



**The Hon. Melinda Pavey MP**  
Minister for Water, Property and Housing

Our ref: IM21/24651  
Your ref: OUT21/15424

Professor Neal Menzies  
Chair, Mining and Petroleum Gateway Panel  
Independent Planning Commission  
Suite 15.02, Level 15  
135 King Street  
SYDNEY NSW 2000

Dear Professor Menzies

Thank you for your email of 23 August 2021 advising that the application for a Gateway Certification by the Tomingley Gold Extension Project was available to review.

The Department of Planning, Industry and Environment – Water (DPIE Water) and the Natural Resources Access Regulator have completed a technical assessment of the application.

The proponent has undertaken an appropriate assessment against the NSW Aquifer Interference Policy, and according to the policy the project is unlikely to create more than minimal impacts.

DPIE Water has made further recommendations which will improve the groundwater modelling, and these should be addressed by the proponent when completing its environmental impact statement (EIS).

I note that DPIE Water has also considered the Independent Expert Scientific Committee's (IESC) advice in relation to the proposal's impacts on water resources and supports the IESC's findings that the impacts on water resources can be appropriately defined, managed and mitigated through enhanced EIS documentation and development consent conditions.

Further detail is provided in the attached technical assessment.

I have arranged for Liz Rogers, Manager Assessments, be available to discuss this matter further with you. Liz can be contacted on [REDACTED] or by email at [landuse.enquiries@dpie.nsw.gov.au](mailto:landuse.enquiries@dpie.nsw.gov.au)

Thank you for your interest in this matter.

Yours sincerely

A handwritten signature in black ink, appearing to be 'Melinda Pavey', written over a large, stylized circular flourish.

**Melinda Pavey MP**  
Minister for Water, Property and Housing

Encl.

## **Attachment**

### **Technical assessment by the Department of Planning, Industry & Environment – Water, and the Natural Resources Access Regulator (NRAR)**

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#### **Advice on the Gateway Certificate application for the Tomingley Gold Extension Project (TGEP)**

##### **Purpose**

The purpose is to provide water assessment advice in response to the Gateway Certificate application as per the requirements of the *State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007*. The advice takes into account:

- The minimal impact considerations of the NSW Aquifer Interference Policy, and
- Other elements of the NSW Aquifer Interference Policy.

This advice also considers the submission by the Independent Expert Scientific Committee (IESC).

##### **Background to the Project**

Tomingley Gold Operation Pty Ltd (the Proponent) is seeking to modify existing approval MP09\_0155 for the Tomingley Gold Mine located 50 km southwest of Dubbo in Central West New South Wales.

The proponent is seeking a Gateway Certificate for a new open cut and underground gold mine due to the project proposal being located in part on Biophysical Strategic Agricultural Land.

The Gateway application document has been examined in detail for this review.

##### **Review and Comment**

###### **DPIE Water and NRAR Gateway Assessment**

DPIE Water and NRAR confirm that the information provided is satisfactory for the purpose of the Gateway application.

###### **Minimal impact considerations of the Aquifer Interference Policy (AIP)**

Considerations of minimum impacts as required by the NSW Aquifer Interference Policy have been appropriately assessed with the project unlikely to create more than minimum impacts.

###### **Other elements of the AIP**

Additional considerations have been addressed by the proponent and outcomes are generally supported by DPIE Water.

However while the proposed development of a numerical model appears to be commensurate with the perceived risk of the extension project, DPIE Water recommends improved conceptual and numerical modelling to ensure informed decision making. DPIE Water notes that an additional groundwater volume of 477 ML/year will be required from the Lachlan Fold Belt MDB Groundwater Source.

Please note more detailed advice regarding the AIP in Table 1 below.

###### **IESC Review**

DPIE Water has considered the advice provided by the Commonwealth's Independent Expert Scientific Committee on Large Coal Mines and Coal Seam Gas (IESC) dated 9 October 2021 on Tomingley Gold Extension Project (GA-15823373). The IESC advice is

thorough and detailed. As a result, DPIE Water supports the IESC advice and its view that impacts on water resources can be appropriately defined, managed and mitigated through enhanced EIS documentation and development consent conditions.

DPIE Water notes that regional-scale studies indicate disconnect between the shallow alluvial aquifer that is found within current waterways channels, the unsaturated Cenozoic alluvium, and the fractured rock groundwater system. The EIS documents should confirm the disconnect locally through some additional data gathering, analysis, and improved conceptual model. This would resolve the potential risk of impacts to the shallow groundwater system. Furthermore, improvements to the numerical modelling are required to confirm the level of impact to surface water features and enable informed decision making and conditioning by the proponents, government agencies, and other stakeholders.

Table 1: Assessment of the Tomingley Gold Extension Project Gateway Certificate application against the AIP

AIP consideration	Assessment Comment
<p><b>3.2.1 Aquifer Impact Assessment</b></p> <p><u>Less Productive aquifers</u></p>	<p>The proponent has assessed the proposal against the criteria for Less Productive aquifers as the groundwater system in the vicinity of TGEF do not have any existing bores that can yield greater than 5 L/s and a total dissolved solids concentration of &lt;1,500 mg/L.</p> <p><i>Assessed as appropriate</i></p>
<p><u>Water Table</u></p> <p>1. Less than or equal to 10% cumulative variation in the water table, allowing for typical climatic “post-water sharing plan” variations, 40m from any:</p> <p style="padding-left: 20px;">a) high priority groundwater dependent ecosystem (GDE); or</p> <p style="padding-left: 20px;">b) high priority culturally significant site;</p> <p>listed in the schedule of the relevant water sharing plan.</p> <p>A maximum of a 2m decline cumulatively at any water supply work.</p> <p>2. If more than 10% cumulative variation in the water table, allowing for typical climatic “post-water sharing plan” variations, 40m from any:</p> <p style="padding-left: 20px;">a) high priority groundwater dependent ecosystem; or</p> <p style="padding-left: 20px;">b) high priority culturally significant site;</p> <p>listed in the schedule of the relevant water sharing plan if appropriate studies demonstrate to the Minister’s satisfaction that the variation will not prevent the long-term viability of the dependent ecosystem or significant site.</p> <p>If more than a 2m decline cumulatively at any water supply work then make good provisions should apply.</p> <p><u>Water Pressure</u></p>	<ul style="list-style-type: none"> <li>• All surrounding users are accessing water from the alluvium associated with Gundong and Tomingley Creeks which has been determined to be disconnected from the underlying fracture rock system.</li> <li>• There are no high priority GDEs as listed in the Water Sharing Plan in the vicinity of the mine. However, there are mapped potential GDEs associated with shallow perched alluvial groundwater systems that are disconnected from the fractured rock groundwater system that the mine will drawdown.</li> <li>• It is not stated that there are any known priority culturally significant sites in the vicinity of the mine.</li> <li>• The modelled 2m drawdown contour does not encroach on any existing registered groundwater bores except for a cluster of Tomingley Gold Operations (TGO) monitoring bores.</li> </ul> <p>Therefore, the impacts from the extension project are assessed to meet the requirement under the AIP.</p> <p><i>Assessed as acceptable.</i></p>



<p>A cumulative pressure head decline of not more than a 2m decline, at any water supply work.</p> <p>If the predicted pressure head decline is greater than requirement 1. (above), then appropriate studies are required to demonstrate to the Minister's satisfaction that the decline will not prevent the long-term viability of the affected water supply works unless make-good provisions apply.</p>	
<p><u>Water Quality</u></p> <ol style="list-style-type: none"><li>1. Any change in the groundwater quality should not lower the beneficial use category of the groundwater source beyond 40m from the activity.</li><li>2. If condition 1 is not met then appropriate studies will need to demonstrate to the Minister's satisfaction that the change in groundwater quality will not prevent the long-term viability of the dependent ecosystem, significant site or affected water supply works.</li></ol>	<ul style="list-style-type: none"><li>• Groundwater quality is assessed as unlikely to degrade to the point that the groundwater beneficial use category is lowered beyond a distance of 40m from a TGO/SAR (San Antonio and Roswell Deposits) activity. The salinity of the fractured rock groundwater system water in the vicinity of TGO/SAR is high and the beneficial use category of the groundwater is limited to industrial use.</li><li>• As a groundwater sink, the final void water chemistry will gradually degrade, with concentration of salts increasing due to ongoing evaporative loss from the void. However, due to the low hydraulic conductivity of the rock mass and the water level in the open cut remaining lower than the regional fractured rock groundwater system water level, poor quality water will remain within the vicinity of the void and is unlikely to migrate a significant distance from the voids. However, some migration and throughflow could potentially occur.</li><li>• Potential reduced water quality in the vicinity of the voids is assessed as unlikely to impact GDEs as the regional water table within the fractured rock groundwater system is disconnected from overlying perched alluvial groundwater systems in the vicinity of mining.</li></ul> <p><i>Assessed as acceptable.</i></p>
<p><b>3.2.2 Additional considerations</b></p>	

<p>Acidity issues</p>	<ul style="list-style-type: none"> <li>Background groundwater quality indicates that pH was generally between 7 and 8.5 for all sites indicating that all sites are slightly basic</li> </ul>
<p>Waterlogging or water table rise to occur, which could potentially affect land use, groundwater dependent ecosystems and other aquifer interference activities.</p>	<ul style="list-style-type: none"> <li>Open cut and underground mining will result in groundwater level drawdown as mining intercepts aquifers that are pumped out of the workings.</li> </ul> <p><i>It is unlikely that water logging or water table rise could occur that could affect land use or GDEs.</i></p>
<p><b>3.2.3 What is required from proponents</b> Volumetric water licensing consideration</p>	<ul style="list-style-type: none"> <li>Calculation of groundwater inflows (or take) to the open cuts and underground mines and groundwater level drawdown was undertaken using an industry standard numerical groundwater flow model, MODFLOW. The model was developed in accordance with the Australian Groundwater Modelling Guidelines with a model confidence level classification is Class 2.</li> </ul> <p><i>Although development of the numerical model appears to be commensurate with the perceived risk of the extension project DPIE Water recommends improved conceptual and numerical groundwater modelling including more robust calibration and uncertainty analysis.</i></p> <ul style="list-style-type: none"> <li>The predicted maximum annual groundwater take of 767 ML in the year 2026 using the model indicates that the proponent needs an additional 477 M of entitlement in the Lachlan Foldbelt MDB Groundwater Source. This is in addition to the 290 ML/year they currently hold.</li> </ul> <p><i>Assessed as adequate.</i></p>
<p>Establishment of baseline groundwater conditions</p>	<ul style="list-style-type: none"> <li>Groundwater data has been collected since 13/11/2020 for the San Antonio Rosewell Extension Site which is only ten months from two effective bores.</li> <li>The monitoring network for the San Antonio and Roswell (SAR) deposits requires additional bores to compensate for the three out of four monitoring bores being dry.</li> </ul> <p><i>Assessed acceptable given the risks. However, DPIE Water will require additional monitoring bores post approval.</i></p>

## **Recommendations**

DPIE Water recommends that the following improvements are made to the assessment in the EIS and encourages the proponent to clearly identify the cumulative impacts of the approved project and the proposed extension as well as the total project impacts throughout the duration of the project up until reaching quasi steady-state conditions post mining. The EIS should also address the cumulative impacts of neighbouring projects including inactive operations.

### **Licensing and entitlement**

- a) Clarify that the proponent has appropriately considered and addressed any risks associated with acquiring entitlement through trade to account for the predicted maximum take. Options include seeking to acquire permanent shares (entitlement) or taking advantage of controlled allocations.
- b) Outline the intended method to dewater the underground mining activities.
- c) Confirm the expected mine life so that we can ascertain when the maximum take is predicted and when the mine will begin to take the end-of-life volume. For example, it is not clear from the report whether the maximum take will occur in 2026 or 2031.

### **Update the monitoring network and analysis of the groundwater level trends by:**

- a) Installing additional bores to the monitoring network for the San Antonio and Roswell deposits to compensate for the three out of four monitoring bores being dry.
- b) Discussing the errors associated with the water levels recorded. For example, RWWB003 is potentially recording water levels just above the sump.
- c) Discussing the hydraulic gradient difference between the Wyoming monitoring bores and the San Antonio and Roswell monitoring bores as this flow direction towards the south is perpendicular to the current flow direction maps. Also, identify the aquifer that the flow direction maps represent.

### **Update the groundwater model in respect to:**

- a) Improving the identification of neighbouring bores by putting the existing information into a table. The predicted drawdown results at the relevant neighbouring bores should also be presented in a table and/or drawdown contour map.
- b) Conceptualisation

The conceptual model states that there is a possibility for preferential flow paths but then disregards them as a major controlling factor on groundwater flow direction. The justification to disregard faults as a control on flow direction is of concern for the following reasons:

- The flow direction maps do not describe which aquifer they relate to
- There is only one effective SAR monitoring bore
- Two of the older monitoring bores show responses to the historic mine workings
- The higher hydraulic conductivity of WYMB006 which has been identified as being close to the historic mine workings

The proponent should improve its conceptualisation by:

- i. providing further evidence prior to eliminating the possibility of preferential flow paths in the conceptual model.
- ii. referencing the layer of which the groundwater flow direction maps are being created.

- iii. discussing the hydraulic gradient between the monitoring bores as a product of the different geologies they are constructed into.
  - iv. discussing the hydraulic conductivity differences between the different methods used to obtain aquifer parameter information
  - v. discussing the sources of uncertainty within the conceptual model such as the logger within RWWB003 recording a water level in the base of the screen
  - vi. comparing the EIS water balance to the conceptual model to provide an indicative test.
  - vii. identifying the source of evapotranspiration data and the methodology used to obtain the data.
- c) Numerical modelling must be undertaken and demonstrated to be in accordance with the Australian groundwater modelling guidelines 2012 and the IESC uncertainty analysis guidance 2018 .

To limit assumptions could the proponent please clarify a number of elements of the model set-up:

- i. provide a simple justification of the choice of model.
  - ii. clarify whether the same boundary conditions have been applied across all 6 layers of the numerical model as it is possible they apply only to Layer 1 which has different consequences on the interpretation of the results.
  - iii. describe how the layers and hydraulic conductivity zones relate to the conceptual model.
  - iv. identify the confinement of each layer in the numerical model.
  - v. justify the applied vertical conductivity is required.
  - vi. identify the model run-times to help us understand to what extent calibration is limited by model-run time lengths.
  - vii. clarify the initial conditions for the transient model.
  - viii. clarify whether the model is sensitive to changes in vertical conductivity.
  - ix. clarify the number of time-steps used in the prediction of impact and justify.
  - x. define the baseline scenario for the model.
- d) Predicted results

The calculation of uncertainty is described in Appendix D but it is difficult to see how it has been applied to the results. Understanding this aspect will allow DPIE Water to have greater confidence in the calculated volume accounted for under a Water Access Licence. It is unclear how uncertainty in the model has been applied when calculating drawdown at neighbouring bores and how the overestimation of the hydraulic head across most of the model when compared to the observed will impact the neighbours through an underestimation of drawdown. Could the proponent please:

- a. clarify how the mining activity phases align with the model results. It is unclear whether the maximum mining take occurs in 2013 as shown in Figure 7.1 or 2026 as described in the text.
- b. present the prediction results for drawdown on the neighbours more clearly such as a table, map or water budget changes over time.
- c. clarify the units in Table 6.9. It is unclear whether the recharge rate as a % of rainfall adopted in the model is 0.036 % or 3.6%.



- d. clarify how the estimation of uncertainty have been applied to the maximum take volume and the predicted impacts to neighbours.
- e. discuss how the overestimated water level in the computed water levels is likely to underestimate drawdown in neighbouring bores and the consequences for this calibration.
- f. relate the model results back to the target model confidence level classification.
- g. describe how the uncertainty analysis has been considered in the results.

#### **Groundwater quality analysis and monitoring**

The piper diagram shows that the RWWB002 monitoring bore appears to have a different ionic composition to the other bores that can't be as easily explained as the shallow alluvial monitoring bore GDCMB01. RWWB002 is also the only monitoring bore to have a significant decline in water levels as it is adjacent to the Wyoming open-cut and underground. It is not discussed whether the water quality difference and decline in water level are related or whether paste-backfilling of stopes has influenced the water quality. Therefore, it is requested that the proponent please:

- a) Discuss the groundwater quality impacts of backfilling stopes with paste.
- b) Include a timeseries analysis of groundwater quality changes at WYMB002 and the implications for groundwater quality changes at the San Antonio and Roswell activities.

#### **The Preliminary Groundwater Management Plan**

Neighbouring bores have been identified within the model domain and although most are associated with the perched aquifer and therefore conceptualised to be disconnected, there still appears to be some bores that are a bit deeper. Although, the project is not deemed to be high-risk, the suggestion to remove triggers and only enact make-good provisions upon complaint cannot be accepted. Could the proponent please:

- a) Extend the monitoring network to include mid-point bores between the mining activity and neighbouring water supply bores.
- b) Consider alternative options to bore deepening given the yield of the aquifer.
- c) Include timeframes for actions in the proposed triggers.
- d) Be explicit about proposed actions and avoid vague commitments.

**END ATTACHMENT**