

**Before an Expert Panel
Bendigo-Ophir Gold Project**

FTAA-2507-1089

Under the

Fast Track Approvals Act 2024

In the matter of

an application for approvals to establish,
operate, and remediate an open pit and
underground gold mine at Bendigo and
Ardgour Stations

By

Matakanui Gold Limited

Applicant

**SUPPLEMENTARY STATEMENT OF EVIDENCE OF DR LEANNE MORGAN
GROUNDWATER HYDROLOGY
RESPONSE TO BURGESS MEMORANDUM**

18 September 2026

*The views of the academic expressed in this report may not necessarily represent the views
of the University of Canterbury*

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Introduction

1. My name is Dr Leanne Kaye Morgan.
2. My qualifications and experience are set out in my evidence in chief dated 10 April 2026 (EiC) and are not repeated here.
3. This is a supplementary statement of evidence identifying a material error in calculations set out in a memorandum from Mr Burgess (Hydro Geochem Group) dated 14 September 2026 which responds to comments on the Applicant's RFI 11 responses. The error concerns Mr Burgess's estimate of natural groundwater flow in the alluvial aquifer of Shepherds Creek, which he uses to support his opinion that unrecovered seepage would report to SC01.

Code of Conduct

4. My evidence in chief and supplementary statements of evidence confirm that I have read the Code of Conduct for Expert Witnesses contained in the Environment Court Practice Note 2023, and referred to in the Fast-track Approvals Act 2024: Panel Conveners' Practice and Procedure Guidance dated 22 July 2025, and that I have complied with it in preparing those statements. I re-confirm my compliance with the Code of Conduct.

Burgess memo

5. In Attachment A, Mr Burgess responds to comments by submitters on the deep bedrock surface and downward vertical hydraulic gradient measured at GW02. He states that GW02 was sited as close to the Bedrock Gap as possible without requiring additional permits for drilling nearer the creek. He explains the GW02 findings as the result of bedrock deepening towards the Lindis River, and infers that conditions at the Bedrock Gap itself, near SC01, are shallower, with upward flow. In support, he cites the narrowing of the valley at the Bedrock Gap and the upward gradient measured at GW03, about 1 km upstream of GW02.
6. Mr Burgess then estimates the natural groundwater flow in the alluvial aquifer at GW03 to be "much less than 0.01 L/s", with his working in footnote 3 giving "less than 1×10^{-6} L/s". He compares this with an estimated 0.3 L/s of unrecovered seepage from the TSF and Shepherds ELF, being 5% of seepage, and concludes that seepage would exceed natural flow by over an order of magnitude. On that basis he states that the added flow would increase the propensity of the alluvial aquifer to discharge to Shepherds Creek at the Bedrock Gap, and that most unrecovered seepage would therefore likely report to SC01, as assumed in the water and load balance models.

Calculation error

7. Footnote 3 states the inputs used. Darcy's law gives groundwater flow (Q) as the product of hydraulic conductivity (K), hydraulic gradient (i) and cross-sectional area (A). Mr Burgess adopts $K = 4 \times 10^{-5}$ m/s, $i = 0.0425$ and $A = 530$ m². Applying these inputs:

$$Q = K \times i \times A = 4 \times 10^{-5} \text{ m/s} \times 0.0425 \times 530 \text{ m}^2 = 9.0 \times 10^{-4} \text{ m}^3/\text{s}$$

Converting to litres per second by multiplying by 1,000 gives approximately 0.9 L/s.

Mr Burgess's reported figure of less than 1×10^{-6} L/s is therefore about six orders of magnitude too low, and his in-text figure of much less than 0.01 L/s about two orders of magnitude too low. The reported footnote value is consistent with dividing by 1,000 rather than multiplying when converting from cubic metres to litres. I have used only the inputs Mr Burgess states, and I make no comment here on whether those inputs are themselves appropriate.

Impact on conclusions

8. With the corrected figure, natural groundwater flow in the alluvial aquifer at GW03 (about 0.9 L/s) is about three times larger than the estimated unrecovered seepage (about 0.3 L/s). Contrary to Mr Burgess's conclusion, seepage would not exceed natural groundwater flow by an order of magnitude. It would be about one third of it. Mr Burgess's stated reason for expecting seepage to increase groundwater discharge to Shepherds Creek at the Bedrock Gap therefore does not hold. His remaining bases for expecting discharge at that location are the inferred geometry of the Bedrock Gap and the upward gradient at GW03. Neither is a measurement at the gap itself, where no bore has been drilled. The nearest measurements, at GW02, show a water table about 11 m below ground and a downward hydraulic gradient.
9. In my opinion, the corrected calculation removes the quantitative basis for Mr Burgess's conclusion that most unrecovered seepage would report to SC01. Whether seepage reports to SC01 or passes beneath it remains, on the available data, uncertain.

Dr Leanne Morgan
18 September 2026