DavidsonPartnersLtd

Structural Engineering
Civil Engineering
Building Design
Project Management

Practising in association with Ayson and Partners, Consulting Surveyors

Our Ref: 24091

4 August 2008

Marlborough District Council
P O Box 443
BLENHEIM

re: A & S BLAIKIE - LOT 4 DP 4360, WILLOW BAY
PROPOSED WASTEWATER SYSTEM

1. Background

We attach a Resource Consent Application Form, processing deposit fee and Engineering Report with an assessment of environmental effects for the proposed construction of a waste field for A & S Blaikie on Lot 4 DP 4360, Willow Bay, Mahau Sound.

2. Resource Consent

We attach two copies of our plan 24091 sheet C1, C2, C3, C4, & C5 showing the proposed location and details of the wastewater system.

If you have any queries, please do not hesitate to contact us.

DAVIDSON PARTNERS LTD

R W Davis

RWD:MH

Encl

COPY TO: A & S Blaikie
84 Mills Road
Halswell
CHRISTCHURCH 8025

Davidson Ayson House, 4 Nelson Street,
PO Box 256, Blenheim 7240, New Zealand
Telephone 03 579 2099 Fax 03 578 7028
Email: service@DavidsonPartners.co.nz
Website: www.DavidsonPartners.co.nz

Principals
Ross Davis, BE, CPEng, MIPENZ
Stephen Sheat, BE, CPEng, MIPENZ
Leigh McGlynn, BE, CPEng, MIPENZ

North

WILLOW BAY

LOT 5
DP 2828

LOT 2
DP 3366

LOT 2
DP 5673

LOT 1
DP 5673

LOT 5
DP 3366

PT SEC 40
BLK VI LINKWATER
SURVEY DISTRICT
(SO6206)

LOT 2
DP 4360

LOT 3
DP 4360

STREAM

LOT 4
DP 4360

LOT 5
DP 4360

KENEPURU ROAD

LOT 1
DP 4360

LOT 12
DP 4360

LOT 11
DP 4360

LOT 9
DP 4360

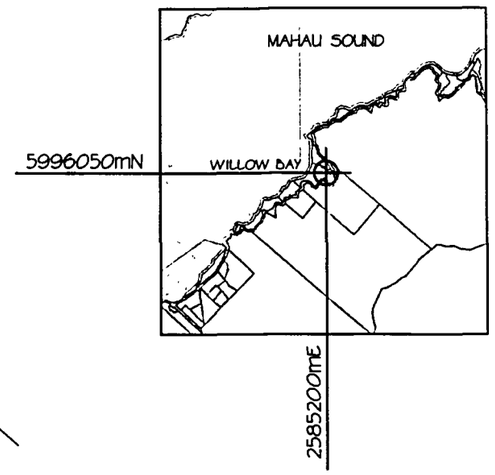
LOT 8
DP 4360

LOT 7
DP 4360

LOT 6
DP 4360

LOT 10
DP 4360

PT SEC 1
BLK VI LINKWATER
SURVEY DISTRICT
(SO 13)



LOCALITY PLAN (NZMS 260 P27)
1:50000

SITE PLAN
1:1000

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5 AUG 2008
MARLBOROUGH
DISTRICT COUNCIL

NOTE:
LOCATIONS OF FEATURES ARE APPROXIMATE ONLY AND HAVE NOT BEEN PRECISELY SURVEYED

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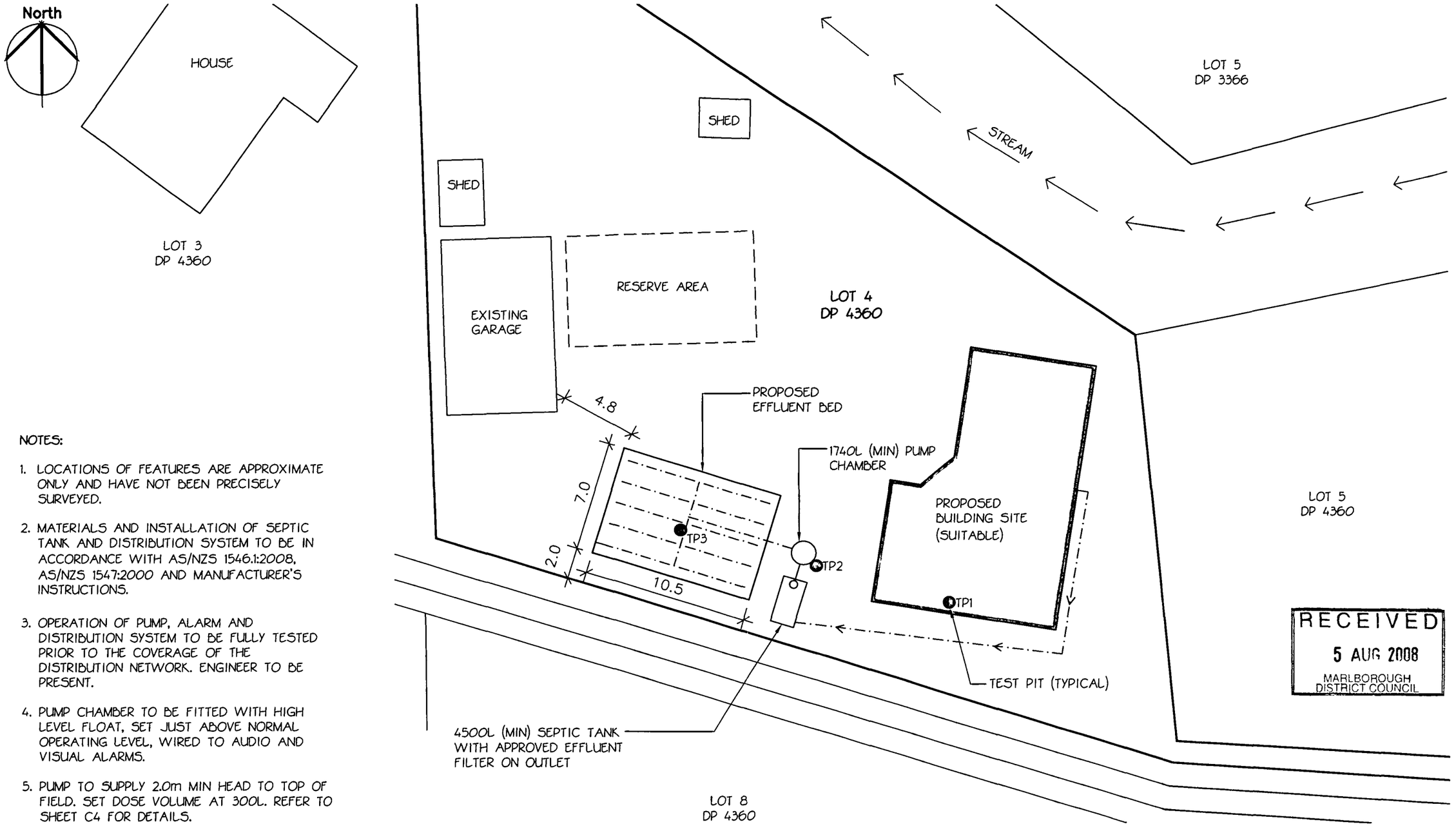
AR & SA BLAIKIE
917 KENEPURU ROAD
WILLOW BAY, MAHAU SOUND

locality & site plans

DATE	ORIGINAL SIZE	DRAWING No.	SHEET	ISSUE
7/08	A3	24091	C1	A

DES MD | DRN BT | CK | CAD

0mm 100mm



NOTES:

1. LOCATIONS OF FEATURES ARE APPROXIMATE ONLY AND HAVE NOT BEEN PRECISELY SURVEYED.
2. MATERIALS AND INSTALLATION OF SEPTIC TANK AND DISTRIBUTION SYSTEM TO BE IN ACCORDANCE WITH AS/NZS 1546.1:2008, AS/NZS 1547:2000 AND MANUFACTURER'S INSTRUCTIONS.
3. OPERATION OF PUMP, ALARM AND DISTRIBUTION SYSTEM TO BE FULLY TESTED PRIOR TO THE COVERAGE OF THE DISTRIBUTION NETWORK. ENGINEER TO BE PRESENT.
4. PUMP CHAMBER TO BE FITTED WITH HIGH LEVEL FLOAT, SET JUST ABOVE NORMAL OPERATING LEVEL, WIRED TO AUDIO AND VISUAL ALARMS.
5. PUMP TO SUPPLY 2.0m MIN HEAD TO TOP OF FIELD. SET DOSE VOLUME AT 300L. REFER TO SHEET C4 FOR DETAILS.
6. TREATMENT SYSTEM AND PUMP CHAMBER LAYOUT SCHEMATIC ONLY AND MAY BE INCORPORATED INTO A SINGLE UNIT.
7. REFER TO SHEET C5 FOR DISTRIBUTION DETAILS.

PLAN
1:250

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AR & SA BLAIKIE
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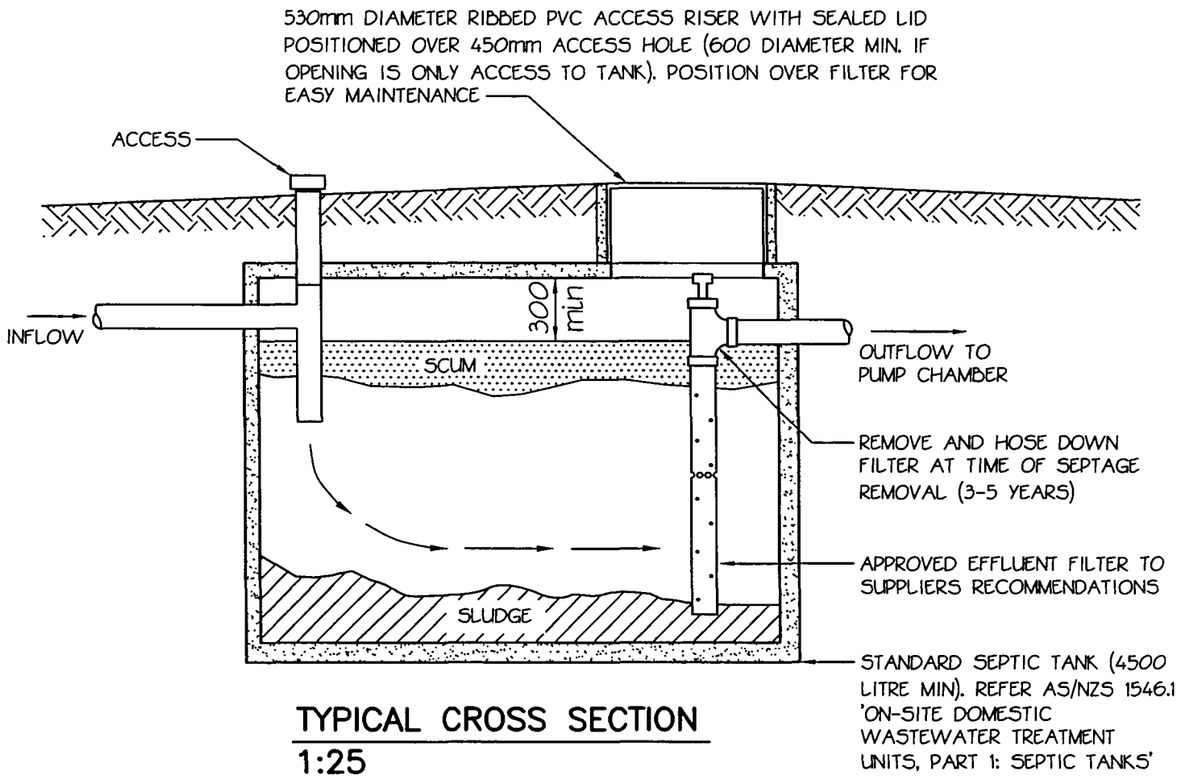
WILLOW BAY, MAHAU SOUND

plan

DATE	ORIGINAL SIZE	DRAWING No.	SHEET	ISSUE
7/08	A3	24091	C2	A

DES MD | DRN BT | CK | CAD

0mm 100mm



TYPICAL CROSS SECTION
1:25

SUGGESTED OPERATION AND MAINTENANCE – SEPTIC TANK

1.) THE INFLOWING HOUSEHOLD SEWAGE SHOULD NOT CONTAIN ANYTHING OTHER THAN HUMAN WASTE AND TOILET PAPER, AND FOOD MATERIAL SUCH AS MAY GO DOWN A KITCHEN SINK DRAIN. GARBAGE GRINDERS ARE NOT RECOMMENDED, ALTHOUGH THEY NEED NOT BE FORBIDDEN. MORE FREQUENT DESLUDGING OF THE SEPTIC TANK MAY BE NEEDED IF A GARBAGE GRINDER IS USED. NORMAL USE IN THE HOUSE OF SOAPS, DETERGENTS, BLEACHES, PLUMBING FIXTURE CLEANERS, DRAIN CLEANERS AND DISINFECTANTS WILL NOT HARM THE FUNCTIONING OF THE SEPTIC TANK OR THE SOIL ABSORPTION SYSTEM.

2.) PROHIBITED DISCHARGES TO THE SEPTIC TANK INCLUDE:
OIL/GREASE FROM E.G. A DEEP FRIER.
STORMWATER AND ANY DRAINAGE OTHER THAN SEWAGE GENERATED IN THE HOUSE.
PETROL, OIL, AND OTHER FLAMMABLE/EXPLOSIVE SUBSTANCES.
HOUSEHOLD, GARDEN, GARAGE, AND WORKSHOP CHEMICALS (E.G. PESTICIDES, PAINT CLEANERS, PHOTOGRAPHIC CHEMICALS, MOTOR OIL AND TRADE WASTE).
DISPOSABLE NAPPIES AND SANITARY NAPKINS.

3.) SEPTIC TANKS NEED TO BE PUMPED (SEPTAGE REMOVED WHEN THE SLUDGE AND SCUM HAVE BEEN ACCUMULATED TO THE EXTENT THAT THE CLEAR SPACE (BETWEEN SCUM AND SLUDGE) HAS A VOLUME LESS THAN 1000 LITRES). SEPTAGE REMOVAL MAY NEED TO BE DONE AS OFTEN AS EVERY THREE YEARS BUT AT NO LONGER THAN FIVE YEAR INTERVALS.

EFFLUENT FILTER

1.) THE SEPTIC TANK SHOULD BE PUMPED PRIOR TO REMOVAL OF THE FILTER TO PREVENT ANY SOLIDS FROM ESCAPING TO THE TRENCHES WHEN THE CARTRIDGE IS REMOVED.

2.) THE FILTER SHALL BE CLEANED AT THE SAME TIME AS THE NORMAL SEPTIC TANK SERVICING (3-5 YEARS).

3.) REMOVE THE CARTRIDGE AND RINSE OFF WITH A GARDEN HOSE, BEING CAREFUL TO RINSE ALL SEPTAGE MATERIAL BACK INTO THE TANK.
IT IS NOT NECESSARY THAT THE CARTRIDGE BE CLEANED "SPOTLESS".
THE BIOMASS GROWING ON THE FILTER AIDS IN THE PRE-TREATMENT PROCESS AND SHOULD BE LEFT ON THE CARTRIDGE.

CURRENT AS OF: 26/10/05

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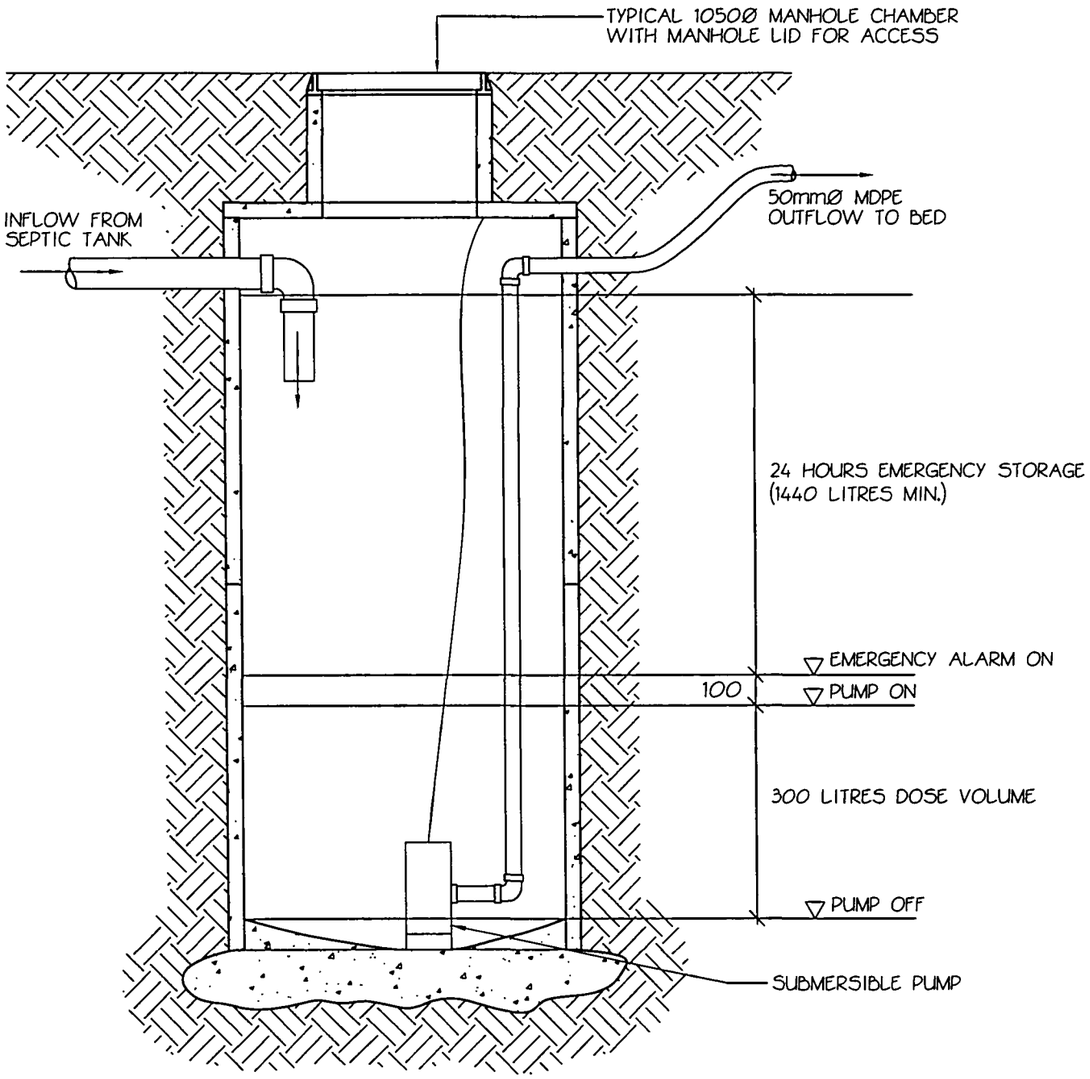
WILLOW BAY, MAHAU SOUND

typical septic tank details

DATE	ORIGINAL SIZE	DRAWING No.	SHEET	ISSUE
7/08	A3	24091	C3	A

DES MD | DRN BT | CK RJ | CAD

0mm 100mm



PUMP CHAMBER

1:20

NOTES:

1.) MATERIALS AND INSTALLATION OF WASTEWATER SYSTEM TO BE IN ACCORDANCE WITH AS/NZS 1546.1:2008, AS/NZS 1547:2000 AND MANUFACTURER'S SPECIFICATION.

2.) PUMP CHAMBER TO BE FITTED WITH A HIGH LEVEL FLOAT SET JUST ABOVE NORMAL OPERATING LEVEL. WIRED TO AUDIO AND VISUAL ALARMS.

3.) PUMP CHAMBER SHOWN IS AN EXAMPLE ONLY. OTHER TYPES COULD BE APPROVED, E.G. MODIFIED SEPTIC TANK.

4.) OPERATION OF DISTRIBUTION SYSTEM TO BE FULLY TESTED PRIOR TO COVERAGE OF PIPEWORK. ENGINEER TO BE PRESENT.

5.) CONFIRM HEAD TO EFFLUENT BED PRIOR TO ORDERING PUMP.

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AR & SA BLAIKIE
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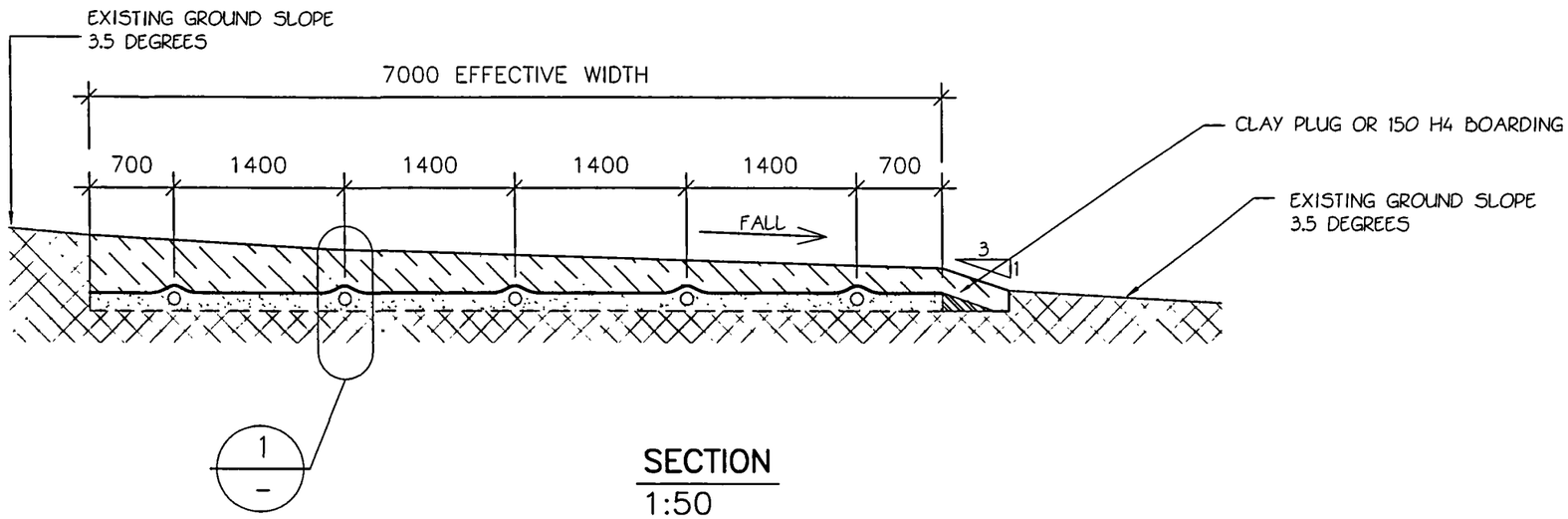
WILLOW BAY, MAHAU SOUND

pump chamber detail

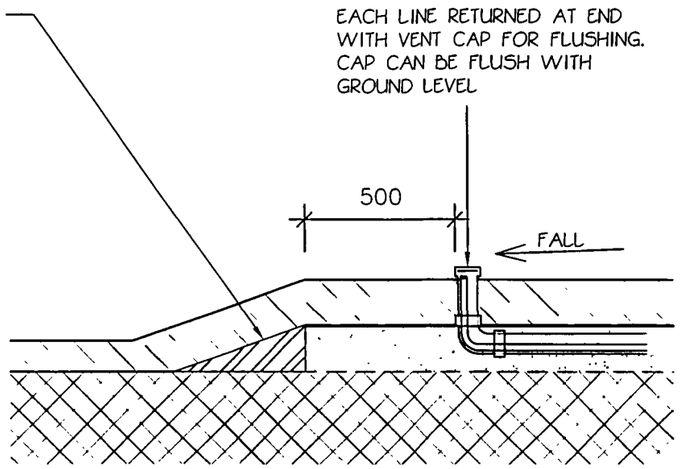
DATE	ORIGINAL SIZE	DRAWING No.	SHEET	ISSUE
7/08	A3	24091	C4	A

DES MD | DRN BT | CK | CAD

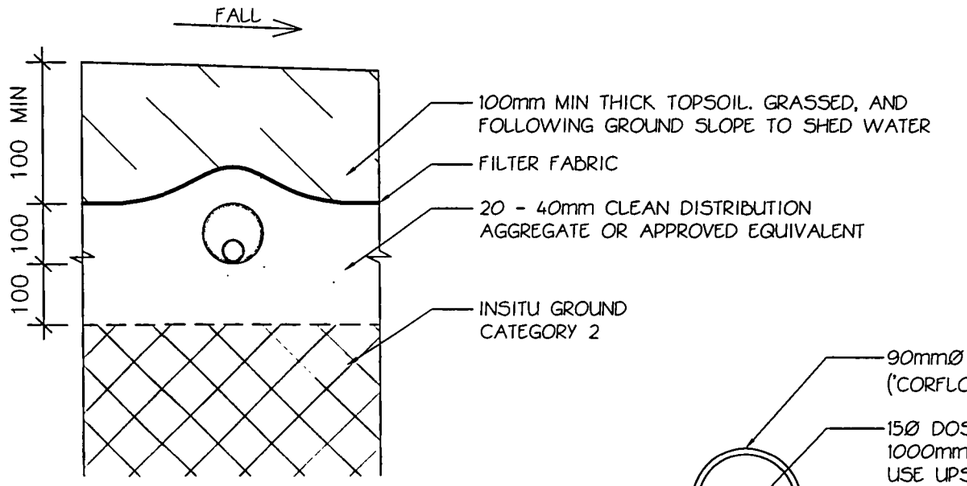
0mm 100mm



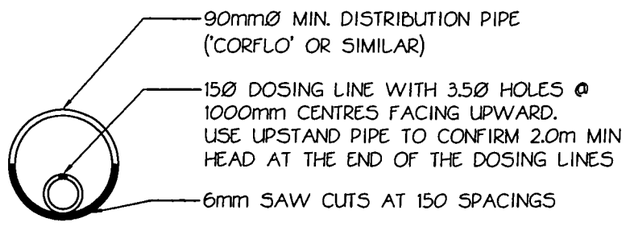
SECTION
1:50



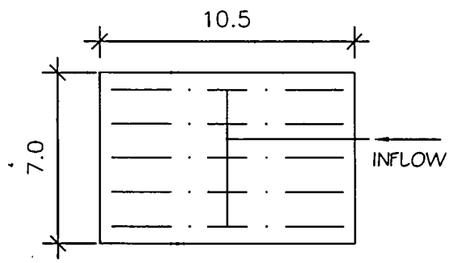
END DETAIL
1:20



DETAIL 1/-
1:10



DISTRIBUTION DRAIN
1:5



BED PIPEWORK PLAN
1:250

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MARLBOROUGH DISTRICT COUNCIL

NOTES:

1.) DOSING LINES TO HAVE REMOVABLE END CAPS TO ALLOW MAINTENANCE FLUSHING.

2.) LARGE ANIMALS AND VEHICLES TO BE KEPT OFF THE BED AREA.

3.) DISTRIBUTION SYSTEM TO BE FLUSHED WITH CLEAN WATER PRIOR TO AND FOLLOWING EXTENDED NON-USE.

4.) ENGINEER TO INSPECT TEST PUMPING OF DISTRIBUTION SYSTEM PRIOR TO COVERING THE PIPEWORK.

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AR & SA BLAIKIE
917 KENEPURU ROAD
WILLOW BAY, MAHAU SOUND

effluent bed details

DATE	ORIGINAL SIZE	DRAWING No.	SHEET	ISSUE
7/08	A3	24091	C5	A

DES	DRN	CK	CAD
MD	BT		

0mm 100mm

Davidson Partners Ltd

ENGINEERING REPORT

A & S BLAIKIE
WILLOW BAY, KENEPURU SOUND

Our Ref: 24091
Date: 30 July 2008

DavidsonPartnersLtd

Structural Engineering
Civil Engineering
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Our Ref: 24091

30 July 2008

ENGINEERING REPORT

A & S BLAIKIE

LOCATION DETAILS: Willow Bay, Kenepuru Sound

LEGAL DESCRIPTION: Lot 4 DP 4360

DATE OF SITE VISIT: 7 April 2008

ZONING: Sounds Residential Zone (Marlborough Sounds Resource Management Plan)
Natural Hazard Zone (Instability)

CONTENTS

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Stephen Sheat, BE, CPEng, MIPENZ
Leigh McGlynn, BE, CPEng, MIPENZ

A SYNOPSIS

A1 Scope of the Investigation

We have been engaged to investigate and confirm suitable measures for on-site wastewater management and visually assess the proposed building site on this property. Our investigation included a general visual inspection, test pits to log the soils, site survey work, assessment of on site wastewater characteristics, inspection of aerial photographs and a review of previous investigations carried out in this area.

At present there is a garage and two small sheds on site. The garage is of relatively recent construction and its site was certified at that time.

A2 Summary and Conclusions

A2.1 Geotechnical

The general area is located in a Hazard Zone (Instability) in the Marlborough Sounds Resource Management Plan. However, the gentle outwash feature which contains this and several other residential sites is not subject to instability.

A2.2 Building Sites

There were no signs of instability on Lot 1 and the entire site is suitable for the construction of dwellings.

A moderately sloping stable building site is available. The underlying silt and gravel outwash soils are expected to provide good foundation conditions of a type and depth to be confirmed at the Building Consent stage.

A2.3 Wastewater

The soils have good drainage characteristics for on site wastewater systems. The north easterly aspect provides good exposure to the sun and wind.

A suitable land application area is available on the higher land adjacent to the southern boundary. The best practicable option for distribution is considered to be septic tank to seepage beds.

A2.4 Stormwater

Excess stormwater runoff from hard surfaces should be discharged to the incised creek to the north.

A2.5 Water Supply

There is an effective local community water supply.

A2.6 Access

Sealed vehicle access to the site exists at gentle grades from Kenepuru Road.

A3 Recommendations

The building site and effluent field area shown on the plans is suitable for house construction and the controlled discharge of treated wastewater respectively provided that:

(a) Foundation type(s) and depths are confirmed by a suitable Engineer at the Building Consent stage.

(b) Water from the roof and storage overflow be collected and piped to the stream to the north of the site.

(c) The wastewater system is reviewed at Building Consent stage, if necessary, to take account of the loading from the proposed development and current methods and guidelines, using the site characteristics and design data described in this report.

(d) The drinking water supply and storage system is checked regularly to ensure that it complies with current drinking water standards, including Drinking Water Standards New Zealand 2005 (DWSNZ, 2005).

B REPORT

B1 Site Description

The property (Lot 4 DP 4360) is located approximately 8kms along the Kenepuru Road from Linkwater in the Marlborough Sounds. The site slopes gently (3 - 4°) towards the north west and is covered in grass. A small deeply incised stream flows from east to west beyond the northern boundary of the site.

The site is largely undeveloped with just a garage present on site. The owner proposes to construct a four bedroomed holiday home in two stages. The first stage will include temporary facilities incorporating a single toilet and shower until the holiday home itself is constructed.

B2 Geotechnical Investigations

The site has a gentle slope in a northwesterly direction and has no engineering concerns whatsoever. The catchment outflow to the north of the site is well incised and of no significant threat to the site.

The test pits undertaken for wastewater assessment reveal silt and gravel outwash soils typical of fan deposits created by historical land and water movement in times long past.

B3 Geotechnical Assessment

The entire site is considered suitable for development. Soil tests to confirm ground bearing capacity will be required at the Building Consent stage.

We consider that the site is sound and has a Low Risk from future instability as defined in Council's "Geotechnical Risk Matrix " (refer appendix).

B4 Building Foundations

A proposed building location is shown on the drawings. The building will be located on the higher ground adjacent to the eastern boundary and will likely be elevated on pole foundations for the benefit of the view and storage underneath the dwelling. Foundation type(s) and depths will be confirmed by an Engineer at the Building Consent stage.

Alternatively, standard foundation construction in accordance with NZS 3604:1999 'Timber Framed Buildings' will be suitable. Significant excavations should not be needed nor be encouraged.

B5 Wastewater Investigation

An investigation was carried out in accordance with ASNZS 1547:2000 "On-Site Domestic Wastewater Management" and the Marlborough District Council "Guidelines for New On-Site Wastewater Management Systems" on 7 April 2008. Refer to the site notes in the Appendix.

The gently sloping north west slope, near where the proposed dwelling is to be constructed, is clear of surface water and suitable for a wastewater land application system. The exposure to the sun and wind is good and moderately good respectively and the vegetation is well established grass providing good evapotranspiration assistance.

Three test pits were excavated by spade and logged. Refer to the site notes and logs in the Appendix.

The soil profile consisted of a 50mm to 100mm thick layer of brown, moist, soft, organic rich silty topsoil overlying a light brown, sandy silt with angular rock fragments varying from 20 to 130 mm. The soils are representative of alluvial outwash deposits.

Ribbon length tests were undertaken on samples from the silty alluvial gravel horizon. The gravel was sieved to remove the particles greater than 2mm. The gravel element represented approximately 30% of the overall sample. The sieved soil had a ribbon length that varied from 30mm to 35mm. The ribbon lengths, sandy nature and rate of drying of the soil indicates that the sieved soil is representative of a Category 3 sandy clay loam. We consider that taking into consideration the gravel element of the soil, the soil is representative of a Category 2 soil. A 100% reserve area is available.

B6 Wastewater Assessment

B6.1 General

Any land application system should be kept shallow to make maximum benefit of evapotranspiration and biological activity in the upper soil.

B6.2 Loading

The owner proposes to construct a four bedroomed dwelling with a roof water supply. For design purposes, the design wastewater loading is therefore 8 persons at 180 l / person / day i.e. 1440 litres / day.

The design wastewater loading was based on the Marlborough District Council "Guidelines for New On-Site Wastewater Management Systems for Households with Standard Fixtures".

B6.3 Land Application System

B6.3.1 Assessment of Land Application Options

We have assessed a number of potential wastewater land application options for the site taking into consideration the underlying geological, hydrogeological and wider environmental conditions. The following options were reviewed:

a) Secondary Treatment to Drip Irrigation

The principle of the drip irrigation system is irrigation into the topsoil at a low application rate for evapotranspiration uptake by the dense bush covering the area. Use of drip irrigation will require secondary treatment.

There are no environmental constraints which require treatment to a secondary level and therefore we do not consider it necessary to use a system which is more expensive and has additional ongoing maintenance and service requirements.

b) Primary Treatment to Trenches

This is the most basic system and uses the pipe work and aggregate in the trench to evenly distribute effluent onto the surface of the underlying soil which then provides further treatment before being completely assimilated.

Trenches could be applied on this site but would occupy a significant area of desirable land to be well clear of the stream.

c) Primary Treatment to Seepage Bed

This system works on a similar principle to the aforementioned trench system but has the advantage of reducing the area requirements. This is considered to be the best practicable option.

B6.3.2 Detailed Design

The drawings show the proposed wastewater application area to the west of the proposed house site.

For a Category 2 soil, the Design Loading Rate (DLR) is 20 mm / d.

Once constructed, the four bedroom dwelling will require a dedicated effluent field consisting of at least 72m² of bed area with the full field pressure dose loaded from a pump chamber.

The final location and layout of the effluent field must be confirmed by the Designer at the time of installation to ensure the best possible siting of the bed.

B6.3.3 Pump Chamber

The pump chamber has been designed for a dose volume of 300 litres plus 24 hours emergency storage to give a total minimum storage capacity of 1,740 litres. The pump should provide a minimum 2.0 m pressure to the ends of the effluent lines. The pressure feed is located in the centre of each bed to minimise the difference in pressure and flow across the land application area.

The pump will be activated by a float switch at the dose volume. In addition, the pump chamber should be fitted with a high level alarm to be activated by a second float switch wired to audio and visual signals within the dwelling.

B6.4 Treatment

Treatment of all waste in a single septic tank will be adequate at this site. The tank should be sized to cater for peak loading and for a minimum of 24 hours residence time. A minimum tank size of 4500 litres is recommended.

The fitment of an approved effluent filter to the outlet of the tank is required to prevent solids exiting the tank, improve treatment performance and the buffering of peak flows.

B6.5 Installation, Operation and Maintenance

Appropriate operation and maintenance of the overall wastewater system is paramount to its performance and a service contract must be in place at the time of commissioning and remain so with the approved service agent.

Davidson Partners Ltd has carried out a site investigation and design in accordance with current codes and modern practice. However, the treatment and land application systems are biological (living) processes and modifications may have to be undertaken to the treatment or land application system in some circumstances, such as when there is/are;

(a) An increase in design load
(b) Disposal of inappropriate substances to the septic system
(c) Poor maintenance
(d) Poor workmanship or departure from construction drawings.

We strongly recommend that the homeowner and installer read and note the information included in the Appendix and shown on the drawings to ensure ongoing good practice and maintenance.

Note that inspections by the Designer are required at the time of setting out of the new system and at commissioning with water prior to pipework being covered.

B6.6 Assessment of Environmental Effects

The assessment of potential effects is in general reference to the matters described on Page 78 Plan Change No. 7 relating to the Marlborough Sounds Resource Management Plan, in particular issues not already covered earlier in this report.

The proposed wastewater system has been kept as simple and compact as possible using a passive advanced treatment system with no power requirement. The bed has been sited on the more prominent ground below the building site to achieve horizontal and vertical separation of the watercourses located north and south of the site. No potential water quality effects are apparent.

Reserve area, if the bed should need to be enlarged, is available and careful site assessment has occurred as part of achieving a sustainable wastewater management solution.

B6.7 Wastewater System Summary

The on site wastewater management system detailed herein consists of;

(a) A 4,500 litre (minimum) septic tank with an approved effluent filter on the outlet.

(b) A 1,740 litre (minimum) pump chamber with two float switches, one to activate the pump at a dose volume of 300 litres and the other to activate the high level alarm. Fault to be indicated by prominent audio and visual signals within the dwelling. Pumping system to be installed when the dwelling is constructed.

(c) A dedicated effluent field consisting of a 72m² seepage bed.

B7 Stormwater Management

The stormwater from the roof should be collected and piped to the stream to the north, well away from the building foundations, wastewater land application areas and neighbouring private property.

B8 Water Supply

There is adequate water supply available from the local community system. The owners may wish to consider back-up tank storage in case of an interruption to supply or extended extreme dry conditions.

B8.1 Treatment

Water sourced from creeks or roofs is open to contamination from bacteria, viruses and protozoa and should be treated to the Drinking Water Standards for NZ 2005 (DWS NZ) to achieve potable water.

There are some good practice guidelines for roof supply and tank storage which will achieve the DWSNZ Standards without the need for disinfection and include;

a) First flush devices
a) A drop inlet pipe;
b) Bottom overflow;
c) A floating arm draw off; and
d) A minimum of two tanks in series
e) A 20 micron washable cartridge filter
f) A UV sterilizer
g) A 1 micron activated carbon under bench filter

B9 Vegetation Clearance

The maintenance of vegetation in this area is not considered essential for long term stability. However, we consider it prudent to limit vegetation clearance in order to benefit from the assistance that vegetation provides to the stability of surface soils and control of soil moisture.

Furthermore, the uptake by plants of treated wastewater discharged to the ground assists the reliable functioning of land application systems. The existing vegetation should be maintained and encouraged around the building site and effluent field.

B10 Access

Very good all-weather vehicle access exists at easy grades from Kenepuru Road.

B11 Disclaimer

B11.1 This report has been prepared solely for the benefit of you as our client and the relevant Local Authority with respect to the particular brief given to us, and data or opinions contained in it may not be used in other contexts or for any other purpose without our prior review and agreement.

B11.2 This disclaimer shall apply notwithstanding that the report may be made available to any other person in connection with any application for permission or approval, or pursuant to any requirement of law.

This report is based on conditions presently found on site and is consistent with standards currently being applied.

B12 References

B12.1 ARC Environment, Technical Paper No. 58, Second Edition 'On-Site Wastewater Disposal from Households and Institutions'.

B12.2 A.S./N.Z.S. 1546.1:1998 'On-Site Domestic Wastewater Treatment Units, Part 1: Septic Tanks.

B12.3 A.S./N.Z.S. 1547:2000 'On-Site Domestic Wastewater Management'.

B12.4 Marlborough District Council (11 July 2005) 'Guidelines for New On-Site Wastewater Management Systems'.

B12.5 Marlborough District Council "Marlborough Sounds Resource Management Plan".

B12.6 Centre for Environment Training 'On-Site Wastewater Management Training Course', Christchurch 2001.

B12.7 Ministry of Health 'Drinking Water Standards for New Zealand 2005'.

B12.8 Ashworth, John (2nd Edition, 2002) 'Tank Water Supply Design Guide'.

DAVIDSON PARTNERS LTD

R W Davis

RWD:RM

C APPENDIX

C1. Professional Opinion

C2. Geotechnical Risk Matrix

C3. Test Results

- Test Pit Logs

C4. On-Site Wastewater Management Details

- Field Assessment Report
- Owner & Installer Guidelines

C5. Drawing Number 24091 sheets;

C1 'A' Locality and Site Plans
C2 'A' Plan
C3 'A' Typical Septic Tank Details
C4 'A' Typical Pump Chamber Details
C5 'A' Distribution Details

DavidsonPartnersLtd

Structural Engineering
Civil Engineering
Building Design
Project Management

Practising in association with Ayson and Partners, Consulting Surveyors

Our Ref: 24091

30 July 2008

STATEMENT OF PROFESSIONAL OPINION AS TO LAND STABILITY

DESCRIPTION: Lot 4 DP 4360, Willow Bay, Kenepuru Sound

FOR: A & S Blaikie

I, **Ross William Davis,** of Davidson Partners Ltd, P O Box 256, Blenheim,

hereby confirm that:

1. I am experienced in the field of soils engineering and more particularly land and foundation stability and am formally recognised by the Marlborough District Council. I am familiar with and understand the purpose of the Marlborough District Council's geo-technical reporting standards. This professional opinion is furnished to the Marlborough District Council alone, on the express condition that it will not be communicated to or be relied upon by any other person. It is based on conditions presently found on site and is consistent with standards currently being applied.

2. Site investigations have been carried out under my direction and are described in our site investigation report dated 30 July 2008, attached. The following professional opinion is based on the assumption that the data obtained from these investigations is representative of the whole area under consideration. In my professional opinion having examined the site it is reasonable for Council to assume that the data referred to above is representative of the whole area under consideration.

3. Detailed residential building and engineering drawings and specifications have yet to be prepared for this site.

4. In my professional opinion, not to be construed as a guarantee, and having regard to the specifics of the site which I have investigated to the extent that acceptable engineering practices require giving due regard to acceptable engineering principles and practices for land and foundation stability then the building site and land application area shown on the plans is suitable for house construction and treated wastewater respectively, providing that the following recommendations described in our accompanying report (Engineering Report for A and S Blaikie) are adhered to:

   (a) The type(s) and depths of foundations are confirmed by a suitable Engineer at the Building Consent stage.

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Principals
Ross Davis, BE, CPEng, MIPENZ
Stephen Sheat, BE, CPEng, MIPENZ
Leigh McGlynn, BE, CPEng, MIPENZ

(b) Water from the roof and storage overflow be collected and piped to the stream to the north of the site.

(c) The recommendations described in the report are adhered to.

5. This professional opinion shall remain current for a maximum of two years.

DAVIDSON PARTNERS LTD

R W Davis

RWD:RM

DAVIDSON PARTNERS LTD

ON SITE WASTEWATER MANAGEMENT
FIELD ASSESSMENT REPORT

JOB NAME: Blaikie **JOB NO.** 24091

LOCATION: 917 Kenepuru Road, Willow Bay **DATE:** 7 April 2008

REFERENCE: 1. ARC TP#58
2. AS/NZS 1547:2000 'On Site Domestic Wastewater Management'

1.	Percolation Rate (if available).		N/A
2.	Site Exposure	- to sun	High
		- to wind	Moderate
3.	Topsoil Depth.		50-100 mm
4.	Soil Description (colour, moisture, firmness, type).		Light brown moist firm gravelly sandy silt
5.	Soil Category (1 - 6)		2
6.	Coarse Fragments	- size/abundance	20-130 mm / common
7.	Ribbon Length		35 mm
8.	Soil Structure (Pedal Content)		High
9.	Performance of existing systems nearby.		Good
	- Type, septic and trench/pit		
10.	Nearby water bodies.		Yes
	- Separation Distance		Stream approx. 35 m to north
11.	Nearby wells.		No
12.	Intended water supply.		Community reticulated supply
13.	Runoff to be controlled.		No
14.	Ground water to be controlled.		No
15.	Any stability considerations, If yes, comment.		No
	.....		
16.	Depth to water table.		Unknown, but >600 mm based on stream approx. 2.0 m minimum
17.	Vegetation cover	- Existing	Yes
		- Type	Grass
		- Proposed	Grass
18.	Gravity head to proposed disposal field location.		Gentle downhill
19.	Reserve areas available?		Yes
20.	Other Comments		

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Practising in association with Ayson and Partners, Consulting Surveyors

Our Ref: 24091

A & S Blaikie, 917 Kenepuru Road, Willow Bay

GEOTECHNICAL RISK MATRIX

(ex MDC "Geotechnical Reporting Requirements 2005")

Likelihood \ Consequence		No risk to life, minor financial loss (<$5k). Potential for small-scale instability only.	No risk to life, minor financial loss (<$50k). Potential for small-scale instability only.	Very low risk to life, moderate damage and financial loss (<$150k). Potential for moderate scale instability.	Low risk for loss of life, significant damage and financial loss (<$500k). Potential for large-scale instability.	High risk for loss of life, extensive and significant damage and financial loss (>$500k). Potential for large-scale instability.
Almost Certain	Extensive evidence of active creep and active instability. Steep Slope.	**M**	**H**	**H**	**E**	**E**
Likely	Evidence of active creep and/or historic instability. Steep to Moderate Slopes.	**M**	**M**	**H**	**H**	**E**
Moderate	Evidence of historic soil creep and/or historic instability. Steep to Moderate Slopes	**L**	**M**	**M**	**H**	**H**
Unlikely	No evidence of soil creep or historic instability, but evidence of instability on similar slopes. Moderate Slopes.	**L**	**L**	**L**	**M**	**H**

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North

WILLOW BAY

LOT 5
DP 2828

LOT 2
DP 3366

LOT 2
DP 5673

LOT 1
DP 5673

LOT 5
DP 3366

PT SEC 40
BLK VI LINKWATER
SURVEY DISTRICT
(506206)

LOT 2
DP 4360

LOT 3
DP 4360

STREAM

LOT 1
DP 4360

LOT 4
DP 4360

LOT 5
DP 4360

KENEPURU ROAD

LOT 12
DP 4360

LOT 11
DP 4360

LOT 9
DP 4360

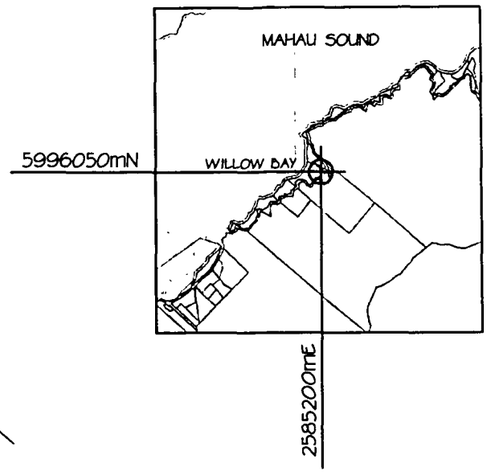
LOT 8
DP 4360

LOT 7
DP 4360

LOT 6
DP 4360

LOT 10
DP 4360

PT SEC 1
BLK VI LINKWATER
SURVEY DISTRICT
(SO 13)



LOCALITY PLAN (NZMS 260 P27)
1:50000

NOTE:

LOCATIONS OF FEATURES ARE APPROXIMATE ONLY AND HAVE NOT BEEN PRECISELY SURVEYED

SITE PLAN
1:1000

0mm 100mm

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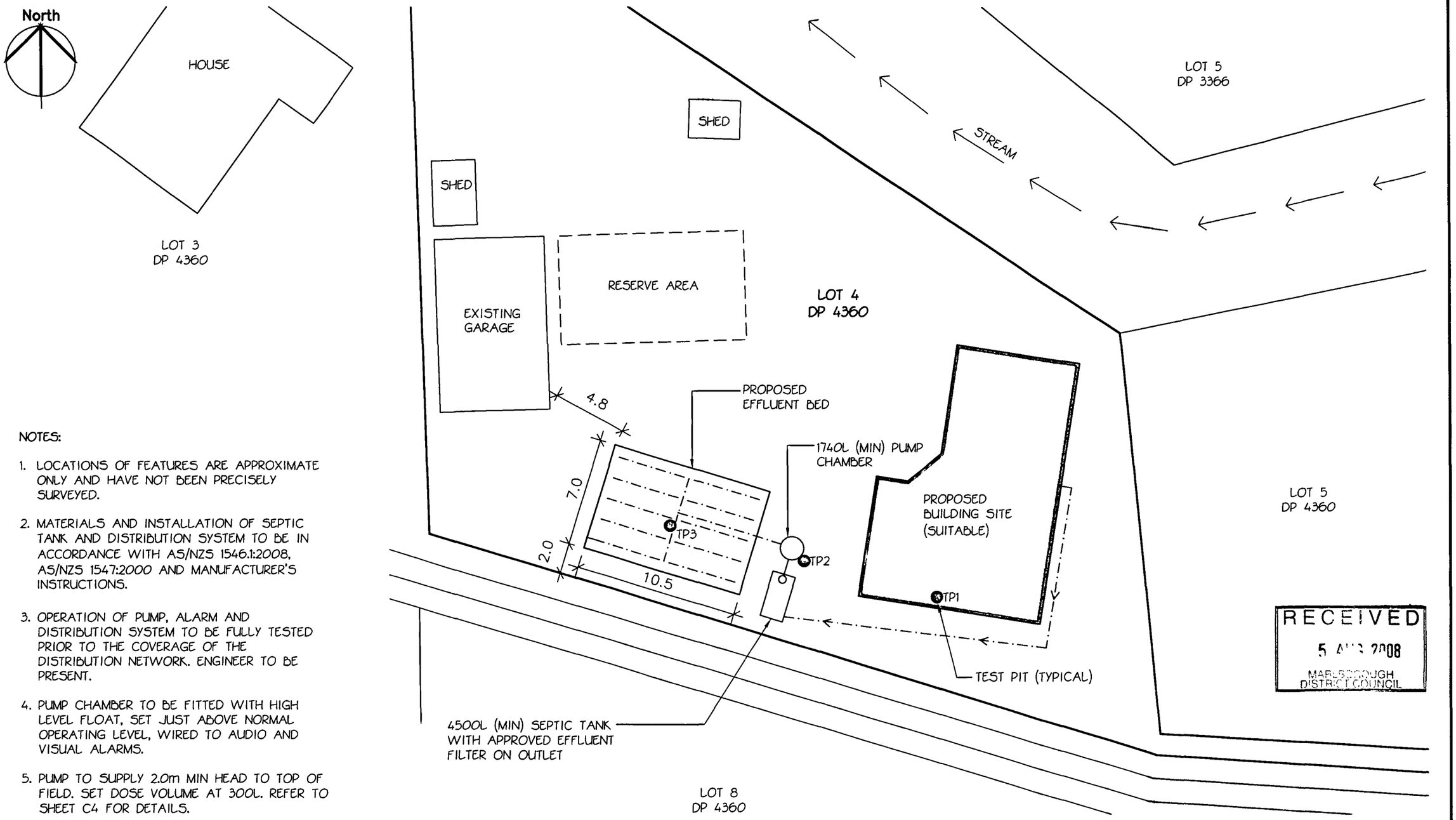
locality & site plans

DATE	ORIGINAL SIZE	DRAWING No.	SHEET	ISSUE
7/08	A3	24091	C1	A

DES MD | DRN BT | CK | CAD



NOTES:

1. LOCATIONS OF FEATURES ARE APPROXIMATE ONLY AND HAVE NOT BEEN PRECISELY SURVEYED.
2. MATERIALS AND INSTALLATION OF SEPTIC TANK AND DISTRIBUTION SYSTEM TO BE IN ACCORDANCE WITH AS/NZS 1546.1:2008, AS/NZS 1547:2000 AND MANUFACTURER'S INSTRUCTIONS.
3. OPERATION OF PUMP, ALARM AND DISTRIBUTION SYSTEM TO BE FULLY TESTED PRIOR TO THE COVERAGE OF THE DISTRIBUTION NETWORK. ENGINEER TO BE PRESENT.
4. PUMP CHAMBER TO BE FITTED WITH HIGH LEVEL FLOAT, SET JUST ABOVE NORMAL OPERATING LEVEL, WIRED TO AUDIO AND VISUAL ALARMS.
5. PUMP TO SUPPLY 2.0m MIN HEAD TO TOP OF FIELD. SET DOSE VOLUME AT 300L. REFER TO SHEET C4 FOR DETAILS.
6. TREATMENT SYSTEM AND PUMP CHAMBER LAYOUT SCHEMATIC ONLY AND MAY BE INCORPORATED INTO A SINGLE UNIT.
7. REFER TO SHEET C5 FOR DISTRIBUTION DETAILS.

PLAN
1:250

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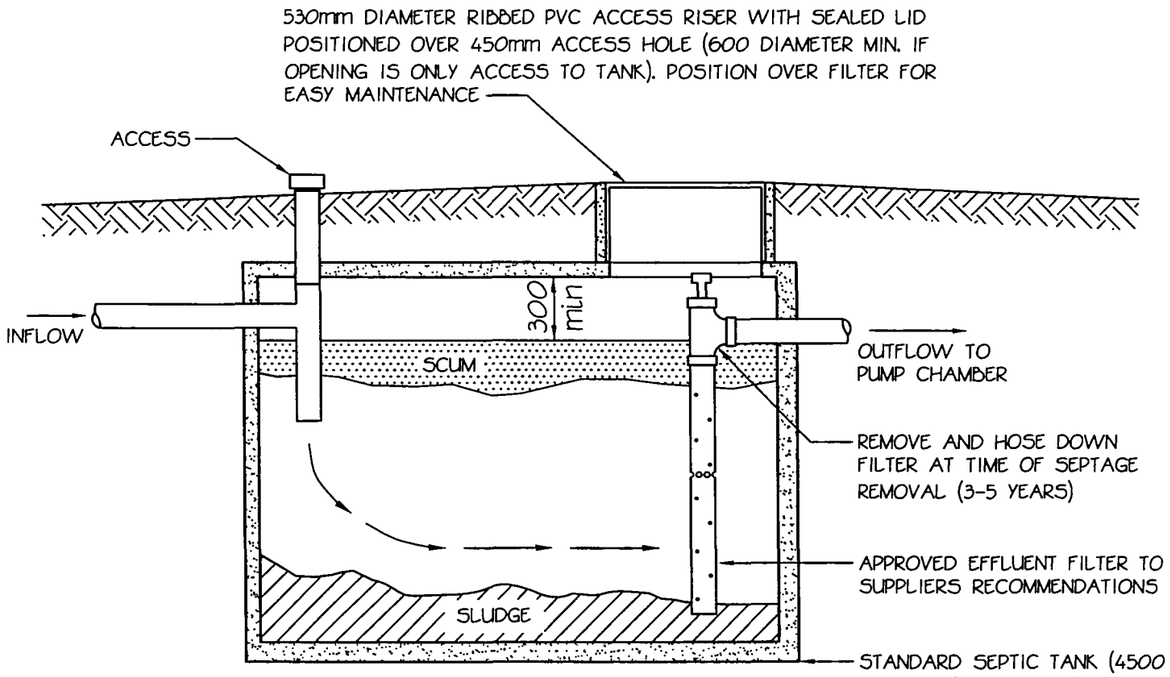
plan

DATE	ORIGINAL SIZE	DRAWING No.	SHEET	ISSUE
7/08	A3	24091	C2	A

DES MD | DRN BT | CK | CAD

0mm 100mm



TYPICAL CROSS SECTION
1:25

SUGGESTED OPERATION AND MAINTENANCE – SEPTIC TANK

1.) THE INFLOWING HOUSEHOLD SEWAGE SHOULD NOT CONTAIN ANYTHING OTHER THAN HUMAN WASTE AND TOILET PAPER, AND FOOD MATERIAL SUCH AS MAY GO DOWN A KITCHEN SINK DRAIN. GARBAGE GRINDERS ARE NOT RECOMMENDED, ALTHOUGH THEY NEED NOT BE FORBIDDEN. MORE FREQUENT DESLUDGING OF THE SEPTIC TANK MAY BE NEEDED IF A GARBAGE GRINDER IS USED. NORMAL USE IN THE HOUSE OF SOAPS, DETERGENTS, BLEACHES, PLUMBING FIXTURE CLEANERS, DRAIN CLEANERS AND DISINFECTANTS WILL NOT HARM THE FUNCTIONING OF THE SEPTIC TANK OR THE SOIL ABSORPTION SYSTEM.

2.) PROHIBITED DISCHARGES TO THE SEPTIC TANK INCLUDE:
OIL/GREASE FROM E.G. A DEEP FRIER.
STORMWATER AND ANY DRAINAGE OTHER THAN SEWAGE GENERATED IN THE HOUSE.
PETROL, OIL, AND OTHER FLAMMABLE/EXPLOSIVE SUBSTANCES.
HOUSEHOLD, GARDEN, GARAGE, AND WORKSHOP CHEMICALS (E.G. PESTICIDES, PAINT CLEANERS, PHOTOGRAPHIC CHEMICALS, MOTOR OIL AND TRADE WASTE).
DISPOSABLE NAPPIES AND SANITARY NAPKINS.

3.) SEPTIC TANKS NEED TO BE PUMPED (SEPTAGE REMOVED WHEN THE SLUDGE AND SCUM HAVE BEEN ACCUMULATED TO THE EXTENT THAT THE CLEAR SPACE (BETWEEN SCUM AND SLUDGE) HAS A VOLUME LESS THAN 1000 LITRES). SEPTAGE REMOVAL MAY NEED TO BE DONE AS OFTEN AS EVERY THREE YEARS BUT AT NO LONGER THAN FIVE YEAR INTERVALS.

EFFLUENT FILTER

1.) THE SEPTIC TANK SHOULD BE PUMPED PRIOR TO REMOVAL OF THE FILTER TO PREVENT ANY SOLIDS FROM ESCAPING TO THE TRENCHES WHEN THE CARTRIDGE IS REMOVED.

2.) THE FILTER SHALL BE CLEANED AT THE SAME TIME AS THE NORMAL SEPTIC TANK SERVICING (3-5 YEARS).

3.) REMOVE THE CARTRIDGE AND RINSE OFF WITH A GARDEN HOSE, BEING CAREFUL TO RINSE ALL SEPTAGE MATERIAL BACK INTO THE TANK.
IT IS NOT NECESSARY THAT THE CARTRIDGE BE CLEANED "SPOTLESS".
THE BIOMASS GROWING ON THE FILTER AIDS IN THE PRE-TREATMENT PROCESS AND SHOULD BE LEFT ON THE CARTRIDGE.

CURRENT AS OF: 26/10/05

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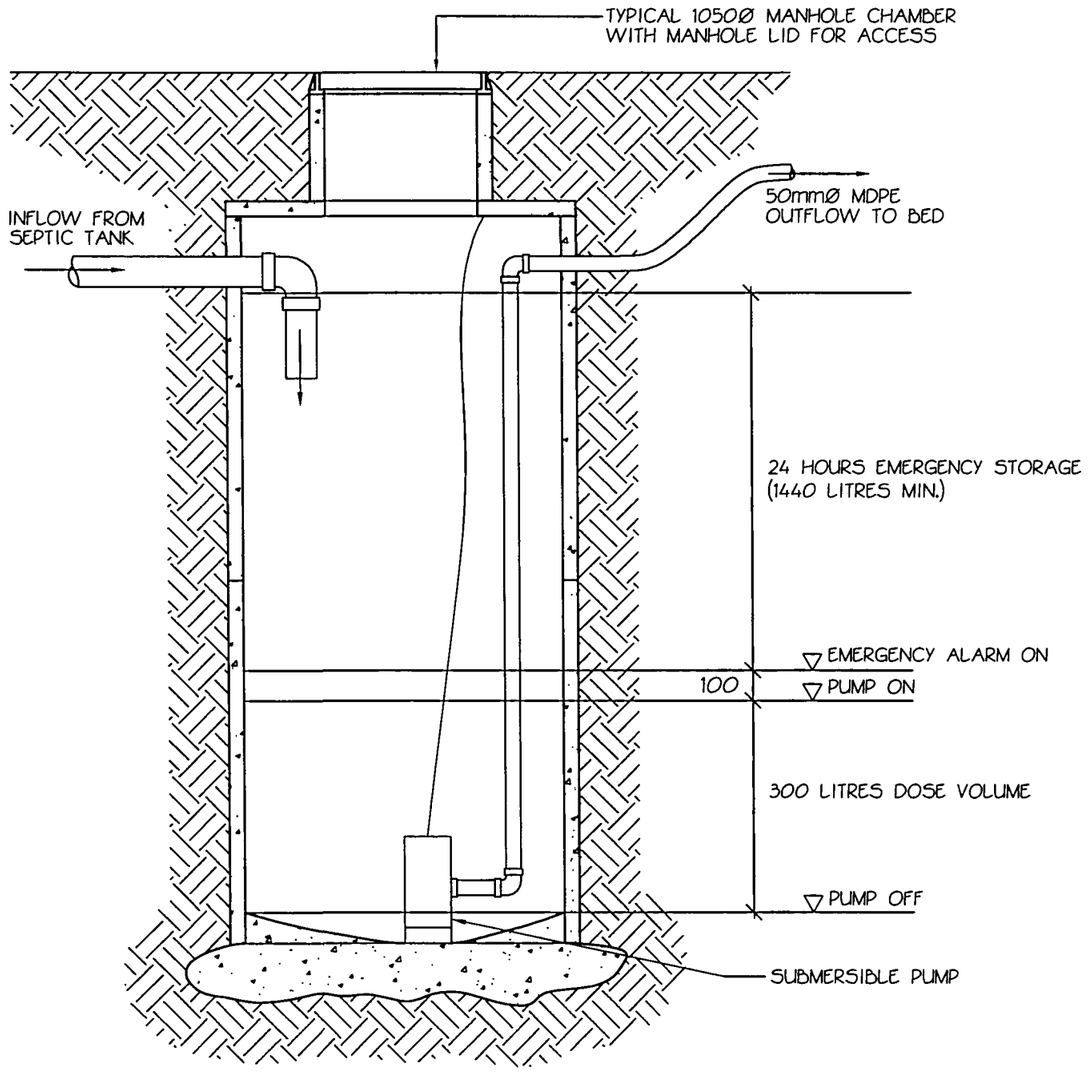
typical septic tank details

DATE	ORIGINAL SIZE	DRAWING No.	SHEET	ISSUE
7/08	A3	24091	C3	A

DES MD | DRN BT | CK RJ | CAD

0mm 100mm



PUMP CHAMBER
1:20

NOTES:

1.) MATERIALS AND INSTALLATION OF WASTEWATER SYSTEM TO BE IN ACCORDANCE WITH AS/NZS 1546.1:2008, AS/NZS 1547:2000 AND MANUFACTURER'S SPECIFICATION.

2.) PUMP CHAMBER TO BE FITTED WITH A HIGH LEVEL FLOAT SET JUST ABOVE NORMAL OPERATING LEVEL. WIRED TO AUDIO AND VISUAL ALARMS.

3.) PUMP CHAMBER SHOWN IS AN EXAMPLE ONLY. OTHER TYPES COULD BE APPROVED, E.G. MODIFIED SEPTIC TANK.

4.) OPERATION OF DISTRIBUTION SYSTEM TO BE FULLY TESTED PRIOR TO COVERAGE OF PIPEWORK. ENGINEER TO BE PRESENT.

5.) CONFIRM HEAD TO EFFLUENT BED PRIOR TO ORDERING PUMP.

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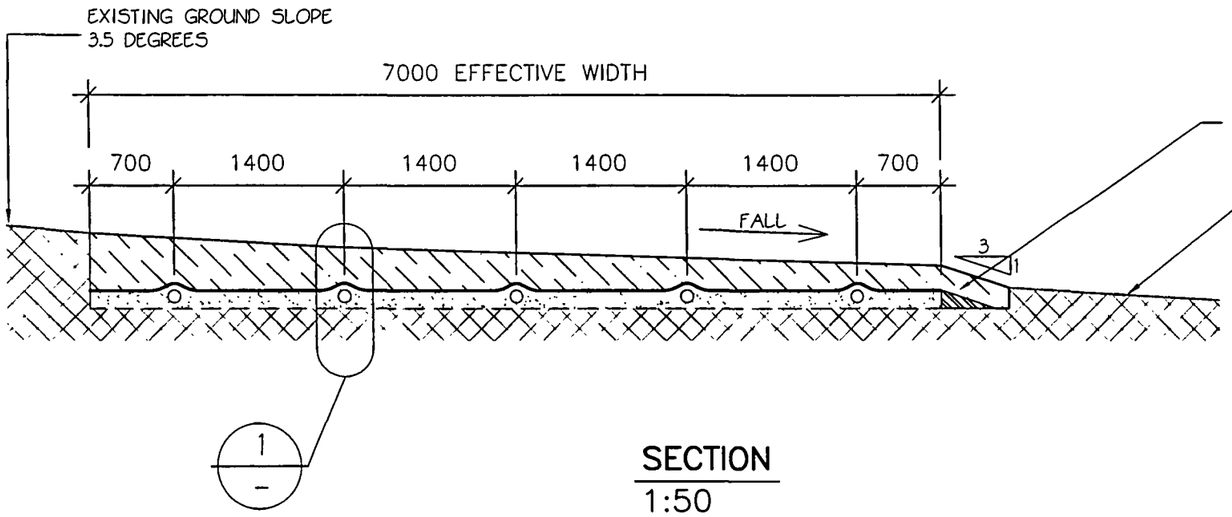
pump chamber detail

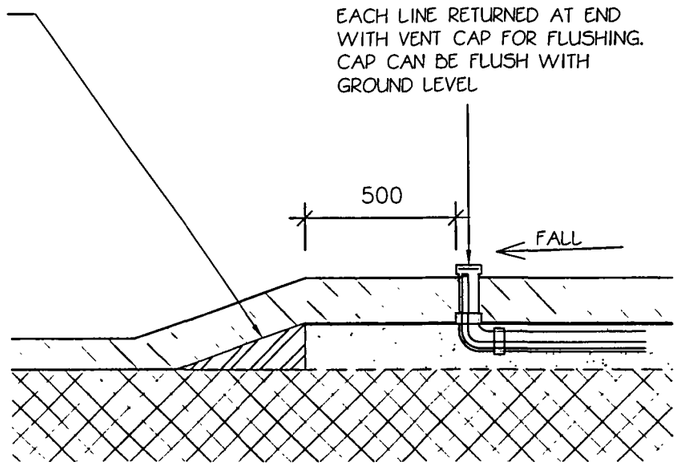
DATE	ORIGINAL SIZE	DRAWING No.	SHEET	ISSUE
7/08	A3	24091	C4	A

DES	DRN	CK	CAD
MD	BT		

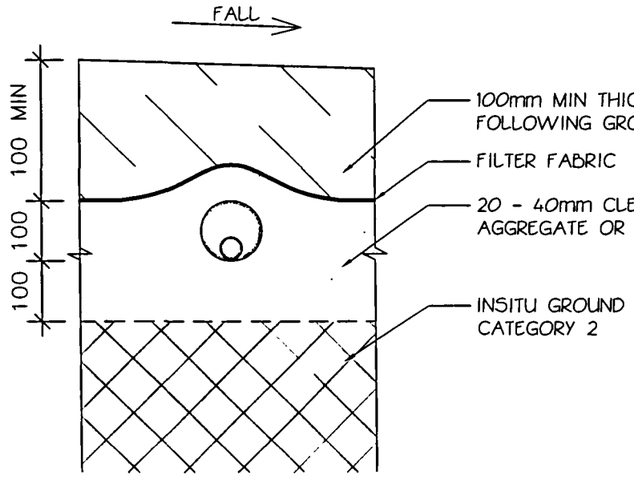
0mm 100mm



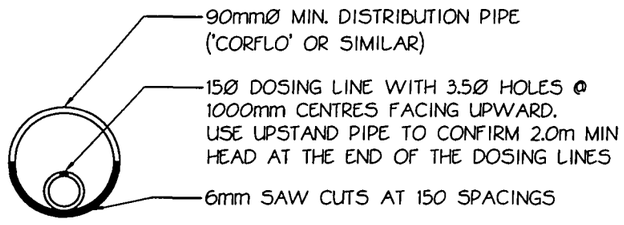
SECTION
1:50



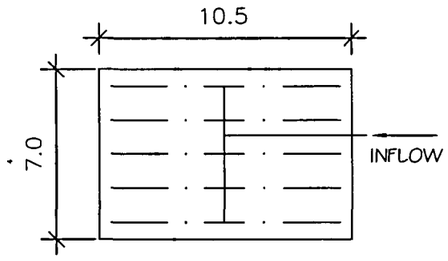
END DETAIL
1:20



DETAIL 1
1:10



DISTRIBUTION DRAIN
1:5



BED PIPEWORK PLAN
1:250

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5 AUG 2008
MARLBOROUGH DISTRICT COUNCIL

NOTES:

1.) DOSING LINES TO HAVE REMOVABLE END CAPS TO ALLOW MAINTENANCE FLUSHING.

2.) LARGE ANIMALS AND VEHICLES TO BE KEPT OFF THE BED AREA.

3.) DISTRIBUTION SYSTEM TO BE FLUSHED WITH CLEAN WATER PRIOR TO AND FOLLOWING EXTENDED NON-USE.

4.) ENGINEER TO INSPECT TEST PUMPING OF DISTRIBUTION SYSTEM PRIOR TO COVERING THE PIPEWORK.

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effluent bed details

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DES MD | DRN BT | CK | CAD

0mm 100mm