

J Armstrong & J Kelman

Engineering Report

Lot 1 DP 382901

January 2008



**Armstrong & Kelman
 Lot 1 DP 382901
 Mahau Sound**

Contents

1 Synopsis.....3
 1.1 Scope of Investigation3
 1.2 Summary and Conclusions3
 1.3 Recommendations.....3
 1.4 Conditions.....4
 2 Report.....5
 2.1 Introduction5
 2.2 Site Description5
 2.3 Geotechnical Investigation5
 2.4 Geotechnical Assessment5
 2.5 Development Impact and Mitigation Measures6
 2.5.1 Access.....6
 2.5.2 Foundations6
 2.5.3 Effluent Disposal.....7
 2.5.4 Stormwater.....7
 2.5.5 Services8
 2.6 Management Plans8
 Appendix 1 – Location Plan9
 Appendix 2 – Site Plan 10
 Appendix 3 – Wastewater Treatment Design 11
 Appendix 4 – Test Results..... 12
 Appendix 5 – Stability Opinion 13

1 Synopsis

1.1 Scope of Investigation

This report presents the details of a geotechnical and engineering investigation undertaken at 292 Moetapu Bay Road, Mahau Sound, Havelock. It is understood that the current owner, John Armstrong and Joy Kelman, wish to determine that there is a suitable area available for the construction of a residential dwelling for domestic dwelling construction, identify the development impact of the proposal and recommend mitigation measures to ensure impact is minimized.

1.2 Summary and Conclusions

A site investigation was conducted in October 2007. The site is located in Moetapu Bay, Pelorus Sound. A suitable building site has been identified on an existing platform, an existing garage is located on the platform at present, further development of the site for residential occupation can be safely achieved through site management aimed at minimizing instability due to disturbance.

The site can be adequately serviced in terms of the requirements of the Marlborough Sounds Resource Management Plan.

1.3 Recommendations

Recommendations are detailed in the report but are summarized as follows:

- Excavation to extend the existing platform may be permitted provided that it is kept to a minimum and that all slopes are battered or retained.
- Foundations to be pole type to a depth of 2m or piles to a depth of 0.75m. Any foundations located on the edge of the platform in the uncompacted fill material shall be engineer designed. Foundations shall be inspected by an engineer prior to placement of poles or piles.
- Stormwater controls and retaining wall shall be formed/upgraded as detailed in the report.
- All storm water runoff from proposed Lot 1 to be collected in a piped system and have controlled discharge to the existing stormwater drain on the access track below the platform.
- Domestic effluent from the site shall be disposed of via a Primary System and Low Pressure Effluent Disposal field as detailed in the report, disposal rates shall not exceed 3mm per day.
- All other recommendations not summarized above but detailed in the report.

1.4 Conditions

This report has been prepared for the indicated building site based on interpretations of the test results.

2 Report

2.1 Introduction

Lot 1 DP 382901 was investigated by Smart Alliances in October 2007. Mr. Armstrong and Ms. Kelman intend to construct a residential dwelling on the site. The site features an existing garage which is located on an existing platform in the south western portion of the site.

2.2 Site Description

The site is located in Moetapu Bay in Mahau Sound, The property is situated below Moetapu Bay Road and has a north eastern aspect

The site features varying slope between 15 and 25 degrees and is vegetated with native bush and a small grassed area surrounding the existing garage. There are no water courses located on the site however a small gully runs down the hillside along the south eastern boundary of the site. A formed access track is situated on the site as shown on the attached plan.

A site plan is attached for reference.

2.3 Geotechnical Investigation

A walkover investigation was conducted on the site. Penetrometer tests were conducted in the vicinity of the dwelling site to determine the subsoil conditions and aerial photographs of the site were inspected. The site and the surrounding area were closely inspected to determine the stability of the area. The under lying rock in the area is described as Marlborough Schist, highly weathered and fragmented schist was observed in the cut face at the rear of the platform. Auger holes were inspected in the vicinity of the building site and the soil profile examined. Auger holes were also conducted in the vicinity of the effluent disposal field.

Recent instability was observed at several locations along the cut banks of the road cutting however, this was at a small scale and will not effect the stability of the proposed dwelling site. The risk of further instability along the access track can be mitigated through retaining the existing slumps and improving the stormwater controls along the course of the track and at the exiting retaining wall. There were no signs of recent or ongoing movement on the building site or the area above and below the building site.

2.4 Geotechnical Assessment

The building site identified on the attached site plan is located on a north east sloping east hillside with an inclination of approximately 25 degrees. Penetrometer indicated that the subsoil material is deep medium dense clay underlain with weathered schist rock at about 2m. The existing cut slope at the rear of the building platform has remained stable for some time.

Penetrometer tests were conducted on the proposed dwelling site and the subsoil was found to have an average allowable bearing capacity in excess of 100kPa at a

depth of 0.75 m below the surface on the portion of the platform founded on natural ground. Penetrometer test three was carried out at the edge of the platform which consists of fill material with a low bearing capacity.

A summary table is indicated below and the results are attached for reference.

Location	T1	T2	T3	T4
0-0.25m	175kPa	200kPa	90kPa	100kPa
0.25m-0.5m	250kPa	240kPa	70kPa	130kPa
0.5m-0.75m	-	170kPa	90kPa	120kPa
0.75m-1.0m	-	240kPa	70kPa	160kPa
1.0m-1.25m	-	-	90kPa	220kPa
1.25m-1.5m	-	-	120kPa	-
1.5m-1.75m	-	-	90kPa	-
1.75m-2.0m	-	-	80kPa	-
2.0m-2.25m	-	-	140kPa	-
2.0m-2.5m	-	-	130kPa	-

The average soil profile on the site was determined to be 100mm topsoil on 2m of light brownish yellow CLAY with occasional schist fragments on highly fragmented and weathered schist. Clay was found to be moist and moderately plastic.

Inspection of the dwelling site showed no signs of recent disturbance in the vicinity of the proposed building site. The topography and subsoil investigations indicate that the risk of instability is low-moderate. Future instability is unlikely to be large scale. We believe there is a low risk to life and potential for low-moderate financial loss as a result of instability. In terms of the Geo-technical Risk Matrix the site is classified as LOW-MODERATE risk provided development of the site proceeds with precautionary measures employed to ensure that the stability of the site is not disturbed. These measures and other comments follow.

2.5 Development Impact and Mitigation Measures

2.5.1 Access

Access to the site is available via a right of way over the neighbouring property Lot 1 DP 2589.

2.5.2 Foundations

Excavation may be required to extend the existing building platform depending on the house design. Excavation should be minimized with all cut slopes battered at 1V:1.5H or structurally retained with a suitably designed structure. The clay subsoil conditions and the moderate slope on the site lend themselves to a pole or

pile type structure using foundations excavated to 2m or 0.75m depths respectively. All excavations shall be designed and observed by an engineer. Foundations shall be inspected prior to placement of poles or piles. At all times the contractor shall ensure that the site is well drained and that all collected runoff is discharged to the proposed stormwater system on the site with adequate sediment controls. Foundations should be kept dry and no uncontrolled runoff shall be allowed to flow over the edge of the platform.

All foundations shall be design to ensure no surface water ponds on or under the site. Suitable subsurface drainage shall be provided where necessary and shall be connected to the controlled stormwater system described later.

2.5.3 Effluent Disposal

A suitable effluent disposal site has been identified adjacent to the proposed house site on proposed lot 1. Three auger holes were conducted within the proposed disposal field and the soil was classified as Category 4-5 (NZS1547). Detailed site report and design is attached.

It is recommended that the disposal system for the new dwelling should be designed to the current requirements of NZS 1547, onsite Domestic Wastewater Management.

A LPED disposal system is recommended, as there is sufficient space available west of the proposed dwelling.

The moderate slopes and the dense vegetative cover are suited to the LPED system as they can efficiently take up the disposed moisture.

The proposed design is based on a 3 bedroom plus office dwelling, 8 people @ 140l/day = 1120l/day. Using a disposal rate of 3m/day results in 373m of LPED bed required.

2.5.4 Stormwater

All storm water collected on proposed Lot 1 shall be conveyed to the existing stormwater drain alongside the formed access track as indicated on the site plan. Runoff can be conveyed in a flexible smooth bore 100mm pipe fixed to galvanized rods driven into the ground. It is imperative that surface water runoff should not be allowed to pond on the site or run uncontrolled over the surface of the site. The discharge point shall be protected from erosion through use of rock protection or other suitable protection. The existing stormwater drain requires reforming in some sections of the track. It is recommended that the stormwater drain is upgraded with the installation of Novaflow drainage coil and chip. A new dish drain shall be constructed on the corner of the track located adjacent to the south eastern boundary of the property within proposed Lot 2. The dish drain shall direct stormwater to the stormwater drain and prevent it from crossing the track and flowing down the small gully, exiting at the rear of the existing dwelling. Some remedial work is required for the storm water system associated with the existing retaining wall. At present a small sump collects all stormwater from the portion of the track located in proposed Lot 1 and drainage from the retaining wall. It is recommended that the existing sump be linked to a new sump approximately twice the size of the existing sump. Storm water exiting the sumps shall be piped away from the site and is discharged to the Foreshore Reserve. During construction of the dwelling, precautions shall be taken to ensure that excavations and foundations do not collect water. Excavations should be completed as fast a possible and, should work be suspended, then the excavation shall be covered to ensure no water is

collected. Upon fitting the roof, contractors shall ensure that gutter/spouting downpipes are fitted when spouting is completed so as to ensure collected runoff is directed away from the dwelling site. This can be a temporary measure such as novaflow pipe but is imperative to ensure the stability of the site.

2.5.5 Services

Water shall be provided from roof water connection and will be held in storage tanks situated as shown on the site plan. Water tanks shall be sited on platforms excavated into the ground and suitable run-off controls installed. Tank overflows and scour valves shall be connected to the piped storm water system. A community scheme is available, however there are no official easements for this supply. Service easements over proposed Lot 1 appurtenant to proposed Lot 2 are to be created at the time of survey.

2.6 Management Plans

The site has been identified as having a LOW-MODERATE risk of instability due to the soil types and the moderate slopes. Management of stormwater is imperative to the mitigation and reduction of risk on the site. As such the following management regime is recommended.

- Stormwater controls on the access track and site shall be maintained throughout the year with cut slope material removed from the water tables and sumps and debris grates cleaned regularly.
- Effluent treatment systems shall be maintained as per manufacturer's recommendations but not less frequently than annually. Disposal dripper lines shall be flushed and electronic failure alarms shall be tested. Disposal areas shall be kept vegetated to ensure adequate evapo-transpiration.

Richard Evans
Engineer
Smart Alliances Ltd

January 2008

Appendix 2 – Site Plan



Appendix 3 – Wastewater Treatment Design

WASTEWATER SYSTEM DESIGN SHEET
 To AS/NZS 1547:2000

Client: J. Armstrong & J. Kelman		File No: 0891
Proposed 3 Bedroom Dwelling + Office		
Intended water Supply:		
Public Supply	Bore/Well/Dam	<i>Rain water (roof collection)</i>
Local experience with existing on-site systems:		
Septic Tank or similar (Primary treatment):		Secondary treatment:
<i>OK when installed properly with a correctly sized level drainage area and maintained.</i>		
<i>Produce high quality effluent suitable for irrigation.</i>		
Recommendation for this site: Primary Treatment System with Low Pressure Effluent Disposal Field		
DRAINAGE CONTROLS:		
Need for surface water collector / cut-off drains?		<i>Yes, Cut off drain to be installed above disposal field</i>
AVAILABILITY OR RESERVE / SETBACK AREAS		
Reserve area available for extensions, % of design area:		100%
Setback distance? (between development and disposal system):		<i>Min. as required by Resource Management Act</i>
Ksat, (m/day):	ESTIMATED SOIL CATEGORY:	Category 4 - 5

Design

RECOMMENDED D.I.R.	23.0	mm/week
(NOTE: Where DIR is 10mm/week or less, ETA/ETS trenches to Fig 4.5A7 NZS1547:2000 should be specified to enable the utilisation of such soils)		
Occupancy:	8 L/person/day: 140 =	1120 L/day from Appendix 4.2D AS/NZS 1547:2000
DESIGN WEEKLY FLOW:		7840 L/week
SEPTIC TANK SIZE (MIN):		4000 (MDC Specification)
AREA REQUIRED:	340.9 m²	<i>373m²</i>
LENGTH REQUIRED:	3 beds 23m X 5m	<i>Three 20x5m + 2 10x5m LPED Beds</i>
RESERVE AREA REQUIRED:		100% of specified drainage area

RECOMMENDATION:

Septic Tank with LPED disposal to beds.
Min 4000 litre capacity treatment and LPED to be a minimum total area of 341m² using 40 Ø LPED line placed at 150mm below ground level or with 150mm mulch/inert layer. Installation of the irrigation system to be in accordance with the product Installer Guide. Detailed design of the irrigation system is to be responsibility of the installer.

Appendix 4 – Test Results

Subsoil profile determination

Method: Auger Hole and inspection of existing cut slope

The subsoil profile has been assessed and described in accordance with NZ Geotechnical Society guidelines for field description of soils and rocks for engineering purposes.

Reporting

Test Site 1

Layer	Lower Depth	Description
1	100mm	TOP SOIL
2	1500mm	CLAY with small fragments of weathered schist, occasion cobble sized fragments moist, medium plasticity, firm consistency, Light yellowish Brown in colour. Homogenous CLAY with no visible bedding.
3	-	SCHIST light yellowish brown, highly weathered and fragmented some original bed structures present

**SUBSOIL PROFILES
 ARMSTRONG & KELMAN
 MOETAPU BAY**

Test Site 2

Layer	Lower Depth	Description
1	125mm	TOP SOIL
2	2000mm	CLAY with small fragments of weathered schist, occasion cobble sized fragments moist, medium plasticity, firm consistency, Light yellowish Brown in colour. Homogenous CLAY with no visible bedding.
3	-	SCHIST light yellowish brown, highly weathered and fragmented some original bed structures present

**SUBSOIL PROFILES
ARMSTRONG & KELMAN
MOETAPU BAY**

Test Site 3

Layer	Lower Depth	Description
1	125mm	TOP SOIL
2	-	CLAY with small fragments of weathered schist, occasion cobble sized fragments moist, medium plasticity, firm consistency, Light yellowish Brown in colour. Homogenous CLAY

Appendix 5 – Stability Opinion

Description of Work:

Armstrong & Kelman - Dwelling Site, Moetapu Bay, Lot 1 DP 382901

I Richard Evans hereby confirm that 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 with respect to the proposed building site.

Site investigations have been carried out under my direction and are described in our site investigation report dated November 2005. A site investigation report formatted as required has been submitted.

This opinion is based on the assumption that the data obtained from these investigations is representative of the area under consideration.

In my professional opinion and having regard to current soils engineering practices and acceptable engineering principles as applied to the specifics of the site, which I have investigated to the extent that acceptable engineering practices require. A suitable building site and land application area for disposal of effluent are located on the site as shown on the attached plans.

Particular requirements are:

- Excavation to extend the existing platform may be permitted provided it is kept to a minimum and that all slopes are battered or retained.
- Foundations to be pole type to a depth of 2m or piles to a depth of 0.75m. Any foundations located on the edge of the platform in the uncompacted fill material shall be engineers designed. Foundations shall be inspected by an engineer prior to placement of poles or piles.
- Stormwater controls and retaining walls as detailed in the report shall be formed/upgraded on the existing access track.
- Best practice standards shall be employed during construction including storm water management as detailed in the report.
- All surface runoff water shall be collected and piped to the stormwater system as described in the report, water storage tanks to have overflow/scour connected to piped system.
- Effluent shall be disposed of via a Primary System and be disposed of via a 373m² Low Pressure Effluent Disposal field as detailed in the report. Discharge rates shall not exceed 3mm per day.
- Other conditions as detailed in the Engineering report shall be constructed in accordance with the drawings.

This opinion is not to be construed as a guarantee and does not extend to areas outside the investigated area.



Richard Evans

BSc Eng, CP Eng, MIPENZ

Date 03-02-08

File Ref: U071321

ISO 9001:2000
Form Ref CI 646

Case Officer: Jenny Keene

13 Dec 2007

S92 request

Smart Alliances Limited
PO Box 546
Blenheim 7240

Dear Sally

Request for Further Information - U071321 - Kelman, Joy May & Armstrong, John William - 292 Moetapu Bay Road Havelock

Thanks for the information about the correct sizing for the wastewater field with the new application received at Council 3 December. Now that all materials are in I have taken the application off hold and reviewed the application materials.

I have a couple of further questions now the final updated application has been received, before processing can be completed.

The geotech report recommends a secondary system, such as a packed bed reactor system, however the system that has been designed is a primary system. Can you clarify the two different recommendations in these 2 different reports please.

In addition the geotech report is over 2 years old. Can you please direct me to where in the application Mr Evans substantiates this report as still valid at this time, or please send in documentation of this.

I cannot locate a Professional Opinion associated with the geotech report, regarding the proposed activities. Can you please forward this Council. This must address all activities requiring consent.

The application will be on hold on my desk in the meantime under section 92 of the Resource Management Act.

Yours sincerely

Jenny Keene
RESOURCE MANAGEMENT OFFICER



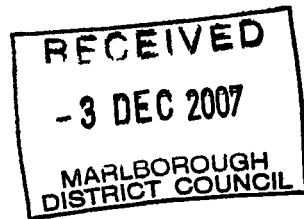
Attn: Jenny Keene

Attached is the revised resource consent application
with amended effluent disposal details

Regards Sally Curk

SmartAlliances Ltd
PO Box 546
Blenheim, 7240

T: 03 579 6211
F: 03 579 6233
E: info@smartalliances.co.nz

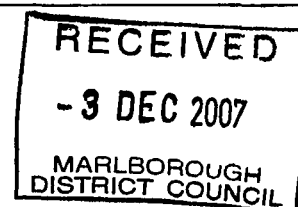


J. Kelman & J. Armstrong

Resource Consent Application

- **Construction of a dwelling within an area identified as a potential land stability hazard.**
 - **Discharge of treated domestic effluent to land.**
-

November 2007



**J. Kelman & J Armstrong
 Resource Consent Application
 New Dwelling and Wastewater Treatment System**

Contents

Application Form For Resource Consent 3

1 Background and Site Description..... 5

2 Proposal..... 5

3 Statutory Parameters 6

 3.1 Resource Management Act..... 6

 3.2 The Marlborough Sounds Resource Management Plan 6

 3.2.1 General 6

 3.2.2 Land Stability Hazard Area 6

 3.2.3 Discharge..... 6

4 Assessment 7

 4.1 Potential Land Instability Area..... 7

 4.2 Wastewater Treatment System 7

5 Conclusion 8

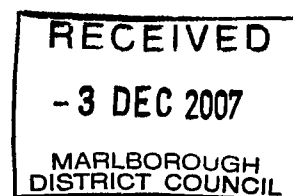
Appendix 1 – Location Plan 9

Appendix 2 – Aerial Photograph10

Appendix 3 – Geotechnical Report.....11

Appendix 4 – Addendum.....12

Appendix 5 – Site and Soil Evaluation Report13



1 Background and Site Description

The applicants, Joy Kelman and John Armstrong own a property in Moetapu Bay in Mahau Sound. The applicants intend to build a 3-bedroom home on the property.

The site is located at 292 Moetapu Bay Road, north and seaward of Moetapu Bay Road. The property is 4003m² in area. An aerial photograph is included in Appendix 2.

The legal description of the site is Lot 1 DP 382901.

The applicant's allotment and the one directly north east were created by subdivision consent U060090.

A building platform was identified and levelled as part of the original subdivision consent. A retaining wall was constructed to the rear of the building site.

There is an existing shed on the property. A right-of-way servicing the adjacent allotment also crosses the property.

The site slopes to the north east and is in places covered with regenerating native bush. It is mapped as being within an area of potential land instability in the Marlborough Sounds Resource Management Plan (the Plan).

There are no Council services available, therefore a domestic wastewater treatment facility will be required to be installed prior to the completion of the dwelling.

2 Proposal

The applicants propose to construct a 3-bedroom dwelling with an office within the previously identified building platform and to install a primary wastewater treatment system coupled with an outlet filter, dose pump and Low Pressure Effluent Disposal (LPED) field.

The treated effluent application area will be 373m², the disposal field will comprise of three 20m x 5m and two 10m x 5m LPED beds.

The application area will be situated north of the proposed dwelling, a location plan is included in Appendix 5.

Based on 140L of effluent and wastewater per person per day, the design maximum discharge rate from the treatment system is 1.12m³ /day (1120 litres /day) for a eight-person household.

Richard Evans an engineer for Smart Alliances Ltd has designed the wastewater treatment system and provided a site and soil evaluation report, these are found in Appendix 5.

Abacus Design provided a geotechnical and suitability report dated the November 2005 for the original subdivision of the parent property, this is found in Appendix 3.

Mr Evans, formally of Abacus Design and now of Smart Alliances Ltd has prepared an addendum in support of the original geotechnical and suitability report, this is included in Appendix 4.

3 Statutory Parameters

3.1 Resource Management Act

Section 9 of the Act states that (paraphrased): *no person may use land in a manner that contravenes a rule in a district or regional plan or a proposed district or regional plan unless the activity is expressly allowed by a resource consent granted by the regional council responsible for the plan.*

This section of the Act applies to the construction of the dwelling in an area identified as a potential land stability hazard.

Section 15(2) of the Resource Management Act 1991 requires that *no person may discharge a contaminant onto land unless the discharge is expressly allowed by a rule in a regional plan, a resource consent or regulations.*

This section of the Act applies to the discharge of treated domestic effluent to land.

3.2 The Marlborough Sounds Resource Management Plan

3.2.1 General

The subject property is zoned Sounds Residential within the Marlborough Sounds Resource Management Plan (the Plan).

3.2.2 Land Stability Hazard Area

Rule 30.1.7.1 of the Plan specifies that except for internal alterations within an existing structure, building activity is not a Permitted Activity within the coverage of the Natural Hazards overlay identified on the Planning Maps.

Rule 30.4 of the Plan specifies that any activity being affected by any potential hazard area identified on the planning maps or listed in the Hazards Register is a **discretionary** activity.

3.2.3 Discharge

Rule 30.3 states that, the discharge of domestic wastewater through any on-site wastewater management system installed after 21 April 2005, into or onto land shall be considered a **limited discretionary** activity.

Rule 30.3.6.1 outlines the standards and terms for domestic wastewater treatment systems as follows: *Domestic wastewater treatment systems shall not be discharged into soil determined to be Category 1, 4, 5 or 6 soil (in accordance with the Council's guidelines for the investigation, design, installation and maintenance of on-site wastewater management systems) if it is proposed to use a conventional on-site wastewater management system.*

The definition of a conventional wastewater treatment system in The Plan is: *"an on-site wastewater management system consisting of a septic tank and a land application area (usually trenches, a bed or mound). The wastewater moves from the septic tank to the land application area by way of gravity."*

Smart Alliances engineers have in the past confirmed with council staff that dose pumped, as opposed to gravity fed effluent disposal systems, do not constitute a 'conventional wastewater management system' as in the Plan definition.

4 Assessment

4.1 Potential Land Instability Area

The site is mapped as being within an area of potential land instability. Richard Evans has undertaken a site assessment and provided a geotechnical report for the application site in November 2005 (see Appendix 3).

Penetrometer tests were performed on the proposed building site to determine subsoil conditions.

The proposed dwelling will be situated within the identified building platform.

Abacus Design's November 2005 report states that further development of the site for residential occupation can be safely achieved through site management aimed at minimising instability due to disturbance.

The recommendations of this report in relation to land disturbance have been adhered to during the completion of the parent property subdivision. The proposed dwelling will also have a specific foundation design as per the recommendations of the Abacus report.

Mr. Evans has substantiated the original report and has provided an addendum to this report. Mr. Evans has concluded that the proposed dwelling will not detrimentally affect the stability of the site.

4.2 Wastewater Treatment System

The property is 4003m² in area, as such there is adequate space for an on-site effluent disposal system of the proposed design.

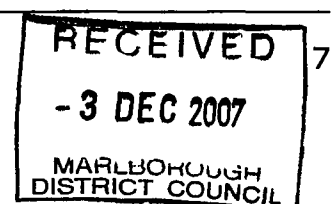
Mr Evans has undertaken a site and soil assessment of the subject site. Mr Evans also designed the wastewater treatment and disposal facility for the subject site. A copy of the site and soil evaluation report and subsequent wastewater treatment design is attached in Appendix 5.

The land application area will be 373m², the disposal beds will be laid at 5m spacings, this will provide for adequate area for the safe disposal of treated domestic effluent.

The nearest neighbouring dwelling is 100m to the east of the proposed disposal field. It is not expected that there will be odour on the applicant's site and certainly not to the neighbouring households considering the separation distance between the two dwellings.

The nearest watercourse is a small gully, which runs along the south eastern boundary of the site approximately 50m from the proposed effluent disposal field. The sea is 110m to the east. There will therefore not be any contamination of surface water.

Therefore, it is considered that the effects of this proposal will be less than minor.



5 Conclusion

The applicant proposes to construct a 3-bedroom dwelling on the property. A domestic wastewater treatment facility will be required to be installed.

Resource consent is required prior to any discharge from any new domestic wastewater treatment systems in the Sounds Residential Zone of the Plan

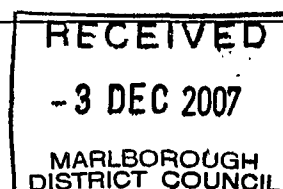
A site and soil evaluation report has been provided with this application .The report concluded that the site is suitable in terms of effluent disposal issues.

An engineers report is provided with this application .The report concluded that the site is suitable in terms of slope stability issues.

Given the above, I considered that the proposal will not compromise the stability of the site or result in any significant adverse effects and therefore it is appropriate to grant consent to this application.

Sally Curr
Resource Management Consultant
Smart Alliances Ltd

November 2007



Site and Soil Evaluation Report Armstrong Kelman – Moetapu Bay, Mahau Sound

1.0 SITE INFORMATION

1.1 Location details:

Owner: J. Armstrong & J. Kelman

Location: Moetapu Bay, Mahau Sound, Havelock

Address: 292 Moetapu Bay Road, RD1, Picton

1.2 Site Description:

The Site is located in Moetapu Bay, Mahau Sound.

The property is situated below Moetapu Bay Road and has a North Eastern aspect.

The site slope features vary between 15 and 25 degrees and vegetated with sporadically regenerating native bush and native grasses. There are no water courses located on the site, however a small gully runs down the hillside on the eastern boundary of the site. A formed access track is situated on the site as shown on the attached site plan. A new septic tank and disposal system is required to be installed.

Wastewater disposal is to be via conventional disposal field to NZS1547.

A site plan is attached for reference.

1.3 Climate:

Annual rainfall (mm): Unknown

Annual Evaporation (mm): Unknown

1.4 Intended water supply:

Roof water collection

1.5 Existing on-site systems:

None

1.6 Site Evaluator:

Name: Richard Evans

Company/agency: Smart Alliances Ltd

Address: PO Box 546
Blenheim

Phone: 5778857

Fax: 5779966

2.0 ON-SITE EVALUATION

2.1 Work Undertaken:

Details: Site visit & effluent design

Date: September 2007

Weather (on day and preceding week): fine, brief rain in preceding week

Photo Attached: NO

2.2 Topography:

Slope: Building site is located on an existing platform. Effluent disposal site slopes approximately 15 degrees to the North East.

Drainage Patterns: Minor small gullies over the site.

Ground Cover: Juvenile scrub and native bush.

Boundaries: Noted.

Waterways: None in vicinity of the site.

Well/Bores: None.

Buildings: Existing shed.

Other:

Site History (land Use): None.

Site Plan Attached: YES.

2.3 Site Exposure:

Disposal Site Aspect: North East.

2.4 Environmental concerns: (e.g. High water table, wetlands, water ways etc.):

No water bodies or ground water issues, no adjacent site contamination risks..

2.5 Site Stability:

Is expert assessment necessary: previously cover see attached Geotechnical report.

2.6 Drainage Controls:

Depth to seasonal water table: Sit is situated on a elevated hillside and therefore no ground water contamination risks.

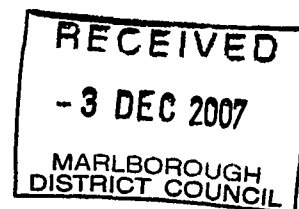
Need for cut off drains/diversion banks: Yes above disposal site.

Need for surface water collector/cut off drains: N/A

2.7 Set back Distances:

Set back distance: 2m from boundaries.

Reserve area: Available



3.0 SOIL INVESTIGATION

3.1 Soil profile determination Method: Auger Hole

A range of soil properties have been assessed in accordance with the procedures outlined in Appendix 4.1D of NZS1547:2000

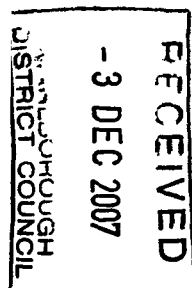
3.2 Reporting

Test Site 1

Layer	Lower Depth	Moisture content	Colour (moist)	Field Texture	Coarse Fragments %	Structure	Other
1	100mm	Moist	Grey Brown	Loam	<2	Moderate	Topsoil
2	1500mm	Moist	Light Brownish yellow	Clay Loam / Light Clay	<30	-	Clay Loam, imperfectly drained moderately plastic, smooth to manipulate with schist fragments.
3	-	Moist	Light Yellow	Schist	<90	Some bedding structures present	Highly fragmented and weathered schist.

Test Site 2

Layer	Lower Depth	Moisture content	Colour (moist)	Field Texture	Coarse Fragments %	Structure	Other
1	150mm	Moist	Brown	Loam	<2	Moderate	Topsoil
2	2000mm	Moist	Light Brownish yellow	Clay Loam / Light Clay	<30	-	Clay Loam, imperfectly drained moderately plastic, smooth to manipulate with schist fragments.
3	-	Moist	Light Brownish Yellow	Schist	<90	Some bedding structures present	Highly fragmented and weathered schist.



Test Site 3

Layer	Lower Depth	Moisture content	Colour (moist)	Field Texture	Coarse Fragments %	Structure	Other
1	50mm	Moist	Brown	Loam	<2	Moderate	Topsoil
2	-	Moist	Light Brownish yellow	Clay Loam / Light Clay	<30		Clay Loam, imperfectly drained moderately plastic, smooth to manipulate with schist fragments.

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3.3 Estimated Soil Category:

Soil Test	1	2	3	4	5
Soil Category	4-5	4-5	4-5		

The estimated soil category has been determined based on Table 4.1.1 NZS 1547:2000 The assignment of soil category 4-5 is based on the texture and structure of the soil as described in 3.2 above and observations made during the site visit.

3.4 Recommended DLR / DIR

DLR: 3mm/day

Reason: Values based on soil category and lack of environmental risk, no risk to ground water or other waterways, LPED field is the best application on moderate slopes.

3.5 General Comments:

A LPED bed disposal field is recommended, the exposed hill side site and the presence of grass & bush on the surface will assist evapo-transpiration.

4.0 DESIGN

4.1 **Soil Category found on site:** 4-5

4.2 **Daily Loading Rate:** 3mm per day

4.3 **Average Daily Flow Rate (Q) (Litres):** 1120L/day

Design Occupancy: based on the following rates:

Dwelling – 3 bedrooms + office x 8 persons x 140L/day = 1120 L/day

4.4 **Septic Tank Capacity (Litres):** new 5500L septic tank to be installed with outlet filter and pump chamber.

Treatment Quality:

Faecal Colliforms: 10^3/100mls

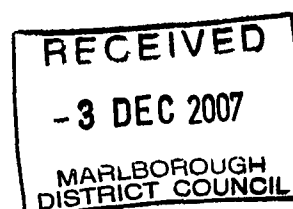
BOD₅: 100g/m³

Suspended Solids: 60g/m³

4.5 **Loading Rate (DLR):** 3mm/day

4.6 **Bed Spacing (m):** 5.0m

Note: Beds shall be laid level.



5.0 CALCULATIONS

$$A = \frac{1120L}{3 \text{ mm/day}}$$

Disposal Area = 373 square meters
Four - 20m x 5m LPED beds

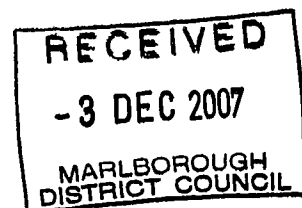
6.0 Assessment of other possible systems:

An aerated secondary treatment system will also be suitable however given the low environmental risks secondary treated effluent is not considered necessary.

7.0 Best Practical Option

The best practical option for management of domestic wastewater is through the use of the proposed system (as detailed in section 4.0 Above) It is my opinion that this system is the best practical method for preventing or minimizing any adverse effects on the environment.

see duplicate



Site and Soil Evaluation Report Armstrong Kelman – Moetapu Bay, Mahau Sound

1.0 SITE INFORMATION

1.1 Location details:

Owner: J. Armstrong & J. Kelman

Location: Moetapu Bay, Mahau Sound, Havelock

Address: 292 Moetapu Bay Road, RD1, Picton

1.2 Site Description:

The Site is located in Moetapu Bay, Mahau Sound.

The property is situated below Moetapu Bay Road and has a North Eastern aspect.

The site slope features vary between 15 and 25 degrees and vegetated with sporadically regenerating native bush and native grasses. There are no water courses located on the site, however a small gully runs down the hillside on the eastern boundary of the site. A formed access track is situated on the site as shown on the attached site plan. A new septic tank and disposal system is required to be installed.

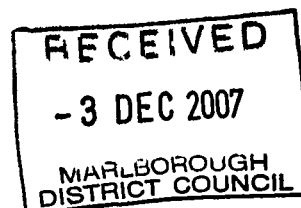
Wastewater disposal is to be via conventional disposal field to NZS1547.

A site plan is attached for reference.

1.3 Climate:

Annual rainfall (mm): Unknown

Annual Evaporation (mm): Unknown



1.4 Intended water supply:

Roof water collection

1.5 Existing on-site systems:

None

1.6 Site Evaluator:

Name: Richard Evans

Company/agency: Smart Alliances Ltd

Address: PO Box 546
Blenheim

Phone: 5778857

Fax: 5779966

2.0 ON-SITE EVALUATION

2.1 Work Undertaken:

Details: Site visit & effluent design

Date: September 2007

Weather (on day and preceding week): fine, brief rain in preceding week

Photo Attached: NO

2.2 Topography:

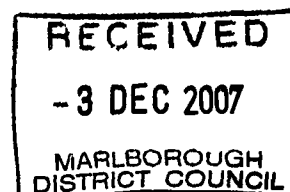
Slope: Building site is located on an existing platform. Effluent disposal site slopes approximately 15 degrees to the North East.

Drainage Patterns: Minor small gullies over the site.

Ground Cover: Juvenile scrub and native bush.

Boundaries: Noted.

Waterways: None in vicinity of the site.



Well/Bores: None.

Buildings: Existing shed.

Other:

Site History (land Use): None.

Site Plan Attached: YES.

2.3 Site Exposure:

Disposal Site Aspect: North East.

2.4 Environmental concerns: (e.g. High water table, wetlands, water ways etc.):

No water bodies or ground water issues, no adjacent site contamination risks..

2.5 Site Stability:

Is expert assessment necessary: previously cover see attached Geotechnical report.

2.6 Drainage Controls:

Depth to seasonal water table: Sit is situated on a elevated hillside and therefore no ground water contamination risks.

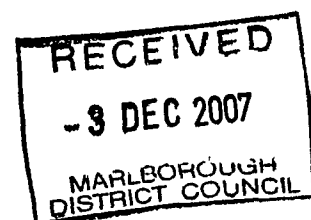
Need for cut off drains/diversion banks: Yes above disposal site.

Need for surface water collector/cut off drains: N/A

2.7 Set back Distances:

Set back distance: 2m from boundaries.

Reserve area: Available



3.0 SOIL INVESTIGATION

3.1 Soil profile determination Method: Auger Hole

A range of soil properties have been assessed in accordance with the procedures outlined in Appendix 4.1D of NZS1547:2000

3.2 Reporting

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Test Site 3

Layer	Lower Depth	Moisture content	Colour (moist)	Field Texture	Coarse Fragments %	Structure	Other
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A LPED bed disposal field is recommended, the exposed hill side site and the presence of grass & bush on the surface will assist evapo-transpiration.

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4.2 Daily Loading Rate: 3mm per day

4.3 Average Daily Flow Rate (Q) (Litres): 1120L/day

Design Occupancy: based on the following rates:

Dwelling – 3 bedrooms + office x 8 persons x 140L/day = 1120 L/day

4.4 Septic Tank Capacity (Litres): new 5500L septic tank to be installed with outlet filter and pump chamber.

Treatment Quality:

Faecal Colliforms: $10^3/100\text{mls}$

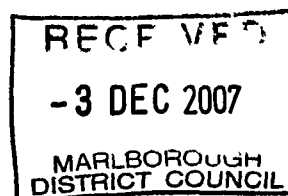
BOD₅: 100g/m^3

Suspended Solids: 60g/m^3

4.5 Loading Rate (DLR): 3mm/day

4.6 Bed Spacing (m): 5.0m

Note: Beds shall be laid level.



5.0 CALCULATIONS

$$A = \frac{1120L}{3 \text{ mm/day}}$$

Disposal Area = 373 square meters

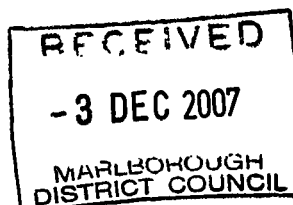
~~Four~~ - 20m x 5m LPED beds *2 10m x 5m LPED beds* *shillock*
TRILL

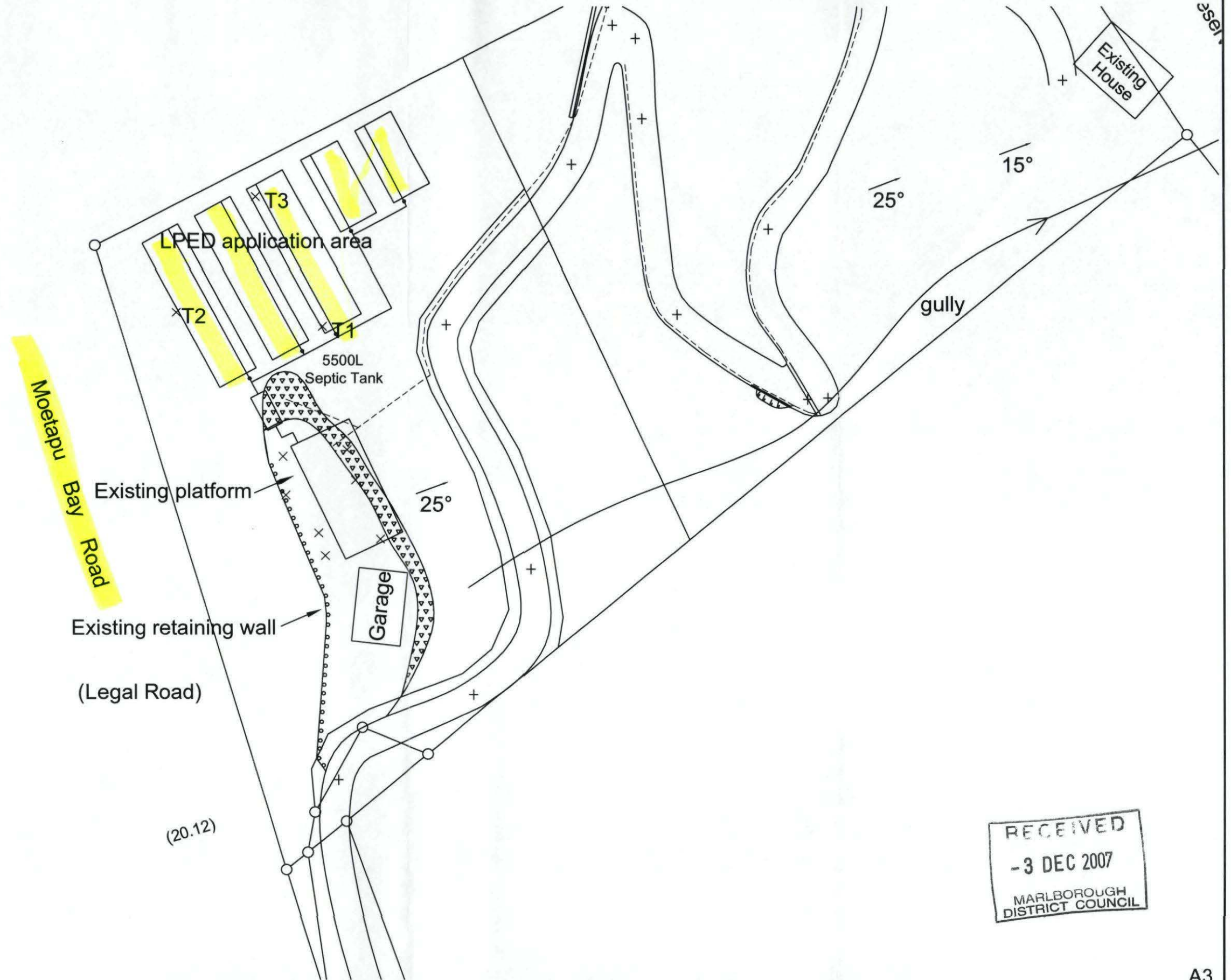
6.0 Assessment of other possible systems:

An aerated secondary treatment system will also be suitable however given the low environmental risks secondary treated effluent is not considered necessary.

7.0 Best Practical Option

The best practical option for management of domestic wastewater is through the use of the proposed system (as detailed in section 4.0 Above) It is my opinion that this system is the best practical method for preventing or minimizing any adverse effects on the environment.





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A3

		 smartalliances ENGINEERING / RESOURCE MANAGEMENT / ARCHITECTS TEL 03 579 6211 FAX 03 579 6233 PO BOX 546 BLENHEIM NEW ZEALAND	CLIENT ARMSTRONG KELMAN	PROJECT DWELLING SITE PLAN DRAWING WWTS	DWG NO. AMENDMENT
AMENDMENT DATE DETAILS	AMENDMENT DATE DETAILS		DATE 29/11/07	SCALE 1:500	CAD FILE REF: 0891

ALLOCATED TO	Jkel
PEER REVIEW	

SUPERSEDED

J. Kelman & J. Armstrong

Resource Consent Application

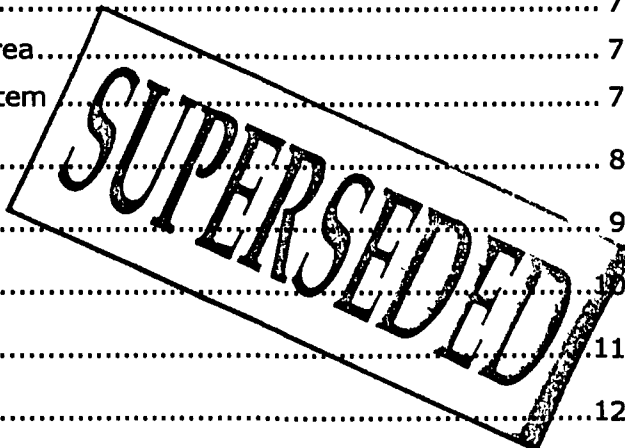
- Construction of a dwelling within an area identified as a potential land stability hazard.
- Discharge of treated domestic effluent to land.

November 2007

**J. Kelman & J Armstrong
 Resource Consent Application
 New Dwelling and Wastewater Treatment System**

Contents

Application Form For Resource Consent	3
1 Background and Site Description.....	5
2 Proposal.....	5
3 Statutory Parameters	6
3.1 Resource Management Act.....	6
3.2 The Marlborough Sounds Resource Management Plan	6
3.2.1 General	6
3.2.2 Land Stability Hazard Area	6
3.2.3 Discharge.....	6
4 Assessment.....	7
4.1 Potential Land Instability Area.....	7
4.2 Wastewater Treatment System.....	7
5 Conclusion	8
Appendix 1 – Location Plan	9
Appendix 2 – Aerial Photograph.....	10
Appendix 3 – Geotechnical Report.....	11
Appendix 4 – Addendum.....	12
Appendix 5 – Site and Soil Evaluation Report	13



1 Background and Site Description

The applicants, Joy Kelman and John Armstrong own a property in Moetapu Bay in Mahau Sound. The applicants intend to build a 2-bedroom home on the property.

The site is located at 292 Moetapu Bay Road, north and seaward of Moetapu Bay Road. The property is 4003m² in area. An aerial photograph is included in Appendix 2.

The legal description of the site is Lot 1 DP 382901.

The applicant's allotment and the one directly north east were created by subdivision consent U060090.

A building platform was identified and levelled as part of the original subdivision consent. A retaining wall was constructed to the rear of the building site.

There is an existing shed on the property. A right-of-way servicing the adjacent allotment also crosses the property.

The site slopes to the north east and is in places covered with regenerating native bush. It is mapped as being within an area of potential land instability in the Marlborough Sounds Resource Management Plan (the Plan).

There are no Council services available, therefore a domestic wastewater treatment facility will be required to be installed prior to the completion of the dwelling.

2 Proposal

The applicants propose to construct a 2-bedroom dwelling within the previously identified building platform and to install a primary wastewater treatment system coupled with an outlet filter, dose pump and Low Pressure Effluent Disposal (LPED) field.

The treated effluent application area will be 187m², the disposal field will comprise of two 20m x 5m LPED beds.

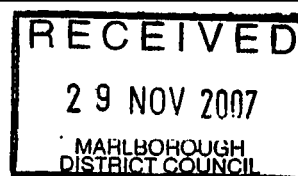
The application area will be situated north of the proposed dwelling, a location plan is included in Appendix 5.

Based on 140L of effluent and wastewater per person per day, the design maximum discharge rate from the treatment system is 0.56m³/day (560 litres /day) for a four-person household.

Richard Evans an engineer for Smart Alliances Ltd has designed the wastewater treatment system and provided a site and soil evaluation report, these are found in Appendix 5.

Abacus Design provided a geotechnical and suitability report dated the November 2005 for the original subdivision of the parent property, this is found in Appendix 3.

Mr Evans, formally of Abacus Design and now of Smart Alliances Ltd has prepared an addendum in support of the original geotechnical and suitability report, this is included in Appendix 4.



3 Statutory Parameters

3.1 Resource Management Act

Section 9 of the Act states that (paraphrased): *no person may use land in a manner that contravenes a rule in a district or regional plan or a proposed district or regional plan unless the activity is expressly allowed by a resource consent granted by the regional council responsible for the plan.*

This section of the Act applies to the construction of the dwelling in an area identified as a potential land stability hazard.

Section 15(2) of the Resource Management Act 1991 requires that *no person may discharge a contaminant onto land unless the discharge is expressly allowed by a rule in a regional plan, a resource consent or regulations.*

This section of the Act applies to the discharge of treated domestic effluent to land.

3.2 The Marlborough Sounds Resource Management Plan

3.2.1 General

The subject property is zoned Sounds Residential within the Marlborough Sounds Resource Management Plan (the Plan).

3.2.2 Land Stability Hazard Area

Rule 30.1.7.1 of the Plan specifies that except for internal alterations within an existing structure, building activity is not a Permitted Activity within the coverage of the Natural Hazards overlay identified on the Planning Maps.

Rule 30.4 of the Plan specifies that any activity being affected by any potential hazard area identified on the planning maps or listed in the Hazards Register is a **discretionary** activity.

3.2.3 Discharge

Rule 30.3 states that, the discharge of domestic wastewater through any on-site wastewater management system installed after 21 April 2005, into or onto land shall be considered a **limited discretionary** activity.

Rule 30.3.6.1 outlines the standards and terms for domestic wastewater treatment systems as follows: *Domestic wastewater treatment systems shall not be discharged into soil determined to be Category 1, 4, 5 or 6 soil (in accordance with the Council's guidelines for the investigation, design, installation and maintenance of on-site wastewater management systems) if it is proposed to use a conventional on-site wastewater management system.*

The definition of a conventional wastewater treatment system in The Plan is: *"an on-site wastewater management system consisting of a septic tank and a land application area (usually trenches, a bed or mound). The wastewater moves from the septic tank to the land application area by way of gravity."*

Smart Alliances engineers have in the past confirmed with council staff that dose pumped, as opposed to gravity fed effluent disposal systems, do not constitute a 'conventional wastewater management system' as in the Plan definition.

4 Assessment

4.1 Potential Land Instability Area

The site is mapped as being within an area of potential land instability. Richard Evans has undertaken a site assessment and provided a geotechnical report for the application site in November 2005 (see Appendix 3).

Penetrometer tests were performed on the proposed building site to determine subsoil conditions.

The proposed dwelling will be situated within the identified building platform.

Abacus Design's November 2005 report states that further development of the site for residential occupation can be safely achieved through site management aimed at minimising instability due to disturbance.

The recommendations of this report in relation to land disturbance have been adhered to during the completion of the parent property subdivision. The proposed dwelling will also have a specific foundation design as per the recommendations of the Abacus report.

Mr. Evans has substantiated the original report and has provided an addendum to this report. Mr. Evans has concluded that the proposed dwelling will not detrimentally affect the stability of the site.

4.2 Wastewater Treatment System

The property is 4003m² in area, as such there is adequate space for an on-site effluent disposal system of the proposed design.

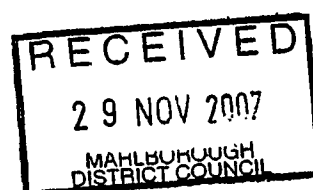
Mr Evans has undertaken a site and soil assessment of the subject site. Mr Evans also designed the wastewater treatment and disposal facility for the subject site. A copy of the site and soil evaluation report and subsequent wastewater treatment design is attached in Appendix 5.

The land application area will be 187m², the disposal beds will be laid at 5m spacings, this will provide for adequate area for the safe disposal of treated domestic effluent.

The nearest neighbouring dwelling is 100m to the east of the proposed disposal field. It is not expected that there will be odour on the applicant's site and certainly not to the neighbouring households considering the separation distance between the two dwellings.

The nearest watercourse is a small gully, which runs along the south eastern boundary of the site approximately 50m from the proposed effluent disposal field. The sea is 120m to the east. There will therefore not be any contamination of surface water.

Therefore, it is considered that the effects of this proposal will be less than minor.



5 Conclusion

The applicant proposes to construct a 2-bedroom dwelling on the property. A domestic wastewater treatment facility will be required to be installed.

Resource consent is required prior to any discharge from any new domestic wastewater treatment systems in the Sounds Residential Zone of the Plan

A site and soil evaluation report has been provided with this application .The report concluded that the site is suitable in terms of effluent disposal issues.

An engineers report is provided with this application .The report concluded that the site is suitable in terms of slope stability issues.

Given the above, I considered that the proposal will not compromise the stability of the site or result in any significant adverse effects and therefore it is appropriate to grant consent to this application.

Sally Curr
Resource Management Consultant
Smart Alliances Ltd

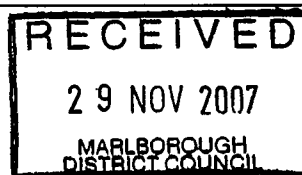
November 2007

SUPERSEDED

Appendix 2 – Aerial Photograph



Appendix 3 – Geotechnical Report



**GEO-TECHNICAL REPORT
FOR
MORRIS HEYWOOD**

**SUBDIVISION OF
LOT 2 DP2589**

**LOCATED AT
MOETAPU BAY**

NOVEMBER 2005

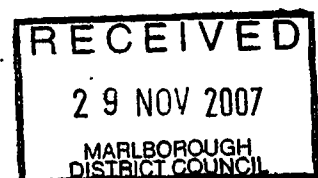


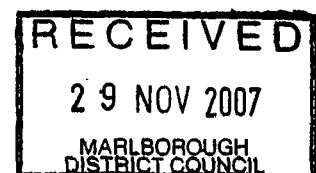


TABLE OF CONTENTS

SYNOPSIS	3
1.1 SCOPE OF THE INVESTIGATION	
1.2 SUMMARY AND CONCLUSIONS	
1.3 RECOMMENDATIONS	
1.4 CONDITIONS	
REPORT	5
2.1 SITE DESCRIPTION	
2.2 INTRODUCTION	
2.3 GEOTECHNICAL INVESTIGATION	
2.4 GEOTECHNICAL ASSESSMENT	
2.5 DEVELOPMENT IMPACT AND MITIGATION MEASURES	
2.6 MANAGEMENT PLANS	
MAPS, PLANS AND TEST RESULTS	10
LOCATION PLAN	
SITE PLAN	
TEST RESULTS	
EFFLUENT DETAILS	
STATEMENT OF OPINION	

ABACUS DESIGN LIMITED EMAIL: abacusdesign@xtra.co.nz TEL 03 677 8857 FAX 03 577 9866 PO BOX 309 141 HIGH STREET BLENHEIM NEW ZEALAND	Prepared by: Bronwen Frazer
	Reviewed by: Richard Evans 
	Approved for issue by: Richard Evans 



SYNOPSIS

1.1 SCOPE OF THE INVESTIGATION

Morris Heywood has commissioned Abacus Design to inspect the property described as Lot 2 DP 2589 and provide an opinion as to the suitability of the site for subdivision. This report will also provide an opinion as to the suitability of proposed Lot 1 for domestic dwelling construction, identify the development impact of the proposal and recommend mitigation measures to ensure impact is minimized.

1.2 SUMMARY AND CONCLUSIONS

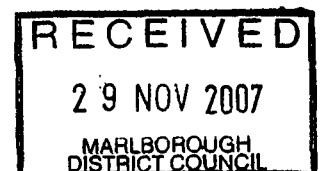
A site investigation was conducted in October 2005. The site is located in Moetapu Bay, Pelorus Sound. A suitable building site has been identified within proposed Lot 1 on an existing platform, an existing garage is located on the platform at present, further development of the site for residential occupation can be safely achieved through site management aimed at minimizing instability due to disturbance.

The site can be adequately serviced in terms of the requirements of the Marlborough Sounds Resource Management Plan.

1.3 RECOMMENDATIONS

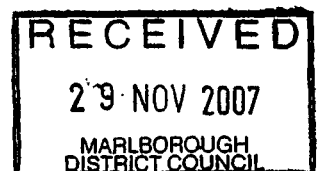
Recommendations are detailed in the report but are summarized as follows:

- Excavation to extend the existing platform may be permitted provided that it is kept to a minimum and that all slopes are battered or retained.
- Foundations to be pole type to a depth of 2m or piles to a depth of 0.75m. Any foundations located on the edge of the platform in the uncompacted fill material shall be engineer designed. Foundations shall be inspected by an engineer prior to placement of poles or piles.
- Stormwater controls and retaining wall shall be formed/upgraded as detailed in the report
- All storm water runoff from proposed Lot 1 to be collected in a piped system and have controlled discharge to the existing stormwater drain on the access track below the platform
- Domestic effluent from the site shall be disposed of via a Secondary Treatment Plant System and irrigated disposal field as detailed in the report, disposal rates shall not exceed 3mm per day.
- All other recommendations not summarized above but detailed in the report.



1.4 CONDITIONS

This report has been prepared for the indicated building site based on interpretations of the test results.



REPORT

2.1 INTRODUCTION

Lot 2 DP 2589 was investigated by Abacus Design in October 2005. Mr. Heywood intends to subdivide the site into two allotments. The site is developed with an existing dwelling which is partially located on the Sounds Foreshore Reserve. The dwelling will be located within proposed Lot 2 of the subdivision. The site also features a garage which is located on an existing platform in the south western portion of the site. The garage and platform will be located within proposed Lot 1.

2.2 SITE DESCRIPTION

The site is located in Moetapu Bay in the Pelorus Sound, The property is situated below Moetapu Bay Road and has a north eastern aspect

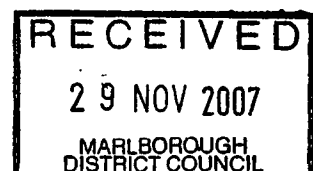
The site features varying slope between 15 and 25 degrees and is vegetated with native bush and a small grassed area surrounding the dwelling. There are no water courses located on the site however a small gully runs down the hillside along the south eastern boundary of the site. A steep cut slope has been formed at the rear of the existing platform which varies in height from 1m to 4m. A formed access track is situated on the site as shown on the attached plan. Several small scale slumps have occurred on the cut bank of the track, a large retaining wall has been constructed to retain slip material adjacent to the northwestern boundary of the property.

A site plan is attached for reference.

2.3 GEOTECHNICAL INVESTIGATION

A walkover investigation was conducted on the site. Penetrometer tests were conducted in the vicinity of the dwelling site on proposed Lot 1 to determine the subsoil conditions and aerial photographs of the site were inspected. The site and the surrounding area were closely inspected to determine the stability of the area. The under lying rock in the area is described as Marlborough Schist, highly weathered and fragmented schist was observed in the cut face at the rear of the platform. Auger holes were inspected in the vicinity of the building site and the soil profile examined. Auger holes were also conducted in the vicinity of the effluent disposal field.

Recent instability was observed at several locations along the cut banks of the road cutting however this was at a small scale and will not effect the stability of either the existing dwelling nor the proposed dwelling site. The risk of further instability along the access track can be mitigated



through retaining the existing slumps and improving the stormwater controls along the coarse of the track and at the exiting retaining wall. There were no signs of recent or ongoing movement on the building site or the area above and below the building site.

2.4 GEOTECHNICAL ASSESSMENT

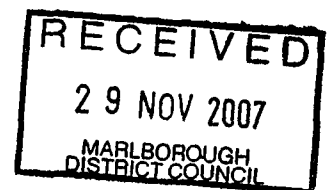
The building site identified on the attached site plan is located on a north east sloping east hillside with an inclination of approximately 25 degrees. Penetrometer indicated that the subsoil material is deep medium dense clay underlain with weathered schist rock at about 2m. The existing cut slope at the rear of the building platform has remained stable for some time.

Penetrometer tests were conducted on the proposed dwelling site and the subsoil was found to have an average allowable bearing capacity in excess of 100kPa at a depth of 0.75 m below the surface on the portion of the platform founded on natural ground. Penetrometer test three was carried out at the edge of the platform which consists of fill material with a low bearing capacity.

A summary table is indicated below and the results are attached for reference.

Location	T1	T2	T3	T4
0-0.25m	175kPa	200kPa	90kPa	100kPa
0.25m-0.5m	250kPa	240kPa	70kPa	130kPa
0.5m-0.75m	-	170kPa	90kPa	120kPa
0.75m-1.0m	-	240kPa	70kPa	160kPa
1.0m-1.25m	-	-	90kPa	220kPa
1.25m-1.5m	-	-	120kPa	-
1.5m-1.75m	-	-	90kPa	-
1.75m-2.0m	-	-	80kPa	-
2.0m-2.25m	-	-	140kPa	-
2.0m-2.5m	-	-	130kPa	-

The average soil profile on the site was determined to be 100mm topsoil on 2m of light brownish yellow CLAY with occasional schist fragments on highly fragmented and weathered schist. Clay was found to be moist and moderately plastic.



Inspection of the dwelling site showed no signs of recent disturbance in the vicinity of the proposed building site. The topography and subsoil investigations indicate that the risk of instability is low-moderate. Future instability is unlikely to be large scale. We believe there is a low risk to life and potential for low-moderate financial loss as a result of instability. In terms of the Geo-technical Risk Matrix the site is classified as LOW-MODERATE risk provided development of the site proceeds with precautionary measures employed to ensure that the stability of the site is not disturbed. These measures and other comments follow.

2.5 DEVELOPMENT IMPACT AND MITIGATION MEASURES

Access

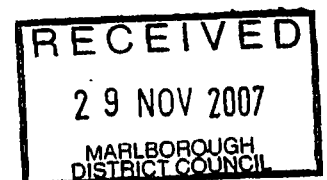
Access to the site is available via a right of way over the neighboring property Lot 1 DP 2589.

Proposed Lot 1 is situated directly below Moetapu Bay Road and can be accessed by the right of way over the neighboring property. Proposed Lot 2 will have access to Moetapu Bay Road via a the existing right of way and a proposed right of way over proposed Lot 1. The approximate grades of the access track are shown on the attached site plan, parts of the existing track exceed the permitted activity grade standard. Consent will be required for this non compliance.

Foundations

Excavation may be required to extend the existing building platform depending on the house design. Excavation should be minimized with all cut slopes battered at 1V:1.5H or structurally retained with a suitably designed structure. The clay subsoil conditions and the moderate slope on the site lend themselves to a pole or pile type structure using foundations excavated to 2m or 0.75m depths respectively. All excavations shall be designed and observed by an engineer. Foundations shall be inspected prior to placement of poles or piles. At all times the contractor shall ensure that the site is well drained and that all collected runoff is discharged to the proposed stormwater system on the site with adequate sediment controls. Foundations should be kept dry and no uncontrolled runoff shall be allowed to flow over the edge of the platform.

All foundations shall be design to ensure no surface water ponds on or under the site. Suitable subsurface drainage shall be provided where necessary and shall be connected to the controlled stormwater system described later.



Effluent Disposal

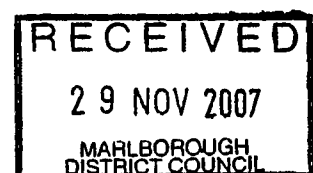
A suitable effluent disposal site has been identified adjacent to the proposed house site on proposed lot 1. Three auger holes were conducted within the proposed disposal field and the soil was classified as Category 4-5 (NZS1547). Detailed site report and design is attached.

It is recommended that the disposal system for the new dwelling should be designed to the current requirements of NZS 1547, Onsite Domestic Wastewater Management.

Due to the moderate slope of the disposal site and clay soils it is recommended that a Secondary Treatment system with irrigated disposal field shall be used. If the site is to be developed with a batch the treatment system will be required to be suitable for intermittent loadings typical of Sounds properties, such as packaged bed reactor systems. Treatment systems shall be provided with visual and audible alarm systems notifying the owner/occupier of failure. The final effluent design shall be determined on application for Building Consent however an indicative design has been calculated based on daily flow rate of 1120 liters per day for a three bedroom dwelling with office or population equivalent of 8 people. A Design Loading Rate of 3mm day was assigned based on the soil category, therefore 375 square meters of disposal area would be required. The proposed disposal site is not located within 30m of any surface water body or any bore and the water table is situated in excess of 0.6m from the ground surface. Drip lines shall be laid in accordance with manufacturers recommendations. The use of an irrigated disposal field and assignment of Low DIR will reduce the risk of saturation of the clay subsoils which may lead to instability. A detailed site and soil evaluation report and design is attached.

Stormwater

All storm water collected on proposed Lot 1 shall be conveyed to the existing stormwater drain alongside the formed access track as indicated on the site plan. Runoff can be conveyed in a flexible smooth bore 100mm pipe fixed to galvanized rods driven into the ground. It is imperative that surface water runoff should not be allowed to pond on the site or run uncontrolled over the surface of the site. The discharge point shall be protected from erosion through use of rock protection or other suitable protection. The existing stormwater drain requires reforming in some sections of the track. It is recommended that the stormwater drain is upgraded with the installation of Novaflo drainage coil and chip. A new dish drain shall be constructed on the corner of the track located adjacent to the south eastern boundary of the property within proposed Lot 2. The dish drain shall direct stormwater to the stormwater drain and prevent it from crossing the track and flowing down the small gully, exiting at the rear of the existing



dwelling. Some remedial work is required for the storm water system associated with the existing retaining wall. At present a small sump collects all stormwater from the portion of the track located in proposed Lot 1 and drainage from the retaining wall. It is recommended that the existing sump be linked to a new sump approximately twice the size of the existing sump. Storm water exiting the sumps shall be piped away from the site and is discharged to the Foreshore Reserve. During construction of the dwelling, precautions shall be taken to ensure that excavations and foundations do not collect water. Excavations should be completed as fast as possible and, should work be suspended, then the excavation shall be covered to ensure no water is collected. Upon fitting the roof, contractors shall ensure that gutter/spouting downpipes are fitted when spouting is completed so as to ensure collected runoff is directed away from the dwelling site. This can be a temporary measure such as novaflow pipe but is imperative to ensure the stability of the site.

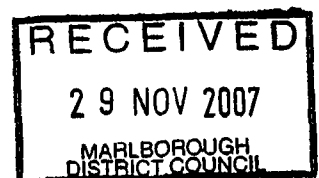
Services

Water shall be provided from roof water connection and will be held in storage tanks situated as shown on the site plan. Water tanks shall be sited on platforms excavated into the ground and suitable run-off controls installed. Tank overflows and scour valves shall be connected to the piped storm water system. A community scheme is available, however there are no official easements for this supply. Service easements over proposed Lot 1 appurtenant to proposed Lot 2 are to be created at the time of survey.

2.6 MANAGEMENT PLANS

The site has been identified as having a LOW-MODERATE risk of instability due to the soil types and the moderate slopes. Management of stormwater is imperative to the mitigation and reduction of risk on the site. As such the following management regime is recommended.

- Stormwater controls on the access track and site shall be maintained throughout the year with cut slope material removed from the water tables and sumps and debris grates cleaned regularly.
- Effluent treatment systems shall be maintained as per manufacturers recommendations but not less frequently than annually. Disposal dripper lines shall be flushed and electronic failure alarms shall be tested. Disposal areas shall be kept vegetated to ensure adequate evapo-transpiration.



APPENDIX

Location Plan

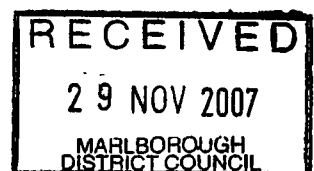
Site Plan

Effluent Details

Test Results

Photos

Stability Opinion





ABACUS
DESIGN

PROJECT
HEYWOOD
GEO-TECHNICAL REPORT
DRAWING
LOCATION PLAN
DATE 16/11/05 SCALE NTS

DWG NO.
SJ703-FIG01
AMENDMENT
01
ISSUE
FOR INFO

abacusdesign@xtra.co.nz
TEL 03 577 8857
FAX 03 577 9966
PO BOX 309
141 HIGH STREET
BLENHEIM
NEW ZEALAND

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Subsoil profile determination

Method: Auger Hole and inspection of existing cut slope

The subsoil profile has been assessed and described in accordance with NZ Geotechnical Society guidelines for field description of soils and rocks for engineering purposes.

Reporting

Test Site 1

Layer	Lower Depth	Description
1	100mm	TOP SOIL
2	1500mm	CLAY with small fragments of weathered schist, occasion cobble sized fragments moist, medium plasticity, firm consistency, Light yellowish Brown in colour. Homogenous CLAY with no visible bedding.
3		SCHIST light yellowish brown, highly weathered and fragmented some original bed structures present

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Test Site 2

Layer	Lower Depth	Description
1	125mm	TOP SOIL
2	2000mm	CLAY with small fragments of weathered schist, occasion cobble sized fragments moist, medium plasticity, firm consistency, Light yellowish Brown in colour. Homogenous CLAY with no visible bedding.
3		SCHIST light yellowish brown, highly weathered and fragmented some original bed structures present

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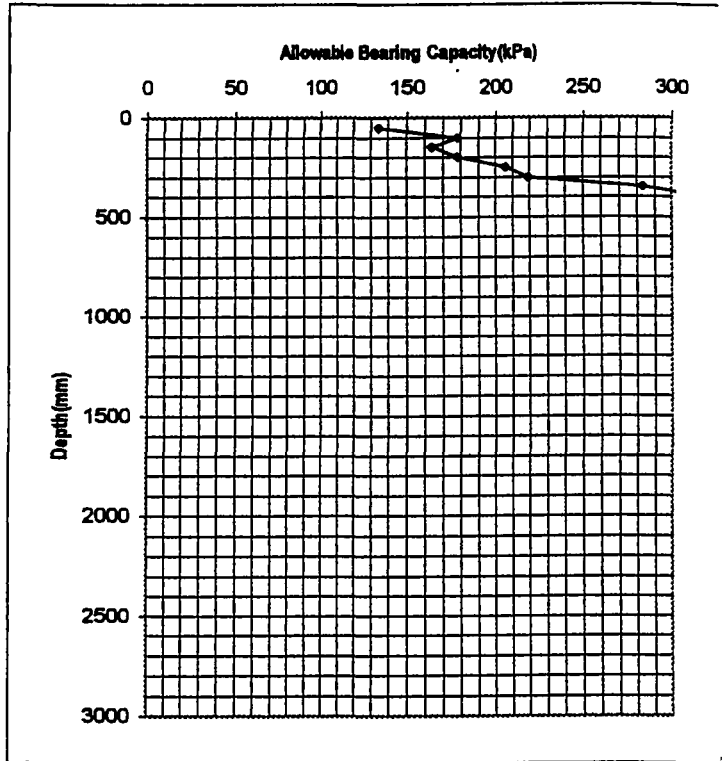
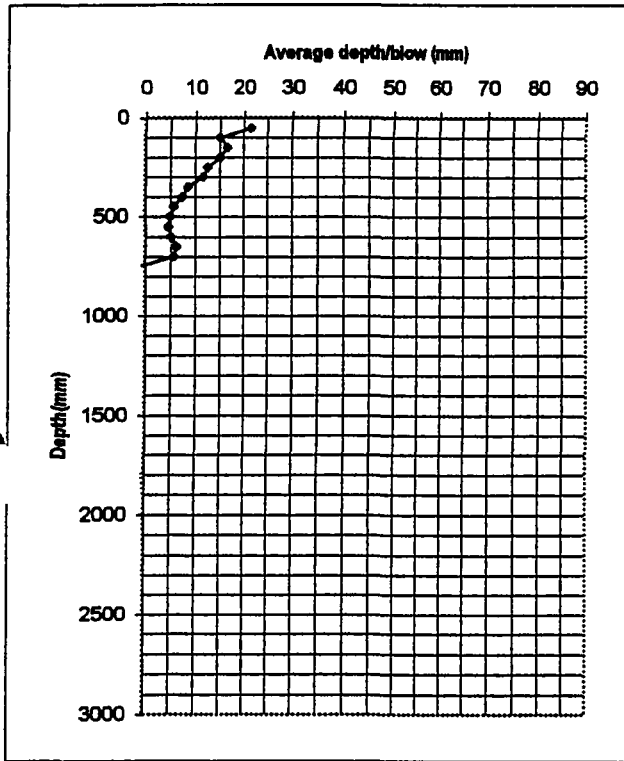
Test Site 3

Layer	Lower Depth	Description
1	125mm	TOP SOIL
2		CLAY with small fragments of weathered schist, occasion cobble sized fragments moist, medlum plasticity, firm consistency, Light yellowish Brown in colour. Homogenous CLAY

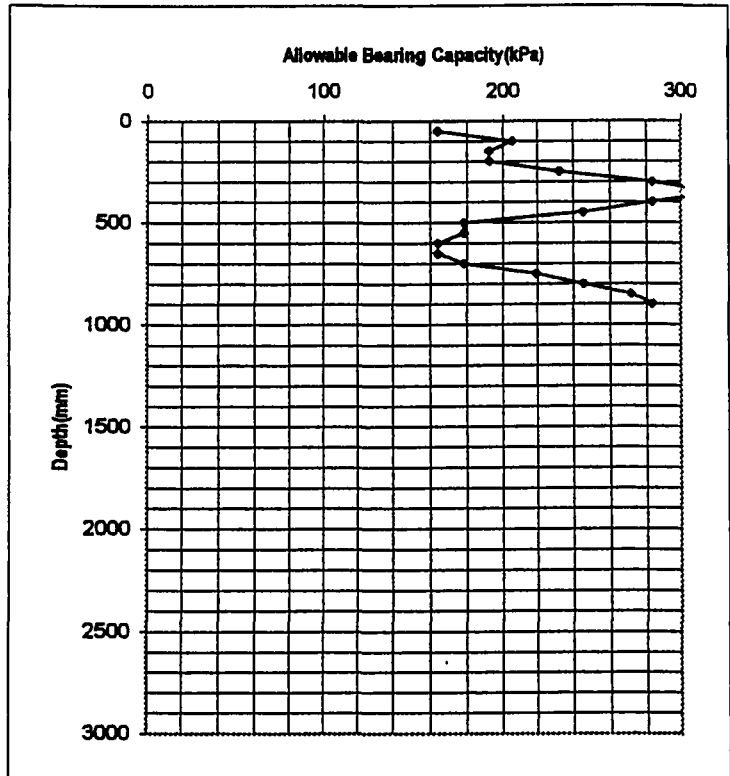
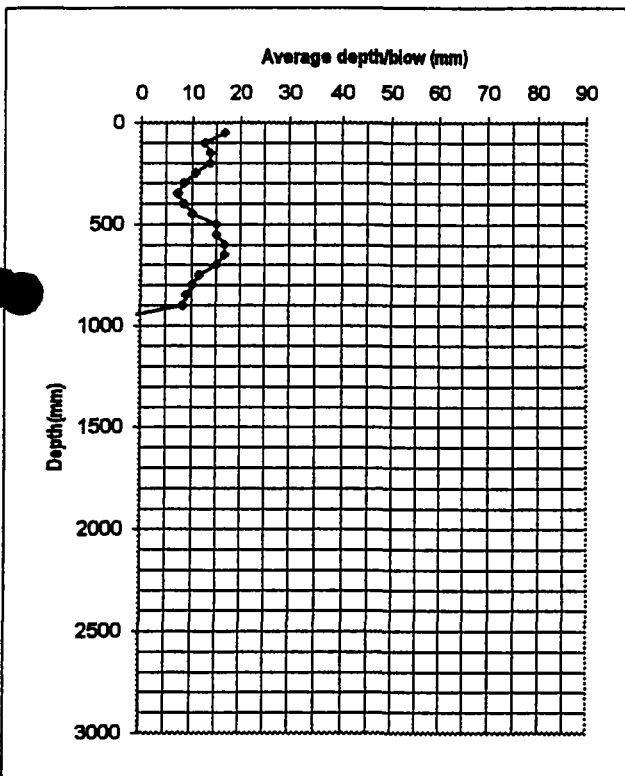
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Scala Penetrometer Tests Results

Test 1



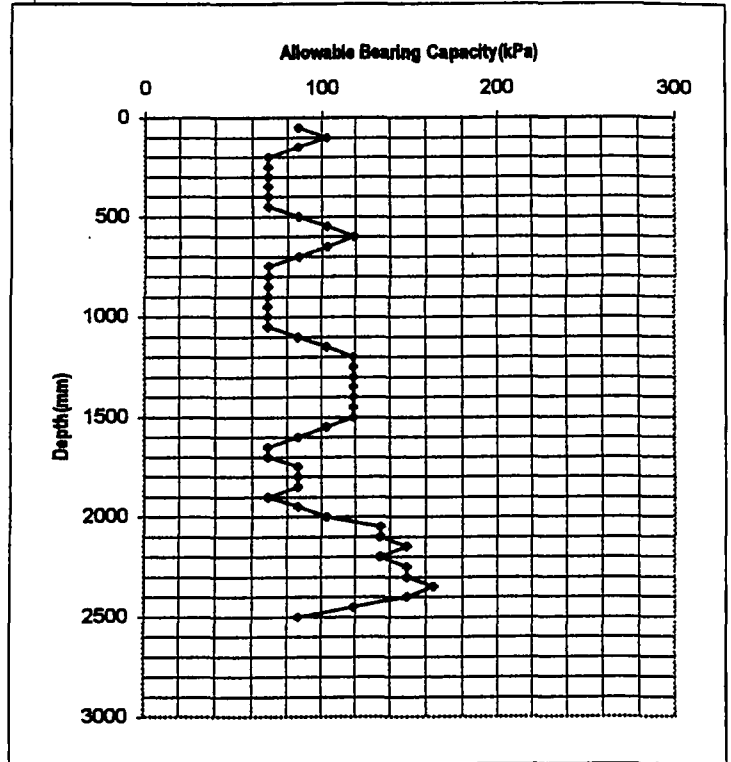
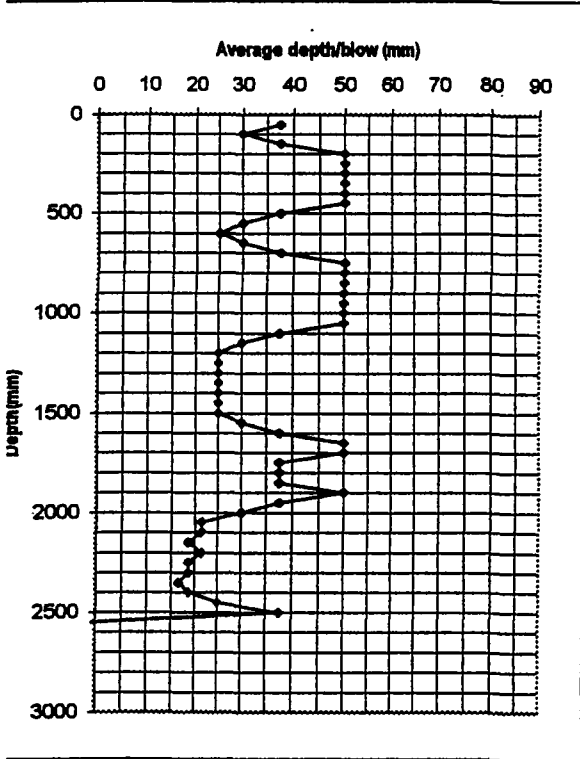
Test 2



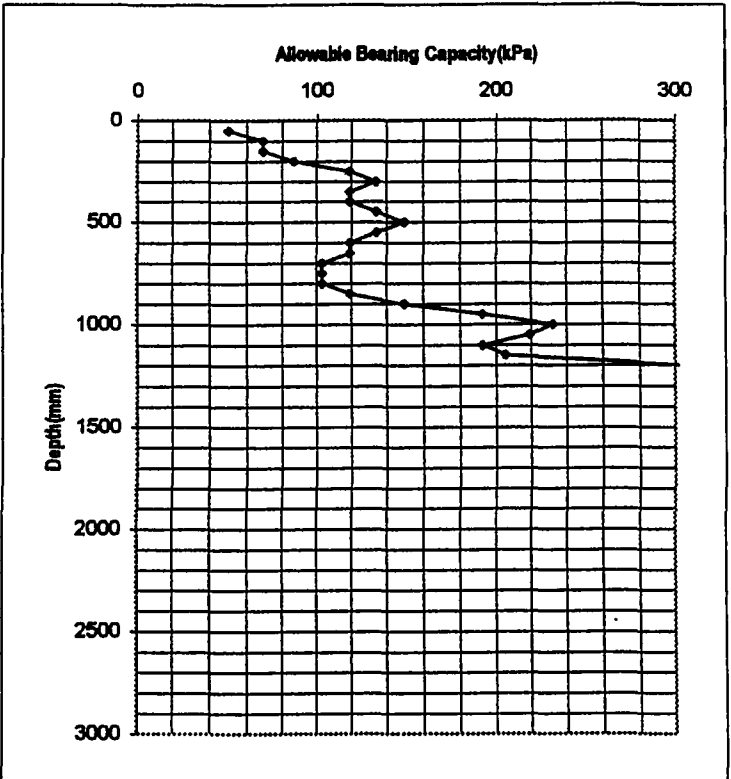
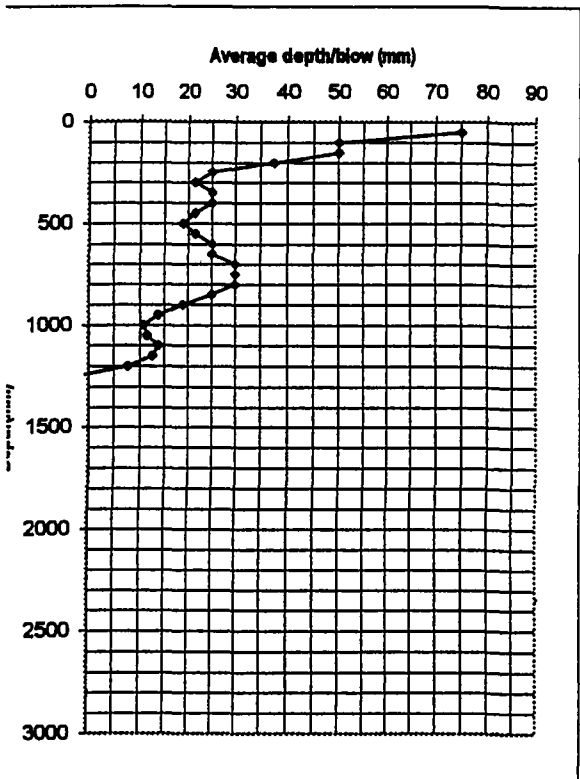
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Scala Penetrometer Tests Results

3

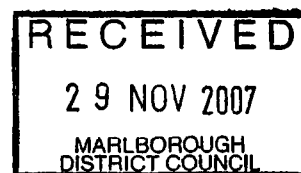


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Appendix 4 – Addendum



6 November 2007

Marlborough District Council
PO Box 443
BLLENHEIM

Dear Sir

RE: Kelman & Armstrong – Dwelling

Smart Alliances Ltd have been engaged by Mr. John Armstrong and Ms. Joy Kelman to assess the stability and suitability of the proposed dwelling at 292 Moetapu Bay Road.

We confirm that an assessment of the development site has been undertaken under our direction and that we have read the previous reports by Abacus Design dated November 2005.

Due to the previous geotechnical report being relatively recent, we do not consider it necessary to provide a new geotechnical report.

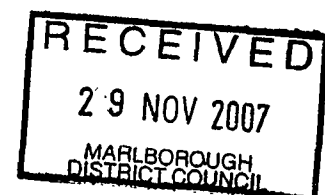
It is our opinion that the proposed dwelling will not detrimentally effect the stability of the site.

We attach a revised effluent design sheet for the proposed dwelling.

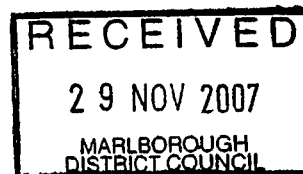
Yours faithfully



Richard Evans
Chartered Professional Engineer



Appendix 5 – Site and Soil Evaluation Report



Site and Soil Evaluation Report Armstrong Kelman – Moetapu Bay, Mahau Sound

1.0 SITE INFORMATION

1.1 Location details:

Owner: A. Armstrong & J. Kelman

Location: Moetapu Bay, Mahau Sound, Havelock

Address: 292 Moetapu Bay Road, RD1, Picton

1.2 Site Description:

The Site is located in Moetapu Bay in Mahau Sound.

The property is situated below Moetapu Bay Road and has a North Eastern aspect.

The site slope features vary between 15 and 25 degrees and vegetated with sporadically regenerating native bush and native grasses. There are no water courses located on the site, however a small gully runs down the hillside on the eastern boundary of the site. A formed access track is situated on the site as shown on the attached site plan. A new septic tank and disposal system is required to be installed.

Wastewater disposal is to be via conventional disposal field to NZS1547.

A site plan is attached for reference.

1.3 Climate:

Annual rainfall (mm): Unknown

Annual Evaporation (mm): Unknown

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1.4 Intended water supply:

Roof water collection

1.5 Existing on-site systems:

None

1.6 Site Evaluator:

Name: Richard Evans

Company/agency: Smart Alliances Ltd

Address: PO Box 546
Blenheim

Phone: 5778857

Fax: 5779966

SUPERSEDED

2.0 ON-SITE EVALUATION

2.1 Work Undertaken:

Details: Site visit & effluent design

Date: September 2007

Weather (on day and preceding week): fine, brief rain in preceding week

Photo Attached: NO

2.2 Topography:

Slope: Building site is located on an existing platform. Effluent disposal site slopes approximately 15 degrees to the North East.

Drainage Patterns: Minor small gullies over the site.

Ground Cover: Juvenile scrub and native bush.

Boundaries: Noted.

Waterways: None in vicinity of the site.

Well/Bores: None.

Buildings: Existing shed.

Other:

Site History (land Use): None.

Site Plan Attached: YES.

2.3 Site Exposure:

Disposal Site Aspect: North East.

2.4 Environmental concerns: (e.g. High water table, wetlands, water ways etc.):

No water bodies or ground water issues, no adjacent site contamination risks..

2.5 Site Stability:

Is expert assessment necessary: previously covered attached Geotechnical report.

2.6 Drainage Controls:

Depth to seasonal water table: Site is situated on a elevated site and therefore no ground water contamination risks.

Need for cut off drains/diversion banks: Yes above disposal site.

Need for surface water collector/cut off drains: N/A

2.7 Set back Distances:

Set back distance: 2m from boundaries.

Reserve area: Available

SUPERSEDED

3.0 SOIL INVESTIGATION

3.1 Soil profile determination Method: Auger Hole

A range of soil properties have been assessed in accordance with the procedures outlined in Appendix 4.1D of NZS1547:2000

3.2 Reporting

Test Site 1

Layer	Lower Depth	Moisture content	Colour (moist)	Field Texture	Coarse Fragments %	Structure	Other
1	100mm	Moist	Grey Brown	Loam	<2	Moderate	Topsoil
2	1500mm	Moist	Light Brownish yellow	Clay Loam / Light Clay	<30	-	Clay Loam, imperfectly drained moderately plastic, smooth to manipulate with schist fragments.
3	-	Moist	Light Yellow	Schist	<90	Some bedding structures present	Highly fragmented and weathered schist.

Test Site 2

Layer	Lower Depth	Moisture content	Colour (moist)	Field Texture	Coarse Fragments %	Structure	Other
1	150mm	Moist	Brown	Loam	<2	Moderate	Topsoil
2	2000mm	Moist	Light Brownish yellow	Clay Loam / Light Clay	<30	-	Clay Loam, imperfectly drained moderately plastic, smooth to manipulate with schist fragments.
3	-	Moist	Light Brownish Yellow	Schist	<90	Some bedding structures present	Highly fragmented and weathered schist.

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Test Site 3

Layer	Lower Depth	Moisture content	Colour (moist)	Field Texture	Coarse Fragments %	Structure	Other
1	50mm	Moist	Brown	Loam	<2	Moderate	Topsoil
2	-	Moist	Light Brownish yellow	Clay Loam / Light Clay	<30		Clay Loam, imperfectly drained moderately plastic, smooth to manipulate with schist fragments.

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3.3 Estimated Soil Category:

Soil Test	1	2	3	4	5
Soil Category	4-5	4-5	4-5		

The estimated soil category has been determined based on Table 4.1.1 NZS 1547:2000 The assignment of soil category 4-5 is based on the texture and structure of the soil as described in 3.2 above and observations made during the site visit.

3.4 Recommended DLR / DIR

DLR: 3mm/day

Reason: Values based on soil category and lack of environmental risk, no risk to ground water or other waterways, LPED field is the best application on moderate slopes.

3.5 General Comments:

A LPED bed disposal field is recommended, the exposed hill side site and the presence of grass & bush on the surface will assist evapo-transpiration.

4.0 DESIGN

4.1 Soil Category found on site: 4-5

4.2 Daily Loading Rate: 3mm per day

4.3 Average Daily Flow Rate (Q) (Litres): 560 L/day

Design Occupancy: based on the following rates:
 Dwelling – 2bedrooms x 2 persons x 140L/day = 560 L/day

4.4 Septic Tank Capacity (Litres): new 5500L septic tank to be installed with outlet filter and pump chamber.

Treatment Quality:

Faecal Colliforms: 10^3/100mls

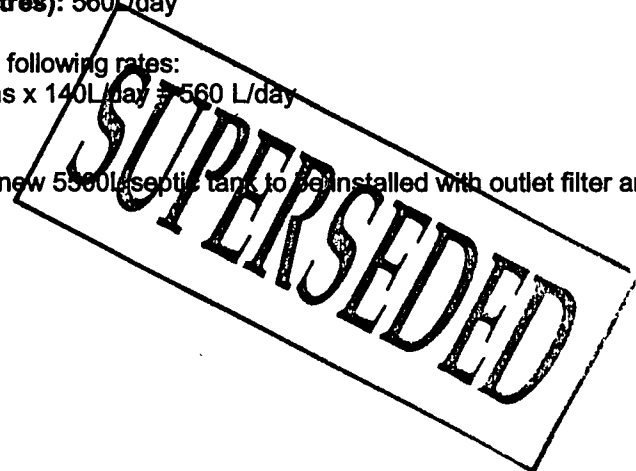
BOD₅: 100g/m³

Suspended Solids: 60g/m³

4.5 Loading Rate (DLR): 3mm/day

4.6 Bed Spacing (m): 5.0m

Note: Beds shall be laid level.



5.0 CALCULATIONS

$$A = \frac{560L}{3 \text{ mm/day}}$$

Disposal Area = 187 square meters
Two - 20m x 5m LPED beds

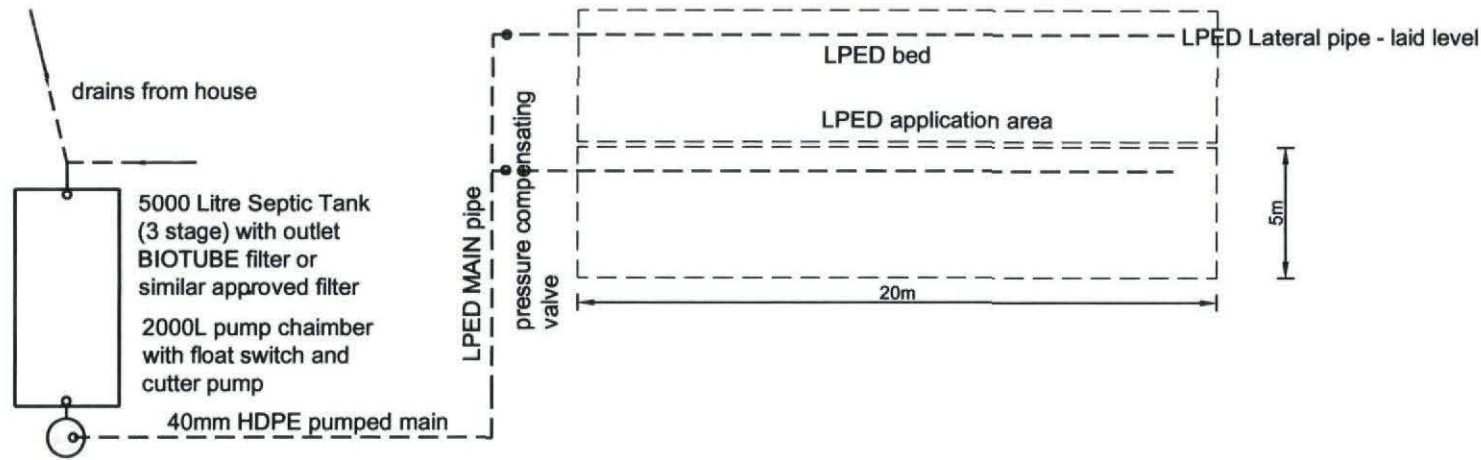
6.0 Assessment of other possible systems:

An aerated secondary treatment system will also be suitable however given the low environmental risks secondary treated effluent is not considered necessary.

7.0 Best Practical Option

The best practical option for management of domestic wastewater is through the use of the proposed system (as detailed in section 4.0 Above) It is my opinion that this system is the best practical method for preventing or minimizing any adverse effects on the environment.

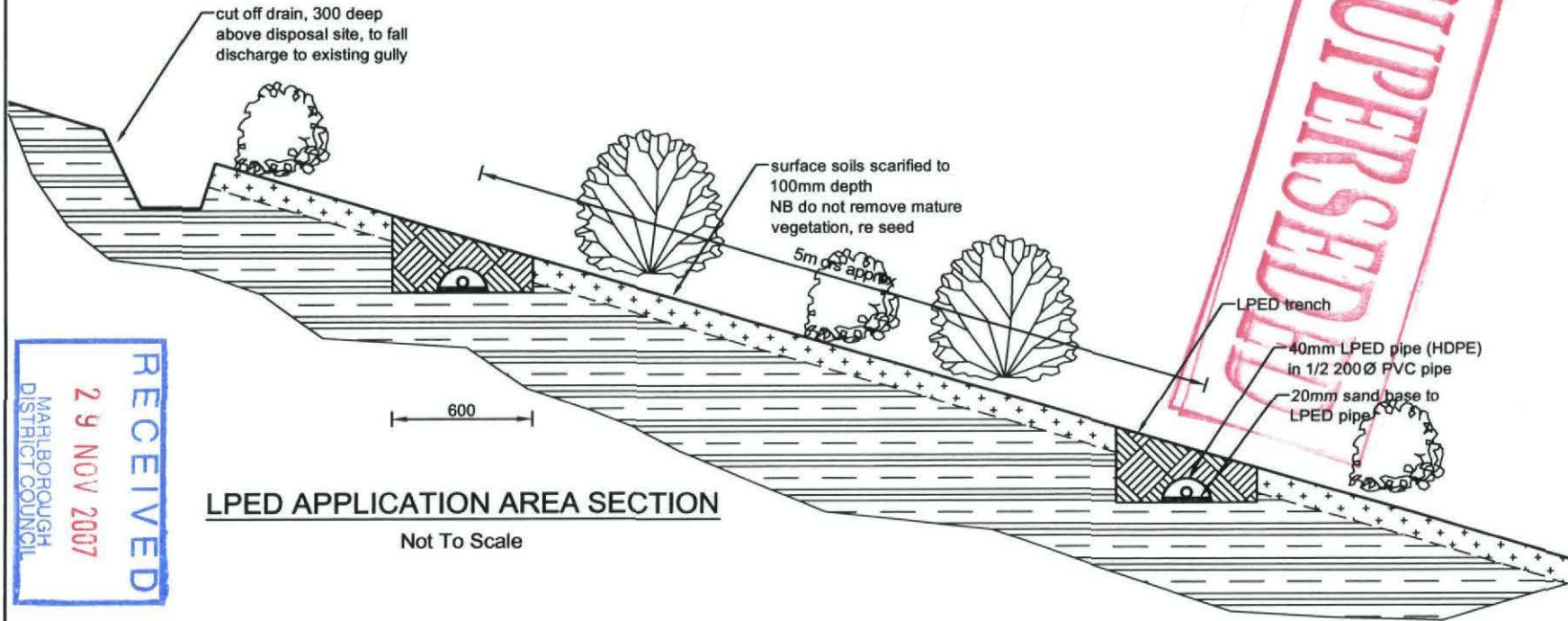
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2 No 20m x 5m LPED beds
Total application area 187m²

FIELD LAYOUT

Schematic - Not To Scale



LPED APPLICATION AREA SECTION

Not To Scale

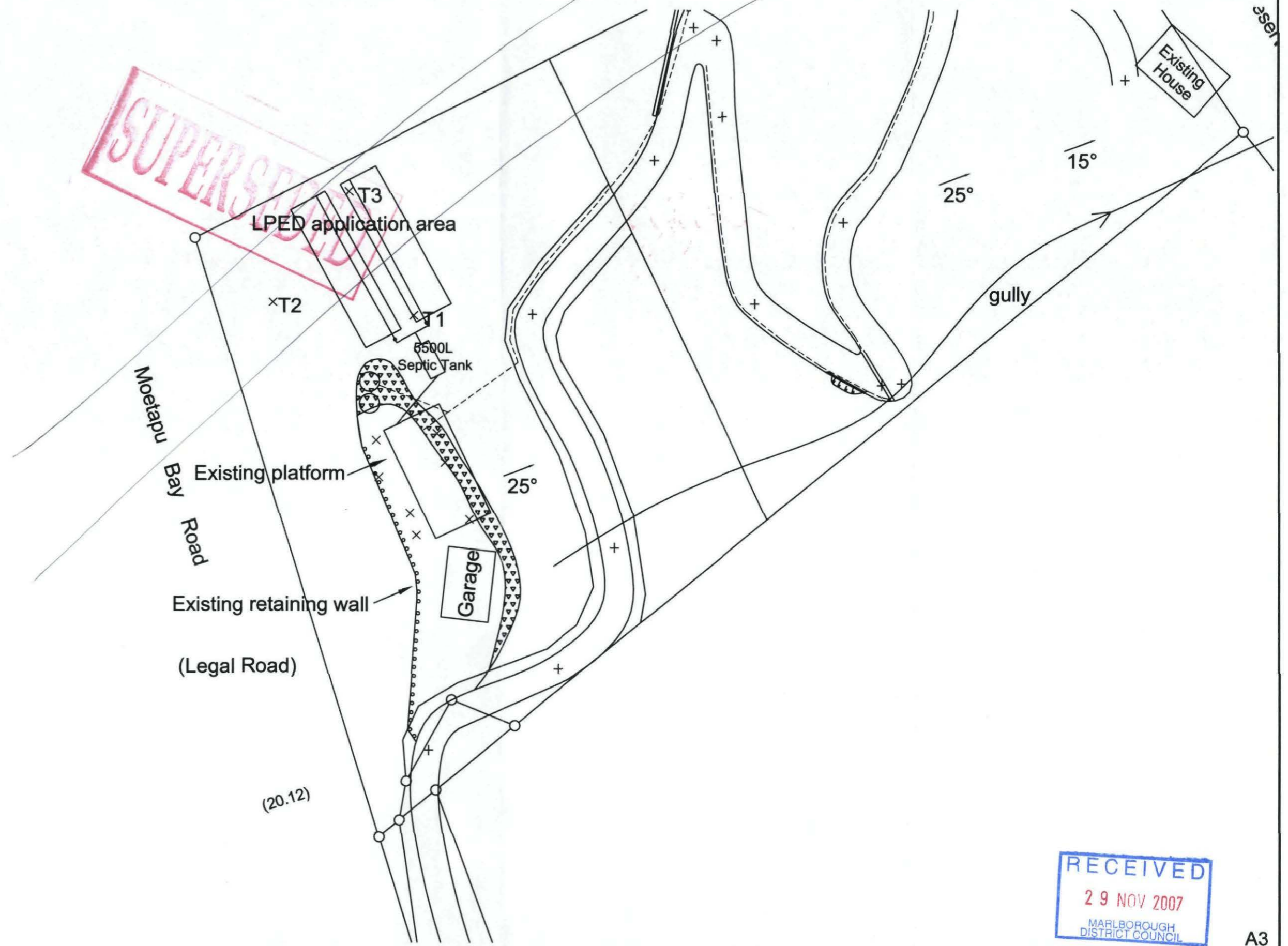
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PROJECT	
ARMSTRONG KELMAN DWELLING	
DRAWING	
MOETAPU BAY EFFLUENT DETAILS	
DATE	SCALE
NOV 2007	NTS
DWG NO.	AMENDMENT
0891-EF01	01
CAD FILE REF:	DRAWN
0528 SEPTIC	APPROVED
DL	RWE

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AMENDMENT	DATE	DETAILS

smartallances
 ENGINEERING / RESOURCE MANAGEMENT / ARCHITECTS LTD
 TEL 03 579 6211 FAX 03 579 6233 PO BOX 548 BLENHEIM NEW ZEALAND

CLIENT
ARMSTRONG KELMAN

PROJECT
**DWELLING
 SITE PLAN**
 DRAWING
WWTS

DWG NO.	AMENDMENT
DATE	SCALE
29/11/07	1:500
CAD FILE REF:	DRAWN
0891	APPROVED