

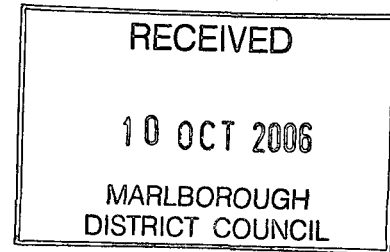
Reference: BC061531



3 October 2006

GS CONSULTING LIMITED
Plumbing & Drainage System Consultancy

Mr Bill East
Building Control Officer
Marlborough District Council
PO Box 443
Blenheim



Dear Bill,

FURTHER INFORMATION RELATING TO BC 06131 – ACCREDITED SITE/SOIL EVALUATOR

Regarding your letter 23 August 2006 relating to the Waste Water and Land Application report provided for building consent application 061531.

As an accredited site/soil evaluator with the Marlborough District Council, I have reviewed the preliminary assessment on wastewater management system for K & J Sharp, and agree with the contents of the report.

I have assessed the reports suitability through site and soil evaluation and assessment of the information relating to the waste water management and it's compliance with AS/NZS 1547:2000 and the Sounds Resource Management Plan.

Find attached a producer statement of design and inspection schedule to cover all inspections regarding this system. If there is any further information required relating to this report please contact me direct.

Yours faithfully

A handwritten signature in black ink, appearing to read 'GSL'.

Gary Stevens
Consultant
027 292 9590
gsconsulting@paradise.net.nz

PO Box 771, Nelson
Mobile 027 292 9590
Email gsconsulting@paradise.net.nz

Producer Statement – Design



1 October 2006

GS CONSULTING LIMITED
Plumbing & Drainage System Consultancy

Producer Statement - Design number KS-01 has been issued by *Gary Wipere Rei Stevens* of **GS Consulting (2004) Limited** to K & J Sharp to be supplied to Marlborough District Council in respect of the following project:

Project Description	Waste Water and Land Application System
Street Address	Bishells bay
Legal Description	Lot 8 DP 832

GS Consulting Limited has been engaged by K & J Sharp to provide design services in respect of the requirements of AS/NZS 1547:2000 for work only as specified.

The design has also been prepared in accordance with Verification Method and Acceptable Solutions of the New Zealand Building Code.

The work is described on Lets Go Environmental Ltd Report on Waste Water & Land Application System and plans and specification and other documents according to which the building is proposed to be constructed.

As an independent design professional covered by a current policy of professional Indemnity Insurance to a minimum value of \$1,000,000 I believe on reasonable grounds that subject to:

- (i) The site verification of the following design assumptions [refer inspection schedule where required], and

- (ii) All proprietary products meeting the performance specification requirements, the drawings, specifications, and other documents according to which the building is proposed to be constructed comply with the relevant provisions of the building code.

A handwritten signature in black ink, appearing to read 'G Stevens', written in a cursive style.

Gary Stevens
Plumbing & Drainage Consultant

PO Box 771, Nelson
Mobile 027 292 9590
Email gconsulting@paradise.net.nz

Inspection Schedule

This inspection schedule must accompany Producer Statement of Design number KS-01 issued by G S Consulting (2004) Limited.

The following inspections are required to verify the proposed work has been completed as described on Lets Go Environmental Ltd Report the specification and other documents according to which the building is proposed to be constructed.

1. Check installation of secondary treated waste water system as described in Lets Go Environmental Ltd Report.
2. Check installation of RAM 17D 2.3LPH 0.6M pressure compensated drip line irrigation land application system as described in said report.
3. Check operation & maintenance system is appropriate for the system and application.



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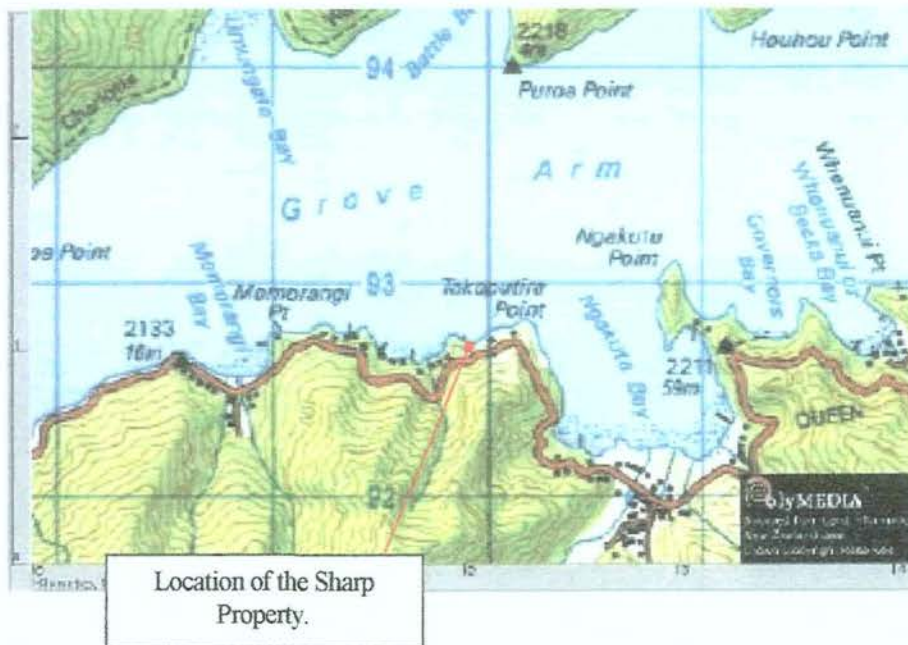
** Specialists in Wastewater Treatment Solutions **

Date: 20th June 2006

Preliminary Assessment on Wastewater Management System for K & J Sharp

1. Introduction

The property Lot 8 DP 832 is situated off Queen Charlotte Drive at Bishells Bay in the Grove Arm. It comprises a total area of 0.44ha. The existing dwelling with its wastewater management system was built on the sounds foreshore reserve.



The existing wastewater management system has been identified as lacking in its ability to protect the surrounding environment.

An advanced Wastewater Treatment Plant and associated Land Application System is proposed to be installed in close proximity to the existing dwelling. The approximate location of the treatment plant and associated land application system is shown in the following site plan. This treatment plant will have the capacity to process the wastewater generated from 4 bedroom house up to a total volume of 2,000 litres per day in accordance with the performance criteria, AS/NZS 1547:2000

Potable water is to be supplied from the stream running (south to north) along the east side of the dwelling.

4 BR
 = 8 people
 @ 150L / p/day
 = 1440 litres/day

2. Location



Facing south from the bay

3. Site and Soil Evaluation

3.1 *Overview*

Install a "Fastflo" packaged pump station at the seaward side of the existing septic tank. This pump station is designed to handle raw domestic wastewater (black and grey) and pump it to a remote treatment plant.

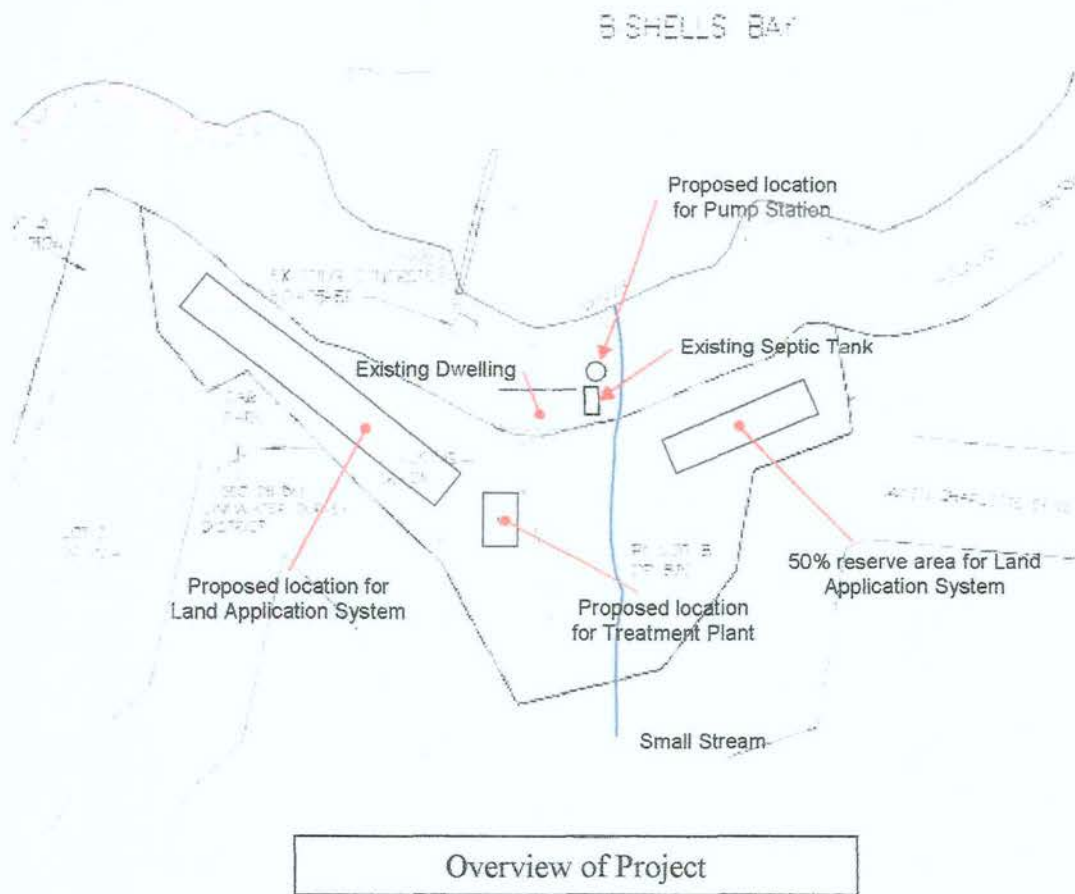
Due to the topography of the land, inaccessibility for heavy machinery and well established native vegetation it is recommended that the advanced Wastewater Treatment Plant be positioned above ground on an engineered platform.

This treatment plant will be capable of meeting the effluent quality required for dripperline irrigation and meet the requirements of the sounds resource management plan.

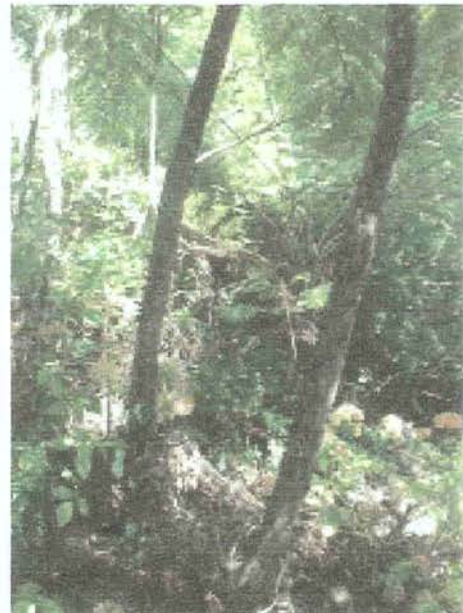
After treatment the wastewater will be pumped through a network of dripperline laid through the bush within the property boundaries. The size of the land application area will be calculated on the soil assessment and respective loading rate from the AS/NZS1547:2000.



Existing Septic tank



Bush around proposed area for Treatment Plant



3.2. Site Evaluation

The land is moderate to steep sloping ground that slopes from the Queen Charlotte Drive down to the waterfront of Bishells Bay. The slope varies from flat in places to near vertical drops in others.

A small stream runs in a well defined track through the centre of the property and along the east side of the existing dwelling. There is no evidence that the stream has moved in past.

The entire property is covered in well established native vegetation with a thin high tree canopy allowing the sun to reach the organic rich topsoil.

In excess of 302m² has been identified on the western side of the property as suitable for the Land Application System. This area is on a 20 degree slope and well vegetated and has good exposure to the sun and wind currents for most of the day

On the east a 50% reserve area for land application has been identified in the event that additional area is required due to increase in wastewater generated.

During periods of rain no surface water is likely to flow over this lot from neighbouring properties. No run-off from the Land Application Area is likely to track directly to the sea via the foreshore reserve.

3.3. Soil Assessment

The profile of the excavation on the slope reveals that the layer of topsoil (between 50 – 200mm deep) is predominantly a moderately structured clay loam with above average organic matter content as apposed the topsoil on the flat being darker with a higher organic content. This soil type falls into category 4 as defined in the AS/NZS 1547:2000 standard.



Soil Profile – Foreshore track facing south

Analysis

The topsoil is dark brown in colour with small stones approx 5mm in diameter interspersed sparsely throughout the sample. Ribbon lengths of 40mm to 50mm were extruded and the behaviour of the moist bolus was coherent plastic; smooth to manipulate. It has an approximate clay content of 30% to 35%.

Emerson's test classified the soil as a class 3 soil with Grade 2 slaking and no dispersion, peds lost form with moderate slaking when left in water for 1 hour. A pH of 6.4 indicates the soil is normal and suitable for growth of plants and effluent disposal.

The layer below the topsoil is a higher structured Clay Loam that is consistent for the next 1m.

No water table was encountered.

4. Design

4.1 Flow Calculations

Inflow Source

- Domestic washing machine
- Standard electric hot water cylinder
- Dual flush toilets
- Standard showers

Based on AS/NZS 1547:2000 the calculated flow rate is as follows

Occupants:	5 Persons
Flow Allowance:	180 litres/person/day (lpd)
Flow:	1440 900 litres per day
Contingency	180 lpd * ¹
Total Flow:	1080 litres per day 1440

Error
shld
be
8 persons
x 180
= 1440
1/day

Footnotes

*¹ Balance for holiday population equivalent for # of bedrooms: 1 @ 180 lpd – AS/NZS 1547:2000

$$\frac{25 \text{ mm/wk}}{7} = 3.5$$

$$\frac{1440}{3.6} = \frac{403 \text{ m}^2}{\text{area reqd.}}$$

4.2 Recommended Land Application System

General

Taking into consideration the sloping grounds, the slaking characteristics of the subsurface soils, a covered irrigation system is best suited for the land application of treated wastewater. This would make the best use of the organic carbon layer for de-nitrification and provide the maximum level of evapotranspiration without working the soils.

Area Required

The soil type falls into the category 4 soil type being a clay loam of moderate structure – Table 4.2A4 AS/NZS 1547:2000.

Recommended Design Irrigation Rate (DIR) for irrigation systems and Category 4 soils is: 25 mm/week → = 3.57 mm/day

Note: 1mm is equivalent to 1 litre of water covering 1 square metre

Area required for the Land Application Area (irrigation area)

Max Loading	7,560 litres per week	$10\ 080 / 25 = 403\ m^2$
DIR	25 millimetres per week	
Area required	302 m ²	

Area

The land application areas identified for providing the safe entry of treated wastewater into the environment complies with following points in the Resource Management Plan being located not less than:

- (i) 30 metres of any bore for domestic water supply;
- (ii) no less than 600mm above the ground water table
- (iii) 1.5 metres of any adjoining property
- (iv) not less than 50m from another disposal field.

The areas are however within 30m from the coastal marine area. It is envisaged that the closest the field will to the coastal marine area is 15m.

Note: The 15m of land separating the two areas is covered in scrub and bush

The Land Application Area is covered in well established scrub/bush and has good exposure to sun and wind currents for most of the day.

Design

A Network of covered dripper lines, manifold line and mains will form the Land Application System (irrigation system). The System will use the "Dose Loading" method for application on the soil.

All irrigation dripper line laid on the surface should be pegged and covered with a decomposing layer of organic material, bark, mulch or soil to a minimum depth of 100mm. 150mm!

The dripper line will be RAM 17D 2.3LPH 0.6M (similar to a garden hose with built in emitters) and connected to a low density alkathene supply line from the irrigation pump via an inline screen or disc filter.

Design Irrigation Rate per dose

Total estimated daily flow	1080	litres / day	8 persons @ 180
Number of Doses	6	doses / day	6 persons @ 180 l/p/d
Discharge per dose	180	litres / dose - approx	
Estimated Duration	10	min/dose	
Design Flow	1057	litres/hour	

Irrigation Rate (RAM 17D)	3.5	litres/hour/metre
Total RAM Required	302	metres
Number of Zones required	1	zones
Land Application Area	302 412	square metres/zone
DIR per dose	0.60	mm / dose

4.3 Effluent Quality

The Wastewater Treatment Plant will be capable of exceeding the recommended minimum effluent quality standard set for subsurface dripper line irrigation in AS/NZS 1547:2000;

BOD ₅	< 20 milligrams per litre
Suspended Solids	< 30 milligrams per litre

4.4 Intermittent Use

Some AWTP's (Aerated Wastewater Treatment Plants) have been specifically designed to handle the fluctuations that are inherent in the operation of holiday homes.

There are 3 key areas that the advanced AWTP's cover over and above the normal criteria

- a. Activated Sludge Return line from clarification to the primary chamber
- b. Aeration controller that has at least a dual operating mode that can be switched between 'stay' and 'away' modes; unlike conventional AWTP's that operate on one cycle with a blower running continuously.
- c. Extended wastewater detention time in the system to accommodate for the lag in bacteria levels on ramp-up. Ideally no less than 5 days detention at full flow.

In some situations reseedling of bacteria is recommended to assist in the systems recovery at start-up. Eg. for prolonged periods of 'none use' (longer than 6 months).

4.5 Wastewater Treatment System

Recommended System:

The *WTS BM2 series advanced Wastewater Management System* (by Lets Go Environmental, Nelson, ph 543 8004). This system is capable of meeting the required standards.

4.6 Operation and Maintenance

Operation and maintenance guidelines are to be provided with the system. To maintain the high quality effluent required from the system the owner will need to enter into a maintenance contract with an approved service provider.

After each maintenance service a completed service report will be forwarded to the compliance officer of the Marlborough District Council.

5. Assessment of Environmental Effects

With the conservative loading rates calculated above and with reference to AS/NZS 1547:2000 it is highly unlikely that treated effluent (in the form of runoff) would come anywhere near the neighbouring properties or waterways. During times when the frequency of loading is higher (increase in occupancy) typically the summer months, the climatic conditions would under normal circumstances balance the effects of additional loading.

As the Faecal coliform count is to be less than 5,000cfu per 100ml the risk of pathogens reaching the water table is highly unlikely based on the following extract from Pg 131 AS/NZS 1547:2000

“Field evidence indicates that under unsaturated seepage flow bacterial numbers are reduced by a factor of 10 for each 50mm of travel path length through the soil. The number of faecal coliforms and total coliforms in the clogging layer is of the order of 1 – 10 million and 10 – 50 million per 100g of soil, respectively. Thus, a path length of 0.3 – 0.4 m would be sufficient to reduce numbers to insignificant levels in normal soils, i.e. soils that are mid-range texture, not too sandy or clayey, and not saturated all the time.”

Therefore with a highly treated effluent of 5,000 cfu it would only take 200mm of soil depth to reduce the cfu's to less than 100 under ideal conditions.

As there will be no less than 0.6m to the ground water table a safety factor of 3 exists to account for any deficiency in soil profile variations.

6. Summation

As the proposed location for the pump station is on the foreshore reserve approval must be given by the Department of Conservation.

Based on the information from AS/NZS 1547:2000, the Sounds Resource Management Plan and best practices it is of my opinion that this application will provide sustainable and effective on-site domestic wastewater management with negligible effects on the surrounding environment.



Mardy Audier
Wastewater Treatment Specialist



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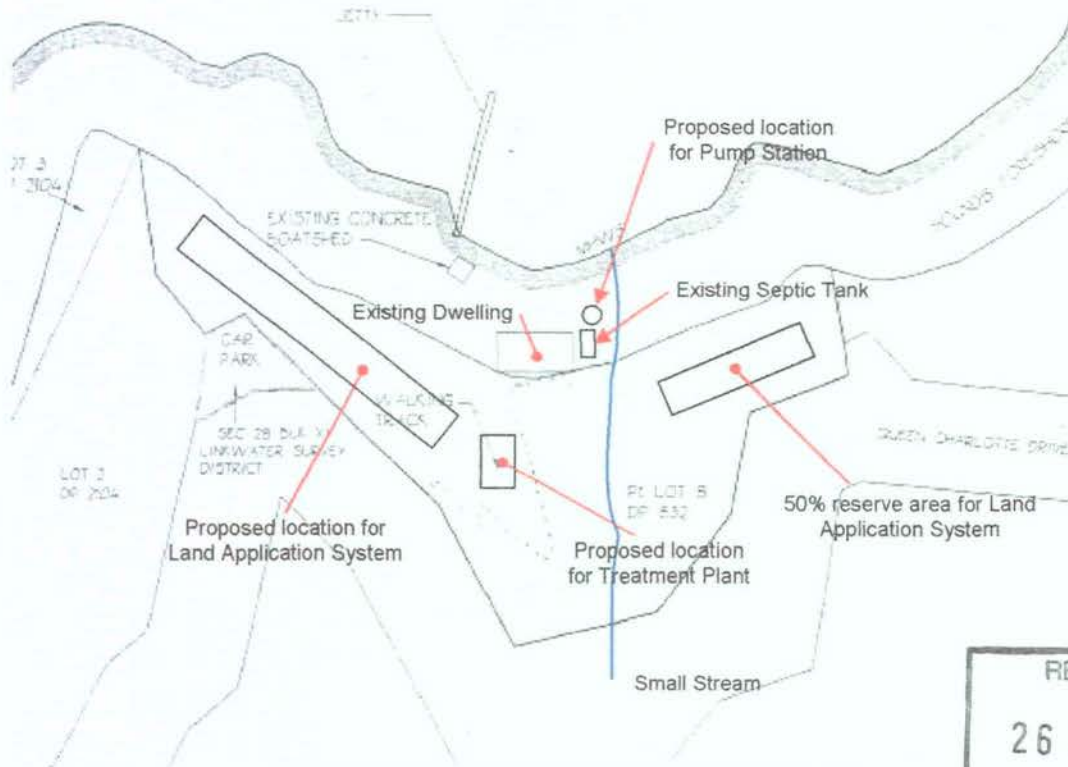
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BISHELLS BAY



Overview of Project

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MARLBOROUGH
DISTRICT COUNCIL



Bush around proposed area for Treatment Plant



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need
map of test
holes/pits
in land
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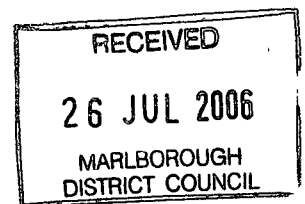
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