Memo

To: Cheryl Low, Matakanui Gold, Environmental Manager
From: Jens Rekker, BOGP Kōmanawa Solutions' Assessment Manager
Date: 30 January 2026
Subject: Responses to ORC Technical Review in terms of the Fast-Track Approvals Act and RMA

Background

The Bendigo – Ophir Gold Project (BOGP) is a multiple pit and workings mining complex proposed by Matakanui Gold Ltd, the New Zealand subsidiary of Santana Minerals Ltd. The proposed mining complex is located in the Dunstan Mountains of Central Otago, on the western flanks of the range overlooking the Bendigo agricultural / horticultural district and nearby historic mining area.

Requests For Information (RFIs) have been received *via* Otago Regional Council (ORC) from the Council's commissioned technical reviewers for divisible review areas. In this case, the 'Groundwater, Surface Water and Geochemistry' review was undertaken by Alexandra Badenhop, Technical Director - Water & Environmental Management, of e3 Scientific Limited (e3) and dated 16 December 2025. A meeting was held on Tuesday 20 January 2026 with the Kōmanawa Solutions (KSL), Mine Waste Management (MWM), and e3 technical personnel, plus the MGL environmental manager and ORC project manager, to traverse the requests informally.

Three RFI questions were formally asked by ORC which were relevant to KSL:

1. *Please indicate whether an aquifer test in accordance with the ORC Aquifer Test Guidelines is planned to be undertaken prior to commencing operations at the site to address* (the tendency of adjacent barrier boundaries to exacerbate aquifer drawdown caused by proposed bore field pumping).

2. *Each of the groundwater quantity models underestimates head in the vicinity of pits, and overestimates* (head) *in areas of discharge. What is the effect of this* (mismatch in modelled heads) *on anticipated groundwater drawdown and stream depletion?*

3. *Please assess the stream depletion effect of the RAS underground mine.*

Responses to each of these are provided below:

Response to RFI Question 1 Control + Click to follow link

Response to RFI Question 2 Control + Click to follow link

Response to RFI Question 3 Control + Click to follow link

Beyond the immediate paragraph response, additional technical background information is provided on each response to questions. The additional technical information is generally intended for the information of the e3 reviewer.

1 Response to RFI Question 1

Question 1: *Please indicate whether an aquifer test in accordance with the ORC Aquifer Test Guidelines is planned to be undertaken prior to commencing operations at the site to address* (the tendency of adjacent barrier boundaries to exacerbate aquifer drawdown caused by proposed bore field pumping).

Response to Question 1: Pumping tests at 100% of the proposed rates of bore field take were initially proposed but could not be undertaken without recourse to special resource consents. Post-grant commissioning tests at full consented rates of pumping that are optimised to detect aquifer boundaries and allow confirmation of the exacerbated drawdown effect of barrier boundaries are proposed. The results would provide supporting information for the drafting of management planning, including responses. Such planning for effects minimisation, offsetting and potentially compensation to surrounding groundwater supplies would be included in the Water Management Plan.

1.1 Background to Response

1.1.1 Water Supply Aquifer Testing

The e3 review noted that the aquifer test in July 2024 did not meet "the ORC minimum aquifer test guidelines". It was not MGL's intention to fail to meet the minimum guidelines. However, MGL and its advisors experienced practical and regulatory difficulties that led to the need to depart from the guidelines, as listed below:

- The test target pumping rate envisaged was approximately 100 litres per second in consideration of the likely future groundwater pumping demand of the mining complex and the capacity of the Bendigo Aquifer[1],
- The permitted activity rule (Rule 12.1.2.3) within the Otago Regional Plan: Water allowed only 2,000 cubic metres per day (equivalent to an average of 23.1 litres per second over 24 hours) across only three consecutive days (i.e., 72 hours),
- The aquifer test guidelines would result in the permitted rule conditionality being exceeded as the maximum daily rate of 8,640 cubic metres per day was sought, and potentially also test duration as leeway for 76 hours was required to ensure stable observed groundwater drawdown[2],
- Enquiries were pursued with ORC groundwater science personnel who indicated that the maxima in the permitted activity conditions had been set aside in past groundwater proposals and it would be their preference in terms of obtaining high precision test data, but that ORC consent planners would need to approve,
- Senior ORC consents planning personnel advised MGL that to exceed the permitted activity would require a restricted discretionary groundwater take water permit for the short-term activity to be lawful, furthermore,
    - Groundwater take applications in Otago require the following:
        - For a new take and bore, a lawfully established bore,
        - A location fixed to within 20 metres laterally,
        - Preferably a completed bore log,
        - An aquifer test to indicate aquifer parameters[3],

[1] The Bendigo Aquifer has among the highest aggregate transmissivity and connection to substantial recharge boundaries of any studied aquifer in Otago (Houlbrooke, 2010), comparable only to the Hāwea groundwater basin (Dumont et al., 2023) in abstractive capacity. Consequently, irrigation bores tapping the aquifer generally have high pumping capacity and low intensity drawdown in the surrounding aquifer.

[2] Guideline B of the ORC aquifer test guidelines specify that should a constant rate test not achieve stability that the test should be run for a further 4 hours before the test pumping is concluded; https://www.orc.govt.nz/media/14441/aquifer-test-guidelines.pdf, Section 1.8 "What are the detailed Constant Rate Discharge test requirements?", item 2.

[3] A few previous aquifer tests in excess of the permitted activity rule condition maxima have been analysed to provide transmissivity, and rarely storage coefficients within the Bendigo Aquifer, although an aquifer test at the BOGP bore field site could theoretically be undertaken within the permitted activity rule condition maxima to provide a transmissivity value and possibly a storage coefficient.

    - The processing of a groundwater take has a great number of factors and effects over which ORC has discretion, including
        - Effects on surrounding bore owners lawfully able to take groundwater,
        - Effects on surface water resources, etc.,
        - And other matters of restricted discretion[4],
- MGL was planning the groundwater exploration in late Autumn and received bore consent in middle May 2024, anticipating the ability to undertake aquifer testing during Winter or early Spring before irrigation-related groundwater pumping was scheduled to resume in the Bendigo Aquifer. Therefore the timing to coincide with the non-irrigation period was critical to avoid potential pumping interference in the constant rate test drawdown observations, or effects on lawful takers of groundwater from the constant rate test at up to 100 litres per second,
- Time lags in meeting each of ORC's requirements might have the effect of pushing the feasible date of aquifer testing into the Winter of 2025 when information on the feasibility was urgently required by mid-late 2024 for the BOGP PFS and subsequent groundwater effects assessment,
- A further risk that could not be excluded was that the application to ORC might result in limited or public notification, hearing, objection to grant, or Environment Court appeal. So, there was no guarantee that the short-term activity water permit would be granted in timely manner to allow the collection of data on groundwater conditions for inclusion in environmental effects documentation,

Due to these practical difficulties and discussion with MGL on alternatives, KSL recommended a course of action for collecting groundwater information from a drilling programme in the Winter of 2024 that would provide the following information:

- Confirmation of the realistic groundwater pumping capacity of the Bendigo Aquifer up to and including 100 litres per second,
- Determination of the groundwater properties of transmissivity and specific yield, and
- The feasibility of obtaining the required mine water supply with effects that were less than minor.

It was accepted by MGL that while this approach may not meet with ORC's minimum requirements, the test design to conform with permitted activity rule conditions would not entail a consent process. Accordingly, an exploration bore was drilled at the bore site over the Bendigo Aquifer on 24 June 2024 and converted to an observation bore with small diameter casing and screen. A test production bore of large diameter and similar depth to the observation bore was drilled on 4 July 2024. A constant rate test was undertaken over 48 hours from 8:35 9 July to the same time on 11 July 2024 at a mean rate of 20.6 litres per second that did not exceed the permitted activity rule limits. An 8-hour step rate test (also known as a step drawdown test) was subsequently undertaken on 25 July 2024 that confirmed the capacity of the test production bore as up to 105 litres per second, including a sustained period at that rate for two hours from 2pm to 4pm. The step rate test also remained within the permitted activity rule limits (i.e., less than 2,000 m^3/d). The pumping tests were interpreted in document B.02. The interpretation and the groundwater parameters determined were accepted as reasonable in the e3 review of document B.02

The ORC minimum requirements are not set out in Regional Plan: Water. Schedule 5B refers to the need to estimate groundwater properties of transmissivity and storage coefficient by way of an aquifer test. Instead of being specifically mentioned in the Plan, aquifer tests guidelines have been progressively phased in as an *ad hoc* set of requirements and referred to within the process of making a technical assessment of groundwater take consent applications. The two main versions of the guidelines are as follow:

- Guidelines A; attached to all bore consent application Form 9 since about 2017 but otherwise undated (https://www.orc.govt.nz/media/11631/form-9a-land-use-consent-to-construct-a-bore-or-drill-over-an-aquifer.pdf), and

[4] See full list of restricted discretionary activity considerations in Policy 12.2.3.4

- Guidelines B; within the ORC website since about 2022, probably associated with the planned revamp of the water plan to the Otago Land & Water Regional Plan but otherwise undated (https://www.orc.govt.nz/media/14441/aquifer-test-guidelines.pdf)

Guideline A is less stringent in terms of minimum aquifer test requirements, while Guideline B is more prescriptive and extensive, and includes matters such as the need to extend the test duration yield past the 72 hour period allowed for within the permitted activity rule. Guideline A sets the minimum requirement of 48 hours of constant rate pumping for unconfined aquifers of bores proposed or producing more than 750 cubic metres per day (8.7 litres per second). It was this guideline that MGL had before it in April 2024 when deciding on the aquifer testing design and the need to obtain short-term consent for such a test. The Bendigo Aquifer is an unconfined aquifer and has been reported as such within two separate ORC-commissioned water resource reports (Houlbrooke, 2010; Sinclair Knight Merz, 2004). For it to be unclear which version of aquifer testing guidelines apply to contemporary and future aquifer testing in Otago is an unsatisfactory situation and requires clarification by ORC.

The e3 reviewer also points out that only one observation bore was employed. In fact two observation bores were available and subject to high resolution groundwater level automated logging. The ORC monitoring bore was located to the northeast in addition to the closer observation bore CB13/0216 , as indicated in Table 1.

Table 1: Observation bores referred to in Constant Rate Test of CB13/0215 from 9 – 11 July 2024

Bore Label (and ORC Well Record Number)	Radius from Pumped Bore (m)	Initial Depth To Water (m ToC)	Final Depth To Water (m ToC)	Drawdown (uncorrected) (m)
Obs-1 (CB13/0216)	13.2	20.62	21.06	0.44
ORC CB13/0159	860	29.04	29.04	0.00

The ORC monitoring bore was more useful in determining whether ambient trends in groundwater level were active before, during and after the constant rate test in the period 9 to 11 July 2024. It is reasonable to assume the drawdown impulse of running the 48 hour pumping test at 20.6 litres per second had no effect on the ORC monitoring bore water levels and that the ability to discriminate any such effect was beyond the ability of the observation bore at 860 metres distance from the pumped bore. It is worth noting that the ORC monitoring bore is adjacent to the eastern till aquitard boundary and despite this the measured high transmissivity (4,500 square metres per day) and unconfined storage coefficients (specific yield of 0.25 – 0.31) determined in testing of test production bore CB13/0215 made it unrealistic to expect that discernible drawdown impulses would be measurable at the monitoring bore.

1.1.2 Bendigo Aquifer Barrier Boundaries

The e3 reviewer noted that among the aforementioned shortcomings of the aquifer tests (as conducted) was the lost opportunity to detect the hydraulic effect of barrier to groundwater flow (sink) boundary condition, presumably as artefacts in the late-time drawdown trends. While theoretical understandings of aquifer and aquifer tests suggest that the harder the bore is pumped and the longer that the aquifer water levels are monitored while pumping, the higher the probability that such artefacts of the surrounding aquifer margins could be detected from within the drawdown measurement at monitoring bores. While I accept the theoretical proposition and this is among the reasons for Environment Canterbury's groundwater section specifying 72 hours as the minimum within large aquifer tests in that region's guidelines, the minimum duration does not confer a guarantee that barrier boundary effects will be detected. Accordingly, I am of the view that even had the aquifer test have been conducted as per the guidelines it would have been unlikely to have gained useful indications of lateral barriers.

The barrier boundaries to the Bendigo Aquifer are in fact well known and their position firmly established with the benefit of hydrogeological mapping (e.g., Earth Science New Zealand maps[5]);

- Schist rock barrier boundaries to the south,
- Clutha River / Mata Au recharge boundaries to the west and north, and
- The Bendigo (Till) Terrace aquitard barrier boundaries to the east

So, that lack of aquifer testing to approximate these barrier boundaries by test data analysis is probably immaterial to the assessment of the hydrologic effect of the lateral barrier boundaries. A more appropriate approach would be undertaking analytical element or numerical modelling with virtual no-flow boundaries simulated as abrupt, impermeable barriers to flow. In order to be realistic, the simulation should include:

- The action of the Lindis, Clutha rivers, Lake Dunstan, and Bendigo Creek infiltration in supporting the groundwater levels in the Bendigo Aquifer,
- The average saturated thickness and groundwater level gradient, plus
- Bendigo Aquifer irrigation bores consented with the aquifer pumping at their relevant consent limits.

It is worth noting that a similar model simulation was developed by ORC groundwater scientists in 2009 (Houlbrooke, 2010), which included a simulation of a MODFLOW groundwater numerical model with irrigation bore pumping for substantially more than the full annual volume of groundwater currently allocated to valid consents. This calibrated model of the Bendigo and Tarras aquifer, plus the lower Lindis alluvium, included barrier boundaries, surface water recharge boundaries noted in the bullet points above but not Bendigo Creek, and land surface recharge in addition to the over-pumping of the Bendigo Aquifer. The ORC modeller concluded that the modelled aquifer was resilient to simulated over-pumping shocks and lawful bore operation would not be jeopardised (Houlbrooke, 2010).

1.1.2.1 Lack of Aquifer Testing to Hydraulically Detect & Characterise Barrier Boundaries

I agree that the 48 hour pumping test at 20.6 litres per second (1,780 cubic metres per day), while lawfully within the conditions of the permitted activity rule for down-hole testing, could not be used to provide indications of the barrier boundaries of the Bendigo Aquifer, for instance to the east and south. However, I would also observe that the presence of surface water recharge boundaries, such as Lindis River, Clutha River / Mata Au and Bendigo Creek would more than compensate for the presence of barrier boundaries in bolstering groundwater levels in the Bendigo Aquifer.

1.1.2.2 Optimised Aquifer Test – Post Approval

Should the BOGP applications for approvals including the proposed groundwater take be granted, the current bore site would be further developed by the addition of a second production bore approximately 150 metre radius from the test production bore CB13/0215 and additional observation bore(s). As part of commissioning the bore field, it is intended to undertake a structured, long-duration pumping test as a shake out for bore field infrastructure and analysis of bore field groundwater hydrology. This commissioning test would be optimised to provide data for image well analysis[6] in triangulating the bearing and radii of any boundaries discernible during the pumping test.

Such commissioning test(s) would at that future time be in possession of the following resources:

- A groundwater take consent allowing the taking of up to 110 litres per second for a period up to a month, or longer at the lower rate of 100 litres per second,

[5] Geological and hydrogeological maps are available online at https://www.gns.cri.nz/data-and-resources/geological-map-of-new-zealand/ and https://www.gns.cri.nz/data-and-resources/new-zealand-hydrogeological-unit-map/ that present 1:250,000 scale mapping of surface expression of aquifers, aquitards and basement aquicludes.

[6] Image well theory uses imaginary wells (images) placed strategically to simulate the hydraulic effects of aquifer boundaries (like rivers or impermeable layers), allowing for the use of standard flow equations (like Theis) in complex, finite aquifer systems by transforming them into equivalent infinite systems, effectively modelling drawdown or recharge from barriers and boundaries. (Ferris et al., 1962) provides the theoretical basis for analysis of barrier boundaries from aquifer test data, supplemented by allied analytical techniques outlined in (Theis, 1935) and/or (Cooper & Jacob, 1946).

- Two production bores with secure electrical supplies, and
- Multiple observation bores and the potential ability to obtain access to existing bores at expanding radii from the bore field.

The analysis of field data would have the choice of using an analytical equation technique such as Ferris et al (1962), analytical element method (Haitjema, 1995), or numerical model such as MODFLOW (McDonald & Harbaugh, 1988). Both field data and the chosen analytical method to characterise the presence of barrier boundaries would have the potential dual purpose of re-assessing groundwater hydrologic effects of BOGP bore field operations.

1.1.3 Modelling of Barrier Boundaries

Before the commissioning aquifer test, it would be feasible to undertake modelling of the Bendigo Aquifer to include modelling of the effect of aquifer margins. The assessment of drawdown in the Bendigo Aquifer surrounding the BOGP water supply bore field used the Theis Equation (Theis, 1935), an analytical equation with fundamental assumptions that include an infinite aquifer. The assumption of infinite aquifer extent creates a conflict between the aquifer's conceptual model and the numerical limitations of the Theis Equation[7]. The Bendigo Aquifer lacks infinite aquifer extent, with low permeability aquifer edges approximately 850 metres to the east (till) and south (schist) from the centre of the BOGP bore field.

Current aquifer margins have been defined by ORC modelling studies (Houlbrooke, 2010) and included in the mapping of declared aquifer in the Regional Plan: Water (Maps C-6). ORC has records on up to 60 labelled wells and bore logs across the Bendigo Aquifer. Fourteen of these well records are arranged in proximity to the eastern or southern margins and generally the lithological logs suggest that there is little if any tapering of aquifer thickness or depth towards the margins. The geological map at 250,000 scale maintained by Earth Sciences New Zealand is reflected in the GIS map layer served up as Geological Map of New Zealand 1;250,000 Scale. The aforementioned geological map is also used to delineate aquifers, aquitards and aquiclude or geohydrological basement in mapping termed the New Zealand Hydrogeological unit map or HUM mapping (White et al., 2019).

These maps either explicitly or implying the outline of the Bendigo Aquifer are presented in Figure 1 to Figure 4, below. Each map from Figure 1 to Figure 3 has small differences mainly due to scale and resolution but are broadly in accordance with each other.

Figure 4 reveals that there is a relatively consistent trend in aquifer depth (recognising that many bores are not drilled to basement) and confirmed elevation of the aquifer - basement surface. A relatively consistent elevation for the base of the aquifer against clay or silt of the Maniototo Formation basement between 178 metres and 182 metres AMSL in the central and southern portions of Bendigo Aquifer is indicated on the right hand image of Figure 4. A single log describing the aquifer abutting directly onto schist rock basement was recorded in a southwestern location. This site has outcrops of schist rock visible within a 'stone's throw' away from the bore and was found at the southwestern intersection of SH8 and Bendigo Loop Road. All other observations of inferred basement materials also noted that the basement comprised sedimentary silt or clay indicative of the Maniototo Formation.

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[7] Complete list of Theis Equation assumptions:

- **Aquifer has infinite areal extent**
- Aquifer is homogeneous and of uniform thickness
- Control well is fully or partially penetrating
- Flow to control well is horizontal when control well is fully penetrating
- Aquifer is nonleaky confined (although an unconfined approximation is feasible)
- Flow is unsteady (i.e., transient)
- Water is released instantaneously from storage with decline of hydraulic head
- Diameter of a pumping well is very small so that storage in the well can be neglected

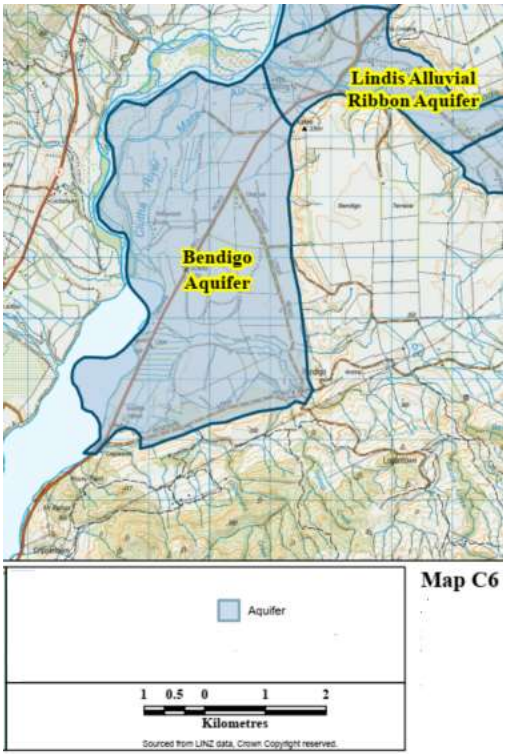

Figure 1: Otago Regional Plan: Water map C6 of Bendigo and Lindis Alluvial Ribbon Aquifer

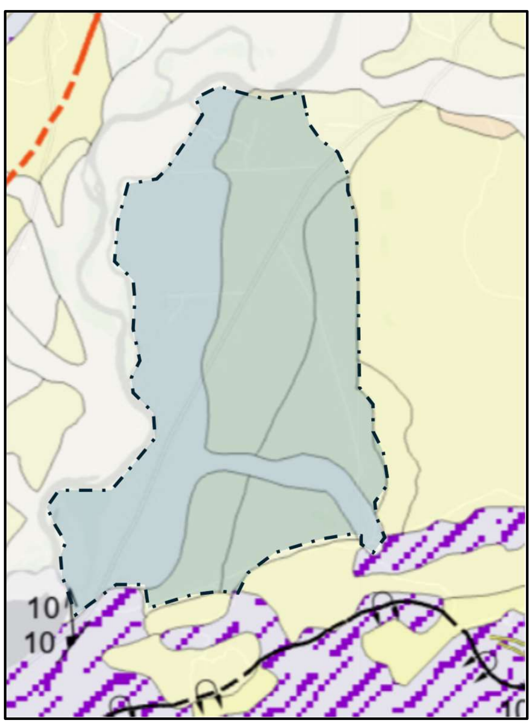

Figure 2: Bendigo Aquifer margin in accordance with 1:250,000 scale geological mapping

Figure 3: Bendigo Aquifer margin in accordance with 1:250,000 scale Hydrogeological Unit Map

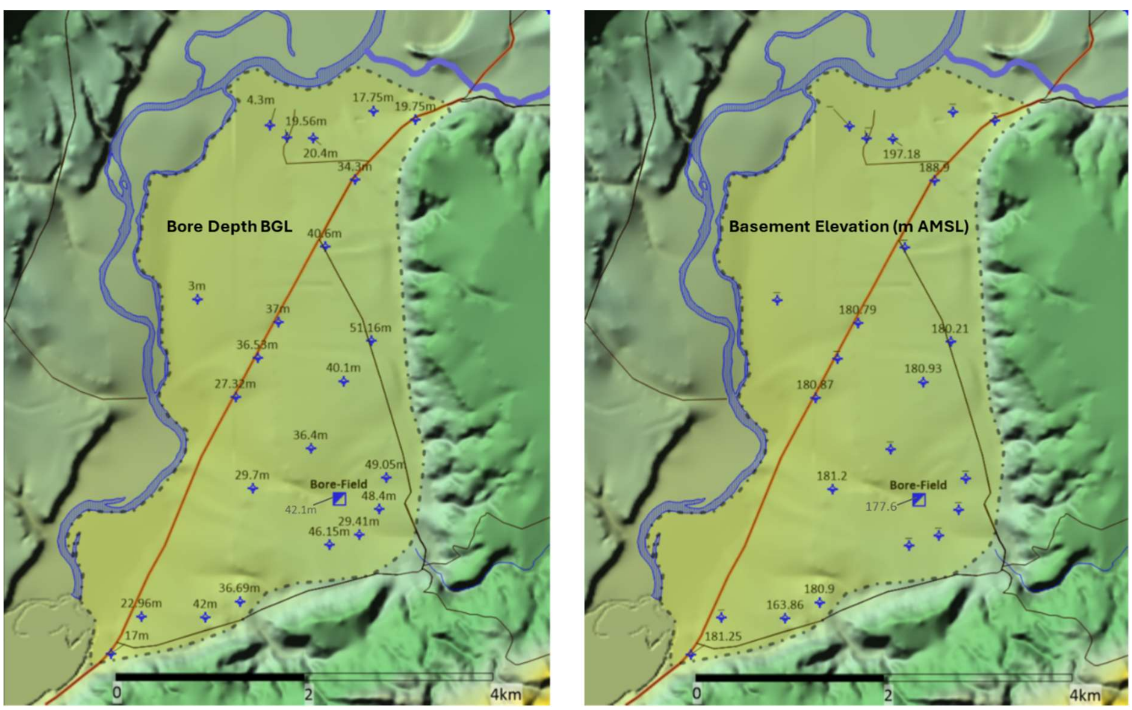

Figure 4: Logged bore depths (left, as depth BGL) and recorded basement elevation (right, wrt mean sea level)

1.1.3.1 ORC (Houlbrooke) Modelling of Abstraction with Barrier Boundaries

Clare Houlbrooke for ORC mapped the Bendigo aquifer seamlessly with the Lindis Alluvial Aquifer, Ardgour Aquifer, and Tarras groundwater system. The mapped schist boundary was modelled within MODFLOW as Head No Flow cells (i.e., impermeable), while the aquifer - till margin against the Bendigo Terrace was simulated with a zone of hydraulic conductivity of 1 metre per day, essentially a permeability ratio of 0.005 or 1:200 from the modelled aquifer to the low permeability till materials. Of relevance to the question of the effect of modelled Bendigo Aquifer boundaries was the Scenario 6 simulation of extremely heavy groundwater pumping from the Taras – Bendigo groundwater allocations areas (Houlbrooke, 2010). This scenario envisaged groundwater pumping from contemporary irrigation bores and ramping up their rates of take until steady state modelled groundwater levels were suppressed to 2 metres of their mean calibrated non-pumped water table surface.

Figure 5 reproduces Figure 5.9 from page 36 of the Houlbrooke report in setting the groundwater allocation for the Bendigo Aquifer. Figure 5 provides contouring of model groundwater level under the describe model regime of Scenario 6. This simulation suggested that steady state modelled pumping across the Bendigo Aquifer at the marked irrigation bores would rest at 58 million cubic metres per annum (approximately 1,843 L/s). The current consented groundwater take total for the Bendigo Aquifer is held by ORC to be 16,225,855 cubic metres per annum (16.23 million m^3/year).

Approximations of each recently current groundwater take consents from the Bendigo Aquifer using the consent database indicate a total of 17.41 million m^3/year, but this includes 6.11 million m^3/year from bores installed on the edge of the aquifer against the Clutha River / Mata Au that are essentially pumping surface water from the river *via* gallery bores. The resulting comparison is that current consent total groundwater take for the Bendigo Aquifer is 11.31 million m^3/year, while (Houlbrooke, 2010) considered that groundwater take could be expanded by a further 46.69 million m^3/year, a 4 fold or 413% increase by inducing up to 2 metres of drawdown throughout the aquifer. This simulation included the presence in the simulation of a no-flow schist boundary and a low permeability till boundary in the locations indicated in figures from Figure 1 to Figure 5. The implication is that despite the presence of mapped barrier boundaries in the ORC MODFLOW simulation, the current consent allocation should be feasible with acceptable levels of cumulative drawdown on aquifer water levels. Such levels of pumping for irrigation would not be feasible without the intimate connection between the Clutha River / Mata Au and the Bendigo Aquifer, plus the exceptionally high transmissivities within the aquifer

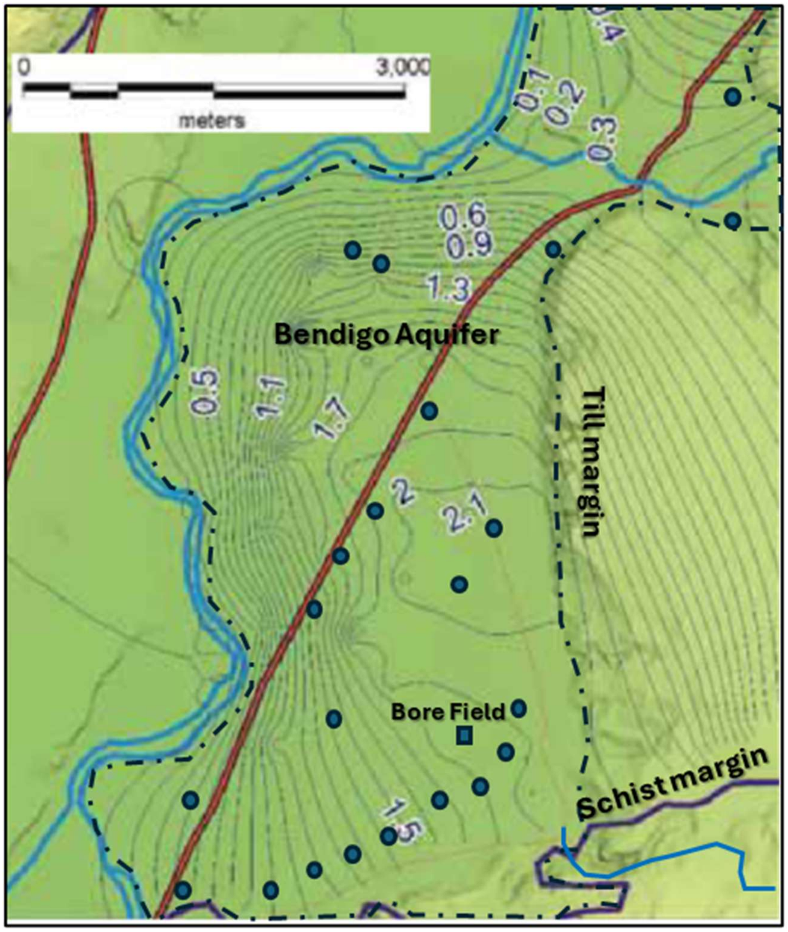

Figure 5: Drawdown under scenario 6, where a drawdown up to 2 metres is applied by elevated pumping

It should be noted that Scenario 6 included nine simulated irrigation bores closer to the southeast corner of the aquifer than the proposed BOGP bore field (marked with blue square and "Bore Field" in Figure 5). Each of these bores would have been simulated with a pumping rate of more than 90 L/s in Scenario 6, approximating the proposed long-term pumping rate of the BOGP water supply bore field.

1.1.3.2 Using Best Information in Minimising, Offsetting or Compensating for Drawdown Effects

The proposed commissioning aquifer test would provide fresh and focused interpretations of intensity of drawdown throughout the aquifer surrounding the BOGP water supply bore field, including whether testing detected discernible basement reverberation[8] and to what extent. These future determinations would add to the best information available to guide responses of specific measures of effects minimisation, any offsetting, and/or compensation for reduced access to groundwater. Having made updated determinations on the drawdown effects of the proposed BOGP water supply bore field operation, determinations of drawdown effects on surrounding existing groundwater users would use the following hierarchy of measures:

- Collecting information on as many surrounding water bores as possible in terms of consented groundwater take, use, total bore depth, top and bottom of screened section, pump intake depth and range of groundwater levels,
- Collecting existing information on the tendency and measurements of surrounding bores' water level and self-induced water level decline at normal rates of groundwater abstraction,

[8] Basement reverberation means the effect of the proximity of a barrier boundary in the presence of groundwater pumping by bores that leads to higher drawdown than if the barrier boundary was absent.

- Collating information on the best estimates of the BOGP induced drawdown effects on surrounding water bores, and
- Undertaking a cumulative drawdown assessment to evaluate whether critical freeboard levels would be breached.

Should the above cumulative drawdown assessment point to single, or multiple existing groundwater user bores being affected, then the following consultation, investigation and remedial actions would be triggered:

- In the case that the above cumulative drawdown assessment indicates a vulnerability to BOGP induced drawdown and difficulties to continued surrounding water bore pumping operation, follow-up consultation and a request to investigate remedial actions would be made to the affected bore owner,
- Investigations may include:
    - Detailed measurements of the affected bore(s):
        - Reference to bore log, bore construction and drilling records,
        - Pulling the pump unit and making essential measurements, and
        - Measuring the internal decline in bore water level during pumping of the subject bore (specific capacity or step rate testing),
- Remedial action recommendations may include:
    - Lowering of the pump unit within the original bore (where feasible),
    - Re-drilling of the bore and setting a deeper, larger diameter screen so as to allow lower setting of the pump unit and higher screen loss efficiency,
    - Provision of a replacement, high reliability water supply of equal or better water quality in the case of elevated risk of bore water supply interruption that cannot be remedied by any other means.

Whether recommended remedial action is undertaken would be at the discretion of the bore owner and may be subject to bore / landuse consent from ORC. The success / failure and overall effectiveness of the remedial actions in restoring access to groundwater can be measured using structured analysis of groundwater level, individual and total abstraction rates. Where this analysis of monitoring is backed up by a point of contact such as a consultative group, plus the provisions of a complaints framework, as follows:

- The institution of groundwater level monitoring and collation of groundwater flow meter data in cooperation with ORC would monitor the effectiveness of the remedial actions, and
- The institution of community consultative structures to report back the progress and outcomes of the remedial actions would complete the circle of informing potentially affected parties.

Similar step-wise investigations and remedial actions were undertaken during the Clyde Dam tailrace deepening project in the early 1990s for bore owners drawing on the Dunstan Flats and Earnscleugh aquifers (Rekker, 2012; Saul & Watts, 1993). Dredging the Clutha River / Mata Au lowered river and aquifer water levels, particularly at the Clyde township end of the deepening project. Existing water bores in the adjoining aquifers would be affected, but investigations were required to prioritise remedial actions and groundwater level monitoring provided critical insights into groundwater use and groundwater level responses.

Actions and responses outlined above are suitable for inclusion in the Water Management Plan (document G.01) and be constituted within the Mine (Environmental) Plan for the project, instituted by the Environmental Manager and ultimately by the Mine Manager / Superintendent.

2 Response to RFI Question 2

Question 2: *Each of the groundwater quantity models underestimates head in the vicinity of pits, and overestimates* (head) *in areas of discharge. What is the effect of this* (mismatch in modelled heads) *on anticipated groundwater drawdown and stream depletion?*

Response to Question 2: For the RAS and CIT pit models we determine the mismatch in modelled heads to have negligible effect on the model simulation of proposed pits. This is further the case given that the model approach is statistically based (having multiple parameter realisations) rather than deterministic (i.e., having a single determined set of parameters), which diffuses the impact in modelling of the mismatch. Furthermore, the overestimation of heads in the lower slopes is offset by the application of strong fixed head cells with high entry conductance along the valley floor. The boundary condition's fixed heads are set to the exact creek bed elevations that are largely unaffected by posterior values (i.e., calibration / optimisation realisations). In the case of the SRX pit groundwater model, the relatively high permeability of intervening schist rock dominates the modelled response of inflows, reduced heads and depletions rates, resulting in an already high level of effect on drawdown and stream depletion in Rise and Shine Creek. It is doubtful that SRX model calibration and optimisation would fail to include model realisations as impactful on surface water.

2.1 Background to Response

The technical documentation, including the documents reviewed by the e3 reviewer, included several layers of water quantity (flow) modelling, or calculations in place of modelling:

- KSL[9]: Three groundwater steady state numerical models using MODFLOW across the three pit areas (RAS, CIT and SRX) to model the pit penetrations to the schist groundwater system (document B.05),
- KSL: Analytical calculations based on an empirical equation (Goodman et al., 1964) were used to estimate the inflow of groundwater to tunnels (collective term for adits, drives, declines and drifts) developed through the life of the underground mine to Year 13 (document B.03)
- KSL: A transient groundwater flow and transport model of the Ardgour and Lindis River alluvium using MODFLOW and MT3D to statistically simulate possible mixing ratios of Shepherds Creek infiltration inflow to the Lindis Valley groundwater system (not a document provided with the application) (Dumont & Rekker, 2025),
- HGCG[10]: Analytical calculations of potential radius of influence (Hazel, 2009) and drawdown (Haitjema, 1995) effects on wetlands using analytical equations from the respective methodologies (document B.042)
- MWM[11]: An annual semi-empirical water balance using an Excel spreadsheet of the operational (Year 1 to Year 13) mining complex water interchanges and exchanges within the Shepherds Creek and Bendigo Creek catchments (document B.06C and appendices), and
- MWM: A transient simulation package using GoldSim and empirical algorithms, trained largely with baseline data and coefficients gained from the Macraes Mine monitoring, of the Active Closure and Post-Closure (Year 13 to Year 200) mining complex water interchanges / exchanges within the Shepherds Creek and Bendigo Creek catchments (document B.06C and Appendix N).

The authorship of each set of models or calculations is important, however links between reports / memoranda by different authors are made in the technical assessments on water assessments or water management. Concrete examples of such links between methods of water quantification are as follow:

[9] KSL; Kōmanawa Solutions Ltd authorship.

[10] HGCG; HydroGeoChem Group Ltd authorship.

[11] MWM; Mine Waste Management Ltd authorship.

- The assessed groundwater inflow rates or surface water depletion rates from the KSL groundwater modelling (KSL: B.05) are employed elsewhere in the operational mine water balance (MWM: B.06C) and the surface water effects assessment (KSL: B.02),
- Estimates of underground tunnel dewatering rates (KSL: B.03) are employed in the operational mine water balance (MWM: B.06C), and
- The operational mine water balance model (MWM: B.06C) estimates of change to operation creek flow were employed in the surface water effects assessment (KSL: B.02) and Section 30 evaluation of derogation of downstream water rights.

2.1.1 Kōmanawa Solutions' Hard-rock Groundwater Models

Three models of hard-rock schist groundwater domains surrounding the three pits were developed and reported [B.05 and (Dumont et al., 2025)]. The more significant in terms of scale and complexity was centred on the RAS open cut pit, but the satellite pits of SRX and CIT made up the centres of the other two model domains. Each model domain included flowing sections of either Shepherds Creek (RAS and CIT) or Rise & Shine Creek (RAS and SRX) simulated as fixed head model boundary conditions. Figure 6 maps the position of these model domains.

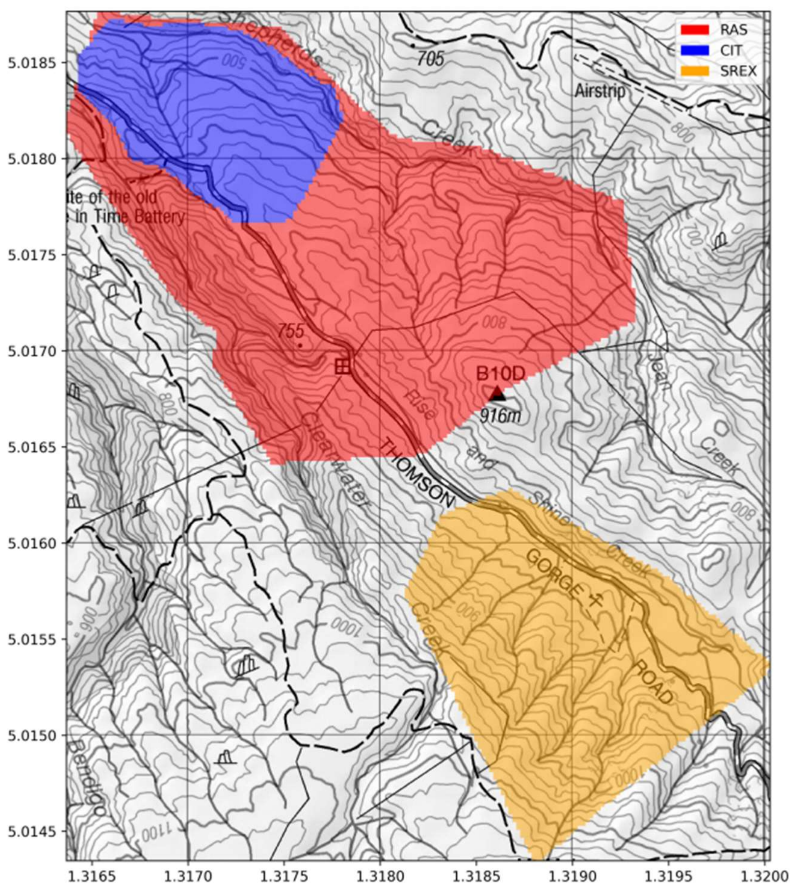

Figure 6: Active model domains used in the model study

Each model domain had been calibrated and parameter-optimised using depth to water (DTWs) and corrected groundwater level elevations (SWLs) provided by dipping of gold resource drill holes remaining open following drilling and flushing out of drilling fluids. Figure 7, Figure 8, and Figure 9 illustrate the development of water level contour maps, but more tangibly, water level profiles in this case through the RAS Pit from Rise and Shine Creek to Shepherds Creek through the RAS Pit. The section line mapped in Figure 8 has a total length of 1,500 metres (1.5 km) for lateral scale.

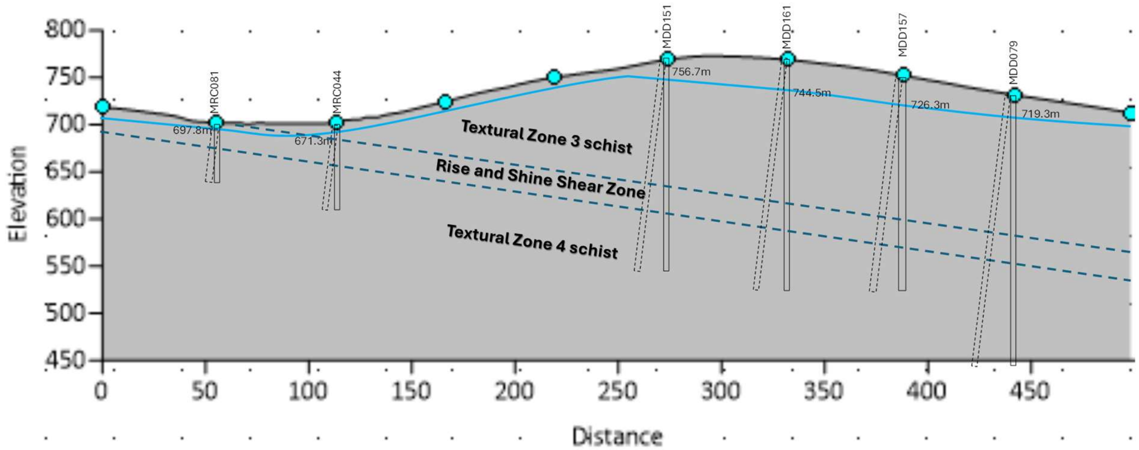

Figure 7: Example of the use of gold resource drill hole data to provide a profile of strata and water levels

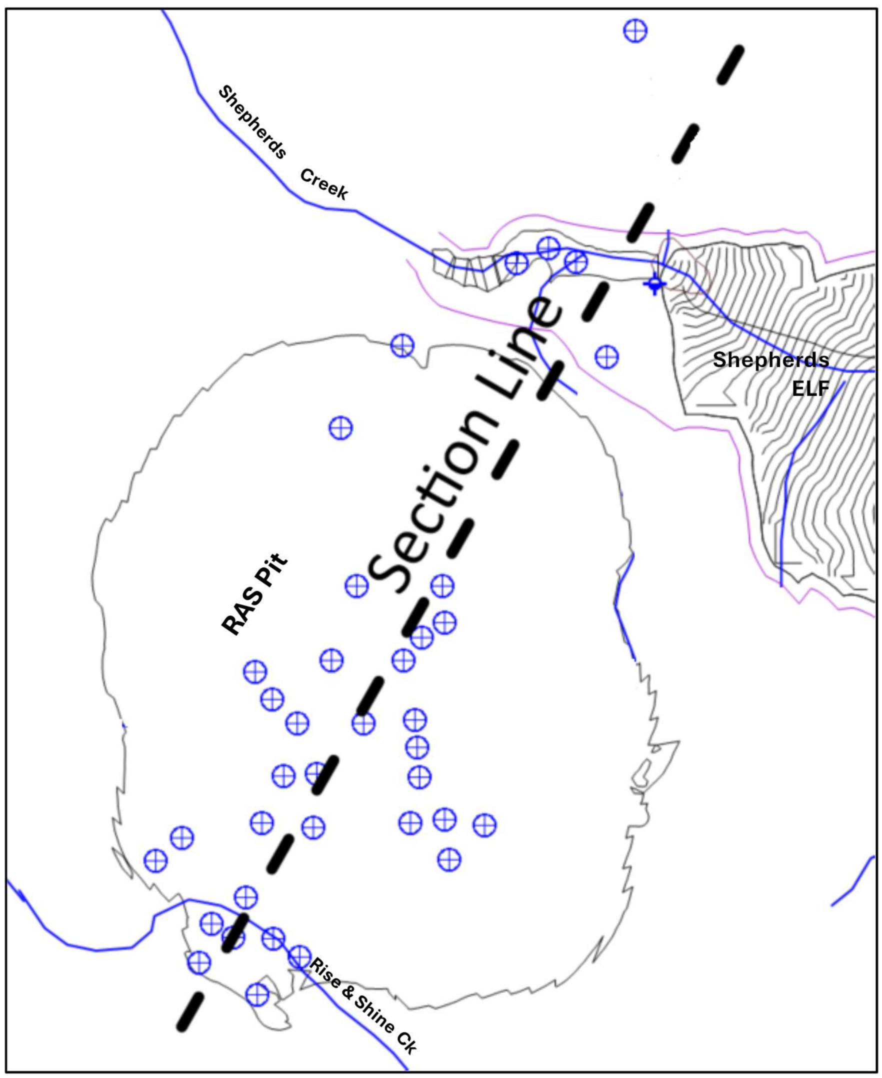

Figure 8: Trend of the RAS Pit cross section line, also plotting density and location of drill holes

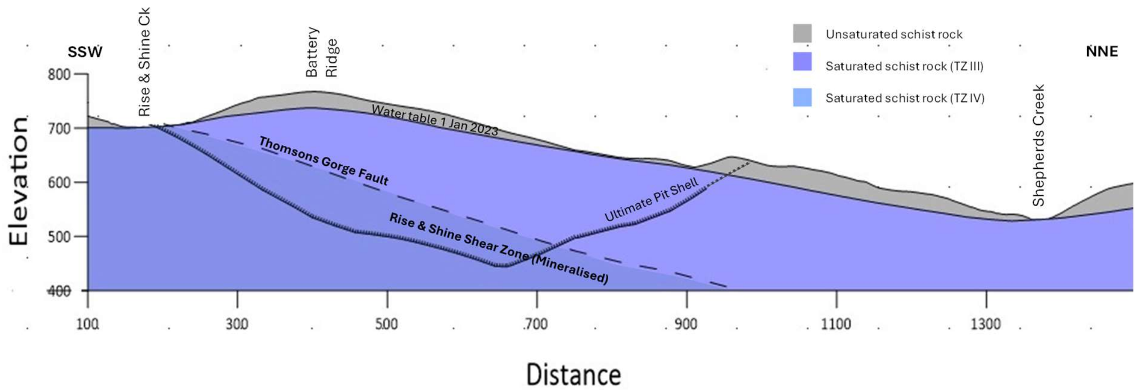

Figure 9: Profile looking down-valley, including water table, schist zones and RAS pit floor / wall outline

Figure 9 shows a representative profile of the dipped water levels measured in January 2023. The profile in Figure 9 is not exaggerated, meaning that the profile displays steep topography and a steep profile in groundwater heads from Rise and Shine Creek to Shepherds Creek. The profile also shows a thick unsaturated zone between the surface and groundwater level (water table) due to the minute recharge through the regolith and weathered hard-rock land surface. The unsaturated zone thickness tapers to small depths to water with its approach to each creek due to the likelihood that the shallow hard-rock groundwater system exchanges groundwater with these water bodies. Figure 9 suggests that the surface water – groundwater exchange at Rise and Shine Creek to be weakly seepage, neutral or even infiltration. Whereas the exchange suggested within the same profile at the Shepherds Creek gorge is more likely to be discharge (seepage) of groundwater into the creek bed. Figure 10 maps an example model domain with the Shepherds and Rise & Shine CHD cell strings.

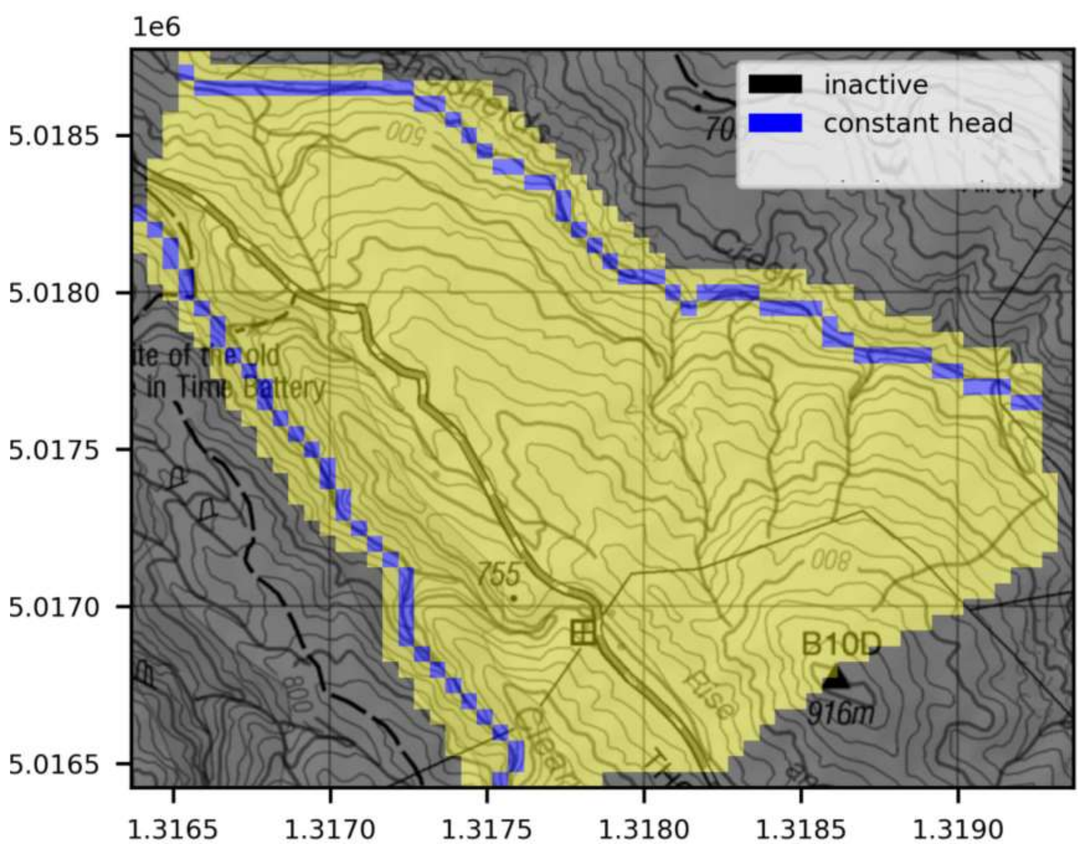

Figure 10: Mapping of constant head (CHD) cell strings representing Rise & Shine and Shepherds creeks

The model interaction between the hard-rock groundwater system and these creeks was simulated using the MODFLOW constant head (CHD) boundary condition. Strings of CHD boundary condition cells were delineated in each model domain to coincide with alignment and vertical elevations of Shepherds and Rise & Shine creeks. Constant head boundaries extract water from adjoining cells when the head in adjoining cells is higher than the specified constant head. But constant head boundaries also inject water into adjoining cells whenever the surrounding heads are lower than the target level. Thus CHD boundaries may be sink or source in nature depending on relative heads between surrounding cells and the specified target head.

2.1.2 Kōmanawa Solutions' RAS Underground Dewatering & Potential for Creek Dewatering

The proposed RAS underground workings would lie beneath Shepherds Creek but not approach Rise & Shine Creek. The underground workings would include sequential extraction of gold ore from the ore zone (Rise & Shine Shear Zone, RSSZ, plus other mineralised quartz veins within TZ-4 schist) beneath the Thompsons Gorge Fault Zone (TGF) by a process termed stoping in the mining industry. A network of tunnels, which is a collective term that includes adits, drives, declines, cross-cuts and drifts, would be extended from the surface access portal to depths up to 300 metres below ground. A schematic of the arrangement is displayed in Figure 11. These tunnels would allow the initial handling ('mucking') of the extracted ore and transportation to the surface and processing plant. The tailings following processing would be mixed with a cementing agent and piped under pressure to refill the completed stope, before ore extraction focus shifted to the next stoping zone. In addition, at least two major lateral pillars would separate stoping zone sets to ensure the structural integrity of the workings.

As the completed stopes would be refilled with cemented tailings paste that set and resulted in a filled void that was at least as permeable or of lower permeability of the original rock before extraction, the stope areas can be considered inert in terms of groundwater and dewatering requirement. Only the tunnel elements of the underground workings were considered to consistently make groundwater and require continuous dewatering to be pumped to the surface.

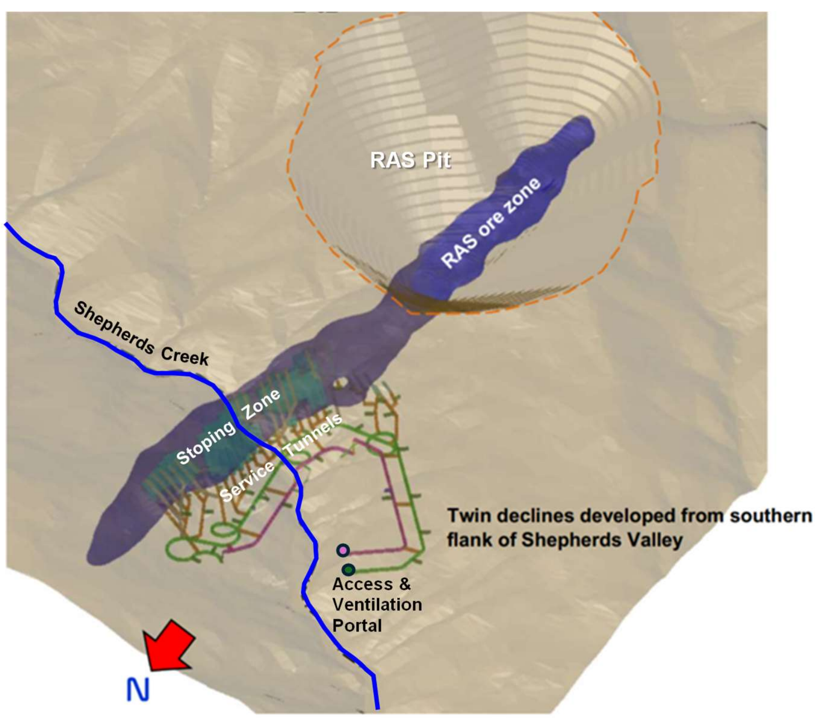

Figure 11: Schematic of RAS Pit, RAS underground workings and Shepherds Creek (from document B.28)

The tunnel network originates at the access portal and includes paired declines from the portal to depths equivalent to the Rise & Shine Shear Zone. This initial tunnel development of the workings amounting to approximately 750 metres of tunnel through the hanging wall TZ-3 schist would occur in Year 5. Extraction of gold ore would not occur until Year 6. The tunnel network is proposed and projected to grow by an average 3 kilometres per year for four years, until fully established in Year 9 at total length of 11.8 kilometres. Mining would take place in the RAS underground to the projected conclusion of mining in Year 13 with the stoping of the crown pillar into the northeast wall of the RAS Pit. In the Active Closure phase of the BOGP mining complex, the water management of Ras Pit and RAS underground would be merged, with the site of the removed crown pillar and tunnel network to the access portal becoming the *de facto* hydrological outlet to the RAS Pit Lake. Following the Active Closure phase and harmonisation of pit lake and tunnel network water pressure, the tunnels would make little groundwater until groundwater levels could rebound in the Post Closure phase.

Prediction of tunnel network dewatering and out-pumping of groundwater utilised Goodman Equation calculations normalised to per kilometre inflow rates. Thus the four year progressive development of the tunnel network servicing the stoping zones was reflected in a steady increase in total dewatering and groundwater pumped to the surface. Once at the access portal, surplus groundwater would enter the Mine Impacted Water ring to be used at the processing plant or stored at the TSF. Another route of groundwater removal was as water vapour following evaporation from tunnel walls and thence to the surface within the ventilation tunnel. Prediction of peak groundwater inflow entering dewatering indicated a maximum rate of 30 litres per second.

The underground workings would pass beneath Shepherds Creek for approximately 300 metres of its creek bed length. Figure 12 displays the elements of the RAS Pit and RAS underground in profile along the RAS ore zone trend. It has vertical grid lines and indicates that the sloping ore zone followed by the stope extraction is from depths of 40 metres to approximately 240 metres above mean sea level (AMSL) or reference level (RL).

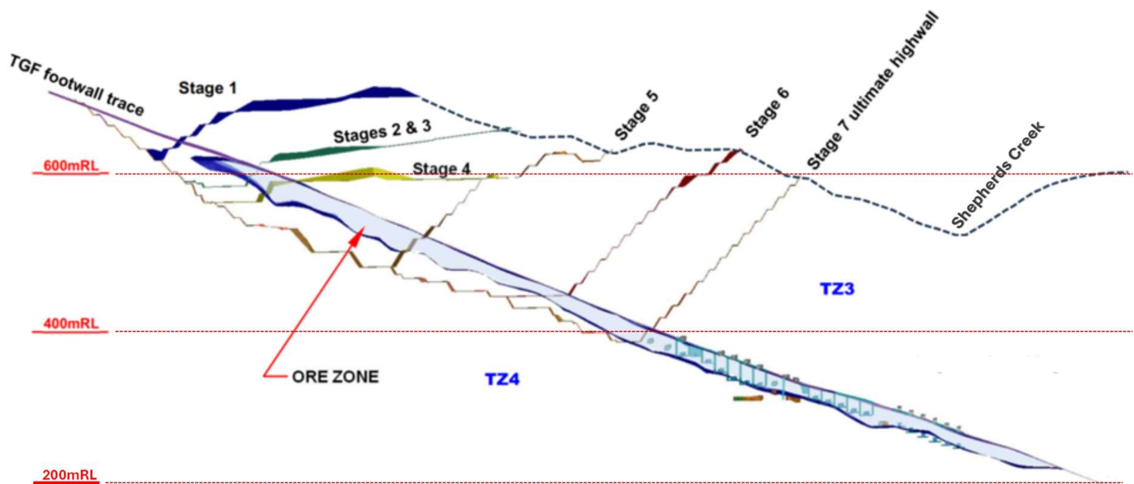

Figure 12: Profile through RAS Pit and RAS underground workings following the RAS ore zone (adapted, B.28)

As Shepherds Creek's bed falls from 550 to 520 metres AMSL as it passes over the proposed underground workings, while the tunnel roofs average 250 metres (220 - 285 metres) AMSL. Thus the depth of covering materials overlying the deeper parts of the workings would range between 250 and 300 metres. Covering materials would be primarily TZ-3 schist rock under a thin veneer of 2 to 4 metres thickness of coarse gravel alluvium comprising the Shepherds Creek boulder-gravel bed.

2.1.3 Heads Estimation in Numerical models

It has been noted by the ORC reviewer that the models "underestimates head in the vicinity of pits, and overestimates (head) in areas of discharge". It is questioned whether this gives rise to model bias in estimating groundwater drawdown and stream depletion using the same models. Firstly, it is worth pointing out that the (head) observation points used for all three models are open hole resource exploration bores with no casing, lining, or screens. These head measurements will have intrinsic uncertainties due to their construction. In addition it is common to have head mis-fits within numerical models.

The reviewer is correct for the RAS and CIT models that there is typically an underestimate of heads on the convex ridge tops and an overestimate of heads on the steeper flanks. We have discussed this in the model report:

> *The most likely tension is the global recharge rate. This rate drives the fit of the heads on the relatively flatter ridge line, while forcing higher than observed levels in the steeper terrain. A spatially distributed recharge layer would likely improve the fit of the model to the observed heads, but also significantly increases the risk of overfitting. At the hydraulic conductivities observed and modelled, a small change to recharge can yield large changes in modelled head, therefore we believe that these misfits do not represent a significant source of error in the model for the predictions of interest.* (document B.05)

Essentially, we believe that in the steeply incised area there is likely to be significantly lower recharge from the veneer aquifer[12]. The stream depletion assessments for both the CIT and RAS mines show that there is no direct depletion of Shepherds creek. For the CIT model the excavation never reaches the elevation of Shepherd's creek, so direct depletion is impossible. For the RAS model, while the pit does extend below the elevation of the creek, the very low conductivity of the TZ-3 material prevents direct depletion[13]. None of the model results showed any direct depletion. This is further supported by the very conservative estimates of stream depletion from the underground workings, which yields a negligible direct depletion (see Section 0). Therefore the stream depletion impacts of both of these features are limited to the intercepted rainfall, runoff, veneer aquifer flow, and recharge. For both the CIT and RAS mining activities we bounded the possible impact of intercepted flow *via* a catchment rainfall analysis, which is independent of the models. Additionally while there are significant model misfits a steep topographic and head gradient remains within each model. Despite the head misfits the steep gradient is largely maintained. For instance in the CIT observations below, the valley bottom heads are overestimated by c. 10 m, but this yields a gradient between the next upslope observation of c. 440m to 490m instead of the correct gradient of c. 430 m to 460 m.

This valley bottom observation is the only observation that is not in the mining area and/or directly adjacent to mining activities for RAS and CIT. The general over-estimate of the valley side heads in the pit areas of the CIT and RAS means that the estimated drawdown is higher than it is likely to be and this should yield a higher flux into the pits from these areas. The underestimates at the top of the ridges will underestimate drawdown but given their high elevation and the very low conductivity it is unlikely that the underestimate will yield significantly increased inflows to the pit and certainly will not exceed the rainfall based estimates from a conservatively sized catchment.

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[12] Note that the term aquifer is used in a narrative sense for hydrogeological units in the schist groundwater system. No part of the schist groundwater system can be described as aquifer under then conventional classification of aquifers, aquitards, aquicludes and geohydrological basement. All of the schist would be conventionally classed as aquitard or geohydrological basement. It is only in the sense that very limited groundwater moves within the Otago Schist basement rocks within various generations of fractures that have broken the rock since it become rock (lithification and metamorphism).

[13] Note that the stream depletion noted in the groundwater assessment from estimates provided from groundwater modelling of the RAS and CIT pits primarily relates to the loss of potential recharge to the schist hard-rock groundwater system rather than a more depletion of Shepherds Creek in the creek gorge passing the pit area.

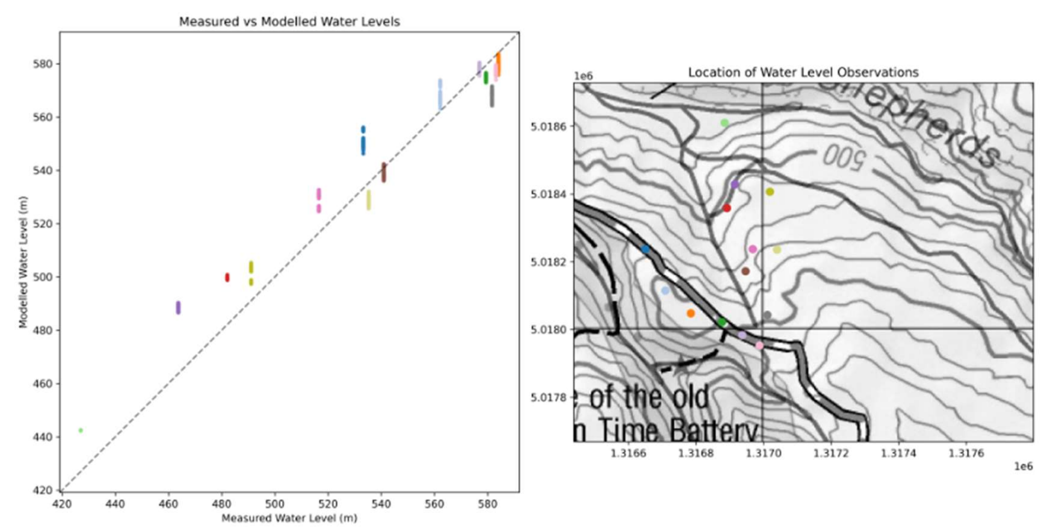

Figure 8.7: CIT: A comparison of measured and modelled heads.

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Figure 13: A comparison of measured and modelled heads for Come In Time (CIT) pit area

The SRX model is a slightly different case. There is not a clear over/underestimation divide at SRX and this seems to reflect more generalised observation mis-fits. Note that many of the under-estimates (blue in the figure below) are very close to other over-estimates. Again the most significant over-predictions occur far down gradient of the modelled area. Finally the conclusion of the SRX based modelling was that without additional information we could not preclude the SRX mining works from fully depleting Rise and Shine Creek and/or significantly impacting the adjacent wetlands. Therefore we would suggest that we cannot be underestimating the potential impacts of the mining activities.

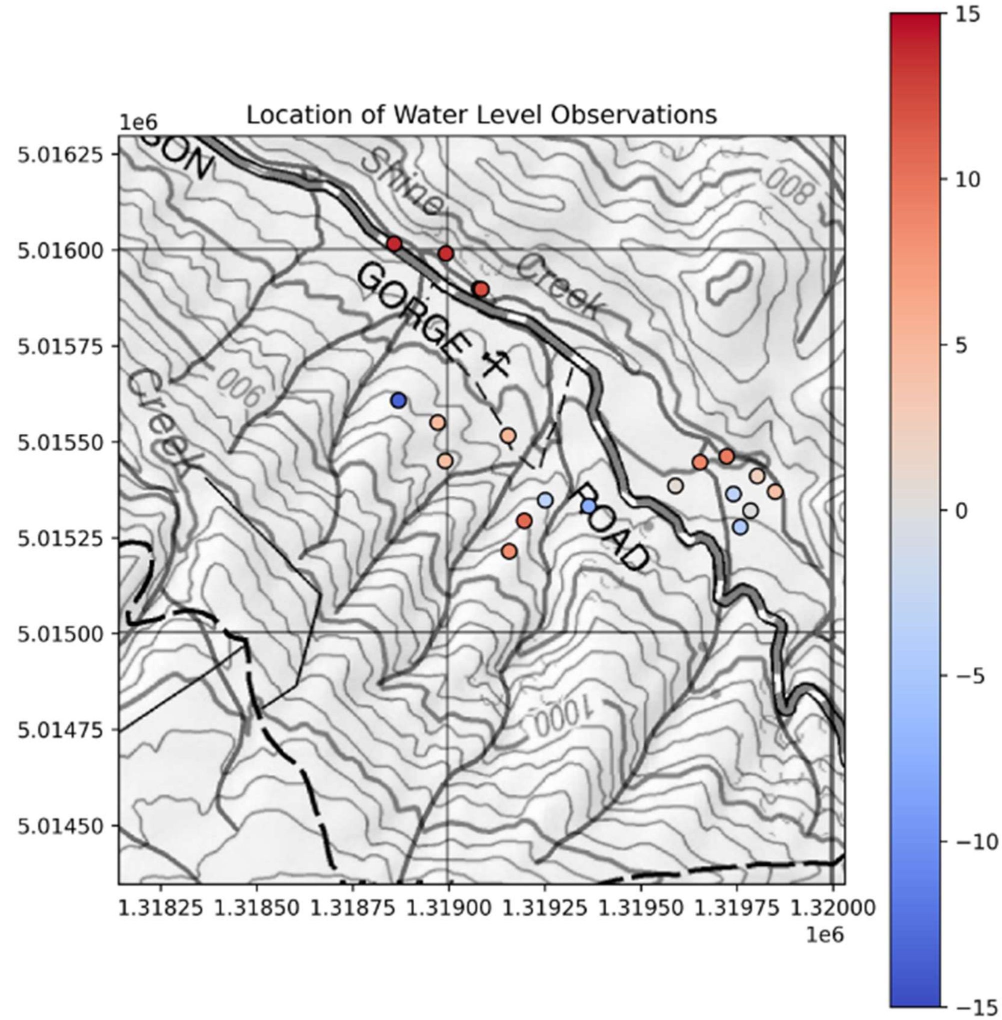

Figure 9.8: SREX: Spatial distribution of measured-modelled misfit.

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Figure 14: Spatial distribution of measured to modelled misfits surrounding the SRZ pit area

3 Response to RFI Question 3

Question 3: *Please assess the stream depletion effect of the RAS underground mine.*

Response to Question 3: The modelled stream depletion on Shepherds Creek of the RAS Pit was largely by intercepting hard-rock groundwater that would otherwise have made its way to the creek bed *via* the groundwater system. The groundwater interaction with the RAS underground workings is quite distinct from the pit. A minimum of 250 metres of saturated TZ-3 schist intervenes between the creek bed and top of the underground tunnels network. A special semi-generic model was developed for responding to Question 3, above. As the previously calibrated and optimised bulk hydraulic conductivity of this schist material was in the range of 3×10^{-7} to 3×10^{-5} m/day (3.5×10^{-12} to 3.5×10^{-10} m/sec), the modelled depletion effect on Shepherds Creek of tunnel dewatering would be negligible, generally in the order of a hundredth of a litre per second but less than 1 litre per second.

3.1 Tailored Model

To provide an underground mine focused numerical assessment of the interaction between the underground workings and Shepherds Creek, a tailored model was developed by Kōmanawa Solutions in recent weeks in providing a response to the ORC reviewer.

To assess the possible stream depletion effects of the underground workings of the Rise and Shine Mine we produced a very simple model conceptualisation. The underground workings are a combination of access / service tunnels and stope zones. The stope zones are to be backfilled with cemented tailings paste as described in the principal application technical document, so these individual zones would not remain as voids for long perhaps a month. The tunnels are longer-term features and to maintain safe and serviceable tunnels, dewatering with out-pumping to the surface would be required long-term (Year 6 to Year 13). For these reasons, the estimation of predicted dewatering and potential for depletion impacts on Shepherds Creek is limited to the tunnel zone of the underground workings.

Instead of assessing the detailed underground workings we have instead created a “underground workings zone”, which contains the potential workings, but is much larger than the total plan view area of the underground workings (see Model Zones figure).

We then created a simplified 3-layer model. The model top elevation is assumed to be flat (0 m). Layer 1 is 1m thick with constant head cells in all model cells that intersect Shepards Creek (Blue in Model Zones figure). There are no additional boundary conditions in layer 1.

Layer 2 is 250 m thick and does not contain any boundary conditions. Layer 3 is 1 m thick and all cells that intersect the underground working zone are populated with Drain cells with an invert at the cell top and a very high conductance (10,000 m/day). The model is parameterised by a single hydraulic conductivity and the model cells are considered unconvertible to minimize any potential numerical instability.

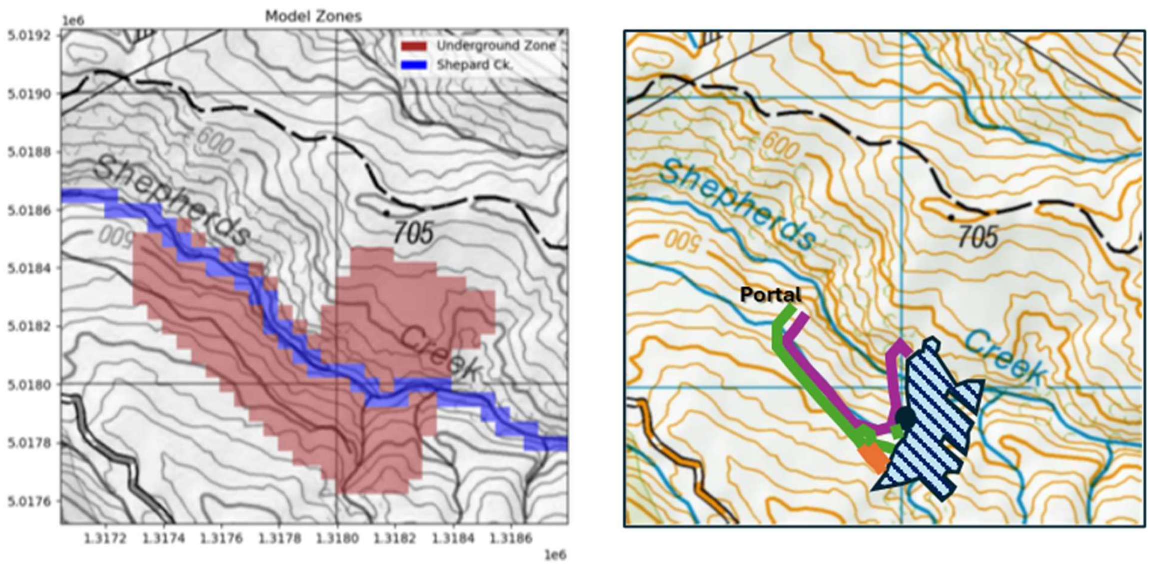

Figure 15: Footprint of Model Zones of RAS Underground Workings (left) vs Actual Proposed Workings (right)

We then ran this model for a range of hydraulic conductivity values (10^{-8} to 1 m/day). For each model run we report the steady state drain flux (Figure 16 for m/day and Figure 17 for m/sec). The resultant steady state drain flux ranges from c. 10^{-5} to 10^{3} L/s (i.e., from a millionth to 1,000 L/s). This drain flux corresponds to the rate of creek water exchange with the underlying schist groundwater system. The shaded area in Figure 16 below shows the posterior distribution of hydraulic conductivity values for the TZ-3 Schist from the previous modelling. The maximum stream depletion under the posterior conductivity distribution is 5 x 10^{-3} (~0.005) L/s. The bulk hydraulic conductivity of the TZ-3 would need to exceed 10^{-4} m/day (10^{-8} m/sec) before the stream depletion in this model would exceed 1 L/s. For context, the typical literature values for un-fractured metamorphic rock is 10^{-5} to 10^{-8} m/day. Based on this analysis we suggest that the stream depletion potential of the underground workings is negligible in comparison to the potential intercepted flow of the RAS open cast mine.

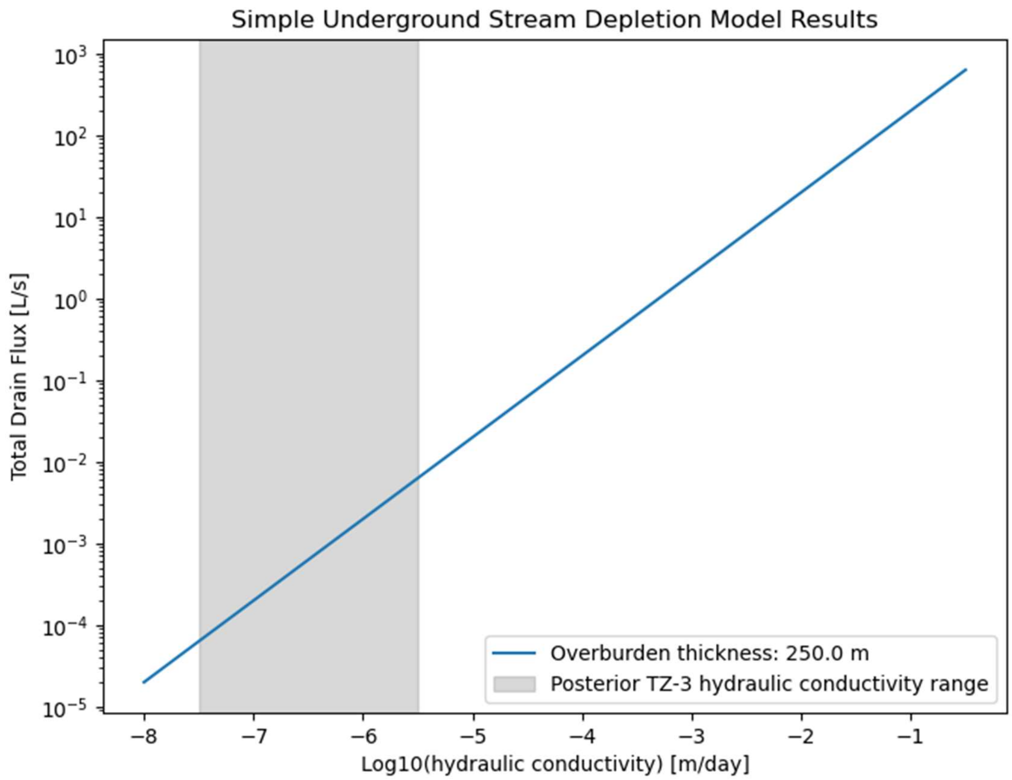

Figure 16: Plot of modelled drain flux emulating stream depletion, against modelled rock permeability [m/day]

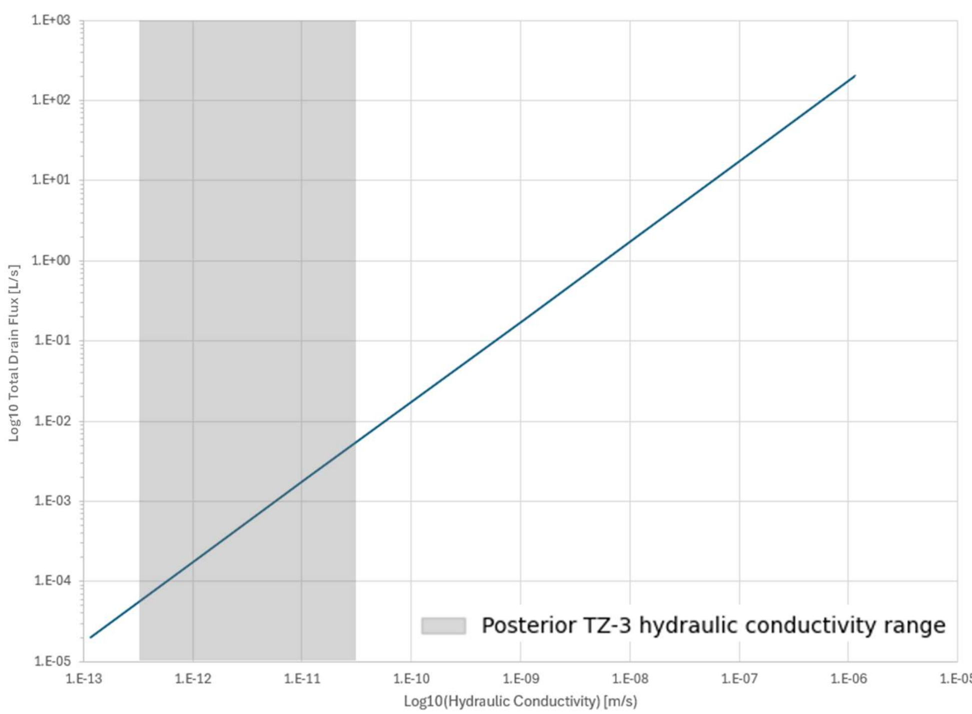

Figure 17: Plot of modelled drain flux emulating stream depletion, against modelled rock permeability [m/sec]

This analysis is very conservative as the plan view area intersected is significantly greater than the planned area. This model assumes that the entire underground zone is worked, rather than the proposed situation of a number of slender tunnels that provide miners access to the stoping areas. In reality, the workings will be a very small fraction of this area shown on the right of Figure 15 and included in the drain cells simulating the workings. Additionally, the distance between the workings and the top layer of the model is assumed to be a constant 250 m, which was set by the minimum distance between the uppermost elevation of the workings and the elevation of the stream bed. As well as schist rock permeability, the projected stream depletion is also inversely proportional to the cover thickness between creek base and underground workings.

4 Outline of Reviewed and Unreviewed Technical Documents

The technical review covered 15 documents within the document list served up by the Fast Track website (https://www.fasttrack.govt.nz/projects/bendigoophir-gold-project/substantive-application), in the following areas:

- Groundwater, Surface Water and Geochemistry; technical documents B.02 to B.07 and B.42 & B.43,
- Proposed approvals and proposed conditions; documents D.02 and D.04,
- Management Plans; documents G.01 (Water Management Plan) and G.015 (ELF Management Plan)

It was also noted by the e3 reviewer that the following reports had not been reviewed despite that these reports being pertinent to water quality outcomes:

- Erosion & Sediment Control Plan; documents B.26 and G.14, and
- Arsenic rich soils management plan; B.32 and G.20.

The reviewer might also have noted that other pertinent technical documents had been prepared by Engineering Geology Ltd (EGL) on engineering geology, geotechnology, erosion & sediment control, and mine waste containment. However, the e3 review does not mention referring to the EGL documents (B.22 to B.27). The mine pit and workings geotechnical report of Peter O'Bryan & Associates (B.27) was also unmentioned.

4.1 Scope of Kōmanawa Solutions' Responses and Associated Documents under Different Authorship

It is noted within this memorandum that the authorship of the technical documents fell across three main consultant groups; Kōmanawa Solutions Ltd (KSL), Mine Waste Management (MWM) or the associated HydroGeoChem Group Ltd (HGCG), and Greg Ryder Consulting Ltd (GRCL). To provide clarity on the scope of this response, the KSL documents are the main subject of this response, and include –

- B.04 Surface Water (Catchment) Existing Environment and Effects (Rekker, 2025a),
- B.03 Groundwater Existing Environment and Effects (Rekker, 2025b),
- B.02 Groundwater Bore Take Effects (Rekker, 2025c),
- B.05 Groundwater Modelling Analysis for Mining Bendigo Ophir Gold Deposit (Dumont et al., 2025)

KSL was also the author of an August 2025 report provided to ORC prior to FTAA applications on the subject of Section 30 of the FTAA, specifically the potential for derogation of existing rights to water in the affected downstream catchments to the proposed mining complex (Rekker, 2025d). Subsequently in October 2025, two further memoranda were provided by Hydro Geo Chem Group Ltd (HGCG, a sister company to MWM) and included in the application list on the subjects of:

a) B.42: Wetland focused drawdown perimeters to define a Dewatering Drawdown Zone (DDZ) in addition to the Direct Disturbance Footprint (DDF), and
b) B.43: Project operational creek flow augmentation.

These two memoranda listed above cover aspects of the BOGP subject areas of groundwater and surface water catchment hydrology, while the latter memorandum relates to the technical implementation of augmentation water management arising from the Section 30 in avoiding derogation of existing rights to water (Rekker, 2025d). Both of the HGCG memoranda were reviewed as part of the ORC formal technical review by the e3 consultant reviewer. Also reviewed were the main water management modelling, mine waste management, and geochemistry reports provided by MWM, namely:

- B.06 Mine Impacted Water (MIW) Overview Report,
    - B.06A Appendices B to G
    - B.06B Appendix H
    - B.06C Appendix I

Lastly, the ORC technical document review in the "Surface water, Groundwater & Geochemistry" subject areas undertaken by e3, included consideration of a GRCL report as follows:

- B.07 Recommended Water Quality Compliance Limits by Greg Ryder, GRCL

4.2 Unreviewed Report

Absent from the review was a KSL document referred to in several lodged documents that was not included in the applications to the national Environmental Protection Authority was a report on semi-generic, statistical modelling of groundwater dilution of Shepherd Creek infiltration in the Ardgour Alluvial Aquifer (Dumont & Rekker, 2025). Interest in this document was expressed by the e3 reviewer and a copy was supplied. However, the report was not listed by the reviewer as one of those reviewed, was requested and only provided to relevant parties on 12 January 2026.

4.3 Conditions and Management Plan

The proposed conditions and management plans were produced by the project planners and Santana Minerals' personnel with input from relevant technical consultants such as KSL, MWM, GRCL and Engineering Geology Ltd (EGL) within their fields of responsibility. In the case of EGL, technical reports were provided in the application documents (i.e. as B.## documents) titled as management plans but having slightly different status to the G.## management plan documents.

4.4 Order of Document Finalisation

Technical documents tended to be completed at different times relative to the final application submission date:

- KSL technical documents tended to be completed first, throughout early 2025 up to 1 September 2025,
- GRCL water quality guideline values report was produced next in July 2025,
- MWM and HGCG technical documents tended to be completed next in October 2025,
- Proposed conditions and management plans in combined authorship tended to be completed last in late October 2025.

Due to this order of finalisation and completion dating, the latest reports or memoranda tended to reflect the most up to date proposals for water and other BOGP management. The order of finalisation and completion of documents reviewed was occasionally a reason for inconsistencies referred to as issues in the e3 review memorandum.

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