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## MEMORANDUM

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**From:** Ryan Burgess – Hydro Geochem Group

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**Document Title:** Response to RFI 11 – Fast Track Approvals Application FTA-2507-1089

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Hydro Geochem Group Limited (HGG) has provided this memo in response to additional stakeholder submissions provided with respect to information provided by HGG in Request for Information (RFI) 11 associated with the Fast-track Approvals Act 2024 (FTAA) application for the Bendigo-Ophir Gold Project (BOGP).

Specifically, this letter addresses the following issues:

- Hydrogeological conceptual model and baseline data suitability.
- Seepage collection expectations.
- Water and Load Balance Model input assumptions.

### Hydrogeological Conceptual Model

Baseline hydrogeological characterisation works are documented in KSL (2025), EGL (2026)<sup>1</sup>, and HGG (2026a). These data are broadly consistent with the conceptual models supporting analysis in HGG (2026b and 2026c), and show (upstream of SC01) a mountainous topographically driven groundwater flow system with the following features:

- Groundwater flow from topographic highs (e.g., ridges) to lows (e.g., Shepherds Creek valley bottom), and down valley towards SC01. Unrecovered seepage is generally expected to be consistent with this flow pattern.
- Low hydraulic conductivity (K) Fresh (schist) Bedrock with average<sup>2</sup>  $K=4 \times 10^{-8}$  m/s (Figure 1). Data indicate is little difference in K between fresh TZ3 and TZ4 schist bedrock on average.
- At shallower depths, the fresh bedrock is overlain by higher K Weathered Bedrock on the valley sides and Alluvium in the valley centre, both with average  $K=5 \times 10^{-5}$  m/s (Figure 1). Weathered Bedrock is typically thin in the valley centre/bottom.

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<sup>1</sup> Previous summaries of K reported in (2026a, 2026b, and 2026c) relied on data provided from geotechnical site characterisation works (EGL, 2025). However, in their updated ground investigation report (EGL, 2026), they have revised some of their K estimates.

<sup>2</sup> The term average here uses the geometric mean.

These higher K units (Alluvium and Weathered Bedrock) are the preferential pathways for seepage migration that require management.

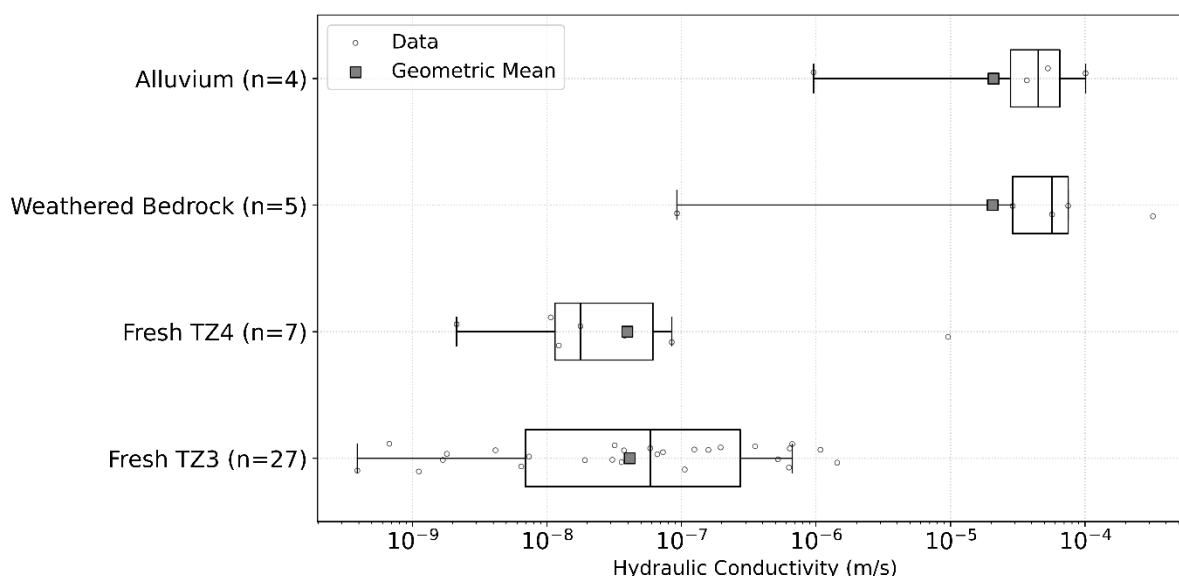


Figure 1: Hydraulic conductivity data summary.

Data source: KSL (2025), EGL (2026), and HGG (2026a)

As discussed in Attachment A, the majority of any unrecovered seepage travelling down Shepherds Creek valley in Alluvium or Weathered Bedrock units is interpreted to discharge to Shepherds Creek upstream of SC01 and the Bedrock Gap. Downstream of the Bedrock Gap, the bedrock surface and water table deepen considerably making seepage collection challenging past this point. Therefore, all seepage control and interception measures should focus upstream of SC01.

Overall, I consider the level of baseline physical hydrogeological information is appropriate to sufficiently understand likely seepage pathways and inform conceptual design of seepage control and interception measures. Further investigations will be required to inform detailed design of seepage collection and interception systems which is a standard approach at detailed design.

### Seepage Collection Expectations

Additional design elements for seepage collection from the Shepherds Engineered Landform (ELF) and Tailings Storage Facility (TSF) are now planned to be incorporated in the designs prior to the discharge of tailings to the TSF, including (D.04 Condition 24 and 25):

- For the TSF, a cutoff wall into bedrock below the TSF embankment.
- For the Shepherds ELF, a cutoff wall into bedrock below the seepage collection sump and seepage interception wells.

Previous modelling by HGG (2026b) and KSL (2026), which did not explicitly include these additional design elements, suggested unrecovered seepage fractions (or bypass proportion) to be in the range 5% to 10%. With the addition of these design elements as part of the primary seepage collection systems, I would expect the proportion of seepage recovered to be enhanced. Based on professional experience with similar systems at other mine sites, unrecovered fractions of 5% or as low as 1% could be achieved, depending on system design. Additional investigations and 3D groundwater modelling are required to inform the detailed design of such systems.

In addition, D.04 Condition 26 makes provision for implementation of additional (contingency) seepage collection measures should performance monitoring indicate that seepage recovery enhancement is required to protect downstream surface and groundwater receptors.

### **Water and Load Balance Model**

The Operational WLBM (MWM, 2026) was developed to evaluate long term the BOGP site wide water balance condition and forecast potential water quality at surface water compliance sites (e.g., SC01 on Shepherds Creek).

Model results suggest a water surplus condition, necessitating the need for additional water 'removal' from the Mine Impacted Water (MIW) circuit to manage water within the TSF. It is important to note that the model results did not suggest the TSF would spill, only that the water removal was required so the TSF pond volume would remain within the adopted design criteria.

The main difference between these results and the screening level water balance assessment (MWM, 2025) was due to how the TSF pond was represented: MWM (2025) assumed a static area representing the entire TSF footprint to assess the maximum potential for evaporative losses while MWM (2026) dynamically represented the TSF development and pond over time. As a result, actual TSF pond evaporative losses simulated in MWM (2026) were lower than assumed by MWM (2025). The approach taken by MWM (2025) was suitable as a screening level assessment and recommended more refined analysis such as the modelling documented in MWM (2026) be completed. It is also noted that scenarios evaluated by MWM (2025) also showed that a water surplus was possible.

To manage the surplus water condition forecast in MWM (2026), evaporation cannons were used to remove water from the MIW water circuit at the TSF Pond from Year 7 of the simulated mine life. Alternatively, an active water treatment plant could achieve the same outcome by treating and discharging MIW to Shepherds Creek upstream of SC01. If more conservative input assumptions were adopted (for example higher net percolation rates or groundwater inflows to pits), these engineering controls would simply require a larger capacity.

An unrecovered seepage fraction of 5% was adopted as the mid-point for most collection systems from the modelling documented in KSL (2026). Although the work by KSL (2026) suggests higher unrecovered seepage fractions were possible, their modelling did not include the design elements now considered by MGL for the primary seepage collection systems. As discussed earlier in this document, an unrecovered seepage fraction of 5% or as low as 1% could be achieved with the additional design elements (depending on system design).

Operational Phase model results suggested that potential exceedances of antimony and nitrate at SC01 are not anticipated to occur until later in mine life (e.g., 2035 or Year 9). This allows years of performance data collection, focussed studies (e.g., cover system trials), interpretation, and WLBM updates, which will enhance confidence in model results, particularly for the closure period.

**CLOSING REMARKS**

Please do not hesitate to contact Ryan Burgess. at [REDACTED] or [REDACTED] should you wish to discuss our memorandum in greater detail.

Attachments: Attachment A – Bedrock Gap

**REFERENCES**

- Engineering Geology Ltd (EGL), 2025. Bendigo-Ophir Gold Project Site Geotechnical Factual Report. Prepared for Matakanui Gold Limited. Document reference: 9702. Dated 8 August 2025.
- Engineering Geology Ltd (EGL), 2026. Bendigo-Ophir Gold Project Site Geotechnical Factual Report (Rev3) DRAFT. Prepared for Matakanui Gold Limited. Document reference: 9702. Dated 8 August 2025.
- Hydro Geochem Group (HGG), 2026a. BOGP Groundwater Site Investigation Memorandum. Document. J-HNZ0238-010-M-Rev0. Dated 17 August 2026.
- Hydro Geochem Group (HGG), 2026b. BOGP MWSF Seepage Risk Assessment. Document J-HNZ0238-003-M-Rev0. Dated 5 March 2026.
- Hydro Geochem Group (HGG), 2026c. BOGP MWSF Mine Waste Storage Facility Seepage Assessment. Document J-HNZ0246-001-R-Rev0. Dated 17 April 2026.
- Kōmanawa Solutions Ltd (KSL), 2025. Bendigo Ophir Gold Mine Project – Groundwater Existing Environment & Effects Assessment. Report for Matakanui Gold Limited. RN: Z24002BOG-Rev2. Dated 14 February 2025.
- Kōmanawa Solutions Ltd (KSL), 2026. Updated Groundwater Modelling for Bendigo Ophir Gold Deposit. Z24002.m3. Dated 14 August 2026.
- Mine Water Management (MWM), 2025. Water Load Balance Model Report BOGP. J-NZ0233-016-R-Rev1.
- Mine Water Management (MWM), 2026. Operational Phase Site Wide Water and Load Balance Mode BOGP. J-NZ0488-015-R-Rev0. Dated 17 August 2026.

**ATTACHMENT A – BEDROCK GAP**

Submitters have noted (as per HGG, 2026a) the (i) relatively deep bedrock surface and (ii) the downwards vertical hydraulic gradient at GW02. This is explained by the uplands of the Shepherds Creek valley transitioning into the main valley of the Lindis and Clutha rivers with bedrock depth increasing from GW02 towards the Lindis River (approximately north to north-west in Figure A1). The location of GW02 was selected as the area as close to the Bedrock Gap as possible that avoided the need for additional permits for drilling closer to the creek channel. Figure A1 shows the depth to bedrock data from test pits (EGL, 2025) and recent drilling described in HGG (2026a). Data presented clearly shows the depth to bedrock upstream of the Bedrock Gap to be in the range of 5 to 7 m below ground level (bgl). Also clear from Figure A1 is the nature of the Bedrock Gap where the valley bottom narrows substantially and exposed bedrock outcrops on the valley sides. At MW03, the valley bottom is approximately 75 m wide while at the Bedrock Gap, it is approximately 10 to 15 m wide. In my opinion, such conditions suggest an even shallower depth to bedrock at this location and data upstream show, or at the very least, a similar depth to bedrock (i.e., 5 to 7 m bgl).

In addition, the narrowing of the valley is likely to cause upwelling of groundwater (or at least shallower groundwater levels) as the alluvium cross-sectional area reduces (assuming thickness remains the same or lowers). For example, the cross-sectional area of the alluvial aquifer perpendicular to down valley flow at GW03 is approximately 530 m<sup>2</sup> (assuming an average thickness of 7 m and width of 75 m) while at the Bedrock Gap, the cross-sectional area is be approximately 100 m<sup>2</sup> (assuming the same aquifer thickness and width of 15 m) or less if thickness is lower than at GW03 (which I consider likely). This fivefold (or more) reduction in area would act to raise the groundwater levels at the Bedrock Gap compared to GW03, resulting in a greater propensity for groundwater discharge to Shepherds Creek at that this narrowing of the valley. I would therefore expect vertical hydraulic gradients in this location to be upwards (as seen at GW03). The presence of the wetland approximately 100 m upstream of the Bedrock Gap is consistent with this interpretation of the groundwater level becoming shallower than seen at GW03 (i.e., <2.5 m bgl).

Any unrecovered seepage that migrates towards SC01 would increase the flow in the groundwater system. For example, I estimate the groundwater flow in the alluvial aquifer at GW03 to be much less than 0.01 L/s<sup>3</sup> and 5% unrecovered seepage from the TSF and Shepherds ELF would be in the region of 0.3 L/s or over an order of magnitude flow in the alluvial aquifer. Such an increase in flow would further increase the propensity of the alluvial aquifer to discharge to Shepherds Creek at the Bedrock Gap. As a result, in my opinion it likely that most unrecovered seepage would report to SC01, as assumed in the Water and Load Balance Models.

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<sup>3</sup> Using Darcy's law and adopting the following parameters: K of 4x10<sup>-5</sup> m/s, horizontal hydraulic gradient of 0.0425 ([head at GW03A – head at GW02A]/1,000 m), and cross-sectional are of 530 m equates to less than 1x10<sup>-6</sup> L/s.

Taking this all together, in my opinion the data indicate the Bedrock Gap or anywhere upstream to GW03 A/B/C provide favourable conditions for installation of a high performing contingency seepage interception system (SIS) where:

- It can be positioned to intercept the main groundwater flow path from unrecovered seepage in alluvium and weathered bedrock.
- Valley width is relatively narrow (100 m or less) which will act to focus unrecovered seepage compared to a wider valley that would tend to spread any seepage over a wider lateral extent across the main flow path direction.
- Depth to bedrock is relatively shallow (<10 m deep).
- Depth to groundwater is relatively shallow (<3 m deep) and unlikely to have downwards vertical gradients.

D.04 Condition 26 identifies this general location as one location for implementation of contingency seepage collection measures.

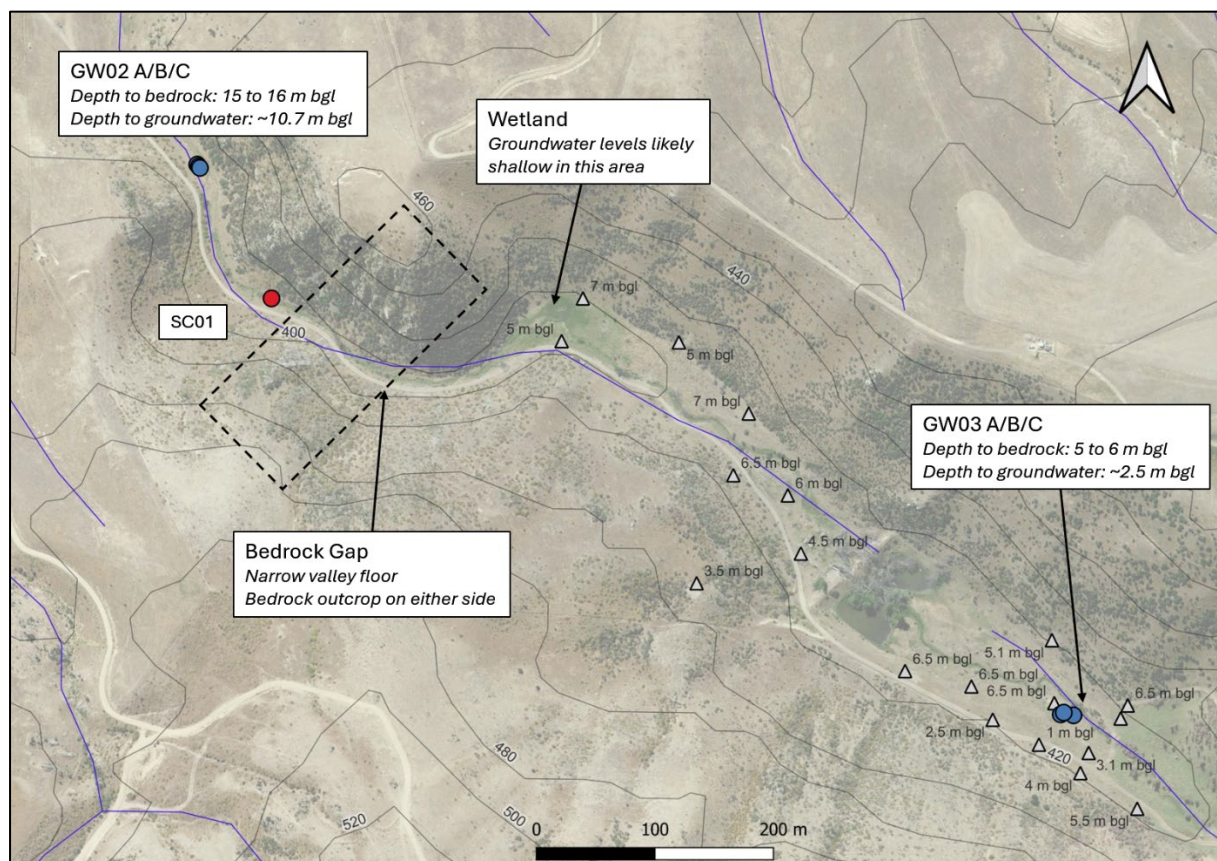


Figure A1: Bedrock Gap and depth to bedrock.

Data source: Triangles represent data source from EGL (2025). GW02 and GW03 data from HGG (2026a).