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6 August 2013

Marlborough District Council
PO Box 443
Blenheim 7240

ATTENTION: Peter Johnson

Dear Peter

Subject: Kaipapa Bay – Knowles – U130376 – Request for Additional Information – Review of Wastewater Report
Our ref: 2337A

Please find the revised wastewater report attached to this letter in accordance with your inquiries made by e-mail dated 18.07.2013.

We understand this is the remaining information you have requested.

Yours sincerely

Mark Batchelor

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M. Knowles

Lot 3 DP 1093, Kaipapa Bay

- Wastewater Report

REV 01 - 8 August 2013 Our ref: 2337A

M. Knowles
Wastewater Report
Lot 3 DP 1093
Kaipapa Bay

Contents

Issue No.	1	2	3	4	5	6
Date	21.04.13	04.08.13				
Prepared By	RE	RE				
Checked By		KS				

1 Executive Summary

With respect to the existing buildings and proposed redevelopment at Lot 3 DP 1093, Kaipapa Bay, Smart Alliances have carried out an engineering appraisal of the site. This report presents the geotechnical conditions and wastewater management criteria for the redevelopment. It is recommended that:

(a) The wastewater management system for the yellow dwelling should comprise a secondary treatment unit coupled with drip irrigation. A minimum length of 257m (242m²) is required. Installation is to be in accordance with requirements and recommendations of AS/NZS 1547:2012.

(h) The drip irrigation field should be located above the existing grey house position so as to avoid any possible surcharging of the slopes behind the black and yellow houses.

The foregoing recommendations cannot be taken in isolation and must be read with respect to the balance of this report and the context of the potential residential development at the site.

2 Introduction

It is understood that Murray Knowles is proposing a redevelopment of his existing property located at Lot 3 DP 1093, Kaipapa Bay, Queen Charlotte Sound. The existing building development at the site comprises three residential dwellings and a large boat shed. The existing dwellings are designated black, yellow, and grey, based on their external wall colour. The boat shed is green. The locations of the existing buildings at the site are shown on the site plan presented in Appendix A of this report, drawing 2337A-G10.

It is understood that the existing grey house is to be completely removed as part of the redevelopment, and no further assessment of the grey house has therefore been undertaken. It is proposed to refurbish the existing yellow house and set the house back approximately 3m to the west in order to provide access along the foreshore in front of the house. A new wastewater system will be provided for this house. The existing system for the black house will not be altered.

The purpose of this report is to present the results of site investigations carried out in relation to on-site wastewater treatment and land application for the proposed building redevelopment at the site. The site investigation was carried out on 8 April 2011.

3 Location & Site Description

The subject property is located in Kaipapa Bay on the northern side of Queen Charlotte Sound, to the northeast of Allports Island. The property comprises very steep west aspect topography leading down to the foreshore from a south-southwest trending ridge, and is generally vegetated in moderately dense regenerating bush.

The existing buildings at the site are generally located immediately adjacent to the foreshore, with the black house located further up the slope. A recently upgraded track extends from the existing jetty to the north before switching back to the south and the black house, as indicated on the site plan.

The legal description of the property is Lot 3 DP 1093 and the land area is 0.564 ha. The site is not shown to be within the 'unstable' hazard overlay according to the maps within the Marlborough District Council Sounds Resource Management Plan.

4 Wastewater Assessment

The existing wastewater management system at the site comprises a septic tank system for the black house and a long drop adjacent to the yellow house.

The existing long drop at yellow house the site is to be removed with a new effluent system installed to accommodate the proposed redevelopment of the yellow house.

No alteration will be made to the existing black house and use of the existing septic tank and field will be continued. There is no indication on the site that the existing system has failed and we expect the system to continue to treat and dispose the wastewater adequately without detrimental effect on the environment. The disposal area is over 35m to the foreshore. The existing wastewater area is over 40m from the new disposal area.

A suitable land application area was identified on the slopes behind the existing grey house which will enable a treatment system to be provided adjacent to the yellow house with the effluent field pumped above the foreshore reserve land to an area where the effluent will not surcharge the slopes above any of the remaining buildings at the site.

The proposed land application area is located to the southwest of the yellow house on moderately steep (20°-25°) slopes vegetated in regenerating bush, as shown on the site plan. The land application area can achieve a 20m setback from the existing foreshore.

Three hand augered boreholes, numbered H1 to H3, were put down at the site in the proposed land application area and their locations are shown on the site plan. Based on the soil assessment carried out, an average drainage category of 5 has been adopted. Logs of the representative soil properties are provided in Appendix B.

Groundwater was not encountered within the subsurface investigation reported herein, and is expected to be generally located at a depth greater than one metre beneath the existing ground surface.

An assessment of the best practical option has determined that secondary treatment and drip irrigation land application is appropriate for the site conditions and constraints, when average site topography and soil considerations are taken into account. A 20% reduction has been applied in accordance with Table M2 for the moderate site slope.

A secondary treatment system involves aerobic biological processing and settling or filtering of effluent received from a primary unit which is required to equal or better the following standards:

BOD after 5 days (average) < 20 g/m^3
Suspended solids (average) < 30 g/m^3

Any system meeting the above performance standards is satisfactory. Such systems include (but are not limited to) Biolytix, Enviroflow, Innoflow AdvanTex, Klaro, Novaclear, Oasis Texass, and RXP Airtech 9000. These systems and other media filtered systems are most suitable for a holiday home situation where the house is unoccupied for extended periods and as a consequence there is no flow of effluent going into the system.

The intermittent use of a building can result in variable wastewater flow and can affect the performance of certain treatment units. It is stated in AS/NZS 1547:2012 that intermittent use of aerated treatment units can result in substandard secondary treatment of domestic wastewater.

It is our opinion that the wastewater from such systems is suitable, provided the owner is aware that in periods of inactivity the system becomes dormant, and may take a period of time before full functionality is restored after inactivity.

A wastewater design sheet is provided in Appendix B with the design calculation based on the following criteria for the proposed development:

- 2 bedroom dwelling with permanent occupation by 4 people.
- Roof water supply source.
- Total design flow of 580 litres/day (4 persons and 145 litres/head/day).
- Full water reduction plumbing fixtures
- Soil category 5 and a design loading rate of 3mm/day.
- Reduction in DIR of 20% to account for slope of 20% (2.4mm/day)

Based on the foregoing, the minimum length of drip line required for the proposed development is 257m (242m^2). The irrigation system design requires 1.6 litre/hr emitters with lines laid at 1.0m spacing and be either buried 150mm below ground level or pinned to the ground and overlain with a 150mm layer of leaf material or other inert material. The installation of the irrigation system is to be in accordance with the product installer guide supplied by the manufacturer. The lines should not be located any closer than 2m from any site boundary.

Prior to the proposed system becoming operational the system installer must certify that the system has been constructed according to the foregoing design. This certification must then be forwarded to Council. As the foregoing design satisfies G13/VM4 of the NZ Building Code, a PS1 and monitoring schedule for the wastewater installation at the site is not required.

The Marlborough District Council requires that the owner of any advanced wastewater treatment system enters into and retains a maintenance contract with the supplier of the system, or with a recognised maintenance contractor, for maintenance to be carried out at yearly intervals. Records of the maintenance should be forwarded to the Council as soon as practicable following the completion of the inspection or, in the case of remedial works being required, on completion of those remedial works.

5 Conclusion

On the basis of our site investigations and appraisal reported herein, it is concluded that the site has a suitable area for wastewater discharge.

It is confirmed that the site wastewater can be effectively managed by installing a secondary treatment unit adjacent to the yellow house and a drip irrigation field upslope of the existing grey house position.

6 Limitations

This report is valid for three years from the date of issue and covers the wastewater requirements for the proposed building redevelopment M. Knowles at Lot 3 DP 1093, Kaipapa Bay. Any other areas are outside the scope of this report.

The reliance by other parties on the information or opinions in the report shall, without our prior review and agreement in writing, be at such parties' sole risk.

The conclusions and recommendations expressed herein have been prepared with respect to the proposed development at the site, and should not be taken out of context from the proposed development discussed herein or the remainder of this report.

Notwithstanding the foregoing conclusions and recommendations, any proposed building development should be designed to satisfy the relevant requirements of the Building Code so as to ensure compliance with the Building Act.

7 References

1. Begg, J.G. and Johnston, M.R. (compilers) 2000. New Zealand Geological Map 10: Geology of the Wellington area, 1:250,000.
2. NZS 1547:2012 On-site Domestic Wastewater Management.
3. Marlborough District Council Guidelines for new on-site wastewater management systems, July 2005.

SMART ALLIANCES LTD

Richard Evans
Chartered Professional Engineer
B.Sc Eng, MIPENZ

28 July 2013

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Appendix A – Site Plan

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Appendix B – Wastewater Logs, Design Sheet

Wastewater Logs - 2337A

Three hand augered boreholes, numbered H1 to H3, were put down at the site in the general vicinity of the proposed land application area and their locations are shown on the site plan in Appendix A. The representative soil properties are:

H1

Lower Depth (m)	Horizon or Layer Boundary	Genesis	Description							Drainage Category
			Colour	Field Texture	% + 2mm Fragments	Compactness	Consistency	Structure	Moisture Condition	
0.15	A	Topsoil	Dark brown	Clay loam	None	Loose	Firm	Moderate	Moist	2
0.6	B	Residual	Browny Yellow	Light clay	None	Moderate	Stiff	Weak	Moist	5

H2

Lower Depth (m)	Horizon or Layer Boundary	Genesis	Description							Drainage Category
			Colour	Field Texture	% + 2mm Fragments	Compactness	Consistency	Structure	Moisture Condition	
0.15	A	Topsoil	Dark brown	Silt loam	None	Loose	Firm	Moderate	Moist	2
0.6	B	Residual	Orange-brown	Silty clay	2%	Loose	Stiff	Weak	Moist	4-5

H3

Lower Depth (m)	Horizon or Layer Boundary	Genesis	Description							Drainage Category
			Colour	Field Texture	% + 2mm Fragments	Compactness	Consistency	Structure	Moisture Condition	
0.15	A	Topsoil	Dark brown	Silt loam	None	Loose	Firm	Moderate	Moist	2
0.6	B	Residual	Browny Yellow	Light clay	None	Moderate	Stiff	Weak	Moist	5

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Project: 2337A
Client: M. Knowles
Location: Kaipapa Bay
Date: 21.04.11

WASTEWATER SYSTEM DESIGN SHEET
To AS/NZS 1547:2000

Bedrooms in redeveloped Yellow House: 2

Intended water Supply: Roof Water Collection

Soil Category Determined on Site: Category 5

Recommendation for this site: *Secondary Treatment and drip irrigation land application*

DRAINAGE CONTROLS:
Need for surface water collector / cut-off drains? *No*

AVAILABILITY OR RESERVE / SETBACK AREAS
Reserve area available for extensions, % of design area: *100%*
Setback distance? (between development and disposal system):

DESIGN
Daily Loading Rate: *2.4* mm/day

Occupancy: 4 *Persons*

L/person/day: 145 L/day/ person = 580 L/day from Appendix 4.2D AS/NZS 1547:2000

DESIGN DAILY FLOW: 580 L/day

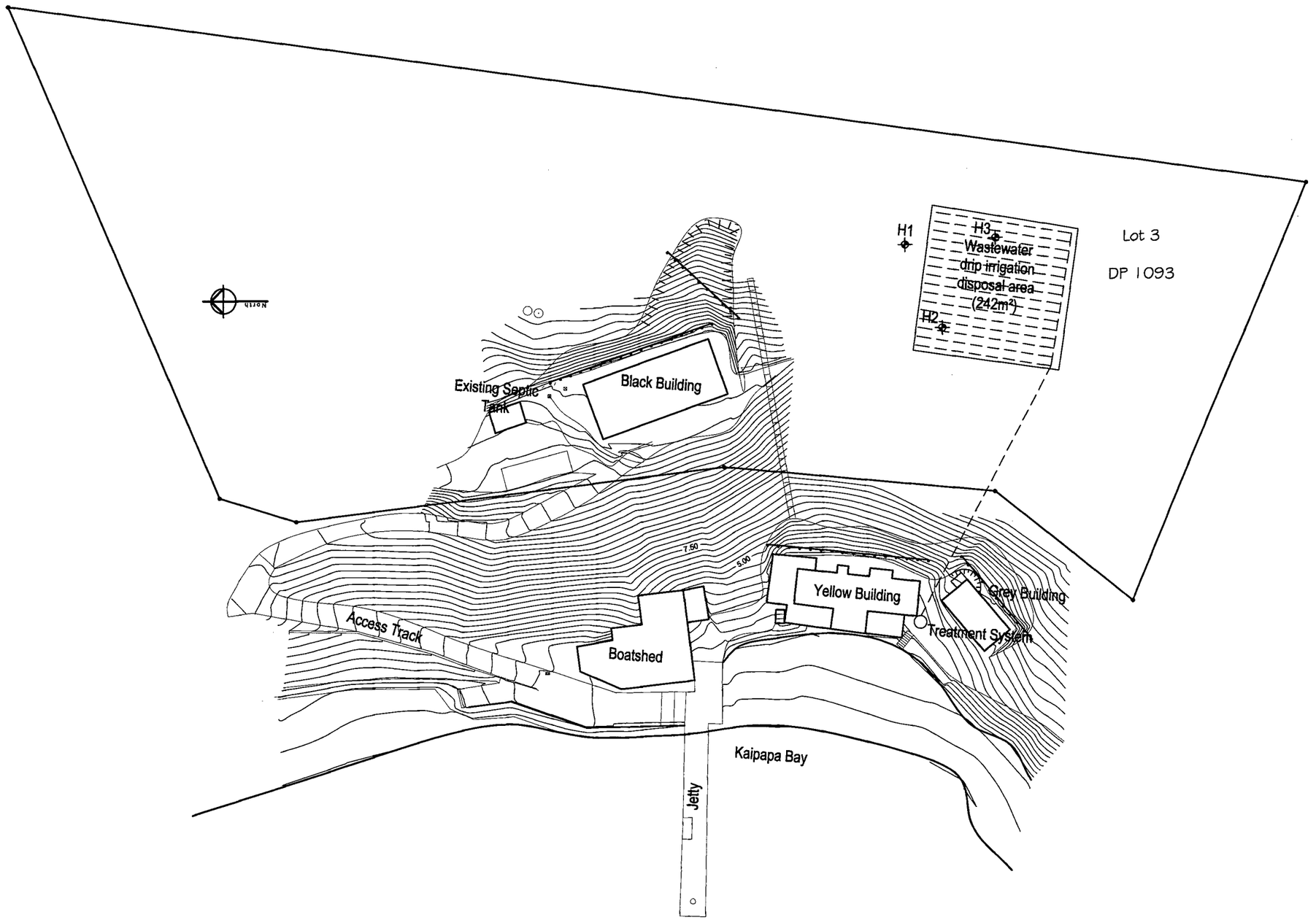
AREA REQUIRED: 241.7 m²

LENGTH REQUIRED: 257 m

RESERVE AREA REQUIRED: *100%* of specified

Irrigation Design

Acceptable daily loading rate (mm/day)	2.4
Daily influent (l/day)	580
Emitter type	Raam 17
Emitter flow rate (l/h)	1.6
Emitter Spacing (m)	1
Dripline Spacing (m)	1
Distance from Treatment system to Irrigation Field (m)	5
Field Size (m^2)	242
Field length assuming square area	16
Number of lines	17
Total Dripline Length (m)	257



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REV	DATE	DETAILS
01	28-07-2013	DETAILS ADDED

REV	DATE	DETAILS

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CLIENT
MURRAY KNOWLES

ISSUE
REPORT

PROJECT
WASTEWATER REPORT
KAIPAPA BAY

DRAWING
SITE PLAN

DATE
05 MAY 11

SCALE (A3)
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DRAWN
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REVISION
01

APPROVED
RE

DWG NO.
2337A-G15

CAD FILE REF: P:\ 2337A\Drawings\2337A-G10

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M. Knowles

Structural Assessment,
Yellow Building - Kaipapa Bay

- **Engineering Report**

30 May 2011 **Our ref: 2337A**

Murray Knowles
Engineering Building Report
Kaipapa Bay

Contents

Issue No.	1	2	3	4	5	6
Date	13.05.11					
Prepared By	KS					
Approved By	RE					

1 Executive Summary

Smart Alliances Ltd has carried out an engineering inspection and appraisal of the yellow coloured building and the grey coloured building on the foreshore in front of Lot 3, DP1093 in Kaipapa Bay, Queen Charlotte Sound.

The yellow building (herein called building) is in a poor state of repair as it has been sparingly maintained. The structure however is generally in good condition and only requires the removal of the southern deck and replacing of two central piles (these areas currently being the only 'unsafe' portion of the building).

The above statements cannot be taken in isolation and must be read in conjunction with the rest of the report.

2 Introduction

Murray Knowles has been issued with a Notice to Fix the building located on the foreshore, in front of his property at Lot 3, DP1093 in Kaipapa Bay, Queen Charlotte Sound.

The specific requirement from the Notice to Fix in relation to the building is;

2.1.1 Schedule 3

1. Dwelling (Yellow Building) has significant deterioration of Foundations.

The purpose of this report is to report on findings from structural inspection of the building and where required to provide remedial works instruction to ensure the building is repaired to a safe standard.

This report should be read in conjunction with the geotechnical report produced by this office assessing the stability of this property.

A site inspection was carried out by Khalid Suleiman of this office on 08 April 2011.

3 Site and Building Description

The property is located in Kaipapa Bay, in the Queen Charlotte Sound.

The property has a westerly aspect and vegetated in primarily regenerating native bush. The immediate site area of foreshore surrounding the building is partially open and grassed.

The property has a black coloured house located just above the foreshore reserve and several buildings located on the foreshore reserve. There is a jetty, new concrete seawall and an access track from the jetty to the black coloured house. Refer to the site layout drawing provided in appendix A.

The building is located on the foreshore at the base of the hill. A sea wall along the beach front forms part of the front foundations of the building and retains the ground on which the rest of the building is founded on.

The remainder of the building is found on a combination of concrete and untreated timber shallow piles.

The subfloor, flooring, roof, walls and external cladding are primarily Rimu and untreated.

The walls are lined in timber weatherboards externally and internally with a combination of 15mm soft board and 5mm masonite compressed board.

The roof cladding is corrugated fibre cement. The roof cladding is supported on 20mm rimu sarking, on 70x50mm purlins on 100x50mm rafters at 1.2m centres.

Details of the structure can be seen on the sectional drawing shown in Appendix A.

The building was constructed in the early 1900's well before the implementation of the building code / act.

The building has been constructed in the ways of building of the time, whilst the construction does not comply with current standards the building has withstood all weather events during its 100+ years of existence.

4 Structural Condition

The building is in a poor state of cosmetic repair as it has had little maintenance during its lifespan, however the overall structure is generally in good condition.

4.1 Foundations

The seawall does not appear to have any reinforcing. The concrete is of pour quality and the aggregate is beach material. The areas of the wall subject to wave action are showing signs of deterioration and the southern end has collapsed.

The sea wall is open in the middle creating a storage area below the seaward section of the building. The back wall of this area has collapsed which has resulted in the earth supporting two piles being undermined.

The untreated timber piles have rotted at ground level and are expected to be rotten below ground level. The rot has caused localised sinking of the floor. Packing above the piles has been installed at some point to level the floor. This has not caused any structural damage to the house or caused any immediate unsafe conditions for the building or its occupants and can be easily repaired by replacement of the two piles.

Repair of the rear wall to the storage area and replacement of the two piles would repair the collapsed area. This is no more than repair and maintenance that can be expected of any building of this age and as such does not present any danger to the building or its occupants. It is essentially part of repairing the piles.

The bearers and floor joists have been attacked by borer and have been slightly weakened by this. This has not caused any immediately unsafe structural conditions that threaten safety of the building or its occupants and that can not be easily repaired when need for this occurs. At present these timbers still have adequate strength .

4.2 Walls

The external cladding is in relatively good condition but needs repainting. There are several small areas of rot located at the front and rear of the building. The rot is limited to a small part of the the outer cladding therefore presents no damage to the structural integrity of the building or to its safety or the safety of any persons occupying the building.

No destructive inspection was undertaken so the majority of the wall framing was not inspected, however some areas were visible and did not show any sign of deterioration.

Most of the walls are deformed due to the pile subsidence however the deformation is only vertical as common to houses of this era requiring localised re-piling. It is expected the majority of the framing is in good condition. Replacement of the two rotten piles and remedial works on the foundation will correct the vertical deformation.

4.3 Roof

The roof is in relatively good condition, most members have been painted and there is no sign if significant deflection or failure.

5 Recommendations

Continuing regular checking and repair, as is common to any building, will ensure the buildings continuing structural integrity and avoidance of deterioration sufficient to result in danger to the building or occupants. Not withstanding the above, we recommend the following remedial works with associated timeframes to ensure the building remains safe:

5.1 Immediately

- Remove the southern deck and associated walls and roofing.
- Replace the two undermined piles behind the seawall with piles extending below the bottom of the seawall.

5.2 Within the next 24 Months

- Replace any rotten weatherboards
- Paint the exterior cladding

5.3 Within the next 5 years

- The sea wall be replaced.
- The foundations and subfloor requires replacing. We recommend the building is lifted, supported, a concrete slab installed tied to the top of the sea wall and the building lowered and fixed to the new slab.

6 Conclusion

The building is in relatively good structural condition. Only minor works and standard preventative maintenance is required within the next 24 months in order to bring the building to a suitable structural standard.

Provided the recommendations provided in section 5 are carried out and the owner adequately maintains the building, the building will continue to be safe and be of a suitable structural standard.

7 Limitations

This report is valid for two years from the date of issue and covers the structural assessment of the yellow and grey buildings in front of Lot 3, DP4448. Any other areas are outside the scope of this report.

As per the meaning of dangerous building (attached in Appendix C) we have excluded the occurrence of an earthquake from this assessment.

The reliance by other parties on the information or opinions in the report shall, without our prior review and agreement in writing, be at such parties' sole risk.

8 References

1. New Zealand Timber Framed Buildings - NZS3604:1999
2. The New Zealand Building Code

SMART ALLIANCES LTD

Khalid Suleiman
NZCE (civil), REA

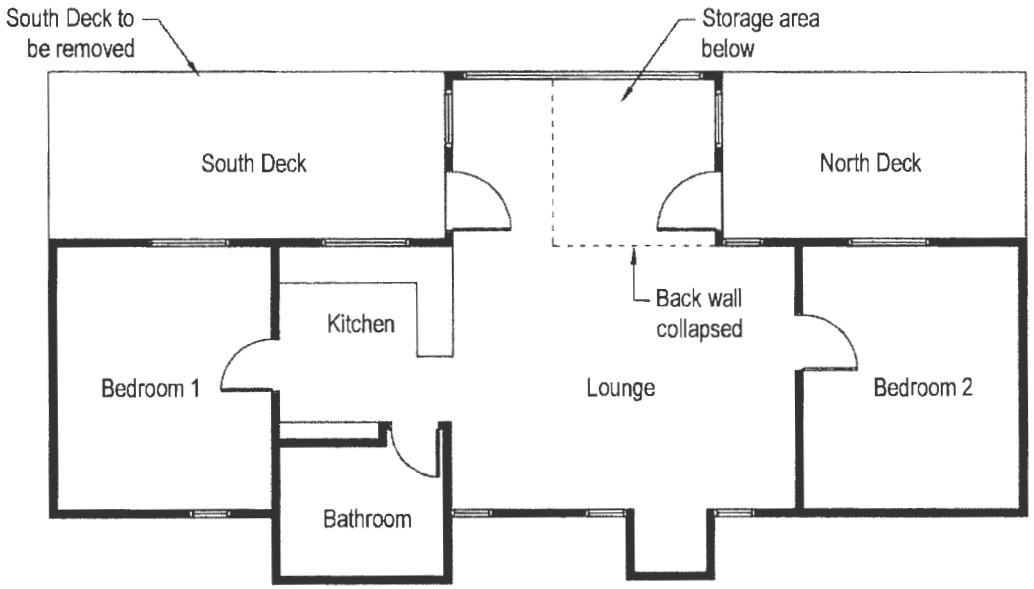
13 May 2011

Richard Evans
BSc Eng, CPEng, MIPENZ

13 May 2011

Appendix A - Drawings

- Site Plan
- Plan
- Cross Section



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CLIENT
Murray Knowles

ISSUE
Resouce Consent

PROJECT
Kaipapa Bay Redevelopment
Yellow House

DRAWING
Plan

DATE
11-05-11

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REVISION

APPROVED
KS

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2337A-S02

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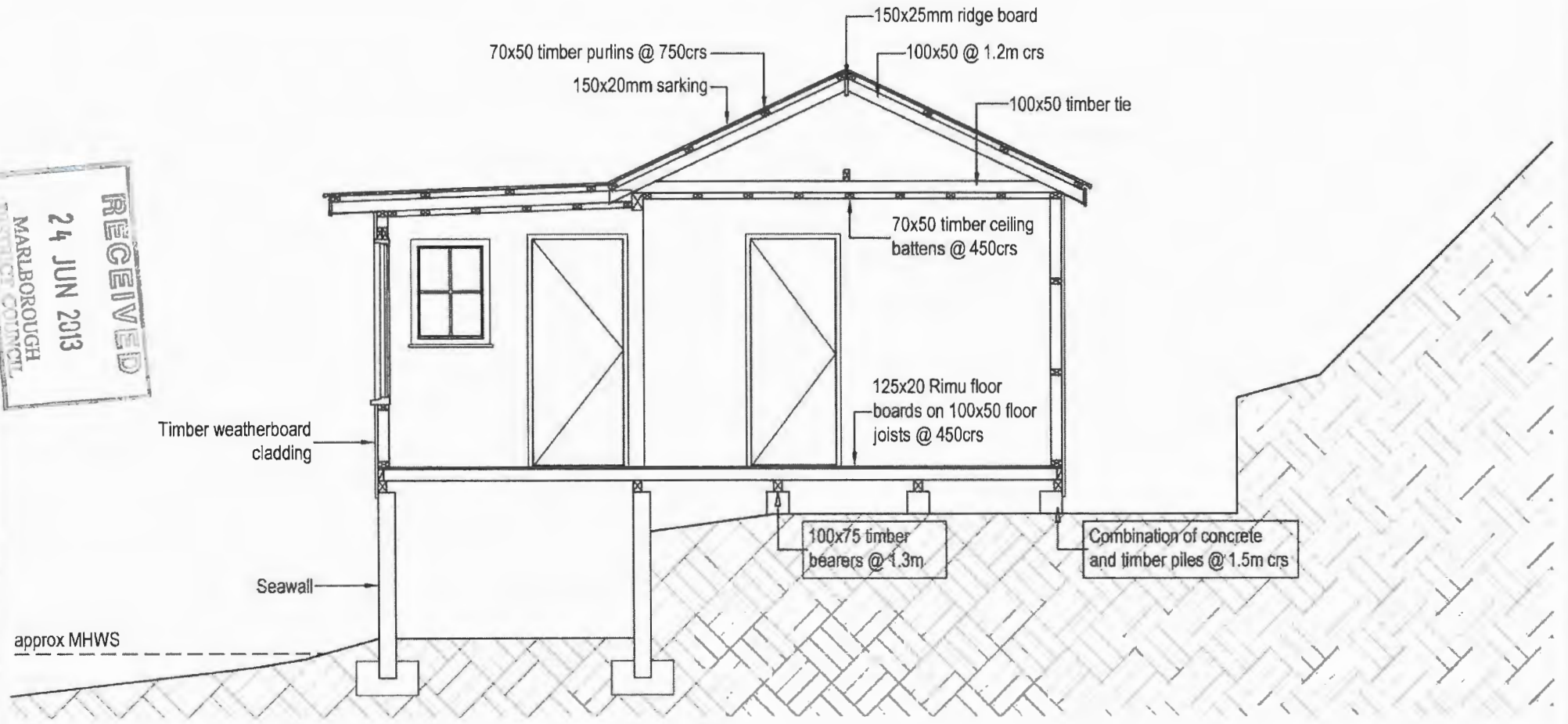

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CLIENT
Murray Knowles

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PROJECT
Kaipapa Bay Redevelopment
Yellow House

DRAWING
Section

DATE
11-05-11

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REVISION

APPROVED
KS

DWG NO.
2337A-S10

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Appendix B –Photographs

Buildings on the property

Southern decking and associated wall and roof to be removed

Southern decking area

Seawall and wave action at high tide

Internal part of seawall

Typical foundation detail

Borer in floor joist

Internal layout – note subsidence in dividing wall

Roof layout