

To:	Gibbons Co Level 2, 6 Viaduct Harbour Avenue Auckland CBD Attention: Cameron Hodgson
From:	Andrew Appleby
Copy:	WGA (Cameron Jasper, Brett Sinclair)
Subject:	Review of Water and Wastewater Demand Calculations
Date:	9/03/2026
Project Ref:	30088
Document ID:	692481
Revision Status:	C
Reviewer:	Bradley Clark

1 BACKGROUND

LDE Ltd has been requested by WGANZ Pty Ltd to complete a review of the water demand and wastewater discharge calculations for a proposed subdivision located at Morven Ferry Road, Queenstown.

2 PROPOSED DEVELOPMENT

The proposed subdivision development includes some 1,210 lots together with a mix of educational, retail, commercial and public facilities.

3 REVIEW

Subsequent to our review of the supplied information we make the comments in the following section together with the responses received.

3.1 Water Demand

This review of the projected water demand has been undertaken based on a provided excel file of the calculations from McKenzie and Co with a file name "4048-500 Water Wastewater demand Calculations", revision G dated 17/02/2026.

A copy of the revision G calculations, upon which our review was completed, are appended along with the updated revision H file dated 23/02/2026 with any concerns raised having been closed out.

3.1.1 References

This review has been undertaken with reference to Auckland Councils Water and Wastewater Code of Practice for Land Development and Subdivision, Chapter 6: Water and the Queenstown Lakes District Councils Land Development and Subdivision Code of Practice.

Specifically, the supplied calculations have been based on the following references.

Table 6.1.b - Other facility design occupancy allowances

Other facility types		Design water flow allowance
Hospitals	Day facility (treatment facilities, wards)	320 Litres per bed per day
	Night and day facility (24-hour operation)	630 Litres per bed per day
	Staff	50 litres per employee per day
Child day-care	Children	45 Litres per child per day
	Staff	50 Litres per employee per day
School (day students)	Primary school	20 Litres per student per day
	Secondary school	25 Litres per student per day
	Staff	50 Litres per employee per day
School (boarding)	Secondary school	160 Litres per student per day
Student accommodation		160 Litres per person per day
Hotels and motels	Guests	200 Litres per room per day
	Staff	50 Litres per employee per day
Community halls and churches and/or facilities with intermittent use		12 Litres per seat per day
Note:		
For activities where a large number of people can be expected to use multiple water fixtures simultaneously e.g. community halls and conference halls, the Peaking Factor shall be based on the number of water fixtures / appliances, as per NZS 3500.2 Plumbing and Drainage: Part 2: Sanitary plumbing and drainage.		
Water consumption allowances in this table include general irrigation (but not specific irrigation systems) and grounds upkeep.		

Table 6.1.c – Wet and dry commercial assumed design allowances

Commercial activity type	Design water flow allowance
Dry retail (Note 1) (where kitchen/toilets are <u>not</u> normally made available to customers)	1 person per 50m ² net floor area at 65 litres per person per day.
Office buildings and dry retail where toilet facilities, etc. are provided to customers.	1 person per 15m ² net floor area at 65 litres per person per day.
Wet retail (Note 2): Food and or beverage retail/preparation e.g. coffee shop, restaurant, bar, butcher, fresh fruit and vegetable retail.	15 litres per day per net m ² of floor area (including kitchen and dining areas).
Table notes:	
1. Dry retail is where water is normally only used by staff for their own personal food preparation / toileting needs. Examples include: clothes shop, hardware retail.	
2. Wet retail is where water is used to prepare food product for customers. Examples include: café, lunch bar, restaurant, butchery, fresh fruit and vegetable, food court-bar and supermarkets.	
3. Assuming no significant irrigation.	
Important:	
Net floor area is the total floor area of the building (exclude any open land areas), less non-productive areas, such as: lobbies; lifts; machine rooms; electrical services; stairwells; fire escapes; corridors and other passages used in common with other occupiers; car parking areas; etc. If net area is unknown, and the type of buildings are unknown, it can be assumed that the Net floor area is = 80% of the gross floor area of the building.	
As a guide to how activities will be assessed, commercial washing activities such as car / boat washing activities, etc. would be regarded as a "wet-industry" and not as a commercial - wet retail, as the water is being used as a part of a process (washing). Large-scale food-processing (i.e. for supply to commercial customers, as opposed to on-site retail customers) would be regarded as an industrial type activity. Preparation / manufacture of non-food based products, is also regarded as an industrial activity. Industry design flows are detailed in the section below.	

3.1.2 Residential

Comment:

A per lot design population of 3 people has been assumed, further information is required to clarify what this assumption has been based on. Specifically, the assumed number of bedrooms in the proposed dwellings, the related design population and the per person daily water demand.

Response:

The per lot design population is based on the Water Care Code of Practice for Land Development and Subdivision Table 6.1.a – Design residential occupancy allowances which states a population of 3 for a 2-4 bedroom dwelling. The per person daily water demand has been increased from the 220 L/p/day recommended in the Water Care document to 250 L/p/day.

Clarification is acceptable and is following recommended practice.

Closed out.

3.1.3 Commercial

Comment:

Calculations of the expected commercial water demand has been based on projected floor areas and the related design flow allowances as per the recommendations in the references cited in Section 3.1.1 above, and appear to be an accurate representation of future water demand for the commercial activities proposed.

Response:

None required.

Closed out.

3.1.4 Other

Comment:

Based on the assumptions in the data provide (4.5L Toilet, 4.5L Basin, 4 uses per hour, 11 hours a day + nominal tap use, assumed as 3L per use) the daily demand would be 396 litres ($(4.5 + 4.5 + 3) * 4 * 11 = 528$). This differs significantly from the figures presented for daily demand in the data provided.

Further information is required to clarify the activities associated with these events and the assumptions made in calculating water demand.

There are errors in the calculations in cells L28 – L30, M28 – M30 which need to be corrected.

Response:

Farm House Play Area and Hay Barn Bike Facilities -

Calculation - 2 toilets by 9L a flush (4.5L flush + 4.5L basin) by 4 flush per hour by 11 hrs operation. ($2*9*4*11 = 792L$).
Then increased the demand to 900L to account for the drinking fountain.

Community Park Changing Rooms -

Calculation - 5 toilets by 9L a flush (4.5L flush + 4.5L basin) by 4 flush per hour by 11 hrs operation. ($5*9*4*11 = 1980L$).
Then increased the demand to 2000L to account for the drinking fountain.

All excel file formulas have been corrected.

Clarifications are accepted, assumptions made are reasonable and minor formula errors have been corrected.
Closed out.

3.2 Wastewater Discharge

A review of the wastewater discharge calculations has been undertaken based on a provided excel file of the calculations from McKenzie and Co, with a file name "4048-500 Water Wastewater demand Calculations", revision G dated 23/01/2026. A copy of these calculations are appended along with an updated revision H file dated 23/02/2026 with any concerns raised having been addressed.

3.2.1 References

This review has been undertaken with reference to Auckland Councils Water and Wastewater Code of Practice for Land Development and Subdivision, Chapter 5: Wastewater, the Queenstown Lakes District Councils (QLDC) Land Development and Subdivision Code of Practice and the QLDC Pressure Sewer System Design Standards.

3.2.2 Residential

Calculations of the expected residential wastewater discharge has been based upon the estimated design population, the number of proposed lots and the related design flow allowances as per the recommendations in the references cited in Section 3.2.1 above, and appear to be an accurate representation of future residential wastewater production.

Response:

None required.

Closed out.

3.2.3 Commercial

Calculations of the expected commercial wastewater discharge have been based on projected floor areas and the related design flow allowances as per the recommendations in the references cited in Section 3.2.1 above, and appear to be an accurate representation of future wastewater production for the commercial activities proposed.

Response:

None required.

Closed out.

3.2.4 Other

The calculations of the expected wastewater discharge for “other” activities has been based on proposed fixtures, predicted use and the related design flow allowances as per the recommendations in the references cited in Section 3.2.1 above, and appear to be an accurate representation of future wastewater production for these proposed activities on the condition that the formulas in the spreadsheet cells noted above are corrected.

The formulas in cells N28 – N30 and O28 – O30 are incorrect.

Response:

All excel file formulas have been corrected.

Closed out.

4 CONCLUSION

4.1 Water Demand

We consider that the responses received adequately address the concerns raised from our initial review and that the Revision G calculations dated 23/02/2026 accurately represent the expected water demand for the proposed development.

4.2 Wastewater Discharge

Following our review, and subsequent responses, we can confirm we consider the Revision G calculations dated 23/02/2026 accurately represents the expected wastewater production for the proposed development.

5 LIMITATIONS

This report should be read and reproduced in its entirety including the limitations to understand the context of the opinions and recommendations given.

This report has been prepared exclusively for WGANZ Pty Ltd (and Gibbons Co) in accordance with the brief given to us or the agreed scope and they will be deemed the exclusive owner on full and final payment of the invoice. Information, opinions, and recommendations contained within this report can only be used for the purposes with which it was intended. LDE accepts no liability or responsibility whatsoever for any use or reliance on the report by any party other than the owner or parties working for or on behalf of the owner, such as local authorities, and for purposes beyond those for which it was intended.

This report was prepared in general accordance with current standards, codes and best practice at the time of this report. These may be subject to change.



MCKENZIE & CO.

WATER DEMAND CALCULATIONS

PROJECT NAME: Ridgeburn
PROJECT NUMBER: 4048

REVISION:	CREATED BY:	CHECK BY:	DATE:
F	SL	SI	23/01/2026
G	SL	SL	17/02/2026
C	SH	RC	13/10/2025
D	SL	SL	18/12/2025
E	SL	SL	22/12/2025

LANDUSE AREA		Gross Floor Area (m2)	Net Floor Area (m2)	No. Personnel		Table 6.1.b - Other facility design occupancy allowances & Table 6.1.c - Wet and dry commercial assumed design allowances, Watercare COP	Daily Consumption (L/dwelling/day)	No. Lots/Dwellings	Daily Demand (m3/d)	Peak Factor	Peak Daily Demand (m3/d)
Residential											
Metered water Supply, WELS fitting, Water Reduction Fittings, No irrigation. TP58 Values, Managed by Water supply company							750	1,210	908	2	1,815
Commercial		GFA									
Gym / Community Hall		450		50	People	100 L/p/d			5	2.0	10.0
Office		2650	2120			65 L/15m2/p/d			9	2.0	18.4
Daycare		750		100	Children	45 L/p/d			5	2.0	9.0
				13	Staff	50 L/p/d			0.65	2.0	1.3
Supermarket	Retail/fresh space	2500	2000			15 L/m2/d			30	2.0	60.0
	Storage	850		5	Staff	50 L/p/d			0.25	2.0	
	Office	300	240			65 L/15m2/p/d			1	2.0	2.1
Worker / Visitor Accomodation				202	Studio rooms	180 L/room/day			36	2.0	72.7
				10	Staff	50 L/p/d			1	3.0	1.5
Retail		450	360			65 L/50m2/p/d			0.47	2.0	0.9
Bar / Pizzeria (Shearing Shed)		300	240			15 L/m2/d			4	2.0	7.2
Other											
Farm House Play Area (Neighbourhood A)	No personnel, just 2 WCs and a drinking tap/sink, 170m2 GFA	170				4.5L Toilet, 4.5L Basin, 4 uses per hour, 11 hours a day + nominal tap use	900 L		0.9	2.0	1.8
Hay Barn Bike Facilities (Neighbourhood J)	2 WCS and a drinking tap/sink, 224m2 GFA	224				4.5L Toilet, 4.5L Basin, 4 uses per hour, 11 hours a day + nominal tap use	900 L		0.9	2.0	1.8
Community Park Changing Rooms (Neighbourhood D)	5 WCS and a drinking tap/sink, 70m2 GFA	70				4.5L Toilet, 4.5L Basin, 4 uses per hour, 11 hours a day + nominal tap use	2000 L		2	2.0	1.8
Water and Wastewater Treatment Plant	Occasional user - not permanent			1	Staff	50 L/p/d			0.05	2.0	4.0
Total									1,003		2,008

Andrew Appleby:
Error in formulas

WASTEWATER DEMAND CALCULATIONS

PROJECT NAME: Ridgeburn
 PROJECT NUMBER: 4048
 Type of Wastewater system: Low Pressure Sewer



REVISION: E, F, G, D
 CREATED BY: SL, SL, SL, JK
 CHECK BY: SL, SL, SL, RC
 DATE: 18/12/2025, 22/12/2025, 23/01/2026, 4/11/2025

LANDUSE AREA		Gross Floor Area (m2)	Net Floor Area (m2)	No. Personnel		Table 6.1.b - Other facility design occupancy allowances & Table 6.1.c - Wet and dry commercial assumed design allowances, Watercare COP	Average Dry Weather Flow (L/p/d)	Occupancy per residence	No. Lots/Dwellings	Population	Average Dry Weather Flow - ADWF (m3/d)	Dilution/Infiltratio Peak Factor (QLDC pressure sewer system design standards 6.4)	Wet Weather Flow - WWF (m3/d)	Dry weather diurnal Peaking factor (QLDC COP, 5.3.5.1)	Peak Wet Weather Flow - PWWF (l/s)
Residential															
QLDC Land Dev CoP 5.3.5.1							250	3	1,210	3,630	908	1.2	1,089	2.5	26.26
Commercial															
Gym / Community Hall		450		50	People	100 L/p/d					5	1.2	6	2.5	0.14
Office		2650	2120			65 L/15m2/p/d					9	1.2	11.02	2.5	0.27
Daycare		750		100	Children	45 L/p/d					5	1.2	5.4	2.5	0.13
				13	Staff	50 L/p/d					0.65	1.2	0.78	2.5	0.02
Supermarket	Retail/fresh space	2500	2000			15 L/m2/d					30	1.2	36	2.5	0.87
	Storage	850		5	Staff	50 L/p/d					0.25	1.2	0.3	2.5	0.01
	Office	300	240			65 L/15m2/p/d					1.04	1.2	1.248	2.5	0.03
Worker / Visitor Accomodation				202	Studio rooms	180 L/room/day					36.36	1.2	43.632	2.5	1.05
				10	staff	50 L/p/d					0.5	2.2	1.1	3.5	0.02
Retail		450	360			65 L/50m2/p/d					0.47	1.2	0.5616	2.5	0.01
Bar / Pizzeria (Shearing Shed)		300	240			15 L/m2/d					3.6	1.2	4.32	2.5	0.10
Other															
Farm House Play Area (Neighbourhood A)	No personnel, just 2 WCs and a drinking tap/sink, 170m2 GFA	170				4.5L Toilet, 4.5L Basin, 4 uses per hour, 11 hours a day + nominal tap use	900 L				0.9	1.2	1.1		
Hay Barn Bike Facilities (Neighbourhood J)	2 WCS and a drinking tap/sink, 224m2 GFA	224				4.5L Toilet, 4.5L Basin, 4 uses per hour, 11 hours a day + nominal tap use	900 L				0.9				
Community Park Changing Rooms (Neighbourhood D)	5 WCS and a drinking tap/sink, 70m2 GFA	70				4.5L Toilet, 4.5L Basin, 4 uses per hour, 11 hours a day + nominal tap use	2000 L				2	1.2	1.1		
Water and Wastewater Treatment Plant	Occasional user - not permament			1	Staff	50 L/p/d					0.05	1.2	2.4		
Total											1,003		1,204		28.9

Andrew Appleby:
Error in formulas

WATER DEMAND CALCULATIONS



PROJECT NAME: Ridgeburn
PROJECT NUMBER: 4048

REVISION:	CREATED BY:	CHECK BY:	DATE:
F	SL	SL	23/01/2026
G	SL	SL	17/02/2026
H	SL	SL	23/02/2026
D	SL	SL	18/12/2025
E	SL	SL	22/12/2025

LANDUSE AREA		Gross Floor Area (m2)	Net Floor Area (m2)	No. Personnel		Table 6.1.b - Other facility design occupancy allowances & Table 6.1.c - Wet and dry commercial assumed design allowances, Watercare COP	Daily Consumption (L/dwelling/day)	No. Lots/Dwellings	Daily Demand (m3/d)	Peak Factor	Peak Daily Demand (m3/d)
Residential											
Metered water Supply, WELS fitting, Water Reduction Fittings, No irrigation. TP58 Values, Managed by Water supply company							750	1,210	908	2	1,815
Commercial											
Gym / Community Hall		GFA 450		50	People	100 L/p/d			5	2.0	10.0
Office		2650	2120			65 L/15m2/p/d			9	2.0	18.4
Daycare		750		100	Children	45 L/p/d			5	2.0	9.0
Supermarket	Retail/fresh space	2500	2000	13	Staff	50 L/p/d			0.65	2.0	1.3
	Storage	850		5	Staff	50 L/p/d			0.25	2.0	60.0
	Office	300	240			65 L/15m2/p/d			1	2.0	2.1
Worker / Visitor Accomodation				202	Studio rooms	180 L/room/day			36	2.0	72.7
				10	Staff	50 L/p/d			1	3.0	1.5
Retail		450	360			65 L/50m2/p/d			0.47	2.0	0.9
Bar / Pizzeria (Shearing Shed)		300	240			15 L/m2/d			4	2.0	7.2
Other											
Farm House Play Area (Neighbourhood A)	No personnel, just 2 WCs and a drinking tap/sink, 170m2 GFA	170				4.5L Toilet, 4.5L Basin, 4 uses per hour, 11 hours a day + nominal tap use	900 L		0.9	2.0	1.8
Hay Barn Bike Facilities (Neighbourhood J)	2 WCS and a drinking tap/sink, 224m2 GFA	224				4.5L Toilet, 4.5L Basin, 4 uses per hour, 11 hours a day + nominal tap use	900 L		0.9	2.0	1.8
Community Park Changing Rooms (Neighbourhood D)	5 WCS and a drinking tap/sink, 70m2 GFA	70				4.5L Toilet, 4.5L Basin, 4 uses per hour, 11 hours a day + nominal tap use	2000 L		2	2.0	4.0
Water and Wastewater Treatment Plant	Occasional user - not permament			1	Staff	50 L/p/d			0.05	2.0	0.1
Total									1,003		2,006

WASTEWATER DEMAND CALCULATIONS

PROJECT NAME: Ridgeburn
PROJECT NUMBER: 4048
Type of Wastewater system: Low Pressure Sewer



REVISION:
 E SL 18/12/2025
 F SL 22/12/2025
 G SL 23/01/2026
 H SL 23/02/2026

CREATED BY:
CHECK BY:
DATE:

LANDUSE AREA		Gross Floor Area (m2)	Net Floor Area (m2)	No. Personnel		Table 6.1.b - Other facility design occupancy allowances & Table 6.1.c - Wet and dry commercial assumed design allowances, Watercare COP	Average Dry Weather Flow (L/p/d)	Occupancy per residence	No. Lots/Dwellings	Population	Average Dry Weather Flow - ADWF (m3/d)	Dilution/Infiltration Peak Factor (QLDC pressure sewer system design standards 6.4)	Wet Weather Flow WWF (m3/d)	Dry weather diurnal Peaking factor (QLDC COP, 5.3.5.1)	Peak Wet Weather Flow - PWWF (l/s)
Residential															
QLDC Land Dev CoP 5.3.5.1							250	3	1,210	3,630	908	1.2	1,089	2.5	26.26
Commercial															
		GFA													
Gym / Community Hall		450		50	People	100 L/p/d					5	1.2	6	2.5	0.14
Office		2650	2120			65 L/15m2/p/d					9	1.2	11.02	2.5	0.27
Daycare		750		100	Children	45 L/p/d					5	1.2	5.4	2.5	0.13
				13	Staff	50 L/p/d					0.65	1.2	0.78	2.5	0.02
Supermarket	Retail/fresh space	2500	2000			15 L/m2/d					30	1.2	36	2.5	0.87
	Storage	850		5	Staff	50 L/p/d					0.25	1.2	0.3	2.5	0.01
	Office	300	240			65 L/15m2/p/d					1.04	1.2	1.248	2.5	0.03
Worker / Visitor Accomodation				202	Studio rooms	180 L/room/day					36.36	1.2	43.632	2.5	1.05
				10	staff	50 L/p/d					0.5	2.2	1.1	3.5	0.02
Retail		450	360			65 L/50m2/p/d					0.47	1.2	0.5616	2.5	0.01
Bar / Pizzeria (Shearing Shed)		300	240			15 L/m2/d					3.6	1.2	4.32	2.5	0.10
Other															
Farm House Play Area (Neighbourhood A)	No personnel, just 2 WCs and a drinking tap/sink, 170m2 GFA	170				4.5L Toilet, 4.5L Basin, 4 uses per hour, 11 hours a day + nominal tap use	900 L				0.9	1.2	1.1	2.5	0.03
Hay Barn Bike Facilities (Neighbourhood J)	2 WCs and a drinking tap/sink, 224m2 GFA	224				4.5L Toilet, 4.5L Basin, 4 uses per hour, 11 hours a day + nominal tap use	900 L				0.9	1.2	1.1	2.5	0.03
Community Park Changing Rooms (Neighbourhood D)	5 WCs and a drinking tap/sink, 70m2 GFA	70				4.5L Toilet, 4.5L Basin, 4 uses per hour, 11 hours a day + nominal tap use	2000 L				2	1.2	2.4	2.5	0.06
Water and Wastewater Treatment Plant	Occasional user - not permament			1	Staff	50 L/p/d					0.05	1.2	0.1	2.5	0.00
Total											1,003		1,204		29.0