REPORT ON
AN EXISTING WASTEWATER SYSTEM FOR
D & V PODMORE

Our Ref: 26586
Date: November 2018

davidson group

PROJECT PLANNERS
RESOURCE MANAGERS
CIVIL & STRUCTURAL ENGINEERS
BUILDING DESIGNERS
ENVIRONMENTAL ENGINEERS

Our Ref: 26586

16 November 2018

REPORT
ON AN EXISTING WASTEWATER SYSTEM FOR
D & V PODMORE

1. BACKGROUND

The property is located in Resolution Bay, legal description Lot 16 DP 3072. The existing three bedroomed house was built in 2004 and is serviced by an on-site wastewater system which was consented under Resource Consent U050428. This expires on 1 July 2020.

We have been engaged to carry inspect the existing system and assess against current codes and practice.

2. CONSENTED SYSTEM

The current wastewater consists of primary treatment to 4 x 16 m long trenches, designed in accordance with AS/NZS 1547:2000 'On-Site Domestic Wastewater Management'.

The system was completed under Building Consent BC050776.

The design basis used was as follows:

- Soil type — Clayey SILT
- Soil Category — 3
- Water supply — Roof
- Number of bedrooms — 3
- Number of people — 6
- Wastewater allowances — 115 litres/person/day (690 litres/day)
- Design Loading Rate (DLR) — 21 mm/day
- Trenches — 4 x 16 m Reln drains with storage capacity

ACENZ

Davidson Ayson House, 4 Nelson St
PO Box 256, Blenheim 7240, NZ
T: 03-579 2099
E: service@DavidsonGroup.co.nz
W: DavidsonGroup.co.nz

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

3. SITE INSPECTION

We visited the site on 25 July 2018 and report as follows:

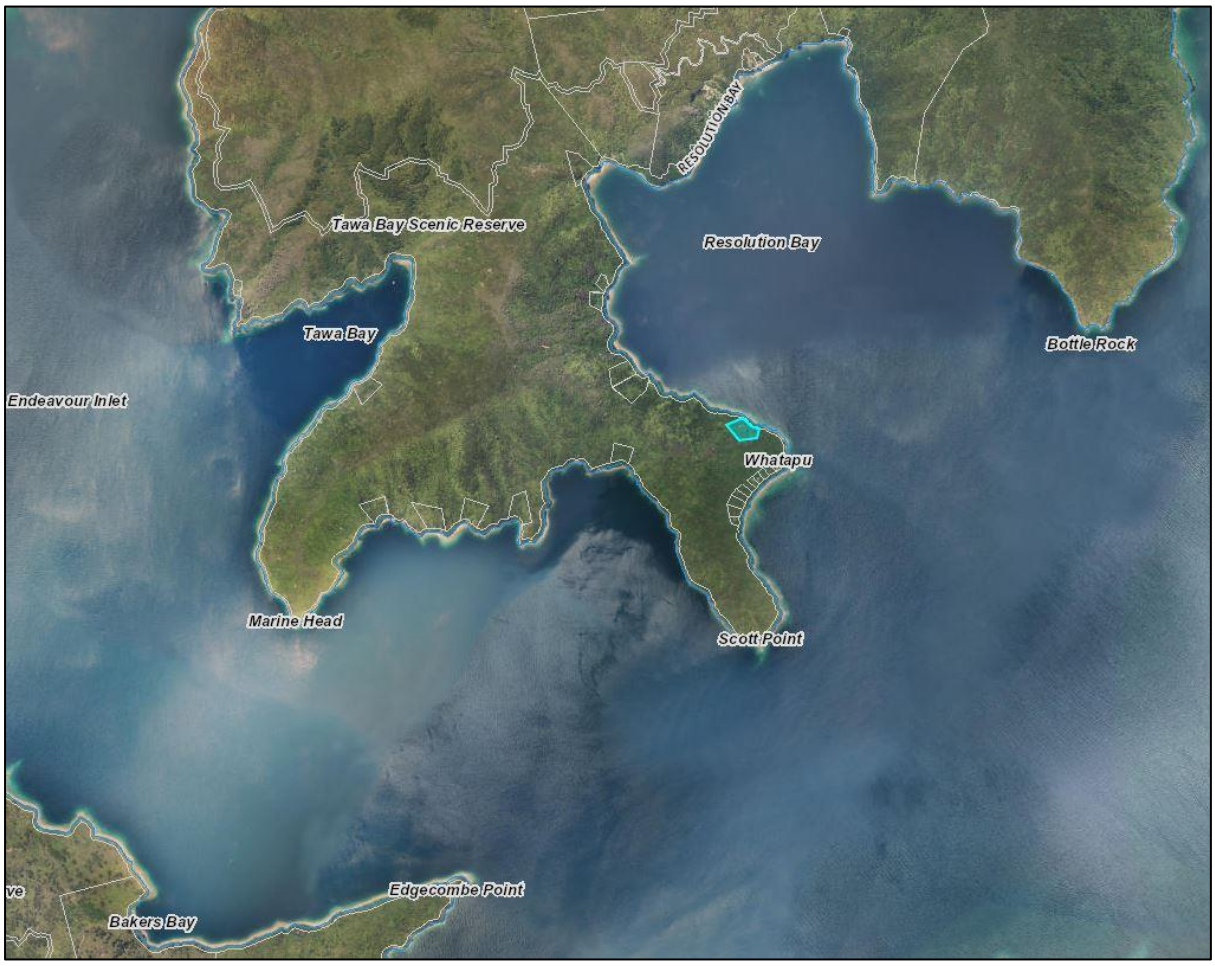


Fig 1: Site Plan

3.1 FLOWS AND FIXTURES

The house has a roof water supply.

The flows to the taps were recorded as follows:

- Laundry 6 litres/min
- Kitchen 3 litres/min
- Basin 4 litres/min
- Shower 3 litres/min

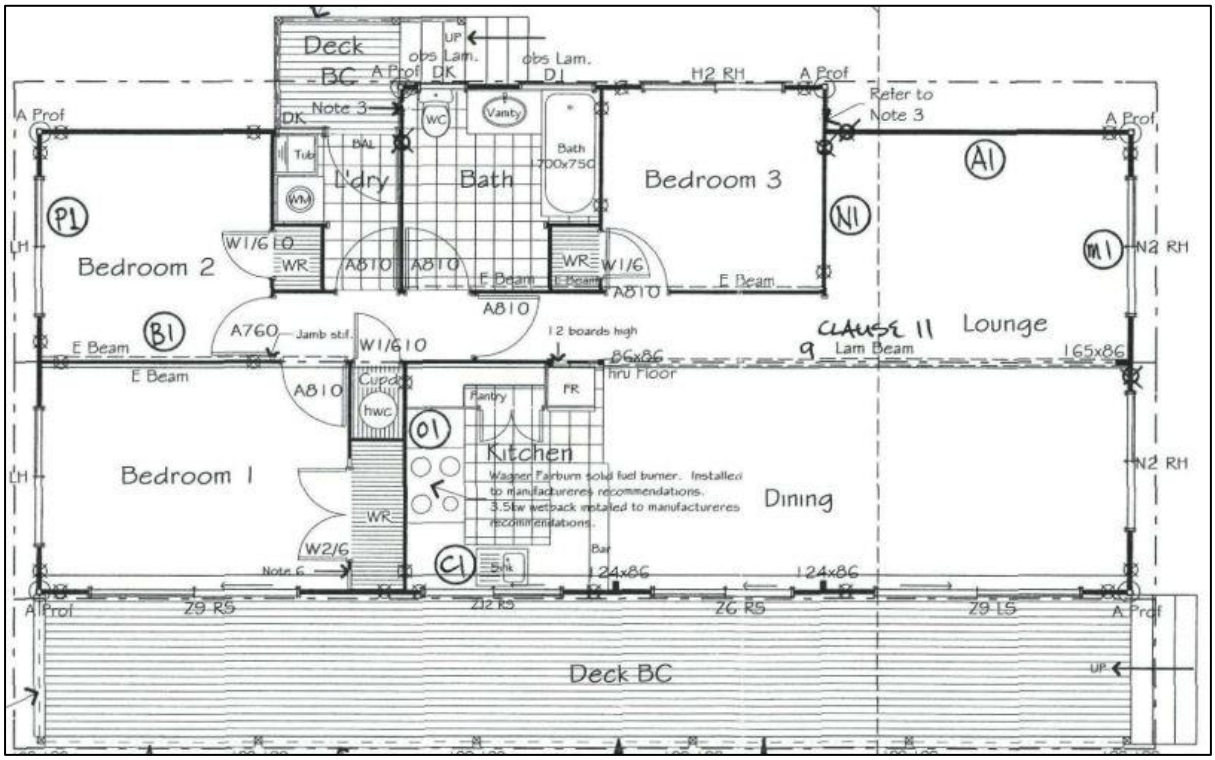
These equate to medium flows (9 - 14 litres/min).

Fixtures in the house include:

- Toilet cisterns - Dual flush (11/5.5 litres)
- Washing machine - 73 litres/load

There is a bath.

The house has three bedrooms. There are no other office or rumpus rooms which can be considered as potential bedrooms.



Floor Plan

3.2 TREATMENT

The treatment system consists of a 4,500 litre primary settlement (septic) tank with an outlet filter.

A visual inspection of the filter confirms that it needs washing down (see Fig 3). The Owners confirmed that the tank has been cleaned 4-5 years ago.

Fig 3: Outlet Filter

3.3 LAND APPLICATION AREA (LAA)

The land application area consists of four 500mm wide Reln drains (Fig 4), each 16 m long (64 m total) fed by gravity from a distribution box (Fig 5), located to the east side of the house as per the original application.

Fig 4: Trench (during construction)

There were no signs of distress.

Fig 5: Distribution Box

3.4 SOIL CATEGORY

Our original soil investigation confirmed topsoil over a clayey silt (Category 3).

4. CURRENT STANDARDS (AS/NZS 1547:2012)

4.1 DESIGN

4.1.1 Loading

The water is sourced from the roof.

The current wastewater allowance for a roof water supply and the fixtures currently in place, in accordance with AS/NZS 1547:2012, is based on;

- 3 bedrooms, or 6 people
- 130 litres/person/day (refer to detailed calculations attached).

This equates to a daily load of 780 litres, which is a 13% increase over the original design (690 litres/day), which was based of 6 people at 115 litres/person/day.

4.1.2 Treatment

The current 4,500 l septic tank can treat 780 litres/day based on full time occupancy with a 7.5 year interval between pump outs.

4.1.3 Land Application Area (LAA)

The current codes require a DLR of 18 mm/day for a Category 3 soil.

For 780 litres/day, this equates to a total trench length of 87 m. This compares to the 64 m currently in place. This length will allow for 4 permanent people.

However, the Reln drain provides some storage capacity allowing for full occupation of 6 persons for 14 days (see calculations attached).

4.1.4 Design Summary

	Original Design	Current Codes
Number of people	6 (3 bedrooms)	6 (3 bedrooms)
Water Supply Source	Roof	Roof
Loading (litres) ▪ per person/day	115	130 (with current fixtures in place)
▪ total/day	690	780
Treatment	Primary	Primary
Design Loading Rate (DLR) (mm/day)	21	18
Trench length (m)	64	87

4.2 RISK ASSESSMENT

The following risk assessment follows the guidelines and recommendations in AS/NZS 1547:2012.

- Risk Reduction Measures (Table A1)

Hydraulic Failure

The risk of hydraulic failure will be reduced using water conservation fixtures, the use of an effluent filter and the use of a distribution box to create an even distribution.

Power Failure

The system does not rely on power for treatment or distribution.

Bacteria Washout

The risk of bacteria washout will be mitigated by the low water usage and even distribution.

Dispersive Soils

The soils are not dispersive.

Marginal Soil Conditions

The soils are clayey silts and not marginal.

Site Constraints

There are no site restraints.

Rainfall

The annual rainfall is about 1400 mm and there are high rainfall events on occasion. However, the catchment above is insignificant.

Salinisation

No bare ground, salt crystals or salt tolerant plants were found to indicate evidence of salinity.

Highly permeable Soils

The soils are not free draining and there is no permanent water table.

No specific measures are therefore required to reduce the risk of water table contamination.

- Slope (Table M2)

  No reductions for slope are recommended for trench applications.

- Setback Distances (Table R1)

  The setback distances have been assessed by way of a weighting analysis (see Appendix) and can be summarised as follows:

Feature	Setback		Comment
	Table R1	Actual	
Property Boundary	22 m	30 m down slope	No Risk
Building/House	3.7 m	10 m	No Risk
Surface Water	51 m	50 m	No Risk
Bore/well	28 m	No bore/well	No Risk
Recreational Areas	8.0 m	30 m to SFR	No Risk
In-ground water tank	8.6 m	No in ground tank	No Risk
Retaining wall cut within 3 m or 45º	3 m	No ret walls	No Risk
Ground Water	0.9 m	No water table	No Risk
Hardpan/Bedrock	0.9 m	>> 1 m	No Risk

4.3 DISCUSSION

No adverse environmental effects were noted on site with the current combination of loadings and treatment and land application system.

However, the current wastewater system is not significantly short of current standards, and with full permanent occupancy, the system can cope for at least 14 days.

It is also current good practice is to have a 'Loading Certificate' on display somewhere prominent in the house. This summarises the wastewater system for the house and reminds occupants, particularly visitors, about the limitations of it.

5. RECOMMENDATIONS

a) The effluent filter should be washed down.

b) Prepare and display a 'Loading Certificate'.

(A Loading Certificate has been prepared and is attached to this report).

6. REFERENCES

- Crites, R and Tchobanoglous, A (1998). 'Small and Decentralized Wastewater Management Systems'.
- ARC Environment, Technical Paper No. 58, Third Edition 'On-Site Wastewater Disposal from Households and Institutions'.
- AS/NZS 1547:2000 'On-Site Domestic Wastewater Management'.
- AS/NZS 1547:2012 'On-Site Domestic Wastewater Management'.
- Marlborough District Council (11 July 2005) 'Guidelines for New On-Site Wastewater Management Systems'.
- Marlborough Sounds Resource Management Plan.
- Marlborough Environment Plan.
- Davidson Partners Ltd, April 2005, 'Engineering Report for D & V Podmore'
- Resource Consent U050428.
- Building Consent BC050776.

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W L McGlynn

WLM: LW

Encl.

APPENDICES

- Field Check List
- Setback Risk Assessment
- Design Flow Assessment and Trench design
- Wastewater Loading Certificate
- Drawings 26586 sheets

  R1 Location and site plan

	A	B	C	D	E	F	G	H	I	J
1	davidson group				Wastewater Revalidations				Job No.	26586
2					for	D & V Podmore			Date	25-Jul-18
3						Resolution Bay			Name	LM
4						**Field Check List**				

5	1	Previously approved system	
6		RC # ?	U050428
7		year	2005
8		type	primary to trenches
9		soil Cat	3
10		# bedrooms	3
11		design flow	690 l/day
12	2	Water supply	
13		roof/creek/spring	roof
14	3	Number of bedrooms	
15	4	Tap flows	
16		Kitchen	
17		laundry tub	
18		bathroom	
19		shower	
20		out side tap	
21	5	Toilet cistern type	dual 11/5.5
22	6	Bath ?	yes
23	7	Washing machine Type	F & P (73 l/load)
24	8	Recheck soil Cat	not required (prveiously carried out by us)
25		topsoil depth	
26		soil type	
27		ribbon length	
28		Soil Category	
29	9	Treatment	
30		Type	Primary (all in one, not secondary as per Variation to U050428)
31		Size	4500 l
32		Check filter	yes…needs cleaning
33		Check sludge/scum	next 2-3 years.
34		Last cleaned out?	Last cleaned 4-5 yrs
35		Maint. Contractor?	not required
36	10	Land Application	
37		type	trenchs (500 mm Reln drains)
38		length/area?	64 m total (4 trenches)
39		signs of distress?	no
40		check splitter valve	d box
41		flush valves?	not required
42		air valves?	not required
43	11	Set backs	
44		boundaries	na
45		water courses	none
46		sea	na
47		house	
48	12	Water table depth?	na
49	13	Other	

quantity (l)	time (secs)	l/min
1.5	29	3.1
1.5	15	6.0
1.5	21	4.3
1.5	30	3.0

davidson group	**SETBACK RISK ASSESSMENT** re : AS/NZS 1547:2012, TABLE R1 (Weighted Assessment) **D & V Podmore** **Resolution Bay**	**Job No**	26586	
		Name	LM	
		Date	6.11.18	

SITE FEATURE	SETBACK(m) min	SETBACK(m) max	SITE CONSTRT ITEM	SCORE (0 - 4) low-best high-worst	WEIGHTED SETBACK (m)	COMMENTS	TP 58
Property	1.5	50.0	**A**	2		The effluent is primary treated	1.5 m
Boundary			**D**	2		Subsurface, less than 30%	
			J	1		subsurface application	
			TOTAL	5	**21.7**		
Building/	2.0	6.0	**A**	2		The effluent is primary treated	1.5-3.0 m
houses			**D**	2		Subsurface, less than 30%	
			J	1		subsurface application	
			TOTAL	5	**3.7**		
Surface	15.0	100.0	**A**	2		The effluent is primary treated	5-20 m
water			**B**	2		Cat 3 soil. The nearest surface water is 50 m away, across gradient	
			D	2		Subsurface, less than 30%	
			E	2		Up gradient from sea	
			F	1		Cat 3 soil, side slope, no groundwater	
			G	0		No flooding risk	
			J	1		subsurface application	
			TOTAL	10	**50.7**		
Bore,	15.0	50.0	**A**	2		The effluent is primary treated	10-20 m
well			**C**	2		Cat 3 soil and no groundwater	
			H	1		Cat 3 soils, low porous soils, no aquifers, no rock	
			J	1		subsurface application	
			TOTAL	6	**28.1**		
Recreatnl	3	15	**A**	2		The effluent is primary treated	
areas			**E**	2		Up gradient from sea	
			J	1		subsurface application	
			TOTAL	5	**8.0**		
In-ground	4	15	**A**	2		The effluent is primary treated	
water tank			**E**	2		Up gradient from sea	
			J	1		subsurface application	
			TOTAL	5	**8.6**		
Ret. wall,	3 or > 45°		**D**			Subsurface, less than 30%	3 m
embankm,			**G**			No flooding risk	
escarpmt,			**H**			Cat 3 soils, low porous soils, no aquifers, no rock	
cuttings						**nothing within 3 m**	
Ground	0.6	1.5	**A**	2		The effluent is primary treated	0.6-1.5 m
water			**C**	2		Cat 3 soil and no groundwater	
			F	1		Cat 3 soil, side slope, no groundwater	
			H	1		Cat 3 soils, low porous soils, no aquifers, no rock	
			I	1		side slope	
			J	1		subsurface application	
			TOTAL	8	**0.9**		
Hardpan,	0.5	1.5	**A**	2		The effluent is primary treated	
bedrock			**C**	2		Cat 3 soil and no groundwater	
			J	1		subsurface application	
			TOTAL	5	**0.9**		

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On Site Wastewater Design

Client	Podmore	**Job No**	26586
Location	Resolution Bay	**Sheet No**	1
		Name	LM
		Date	6.11.18

FLOW ALLOWANCES

REFERENCES : ARC TP # 58 Third Edition
2 AS/NZS 1547:2012 "On Site Domestic Wastewater Management"
3 ON-SITE NewZ Special Report - 97/1
4 MDC,11 July 2005,"Guidelines for New On -Site Wastewater Systems"

		Appliance / Fixture per Capita Daily Flow Allowance				Total per Capita Flow (l/p/d)
		Toilet	Washing Machine	Shower	Basin (kitchen, bathroom, laundry)	
1	**Households with standard fixtures**	11 litre cistern	>120 litres/load	*flows > 14 litres/min*		
		60 *60*	25 *25*	85 *70*	30 *25*	
	Blackwater only	60 *60*				
	Greywater only		25 *20*	85 *65*	10 *5*	
2	**Households with standard water reduction fixtures**	*11/5.5 dual flush*	*<120 litres/load*	*flows < 14 litres/min (may need shower flow restrictors or aerator taps)*		
		40 *40*	20 *20*	80 *65*	25 *20*	40
	Blackwater only	40 *40*				
	Greywater only		20 *15*	80 *60*	10 *5*	
3	**Households with full water reduction facilities**	*6/3 dual flush*	*<90 l/load*	*flows < 9 litres/min (may need aerator taps and flow/pressure control valves on all outlets)*		
		35 *35*	15 *15*	75 *55*	20 *15*	85
	Blackwater only	35 *35*				
	Greywater only		15 *10*	75 *55*	10 *5*	
4	**Bath**	*add 5 l/p/d if there is a bath*				*5*
	Design wastewater flow per person per day					**130**
	Number of Bedrooms					**3**
	Equivalent Occupancy					**6**
	Design Daily Wastewater Allowance					**780**

NOTE Figures in *italics* are for roof water supply. Other values are for creek, community and/or bore water supply (see also Note 6, Table H3, 1547).

davidson group	**On Site Wastewater Design**	**Job No**	26586
	Client Podmore	**Sheet No**	2
	Location Resolution Bay	**Name**	LM
		Date	6.11.18

SEPTIC TANK

Daily flow	780	litres	
Minimum residence time required	24	hours	
Pump out interval required	7.5	years	
Sludge / scum accumulation	80	litres / person / year	
Allowance for scum / sludge	3600	litres	
Minimum tank size	4380	litres	
Let tank size be	**4500**	**litres min.**	
Settling volume available	900	litres	
Settling time available	28	hours	OK, > min. res. time

davidson group	**On Site Wastewater Design** **Client** Podmore **Location** Resolution Bay TRENCH DESIGN	**Job No** 26586 **Sheet No** 3 **Name** LM **Date** 6.11.18

1 Soil Category 3

2 (a) DLR (Design Loading Rate) Indicators

INDICATOR	0	1	2	SCORE	WEIGHT	RANKING
Slope	> 20º	10-20º	0-10º	1	3	3
Topsoil depth	<100 mm	100-200	>200 mm	1	2	2
Exposure to sun	low	mod	high	2	3	6
Exposure to wind	low	mod	high	2	3	6
Vegetation	not suit.	suitable	v. suitable	1	3	3
Proximity to water bodies or wells	<10 m	10-30	>30 m	2	2	4
Proximity to water table	<1 m	1-2	>2 m	2	3	6
Known problems in the area ?	yes	unsure	no	1	2	2
Nearby systems?	yes	unsure	no	1	1	
Trench width	>400 mm	300-400	<300 mm	0	1	0
Distribution method	gravity	dose	LPED/drip	0	3	0
Frequency of use	permanent	frequent	infrequent	0	3	0
RANKING SCORE						**32**

(b)

DLR (ex Table 4.2.A1)			RANKING
Most Conservative	15	mm/day	<25
Least Conservative	25	mm/day	>50

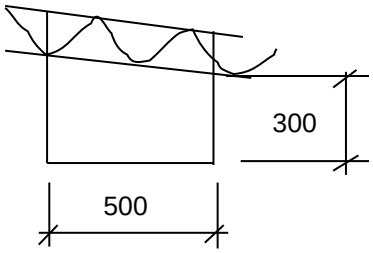
(c) DLR considered appropriate for the site 17.8 mm / day

Let DLR be 18 mm / day

3 Trench Dimensions Proposed

width 500 mm

depth 300 mm (below topsoil layer)



4 Trench Length, L (min.) = (Daily Flow)/(DLR x width)

= **86.7** m

Actual trench length is 64 m

Check storage capacity.

davidson group	**On Site Wastewater Design**	**Job No**	26586
	Client Podmore	**Sheet No**	4
	Location Resolution Bay	**Name**	LM
		Date	6.11.18
	TRENCH STORAGE		

1 Philosophy

The septic tank has been designed for the maximum peak load expected.
The trench has been designed for bottom loading only for the likely long term loading, not the maximum peak.
The balance of the peak less normal loading needs to be taken up in storage in the trench which will seep out through the side walls over time.

2 Design

Soil Category	3		
DLR	18	mm/day	
Normal Occupancy	6		
Peak Occupancy	6		
Peak design load	780	litres/day	
No. of days peak is assumed to be over	14	days	
Trench length from trench design	64	m	
Trench width	500	mm	
Trench depth	300	mm	
Max.flow over peak period	10920	litres	
less percolation at DLR	8064	litres	
Balance required to be stored	2856	litres	
Storage capacity @ 30% void space in gravel trench	2880	litres	OK

Our Ref: 26586

November 2018

WASTEWATER LOADING CERTIFICATE

- **Location** — Lot 16 DP 3072, Resolution Bay
- **Owner** — D & V Podmore
- **Number of bedrooms** — 3
- **Number of people (maximum)** — 6 for maximum for 14 days, otherwise 4 permanently max.
- **Maximum daily wastewater** — 780 litres (130 litres/person for 6 people).
- **Wastewater reduction facilities** — Low water fixtures are required and include;
  - low water use washing machines (< 90 litres/wash)
  - 11/5.5 toilet cistern
- **Water supply source** — Roof
- **Treatment System** — Primary Treatment (4500 ml septic tank with effluent filter)
- **Land Application system** — Trenches with 500 mm wide Reln drains
- **Land Application Area** — 64 m (4 trenches)
- **Overloading the system** — Overloading the system may result in:
  - Inadequate treatment and/or odour
  - Saturation of the soil in some areas of the Land Application Area (LAA)
  - Seepage from the LAA
  - Odour from the LAA
  - Spread of infectious diseases
  - Breeding of mosquitoes and attraction of flies and rodents
- **Good Practice** — To keep the bacteria working in the treatment system and LAA:
  - Use biodegradable soaps
  - Use low-phosphorus detergent
  - Use detergents in recommended quantities
  - Don't use powerful bleaches, whiteners, nappy soakers, spot removers and disinfectants, and
  - Don't put oil, chemicals or paints down the drain
- **Maintenance** — Inspect and washdown the effluent filter at least annually (do not scrub clean) and check scum/sludge levels every 3-5 years and cleanout if required.

North

RESOLUTION
BAY

STORMWATER
DISCHARGE PIPE

M.H.W.S.

99m

SOUNDS FORESHORE RESERVE

SLIP

SEA WALL

32m

BOUNDARY

EXISTING JETTY,
BOATSHED & RAMP

EXISTING
TRACK

EXISTING ROCK
OUTCROP

SLIP

EXISTING
DWELLING

SLIP

PROPOSED ROCK
PROTECTION WORK

4500 L SEPTIC
TANK & FILTER

4 WAY
DISTRIBUTION
BOX

4 x RELN
(500 mm)
TRENCHES

BOUNDARY

PLAN
1:500

davidson group

PROJECT PLANNERS
RESOURCE MANAGERS
CIVIL & STRUCTURAL ENGINEERS
BUILDING DESIGNERS
ENVIRONMENTAL ENGINEERS

Davidson Ayson House, 4 Nelson St
PO Box 256, Blenheim 7240, NZ
T: 03 579 2099 / F: 03 578 7028
E: service@DavidsonGroup.co.nz
W: DavidsonGroup.co.nz

D. & V. PODMORE
LOT 16, DP 3072, RESOLUTION BAY
RESOURCE CONSENT

plan

DATE	ORIGINAL SIZE	DRAWING No.	SHEET	ISSUE
10/11	A3	26586	R1	A

DES	DRN	CK	REF
L.M.	T.A.		

0mm 100mm