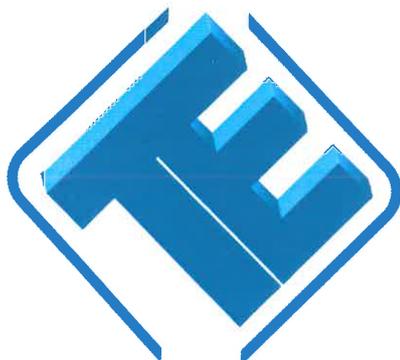




Effluent Disposal and Stormwater Management Report



Tilsley Engineering Ltd

75 Seddon Street, Pukekohe

Ph: 09 238 3245

info@teng.co.nz

7th August 2017

Ref: T3821/0

Report prepared for:
Frizzell Residence

Site Location:
357 Drury Hills Road, Drury

Original copy

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1. INTRODUCTION

The client wishes to construct a new dwelling on their property at 357 Drury Hills Road, Drury.

As such they require an effluent disposal report in accordance with TP58. This report also covers the required stormwater control due to the increase of non-permeable areas.

Tilsley Engineering Ltd has been engaged to investigate the site and design an effluent disposal system and stormwater management recommendations to suit the soil conditions and other prevailing conditions of the site.

This report addresses this request.

The geotechnical assessment report for a proposed Lot was undertaken by Ground Consulting Limited dated 31 October 2015 (ref R2129-1) and has been reviewed as part of this report. The report discusses the previous use of the site as a quarry and suggests a location for the wastewater disposal field near one of the two house sites. It is stated within the geotechnical assessment report that the soil category is 4 and 5 with a loading rate of 5mm/day based on TP58. The ground water was assumed at a depth of 4m+. There was no water table recorded within the borelogs. The report mentions using an AWTS system with dripper line disposal suitable for the site and shall be designed prior to building consent. Due to the limited area available that has not been quarried the owner would like to use the bush area on the northern boundary as part or all of the wastewater dripper line field should it meet the requirements of TP58. The area next to the driveway will continue to be utilised for the stormwater runoff and is not appropriate for wastewater disposal. The wastewater disposal field shown within the report is within the driveway for the proposed building and will not be used for this development.

For stormwater design the Ground Consulting Limited report mentions that all concentrated stormwater flows are to be dispersed evenly on to the gently sloping platform to the north-east of the property. Since the report was written two culverts have been installed below the building site. The main culvert collects the water beside the driveway and directs it into the Waihoihoi Stream. This system will be utilised for the proposed development.

1.1 SITE DESCRIPTION

The property is described as Lot 2 DP 490884 and the Lot area is 9506 m².

1.2 CONSENT NOTICES

Consent notice 10551765.4: Requires the owner to keep the bush area weeded as it is an area of Significant Ecological area. This consent notice does not limit the use of the bush area for wastewater disposal area. Dripper line disposal can support the growth of native plants if installed and maintained appropriately. As there is an overland flow path located near the area labelled W on the certificate of title plan this area will not be used for wastewater disposal.

Consent notice 10551765.5: Limits the location of the building site to meet the geotechnical assessment by Ground Consulting Ltd

1.3 SITE CONDITIONS

Access to the site is along the existing driveway for 355 Drury Hills Road, Drury. The driveway access has been laid and is mostly easy access for vehicles.

The property is located on the eastern side of Drury Hills Road. There is an onsite overland flow path located near the western boundary which the proposed stormwater system will discharge into prior to connecting into the main overland flow path. According to the Auckland Council GIS mapping system the site is not within a flood plain. The overland flow path shown on Auckland Council Geomaps is not accurate for this site. The attached site plan shows the stormwater path through the site.

The location of the proposed effluent field is below the proposed building within the area approved by the geotechnical assessment report.

Site plans attached in Appendix A show the location of the proposed dwelling, stormwater location and wastewater field.

1.4 SITE VISITS AND TESTS

The site was visited on the 13th of July 2017 and the soil samples and soil profile were taken and logged in two hand augured boreholes.

The soil profile was logged to 1.5m depth. The test results are shown on the attached result sheet. The locations of the boreholes are shown on the site plan.

1.5 PUBLISHED GEOLOGY

The soils for the site are designated "Qvs" on the map and are part of the South Auckland Volcanic Field.

These are basaltic soils formed from scoria, lapilli and ash originating from local volcanic events, which took place some 1 – 2 million years ago.

Soils uncovered from this Lot showed the soils type is consistent with the published geology.

The site is located near the Drury Fault.

2. ENVIRONMENTAL ASSESSMENT AND WASTEWATER DESIGN

The dwelling will be using a new AWTS System with dripper line disposal which is designed in accordance with TP58.

The attached site plan shows the available area for wastewater disposal. The effluent disposal field shall be kept at least 15m away from any overland flow path.

Ground water was not encountered in the boreholes and due to the elevation of the field location of the site it is anticipated ground water will be at 4 metres below ground level within the wastewater field area during winter months. As such, conventional trench or dripper line disposal will not impact on ground water.

As such any impact to the environment is considered to be minimal upon completion of the works mentioned within this report.

2.1 DWELLING WASTEWATER DESIGN

The proposal is to install a new system to meet council requirements for the proposed 4 bedroomed dwelling. All water supply being supplied from collected rain water,

No of Bedrooms: 4 Design Occupancy: 6 Water usage per day: 160L/day
Total water usage will be 960L/day

The calculation sheet is in accordance with TP 58 and the TP 58 checklist is enclosed in this report. The soil category is assessed as category 4 to 5 with a loading rate of 5 mm (from Ground consulting report) giving a disposal area of 192m².

The dripper line will be at 1m centres. Reserve area of at least 50% of the disposal area of 96m² shall be maintained on site.

The topsoil has been stripped from the Lot as part of the quarry works. Some topsoil has been spread within the areas but additional topsoil will be required to provide an adequate area for wastewater treatment.

3. STORM WATER MANAGEMENT

The enclosed calculation sheet shows that attenuation built into the proposed water tanks will allow for a 10 year, 10% AEP 10min storm event. All runoff from roof (proposed dwelling) areas shall be piped and released into at least one rain collection tank for domestic use.

3.1 DWELLING STORMWATER TANK ATTENUATION

The dwelling has a roof area of approximately 490.5m². The stormwater attenuation required is 5.4m³. This can be achieved by using at least one 22,500L stormwater tank. The attenuation shall be carried by a 20mm diameter orifice pipe fixed to the manufacturer's outlet point of the tank. The overflow pipe shall be equal to the size of the inflow pipes and be connected into a controlled outlet.

3.2 PAVED AREA

The paved area should be built to limit any uncontrolled stormwater runoff. Install cesspits within the lower areas of the paving to collect the runoff to provide a controlled discharge.

The outlet for the cesspit shall be connected into the overflow pipe for the tank prior to entering the controlled outlet.

3.3 DRIVEWAY

The existing driveway entrance will retain the existing stormwater controls. The current controls consist of a vee drain beside the lower edge of the driveway which directs the stormwater into one of two culverts which then discharge into the overland flow path.

Should the driveway be sealed then the stormwater runoff shall be collected using the existing vee drains which shall be armoured with rock riprap to prevent erosion.

3.4 CONTROLLED OUTLET

For this site the outlet for the water tanks and cesspits shall be piped past the driveway culvert and into a channel armoured with rock rip rap prior to the culvert under the existing driveway beside the entrance to the property. The location of the outlet shall be within a slope less than 5 degrees. The rock rip rap shall be a minimum of 2m long by 1m wide by 300mm thick.

Outlet to discharge 10m away from any foundations and below the wastewater field.

3.5 CONSTRUCTION OF STORMWATER

The stormwater system for the building shall be operational as soon as the roof is in place. This is to ensure that the ground within the vicinity of the building is not compromised by the negative effects and potential consequences of soil saturation

4. SYSTEM MAINTENANCE

The equipment suppliers will offer training and maintenance support for the system. However, it is the owner's responsibility to carry out all general maintenance procedures in order for the system to function as designed. We recommend that a maintenance contract be entered into with a recognized wastewater maintenance company. Attached in Appendix D are the operation and maintenance forms for both the stormwater and wastewater.

5. RECOMMENDATIONS

- 5.1. The 100 year flood level for this property will be set at RL3.172m. (based on the LINZ survey mark ED56).
- 5.2. Wastewater tanks to be placed above the 100 year flood level. The existing tank meets this requirement. Dripper lines to be placed above the 50 year coastal inundation level of RL 3.01m.
- 5.3. Any new habitable area (eg. dwellings) within this Lot shall have a minimum finished floor level of RL3.672m. (based on the LINZ survey mark ED56).
- 5.4. Any new non-habitable area (eg. garage) within this Lot shall have a minimum finished floor level of RL3.472m. (based on the LINZ survey mark ED56).

Report written by:



T. Gibbons

NZCE(Civil), BEtech (Civil), CPEng. MIPENZ

Report reviewed by:



Sig#Z39

R. Tilsley

B.E (Civil) CPEng. MIPENZ

DISCLAIMER

This report has been prepared solely for the benefit of our client with respect to particular brief given to us, and data or opinions in it may not be used in other contexts, by any other party or for any other purposes. To the maximum extent permitted by law, Tilsley Engineering Ltd disclaims all liability and responsibility (in contract or tort, including negligence, or otherwise) for any loss or damage whatsoever which may be suffered as a result of any reliance by any third party on this report, whether that loss is caused by any fault or negligence on the part of Tilsley Engineering Ltd or otherwise.

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Notice to Reader/ User of this document

Should you be in any doubt as to the applicability of this report and/or its recommendations for the proposed development as described herein, and/or encounter materials on site that differ from those described herein, it is essential that you discuss these issues with the authors before proceeding with any work based on this document.

This is a factual report of field investigations (and laboratory testing). The field investigations have been undertaken at discrete locations and no inferences about the nature and continuity of ground conditions away from the investigation location are made.

Furthermore, the logs are provided presenting descriptions of the soils and geology based on field observations of the samples recovered in the fieldwork and may not be truly representative of the actual underlying conditions.

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APPENDIX A – BACKGROUND INFORMATION

LOCALITY PLAN AND GEOLOGICAL MAP



FIGURE 1: TOPO50 MAP AND SITE LOCATION

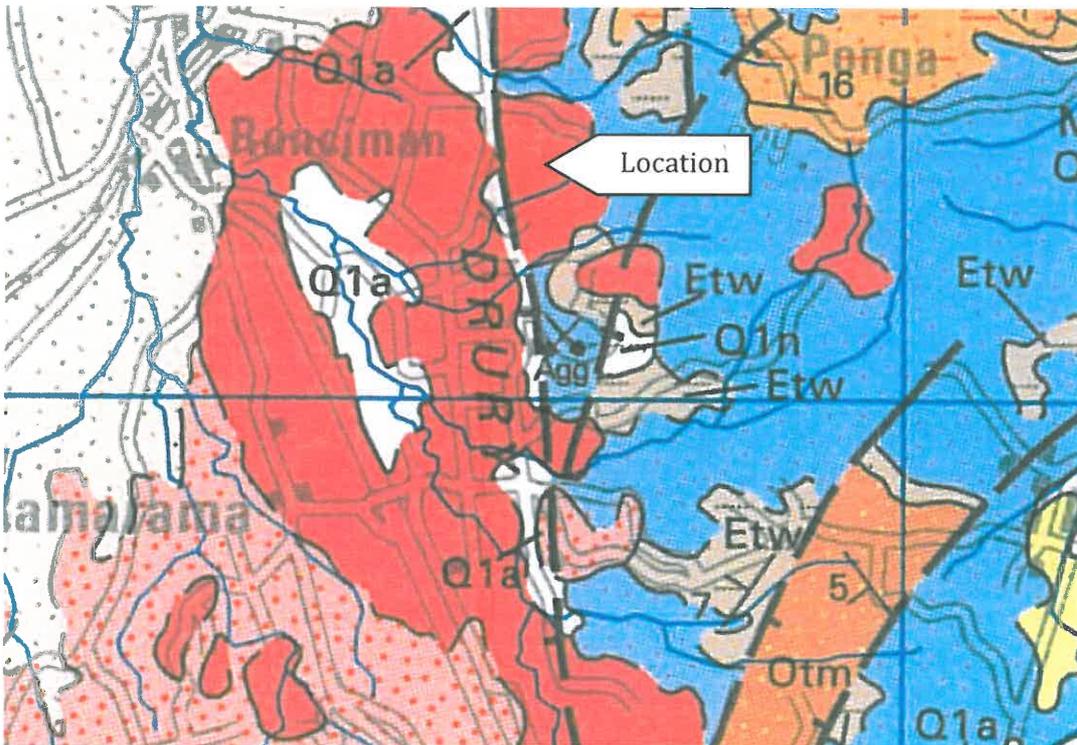
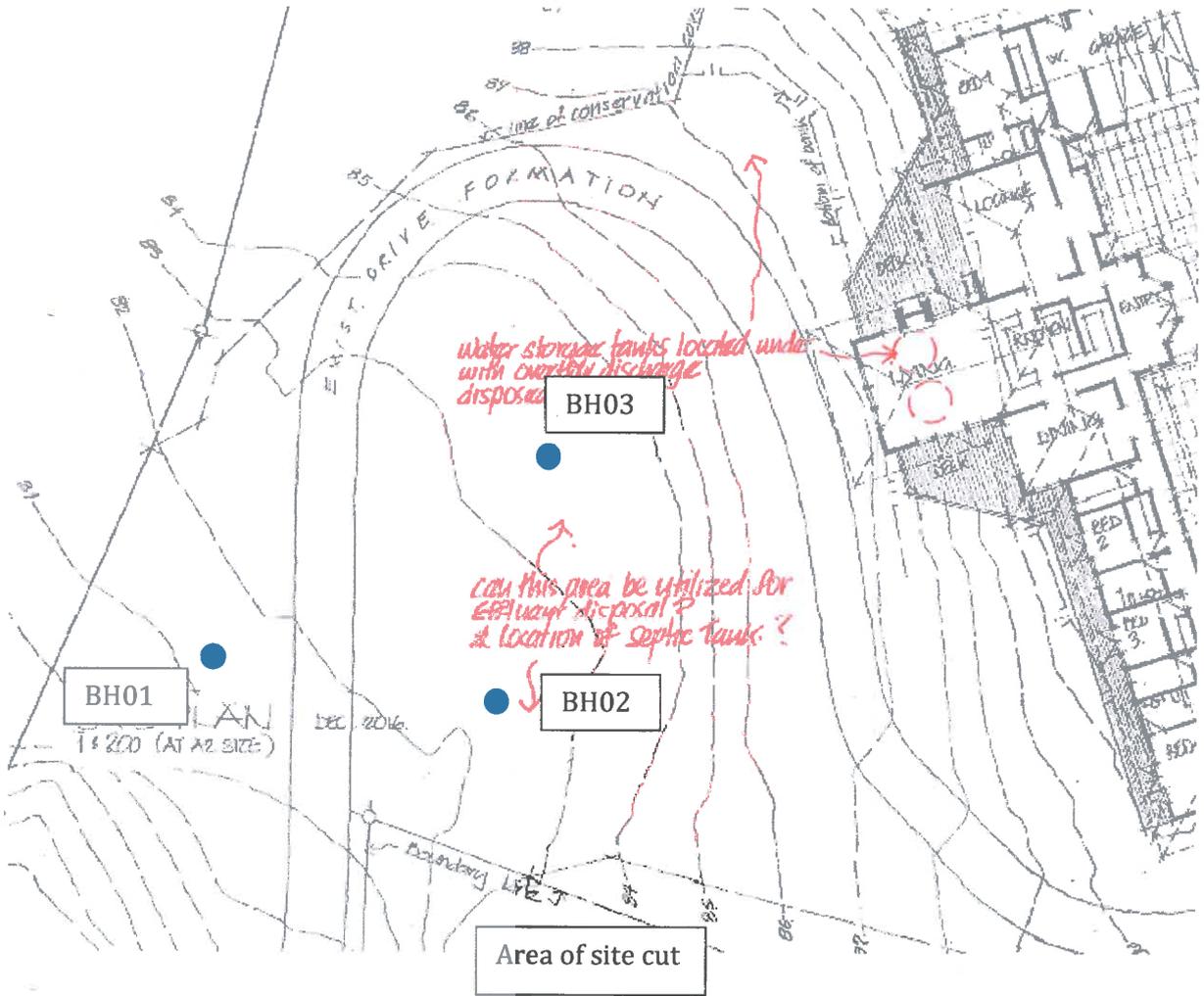


FIGURE 2: AUCKLAND GEOLOGICAL MAP AND SITE LOCATION



NIWA HIRDS DATA



High Intensity Rainfall System V3

Calculator Help

Results for 357 Drury Hills Road

Intensity-Duration-Frequency results (produced on Monday 7th of August 2017)

Site name: 357 Drury Hills Road

Coordinate system: NZMG

Easting: 2686585

Northing: 6453059

Rainfall intensities (mm/h)

ARI (y)	aep	Duration									
		10m	20m	30m	60m	2h	6h	12h	24h	48h	72h
1.58	0.633	59.4	40.8	33.0	22.6	14.5	7.1	4.5	2.9	1.7	1.2
2.00	0.500	64.2	44.1	35.6	24.6	15.7	7.7	4.9	3.1	1.8	1.3
5.00	0.200	81.0	56.1	45.2	31.2	19.9	9.8	6.3	4.0	2.3	1.7
10.00	0.100	94.8	65.7	53.0	36.6	23.4	11.6	7.4	4.8	2.8	2.0
20.00	0.050	110.4	76.5	61.6	42.6	27.4	13.5	8.7	5.6	3.2	2.4
30.00	0.033	120.6	83.4	67.2	46.4	29.9	14.6	9.5	6.1	3.6	2.6
40.00	0.025	127.8	88.5	71.4	49.4	31.6	15.6	10.2	6.5	3.8	2.8
50.00	0.020	134.4	93.0	74.8	51.8	33.4	16.6	10.7	6.9	4.0	2.9
60.00	0.017	139.8	96.6	77.8	53.8	34.7	17.3	11.1	7.2	4.2	3.0
80.00	0.012	148.2	102.6	82.8	57.2	36.9	18.4	11.9	7.7	4.4	3.2
100.00	0.010	155.4	107.7	86.8	60.0	38.7	19.3	12.5	8.1	4.7	3.4

Extreme rainfall assessment with climate change

Projected temperature change: 2.1° C

Rainfall intensities (mm/h)

ARI (y)	aep	Duration									
		10m	20m	30m	60m	2h	6h	12h	24h	48h	72h
1.58	0.633	69.6	47.4	38.0	26.0	16.4	7.9	5.0	3.1	1.8	1.3
2.00	0.500	75.0	51.3	41.0	28.1	17.8	8.5	5.4	3.4	2.0	1.4
5.00	0.200	94.8	65.1	52.2	35.9	22.8	11.1	7.0	4.5	2.6	1.9
10.00	0.100	111.0	76.5	61.4	42.3	27.0	13.2	8.4	5.4	3.1	2.3
20.00	0.050	129.0	89.4	71.6	49.5	31.7	15.7	10.0	6.4	3.7	2.7
30.00	0.033	141.0	97.5	78.4	54.2	34.9	17.3	11.1	7.2	4.1	3.0
40.00	0.025	149.4	103.5	83.4	57.7	37.1	18.5	11.9	7.6	4.4	3.2
50.00	0.020	157.2	108.6	87.4	60.5	39.0	19.4	12.5	8.0	4.7	3.4
60.00	0.017	163.2	112.8	90.8	62.8	40.5	20.2	13.0	8.4	4.9	3.5
80.00	0.012	172.8	119.7	96.8	66.8	43.1	21.5	13.9	9.0	5.2	3.8
100.00	0.010	181.8	125.7	101.4	70.1	45.2	22.6	14.6	9.4	5.5	4.0

FIGURE 3: NIWA RAINFALL INTENSITY DATA

PHOTOGRAPHS



FIGURE 4: VIEW OF PROPOSED WASTEWATER FIELD



FIGURE 5: VIEW OF DRIVEWAY BESIDE WASTEWATER FIELD



FIGURE 6: VIEW OF ENTRANCE TO CULVERT BESIDE ENTRANCE TO LOT



FIGURE 7: VIEW OF ARMoured ROCK RIP RAP CHANNEL BELOW CULVERT

CERTIFICATE OF TITLE



**COMPUTER FREEHOLD REGISTER
UNDER LAND TRANSFER ACT 1952**



Search Copy

Identifier 710063
Land Registration District North Auckland
Date Issued 09 September 2016

Prior References
NA51B/962

Estate	Fee Simple
Area	9506 square metres more or less
Legal Description	Lot 2 Deposited Plan 490884

Proprietors
Miles Henry Frizzell and Bronwyn Edith Frizzell

Interests

10551765.4 Consent Notice pursuant to Section 221 Resource Management Act 1991 - 9.9.2016 at 11:14 am

10551765.5 Consent Notice pursuant to Section 221 Resource Management Act 1991 - 9.9.2016 at 11:14 am

Appurtenant hereto is a right of way and right to convey water, electricity, gas, telecommunications and computer media created by Easement Instrument 10551765.7 - 9.9.2016 at 11:14 am

The easements created by Easement Instrument 10551765.7 are subject to Section 243 (a) Resource Management Act 1991

10551765.8 Conservation Covenant pursuant to Section 77 Reserves Act 1977 - 9.9.2016 at 11:14 am

10639427.2 Mortgage to Kiwibank Limited - 8.12.2016 at 3:24 pm

Transaction Id
Client Reference 357 drury hills road

Search Copy Dated 28/06/17 3:23 pm, Page 1 of 2
Register Only

APPENDIX B - BORE LOGS



BORE LOG

TILSLEY ENGINEERING LIMITED

75 Seddon Street, Pukekohe
 info@tilsleyengineering.co.nz
 PO Box 392, Pukekohe
 Phone: 09 238 3245

Job number: T3821/0

Client: Frizzell

Location: 357 Drury Hills Road, Drury

Soil type South Auckland Volcanic Field

Date: 13/7/2017

Time: 9am

Augered by: TG

Logged by: TG

Bore No: BH01

COMMENTS

Depth (m)	Material Description	Soil Symbol	Munsell Chart Number	Moisture	Water	Shear Vane Test / Reform (kPa)	Scala Penetrometer Test (blows/150mm - kPa)
0.0 - 0.1	Topsoil with silt						
0.1 - 1.2	Silt with minor clay, Yellow with Yellowish Brown striations, Firm		10YR 7/8 with 6/8				
1.2 - 1.4	EOB						



BORE LOG

TILSLEY ENGINEERING LIMITED
 75 Seddon Street, Pukekohe
 info@tilsleyengineering.co.nz
 PO Box 392, Pukekohe
 Phone: 09 238 3245

Job number: T3821/0
 Client: Frizzell
 Location: 357 Drury Hills Road, Drury
 Soil type: South Auckland Volcanic Field

Date: 13/7/2017
 Time: 9am
 Augered by: TG
 Logged by: TG
 Bore No: BH02

COMMENTS

Depth (m)	Material Description	Soil Symbol	Munsell Chart Number	Moisture	Water	Shear Vane Test / Reform (kPa)	Scala Penetrometer Test (blows/150mm - kPa)
0.0 - 0.1	Topsoil with silt						
0.1 - 1.2	Silt with minor clay, Yellow with Yellowish Brown striations, Firm		10YR 7/8 with 6/8				
1.2 - 1.4	EOB						



BORE LOG

TILSLEY ENGINEERING LIMITED

75 Seddon Street, Pukekohe
 info@tilsleyengineering.co.nz
 PO Box 392, Pukekohe
 Phone: 09 238 3245

Job number: T3821/0

Client: Frizzell

Location: 357 Drury Hills Road, Drury

Soil type South Auckland Volcanic Field

Date: 13/7/2017

Time: 9am

Augered by: TG

Logged by: TG

Bore No: BH03

COMMENTS

Depth (m)	Material Description	Soil Symbol	Munsell Chart Number	Moisture	Water	Shear Vane Test / Reform (kPa)	Scala Penetrometer Test (blows/150mm - kPa)
0.1	Topsoil with silt						
0.2	Silt with minor clay, Yellow with Yellowish Brown striations, Firm		10YR 7/8 with 6/8				
0.3							
0.4							
0.5							
0.6							
0.7							
0.8							
0.9							
1.0							
1.1							
1.2	EOB						
1.3							
1.4							

APPENDIX C – CALCULATIONS AND DESIGNS

WASTEWATER DESIGN - CALCULATIONS

Frizzell Residence

357 Drury Hills Road, Drury

Lot 2 DP 490884

7/8/2017

AWTS

DRIPPER LINE DISPOSAL CALCULATIONS

Water Supply	Rain/Roof water
Number of Bedrooms	4 Bedrooms
Number of occupants	6 persons
Water consumption per person per day	160 litres/day per person
Water usage	960 litres/day
Maximum dose rate	5 mm
Soils category estimated from soakage test	Category Five
Aerial area required	192 m ²
Dripper length required	192m at maximum 1m spacing
Reserve area required	96 m ²
AWTS	Devan Blue

Dripper line runs shall be kept to 100m lengths from feed point.

Disposal Field must be at least 5m from buildings, 1.5m from boundaries, and 15m from streams.

TILSLEY ENGINEERING LTD

PO Box 392, Pukekohe

WASTEWATER DESIGN – DESIGN DRAWING

General Notes

NOTES

Refer to architects plans for details of dwelling and driveway location and layout

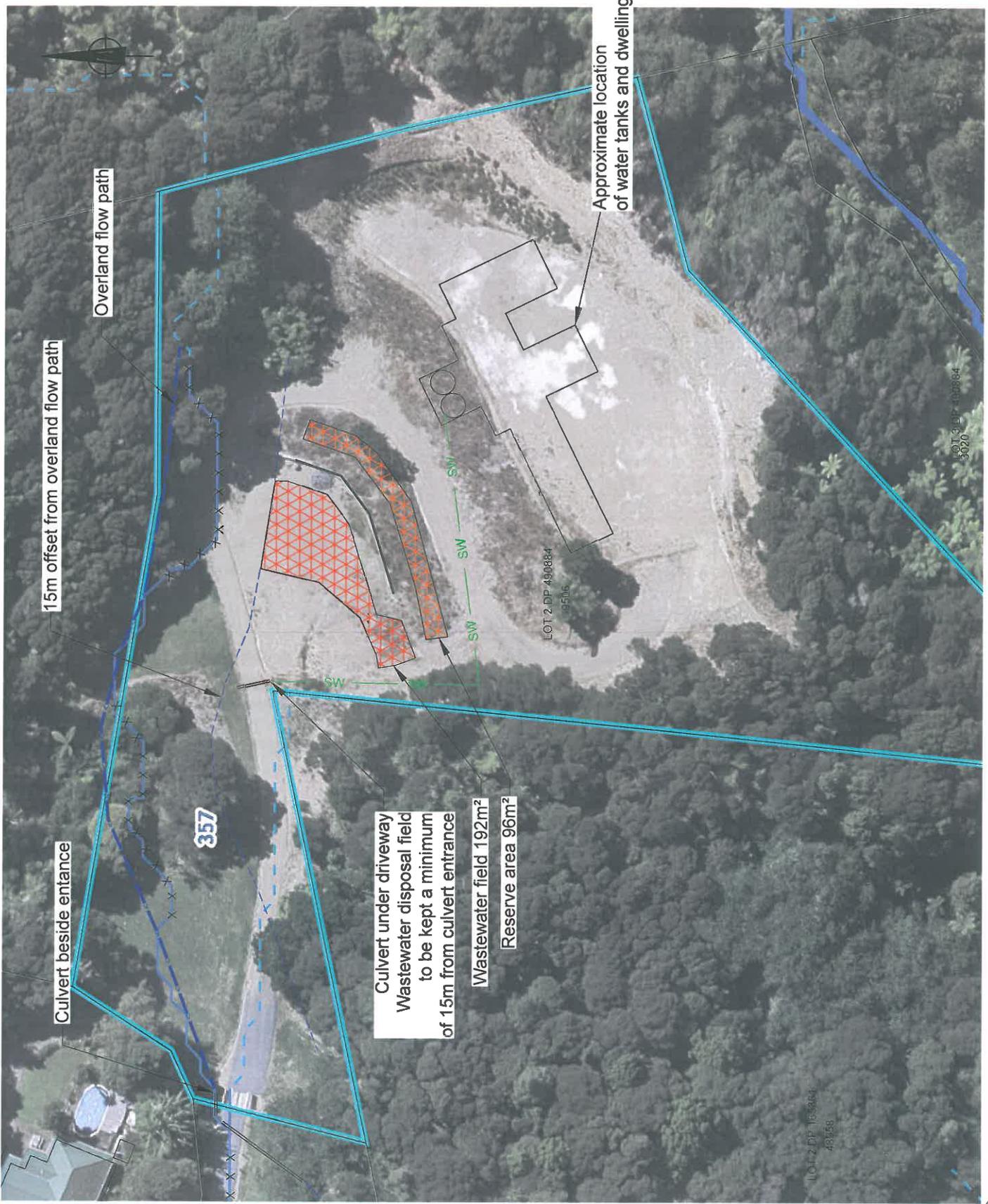


Drawn By	Taitlha Gibbons
Approved By	Robert Tilsley
No.	
Revision/Issue	
Date	

TILSLEY ENGINEERING LIMITED
 75 Seddon Street, Pukekohe
 PO Box 100, Pukekohe
 Tel: 08 238 3245
 info@tilsleyengineering.co.nz

Project Name and Address
 Site Plan
 357 Drury Hills Road
 Drury

Project	Site Plan	Sheet	01
Date	8/8/2017		
Scale	1:500@A3		



15m offset from overland flow path

Overland flow path

Culvert beside entrance

357

Culvert under driveway
 Wastewater disposal field
 to be kept a minimum
 of 15m from culvert entrance

Wastewater field 192m²

Reserve area 96m²

Approximate location
 of water tanks and dwelling

LOT 2, DP 490884
 19506

LOT 3, DP 4100684
 3020

LOT 2, DP 165984
 48358

STORMWATER DESIGN – CALCULATIONS

Client	Frizzell	Version 2.2
Address	357 Drury Hills Road Drury	
Date	Aug-17	
Stormwater management via detention		

Pre-development Grass Area	490 m ²
Modified (C=0.3)	147.0 m ²

Developed Roof Area (existing plus proposed addition)	490 m ²
Modified (C=0.9)	441.0 m ²

Design Storm	
1 in 10 year (10% AEP), 10min storm NWA value	94.8 mm/hr
cc. Adjusted for climate change 2.1 degrees	111.0 mm/hr

Quantity of Flow - Pre-development	
Pre-development Grass Area	4.5 l/sec

Quantity of Flow - Developed	
Developed Roof Area	13.6 l/sec

Storage Volume Required	
(developed) - pre-developed) flow x 10 x 60	5,439 Litres
	5.4 m ³

Detention Tank

Water tank Size	25,000 litre	
Tank Base Dia	3.5 m	
Attenuation depth		0.565 m

Maximum Orifice Size

Q release (pre-development)	4.53 l/sec
V = sqrt(2gh)	3.33 m/s
Area = Q/V	0.00136 m ²
Dia = sqrt(4 x A/pi)	0.042 m
Diameter of outlet pipe	42 mm
Recommended Outlet to be	20mm

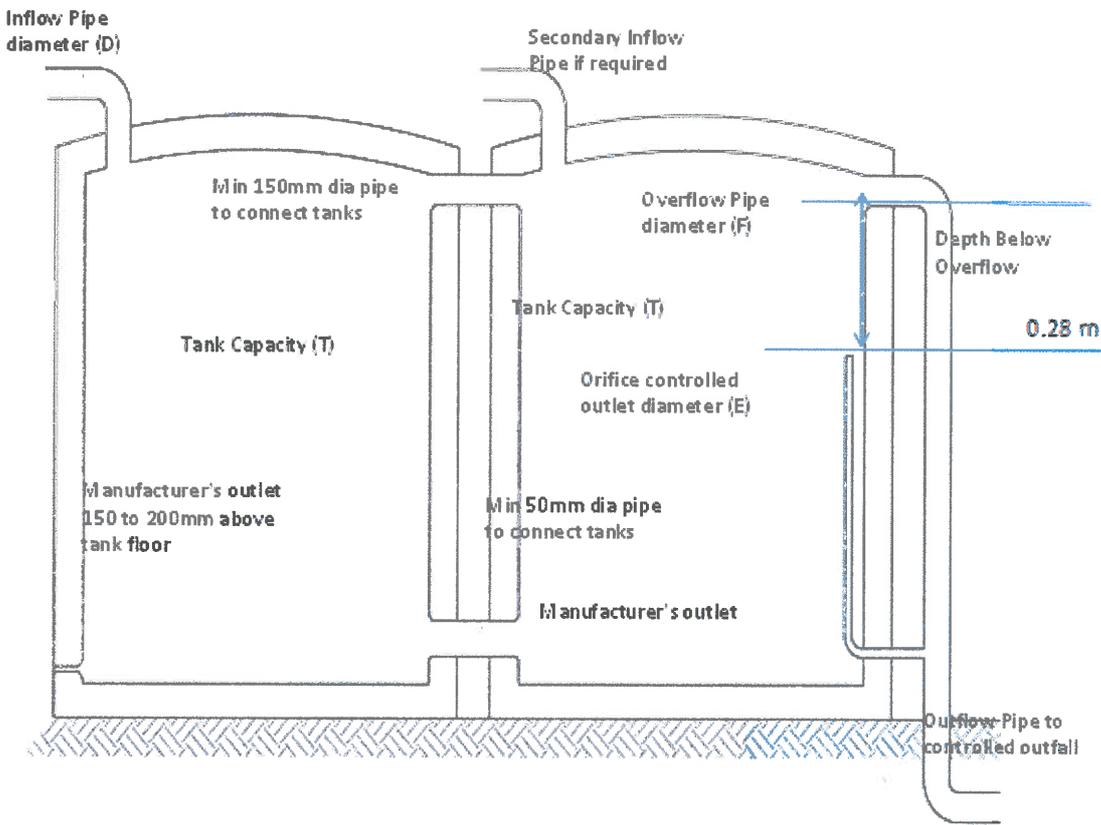
Minimum Orifice Size

Q release (24 hour drain)	0.063 l/sec
V = sqrt(2gh)	3.33 m/s
Area = Q/V	0.00002 m ²
Dia = sqrt(4 x A/pi)	0.005 m
Diameter of outlet pipe	5 mm
Recommended Outlet to be	Acceptable

Client Frizzell
 Address 357 Drury Hills Road Drury
 Date 7/08/2017

Version 2.2

Detention Tank Detail



Note: Minimum orifice diameter is 20mm.

Screening is required for orifices smaller than 25mm

D= 90 to 120 mm
 T= 25000 litres (x 2 tanks)
 E= 20mm

F= Overflow, Pipe size to be 10mm larger than inflow pipe/s

Capacity to be used for attenuation 5.4 m³

Notes:

1. Orifice controlled outlet 'E' is to use an approved manufacturer's outlet point. This may require an internal PVC pipe connected to a base point
2. If different tank dimensions are used than those specified, the orifice controlled overflow must allow for a minimum attenuation below the overflow pipe of 5.4 m³
3. First flush diverter recommended but not required.

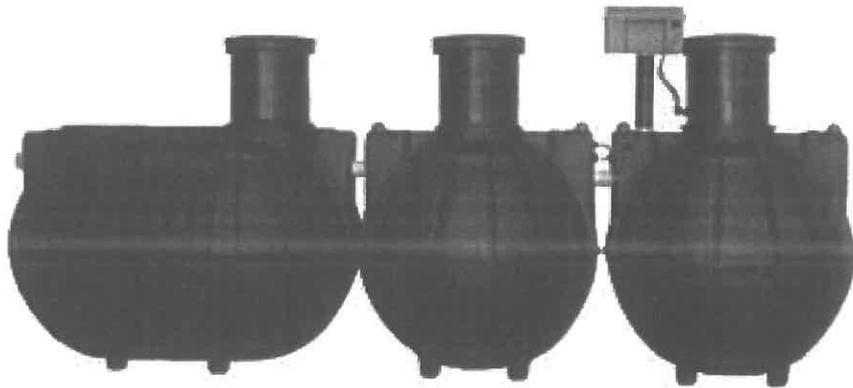
APPENDIX D - OPERATIONAL & MAINTENANCE FORM

AWTS MANUAL - DEVAN BLUE



Homeowner Manual

Devan Aerated Wastewater Treatment Systems



WELL DONE!

With the preservation of our precious environment becoming increasingly important, many people are now choosing to manage their wastewater in an environmentally sensible manner.

Well done on making the decision to partner with Devan to manage and treat the wastewater you dispose of from your property.

Through a partnership with another company Devan embarked on the world of wastewater management about a decade ago. Since then, Devan has formed its own wastewater management division and invested

hundreds of thousands of dollars into research and development over a number of years which has resulted in the product you have installed to treat and dispose of the wastewater from your property.

With a strong support network and a comprehensive product warranty your Devan wastewater product will provide years of trouble free service providing you take the time to read all the information in this manual and adhere to the warnings and recommendations made.

Thank you and well done!



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SYSTEM COMPONENTS

Your Devan wastewater treatment system is made up of several key components which we will cover off here.

Vessels



The vessels which comprise a Devan wastewater treatment system are made of a robust underground grade of polyethylene.

Ecotube



The Ecotube™ effluent filter improves the efficiency of your septic tank or wastewater treatment plant in two ways. It prevents the occurrence of solids carrying over into the aeration chamber by filtering out solid matter.

Septic tank effluent typically separates into three layers. The Ecotube™ extracts and filters the effluent from the relatively clean middle layer for discharge to the aeration vessel.

The Ecotube™ utilises highly durable polypropylene filter tube from NSW Environmental and provides a large filter area through the use of patented concentric filter tubes.

The Ecotube™ comes with an adjustable handle to allow for easy and complete removal however frequent cleaning is not required as solids captured on the filter fall back into the underlying sludge layers. The Ecotube™ comes complete with an outlet junction and insert filter.

Blower and air diffuser



The Gardner Denver diaphragm air compressor utilised in the system for circulating airflow into the second stage of the process provides between 60 and 100 litres per minute of air flow depending on blower size used. The air is diffused from the bottom of the vessel to aerate the contents, catalysing the digestion of remaining solids.

Submersible pump



The systems utilises the Grundfos SB 3-35A submersible pump. The pump is essentially silent from above the ground and has built in thermal overload

protection. Made of a composite of stainless steel and other materials the Grundfos SB is rugged and built for purpose meaning an extra long life when compared to other submersibles which do not last in this harsh environment.

Control panel



The PLC controller used with the Devan wastewater treatment system is built specifically for the purpose and is housed in a water proof controller box. The blower mode and alarming functionality is controlled from the box. It is recommended that the control panel is located on the wall of the dwelling closest to the system. The audible alarm housed within the controller box sounds when a problem is detected with the system. Such problems could be an issue with the blower or the pump.

Arkal filter



The arkal filter is an above ground filter so it can be easily accessed for cleaning by the homeowner without the need

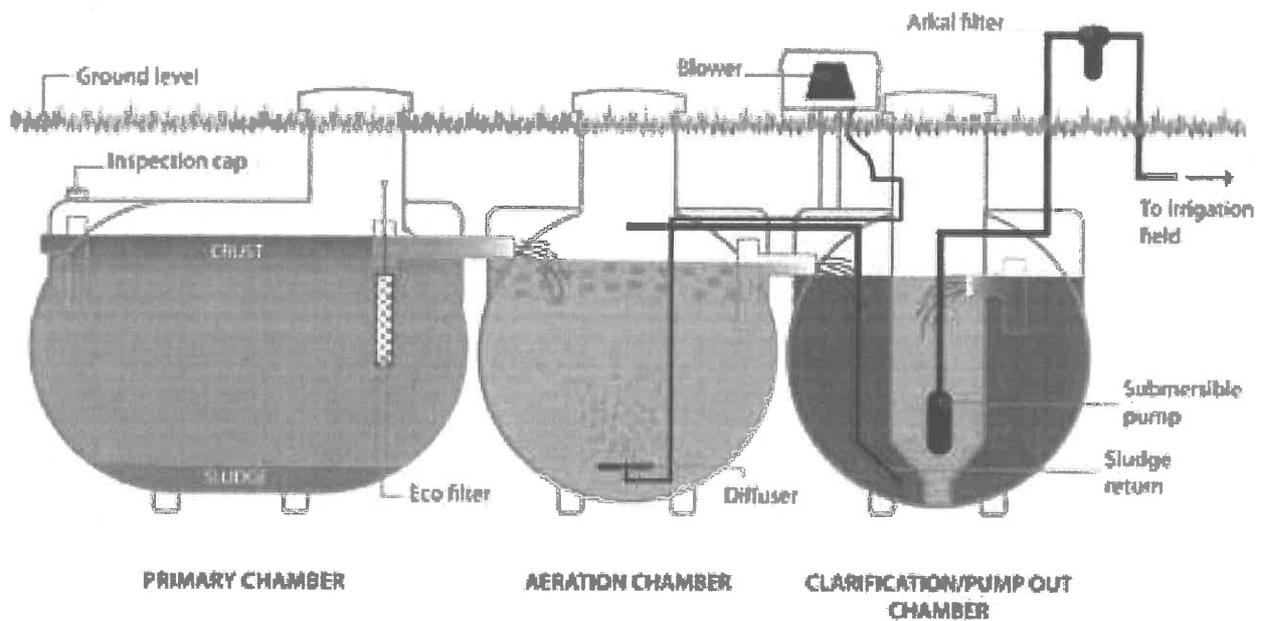
for a service agent. This filter removes any final traces of solid matter to ensure it does not enter the disposal field which could then cause blockages in the dripper line. This manual provides a guide to cleaning the filter as required.

Irrigation field



A key element of the Devan wastewater treatment system is that the final product is treated to a standard that is safe to discharge under a lawn or into a planted area. The irrigation field is constructed using dripper line. This dripper line has anti-siphon and self flushing technology within to avoid wet patches at lower points in the irrigation field and blockages in the dripper holes. Generally the minimum size of an irrigation field will be 300 metres of dripper line and the line is coloured purple to indicate non-potable.

HOW DOES THE SYSTEM WORK?



As you will be aware by now, an aerated wastewater treatment system treats wastewater from your home to a much higher level than an ordinary septic tank. The graphic above illustrates what is taking place in each of the three chambers.

Primary Chamber

Initially the wastewater is handled much the same as with a standard septic tank in what is described as the primary stage of the process. In the primary chamber the raw wastewater from the home is given time to settle out. This means that any scum that floats will form a crust on the top of the contents of the primary chamber while any heavier solids will sink to the bottom of the chamber forming sludge.

The clearer wastewater is therefore

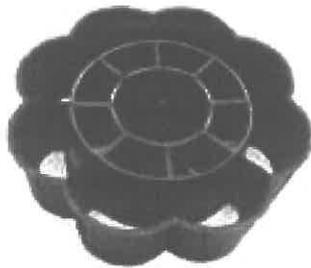
found in the middle section of the chamber and after being filtered through the Ecofilter it then overflows into a secondary stage.

Aeration Chamber

In this chamber, the clearer wastewater that has been passed from the primary chamber has air bubbled up through the contents of the tank to speed up the digestion of any remaining solid material. Air is blown through a large round diffuser that is located in the bottom of the vessel which maximises the bubbles generated and the spread of these bubbles throughout the chamber.

Also within the aeration chamber is a large amount of 'media'. This media takes the form of large unusually shaped plastic discs. These discs bounce

and float around in the circulating aerated wastewater providing extra surface area for the digesting bacteria to live on which increases the level of aerobic bacteria (bacteria with air) present in the chamber and in turn speeds up the rate at which the system can process the waste within.



One of the media discs

Clarification Chamber

The third stage of the process is referred to as clarification. Again, the mid-water overflows from the aeration chamber into the third chamber, clarification. Any remaining minute solids settle out of the liquid to the bottom of the chamber where a continuous vacuum sucks them up and returns them to the aeration chamber.

Pump-out Chamber

The remaining clear odourless liquid from the middle area of the clarification stage overflows into a fourth chamber, the pump out chamber. When the pump chamber fills to a certain level the Grundfos Hi-lift submersible pump float switch kicks the pump in and the contents is pumped out to the irrigation field.

Irrigation Field

The irrigation field is normally constructed of dripper line and can be beneath a lawn helping keep it green and lush, or amongst plantings removing the need for watering. The size of the irrigation field is dictated by the soil type at your site. The irrigation tubing can be laid underneath a lawn to keep it lush, amongst plantings to keep them watered or can be installed above ground with mulch mounded up over top of it.



GENERAL GUIDELINES

The information to follow is crucial to the running of the wastewater treatment system and must be adhered to in order to preserve the conditions of your warranty policy.

Your new home now has a modern wastewater treatment system. This system treats your household wastewater and requires bacteria to be present in order to operate correctly and efficiently.

Keeping the bacteria alive

In order to maintain these bacteria you need to consider what chemicals end up going down your drains. You need to refrain from using any bleaches or chlorine (i.e. Napisan – Bleach – Janola). These products are designed to kill bugs and will kill off the desirable bacteria in the tank causing smells and blocked filters. Powdered laundry detergents and dish washing powders are also powerful bacteria killers along with toilet bowl rim sanitizers. Within this manual is a detailed list of products that should be avoided and other products that are ideal for the same purpose without the harmful effect on your new system.

Fats and oils also have a negative impact on a wastewater treatment system as they may block the tank filters and kill the bacteria in the tank. Tea leaves and coffee grinds can also have a similar effect

The washing of paint brushes and disposal of paint and stains down drains

will certainly kill your bacteria and need to be avoided. Not only will they kill the bacteria in the tank, but the residue is very difficult and costly to remove.

Disposable nappies, feminine hygiene products and condoms are difficult or impossible to be broken down within the system and should be disposed off by other means

Power supply

It is important that you do not turn off the power to the system as there are electrical parts that require power in order for the system to operate. These items include the air blower (situated in the box above the ground) that supplies air to the aeration chamber for the aerobic bacteria to survive. This blower uses the same amount of power as a light bulb and is not costly to operate.

Electrical alarm panel

The waste treatment system has a controller with a built in buzzer alarm and red warning light.

The alarm will be activated if either the high level alarm is tripped or the air blower fails. The buzzer alarm can be muted by pressing the mute button. If the fault has not been rectified in 24 hours, the buzzer alarm will automatically reset and continue the audible alarm until muted again or the fault is remedied. If one of these alarms come on, please refer to your service agent who will assist you remotely or if this fails will come to site to troubleshoot any problems.

DW9000 DESIGN PARAMETRES

Waste Water Characteristics

Volume	180-200L/adult day
BOD 5 Input to anaerobic tank	60g/adult day
TSS Input to anaerobic tank	80g/adult day
Total nitrogen to anaerobic tank	15g/adult day
Total phosphorus to anaerobic tank	2.5g/adult day

Effluent Quality

BOD 5	15 to 20 mg/L
TSS	20 to 30 mg/L
Faecal Coliform (with disinfection)	0 to 200/100ml

Capacities

Primary Anaerobic Chamber	3600 Litres
Aerobic Chamber	2100 Litres
Wetted surface area	50m ²
Clarification/Pump Chamber	2100 Litres
Normal Operating Capacity	6220 Litres

Construction

Rotationally moulded polyethylene construction

Tank Dimensions

Height	2170 mm
Diameter	1650 mm
Overall length	6200 mm
Weight	565 kgs (approx)

Equipment

Irrigation Pump	Grundfos SB 3-35A
Air Blower	Gardner Denver



SERVICING REQUIREMENTS

The system is designed so that it can be simply serviced. The company has developed a recording system for the monitoring of each installation. The owner may be required to submit to the company, certification that

the servicing has been carried out in accordance with the service schedule specified to follow. The servicing requirements for componentry as recommended by Devan are as follows.

COMPONENT SERVICING

Component	Service requirement
Anaerobic chamber	Check annually, desludge every five years or as required
Ecotube effluent filter	Remove, check and clean twice annually
Air blower	Clean air filter twice per year
Air system	Check diffuser/sludge return/air flow twice annually
Effluent pump	General check of pump and flow pressure annually
Arkal outlet filter	Check and wash four times per year
Alarm system	Check system twice per year
Effluent disposal field	Check disposal area and flush field twice per year

SERVICING FREQUENCY

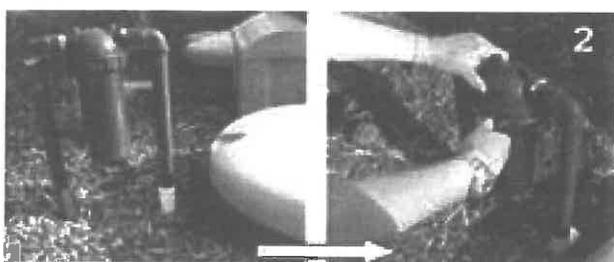
Component	3 monthly	6 monthly	9 monthly	Annually
Anaerobic chamber		Service agent		Service agent
Ecotube effluent filter		Service agent		Service agent
Air blower	Owner	Service agent	Owner	Service agent
Air system		Service agent		Service agent
Effluent pump		Service agent		Service agent
Arkal outlet filter	Owner	Service agent	Owner	Service agent
Alarm system		Service agent		Service agent
Effluent disposal field		Service agent		Service agent

OWNER SERVICING - ARKAL FILTER

Cleaning of the arkal filter needs to be completed by the home owner in between six monthly visits by the service contractor. A clean arkal filter ensures that your effluent can pass into the irrigation field with less restriction. Often a dirty or clogged irrigation filter is the cause of a high water alarm being activated on the controller.

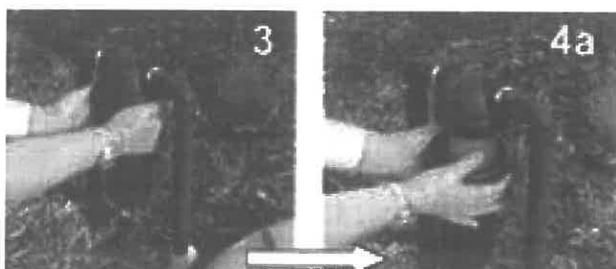
1) Turn power to system off. This will ensure the pump will not kick in while cleaning.

2) Loosen arkal filter neck ring with the supplied filter spanner.

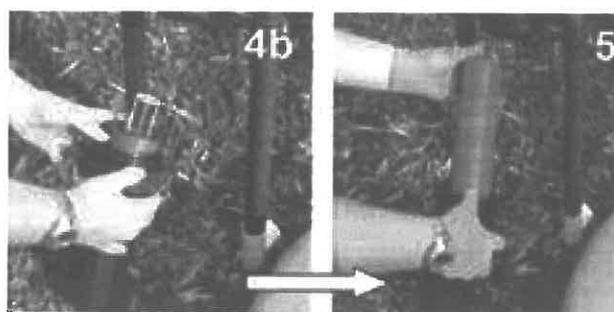


3) Unscrew neck ring until detached from the upper manifold.

4) Lower the filter body and disk cartridge down until they are free from the upper manifold.

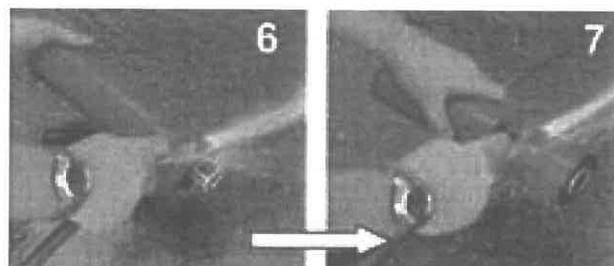


5) Remove the disk cartridge from the filter body.



6) Using a garden hose, hold the disk cartridge parallel with the ground (holding filter close to ground reduces the amount of spray or splash).

7) Spray water over 1cm of the disks at a time allowing them to spin from the water pressure. Move cleaned disks to one end and repeat until all disks are clean.



8) Re-assemble filter in reverse order of steps 1-5.

9) Turn power back on.

10) Clean hands thoroughly with hot soapy water.

OWNER SERVICING - AIR BLOWER

Cleaning of the air compressor (blower) needs to be undertaken on a six monthly basis in between the scheduled services undertaken by your agent.

These instructions relate to the servicing and maintenance of the Rietschle Thomas Linear models LP-60A and LP-100H.

Blower Air Filter Cleaning (3 Monthly)

- Loosen and remove screw to top cover.



- Remove Filter Cover and Gasket.



- Remove Air Filter media and wash in warm water & detergent.



- Clean Filter housing area from all dust and contaminants.
- Dry Filter media with towel before replacing media.

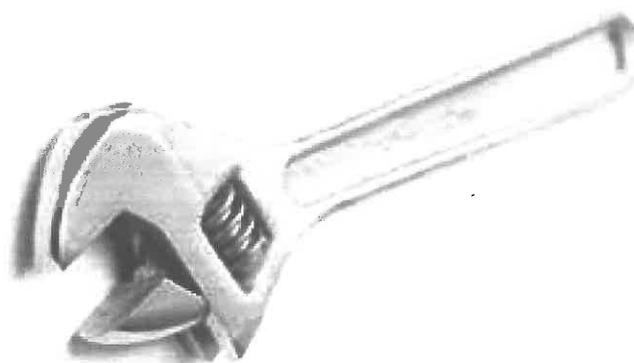
Blower Diaphragm Failure

Diaphragm blowers are not prone to wear. However, in case of diaphragm breakage, an integrated safety switch will switch off the blower.

Replacement diaphragm kits are available through your service agent.

TROUBLE SHOOTING

Problem	Possible solution
<p>The system is producing an odour.</p>	<p>Double check that you are using products from the list of 'Suitable Products' otherwise you may be killing your desirable bacteria required to keep your system actively operating and healthy.</p> <p>The terminal vent may also be affected by wind direction.</p> <p>The seals on the lid may be broken.</p> <p>If you are still not happy with the results of inspecting the above, please consult your Service Agent.</p>
<p>The high level alarm is activated and/or the system is overflowing.</p>	<p>The filters may be blocked and need cleaning, the effluent pump has failed, or the power is turned off. (Firstly, check that the power is turned on to your system, if it is, check to see if the Arkal Filter is blocked and needs cleaning, lastly call your local Service Agent to resolve problem).</p>
<p>The primary chamber is full and needs emptying.</p>	<p>Do not let your Septic Tank be cleaned and sucked out in winter, or at times when the ground water table is high. It is recommended that the operator leaves a percentage (10%) of the effluent in the tank to re-activate the system. On completion of the septic tank pump out, refill with water to normal operating level ASAP.</p>
<p>The toilet is backed up and doesn't appear to</p>	<p>and require</p>

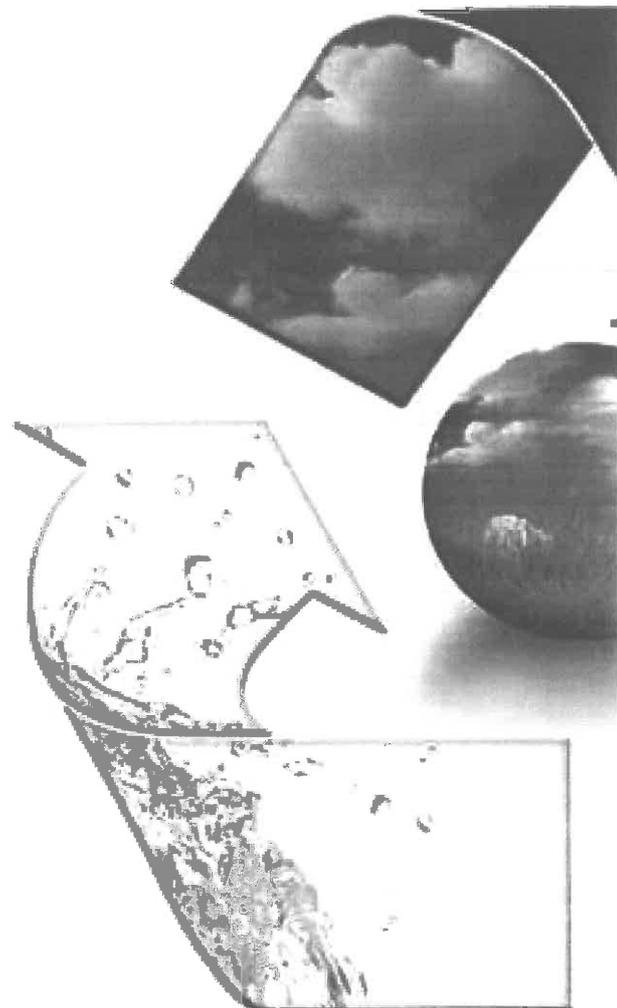


SUITABLE AND AVOIDABLE PRODUCTS

Avoidable Products

Ajax
Antibiotics & Antidepressants
Aussa
Alcohol & Spirits
Bio-Ad
Bubble Bath
Bio Jo
Caustic Oven Cleaners
Blue Loo
Coffee Grounds
Detol
Cooking Oils
Domestos
Cooking Fats and Grease
Down to Earth
Diesel and Petrol
Draino
Flea or Tick Wash
Exit Mould
Floor Cleaners
Fiesta
Kerosene
Finish Dish Wash
Powder Milk
Green Choice
Oil Based Paints
Handy Andy
Harpic Toilet Cleaners
Paint Brush Washing
Marvolinn
Sprays, Herbicides & Pesticides
Milton Tablets
Petrol & Diesel
Napisan
Petroleum products
Nappy Fresh
Nappy Plus
Tea Leaves
Nappy Soft
Turps

Persil Automatic
Water Based Paints
Pineoclean
Waste Disposal Unit – More frequent
pump out of Primary Tank required
Power Ball
Preen Soaker
Sun Advance Dish Wash Powder
Swipol
Shower Power
Blood Pressure Medication
Toilet Bowl Rim Cleaners
Heart Medication
Toilet Cistern Sanitizers
Chemotherapy Treatment
Toilet Duck
Tri-zym



Suitable Products

Dish washing liquids

- BEE Dish washing Liquid
- Ecostore Dish Wash Liquid
- Green Works
- Palmolive
- Morning Fresh
- Sunlight

Dish washing powders

- Ecostore Auto Dish Wash Powder

Surface cleaners

- BEE Multi Surface Cleaner
- Bio-Zyme Cleaner
- Ecostore Spray Cleaner
- Green Works

Jiff cream cleaner

- Spray & Wipe (limited quantity)

Toilet cleaners

- Ecostore Toilet Cleaner
- Green Works
- Cream cleaners (ie: Jiff in limited quantities)

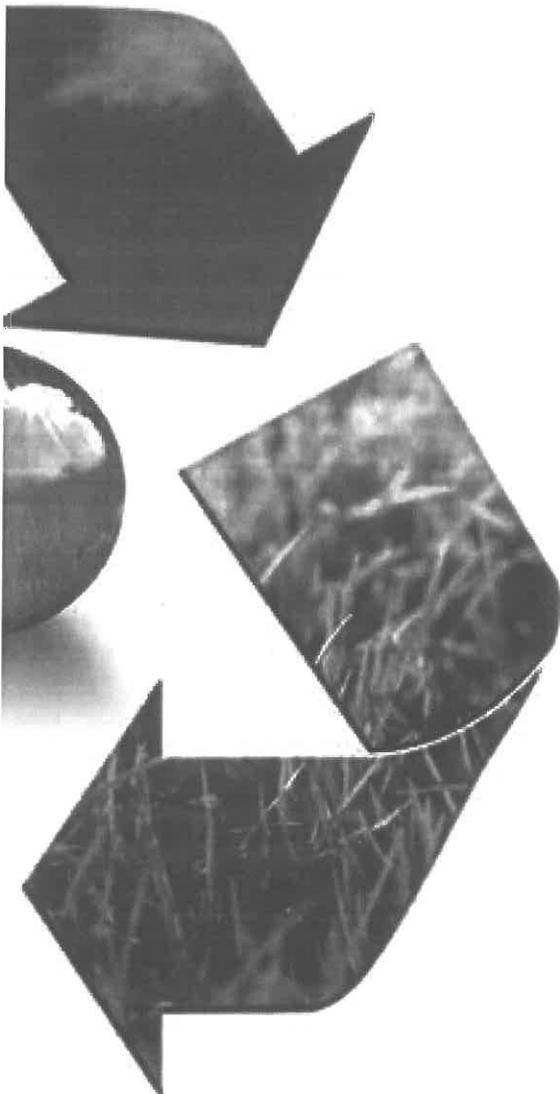
Laundry powders

- BEE Fabric Wash & Whitener
- Ecostore Laundry Powder
- Ecostore Oxygen Whitener (soaking)
- EarthOn

NOTE 1: Liquid laundry detergents are better suited to septic and waste treatment systems than traditional powdered laundry detergents (powder fillers are used in powder laundry detergents)

NOTE 2: A waste disposal unit will substantially increase the waste load into the Primary Tank. This will necessitate more frequent pumping out (approx. 2 yearly) of the Primary Tank.

NOTE 3: The lists above are not intended to promote or discredit the product of any company. It is provided to assist in ensuring the correct operation of your waste water treatment system. If you consider some of the avoidable products as essential in your home, dispose of the outfall in an alternative manner such as throwing the bucket of cleaning water out on the lawn rather than down the drain. All drains lead to the wastewater treatment system, not just the toilet.



SUITABLE PLANTINGS WITHIN THE IRRIGATION AREA

The following is a guide to general matters to consider when planting out a disposal field and a listing of water tolerant plants suitable for use with on-site wastewater disposal systems.

Plants that are suitable for planting in moist conditions, such as those associated with wastewater land disposal fields need to be selected on the basis of both their tolerance for such moist conditions and for their potential for high level of growth/high transpiration of moisture in such conditions.

Standard lawn grass is a proven effective high transpiration plant species in such conditions, as are a large number of other plant species seen in typical domestic gardens,

Consideration needs to be given to effects of roots from plants and from trees in particular on wastewater

distribution pipe networks/emitter lines in land application systems. Potential for root intrusion/disruption to the pipe system must be considered prior to selection and planting of a plant or tree species. Advice on such matters for particular plant species can be obtained from garden centre specialists and landscaping consultants.

Native plants suitable for moist conditions

The following list covers native plant species that are considered to be suitable for planting in moist conditions, such as those associated with wastewater disposal fields. They are all tolerant or fond of moist conditions. Much of this information has been adapted from one of the ARC Botanic Gardens advisory leaflets; "14—New Zealand plants for wet places" and the list edited and reviewed by Dr. Rhys Gardner Consulting Botanist, Auckland War Memorial Museum (August 2004).



Grasses, ground covers, and other plants

<p><i>Astelia grandis</i> (swamp astelia)</p>	<p>Large clump forming plant with bright green, flax-like foliage. Female plants produce upright panicles of orange berries in the centre of the plant. This endemic species will not tolerate eutrophic conditions and prefers peat soils.</p>
<p><i>Blechnum novaezealandiae</i> (kiokio)</p>	<p>Large, robust fern growing to 1 or even 2m, Hardy species that tolerates most conditions, but does best in well drained, shady areas.</p>
<p><i>Carex</i></p>	<p>There are many members of this genus which grow naturally in damp to wet areas. They all have quite fine drooping foliage and are vigorous in moist conditions. Most prefer very light shade. The following species have been identified for their suitability: <i>Carex dissita</i>, <i>Carex flagellifera</i>, <i>Carex geminata</i>, <i>Carex lessoniana</i>, <i>Carex secta</i>, <i>Carex virgata</i></p>
<p><i>Cortaderia fulvida</i> (toetoe)</p>	<p>Branching from the base and forming a clump to 4m high. Long strap-shaped leaves with red-orange coloured veins, flower heads cream yellow. New shoots exhibit pale waxy cover on lower parts (unlike pampas grass) Prefers good drainage and semi-shade. Will struggle to compete if dried out in summer.</p>
<p><i>Cyperus ustulatus</i> (toetoe upoko-tangata, giant umbrella sedge)</p>	<p>Vigorous leafy sedge growing to 1m in open damp places. Tolerates immersion in standing water within a range of habitats from seepages to wetlands.</p>
<p><i>Dicksonia squarrosa</i> (wheki, tree fern)</p>	<p>Tree fern up to 7m tall that exhibits tolerance of wet open ground, and floods. Found to shelter and accumulate with other native plants. The base of the fern attracts biodiversity. Useful application to streambank and seepage habitats.</p>
<p><i>Elatostema rugosum</i> (parataniwha)</p>	<p>Herbaceous plant up to 0.5m tall that spreads by rhizomes. Bronze coloured foliage with serrated edge. Grows on moist sites in light to heavy shade. Intolerant of dry habitats.</p>

Elatostema rugosum (parataniwha)	Herbaceous plant up to 0.5m tall that spreads by rhizomes. Bronze coloured foliage with serrated edge. Grows on moist sites in light to heavy shade. Intolerant of dry habitats.
Hypolepis dicksonioides	Large fern that prefers fertile moist, but well-drained ground, grows vigorously and spores into planted areas with abundance. Does however, die back during winter.
Phormium tenax (harakeke,, flax)	Fast growing clump-forming flax with large stiff leaves, to 3m. Full exposure and sun. Moist to wet conditions. Does not have deep or wide roots. Easily propagated from split fans or grown from seed. Attracts birds, especially Tui.
Trees and shrubs	
<i>Consideration needs to be given to the effects of roots land application on wastewater distribution pipe networks. This problem can be more significant for large tree species.</i>	
Carpodetus serratus (putaputaweta, marbleleaf)	Lowland forest tree up to 7m tall. Large bunches of cream coloured flowers appear in spring followed by black berries.
Coprosma areolata	Species that grows to 4m tall. Low tolerance to drought, with medium to high fertility.
Coprosma robusta (karamu, shining karamu)	Shrubs or small trees growing to 3m+, with glossy green leaves. Masses of orange-red fruit in autumn are attractive to birds. Hardy plant.
Coprosma tenuicaulis (swamp coprosma)	Endemic species that grows to 3m tall. Leaves pale green with slender branches. Will tolerate a range of swampy to boggy habitats including standing water.
Cord yline australis (ti kouka, cabbage tree)	Palm-like in appearance with large heads of linear leaves and panicles of scented flowers. Sun to semishade. Prefers damp to moist soil. Grows eventually to 12m+ height.

Dacrycarpus dacrydioides (kahikatea, white pine)	Tree that grows to 40m. Moderately growing species, which prefers wetland and boggy environments. Application of this species must consider the possible impact of its root systems on the wastewater disposal field.
Geniostoma rupestre (hangehange)	Common forest shrub with pale green glossy foliage, growing to 2-3m. Tiny flowers give off strong scent in spring. Looks best in sunny position where it retains a bushy habit, and prefers well-drained soil.
Hebe stricta (koromiko)	Shrub or small tree growing to 2-5m in height. Natural forms have white to bluish flowers. Plant in full sun. Tolerates exposure. (NB Many cultivars and hybrids are available commercially, but these are all unsuitable for use near existing natural vegetation.)
Laurelia novae-zelandiae (pukatea)	Large upright tree (to 30m) with attractive bright green foliage and distinctive whitish bark. Fast growing and able to handle a wide variety of soils. It will tolerate periodic flooding, breathing roots develop in water logged soils. Can be grown from seed. Tolerant of some sun and frost. Not tolerant of wind.
Leptospermum scoparium (manuka)	Shrub or small tree growing to 4m+ in height. Ubiquitous shrub varying in form throughout New Zealand. Ideal to provide shelter for other plants as it is quick growing and hardy. Requires full sun and. Hardy and tolerant of difficult conditions, including waterlogging and drought
Melicytus ramiflorus (mahoe)	A fast growing yet long lived tree to 7m height. Prefers well drained fertile soils. Tolerates some frost, wind and sun. Birds are attracted to the blue berries.
Pennantia corymbosa (kaikomako)	Slow growing species that will reach 12m in moist, fertile sites. Useful species application in bank stabilisation or wetland habitats.

Rhopalostylis sapida (nikau)	New Zealand's only native palm, with red berries attractive to birds. Requires light shade, plenty of moisture and protection from wind when young. Grows well in areas of permanent dampness.
Syzygium maire (maire tawake)	Attractive and moderately growing wetland tree to 15m with bronze foliage, large bunches of reddish fruit and distinctive whitish bark. Requires a sheltered sunny position. Tolerates some frost.
Vitex lucens (puriri)	Fast growing to 20m in fertile, open but sheltered conditions. Will struggle with poor drainage during adolescence.
Plagianthus betulinus (ribbonwood)	Fast growing species to 15m. Similar application to that of Pennantia



YOUR OBLIGATIONS

Local Authority Requirements

The owner of the system must be aware that they are obliged to undertake a formal maintenance service contract with the Devan authorised wastewater agent who supplied and installed the waste treatment system, in accordance with Local Authority Building Consent requirements.

The extent of the required service contract involves the agent carrying out a six monthly site check and inspection of the system and irrigation field, flushing the irrigation pipe work system, checking each vessel in the system for proper operation, checking the installed equipment for correct operation and function, and servicing the filters.

Typical Service Cost

A typical cost of a service contract with a Devan wastewater agent for the maintenance and servicing work involved in fully maintaining a waste treatment system would be expected to be in the range of \$150 to \$170 on a six monthly basis. (Note: Distance travelled and travel time costs may influence this cost).

Ongoing Maintenance

After the two year warranty period has passed, it is still necessary to maintain a service contract for your system. This will help ensure the continued trouble free operation of the waste treatment system and aid in early detection of any faults that have the potential to

cause problems in the future. Your local authority will also require you to maintain a service contract for the system.

System Faults

In the event that the owner requires assistance to resolve any issue ranging from a minor query to a fault, or major problem, the owner needs to contact the local Devan agent to progress and resolve the identified problem. The Agent has been trained and is experienced in fault finding and trouble shooting problem issues.

Important Health Note

Septic service work should not be carried out by the home owner due to the nature of septic waste. Septic waste is a hazardous substance with serious potential associated health risks involved. All service staff are trained and have had various injections to cover Tetanus, Hepatitis A, Typhoid and Hepatitis B as a minimum requirement to minimize the health risk to workers.

Need to find a new agent?

A list of Devan authorised wastewater agents in the owner's locality can be advised by phoning Devan on their free phone 0800 5000 26 where one of the sales team will readily advise contact details.

WARRANTY POLICY

Your Devan product has been manufactured to the highest standards utilising advanced technology and production procedures. Devan Plastics Limited ("Devan") warrants their products to be free of defects in workmanship or materials for the period defined in Appendix A, provided the provisions detailed below have been complied with.

A third party manufacturers' warranty applies to all other components used in the manufacture of Devan products. Third party manufacturer's warrant their products are free from defects in material and workmanship at the time of shipment and will make good, by repair or at its option replacement, any defects which occur during the warrantable period as defined in Appendix A provided the provisions below have been complied with.

Necessary provisions

In order for a warranty claim to be accepted by Devan Plastics Limited or a third party manufacturer the following provisions must be met:

- 1) The equipment was correctly installed and in proper use as was intended by the manufacturer in accordance with the Installation and operating instructions supplied, and generally accepted code of practice or national standard/s.
- 2) The warranty period (as defined in Appendix A) from the date of invoice to the end user has not lapsed.

3) The claim for goods under warranty arises solely from faulty material or manufacturers' workmanship.

4) The customer or agent of the customer must return goods under warranty (where appropriate), stating the date and place of purchase promptly and within the product liability period.

5) No repairs must be entered into by anybody other than a specified distributor or repairer as agreed and appointed by Devan Plastics Limited.

6) Devan must be given a reasonable opportunity to inspect the tank and, if deemed necessary by Devan to have an independent engineering or other expert analysis of the cause of failure carried out.

Exclusions

Both the Devan warranty and third party manufacturer's warranty do not cover the following exclusions:

- 1) Except where otherwise stated by law, the manufacturer shall not be under liability for any injury, damage, or loss, including consequential damage or loss resulting from the use of its products, or resulting from defects therein. This may specifically refer to the cost of carriage, installation, electrical or plumbing requirements etc.
- 2) Damage caused by abnormal operating conditions, war, violence, cataclysm, or any force majeure.

3) Damage caused by the equipment being used for an application for which it is not manufactured or recommended by the original manufacturer or Devan Plastics Limited.

4) Damage caused by sand or abrasive materials, corrosion due to salt water, hazardous liquids, electrolytic action, and liquid temperatures beyond the recommended range, cavitation, and improper power supply voltage or outages.

5) Attempted repair, dismantling or any other tampering with any component of the system without the prior written approval of Devan Plastics Limited will void any warranty.

6) If the Devan product or third party component has not been maintained in accordance with Devan Plastics instructions.

7) Ingress of water or insect infestation to electrical components due to post-manufacture electrical penetrations not being appropriately protected.

8) Incorrect installation or negligent practices of the installer of the product.

This warranty does not exclude any condition or warranty implied by the Consumer Guarantees Act 1993, Fair Trading Act 1986, and the Commerce Act 1986 and is in addition to any rights the purchaser may have at law.

Appendix A - Product warranty periods

Product	Warranty Period
Water tanks (residential)	20 years
Water tanks (commercial)	10 years
Molasses tanks	10 years
Septric tanks	15 years
WWTS vessels	15 years
Grease traps	10 years
Flout tank	10 years
Detention/retention tanks	15 years
Drums	1 year
Refuse bins	1 year
Industrial bins	1 year
Third party components (WWTS)	2 years
Third party components (other)	1 year
Grundfos pumps	2 years



MANUFACTURER

Devan Plastics Limited
125 Birch Avenue
PO Box 2602
Tauranga

Phone 07 578 8726
Fax 07 577 0437
Email info@devan.co.nz

LOCAL AGENT



WATER TANK OPERATION AND MAINTENANCE MANUAL



Property Address

Street name and number:

Suburb:

Note: This manual should be handed over to the new owner whenever the property is sold.

Rain Tank Data

(To be completed by the tank installer or property owner as appropriate)

Note: This information is required by the Council for entry into the On-site Stormwater Management Devices database.

Property address: Street name & number

Suburb

Date of completion:

Resource consent number:

Building consent number:

Tank Details

Impermeable area – roofs (m²)

Nominal tank size (litres)

Actual reuse volume (litres)

Tank material

(Concrete, steel, plastic, fibreglass, other)

Above/below ground installation

Kerb outlet – yes/no

Additional Data for “Dual Purpose” Tanks

Detention volume (litres)

Single orifice diameter (mm)

Single orifice height above base (mm)

Second/upper orifice diameter, if any (mm)

Second/upper orifice height above base (mm)

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1. Introduction

The purpose of this document is to provide the property owner with instructions and advice on how to operate and maintain the rainwater tank for drinking water supply on their property. One copy of this document should be kept in a handy location in the house and a second copy should be provided to the Council for record purposes.

All materials used prior to connections to the dwelling that are in contact with the potable rain water shall comply with **NZS 4020**.

2. Purpose of Rainwater Tank

Hard surfaces created as part of urban development generate increased storm water runoff which is ultimately discharged via the storm water network into streams and the sea. The increased flow of storm water can overload the downstream storm water network causing flooding. Increased stream flows accelerate the erosion of stream banks resulting in damage to adjacent properties and the release of sediment which is later deposited downstream or in the sea causing harm to the stream and marine environment.

"Single Purpose" rainwater tanks capture storm water runoff from the roof of the house and supply this throughout the year for both potable and non-potable purposes. "Dual Purpose" rainwater tanks have an additional volume which is used to temporarily store excess storm water from larger rainfall events which is then released slowly to the storm water outfall via a small diameter outlet or "orifice". The reduction in the total volume of storm water runoff from the property is achieved through the reuse of storm water in the household and the attenuation (reduction) of peak flows as a result of slow release. This contributes significantly towards the protection of streams from erosion and alleviating flooding in the downstream storm water network.

It is accepted that rainwater tanks will overflow in sustained, heavy rainfall events greater than or equal to approximately the 10 year average recurrence interval (ARI) or 10% annual exceedance probability (AEP) event. However periodic flooding is a natural process and would occur even in the absence of development. Streams are able to tolerate these infrequent, high flows as they have a chance to recover and stabilise between events. The greatest benefits of rain water tank are experienced during the high frequency, "normal" rainfall events that happen throughout the year and which would not cause significantly increased runoff in the absence of development and its associated impervious surfaces.

As a secondary benefit, the rainwater tank provides a source of "free" water for potable and non-potable uses potentially saving up to 40% on the annual household water bill.

3. Rainwater Tank Operation

The rainwater tank captures rain falling on the roof of the house via the gutters and downpipes which discharge into the tank. On demand the water in the tank is pumped to the dwelling for potable and non-potable uses.

With "Single Purpose" rainwater tanks the whole tank is used to store rain water permanently for potable water supply.

With "Dual Purpose" rainwater tanks approximately the bottom third of the tank is used to store rainwater permanently for potable water supply. The upper two thirds of the tank stores rainwater temporarily while it is slowly released through a small diameter orifice located one third of the tank height above the base, just above the maximum permanent water storage level.

A large diameter overflow pipe located near the top of the rainwater tank allows excess rainwater to safely drain away when the amount of rainfall exceeds the amount of water being used in the dwelling or which

can be temporarily stored. This overflow is connected to the approved storm water “outfall” for the property; usually the Council’s piped storm water network.

The volume of rainwater that can be captured in the tank in an average year will be sufficient to ensure an adequate supply of water for most of the year. However, to ensure an uninterrupted supply of water to the dwelling during extended dry periods, a backup supply of water is recommended.

This may be achieved by one of the following means:

1. The rainwater tank is connected to the property's mains water supply via a float operated valve which opens when the water level in the tank drops to a pre-determined level and shuts off when the pre-determined top-up level is reached.
2. The water supply pipe from the rainwater tank is connected to the property’s mains water supply via a proprietary 3-way solenoid valve. Under normal operating conditions the valve supplies tank water to the dwelling for potable and non-potable water outlets. However, the valve automatically switches over to mains water supply when the water level in the tank drops to a pre-determined level or during power outages when the rainwater tank pump is not operational.
3. Manual top-up of the rainwater tank by hosepipe, water tanker or other means.

Your rainwater tank system is provided with [1 / 2 / 3 / other] above.

(Installed system to be circled by tank installer or property owner as appropriate.)

4. Operation and Maintenance Requirements

4.1 Preventing Contamination

Since water from the rainwater tank is used for both potable and non-potable purposes, some basic precautions should be taken to prevent contamination of the water supply. These include:

- Keeping roofs clear of overhanging branches to minimise leaf litter and eliminate potential roosting points for birds. This also reduces opportunities for access to the roof by rodents, cats and possums.
- Preventing access by small animals and birds into the tank by screening all inlets and overflows and keeping access hatches closed.
- Preventing the entry of surface water runoff from areas other than the roof into buried tanks and ensuring the integrity of buried tanks to prevent the ingress of groundwater.

4.2 Routine Maintenance

Property owners should periodically inspect their property's plumbing and drainage system for leaks and faults. Similarly, the rainwater tank and associated water supply system requires periodic inspection and maintenance.

Most actions are relatively simple to perform and may easily be carried out by the property owner. Some actions such as pruning branches overhanging roofs, servicing the pump, de-silting the tank and repairs to top-up valves and backflow prevention devices may require professional assistance.

The following table sets out the recommended inspection and maintenance actions for a typical rainwater tank installation. The installed system may not be provided with all of the components listed and may have additional features not covered below. If in any doubt, contact a qualified plumber for advice.

Component	Recommended Actions	Frequency
Backup water supply	<ul style="list-style-type: none"> Inspect all pipes and valves for leaks. Float operated top-up valves are prone to leakage which may result in constant filling of the tank to overflow which may go unnoticed until the next water meter reading. Check these valves regularly to ensure that they are closing properly and not leaking. Seek professional assistance if necessary. With the 3-way solenoid valve option check that the valve is switching to tank water supply rather than mains supply when tank water is available. Confirm by listening for the pump and noting drawdown in the tank when water is used. 	Monthly
Tank hatches & covers	Inspect for correct fit and seal. Particularly important for underground tanks to prevent ingress of contaminated surface water runoff and entry by children.	Monthly
In-line filter	It is advisable to keep a spare filter cartridge. Swap filter cartridge and clean the old cartridge ready for the next replacement.	3 monthly
First flush diverter	Inspect and remove any debris and accumulated sediment. Refer to the manufacturer's instructions.	3 monthly
Overflow, outlet pipes & orifices	Inspect for blockage and clean if necessary. Flush when the tank is cleaned.	3 monthly / when tank is cleaned
Roofs, gutters, downpipes, gutter guards & leaf diverters	Inspect and remove debris and accumulated sediment and prune any overhanging branches. If the roof and gutters need to be cleaned, the inlet to the rainwater tank should be temporarily diverted to prevent ingress of dirty water to the tank.	6 monthly
Tank	<ul style="list-style-type: none"> Inspect the tank for leaks, sediment build up and structural integrity. A professional tank cleaning contractor should be employed to clean out the tank when the sludge level gets close to the pump inlet. Most rainwater tanks have a design of 20 years or more. Tanks older than this should be regularly assessed and replaced if necessary. 	Annually
Backflow prevention valve	Check by qualified person.	Annually
Pump	Pumps should be professionally inspected and/or serviced every few years. Refer to the pump service manual or contact a local service provider.	2 to 5 yearly
Non-return valve	Check operation when the pump is serviced.	When pump is serviced

Note: The maintenance frequency suggested above is the recommended minimum. After storms and in the autumn months additional inspections may be warranted.

5. Safety Considerations

- Extreme care should be exercised when cleaning roofs and gutters. Ensure that the ladder is secure, away from power lines and that there is another person present. If in doubt, seek professional assistance.
- It is recommended that professional rainwater tank cleaning contractors be employed to clean and service the rainwater tank. Should it be necessary to enter the tank for any reason, ensure that the tank has adequate ventilation and that there is another person present. The risks involved with working in confined spaces should not be underestimated.
- Access hatches and covers to rainwater tanks, particularly underground tanks, should be secured at all times to prevent access by children.
- Vehicles should not park on or drive over underground tanks unless the tank has been specifically designed for this.

6. Trouble Shooting

Problem	Possible Solution
<p>Discoloured water</p>	<ul style="list-style-type: none"> • Discoloured water could be caused by a build-up of leaves in the gutters, inlet system and tank or by the stirring up of sediment in the tank. • If discolouration appears to be caused by leaf tannins, consider: <ul style="list-style-type: none"> ○ Cleaning the gutters and inlet system. ○ Installing leaf guards, a leaf slide, inlet filter if one is not installed. ○ Pruning overhanging trees that drop leaves on the roof. • If discolouration appears to be caused by sediment, consider: <ul style="list-style-type: none"> ○ Installing a bottom inlet system. ○ Installing an in-line filter. ○ Cleaning out the tank.
<p>Power outage</p>	<ul style="list-style-type: none"> • During a power outage the pump will not operate which means that the water supply to the toilets and laundry from the rainwater tank may not be available. Mains water will still be supplied to the kitchen and bathrooms. • If the system is provided with a proprietary 3-way solenoid valve this should automatically switch over to mains supply in the event of a power outage. Automatic or manual tank top-up systems will require toilet cisterns to be manually filled until such time as power is restored. • Once the power returns the pump may need to be "reset". To do this, follow the instructions that came with the pump or seek advice from the pump supplier or local service provider.
<p>Pump not working</p>	<ul style="list-style-type: none"> • Check that the power supply to the pump is switched on. • Check the circuit breaker. • Try "re-setting" the pump. To do this, follow the pump manufacturer's instructions or seek advice from the pump supplier or local service
<p>No water getting to the dwelling</p>	<ul style="list-style-type: none"> • Check that the power supply to the pump is switched on. • Check that the water supply valve from the tank to the pump is open. • Check that the pump is switched on and is working. • Check that the pump inlet is not blocked. • Check that the in-line filter is not blocked.
<p>Mosquitoes in & around tank</p>	<ul style="list-style-type: none"> • Ensure that all connections and entries to the tank are sealed. • Check that gutters are not holding water. • Clean out mesh screens on inlet filters, leaf slides and gutter guards. • Ensure that access hatches and covers are closed at all times.
<p>Excess mains water usage</p>	<ul style="list-style-type: none"> • Check that the float operated rainwater tank top-up valve is closing correctly and is not leaking. • Check that the proprietary 3-way solenoid valve is switching over to tank supply when tank water is available.

7. Contacts

Tank supplier

Name: _____ Tel: _____
Company: _____ Fax: _____
Address: _____ Mobile: _____
A/H Tel: _____
Email: _____

Pump supplier

Name: _____ Tel: _____
Company: _____ Fax: _____
Address: _____ Mobile: _____
A/H Tel: _____
Email: _____

Plumber

Name: _____ Tel: _____
Company: _____ Fax: _____
Address: _____ Mobile: _____
A/H Tel: _____
Email: _____

Electrician

Name: _____ Tel: _____
Company: _____ Fax: _____
Address: _____ Mobile: _____
A/H Tel: _____
Email: _____

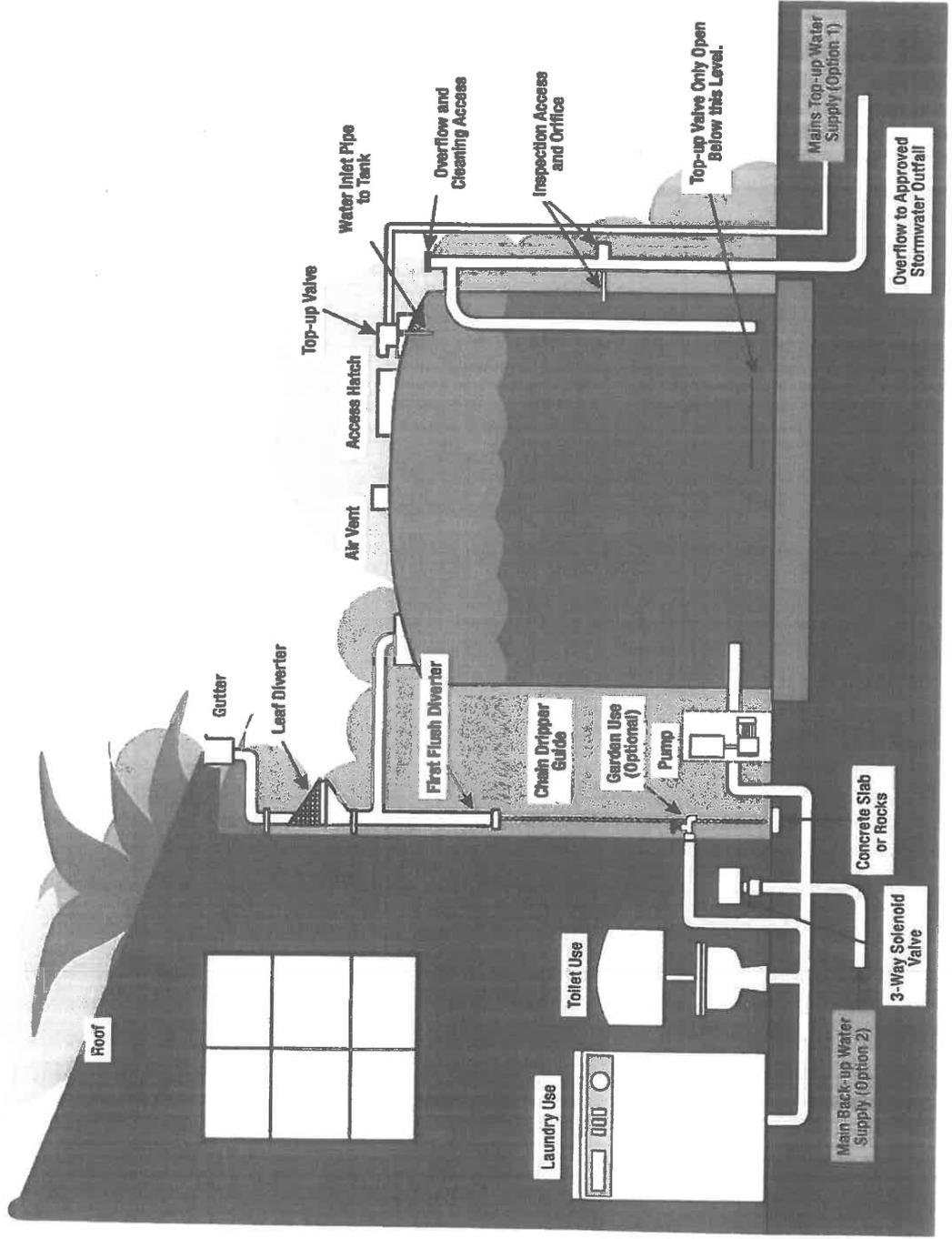
Tank cleaning
contractor

Name: _____ Tel: _____
Company: _____ Fax: _____
Address: _____ Mobile: _____
A/H Tel: _____
Email: _____

ANNEXURE 1

Rainwater Tank Drawings

Note: This drawing is for a typical above-ground rainwater tank installation. Some tanks may be installed underground and may differ from that shown. The tank installer or property owner, as appropriate, should attach a drawing specific to the approved rainwater tank installation for the property.

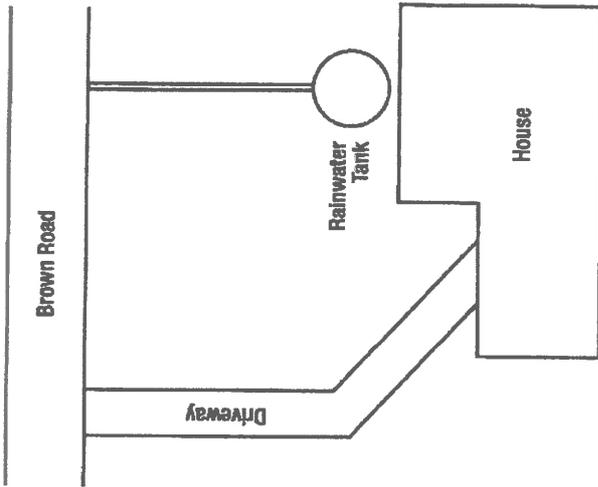


ANNEXURE 2

Rainwater Tank Location Plan

Note: The tank installer or property owner, as appropriate, should attach a drawing indicating the location of the rainwater tank on the property as well as the location of associated drainage and water supply components. The level of detail provided should be sufficient for future property owners and inspectors to locate the various components of the rainwater tank system with a minimum of inconvenience.

Example:



ANNEXURE 3

Pump and Proprietary Products Operating and Service Instructions

Note: The tank installer or property owner, as appropriate, should attach any relevant product brochures, manuals or service instructions relevant to the specific rainwater tank installation on the property. This should include detailed operating and maintenance instructions for the pump, valves and any other specialised components.

APPENDIX E - TP58 CHECKLIST

Appendix E

On-site Wastewater Disposal Site Evaluation Investigation Checklist

On-site Wastewater Disposal Site Evaluation Investigation Checklist

PART A: Contact Details

1. Applicant Details:

Applicant Name	Frizzell Residence		
Company Name			
	First Name(s)	Surname	
Property Owner Name(s)	Miles Henry	Frizzell	
	Bronwyn Edith	Frizzell	
Nature of Applicant*			

(* i.e. Owner, Lessee, Prospective Purchaser, Developer)

2. Consultant/Site Evaluator Details:

Consultant/Agent Name	Tilsley Engineering Limited			
Site Evaluator Name	Talitha Gibbons			
Postal Address	PO Box 392 Pukekohe			
Phone Number	Business	09 238 3245	Private	
	Mobile		Fax	
Name of Contact Person	Talitha Gibbons			
E-mail Address	info@teng.co.nz			

3. Are there any previous existing discharge consents relating to this proposal or other waste discharge/disposal on the site?

Yes No

If yes, give Reference Number(s) and Description

--

4. List any other consents in relation to this proposal site and indicate whether or not they have been applied for or granted.

If so, specify Application Details and Consent No.):

(e.g. Land Use, Water Take, Subdivision, Earthworks Stormwater Consents)

Building Consent

PART B: Property Details

1. Property for which this application relates:

Physical Address of Property	357 Drury Hills Road Drury		
Territorial Local Authority	Auckland Council		
Regional Council	Auckland		
Legal Status of Activity	Permitted: <input checked="" type="checkbox"/>	Controlled: <input type="checkbox"/>	Discretionary: <input type="checkbox"/>
Relevant Regional Rule(s) [Note 1]	5.5.20		
Total Property Area (m ²)			
Map Grid Reference of Property [Note 2]			
Notes:			
1. In the Auckland Region, the relevant Permitted Activity criteria is as specified in the ARC Proposed Regional Plan: Air Land and Water (ARC: ALWP) Decision Version October 2004 Rule 5.5 20-23 (refer Appendix C and in particular C5, in TP58).			
2. NZMS 260 series, scale 1:50,000			

2. Legal description of land (as shown on Certificate of Title):

Lot No.	Lot 2	DP No.	490884	CT No.	710063
Other (specify)					

Please ensure copy of Certificate of Title is attached.

PART C: Site Assessment – Surface Evaluation

(Refer TP58 – Sn 5.1 General Purpose of site Evaluation and Sn 5.2.2(a) Site Surface Evaluation)
Note: Underlined terms defined in Table 1, attached

1. Has a Desk Study been undertaken for this property

Yes No (Please tick one)

If yes, please specify the findings of the Desk Study, and if not please specify why this was not considered necessary.

Neighbouring systems within the surrounding area are working satisfactorily

2. Has a Slope Stability Assessment been carried out on the property?

Yes No (Please tick one)

If No, why not?

Slope angle less than 5 degrees

On-site Wastewater Systems:
Design and Management Manual (TP 58)

If Yes, please give details of report (and if possible, please attach report):

Author:	
Company/Agency	
Date of Report	
Brief Description of Report Findings	

3. Site Characteristics (See Table 1 attached):

Provide descriptive details below:

Performance of Adjacent Systems:
Satisfactory
Estimated Rainfall and Seasonal Variation:
1500mm +/- 200mm
Vegetation Cover:
English Grass
Slope Shape:
Gentle
Slope Angle:
<5 degrees within wastewater field
Surface Water Drainage Characteristics:
Drains to the west
Flooding Potential: YES/NO
No
If yes, specify relevant flood levels on appended site plan, i.e. one in 5 year and/or 20 year and/or 100 year return period flood level, relative to disposal area.
Surface Water Separation:
15m
Site Clearances (Provide general description and specific dimensions in Part 6 below and in Site Plan)
See over
Site Characteristics:
No special characteristics or embankments affecting the septic field

4. Site Geology of the subject property

"Qvs" refer to attached report for more detail

Geological Map Reference Number

5. What Aspect(s) does the proposed disposal system face (please tick)?

North	<input checked="" type="checkbox"/>	West	<input type="checkbox"/>
North-West	<input type="checkbox"/>	South-West	<input type="checkbox"/>
North-East	<input type="checkbox"/>	South-East	<input type="checkbox"/>
East	<input type="checkbox"/>	South	<input type="checkbox"/>

6. Site clearances, which should also be shown on the site plan:

Separation Distance from	Treatment Separation Distance (m)	Disposal Field Separation Distance (m)
Boundaries	>3	>1.5
Surface water	>15	>15
Groundwater	>3	>1.5
Stands of Trees/Shrubs	>10	>10
Wells, water bores	N/A	N/A
Embankments/retaining walls	>3	>3
Buildings	3	5
Other (specify):		

PART D: Site Assessment – Subsoil Investigation

(Refer TP58 – Sn 5.1 General Purpose of Site Evaluation, Sn 5.2.2(b) Site Surface Evaluation and Sn 5.3 Subsurface Investigations)

Note: Underlined terms defined in Table 2, attached

1. Please identify the soil profile determination method:

Test Pit	<input type="checkbox"/>	(Depth ___ m)		No. of Test Pits	
Bore Hole	<input checked="" type="checkbox"/>	(Depth ___ m)	1.2	No. of Bore Holes	3
Other (specify)					
Soil Report Attached?	Yes	<input checked="" type="checkbox"/>	No	<input type="checkbox"/>	(Please Tick)

2. Was fill material intercepted during the subsoil investigation?

Yes No (Please tick)

If yes, please specify the effect of the fill on wastewater disposal

3. Has percolation testing been carried out?

Yes No (Please tick)

If yes, please specify the method

Test Report Attached? (Please tick) Yes No

4. Are surface water interception/diversion drains required?

Yes No (Please tick)

If Yes, please show on site plan

5. Please state the depth of the seasonal water table:

Winter	2	(m)
Summer	3	(m)

Please indicate whether measured or estimated (please tick)

6. Are there any potential short circuit paths?

Yes No (Please tick)

If the answer is yes, please explain how these have been addressed

7. Based on results of subsoil investigation above please indicate the disposal field soil category

(Refer TP58 Table 5.1):

Is Topsoil Present? If so, Topsoil Depth? 0.15 (m)

Soil Category	Description	Drainage	Tick One
1	Gravel, coarse sand	Rapid draining	<input type="checkbox"/>
2	Coarse to medium sand	Free draining	<input type="checkbox"/>
3	Medium-fine & loamy sand	Good drainage	<input type="checkbox"/>
4	Sandy loam, loam & silt loam	Moderate drainage	<input type="checkbox"/>
5	Sandy clay-loam, clay loam & silty clay-loam	Moderate to slow drainage	<input checked="" type="checkbox"/>
6	Sandy clay, non-swelling clay & silty clay	Slow draining	<input type="checkbox"/>
7	Swelling clay, grey clay, hardpan	Poorly or non-draining	<input type="checkbox"/>

Reasons for placing in stated category

Soil type within area of wastewater treatment zone

PART E: Discharge Details

1. Water supply source for the property (please tick):

Rainwater (roof collection)	<input checked="" type="checkbox"/>
Bore/well	<input type="checkbox"/>
Public supply	<input type="checkbox"/>

2. Calculate the maximum daily volume of wastewater to be discharged, unless accurate water meter readings are available (Refer TP58 Table 6.1 and 6.2):

Number of Bedrooms	4	
Design Occupancy	6	(Number of people)
Per capita Wastewater Production	160	(Litres per person per day)
Other - Specify		
Total Daily Wastewater Production	960	(Litres per day)

3. Do you propose to install:

a) Full Water Conservation Devices?	Yes	<input type="checkbox"/>	No	<input checked="" type="checkbox"/>	(Please tick)
b) Water Recycling – what %?	%	<input type="checkbox"/>	No	<input checked="" type="checkbox"/>	(Please tick)

If you have answered Yes, please provide additional information including the estimated reduction in water usage:

Use dual flush toilets and aerated taps

4. Is Daily Wastewater Discharge Volume more than 2000 litres:

Yes	<input type="checkbox"/>	(Please tick)
No	<input checked="" type="checkbox"/>	(Please tick)

Note if the answer to the above is yes an ARC wastewater discharge permit will be required

5. Gross Lot Area to Discharge Ratio:

Gross Lot Area	9506	m ²
Total Daily Wastewater Production	960	(Litres per day) (from above)
Lot Area to Discharge Ratio	9.9	

6. Does this proposal comply with the Auckland Regional Council Gross Lot Area to Discharge Ratio of greater than 1.5)

Yes	<input checked="" type="checkbox"/>	No	<input type="checkbox"/>	(Please tick)
-----	-------------------------------------	----	--------------------------	---------------

7. Does this proposal comply with the Auckland Regional Council Gross Lot Area to Discharge Ratio of greater than 3

Yes No (Please tick)

8. Is an Auckland Regional Council Discharge Consent Required?

Yes No (Please tick)

PART F: Primary Treatment (Refer TP58 Section 7.2)

1. Please indicate below the no. and capacity (litres) of all septic tanks including type (single/dual chamber grease traps) to be installed or currently existing:

Number of Tanks	Type of Tank	Capacity of Tank (Litres)
One	AWTS	4000
	Total Capacity	4000min

2. Is a Septic Tank Outlet Filter to be installed?

Yes No (Please tick)

If Yes, please state the type

PART G: Secondary and Tertiary Treatment

(Refer TP58 Section 7.3, 7.4, 7.5 and 7.6)

1. Please indicate the type of additional treatment, if any, proposed to be installed in the system (please tick):

Secondary Treatment	<input checked="" type="checkbox"/>	
Home aeration plant	<input checked="" type="checkbox"/>	
Commercial aeration plant	<input type="checkbox"/>	
Intermittent sand filter	<input type="checkbox"/>	
Recirculating sand filter	<input type="checkbox"/>	
Recirculating textile filter	<input type="checkbox"/>	
Clarification tank	<input type="checkbox"/>	
Tertiary Treatment	<input type="checkbox"/>	
Ultraviolet disinfection	<input type="checkbox"/>	
Chlorination	<input type="checkbox"/>	
Other	<input type="checkbox"/>	
	Specify	<div style="border: 1px solid black; width: 300px; height: 25px;"></div>

PART H: Land Disposal Method (Refer TP58 Section 8)

1. Please indicate the proposed loading method (please tick):

Gravity	<input type="checkbox"/>
Dosing Siphon	<input type="checkbox"/>
Pump	<input checked="" type="checkbox"/>

2. Is a high water level alarm being installed in pump chambers?

Yes No (Please tick)

3. If a pump is being used, please provide the following information:

Total Design Head	20	(m)
Pump Chamber Volume	960 min	(Litres)
Emergency storage volume	960	(Litres)

4. Please identify the type(s) of land disposal method proposed for this site (please tick) (Refer TP58 Sections 9 and 10):

Surface Dripper Irrigation	<input type="checkbox"/>
Sub-surface Dripper Irrigation	<input checked="" type="checkbox"/>
Standard Trench	<input type="checkbox"/>
Deep Trench	<input type="checkbox"/>
Mound	<input type="checkbox"/>
Evapo-transpiration Beds	<input type="checkbox"/>
Other (Please Specify)	<input type="text"/>

5. Please identify the loading rate you propose for the option selected in Part H, Section 4 above stating the reasons for selecting this loading rate:

Loading rate		5	(Litres/m ² /day)
Disposal Area	Basal	-	(m ²)
	Areal	192	(m ²)

Explanation (Refer TP58 Sections 9 and 10)

See calculations sheet

6. What is the available reserve wastewater disposal area (Refer TP58 Table 5.3)

Reserve Disposal Area (m ²)	96
Percentage of Primary Disposal Area (%)	100

7. Please provide a detailed description of the design and dimensions of the disposal field and attach a detailed plan of the field relative to the property site:

Description and Dimensions of Disposal Field:

Effluent will flow in to a new AWTS system. From the tank the effluent will be pumped into 192m² of subsurface dripper line located within the area shown on the wastewater plan. Each run to be a maximum of 90-100m from the feed point.

Plan Attached ? Yes No (Please tick)

If not explain why not

PART I: Maintenance & Management (Refer TP58 Section 12.2)

1. Has a maintenance agreement been made with the treatment and disposal system suppliers?

Yes No (Please tick)

PART J: Assessment of Environmental Effects

1. Is an assessment of environmental effects (AEE) included with application?

(Refer TP58 section 4 (particularly 4.4.2), section 5, and section 11 (parts 11.1 & 11.8). Ensure all issues concerning potential effects addressed)

Yes No (Please tick)

2. Are there any specific environmental constraints?

Yes No (Please tick)

If Yes, please explain

PART K: Is Your Application Complete?

1. In order to provide a complete application you have remembered to:

(Refer to TP58 section 3.5 for summary list of information to be covered):

Fully Complete this Assessment Form
Include a <i>Location Plan and Site Plan</i> (with Scale Bars)
Include a Property Title (Certificate of Title)
Attach an Assessment of Environmental Effects (AEE)

<input checked="" type="checkbox"/>

2. Declaration

I hereby certify that, to the best of my knowledge and belief, the information given in this application is true and complete.

Name	Talitha Gibbons	Signature	
Position	Senior Engineer	Date	7-Aug-2017