

BEFORE THE COMMISSIONERS

IN THE MATTER of an application to Dunedin City Council for Resource
Consent comprising:
SUB-2017-49, and LUC-2017-255

BETWEEN

BALMORAL DEVELOPMENTS (OUTRAM) LIMITED

AND

DUNEDIN CITY COUNCIL

BRIEF OF EVIDENCE OF DERRICK EDMUND RAILTON

INTRODUCTION

1. My name is Derrick Railton. I am a Director of Fluent Infrastructure Solutions Ltd in Dunedin and have 40 years' experience in the field of infrastructural and environmental engineering, with a particular focus on wastewater engineering. I am appearing on behalf of Balmoral Development (Outram) Ltd to provide evidence in relation to wastewater management for their resource consent application LUC 2017-255 & SUB 2017-49
2. I hold a degree of Bachelor of Engineering (Civil) from the University of Auckland; I am a Chartered Engineer; and I am a member of the Institution of Professional Engineers of New Zealand and of Water New Zealand.
3. Over the past 25 years I have developed a particular interest and expertise in the area of on-site wastewater management, attending conferences in New Zealand and Australia. I have also presented papers on On-site Wastewater Systems, and related aspects to those conferences. I am conversant with the two key technical standards for on-site and small scale wastewater management most commonly used in New Zealand, namely the National standard AS/NZS 1547:2012 "On-site Domestic Wastewater Management", and Auckland Regional Council's Technical Publication 58 "On-site Wastewater Systems: Design and Management Manual".
4. While this is a Local Authority hearing, I have read and agree to comply with the Code of Conduct for Expert Witnesses set out in the Environment Court Practice Note on Alternative Dispute Resolution, Expert Witnesses, and Amendment to Practice Note on Case Management. My evidence has been prepared on that basis.

SCOPE OF MY EVIDENCE

5. In this matter I have been asked by the applicant, Balmoral Developments (Outram) Ltd, to review and assess the wastewater management related aspects for the proposed subdivision of the northern 2.19 Ha part of 94 Holyhead Street, Outram.
6. I firstly address how management of wastewater is proposed to be undertaken and then respond to matters raised in submissions to the proposal. Finally, I address comments and matters raised by Council's reporting officers.

BACKGROUND

7. As background, I note that the original subdivision application for the site (via a private plan change PC-2012-14) proposed a communal wastewater treatment and effluent dispersal system. Subsequently, approximately half the subject site was rezoned Residential 5 through a consent order ENV-2013-CHC-84, with a change to individual lot on-site wastewater management. This consent order provided for 26 residential lots.

8. The applicant now seeks to subdivide the balance of land not rezoned into 15 further residential lots, with wastewater servicing of these additional lots being on the same basis as for the 26 lots already approved.
9. While my evidence, then, relates in particular to wastewater management of the additional 15 lots, it does also naturally relate to the wastewater servicing of the 26 lots already approved.

OTAGO REGIONAL COUNCIL RP:W

10. The previously rezoned land and the proposed new subdivision is partially over an Otago Regional Council designated “Ground Protection Zone-A” (GPZ-A). This means that individual properties within this zone will, under the Regional Plan: Water are required to submit a discretionary consent application for the discharge of human waste to land for the proposed wastewater systems servicing those properties, separate to and subsequent to this present subdivisional consenting process.

WASTEWATER MANAGEMENT BACKGROUND

11. All residential lots are to be serviced by individual on-site secondary wastewater treatment systems with pressure compensating dripline effluent dispersal to land. Pressure compensating dripline is small 16mm diameter pipe with effluent “emitters” spaced at regular intervals. The pipe is laid in the topsoil layer at shallow depth, typically at 100 - 150mm depth. Drip irrigation applies the effluent directly to the surface topsoil layer to help disperse the effluent to encourage both ground soakage and plant or grass uptake of moisture. Dripline is particularly suited to incorporation within landscaped areas and gardens, providing beneficial irrigation to such areas.
12. The Application refers to the installation of “Hynds Lifestyle” aerated wastewater systems, but I note that it is not so much the particular model of treatment system that is important but rather the requirement for a treatment system that can achieve or better the outcomes of that Hynds system, reported as:
 - Effluent BOD <20mg/L
 - Effluent Suspended Solids <30mg/L
 - Total Nitrogen <25mg/L
13. I mention this as wastewater treatment system models (and brands) can change, and it is possible that during the resource consenting process for those properties in the GPZ-A area (more particularly) that other treatment systems providing equal or better treatment might be identified.
14. Ground test pitting in 2011 determined that the soils across the site of the proposed subdivision were classed as a “moderate permeability” Category 4 soil under AS/NZS 1547 “On-site domestic wastewater management”. This provides for an application rate of wastewater to land of 3.5mm/d, which for a typical residential dwelling leads to a dripline dispersal area of around 300m² – more or less depending on the size of house

and degree of water conserving fittings installed. The required area of dripline field for individual properties will be confirmed at the time of building consent approval.

15. Given that all residential lots are at least 1000m² in area, I am satisfied that the 300m² (more or less) dispersal field area required for each lot is practically achievable.
16. A particular benefit of dripline effluent dispersal in the surface topsoil layer is the high level of additional in-ground effluent renovation that occurs before the effluent eventually percolates down to the ground water table. I address this further shortly, in response to environmental concerns raised by submitters.

SUBMISSIONS

17. Only two submitters (the Otago Regional Council and Patricia Scott) have raised particular concerns relating to wastewater management. These concerns, as summarised in the Planners report, are as follows:
 - Proposals for wastewater disposal are inadequate (ORC)
 - Development has potential to contaminate groundwater (ORC)
 - Questions land's capacity to process wastewater of septic tanks (Patricia Scott)
 - Likely to be seepage of wastewater, nutrients and gut pathogens into the soil and river (Patricia Scott)

All the above points relate to the potential for contamination of the underlying groundwater table - and potentially the adjacent Taieri River. On Wednesday 18th October 2017 a meeting was held between the Applicant's advisors and the Otago Regional Council to discuss (amongst other things) the ORC's wastewater concerns, which I now address.

18. The principal concern raised by the Regional Council was pathogen contamination of the underlying groundwater table, particularly during extreme wet weather events when the water table can rise. Potential nutrient impacts (nitrogen in particular), which are sometimes of interest, were not raised as an issue. I note in this latter regard that the type of secondary treatment plant proposed is designed for nutrient reduction, as indicated by the effluent quality parameters set out earlier in Paragraph 12.
19. As part of the early site investigations 5 pits varying in depth between 2 and 3m deep were excavated across the site. The test pits revealed a predominantly sandy/silty loam with occasional intrusions of clay and sands/gravels.
20. Groundwater was not encountered in any pit, although wet soil was noted at 3m depth in the base of the pit excavated at the lowest point on site – the depression that is now Lot 31, where stormwater detention is proposed. The ground level here is a 1 to-3m below the rest of the site, meaning that the groundwater table was at least 4m depth below the land on which residential development is proposed.

21. This is consistent with advice by Dave Brownlie, a local drainlayer who has installed many of the septic tanks in the Outram Township, that he has observed groundwater around Outram township to generally be at 5m to 8m depth.
22. It is likely that the groundwater table will rise during extreme weather events when the Taieri river is in flood. However, given the relatively short duration of such flood events and the slow rate of groundwater flow beneath the flood banks, such rise is limited. Information from the ORC for the “Outram Bore” on the corner of Orme Street and Allanton Road shows that such rises are of the order of 1m, or less.
23. I am satisfied then that the soils underlying the proposed residential lots are well drained to significant depth (around 4m or more), which is ideal for on-site wastewater systems, particularly pathogen attenuation. In this regard, the main mechanisms that operate within the soil matrix to ensure pathogen removal are filtration, adsorption and natural physical wear/die-off.
24. To put this in context, results from various studies show virus reductions of 99.99% through just 0.6m of free draining sand, and 92 to 97% reduction in just the top 1cm depth of a fine grained soil. Clearly, a high degree of pathogen removal is achieved in just a short travel distance through unsaturated fine grained soils. In the case here, then, with more than 3m of free draining soils beneath the proposed wastewater systems (assuming a worst case 1m rise in groundwater in flood conditions), close to complete pathogen removal can be expected prior to the wastewater reaching groundwater, even in flood conditions.
25. I am satisfied that the dispersal of effluent from the proposed wastewater systems are unlikely to contaminate the underlying groundwater table.

PLANNER'S REPORT

26. The Planner's Report notes that the Wastewater and Waste Services Business Unit has not identified any issues with the self-servicing of the new lots (at least with regard to wastewater), so no further submission is required here.

CONCLUSIONS

27. I am satisfied that the proposal to install secondary wastewater treatment systems on individual lots of the proposed subdivision, all having lot areas greater than 1000m², is sustainable and will not lead to contamination of the underlying ground water table.