



STAFF REPORT

Attachment 6

TO: Environment & Planning Subcommittee

FROM: Rob Lieffering, Co-ordinator Resource Consents

REFERENCE: RM060419

SUBJECT: **ST ARNAUD TRUSTEE SERVICES LIMITED - REPORT EP07/05/13** - Report prepared for 14 May 2007 hearing

1. INTRODUCTION

My name is Robert Lieffering and I hold the position of Co-ordinator Resource Consents within the Council. I hold the qualifications of Doctor of Philosophy (PhD) in Earth and Soil Science from Waikato University, a Masters of Science (Honours) in Soil Science and Bachelor of Science in Earth Sciences both from Massey University. I have seven years experience in environmental research (hydrogeology and soil physics and chemistry) and over eleven years of local government work experience in environmental investigations and resource consent processing/planning.

Prior to being employed at Tasman District Council I worked for Northland Regional Council for seven years as the Water and Wastes Team Leader, and prior to this worked for Tonkin and Taylor Environmental and Engineering Consultants Ltd and Marlborough District Council.

I have undertaken many technical assessments of wastewater treatment and disposal systems, ranging from on-site wastewater treatment disposal systems through to municipal treatment plants. These assessments have been for the purpose of reporting and making decisions on discharge permit applications under the Resource Management Act.

2. PURPOSE OF THIS REPORT

The purpose of this report is to provide the Committee with an understanding of the proposed wastewater treatment and disposal on Proposed Lot 1 of the subdivision application lodged by St Arnaud Trustee Services Limited at State Highway 63, St Arnaud.

3. WASTEWATER MANAGEMENT OPTIONS

The applicant initially presented two options to manage the wastewater that would be generated by the new dwelling on Proposed Lot 1, these being:

1. connection with the Tasman District Council's reticulation system; or
2. on-site treatment and disposal.

Clearly the preferred option would be to connect the dwelling to the Council's reticulation system and the Council's Engineering Department has confirmed that there is spare capacity to enable connection.

However, according to Mr Dugald Ley, there may be issues with "*cover over the pipeline and odours at the property boundary*". In addition, permission from Transit New Zealand would be required to place the pipeline under State Highway 63 (a third party approval). It was Mr Ley's opinion that on-site wastewater treatment and disposal was "*the most appropriate option to investigate further*" and the applicant was therefore requested to prepare a detailed investigation report on the suitability of the site for on-site wastewater management.

The issues associated with connecting to the Council's reticulation system should, in my opinion, be further investigated by the Committee (see my recommendations). There may also be a legal ability to make the property connect to the Council's system under the Local Government Act as I understand that if a public drain (which includes sewers) is either within 30 metres of a property boundary or within 60 metres of a dwelling that a Council can "require" a person to connect. Mr Ley should be able to advise the Committee on this matter. I believe that both these distances are met in this case.

4. PREVIOUS INVOLVEMENT

On 6 September 2006 I was asked by the reporting officer (Deborah Hewett) to review a report prepared by Abacus Design Ltd which presented a proposed design of the on-site wastewater treatment and disposal system to service the dwelling on Proposed Lot 1. This review resulted in further information being requested from the applicant and an amendment to their design report being made and the following comments pertain to the amended report (referred to as "the report"), being dated 1 December 2006. It should be noted that the "Effluent Plan" was subsequently amended again and the final plan is labelled "Amendment 03" (dated 13-02-07) and it is this plan which is referred to where "the plan" is mentioned below.

5. SOIL TYPE

The report concludes that the soils are category 4-5 according to AS/NZ1547:2000. Based on the variability across the site, it is considered appropriate to design the disposal system for a category 5 soil type to ensure the poorer soils (i.e. those that are category 5) of the disposal area will be able to accommodate the wastewater. This approach has been followed by the applicant.

It should be noted that only the topsoil of the three investigation test pits was fully described in respect of the "structure" of the soil (being in all cases "moderate"). The lower soil horizons have not been described in respect of their structure.

No assessment has been made as to the depth to groundwater. The three test pits that were excavated were to a depth of 1 metre (two pits) and 1.5 metres (one pit). None of these pits encountered standing groundwater but the moisture content of the soil horizons were all described as being "moist". No environmental concerns were noted in the report and the disposal area meets the horizontal and vertical separation distances of Permitted Activity Rule 36.1.4 of the TRMP according to the applicant. I have no information to dispute these claims.

6. TREATMENT SYSTEM

The applicant is proposing to install a 4,500 litre capacity septic tank. An outlet filter will be installed to minimise the carry over of solids to disposal system. This level of pre-treatment is considered appropriate but the likely treatment performance specified in Section 4.4 of the report are unlikely to be achieved, particularly the faecal coliform concentration of <1,000 cfu per 100 millilitres. I would personally prefer a higher level of pre-treatment but there is no requirement for this in the St Arnaud area according to the Tasman Resource Management Plan as the property is neither within the Wastewater Management Area (WMA) nor a Special Domestic Wastewater Area (SDWA).

7. WASTEWATER ALLOWANCE

The applicant has based the design on a three bedroom house being built which would be occupied by six persons. This occupancy is considered appropriate given that the exact details of the house are unknown (i.e. a four bedroom house could be built). Any design based on a lesser occupancy should not be considered at this stage of the project. A daily wastewater volume of 1,080 litres per day has been used to design the disposal system. This is considered to be appropriate.

8. LAND DISPOSAL SYSTEM

Loading Rate

The applicant has amended the design loading rate (DLR) and now proposes to load the disposal system at a rate of 5 mm/day, which is appropriate for Category 5 soils.

Disposal

A conventional “*disposal bed*” system is proposed (not trenches) and a cross section drawing of the bed construction is provided. The design of these beds has been amended since the original design and now conforms with AS/NZS1547:2000 for conventional “disposal beds”.

It is important to note that the proposed disposal beds are **not** evapotranspiration-seepage (ETS) beds despite the report stating that “*the surface of the shallow bed shall be planted with shrubs and grasses to assist evapo-transpiration*”. Whilst such planting may assist in reducing the amount of wastewater required to be disposed of via percolation in the designed beds, true ETS beds include a 200 mm depth of fine sand above the gravel media to enable the wastewater to be “wicked” up towards the root zone of the vegetation planted on the beds. Such sand is not being proposed by the applicant and the beds will be relying very much on percolation through the basal area of the beds as the means of wastewater disposal.

With a daily wastewater volume of 1,080 litres, and a DLR of 5 mm/day, a total of 216 square metres of basal disposal area has been calculated for the proposed disposal beds. The applicant is proposing a total of 4 disposal beds, each being 20 metres long and 2.7 metres wide with dual distribution pipes within each bed. An inter-bed spacing of 2 metres has been provided in the design.

The location of the proposed disposal beds is shown on the latest plan. Wastewater from the septic tank will flow under gravity to a distribution chamber which will evenly load each of the four disposal beds. No dose loading is proposed but the distribution pipes will have two sets of outlet holes drilled at 8 o'clock and 4 o'clock with holes every 150 mm along the pipe. Provided the pipe is laid perfectly flat, this configuration would result in an element of even distribution of the wastewater to the entire disposal bed. It would be my preference that any disposal system on these soils be "dose loaded" by means of either a pump or dosing siphon to ensure even distribution of the wastewater to the disposal area.

Reserve Area

The applicant has amended the design so that it now incorporates a reserve area equivalent to 100% of the primary disposal area. However, it should be noted that the proposed reserve area is located in an area of existing bush and this bush would need to be partially (or even fully) removed to enable the reserve area to be constructed. Whilst planting vegetation on the disposal beds can assist in evapotranspiration (bearing in mind my comments that the proposed beds are not ETS beds), the type of vegetation planted on the beds needs to be carefully considered. Plants need to be suitable to moist environments and regard must be had on root migration.

9. SUITABILITY OF PROPOSED DESIGN

There are a number of matters which the Committee need to consider before accepting that the proposed design is the best practicable option (BPO) for the management of wastewater at the site.

There are two documents which are commonly used in New Zealand to design on-site wastewater systems, namely the Australian-New Zealand Standard (AS/NZS1547:2000) and Auckland Regional Council's Technical Publication Number 58 (TP58). How the proposed design conforms with these two documents is discussed below.

AS/NZS1547:2000

Table 4.2A1 of AS/NZS1547:2000 presents recommended DLRs for conventional disposal beds. Note 7 of the table states that where disposal beds are used that the "conservative" DLRs listed should be used in the design. The table presents 3 DLR columns for each soil category and each soil category is further divided based on the soil structure. For Category 5 soils (which is the case here), there is only one DLR presented in the Conservative DLR column and this applies only where the soils are "strongly structured", which is not the case here (the topsoil has been described as having "moderate" structure). Note 11 to the table applies for moderately structured Category 5 soils and this note states that alternative disposal systems, special design requirements, and/or soil modification procedures will be necessary. What this means is that using conventional disposal beds (or trenches for that matter) should not be used on moderately structured Category 5 soils as there are other options available.

AS/NZS1547:2000 does allow ETS beds to be used on moderately structured Category 5 soils (and can be loaded at 5 mm/day) but this is not what is being proposed by the applicant. It should be noted too that if ETS beds were to be used that the configuration of them would be quite different to the conventional beds because ETS beds should not be more than 1.5 metres wide (cf 2.7 metre width proposed for the conventional bed design). This would mean that a greater total disposal area *may* be required as there would need to be in the order of eight ETS beds (~20 metres long) and they would require at least 1 metre between adjacent beds. The exact area that would be required would only be able to be determined after a site specific design is prepared.

TP58

TP58 differs slightly from AS/NZS1547:2000 in a number of respects but is a manual which is commonly referred to and used by designers. AS/NZS1547:2000 is currently being revised and hopefully the differences between these two documents will be less in the future.

A soil which is classified as Category 5 according to AS/NZS1547:2000 becomes a Category 6 soils under TP58 (TP58 has a 1-7 soil category system). According to TP58, neither conventional trenches nor conventional disposal beds should be used for these soils. TP58 recommends that either ETS beds or dripper irrigation be used for these soils.

10. CONCLUSIONS AND RECOMMENDATION

It is my opinion that the applicant's proposed on-site wastewater treatment and disposal design is not the best practicable option for the site for the following reasons:

- The soils across the site have been classified as Category 5 with a moderate structure;
- AS/NZS1547:2000 states that conventional disposal beds are not appropriate for such soils and suggests that either ETS beds or dripper irrigation should be used;
- TP58 also states that conventional disposal beds should not be used for these soils; and
- Category 5 soils, and the vegetation cover on Proposed Lot 1 in particular, lend themselves to the use of dripper irrigation with the wastewater being treated to a secondary standard prior to being discharged. A similar (or smaller) disposal area is likely to be required (~380 square metres).

Notwithstanding the above comments, I believe that wastewater **can** successfully be treated and discharged on Proposed Lot 1, but not in the manner proposed by the applicant. My preferences (in preferred order), in respect of wastewater management on Proposed Lot 1 are as follows:

1. Connection to Council's reticulation system (see discussion earlier);

2. Require the applicant to treat the wastewater to a secondary standard prior to discharging the wastewater to land via pressure compensating drippers. Whilst not “required” by the TRMP in this area, I believe that this is the best practicable option if connection to the Council’s reticulation system is not feasible/possible. The advantage of this method of disposal is that the irrigation lines can be placed in the area of bush shown on the site plan where the “reserve area” has been shown;
3. Installation of a primary treatment tank (septic tank) of 4,500 litres capacity fitted with an outlet filter with the treated wastewater being dose loaded to evapotranspiration-seepage (ETS) beds. This option is likely to require a greater area than (2) above and a detailed design for such a system would need to be submitted at building consent stage for checking.

Should the Committee be of the mind to grant resource consent to subdivide the property, and connection to the Council’s reticulation system is possible, then I recommend that this be made a condition of consent.

However, if connection is not possible, and the Committee agrees with my preferred option (2) above, then I would recommend the following be imposed as a Consent Notice on the title of Proposed Lot 1 pursuant to Section 221 of the Resource Management Act 1991:

- a) Treatment of domestic wastewater shall be by way of a treatment system that treats the wastewater to a secondary standard prior to being discharged to land. Secondary treatment is defined as meeting the following standards:
 - 5-day biochemical oxygen demand (BOD₅) shall be less than 20 milligrams per litre;
 - Total suspended solids shall be less than 30 milligrams per litre; and

The type of wastewater treatment system selected shall take into account the likely occupancy patterns of the property (e.g. holiday versus permanent occupancy). The treated wastewater shall be discharged to land either by way of pressure compensating drippers. The on-site wastewater treatment and disposal system shall be designed, supervised and certified by a chartered professional engineer.

Lastly, if the Committee considers that preference (3) is appropriate for Proposed Lot 1 then I would recommend the following be imposed as a Consent Notice on the title of Proposed Lot 1 pursuant to Section 221 of the Resource Management Act 1991:

Treatment of domestic wastewater shall be by way of a system that consists, as a minimum, of a 4,500 litre capacity, two chamber septic tank which has an outlet filter installed. The treated wastewater shall be discharged to a disposal system that consists of evapotranspiration-seepage beds (ETS) which have a basal disposal area of not less than 216 square metres. The disposal system shall incorporate dose loading to ensure even distribution of the wastewater to the disposal area. A reserve area equivalent to 100% of the primary disposal area shall remain undeveloped.

As an alternative to the above, a treatment system which treats the wastewater to a secondary standard may be installed with the treated wastewater being discharged using pressure compensating drippers to any suitable part of the allotment provided a specific design report is prepared which allows for appropriate loading rates for the soil types found on the property.

Irrespective of which type of wastewater treatment system is selected, it shall take into account the likely occupancy patterns of the property (e.g. holiday versus permanent occupancy). The on-site wastewater treatment and disposal system shall be designed, supervised and certified by a chartered professional engineer.

Rob Lieffering
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