area. The peat layers additionally contain coco peat, the fibrous structure of which significantly increases the available treatment surface area and the ability to retain moisture. The layers are separated by coarse HDPE mesh fabric.

The resulting filter bed mimics a natural soil habitat, containing a diverse ecosystem of micro and macro-organisms. These organisms aerobically treat the wastewater as it percolates through the bed, prevent the accumulation of sludge, and keep the filter aerated. On commissioning, the filter is inoculated with a kilogram of tiger worms *(Eisenia Fetida)*. These worms propagate and burrow through the filter bed, thereby keeping its structure open and porous. A Schego M2K3 air pump is used to provide additional air to the bed at the rate of 350 L per hour.

A geotextile filter layer with a nominal pore size of 80 micron separates the filter bed from the effluent storage sump. Its purpose is to remove fine solids from the treated effluent. To support the bed, the sump is filled to a depth of 400 mm with a matrix of plastic media. It drains into the central pump well, from where the effluent is pumped using a submersible pump to a land dispersal system (e.g. subsurface drip irrigation). The pump is controlled by a factory set float switch. The total bed depth including sump is 1050 mm.

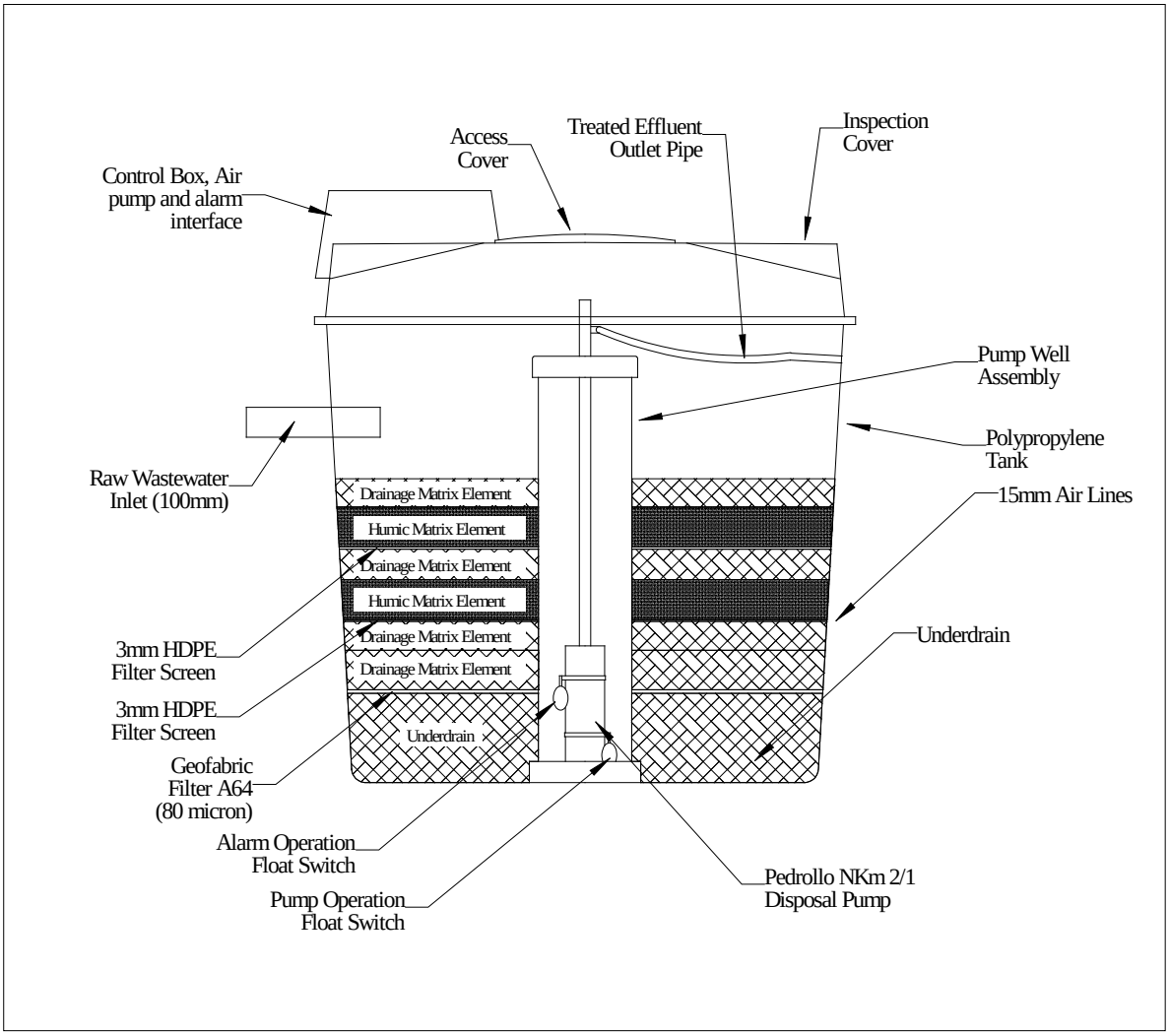


Figure 1 Biolytix BF6 wastewater treatment system

Configuration Options

The BF6 can be installed in-ground or above ground. Local Council restrictions may apply to above-ground installations (Land Use/Building Consent conditions etc). Available tank sizes are 3000 L and 4000 L. Both tanks have the same bed configuration and provide the same treatment capacity and performance, but use different inlet invert depths as follows:

- BF6-3000 tank: 650 mm
- BF6-4000 tank: 1100 mm

The BF6 effluent is either gravity drained or pumped to a dispersal system. The pumpout (dose) volume is 220 L per cycle. The standard pump is a high-quality Pedrollo NKm 2/1 submersible pump, the characteristics of which are shown in Figure 2 below. Other Pedrollo pumps may be used instead to suit specific sites. Contact Biolytix to discuss your requirements and for information on the types of pumps available.

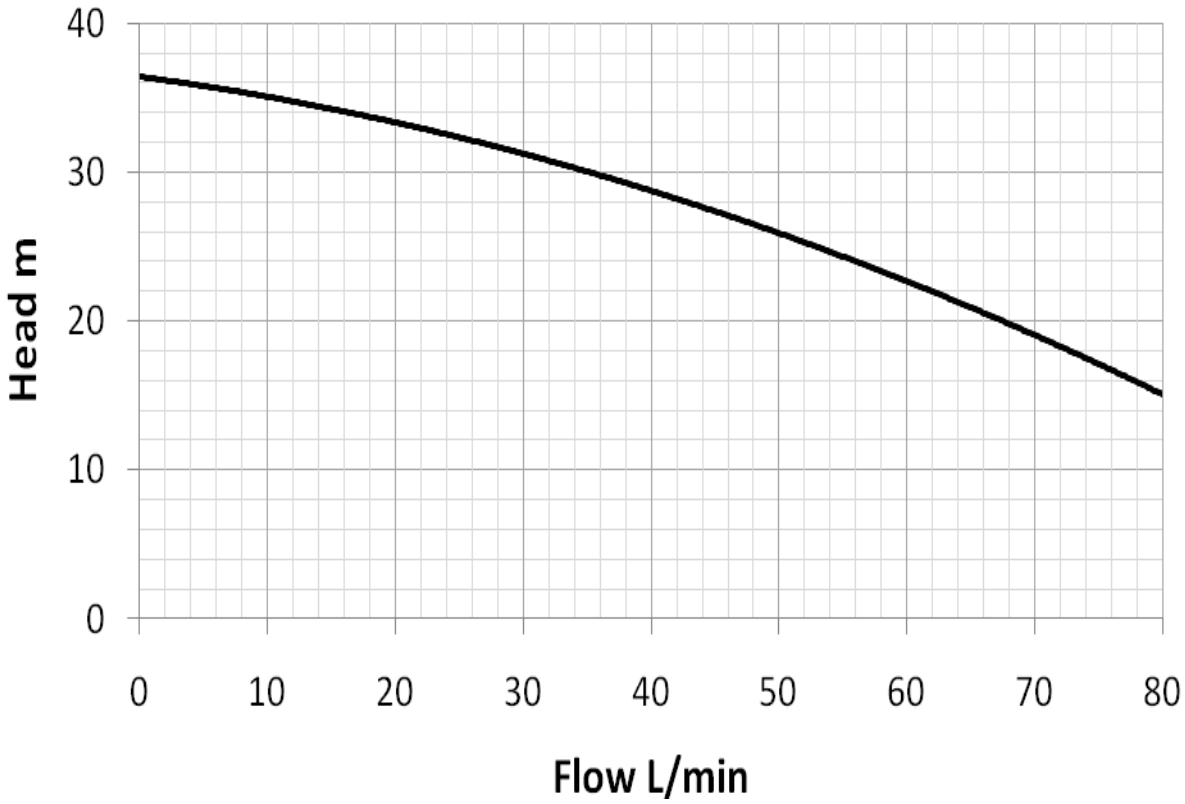


Figure 2 Pedrollo NKm 2/1 characteristic curve (power 0.45 kW)

Alarm System

The BF6 is equipped with an AS/NZS 1546.3 compliant audible and visual alarm with a mutable audible alarm signal and an alarm light. The alarm must be mounted in a location that is readily visible from within the dwelling.

Alarms are triggered by either a high-level float switch in the pump well or an air pressure switch on the air supply line.

On-site Effluent Treatment National Testing Programme (OSET NTP)

PERFORMANCE CERTIFICATE
Biolytix BioPod On-site Domestic Wastewater Treatment System,
OSET NTP Trial 9, 2013/2014

System Tested
The **Biolytix BioPod system** is an aerated biological trickling filter with a vermicomposting wastewater treatment unit using tiger worms within 3 layers of aerated drainage and humus matrix elements. Effluent gravitates through the matrix elements and discharges into the pump well below.

The manufacturer's rated design capacity is 1,600 litres/day. Total liquid volume is 1,351 litres within a 3,000 litre tank: (aerobic treatment 893 litres; pump chamber 458 litres). Emergency storage is 1,649 litres. No tertiary treatment (such as UV disinfection) is incorporated. The manufacturer's stated service requirement is annual.

Test Flow Rate
The **Biolytix BioPod system** was tested at 1,000 litres/day (equivalent to servicing a 3-bedroom 5 to 6 person household) over an 8 month (35 week) period November 2013 to July 2014 followed by a 1 month (4 week) high load effects test involving 5 days at 2,000 litres per day then 1,000 litres/day over the following 3 weeks.

Testing and Evaluation Procedures
A total of 37 treated effluent samples of organic matter (BOD_5) and suspended solids (TSS) at generally six day intervals during weeks 9 to 35 were tested and evaluated against the secondary effluent quality requirements of the joint Australia/NZ standard AS/NZS 1547:2012.

A total of 16 treated effluent samples of organic matter (BOD_5), total suspended solids (TSS), total nitrogen (TN), ammonia nitrogen (NH_4-N), total phosphorus (TP) and faecal coliforms (FC) at generally six day intervals during weeks 23 through 35 were tested and the results benchmarked and rated on their median values. In addition, the energy used by the treatment system was assessed on the mean of consumption levels over the benchmark period.

AS/NZS 1547:2012 Secondary Effluent Quality Requirements
These requirements are that 90% of all test samples must achieve a BOD_5 of $\leq$ 20 g/m^3 and TSS of $\leq$ 30 g/m^3 with no one result for BOD_5 being >30 g/m^3 and no one result for TSS being >45 g/m^3. The **Biolytix BioPod system achieved** a performance level of **100%** for BOD_5 and **100%** for TSS based on the full set of 37 test results in weeks 9 to 35, with no results exceeding the maximums. The **Biolytix BioPod system** thus **meets** the secondary effluent quality requirements of AS/NZS 1547:2012.

Benchmark Ratings
The **Biolytix BioPod system achieved** the following effluent quality ratings for the sixteen benchmarking results in weeks 20 to 35.

Indicator Parameters	Median	Std Dev	Rating	Rating System				
				A+	*A*	*B*	*C*	*D*
BOD (mg/L)	*5.5*	*2.6*	A	*<5*	*<10*	*<20*	*<30*	*≥30*
TSS (mg/L)	*10*	*2.5*	B	*<5*	*<10*	*<20*	*<30*	*≥30*
Total Nitrogen (mg/L)	*37.8*	*4.2*	D	*<5*	*<15*	*<25*	*<30*	*≥30*
NH_4- Nitrogen (mg/L)	*13.8*	*3.7*	C	*<1*	*<5*	*<10*	*<20*	*≥20*
Total phosphorus (mg/L)	*4.3*	*0.6*	B	*<1*	*<2*	*<5*	*<7*	*≥7*
Faecal Coliforms (cfu/100mL)	*1,200,000*	*895,000*	D	*<10*	*<200*	*<10,000*	*<100,000*	*≥100,000*
Energy (kWh/d) (mean)	*0.4*	*0.04*	A	*0*	*<1*	*<2*	*<5*	*≥5*

This Performance Certificate is specific to the **Biolytix BioPod** model as specified above when operated at a flow rate of 1,000 litres/day, and is valid for 5 years from the date below. For the full OSET NTP report on the performance of the **Airtech 9000 system** contact **Biolytix Ltd**, Penrose, Auckland, Ph: +64 9 579 1080 or 0800 700 818, Email: karl@biolytix.com.

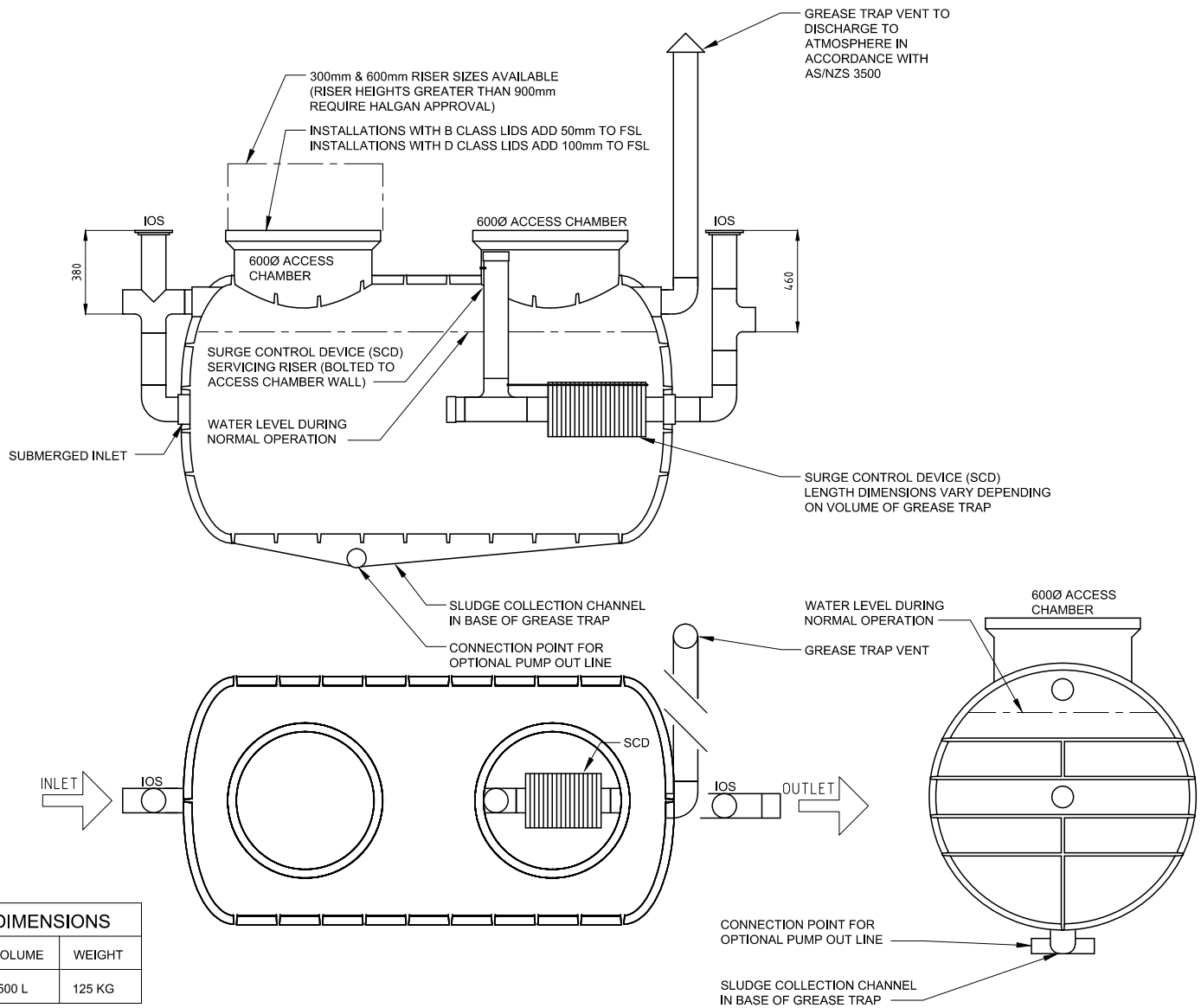
Authorised By:
Ray Hedgland, Technical Manager, OSET NTP
20 February 2015

On-site Effluent Treatment National Testing Programme, c/- Technical Manager, 2/12 Mt Blanc Pl, Northpark, Howick, AUCKLAND 2013 Mob: 021 626 772 E-mail: ray@hedgland.co.nz

HALGAN MGTS 1500 GREASE TRAP DETAIL

Notes

1. General
   - 1.1. Tank constructed from Polyethylene.
   - 1.2. The MGTS is to be installed in a location that will not cause a nuisance, obstruct fire access, cannot be vandalised or be damaged by vehicles.
   - 1.3. The MGTS must have ease of access to pumpout point for maintenance.
   - 1.4. A hose tap fitted with RPZD backflow protection (as per AS/NZS 3500) must be installed within 5 metres of the grease trap for maintenance and cleaning.
   - 1.5. Non standard installations require Halgan approval.
2. Installation above ground
   - 2.1. The MGTS is to be supported on a 100mm thick concrete pad.
   - 2.2. A stand is available for S Series models if required.
   - 2.3. Any maintenance platform must be installed in accordance with Australian Standard 1657-1992 allowing safe access while inspecting and maintaining the MGTS.
   - 2.4. All pipes connecting to the MGTS shall be fully supported; there shall be no stress on the tank connections.
   - 2.5. All stormwater must be diverted away from the MGTS to prevent undermining of foundation.
3. Installation below ground
   - 3.1. All connections to the MGTS shall be in accordance with the appropriate authorities.
   - 3.2. Any excavation exceeding 1.5 metres in depth shall comply with the construction safety acts and regulations before backfilling.
   - 3.3. The MGTS must be filled with water prior to backfilling.
   - 3.4. Riser heights greater than 900mm require Halgan approval.
4. Excavation dimensions
   - 4.1. The excavated hole width shall be kept as narrow as practicable. The depth shall not be greater than 150mm more than the required depth.
   - 4.2. 75mm clearance is required at the sides of tank.
5. Over excavation
   - 5.1. Where an excavation has been made deeper than required, the excess depth shall be filled either with 4:1 sand cement compacted to achieve 98% compaction or concrete.
6. Bedding/Backfill
   - 6.1. The bedding/backfill material shall be Blue Metal granular material up to 10mm diameter.
   - 6.2. The bedding/backfill shall be minimum 75mm thick.
   - 6.3. The bedding/backfill shall be thoroughly compacted by tampering at 300 mm layers.
   - 6.4. The bedding/backfill material shall encase the whole tank.
   - 6.5. Foreign material such as builder's waste, bricks, and concrete shall not be used as backfill.
   - 6.6. The backfill shall be compacted to restore the excavated hole as near as practicable to the normal ground.



HALGAN MGTS 1500 GREASE TRAP DIMENSIONS					
MODEL	HEIGHT	WIDTH	LENGTH	VOLUME	WEIGHT
MGTS 1500	1515mm	1130mm	2230mm	1500 L	125 KG

REV	DATE	DESCRIPTION	BY	CHKD	APP
A-1	23.05.2013	NOTES, DIMENSION TABLE & DETAIL AMENDED	DN	SM	KH
A	15.10.2012	DETAIL DESIGN	DN	SM	KH

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HALGAN MGTS 1500 GREASE TRAP DETAIL

DRAWN	DATE	
DN	15.10.2012	
CHECKED	SCALE	
SM	1:20	A3
DWG. NO.	REV.	
MGTS1500	A-1	

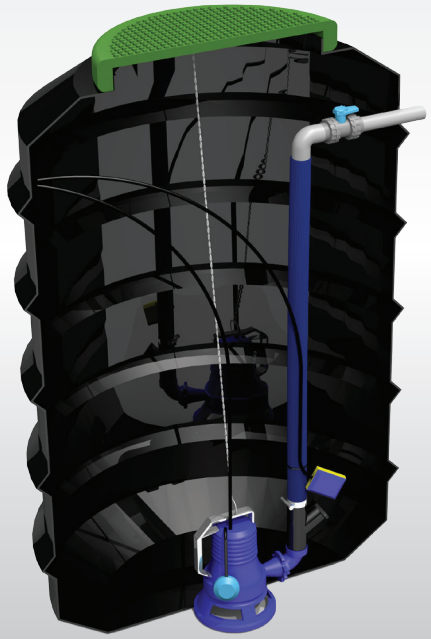
aquate
water reticulation solutions

Scan for more information

Aquate Pump Stations

Product Sheet R7.1

Aquate offer a wide range of pump stations for most domestic or commercial applications.



Applications

- Domestic houses
- Commercial buildings
- Schools
- Campgrounds
- Stormwater pump stations

Product Attributes

- Adaptable design
- Large capacity chambers
- Watertight – eliminating infiltration into the sewer network
- Easy and economical to install
- Lightweight for easy handling – no special lifting equipment is required

Approvals/Standards

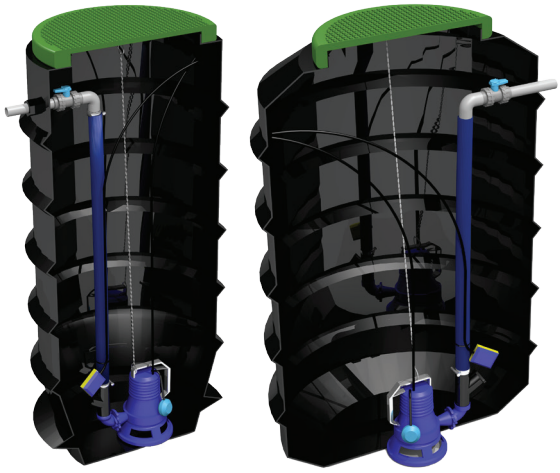
- Tanks certified to AS/NZS1546:1

Quality

- ISO 9001:2008 Quality Management Standard

Aquate offer a wide range of prefabricated pump stations for most domestic or commercial applications.

Manufactured in either polyethylene or concrete, the Aquate range comes complete with an electrical controller, either one or two high quality pumps, alarms and all internal pipework. Aquate Pump Stations are delivered to site ready to be installed, keeping site work to a minimum. From raw sewage through to clean rainwater, a wide range of products are available to suit most applications.



Features

- **Easy to install**
  Aquate Pump Chambers come complete with all internal pipework ready for connection. The controller is supplied as part of the unit. Installation is quick and easy, saving time and money.
- **Lightweight**
  The polyethylene chamber is light and easy to handle. No special lifting equipment is required.
- **Flexible design**
  Custom designed systems are available to suit all applications.
- **Watertight**
  Eliminates infiltration into the sewer network.
- **Large capacity**
  The chambers have a volume of at least 900 litres giving 24 hour emergency storage in most applications. (1350 L, 2750 L and above available on request)

What system do you need?

The right system for your site will depend on the type of water being pumped and the layout and geography of your site. A range of grinders, cutters, vortex or drainage pumps are available to suit all applications.

Codes	Pump	Description
PSAS1050G18H	Pump STN1350L Grinder 18 m Head	Pump Station 1350 L, Grinder Pump – Max 18 m Head
PSAS1050G21H	Pump STN1350L Grinder 21 m Head	Pump Station 1350 L, Grinder Pump – Max 21 m Head
PSAS1050V12H	Pump STN1350L Vortex 12 m Head	Pump Station 1350 L, Vortex Pump – Max 12m Head
PSAS900G18H	Pump STN900 Grinder 18 m Head	Pump Station 900 L, Grinder Pump – Max 18 m Head
PSAS900G21H	Pump STN900L Grinder 21 m Head	Pump Station 900 L, Grinder Pump – Max 21 m Head
PSAS9000V12H	Pump STN900L Vortex 10 m Head	Pump Station 900 L, Vortex Pump – Max 12m Head

Control Panels

All Aquate Pump Stations come complete with an electrical controller that can be located on the pump chamber or installed at a nearby dwelling. The controllers are simple and easy to install. Standard controllers feature audio and visual alarms for pump failure and high water situations.

For larger systems, additional features can be included if required.

FIG. 1 Controller – manufactured to AS/NZS 3000:2007

Disclaimer: While every effort has been made to ensure that the information in this document is correct and accurate, users of Hynds product or information within this document must make their own assessment of suitability for their particular application. Product dimensions are nominal only, and should be verified if critical to a particular installation. No warranty is either expressed, implied, or statutory made by Hynds unless expressly stated in any sale and purchase agreement entered into between Hynds and the user.