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CONSULTING ENGINEERS

132 WHANGAPOURI FAST-TRACK REFERRAL APPLICATION WATER SUPPLY SERVICING REPORT

132 Whangapouri Road
Karaka, Auckland

132 WHANGAPOURI DRURY LIMITED

June 2026 | Final R1



PROGRESS ENGINEERED. PROBLEMS SOLVED.

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EXECUTIVE SUMMARY

This report presents a high-level assessment of potable water supply servicing for the proposed development at 132 Whangaparaoa Road, Karaka, in support of the Fast-Track referral application.

The Project comprises approximately 904 residential lots, a retirement village, a local centre, as well as significant open space, wetlands and drainage reserve provision. The site is not serviced by a reticulated municipal water supply and therefore a self-sufficient water supply solution is required.

A preliminary water demand assessment estimates an average potable demand of approximately 495 m^3/day at full development. Total water demand will be reduced through the implementation of water-efficient fixtures and rainwater harvesting systems, significantly reducing reliance on potable supply. Rainwater harvesting has been assessed to provide an average of approximately 277 m^3/day for non-potable uses.

The proposed water supply strategy is based on groundwater abstraction from the Pukekohe Kaawa formation. This will be supported by a centralised treatment, storage, and reticulation system, collectively providing a resilient and sustainable supply. Groundwater will be treated to meet drinking water standards under the Water Services Act 2021 and Drinking Water Quality Assurance Rules. The system is intended to be implemented in stages, with infrastructure progressing in line with the development.

A preliminary assessment of environmental and operational effects indicates that potential impacts associated with groundwater abstraction and water supply infrastructure can be managed through further investigations, design, and consenting processes.

Overall, the assessment confirms that a feasible, reliable, and sustainable water supply solution can be achieved for the Project. No constraints have been identified that would preclude the development at the Fast-Track referral stage.

1 INTRODUCTION

This report has been prepared to support the Fast-Track referral application for the proposed development at 132 Whangapouri Road, Karaka (the Project).

The Project involves the development of a large-scale residential community with supporting commercial and retirement living components, for which a self-sufficient water supply servicing solution is required.

This report provides a preliminary, concept-level assessment of potable water supply servicing, including anticipated demand and a proposed servicing strategy based on available hydrogeological information and the current masterplan.

2 PURPOSE AND SCOPE

This purpose of the report is to provide a high-level assessment of potable water supply servicing for the Project.

The scope of this assessment includes:

- Estimation of potable water demand based on the proposed development layout and industry-standard design assumptions.
- Identification of potential water supply sources.
- Development of a concept-level water supply strategy.
- Consideration of relevant regulatory requirements and compliance obligations.

The level of detail is appropriate for a Fast-track referral application and will be refined during the substantive application stage.

3 DEVELOPMENT OVERVIEW AND ASSUMPTIONS

3.1 Development Summary

The Project comprises a predominantly residential subdivision located at 132 Whangapouri Road, Karaka. The current concept masterplan (Appendix A) includes:

- Approximately 904 residential lots.
- A retirement village comprising approximately 200 villas.
- A local centre supporting commercial and community activities.
- Approximately 28 hectares of open space, wetlands, and drainage reserves.

The development is intended to be delivered in stages, with infrastructure designed to support both interim and ultimate build-out conditions.

3.2 Key Assumptions

The assessment is based on various high-level assumptions consistent with early planning and concept-level design. The following assumptions underpin the demand estimates and servicing strategy presented in this report:

- Residential occupancy and usage are consistent with typical Auckland design standards.
  - Average per-capita water demand of 150 L/person/day consistent with lower-water usage.
- Non-residential demand (retirement village and local centre) is derived from comparable developments and industry benchmarks.
- Rainwater harvesting systems will be incorporated to supplement non-potable water uses across the Project.
- Non-potable demand = 56%, potable demand = 44%.
- Groundwater abstraction from local aquifers will form the primary potable water supply.

These assumptions will be tested and refined as the Project is progressed through detailed design and supporting technical investigations.

4 WATER DEMAND ASSESSMENT

4.1 Demand Overview

A preliminary water demand assessment has been undertaken for the Project based on the development layout described in Section 3.1 and the assumptions outlined in Section 3.2.

The total average daily potable water demand for the Project is estimated at approximately 495 m^3/day, consisting of the following average daily demands from each land use:

- Residential: 407 m^3/day.
- Local centre: 21 m^3/day.
- Retirement village: 68 m^3/day.

The water supply-demand balance is provided in Appendix B.

4.2 Demand Reduction Measures

Water demand across the Project will be reduced through the implementation of water-efficiency measures and alternative water sources, including:

- Installation of water-efficient fixtures and appliances (e.g. low-flow fittings and dual flush systems) in accordance with industry best practice (e.g. TP58).
- Implementation of rainwater harvesting system to supply non-potable demands such as toilet flushing, irrigation, and outdoor water use.

Preliminary assessment indicates that rainwater harvesting has the potential to provide an average of approximately 403 m^3/day of supply across the Project, accounting for collection losses and inefficiencies. This represents a significant portion of the total demand, thereby reducing reliance on groundwater abstraction. Actual yield and re-use efficiency will depend on storage, seasonal variability, and system design.

5 WATER SUPPLY STRATEGY

5.1 Regulatory Framework and Compliance

The proposed water supply system will be designed, constructed, and operated in accordance with all relevant regulatory requirements, including:

- Water Services Act 2021 (WSA)
- Drinking Water Quality Assurance Rules 2022 (DWQAR, revised 2024), including applicable rule modules for large, networked supplies
- Resource consent requirements under the Resource Management Act 1991 (RMA) for groundwater abstraction and associated infrastructure
- Applicable Auckland Council engineering standards and guidelines

The Project is expected to be classified as a large, networked drinking water supply and will require registration with Taumata Arowai. A risk management approach will be adopted, including preparation of a Drinking Water Safety plan at later design stages.

5.2 Water Supply Sources

The primary source of potable water for the Project is proposed to be groundwater abstraction from local aquifers identified within and surrounding the site.

This approach is informed by the groundwater supply feasibility assessment prepared by Earthtech Consulting Ltd (Earthtech, 2026)[1], which reviewed aquifer availability, allocation, and bore yield potential for the Project.

Available hydrogeological information indicates that multiple aquifers may be present and capable of contributing to supply, specifically:

- Shallow Sand Aquifers (Bombay-Drury Sand / Papakura Kaawa)
  - Significant remaining allocation.
  - Limited availability of approximately 55 m^3/day due to local flows associated with landform.
- Pukekohe Kaawa Aquifer
  - Remaining existing allocation of approximately 69,574 m^3/year.

[1] Earthtech (2026). *Groundwater Supply Feasibility Assessment for Fast Track Referral Application Acceptance for Residential and Commercial Development at 132 Whangapouri Road, Karaka*. Report prepared for Bei Group Limited. Ref L3750-1, Rev A dated 29 May 2026.

- Additional availability of 111,496 m^3/year determined in Earthtech (2020)[2] groundwater modelling caried out for the Pukekohe Municipal Supply.
- Estimated yields of 130–220 m^3/day for 100 mm diameter bores.

- Paerata Waitemata Aquifer
  - Potential availability of approximately 137,800 m^3/year.
  - Proven use in nearby developments.
  - Existing bore yields of 15 m^3/hr.

The Pukekohe Kaawa aquifer is expected to form the primary potable water source, subject to further testing and consenting.

5.3 Supply-Demand Balance

The estimated total water demand for the Project is approximately 495 m^3/day. As outlined in Section 4.2, rainwater harvesting has the potential to provide an average yield of approximately 403 m^3/day. Accounting for demand usage assumptions, 277 m^3/day of rainwater is anticipated to supply non-potable uses, thereby substantially reducing reliance on potable groundwater abstraction. The water supply-demand balance calculations are provided in Appendix A and summarised in Table 1.

Table 1: Water Supply-Demand Balance

AVERAGE DAILY WATER DEMAND	495 m^3/day
NON-POTABLE DEMAND (RAINWATER SUPPLY)	277 m^3/day
REMAINING GROUNDWATER DEMAND	229 m^3/day

As shown, the remaining demand of approximately 229 m^3/day is expected to be supplied from groundwater abstraction. The available groundwater sources are distributed across multiple aquifers.

Key observations:

- The Kaawa aquifer alone is estimated to be capable of meeting the remaining groundwater demand.
- Additional capacity may be achieved through:
  - Revised allocation based on updated hydrogeological modelling.
  - Groundwater trading arrangements.
  - Supplementary abstraction from the Waitemata aquifer.

The combined use of multiple aquifers is therefore considered a viable strategy, enabling a balanced supply-demand outcome at concept-level.

[2] Earthtech (2020). *Groundwater and Spring Investigations for Resource Consent Application. Pukekohe Municipal Water Supply.* Report prepared for Watercare Services Limited. Ref R3436-1, Rev A dated 12 August 2020.

5.4 Water Treatment

Abstracted groundwater will require treatment prior to potable use. Earthtech's assessment identified that existing bore logs for the Kaawa aquifer indicate elevated Fe (Iron) in groundwater which would require focused treatment.

A centralised water treatment plant is proposed, incorporating processes such as:

- Pre-treatment and filtration for removal of suspended solids.
- Treatment for dissolved constituents (e.g. iron and manganese)
- Disinfection using ultraviolet (UV) systems.
- Chlorination to provide a residual disinfectant within the reticulation network.

The final treatment configuration will be determined based on bore water quality testing and compliance requirements under the WSA and DWQAR.

5.5 Storage and Distribution

Treated water storage will be provided to ensure supply reliability, operational resilience, and firefighting capability.

The storage system is anticipated to:

- Provide a minimum of 72 hours effective storage based on average daily demand.
- Include an allowance for firefighting storage, typically equivalent to 24 hours of supply.

A reticulated potable water network will distribute treated water throughout the Project, supplying potable water to all residential, retirement, and commercial areas. The system will be designed to meet peak demand and firefighting requirements.

Storage infrastructure, the network layout, and hydraulic design will be sized and refined during detailed design and may be expanded as development progresses.

5.6 Process Flow Diagram

An indicative process flow diagram (PFD) depicting the proposed water supply strategy is provided in Figure 1.

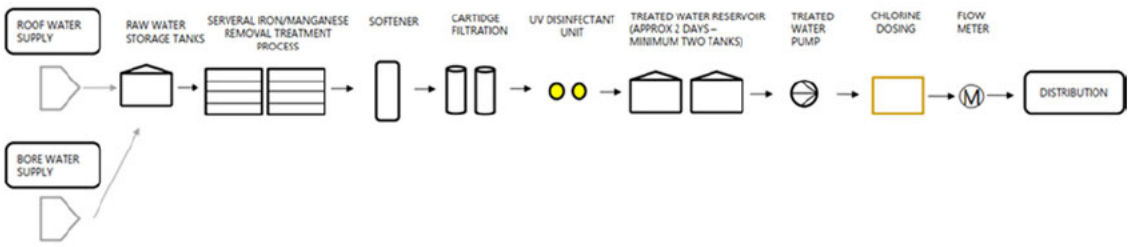


Figure 1: Indicative Process Flow Diagram

6 ASSESSMENT OF EFFECTS

A preliminary assessment of the environmental and operational effects of the proposed water supply infrastructure for the Project has been undertaken based on the concept-level designed outlined in Section 5.

- Earthtech have investigated local aquifers and existing/potential bore yields, to provide a robust and sustainable foundation of the water quantity available, which has informed the water supply-demand balance analysis.
- The assessment indicates that a suitable and sustainable water supply solution can be achieved for the Project.
- The adoption of rainwater harvesting significantly reduces the reliance on groundwater abstraction, with the remaining demand achievable based on available aquifer capacity in the Pukekohe Kaawa aquifer.
- Water quality will be managed through appropriate treatment processes designed to comply with the WSA and DWQAR.
- Environmental effects associated with the groundwater abstraction will be assessed through further investigations and addressed as part of future groundwater take consent applications.

7 CONCLUSION

The concept-level assessment indicates that a feasible and reliable potable water supply solution can be achieved for the Project.

A centralised water supply system incorporating abstraction, treatment, storage, and reticulation is considered appropriate and achievable to service the Project. The combination of rainwater harvesting and groundwater abstraction significantly reduces potable demand and supports a resilient supply approach.

While there are existing constraints in relation to groundwater allocation, these can be addressed through increasing abstraction from the Pukekohe Kaawa aquifer based on technical assessment, including the groundwater modelling presented in Earthtech (2020). Water quality can be managed through treatment processes in accordance with applicable regulatory requirements.

No constraints have been identified that would preclude the provision of a suitable water supply solution for the Project at the Fast-Track referral stage. Further investigations and more detailed design will be undertaken at the substantive application stage.

8 LIMITATIONS

This report has been prepared for the sole benefit of **132 Whangapouri Drury Limited** as our Client, and their appointed representatives, according to their instructions, for the specific objectives described herein. This report is qualified in its entirety and should be considered in the light of our Terms of Engagement with the Client and the following:

a. Data or opinions contained within the report may not be used in other contexts or for any other purpose without our prior review and written agreement. Any reliance will be at the parties' sole risk.

b. No responsibility is assumed for inaccuracies in reporting by the information providers. In no event, regardless of whether GWE 's consent has been provided, does GWE accept any liability, whether directly or indirectly, for any liability or loss suffered or incurred by any third party to whom this report is disclosed placing any reliance on this report, in part or in full.

c. GWE has relied on information provided by the Client and by third parties to produce this document and arrive at its conclusions. GWE has not verified information provided (unless specifically noted otherwise) and we assume no responsibility and make no representations with respect to the adequacy, accuracy, or completeness of such information.

APPENDIX A

CURRENT MASTERPLAN (DATED 28/05/2026)

Legend

Site boundary

5m road widening allowance

Lots	Yield
200-299m²	56
300-399m²	348
400-499m²	389
500-599m²	55
600m² +	56
Total	904

Retirement Village site - 11.9Ha - approx. 200 villas

Local Centre - 0.7Ha

Open Space / Drainage Reserve - 28.0Ha

Landscape Buffer

Collector Road

Local Road

Wetlands

Natural Stream

Artificial drainage channel

Roandabout/gateway entrance

Indicative water reservoir location

Indicative waste watrer treatment plant location

Whangapouri Road
Fast Track Referral
Masterplan

Scale. 1:6,000 at A3
Date. 28/05/2026

Status. Final
Sheet. 1/1

B&A
Urban & Environmental

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APPENDIX B

WATER SUPPLY-DEMAND BALANCE

Table 1: Assumptions

Assumptions	Value
Rainwater losses / collection inefficiences	17.5%
Rainfall (m)	1
Roof area percentage of lot area	35%
Non-Potable Demand	56%
Potable Demand	44%

Table 2: Data Legend

Data Type	Colour
Input - Provided	
Input - Assumed/Calculated	
Output - Calculated	

Table 3: Water Supply-Demand Calculations

Housing Typology	Occupancy		HUE	Average Lot Area (m^2)	Total Roof Area (m^2)	Water Consumption Rate (L/person/day)		Total Water Demand (m^3/day)	Rainfall Collection (m^3/day)
Residential - 200-299 m^2	3		56	200	3920	150		25	9
Residential - 300-399 m^2	3		348	350	42630	150		157	96
Residential - 400-499 m^2	3		389	450	61268	150		175	138
Residential - 500-599 m^2	3		55	550	10588	150		25	24
Residential - 600 m^2+	3		56	800	15680	150		25	35
Local Centre	-		-	7000	2450	1.3 (L/m^2/day)	15.0 (L/m^2/day)	21	6
Retirement Village (Residents / Staff)	300	30	200	119000	41650	220	50	68	94
							Total	**495**	**403**

Table 6.1.a - Design residential occupancy allowances

Number of bedrooms (Notes 1 and 2)	*Occupancy for design purposes (i.e. people)*
1	*2*
2-4	*3*

Table notes:

1. *Where large dwellings are proposed, which have additional rooms beyond those allocated as dining, lounge and bedroom e.g. family, office, study or sleepouts which have the potential to be used as bedrooms, an additional occupancy allowance should be made on the basis of 1 extra person times the ratio of the total floor area of the additional room(s) to that of the smallest designated bedroom.*
2. *For residential retirement villages without a hospital facility and that have single bedroom units then a design occupancy rate of 1.5 may be considered.*

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 not 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).*

Non-Potable Rainwater Demand (m^3/day)	Additional groundwater required for non-potable demand?	Non-Potable Groundwater Demand (m^3/day)	Potable Groundwater Demand (m^3/day)	Total Groundwater Demand (m^3/day)
14	Yes	5	11	16
88	No	0	69	69
98	No	0	77	77
14	No	0	11	11
14	No	0	11	11
12	Yes	6	9	15
38	No	0	30	30
277	**-**	**11**	**218**	**229**