

THE MATTER

of the Resource Management Act 1991

AND

IN THE MATTER

of an application for subdivision and land use
consents SUB-2016-28, LUC-2016-169 at 82
Riccarton Road East, Mosgiel.

BY MAINLAND PROPERTY (2004) LTD

Applicant

TO DUNEDIN CITY COUNCIL

The Council

**EVIDENCE OF DERRICK EDMUND RAILTON
ON BEHALF OF
MAINLAND PROPERTY (2004) LTD**

INTRODUCTION

- 1.1 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 hold a degree of Bachelor of Engineering (Civil) from the University of Auckland; I am a Chartered Engineer and a member of the Institution of Professional Engineers of New Zealand and of Water New Zealand.
- 1.2 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".
- 1.3 In regard to stormwater management, I have also had wide experience in the design of such systems. In this case, I acknowledge the assistance of Gary Dent, Civil Engineer and fellow Director at Fluent Solutions Ltd, with the preparation of my evidence. Gary has extensive and more specialised experience in the field of stormwater management and hydrology generally. Both Gary and I have visited and walked over much of the site.
- 1.4 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

- 1.5 In this matter I have been asked by the applicant, Mainland Property, to review and assess the stormwater and wastewater management related aspects for the proposed subdivision of land at 82 Riccarton Rd East, Mosgiel, into what was originally to be three residential lots, but now reduced to just two lots.
- 1.6 I firstly consider how such management may be undertaken on each of the three sites and then respond to stormwater and wastewater matters raised in submissions to the proposal.
- 1.7 Finally, I address comments and matters raised by Council's reporting officers.

EXECUTIVE SUMMARY

- 1.8 Having evaluated and assessed the wastewater and stormwater management aspects of the proposal, I confirm my view that both can relatively simply and sustainably be managed within the site boundaries. This can all be achieved in accord with the NZ standard for on-site wastewater management AS/NZS 1547:2012 and in accord with the Dunedin City Council (DCC) “Dunedin Code of Subdivision and Development 2010” and requirements of the Otago Regional Council (ORC) “Regional Plan – Water for Otago”.

I note that I originally found that the earlier 3-lot proposal was able to be adequately serviced for stormwater and wastewater, as I now confirm for the revised 2-lot proposal, and I expand as follows.

STORMWATER MANAGEMENT

Introduction

- 1.9 The development located at 82 Riccarton Rd East is approximately 6.5 ha in size. The land lies to either side of a smooth topped ridge that extends west of Riccarton Rd. Slopes off this ridgeline to either side are generally steep as shown in Figure 1. The site has been well described in greater detail in other documentation relating to this Application.



Figure 1: Photos of ground slope either side of ridge: to the south (left) and to the north (right)

- 1.10 The proposed subdivision plans are to now subdivide the property into two lots sized as follows:

- Lot 1 (Previously Lots 1 and 2) 4.0 ha
- Lot 2 2.5 ha

I understand that these areas are subject to confirmation at the time of writing my evidence and note that any changes are not likely to change my findings.

Stormwater management for each Lot is considered separately, as each site has different circumstances and topographical features.

Lot 1 Stormwater Management

- 1.11 Lot 1 lies across the eastern end of the ridge on which a residential dwelling is already constructed. This residence is referred to as a 'temporary' residence, but it is understood that this is in fact could become a permanent residence. The property is served by an existing stormwater system that appears to be well designed and installed, and working satisfactorily.

Lot 2 Stormwater Management

- 1.12 The indicative location of the proposed building platform and the stormwater drainage point from Lot 2 are illustrated in Figures 2 and 3. (The actual location of the proposed building platform is shown on the Craig Horne drawing for the Proposed Subdivision of Lot 28 DP341800.)
- 1.13 Stormwater runoff from Lot 2 drains to a depression that then drains via pipe into an adjacent residential lot. Inside the adjacent lot, stormwater flows for approximately 50metres via an open drain to the stormwater system on the Main South Road (SH1).



Figure 2: Lot 3 and indicative location of the proposed building platform



Figure 3: Depression and stormwater discharge locality - northern boundary of Lot 2

- 1.14 The Dunedin City Council (DCC) Dunedin Code of Subdivision requires management of post-development stormwater flows off site to be equal to or less than flows existing from the pre-developed property. This approach applies to all land zoned rural, including Lot 2, in the Mosgiel area.
- 1.15 Despite the roof / paved area representing around only 1.6% of the total area of Lot 2 (assuming that the total roof and pavement area is of the order of 400m²), the close proximity of the proposed building platform to the existing discharge drain from the collector at the bottom of the site means that there is limited opportunity to disperse increased peak runoff flows from impermeable areas. Consequently, stormwater detention for impermeable areas on the Lot 2 is recommended to avoid increases in peak runoff due to development of the building platform and access ways.
- 1.16 At the building consent stage it is recommended that a stormwater management plan be prepared for Lot 2 that addresses impermeable areas proposed as a result of the change of land use.
- 1.17 Stormwater detention and controlled discharge to the existing stormwater collector drain could be achieved using one, or a combination of, detention storage options including tanks to collect roof water, subsurface tanks and bunded areas. The option adopted would be configured to suit the building and access way layout for the site.

Conclusion

- 1.18 Lot 1 is already served by an existing stormwater system that appears to be well designed and installed, and working satisfactorily. Regarding Lot 2, taking the recommended stormwater management approach for Lot 2 would avoid any potential adverse stormwater effects on property downstream.

WASTEWATER MANAGEMENT

Introduction

- 1.19 There is currently no reticulated sewerage system servicing the property at 82 Riccarton Rd East. It is necessary then for wastewater to be managed individually on-site on each of the three proposed lots.
- 1.20 Lot 1, which contains the 'temporary' (but likely permanent) residence already has a consented wastewater system serving that dwelling which again, appears to be working satisfactorily, and I therefore do not consider this lot further.
- 1.21 Regarding Lot 2, I note that the design of an on-site wastewater management system is dependent on many variables, including soil drainage properties, contours, ground steepness, available area for effluent dispersal and effluent flows. For the overall property in question, a

preliminary geological site assessment conducted by Jon K Lindqvist, Geological Consultant, identifies the soil characteristics of the whole property and together with my site visit enables the suitability of the in-situ soils to support on-site wastewater dispersal for Lot 2 to be assessed. That investigation identifies the subsoils to be predominantly clayey silt loess overlying schist bedrock, leading me to classify these soils as Category 6 soils, as set out in the previously referred to standard; AS/NZS:1547:2012 "On-site Domestic-Wastewater Management". This category is the highest (least permeable) and therefore most conservative soils category in the standard.

- 1.22 For a Category 6 soil on a moderately flat site the standard prescribes an application rate to land for secondary treated wastewater by pressure compensating dripline of 2.0mm/d. On increasingly steep slopes this application rate progressively reduces to 1mm/d.
- 1.23 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), or even laid on the surface and covered with mulch or woodchips. 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.
- 1.24 For the low application rates (1-2mm/d) proposed, I am satisfied that the addition of wastewater to land would not add to potential land instability issues that have been raised by others.
- 1.25 Secondary treatment of the wastewater, as just referenced, is that which has passed first through a conventional septic tank, followed by an additional treatment stage to further treat the wastewater before dispersal to land.

I note that there is actually sufficient land on Lot 2 to potentially facilitate a septic tank only system, with dispersal through a surface based mound system, but this would depend on the development of the site and intended area for effluent dispersal. Such a system would be subject to further investigation and specialist design. Generally, the steepness of the land is likely to make the construction of a mound system reasonably complex and expensive, and therefore my view is that secondary treatment and pressure compensating dripline would likely be the more appropriate approach in each case.

- 1.26 Looking a little closer at the design considerations for a wastewater system on Lot 2, a four bedroomed home with water conservation fittings is assumed. Water conservation will be important for a dwelling relying on rainwater supply, as in this case. I assess then, a design

flow for each wastewater system of 870L/d. This then translates to an area requirement for the dripline system estimated to be between 450 and 800m², depending on slope.

- 1.27 Lot 2 is large (around 25,000m²) and I am therefore satisfied having inspected the site that there is ample room to site here a dispersal field sized upwards of 800m².
- 1.28 Overall I am satisfied that on-site wastewater management can be simply and readily achieved on Lot 2 in a safe and sustainable manner without any offsite effects of any significance.

Conclusion

- 1.29 Lot 1 is already served by an existing wastewater system that appears to be well designed and installed, and working satisfactorily. Regarding Lot 2, I am satisfied that this can be adequately serviced by an on-site system.

SUBMISSIONS

- 1.30 I have reviewed the Planners report and included list of submissions to identify those which raise stormwater or wastewater management concerns. All matters raised by Submitters, are I believe, addressed by my foregoing comments.

PLANNER'S REPORT

- 1.31 Turning to the Planners Report, I refer to concerns raised by the Otago Regional Council pertaining to excess discharge onsite and its effect on land stability issues. Under [83] the Otago Regional Council have raised concerns about the subsequent discharge of both stormwater and wastewater to land. I consider that I have now adequately addressed all matters relating to this concern.
- 1.32 Regarding stormwater, under [Policy 9.2.2.7] any discharge from the site post development is to have no adverse effects on downstream properties. I am satisfied that appropriate stormwater management techniques have been made part of the overall design as described above.
- 1.33 The Water & Waste Services Department have raised concerns about managing the discharge and disposal of stormwater and wastewater onsite under [147]. I consider that I have now adequately addressed this matter.

SUMMARY

- 1.34 Having evaluated and assessed the stormwater and wastewater management aspects of the proposed development at 82 Riccarton Road East, East Taieri, I confirm my view that both aspects can relatively simply and sustainably be managed within the site boundaries. Stormwater management can be achieved in accord with the DCC Code of Subdivision and wastewater treated in accordance with the NZ standard for on-site wastewater management AS/NZS1547:2012. I am satisfied in this regard that any potential off-site effects due to the proposed activities will certainly be less than minor.