

**Before the Hearing Panel
Appointed by the Gore District Council**

In the Matter of

The Resource Management Act
1991 (**Act**)

And

In the Matter of

the Proposed Gore District Plan

**Statement of Evidence of
Justin Gregory Ralston
for McNab Management Limited**

Dated: 7 October 2024

Lane Neave
2 Memorial Street
Queenstown
Solicitor Acting: Joshua Leckie
Email: joshua.leckie@laneneave.co.nz
Phone: 03 372 6307

lane neave.

INTRODUCTION

Qualifications and Experience

1. My name is Justin Gregory Ralston.
2. I am a consulting civil engineer and hold the position of Senior Civil Engineer with Airey Consultants Limited, based in Queenstown.
3. I hold the qualifications of a Bachelor of Engineering (Civil) from the University of Auckland. I have over 25 years' experience in the design and construction of civil infrastructure with expertise in site investigation and assessment, along with the design and construction of development infrastructure including roading, water supply, wastewater and stormwater disposal systems.

Code of Conduct

4. Whilst this is not an Environment Court hearing I have read and agree to comply with the Code of Conduct for Expert Witnesses in the Environment Court Practice Note 2023. This evidence is within my area of expertise, except where I state that I am relying on material produced by another person. I have not omitted to consider material facts known to me that might alter or detract from the opinions that I express.

SCOPE OF EVIDENCE

5. My evidence will deal with the following:
 - (a) Background and involvement;
 - (b) Water Supply;
 - (c) Wastewater; and
 - (d) Stormwater.

BACKGROUND AND INVOLVEMENT

6. I have been engaged by McNab Management Limited to assess and report on engineering related matters involving the potential rezoning of the subject land at 10 McKinnon Road, Gore (**Site**).
7. My evidence is limited to infrastructure issues and in particular the feasibility of servicing the Site with stormwater, wastewater and water supply services.

WATER SUPPLY

8. The Site currently has access to water from the Otama Rural Water Scheme. Currently the Site is allocated 3 units from the Otama Rural Water Scheme with 1 unit being equal to 1.8m³/day. It is also understood that the existing Marae may have an additional allowance. It is noted that the current Otama scheme is not accepting additional connections at this time and the current allowance would not be sufficient for the intensification of the Site.
9. I consider that two feasible additional sources of water are available. This could be provided by either a bore on site or a connection to the Gore District Council's (**Council**) supply.
10. Drilling a bore on the site and determining if the ground water is suitable is the preferred initial option. We note Council staff have indicated that Mataura Valley Milk (**MVM**) south of the Site have a bore but testing has shown that it is not suitable. I consider that a bore drilled at the northern end of the McNab Site is likely to be fed from a different source to MVM and therefore maybe be suitable.
11. Alternatively, a connection to Council's Reservoir in Talbot Street to the south west of the Site could be made:
 - (a) Water could be supplied to the site by extending a line from the Talbot Reservoir located 1.8 km to the south east of the site. Refer **Annexure A Plan 01**;
 - (b) A booster pump at the reservoir would be needed to push water over the high point in Talbot Street and the existing watermain in Talbot Street would likely need to be upgraded, rather than just an extension from the existing line that ends just 720m from the site. Refer **Annexure B Plan 02**;
 - (c) If there is insufficient tank volume in the reservoir for the increased fire fighting requirements then allowances for firefighting supplies within the development will need to be made;
 - (d) A connection to council's network could have additional benefits for the wider community in allowing investigations into:
 - (i) Connecting other users south of the state highway;
 - (ii) Completing a ring main back to the council network via Mckinnon Rd and Wentworth St to provide for future intensification of properties adjoining these roads. Refer **Annexure A Plan 01** and **Annexure C Plan 03**; and

- (iii) Connecting any potential water source east of Gore into the town supply.
- 12. In summary I consider that either an onsite bore option or connection to the council's main is feasible and this could be determined through detailed design following the rezoning process.

WASTEWATER

- 13. The existing dwellings and buildings on the Site currently discharge wastewater to ground via traditional septic tank and disposal field systems.
- 14. With a density of one dwelling per hectare proposed for the Rural Lifestyle zone there would be a satisfactory amount of unencumbered land remaining for modern ground disposal system to be established for each dwelling or centrally. Refer **Annexure E** Indicative Disposal Field Sizing 500m².
- 15. For the light industrial zone with a rural overlay, depending on the ultimate industrial use wastewater flows could vary. Land disposal could be used initially for low flows with long term planning in place to eventually connect to council's wastewater network if high flows are to occur. I consider either option is feasible and could be determined in the future.
- 16. A pump station could be established near the low point on site on McKinnon Road and inflow pumped up to council's system in Wentworth Street. A rising main 2.25km long line with 40m of elevation change would be required and is technically achievable. Refer **Annexure C** Plan 03 for route long section. There would be on going power maintenance costs associated with a pumping station. Council's sewer capacity downstream of the connection point would need to be investigated.
- 17. In addition to the light industrial flows, domestic flows from the rural lifestyle zone could be allowed for in any pump station design, with a low pressure sewer system established within the rural lifestyle zone to pump to the station as an alternative disposal method or long term replacement of ground disposal.
- 18. Connecting to Council's network could have long term benefits for the wider community in allowing future connections to the network if further land intensification was to occur along the McKinnon and Wentworth Streets.

STORMWATER

- 19. Environment Southland have provided historical records that shows flooding occurs on site when water backs up in the Waikaka Stream and discharge from the

upstream catchment cannot be released via the culvert under the adjoining state highway and railway line to the south.

20. A flood level restriction on the lower part of site to RL 80m based on historical data is proposed.
21. Preliminary work based on the latest lidar information available from the recent Provincial Growth Fund -LiDAR collection program has been analyzed to determine the size and extent of the upstream catchment. Contributing to the unnamed tributary discharging to the concrete box culvert under the state highway and in to the Waikaka Stream. Refer to **Annexure D** Plan 04 Stormwater Catchment Plan.
22. The catchment is approximately 372ha in size and bounded by a ridge line running parallel to Pinnacle Road to the west, and a ridge line transversing farm land running parallel to the Site's east boundary.
23. A number of overland flowpath in the form of depressions, swales and shallow gullies direct water to a central flowpath through the catchment which forms the longest flow path of 3.8km.
24. The subject Site occupies approximately 100ha of the catchment in the lower south eastern area and is bisected by the central flowpath. There are a number of secondary flowpaths entering the property across various boundary lines and transversing shallow gullies and formal/informal channel network before joining the central flow path.
25. The rolling nature of the site provides the ideal topography to introduce what is currently considered best practice stormwater controls by way of a treatment train. That could begin at the individual developed sites with at source treatment of stormwater runoff by either soft green solutions such as swales or sand/media filters. While discharge from upstream properties could be treated by way of a system of terraced attenuation and stormwater treatment ponds and wetlands throughout the Site.
26. This would provide the ideal environment to undertake research into the efficiency and successfulness of the different stormwater treatment approaches on overall catchment water quality. This activity could be done in conjunction with Mahinga Kai principles and activities related to wildlife breeding and monitoring programs.
27. Providing separate stormwater controls for different areas of land zoning could be beneficial in providing information on the effects of different land use practices on water quality.

28. Alternatively, an end of line arrangement of stormwater controls could feasibly be provided at the low point of the site. This could be in the form of 3 terraced ponds and or wetland areas, with the:
- (a) Lower area providing flood protection mitigation, treatment of industrial areas and yards;
 - (b) Central area providing – stormwater treatment of runoff from other areas.
 - (c) The Upper area – being the reinstatement of waterways and investigation into environmental benefits and introduction of habit for native fish breeding, etc.

CONCLUSION

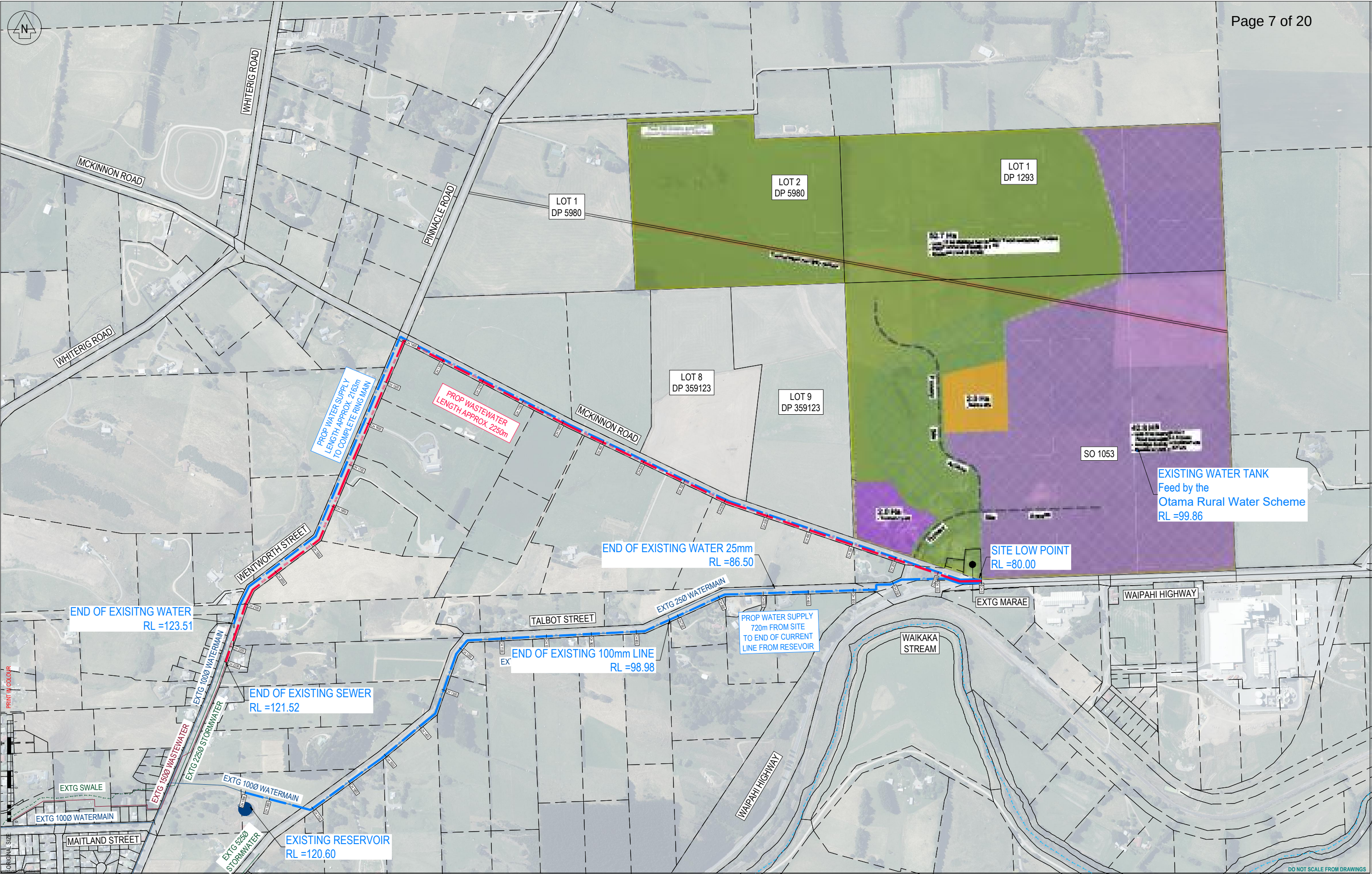
29. Our investigation into the Site's suitability for rezoning with regards to 3 waters infrastructure services has determined that there are multiple variable scenarios to feasibly provide each service.
30. All scenarios are technically achievable with further detailed engineering investigation and design.
31. I do not see any insurmountable servicing limitations that should prevent the site from being rezoned.



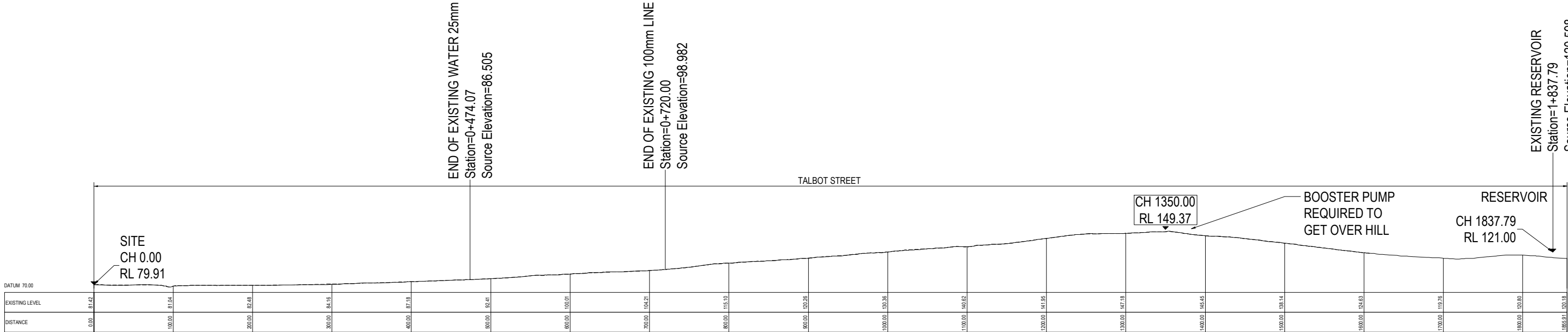
Justin Gregory Ralston

7 October 2024

ANNEXURE A – PLAN 01



ANNEXURE B – PLAN 02



VERT 1:100
HORIZ 1:250

WATERMAIN TALBOT ST LONGSECTION

VERT 1:100
HORIZ 1:250

PRINT IN COLOUR



ORIGINAL SIZE:



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BOTANY
QUEENSTOWN

JOB TITLE:

**PLAN CHANGE
HOKONUI SUBDIVISION
MCNAB BLOCK
MC KINNON ROAD
GORE**

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A	FOR EVIDENCE REVIEW	27/09/2024	
REV	AMENDMENT	DATE	BY

DRAWING STATUS:

RC

ISSUE PURPOSE:

FOR EVIDENCE REVIEW

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DRAWN: JR
CHECKED: JR
DATE: 1/10/2024
SCALE: 1:2500 @ A3
SURVEY: LIDAR
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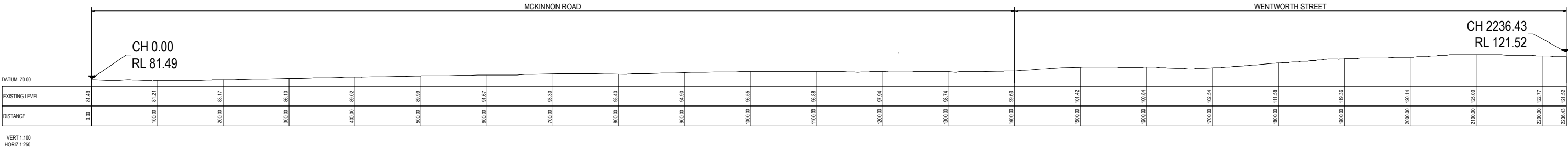
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WATERMAIN TALBOT STREET LONG SECTION

JOB No: 240153-01	SHEET No: 02	REV: A
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DO NOT SCALE FROM DRAWINGS

ANNEXURE C – PLAN 03



WATERMAIN & SEWER MC KINNON RD & WENTWORTH ST LONGSECTION

VERT 1:100
HORIZ 1:250

PRINT IN COLOUR



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ISSUE PURPOSE:

FOR EVIDENCE REVIEW

DESIGN:	JR
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CHECKED:	JR
DATE:	1/10/2024
SCALE:	Custom @ A3
SURVEY:	LIDAR
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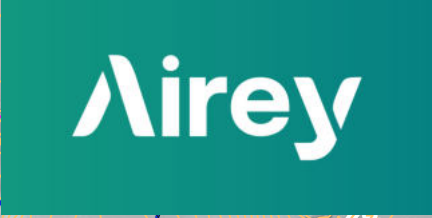
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WATERMAIN & SEWER MC KINNON RD
& WENTWORTH ST

JOB No:	240153-01	SHEET No:	03	REV:	A
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DO NOT SCALE FROM DRAWINGS

ANNEXURE D – PLAN 04



- Contours1m
- nz-primary-parcels
- LongestFlowPath
- Basins
- dpointsfinal
- DrainagePoints
- Streams
- DevelopmentArea

372ha



ANNEXURE E - INDICATIVE DISPOSAL FIELD SIZING 500M²



ENGINEERING CALCULATIONS

Job: On-Site Wastewater Disposal Design

**Address: Hokonui Subdivision, McNabb Block,
McKinnon Road, Gore**

Client: McKinnon Property Ltd

Job No: 240153Q/01

Date: 02 October 2024

Design Engineer: Laura Bylsma

Checked By: Justin Ralston

Contact Phone: (03) 442 3101

Fax: (03) 442 3102

Email: laurab@aireys.co.nz

Item	Description	Page
1	Wastewater Disposal Design Calculations	1
2	AS/NZS 1547:2012 Details	2 – 4
3	Geological Map	5



CONSULTING CIVIL, STRUCTURAL & FIRE
ENGINEERS

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T: 03 442 3101
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ON-SITE EFFLUENT DISPOSAL SYSTEM

CLIENT:	McKinnon Property Ltd
JOB:	Effluent Disposal for Proposed Hokonui Subdivision
LOCATION:	McNabb Block, McKinnon Road, Gore
JOB No.:	240153Q/01
DATE:	02/10/2024

Number of Bedrooms:	4
Other Rooms (Rumpus etc):	2
Design Occupancy:	10
Water Supply:	Otama Water Scheme
Design Wastewater flows:	200 l/p/d
Discharge Volume:	2000 l/d

Area of Site:	10,000	m ²	
Regional Authority:	SDC		
Gross Lot Area/Discharge	5.00		OK Greater than 3
Soil Category:	4		
Type of field:	ETA		
Soil Loading Rate:	8	l/m ² /day	
Trench Width:	1	m	
Slope of receiving ground	5	%	
Disposal area reduction factor	1		
Area of field	250	m ²	
Reserve area	250	m ²	50%-100%min

TABLE E1
ASSESSMENT OF SOIL TEXTURES

Soil category	Classification	Properties	Typical clay content% (see Note)
1	Sand	Very little to no coherence; cannot be moulded; single grains stick to fingers	Less than 5
2	Loamy sand	Slight coherence; forms a fragile cast that just bears handling; gives a very short (5 mm) ribbon that breaks easily; discolours the fingers	5 – 10
	Sandy loam	Forms a cast but will not roll into a coherent ball; individual sand grains can be seen and felt; gives a ribbon 15 – 25 mm long	10 – 20
3	Fine sandy loam	As for sandy loams, except that individual sand grains are not visible, although they can be heard and felt; gives a ribbon 15 – 25 mm long	10 – 20
	Loam	As for sandy loams but cast feels spongy, with no obvious sandiness or silkiness; may feel greasy if much organic matter is present; forms a thick ribbon about 25 mm long	10 – 25
	Silty loam	As for loams but not spongy; very smooth and silky; will form a very thin ribbon 25 mm long and dries out rapidly	10 – 25
4	Sandy clay loam	Can be rolled into a ball in which sand grains can be felt; forms a ribbon 25 – 40 mm long	20 – 30
	Fine sandy clay	As for sandy clay loam, except that individual sand grains are not visible although they can be heard and felt; forms a ribbon 40 – 50 mm long	20 – 30
	Clay loam	Can be rolled into a ball with a rather spongy feel; slightly plastic; smooth to manipulate; will form a ribbon 40 – 50 mm long	25 – 35
	Silty clay loam	As for clay loams but not spongy; very smooth and silky; will form a ribbon about 40 – 50 mm long; dries out rapidly	25 – 35
5	Sandy clay	Forms a plastic ball in which sand grains can be seen, felt or heard; forms a ribbon 50 – 75 mm long	35 – 45
	Light clay	Smooth plastic ball that can be rolled into a rod; slight resistance to shearing between thumb and forefinger; forms a ribbon 50 – 75 mm long	35 – 40
	Silty clay	As for light clay but very smooth and silky; will form a ribbon about 50 – 75 mm long but very fragmentary; dries out rapidly	40 – 50
6	Medium clay	Smooth plastic ball, handles like plasticine and can be moulded into rods without fracture; some resistance to ribboning, forms a ribbon 75 mm or more long	40 – 55
	Heavy clay	Smooth plastic ball that handles like stiff plasticine; can be moulded into rods without fracture; firm resistance to ribboning; forms a ribbon 75 mm or more in length	50 or more
NOTE: The typical clay content figures are included for information only.			

TABLE H3
TYPICAL DOMESTIC WASTEWATER DESIGN FLOW ALLOWANCES
– DOMESTIC WASTEWATER FROM HOUSEHOLDS – NEW ZEALAND

Source	Typical wastewater design flows (L/person/day) (see Note 1)	
	On-site roof water tank supply	Reticulated community or a bore-water supply
Households with standard fixtures (including automatic washing machine)	180	200
Households with standard water reduction fixtures (see Note 2)	145	165
Households with full water-reduction facilities (see Note 3)	120	145
Households (blackwater only) (see Notes 4 and 5)	60	
Households (greywater only) (see Notes 4 and 6)	90	120
NOTES:		
1 These flows should be used for design purposes unless past experience demonstrates lower actual flows. 2 Standard water reduction fixtures include dual flush water closets, shower-flow restrictors, aerator faucets (taps), and water-conserving automatic washing machines. 3 Full water-reduction fixtures include the combined use of reduced flush 6/3 litre water closets, shower-flow restrictors, aerator faucets, front-load washing machines and flow/pressure control valves on all water-use outlets (9 L/min maximum). Baths should also be discouraged. 4 Additionally, water reduction may be achieved by treatment of greywater and recycling for water closet flushing (reclaimed water cycling). However, when designing the water treatment unit and the land application area, it needs to be borne in mind that effluent derived from recycled wastewater will be likely to have a higher level of nutrients and salts than non-recycled water, and that there is no certainty on the exact extent of reuse or that the reuse system will remain in place in the long term. Therefore any reduction in the size of the land application system should be conservative and subject to the approval of the relevant regulatory authority. 5 Flow allowances only apply where the blackwater from toilets is to be treated and discharged to land disposal. Blackwater flows constitute 10% to 30% of the total per person daily flow allowances, typically in New Zealand in the order of 25%. Where water-reducing fixtures are already in place, blackwater flows from toilets are likely to be a lower proportion of the total daily water usage, in the order of 15% to 18% of the total water usage. 6 Flow allowances only apply where the greywater is to be treated and discharged to land disposal, where solids from kitchen and toilet waste flows are excluded from the wastewater stream (no food waste disposal unit).		

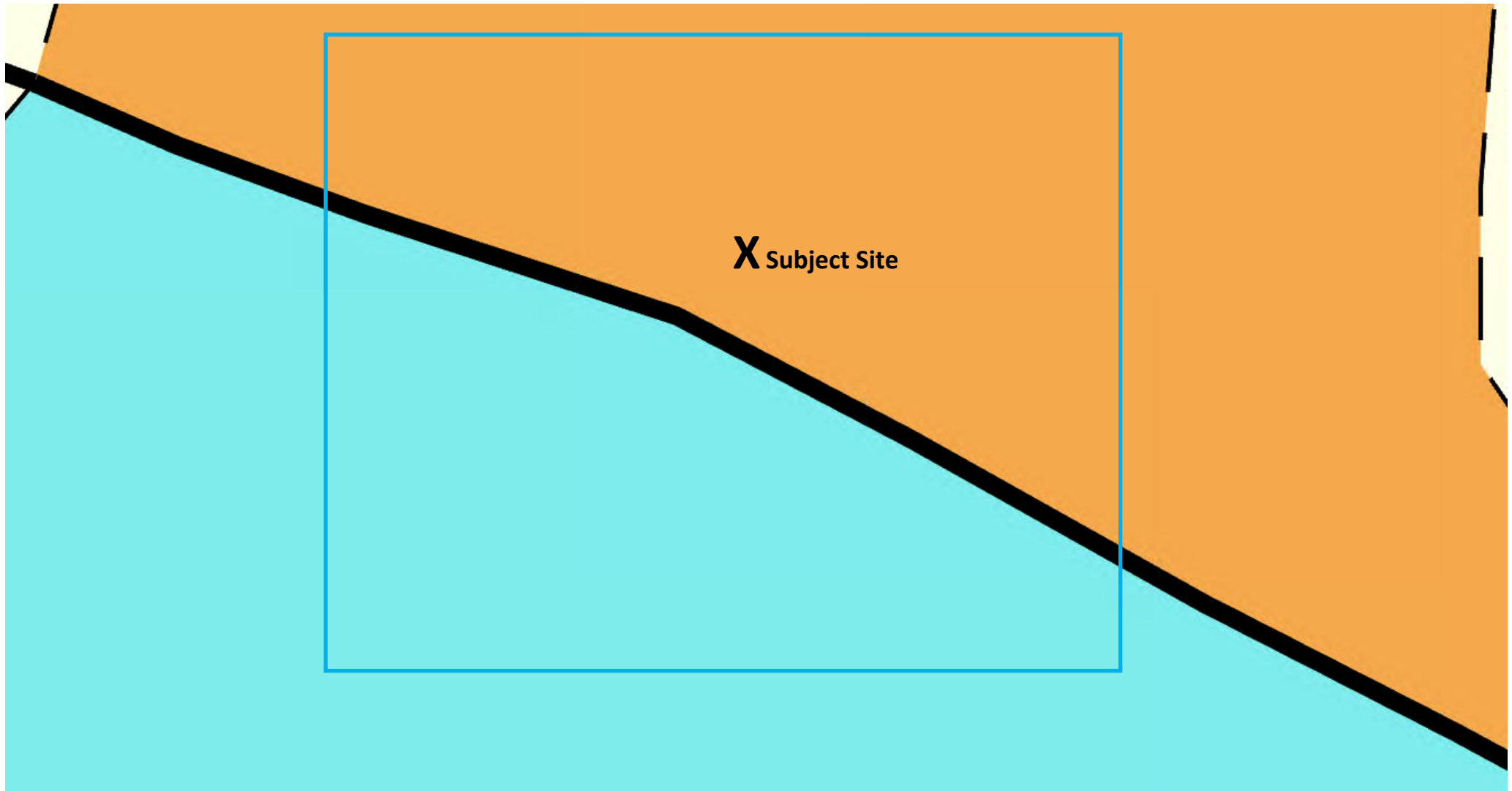
TABLE L1
RECOMMENDED DESIGN LOADING RATES FOR TRENCHES AND BEDS

Soil category	Soil texture	Structure	Indicative permeability (K_{sat})(m/d)	Design loading rate (DLR) (mm/d)			ETA/ETS beds and trenches
				Trenches and beds		Secondary treated effluent	
				Primary treated effluent			
				Conservative rate	Maximum rate		
1	Gravels and sands	Structureless (massive)	> 3.0	20 (see Note 1)	35 (see Note 1)	50 (see Note 1)	(see Note 4)
2	Sandy loams	Weakly structured	> 3.0	20 (see Note 1)	30 (see Note 1)	50 (see Note 1)	
		Massive	1.4 – 3.0	15	25	50	
3	Loams	High/moderate structured	1.5 – 3.0	15	25	50	
		Weakly structured or massive	0.5 – 1.5	10	15	30	
4	Clay loams	High/moderate structured	0.5 – 1.5	10	15	30	12
		Weakly structured	0.12 – 0.5	6	10	20	8
		Massive	0.06 – 0.12	4	5	10	5
5	Light clays	Strongly structured	0.12 – 0.5	5	8	12	5 (see Notes 2, 3, & 5)
		Moderately structured	0.06 – 0.12	(see Notes 2 & 3)	5	10	
		Weakly structured or massive	< 0.06		8		
6	Medium to heavy clays	Strongly structured	0.06 – 0.5				
		Moderately structured	< 0.06				
		Weakly structured or massive	< 0.06				

NOTES:

- The treatment capacity of the soil and not the hydraulic capacity of the soil or the growth of the clogging layer govern the effluent loading rate in Category 1 and weakly structured Category 2 soils. Land application systems in these soils require design by a suitably qualified and experienced person, and distribution techniques to help achieve even distribution of effluent over the full design surface (see L8.2 and Figure L4 for recommended discharge method by discharge control trench). These soils have low nutrient retention capacities, often allowing accession of nutrients to groundwater.
- To enable use of such soils for on-site wastewater land application systems, special design requirements and distribution techniques or soil modification procedures will be necessary. For any system designed for these soils, the effluent absorption rate shall be based upon soil permeability testing. Specialist soils advice and special design techniques will be required for clay dominated soils having dispersive (sodic) or shrink/swell behaviour. Such soils shall be treated as Category 6 soils. In most situations, the design will need to rely on more processes than just absorption by the soil.
- If $K_{sat} < 0.06$ m/d, a full water balance for the land application can be used to calculate trench/bed size (see Appendix Q).
- ETA/ETS systems are not normally used on soil Categories 1 to 3.
- For Category 6 soils ETA/ETS systems are suitable only for use with secondary treated effluent.

GNS Geology Map: Hokonui Subdivision, McNabb Block, McKinnon Road, Gore



Undifferentiated Maitai Group siltstone – Basement (Eastern Province) sedimentary rocks. Siltstone; conspicuous sandstone bands; minor conglomerate and limestone; and red and green siltstone.

North Range Group siltstone – Basement (Eastern Province) sedimentary rocks. Well bedded siltstone; sandstone; tuff; shellbeds and conglomerate.