

BEFORE AN INDEPENDENT HEARING COMMISSIONER

APPOINTED BY MASTERTON DISTRICT COUNCIL

RM210207

IN THE MATTER OF The Resource Management Act 1991

AND An application by East Leigh Limited for consent to
subdivide land at Riversdale Beach (Lot 102 DP517369)
to create 21 residential allotments and a local purpose
reserve to vest, to adjust the boundary between Lots 12
& 13 DP383390, and for land use consents to enable
development of the allotments for residential use.

STATEMENT OF EVIDENCE OF ANREW GARETH DUNCAN

13 May 2022

MAY IT PLEASE THE COUNCIL

1 My name is Andrew Gareth Duncan.

Qualification

2 I hold a Bachelor of Engineering degree (Honours) in Civil Engineering and a Masters Degree in climate change and renewable energy [B.Eng (Hons) M.Eng]. I am a Chartered Professional Engineer (CPEng), Chartered Member of Engineering New Zealand and International Professional Engineer (formal title CMEngNZ CPEng IntPE(NZ)).

I have thirty years post graduate experience in environmental engineering, with a significant proportion in wastewater design from domestic to township scale.

Code of Conduct and Conflict of Interest Declaration

3 I have read the Environment Court's Code of Conduct for Expert Witnesses 2014, and I agree to comply with it. I confirm that the issues addressed in this brief of evidence are within my area of expertise, except where I state I am relying on what I have been told by another person. I have not omitted to consider material facts known to me that might alter or detract from the opinions expressed.

4 I have no commercial relationship with the applicant (Mr Evans), save in my role as an expert in relation to this application.

Introduction

5 My brief was "to demonstrate that the development can be serviced", starting with an assessment of the existing system capability.

My evidence

6 My evidence is attached to this document. By way of further explanation, it should be noted that: the methodology used is widely accepted throughout New Zealand including in the Ministry for Environment *Sustainable Wastewater Management- a handbook for smaller communities*. My understanding is that it was also used in the original design, although I have not been able to locate a copy of that design. The literature is based on real life data that can seem anomalous to layman and practitioner alike – hence the reference to the capacity of the system being 'somewhat unexpectedly' significantly larger than the current use.

Dated this 13th day of May 2022

.....Andrew Gareth Duncan.....

**Services Assessment report 201110 Riversdale Terraces
Rochdale road.**

March 2022



Services assessment report, Riversdale Terraces, Rochdale Road extension.V2

Prepared by EQOnz Ltd

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28th Mar 2022

for **AdamsonShaw**



1. Background:

It is proposed to add additional lots to the Rochdale Road area of the Riversdale Terraces subdivision. EQOnz Ltd has been engaged to provide an initial assessment of the effects on wastewater and stormwater services in terms of capacity.

2. Methodology

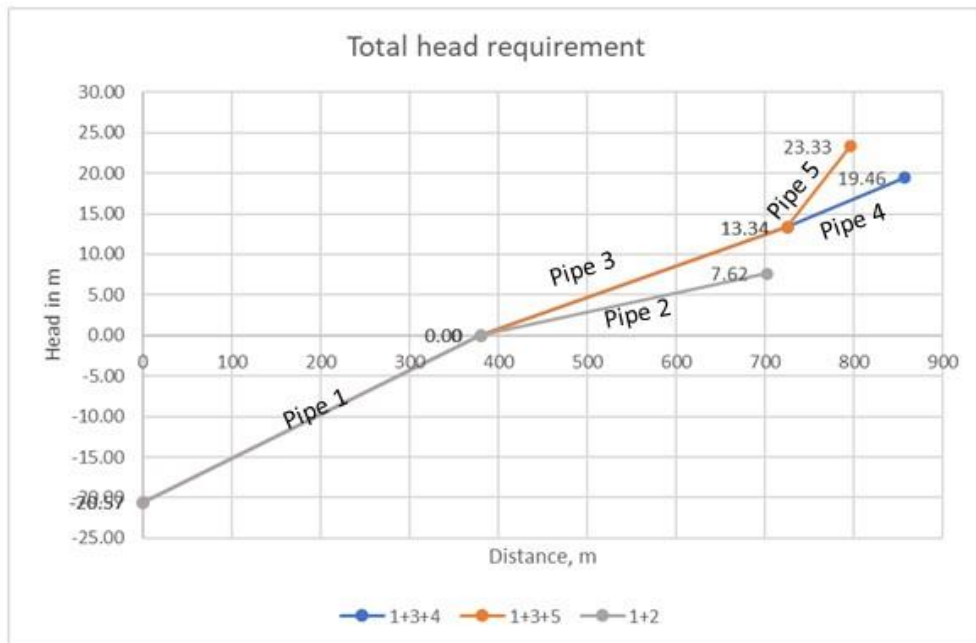
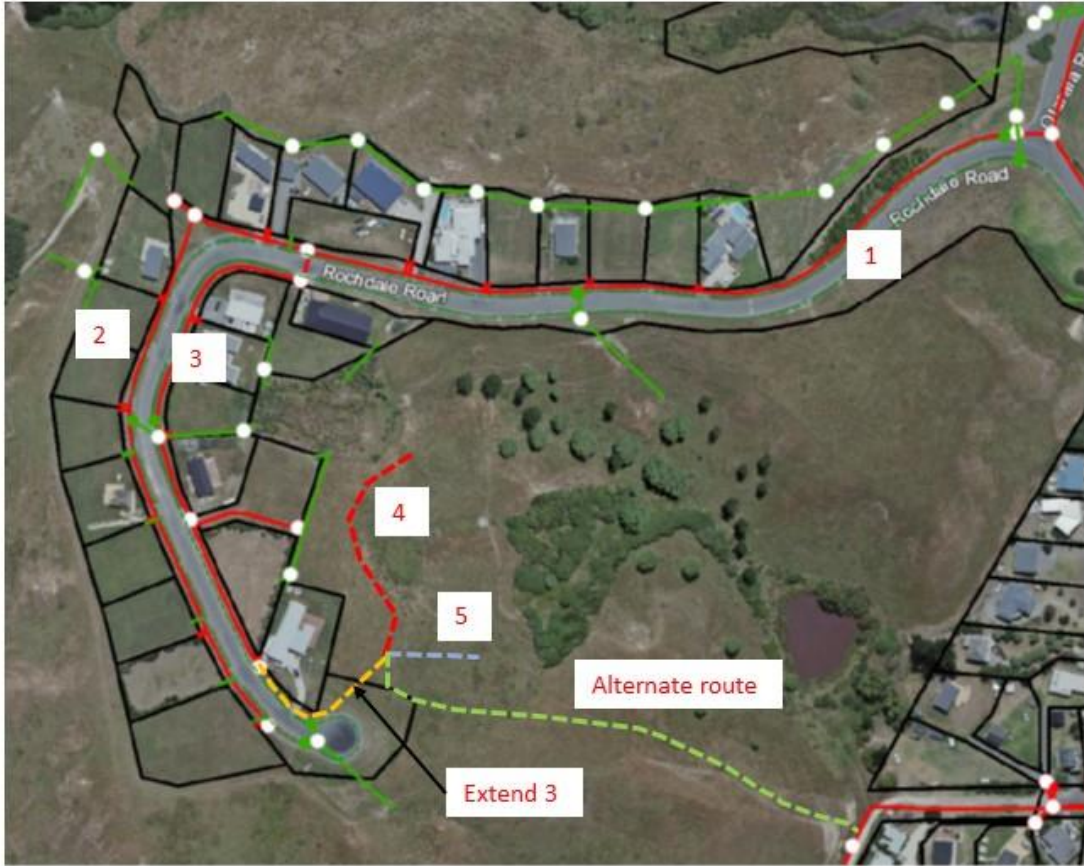
We have adopted the following methodology in this assessment:

- Review the as-builts and define pipe sizes
- Identify the proposed additional lot locations and likely pipe connection points
- Collate topographic data
- Calculate likely wastewater flows in accordance with the Crites/Tchobanoglous (Crites & Tchobanoglous, 1998) methodology
- Assess the capacity of the system and potential effects.

3. Assumptions

We have used the following assumptions:

- Existing pipes are 63mm and 75mm OD polyethylene
- The number of pumps that would likely be in operation at any one time has been taken directly from Crites/Tchobanoglous (table 6-3) as has the design flow rate.
- Pipes have only been analysed to the bottom of Rochdale Rd where it joins the main.



Pipe No.	Nbr Houses	Max no. operating (table 6-3)	Design Flow l/s	Upstream elevation	Downstream elevation	Fall/rise m	Length m	Slope m/m	Nom. Dia.(mm)	Inside Dia.(mm)	Headloss m/100m	Pipe Area mm ²	Velocity m/s	Headloss m	Total Head (m)	Max head (m)
1	51	7	4.783	48	12	-36	380	-0.09474	75	60.9	4.06	2912.9	1.642	15.43	-20.57	-20.57
2	15	4	2.733	48	48	0	322	0	63	55	2.37	2375.8	1.150	7.62	7.62	7.62
3	22	5	3.417	47	48	1	345	0.002899	63	55	3.58	2375.8	1.438	12.34	13.34	13.34
4	13	4	2.733	44	47	3	132	0.022727	63	55	2.37	2375.8	1.150	3.12	6.12	19.46
5	6	3	2.050	38	47	9	71	0.126761	63	55	1.39	2375.8	0.863	0.99	9.99	23.33

4. Results

The assessment indicates that the existing infrastructure has capacity to accommodate the additional flows.

It also indicates the most probable total head requirements for each pipe segment, which suggests that some of the sections would require specific design in terms of pipe/pump combination.

Alternatively, another pipe route servicing the lower sections would also provide a viable solution.

5. Conclusions

Because of the way in which communal pumped systems work, pumps do not all operate at the same time, hence there is typically, and somewhat unexpectedly, significant capacity in this type of system to accommodate additional flows.

The physical elevation of some of the sections places a head burden such that specific design of the pumps may be required. There are pumps and pipes available to match the duty requirements, so in principle there is no engineering obstacle in terms of wastewater design.



A. Duncan
B.Eng(Hons) M.Eng MIPENZ CPEng

Works Cited

Crites, R., & Tchobanoglous, G. (1998). *Small and Decentralised Wastewater Management Systems*. WCR/McGraw-Hill.