

Edgar Alterations

J & A Edgar
397 Ben Morven Road

Wastewater Assessment

31 January 2017

Our ref: 5746

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Wastewater Assessment
397 Ben Morven Road
Fairhall

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Issue No.	1	2	3	4	5	6
Date	31/01/17					
Prepared By	NE					
Approved By	RE					

1 Outline Recommendations

With respect to the residential development at 397 Ben Morven Road, Fairhall, Smart Alliances Ltd have carried out an engineering appraisal of the existing onsite wastewater management system for the proposed development. It is recommended that:

- a) The existing secondary wastewater system installed in 2008 is considered suitable for use as long as the remedial repairs are carried out and the dripper lines are upgraded to accommodate the additional bedroom.
- b) Remedial repairs consist of repairing the existing leaking irrigation lines and ensuring that they are pinned and covered.
- c) The proposed Marlborough Environment Plan has identified the property as being within a Soil Sensitive Area – loess soils. On this basis, any new or upgraded wastewater system requires resource consent.

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 proposed residential development at the site.

2 Introduction

J & A Edgar are proposing to make alterations to their existing dwelling by relocating one bedroom and creating another new office/bedroom. The proposed development equates to a total number of 6 bedrooms which comprises of a 4-bedroom dwelling a 2-bedroom cottage.

The purpose of this report is to assess the existing wastewater system and outline the necessary upgrades and/or remedial works which are required so that the system can serve the proposed development. Smart Alliances Ltd undertook an assessment of the existing wastewater system on 26 January 2017.

3 Location & Site Description

The site is located to the south of Ben Morven Road via a shared driveway. Further property information is as follows:

- Address: 397 Ben Morven Road, Fairhall
- Legal Description: LOT 2 DP 7187 BLK II TAYLOR PASS SD
- Property Number: 189747
- Legal area: 1.7380ha

4 Wastewater Assessment

4.1 Existing System

The existing wastewater system was installed in 2008 and consists of a secondary Oasis Clearwater TEXASS system. The application area was designed and based on Category 4 soil which has a soakage rate of 25mm/week or 3.6mm/day. The outflow effluent was designed to be pumped to dripper lines measuring 526m in length, this length was not confirmed during the assessment.

The dripper lines were originally designed to be placed between the olive plantation which was considered, at the time of installation, to be at risk of being crushed by the frequent vehicle movements. It was therefore reassessed and agreed with Smart Alliances Ltd to pin and cover the dripper lines along the north facing bank below the swimming pool.

4.2 Soils and Site Assessment

4.2.1 Soils

In the original engineering report dated 16 July 2008 by Smart Alliances Ltd, the soils were identified as being loess clayey silty loam to a depth of 0.6m at where residual orange silty clay loams were encountered.

The recent site assessment identified any signs of loess soils which may result in subsurface tunnelling and erosion. No erosion as a result of dispersive or loess type soils was identified in the vicinity of the dripper line application area.

On the basis of the above, it is considered that drainage category 4 soil is still applicable for this system.

4.3 System Design

The existing system was designed in accordance with the obsolete onsite wastewater management standards NZS1547:2000.

The proposed development and required irrigation line upgrade have been designed in accordance with the newer standards, NZS1547:2012.

4.3.1 Proposed Wastewater Management System

An assessment of the best practical option has determined secondary treated effluent and dripper line application is still the most appropriate due to the risk of dispersive soils, number of occupants and the restrictive qualities of the subsoil (Category 4).

Under the new Marlborough Environment Plan (MEP) the property is within a Soil Sensitive Area (Loess Soils) and as a result, will require resource consent.

4.3.2 Wastewater Design

The required dripper line length has been designed for the values shown in Table 3 below.

Please note that the crossed-out values are what the existing system was designed for.

Number of proposed bedrooms	6 (5 existing design)
Number of Occupants (2 per bedroom)	12 (10)
Intended water supply	Bore-water supply
Drainage controls	Not required – flat application area
L/person/day	165* (180)
Daily design flow (L/day)	1980 (1800)
Soil category	4
Effluent loading rate (mm/day)	3.5 (3.6)

Table 1: Design Summary

*Standard water reduction fixtures are to be installed in accordance with Appendix note 2, in Table H3 of AS/NZS1547:2012 to assist in minimising water usage, such fixtures include: Dual flush 11/5.5 litre water closets, shower flow restrictors, aerator faucets (taps) and water conserving automatic washing machines. The existing developments were found to have these installed.

4.3.3 Secondary Treatment Unit

The existing 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

It is considered that the existing Oasis Clearwater TEXASS unit is able to achieve these standards as long as it is maintained in accordance with the manufacturer's guidelines. A photograph of the existing unit is shown in Figure 1 overleaf.



Figure 1: Existing Wastewater System

4.3.4 Irrigation System

Based on a six-bedroom development and the current NZS1547:2012 standards, the following has been calculated:

Please note that the crossed-out values are the existing system design.

Number of Bedrooms	Number of Occupants (as per MDC Guidelines)	Design Flow (Litres/day)	Drip Line length Requirement (m)
5 (existing 6)	10 (12)	1980 (1800) existing design	589m (526m)

Table 2: Irrigation Line Requirement

The current and proposed irrigation system should consist of 1.6 litre/hr emitters spaced at 1m centres. The additional dripper line is to be positioned next to the existing dripper lines once the remedial repairs (discussed later in the report) are carried out. A photograph of the existing dripper line location is shown below.



Figure 2: Existing application area

The dripper lines are to be positioned within the topsoil layer and laid at a maximum of 150mm below the existing ground surface or 200mm if within a light trafficable area. They should not be positioned in areas which encounter frequent heavy traffic such as tractors.

4.4 Remedial Repairs

Whilst the existing system is suitable for the proposed development once additional dripper line has been added, it was apparent at the time of the assessment that a number of remedial repairs are required.

During the assessment, there were a number of damp areas which showed signs of sludge growth. This may indicate a concerning leak in the dripper line and is, therefore, a repair is required to ensure a concentrated discharge of effluent does not occur. Refer to the photograph in Figure 3 below.



Figure 3: Significant dripper line leak

Prior to the irrigation lines being upgraded, all leaks should be sealed and the system flushed and checked to ensure that effluent is distributed evenly over the dripper lines.

During the assessment, there were a number of dripper lines that were exposed and at risk of being damaged by UV rays. The dripper lines should be protected or be placed beneath the ground surface. It is recommended that the dripper lines are carefully assessed by a contractor and as a minimum, be appropriately pinned to the ground and covered with a 150mm layer of mulch or other inert material so that no part of the irrigation line is exposed. A photograph highlighting one of the many exposed irrigation lines is shown overleaf.



Figure 4: Exposed dripper line

In addition to the above, Marlborough District Council requires that the owner of any advanced wastewater 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.

Prior to the proposed upgraded system becoming operational the system installer must certify that the system has been constructed according to the foregoing design and confirm that the system has been appropriately sized by the manufacturer and installed to meet the field design requirements. This certificate must then be forwarded to Council.

4.5 Environmental Assessment and Risk mitigation

As per the proposed Marlborough Environment Plan:

- The property is **not** located within a flood hazard Area.
- The application area is **not** within a Groundwater Protection Area.
- The application area is **not** to be positioned within 50m of a well borehole.
- The discharge **will** occur within a Soil Sensitive Area (Loess Soils).

The main mitigation against any possible risk to water sources is that the effluent will undergo a high level of treatment prior to land application with the considerable removal of pathogens and nutrients.

There is greater than 100% reserve area should the system be underperforming and require extending.

Irrigation percolation rates vary according to the soil type. We have classified the soil as a category 4 type soil which is suitable for on-site disposal via dripper lines. Effluent is distributed over a large area via a secondary treatment unit which will be absorbed by grass and planted vegetation.

This area of Marlborough is recognised as having dispersive type soils which can be adversely impacted by poorly designed wastewater systems. The existing and proposed system has considered the dispersive soils (loess) and found that it is a low-risk site. To further mitigate against erosion or subsurface tunnelling developing, the system uses dripper line irrigation which evenly distributes the effluent over a large area.

A higher quality effluent will also ensure there is no risk of contamination to the groundwater table that is positioned at a conservative estimate of beyond 2m below the ground surface.

Regular maintenance and inspection, a requirement of the resource consent, will ensure the onsite wastewater system is operating to a suitable standard.

Road access to the system for maintenance is to be available.

The system is to be protected from heavy animal access and traffic movements.

5 Limitations

This report is valid for five years from the date of issue and covers the wastewater assessment and upgrades for J & A Edgar alterations at 397 Ben Morven Road. 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 recommendations expressed herein have been prepared with respect to the proposed development at the property, and should not be taken out of context from the information discussed herein.

6 References

1. NZS 1547:2012 On-site Domestic Wastewater Management.
2. Marlborough District Council Guidelines for New On-site Wastewater Management Systems, July 2005.
3. Crites, R.W. and Tchobanoglous. Small and Decentralised Wastewater Management Systems. WCB/McGraw-Hill, 02/04/1998
4. Liping Pang (ESR Christchurch). Microbial removal rates in subsurface mediestimated from published studies of field experiments and large intact soil cores. J.of Environmental Quality. Vol 38. July-Aug 2009. pp 1531-1559.
5. The Proposed Marlborough Environment Plan. Accessed on 30 January 2017

SMART ALLIANCES LTD



Nathan Edwards
Civil Engineer
31 January 2017

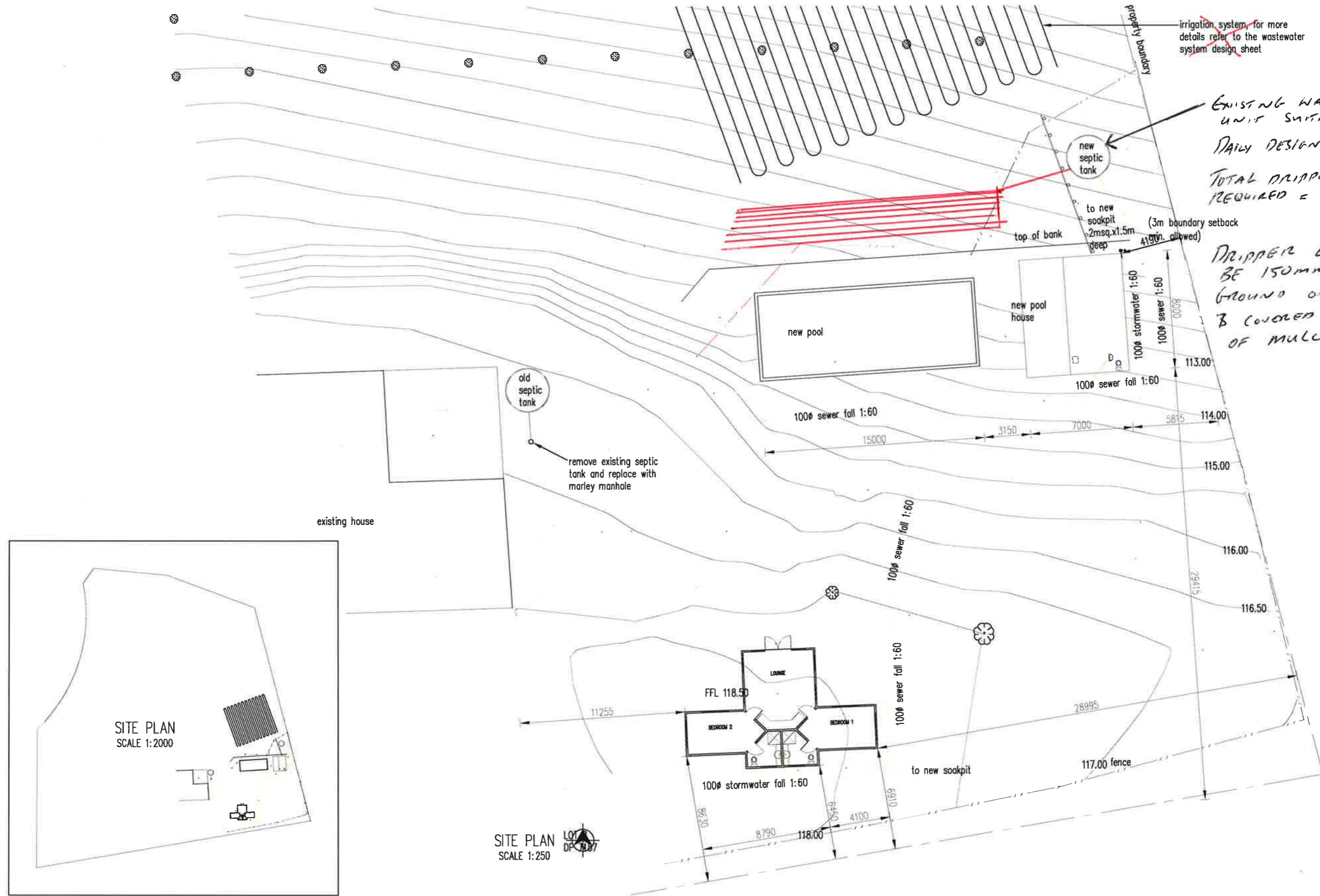
SMART ALLIANCES LTD



Richard Evans
Chartered Professional Engineer
31 January 2017

Appendix A: Drawings

- Marked-up existing design drawing



A3

01	04/09/08	Issued for Consent
AMENDMENT	DATE	DETAILS
AMENDMENT	DATE	DETAILS



smartalliances

ENGINEERING / RESOURCE MANAGEMENT / ARCHITECTS LTD

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CLIENT
JONTY EDGAR

PROJECT
NEW POOL & POOL HOUSE
397 BEN MORVEN ROAD
 DRAWING
SITE PLAN - Amended
MARKED UP JAN 2017

DWG NO.	AMENDMENT
0740 - F10	01
DATE	SCALE
04/09/08	AS SHOWN
CAD FILE REF:	DRAWN
P:0740 - Site Plan	KL
	APPROVED
	RE

Appendix B: Setback Distance Matrix from AS/NZS 1547 Appendix R

Appendix C: Loading Certificate

WASTEWATER SYSTEM LOADING CERTIFICATE

ISSUED BY: Smart Alliances Ltd – Richard Evans
TO: J & A Edgar
TO BE SUPPLIED TO: Marlborough District Council
IN RESPECT OF: On-site Wastewater Management System
AT: 397 Ben Morven Road, Fairhall

SYSTEM CAPACITY: System designed for a maximum of 12 persons. Design load based on 165L/person/day with a maximum daily allowance of 1980L/day.

SPECIFIED SYSTEM: Secondary treated effluent pumped to dripper lines. Refer to marked up site plan.

RESERVE AREA: There is a sufficient reserve area should the dripper lines need to be extended if found underperforming.

WASTEWATER INPUTS: Design based on standard water reducing fixtures installed with wastewater stream from the domestic dwelling. The intended water supply is through a borehole well.

CONSEQUENCES OF OVERLOADING THE SYSTEM: Overloading the system beyond the design load specified could result in the treatment plant failing to meet the performance standards specified and/or the dripline land application area failing to adequately distribute the effluent due to blockages. The odour may be unpleasant and inhibit the owners use of the property.

CONSEQUENCES OF UNDERLOADING THE SYSTEM: The treatment plants are living systems and require regular 'feeding' to maintain essential biological activity. In periods of inactivity, the system may become dormant and may take a period of time before full functionality is restored. Property owners should be aware of this if the property is to be vacated for any length of time.

CONSEQUENCES OF INADEQUATE MAINTENANCE: The system should be periodically maintained by a recognised maintenance contractor (a maintenance contract is required with the supplier of the system). Failure to do this may result in the same consequences that are outlined for overloading the system, as well as mechanical failures with system hardware. Regular monitoring should also be carried out by the owner to ensure the system is working adequately.

Date 31 January 2017

Prepared by:


Richard Evans

Engineer and Accredited Wastewater System Designer