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HYDROGEOLOGY • GEOTECHNICAL ENGINEERING • ENGINEERING GEOLOGY

PIK/L3751-1/cam

31 July 2026

Fulton Hogan Land Development Limited

[REDACTED]

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Christchurch 8053

Attention: Gregory Dewe
General Manager

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Dear Greg

**RE: PEER REVIEW OF GROUNDWATER AVAILABILITY ASSESSMENT OF OREWA
WAITEMATA AQUIFER FOR MILLDALE NORTH PROJECT, STAGES 14 TO 17**

1. Statement of Qualifications and Experience

My full name is Philip Ian Kelsey.

I am the Principal Hydrogeologist at Earthtech Consulting Limited. I hold the qualifications of BSc (Hons) in geology from the University of Otago and MSc (Hons) in engineering geology from the University of Canterbury. I have practised in the fields of hydrogeology and engineering geology for the past 39 years. Relevant experience with respect to the Milldale peer review includes:

- A. Consenting of two water supply projects for increased aquifer water availability over and above that adopted by Auckland Council with:
 - i. Pukekohe Municipal Supply for Watercare
 - 1,616,400m³/yr groundwater allocation increase over and above the 2,481,000m³/yr AUP Pukekohe Kaawa Aquifer water availability.
 - ii. Warkworth South Residential Supply for Ka Waimanawa Limited Partnership
 - 422,780m³/yr groundwater allocation increase over and above the 1,605,500m³/yr AUP Mahurangi Waitemata Aquifer water availability.
- B. Groundwater resource investigations and technical reviews for Auckland Council including:
 - i. Franklin Deep Waitemata Aquifer groundwater availability study.
 - ii. Kaawa Aquifer allocation review.
 - iii. Review of Mahurangi Waitemata Aquifer groundwater availability for Watercare Orewa municipal supply application.

I have been engaged by Fulton Hogan Land Development Limited (FHLD) (the Applicant) to undertake a peer review of the Orewa Waitemata aquifer groundwater availability for the groundwater take associated with the Milldale Stages 14-17 project and to prepare this report in support of the substantive application under the Fast-track Approvals Act 2024 (FTAA).

While this is not an Environment Court proceeding, I confirm that I have prepared this assessment in accordance with the applicable professional and ethical obligations of my profession and that the opinions expressed are within my area of expertise.

2. Introduction

The peer review is based on the groundwater availability assessment presented in WWLA (2026)¹, attached in Appendix A. Prior to reviewing this report, I have been involved in reviewing previous draft assessments and a pre-application meeting with Auckland Council on 28 May 2026.

3. Peer Review

3.1 Methodology

The WWLA (2026) aquifer water availability assessment is based on the following methodology:

- i. Determination of aquifer throughflow for the Orewa-Waitemata aquifer.
- ii. Determination of water availability on the basis of 65% aquifer throughflow (relating to aquifers with no connection to surface water).
- iii. Determination of excess water availability taking into account existing groundwater users.

The above methodology is considered appropriate for the hydrogeological setting of the Orewa Waitemata aquifer and has been adopted for resource evaluations elsewhere in the Auckland region (Earthtech, 2018)².

3.2 Groundwater Chemistry

A key aspect of the WWLA (2026) water availability assessment is that the Orewa-Waitemata Aquifer is deep and has no direct hydraulic connection to surface water. WWLA note that on average bores extend to 100m (Section A.2 from WWLA, 2026). An independent check of deep Waitemata groundwater has been carried out using the water chemistry from the Sunny Heights Nursery bore which has an intake zone extending between 48m and 220m and is located on site.

The Table 3 Water Quality Analysis presented in Appendix D of WWLA (2026) shows that the 220m deep Sunny Heights Nursery bore chemistry overall is typical of deep Waitemata Aquifer groundwater with:

- i. Total Hardness / Total Alkalinity Ratio <12%
- ii. pH >8.4
- iii. Sodium >75g/m³

¹ WWLA (2026). *Milldale North (Stages 14-17) Proposed Groundwater Take Assessment of Environmental Effects*. Report prepared for Fulton Hogan Land Development Limited dated 24 July 2026.

² Earthtech (2018). *Groundwater Availability Study. Franklin Deep Waitemata Aquifer*. Report prepared for Auckland Council dated 31 October 2018. Ref: R3172-2.

3.3 Groundwater Throughflow Assessment

WWLA used a groundwater model to determine the Orewa-Waitemata groundwater management area throughflow at $4,169\text{m}^3/\text{d}$. The groundwater modelling undertaken is considered appropriate.

A check of the throughflow assessment has been carried out considering aquifer recharge as follows:

- i. Average annual rainfall for Orewa-Waitemata Aquifer Management Area

$$1.255\text{ m/yr} \times 62.35\text{ km}^2 = 214,485\text{ m}^3/\text{d}$$

- ii. Deep Orewa-Waitemata Aquifer recharge

$$\frac{4,169\text{ m}^3/\text{d}}{214,485\text{ m}^3/\text{d}} = 2\% \text{ annual average rainfall}$$

The assessed deep Orewa-Waitemata recharge rate of 2% is at the lower bound of the general Auckland Waitemata aquifer recharge rates of 3% to 10% annual rainfall presented by Crowcroft and Smail (2001)³. On the basis of the groundwater modelling carried out and the published recharge values, the $4,169\text{m}^3/\text{d}$ throughflow is appropriate.

3.4 Groundwater Availability

From WWLA (2026), the revised Orewa-Waitemata groundwater availability is assessed as follows:

- i. Aquifer recharge

$$4,169\text{ m}^3/\text{d} \text{ and } 1,521,685\text{ m}^3/\text{yr}$$

- ii. Groundwater availability at 65% recharge

$$2,710\text{ m}^3/\text{d} \text{ and } 989,095\text{ m}^3/\text{yr}$$

$$\textbf{Say } 990,000\text{ m}^3/\text{yr}$$

3.5 Excess Groundwater Availability

The AUP states an availability of $858,000\text{m}^3/\text{yr}$ for the Orewa-Waitemata aquifer. It is understood from WWLA (2026) that the current allocation is at $824,073\text{m}^3/\text{yr}$. The excess availability based on WWLA (2016) is therefore:

$$990,000\text{ m}^3/\text{d} - 824,073\text{ m}^3/\text{d} = 165,927\text{ m}^3/\text{d}$$

The above excess water availability is sufficient for the proposed Milldale groundwater take for $165,922\text{m}^3/\text{yr}$.

³ Crowcroft, G. and Smaill, A. (2001). *Auckland. In Groundwaters of New Zealand*. M.R. Rasen and P.A. White (eds) New Zealand Hydrogeological Society Inc. Wellington. Pp 303-313.

4. Conclusions

This peer review supports the increase in the water availability for the Orewa-Waitemata aquifer from $858,000m^3/yr$ to $990,000m^3/yr$. The increase in water availability is sufficient for the proposed $165,922m^3/yr$ groundwater take for the Milldale project.

Yours sincerely



P I KELSEY

Principal Hydrogeologist

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