



14 September 2020

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Dear Stephen,

Tahmoor South Project: Response to agency feedback on Second Project Amendment Report

1. Introduction

This letter provides a response to the matters raised in advice from government agencies in relation to the *second amendment report* (EMM 2020) for the Tahmoor South Project (the Project), including:

- NSW Heritage;
- the Heritage Council of NSW (HC-NSW);
- the Biodiversity and Conservation Division (BCD);
- Resources Regulator; and
- Wollondilly Shire Council (WSC).

It also provides a response to a request for additional information from the NSW Department of Planning, Industry and Environment (DPIE).

This letter provides a summary of each matter raised by each agency followed by a response.

It should be noted that responses to advice from Crown Lands, DPI-Fisheries, the Environment Protection Authority (EPA), Mining, Exploration and Geosciences (MEG), Roads and Maritime Services (RMS) and WaterNSW are not required, as these agencies either provided no comments or stated that they had no concerns with the Project, subject to certain conditions being imposed on any development consent, should it be granted. It is also noted that the advice from MEG stated:

“MEG concludes that should the amended Project be approved, efficient and optimised resource outcomes can be achieved given the Project constraints, and any identified risks or opportunities can be effectively regulated through the conditions of mining authorities issued under the *Mining Act 1992*.”

2. Heritage NSW

Comment

Further reduction in length of longwalls 101 (labelled LW 101B in the Second Amendment Report) and 103B would provide stronger protection to the Dog Trap Creek site complex.

We support the requirement to shorten the commencing position of LW103B as per MSEC (2020, p.174) if monitoring detects movement at or in the immediate vicinity of Aboriginal objects. This must be set out in the HMP. However, we advise this is the minimum required response; it would be preferable to reduce the longwall lengths and remove the risk of any harm occurring.

Response

Tahmoor Coal has significantly amended the proposed mine plan to respond to concerns raised by stakeholders on the Project and to reduce impacts of the Project. These amendments have been documented in the *project amendment report* (PAR, AECOM 2020) and the *second amendment report* (EMM 2020a) and include:

- the removal of three longwalls, including the removal of the two largest longwalls in the mine plan; and
- the reconfiguration of the longwalls, including a reduction in longwall width and height.

These changes have significantly reduced the amount of run-of-mine (ROM) coal, and subsequently, product coal, available to be mined. Coal volume has decreased from 48 million tonnes (Mt) ROM in the EIS (AECOM 2018), to 43 Mt ROM in the PAR, to now 33 Mt ROM as documented in the *second amendment report*. These reductions have resulted in an overall decrease in ROM and resource recovery by 31 per cent.

In addition to the above, as indicated in Heritage NSW's comments, Tahmoor Coal has committed to adaptive management regime in relation to the management of potential impacts to sites of Aboriginal heritage. This includes monitoring ground movements and the condition of the sites during the mining of Longwalls 101B and 102B. If monitoring detects the early development of potentially severe differential movements at the sites, the commencing position of Longwall 103B could be shortened.

Tahmoor Coal has committed to documenting these adaptive management measures in a *heritage management plan* (HMP) which will be prepared prior to any mining being undertaken in the Tahmoor South Project area.

As stated in the *second amendment report*, it is now considered that the Project provides the best balanced outcome, taking into account and balancing the benefits and impacts of the Project. Reducing the length of LW101B and LW103B would further reduce ROM volumes by around 1 Mt impacting resource recovery and benefits to local, regional and NSW economies.

Comment

We recommend the applicant be required to address this matter in the HMP. The issue has not been adequately addressed in the Second Amendment Report (p.73).

The impact of changed hydrological patterns in Dog Trap Creek on intangible Aboriginal cultural heritage values has not been assessed.

Response

This comment relates to the impact of changed hydrological patterns in Dog Trap Creek on Aboriginal cultural heritage values which should be considered in the HMP.

Firstly, Tahmoor Coal is of the view that a HMP should not be required to be prepared until after the development application (DA) for the Project has been determined. Should the DA be approved, Tahmoor Coal would commit resources to documenting the detailed management measures that would be implemented to avoid, mitigate and manage impacts to Aboriginal heritage.

Secondly, Tahmoor Coal is of the view that the *Aboriginal cultural heritage assessments* that accompanied the EIS (AECOM 2018) and the PAR (AECOM 2020) have adequately assessed potential tangible impacts to Aboriginal heritage, and intangible impacts where possible. As described below, in some cases intangible impacts could not be ascertained through the consultation process with Aboriginal stakeholders.

Comment

The applicant has not addressed the impact of landscape and hydrological changes on the Dreaming site. The intangible nature of the site means that by definition it does not have a physical location; the response from the applicant is therefore inadequate.

Additional consultation with the Registered Aboriginal Parties on this matter does not appear to have occurred.

Response

Niche Environment and Heritage (Niche) undertook consultation with the registered Aboriginal parties (RAPs) for the Project, which included consultation on the potential dreaming site. As described in the *second amendment report* (EMM 2020a), no cultural information was ascertained from the RAPs on this potential site.

The only information available to Niche on the potential dreaming site is what is contained in the AHIMS site card and this is far from definitive.

Comment

The absence of sub-surface archaeological deposits is relevant to our understanding of the archaeological record in this area.

We require EMM to submit a site impact recording form for site 52-2-4487 (Charlies Point Road OCS-1). This will inform future assessments in the region.

Response

EMM has submitted a site impact recording form for the site to Heritage NSW. Notwithstanding this, a copy of the form is attached (see Attachment A).

Comment

Heritage NSW requests the opportunity to review the Heritage Management Plan before it is finalised.

Response

Tahmoor Coal will engage with Heritage NSW in the preparation of the HMP.

3. Heritage Council of NSW

Comment

Following receipt of the SOHI, we note that the proposal occupies most of the SHR curtilage. Although mitigation measures have been proposed, grave concerns previously raised by Heritage NSW surrounding long term impacts to the unique and underrepresented natural heritage of the SHR item remain. To avoid any adverse potential impacts, it is, therefore, recommended that the proposed longwalls be relocated outside the SHR curtilage and an adequate buffer zone be identified around the curtilage.

Response

A comprehensive *Statement of Heritage Impact* (SoHI) of the Wirrimbirra Sanctuary was undertaken by EMM (2020b) which accompanied the *second amendment report* (EMM 2020a). The assessment was undertaken by two heritage specialists, including a specialist with over 20 years of experience in archaeological and historical heritage consulting in NSW and abroad. This experience includes field survey and archaeological excavation and monitoring, as well as analysis of documentary sources for major projects.

The SoHI concluded that the impacts against identified heritage items at Wirrimbirra Sanctuary (including relics, standing structures and landscape features) range between a probability of 'possible' to 'very unlikely' and that provided that the management measures described in the report are implemented, impacts to heritage items should be able to be managed without any loss of value.

Accordingly, while the recommendation of the HC-NSW to relocate the longwalls outside of the curtilage of the Wirrimbirra Sanctuary is noted, it ignores the outcomes of the SoHI. As the HC-NSW advice itself acknowledges:

Based on the observation of impacts to three other longwall locations being Tahmoor, Appin Area and West Cliff Colliery, the SOHI concludes that the probabilistic assessment of impacts arising from the mining method will be very minor to nil. This is supported by *Appendix B Subsidence Assessment* prepared by MSEC dated July 2020, which includes the maximum predicted total subsidence movements for the longwalls after the extraction of the longwalls within a 20 m radius of the Wirrimbirra Sanctuary structures. The SOHI further states that the landscape will experience mine subsidence movement, but the orders of magnitude will be such that changes will not be visually perceptible and will therefore not have a detrimental effect on its significance.

Comment

The following recommendations are provided to further mitigate potential adverse impacts posed by the works in the vicinity of the SHR item:

- a) A detailed site-specific Heritage Management Plan including a Trigger Action Response Plan (TARP) for Wirrimbirra Sanctuary and the areas within the buffer zone, itemising specific monitoring requirements and frequencies should be prepared and implemented prior to longwall extraction in the vicinity of the SHR curtilage.

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| b) | All historic heritage items and ground water hydrology within Wirrimbirra Sanctuary must be regularly (e.g. every six-months) monitored for vibration and subsidence during mining operations in the vicinity of the SHR curtilage. If vibration and subsidence are detected, the area must be rehabilitated prior to any further mining works being undertaken, and a report is to be submitted to Heritage NSW outlining the actions taken, to its satisfaction, before any further mining works recommence. |
| c) | Adjoining areas to the boundaries of the SHR item, including ground water hydrology, must be regularly (e.g. every six-months) monitored for vibration and subsidence during mining operations. If vibration and subsidence are detected that would result in a cumulative impact that would adversely affect the SHR item, the area must be rehabilitated prior to any further mining works being undertaken, and a report is to be submitted to Heritage NSW outlining the actions taken, to its satisfaction, before any further mining works recommence. |

Response

As previously stated, the SoHI included a range of mitigation measures which included preparation of a trigger action response plan (TARP), subsidence monitoring before, during and after longwall extraction, and undertaking remedial works if required.

The SoHI did not recommend broad groundwater monitoring but did recommend monitoring of a well (BRE_600_pa19) at the Wirrimbirra Sanctuary. Notwithstanding this, broader groundwater monitoring will be undertaken by virtue of recommendations made in the groundwater assessments undertaken for the Project.

The mitigation measures, including monitoring measures, recommended in the SoHI and groundwater assessments are based on the assessment of impacts of the Project, and are considered appropriate.

4. Biodiversity and Conservation Division

Comment

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| <ul style="list-style-type: none">• We are supportive of the proposed REA being retained without further expansion, and therefore no impact on Shale Sandstone Transition Forest (SSTF) CEEC in this location.• Whilst some clearing of SSTF CEEC is proposed for surface infrastructure, we note this has been reduced and that opportunities for micro-siting will be investigated.• The residual impact on threatened flora species has also been significantly reduced, as discussed under Key Issue 3 below. |
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Response

BCD's comments are noted.

Comment

- A significant impact to SSTF is still likely to occur, given 10.1ha will be cleared. However, we recognise that this is a major reduction from EIS and RTS stages.
- Notably, the extent of SSTF clearing from the EIS project to the current proposal has been reduced by 77%, from 43.4ha to 10.1ha, with 4.12 ha considered to be in “good” condition and 5.98 ha considered to be in “derived” condition.
- The revised surface works footprints would significantly reduce impacts on hollow-bearing trees. Reduction of further impacts to hollow bearing trees can be achieved at biodiversity management plan stage, and we recommend this matter be conditioned.
- There are also opportunities for further micro-siting of surface infrastructure elements at TSC 1, TSC 2 and the transmission lines to refine the clearing footprint and impacts to hollow bearing trees. This will also minimise the impacts upon SSTF CEEC. We recommend that a condition of consent regarding micro-siting at TSC 1, TSC 2 and the transmission lines be imposed, as discussed with the proponent.

Response

BCD’s comments are noted. In addition, as discussed with BCD, Tahmoor Coal is happy with a condition being imposed on the development consent, if granted, requiring micro-siting of the ventilation shafts to further avoid impacts to Shale Sandstone Transition Forest (SSTF).

Comment

- The impacts on *P. bargoensis* resulting from the amended footprint are now considered to be minimal.
- Impacts on some individuals of *G. parviflora* will remain but is now not at a level likely to be considered “significant”.
- No impacts on *P. brunnea* are now proposed.

Response

BCD’s comments are noted.

Comment

- We note the findings of the biodiversity assessment update (Niche, August 2020). Once the preferred project footprint is finalised, we request that the BAR be updated in final and issued to BCD prior to determination.
- We note that the credit offset liability has been reduced significantly.
- The biobanking credit calculator was re-run to reflect the amended footprint and the proponent must submit the case for EES to review prior to approval.

- The BSA sites proposed appear unchanged from RTS stage, and our query regarding potential fire impact has not been addressed.
- The final BOS will need to identify whether fire has impacted the proposed BSA sites in light of the reduced offset liability, notably for vulnerable flora species credit species.
- We recommend conditions of consent be imposed for the following:
- Staged offset approach, including retirement of requisite credits (including Biodiversity Conservation Fund payments) prior to impact occurring.
- Finalisation & submission of Biodiversity Offset Strategy (BOS) as required by s11.1 of the FBA & in consultation with EES, prior to commencement of Stage 1
- Submission of a Biodiversity Management Plan, in consultation with BCD.
- Micro-siting of surface infrastructure elements at TSC 1, TSC 2 vent shaft sites and transmission lines to further minimise impacts, as discussed previously with the proponent.
- We request the opportunity to review draft conditions of consent prior to any recommendation being finalised and remain available to assist with wording as required.

Response

Most of BCD's comments are noted.

The biobanking credit calculator case will be submitted to BCD in due course, and prior to determination of the DA.

In relation to the comment on fires on the proposed biodiversity stewardship sites (BSSs), details on these impacts were contained in pages 69 to 72 in Chapter 7 of the *second amendment report* (EMM 2020).

Comment

- Impacts to 3rd order Dog Trap Creek pools and flow will be almost inevitable given the proposed mine layout. Once impacted, Dog Trap Creek is unlikely to be repairable or continue to flow in the area of mining (except after heavy rain).
- Insufficient justification has been provided to demonstrate that impacts to undermined streams and watercourses, notably 3rd order streams Dog Trap Creek, will be repairable.

Response

Potential impacts to Dog Trap Creek's pools and flows have been documented in the EIS (AECOM 2018), PAR (AECOM 2020) and *second amendment report* (EMM 2020), including in the subsidence, groundwater and surface water assessments that accompany them.

In late 2019, Tahmoor Coal commenced works within Redbank and Myrtle Creeks to remediate impacts from operations at Tahmoor North. These works have been undertaken in accordance with a *Myrtle Creek Corrective Management Action Plan* and *Redbank Creek Corrective Management Action Plan* (CMAP) prepared by Tahmoor Coal in consultation and approved by the NSW Resources Regulator (NSW-RR). Quarterly progress reports are prepared and lodged with a range of stakeholders,

including NSW-RR and Wollondilly Shire Council (WSC). A copy of the latest quarterly CMAP report is attached to this letter (see Attachment B).

This quarterly CMAP report indicates that there has been success in remediating impacts to the creeks as a result of the works within the creeks. In particular, the report indicates that following works, within a section of Myrtle Creek, water levels have increased and been maintained. Section 2.3.1 of the quarterly CMAP report states:

Level monitoring is conducted at Myrtle 5 which is located within Pool 23. Figure 2 illustrates pool height level at Pool 23 with rainfall. Rainfall data is collected from the weather station located at Pool 23 from 11 October 2019 onwards and Tahmoor Coal mine site from 2010. Pool height is measured as zero if the monitoring equipment is not submerged in water. Prior to remediation works, rain events in 2019 had no noticeable impact to Pool 23 height due to subsidence impacts and its inability to competently hold water, hence no pool level was recorded. It can be observed, that following remediation works, Pool 23 has effectively filled to its full level which has since been sustained.

Figure 1 below is reproduced from Figure 2 of the quarterly CMAP report.

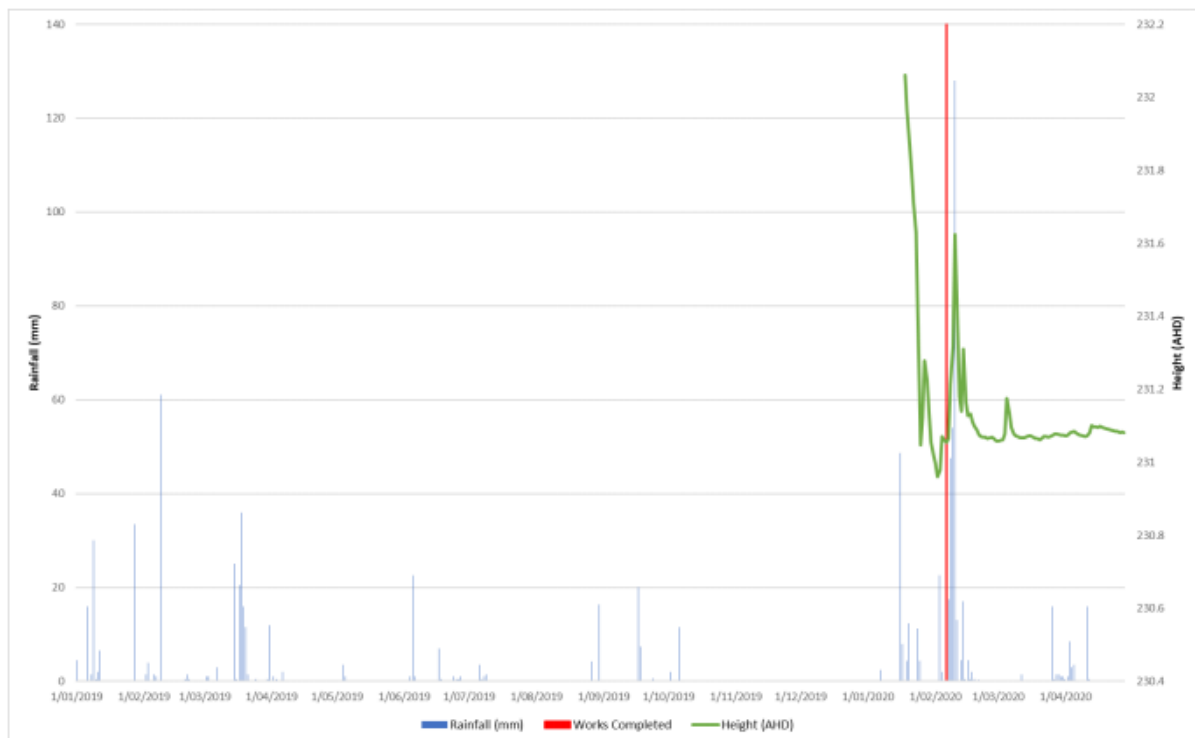


Figure 1: Myrtle Creek M5 – Pool 23 Level Monitoring

An extension of this graph is shown below as Figure 2 through until 20 August 2020, further illustrating that the water levels have been maintained following successful remediation.

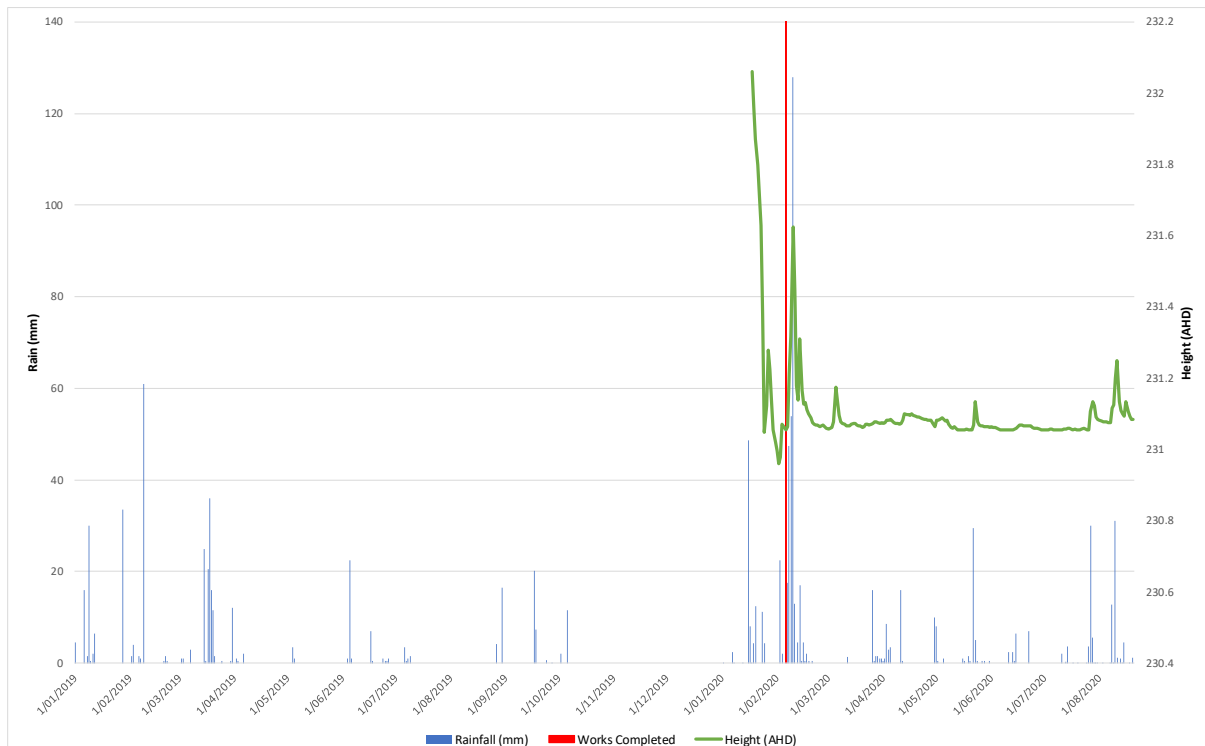


Figure 2: Myrtle Creek M5 – Pool 23 Level Monitoring

The *second amendment report* referenced an aquatic monitoring report prepared by Niche, which documented an improvement in stream health following the repair works within Myrtle Creek as a result of the creek holding water. A copy of the aquatic monitoring report is attached to this letter (see Attachment C).

The aquatic monitoring report indicated that the improvement in stream health occurred in part due to overall wetter conditions in February 2020, however remediation of Pool 23 has enabled the pool to store water. This has resulted in a rapid response from aquatic macroinvertebrates (approximately one month) that have colonised this habitat. The report notes that while it is difficult to determine what recovery of Pool 23 should look like with no pre-mining macroinvertebrate surveys, the AUSRIVAS and benthic quantitative data suggests that Pool 23 is close to reference condition and has ecology reflective of good stream health.

Comment

- To date the proponent has not demonstrated that “no flow loss” to Redbank Creek (or other streams impacted by mining) will occur due to inadequate experimental design of monitoring (eg. significant lack of appropriate baseline data).

Response

A response to this comment is contained in a separate letter from Hydro Engineering and Consulting Pty Ltd (HEC) which is contained in Attachment I.

Comment

- The second amendment report does not provide a proper assessment of the ongoing impact of mine wastewater on the receiving environment, or how this will be improved in the future if the Tahmoor South proposal is approved.
- Mine wastewater is currently discharged into Tea Tree Hollow (where a barium precipitate appears to be deposited) and then goes on to pollute the Bargo River all the way down to its junction with the Nepean River. Previous work on the quality of the discharge demonstrated that it was toxic to sensitive aquatic life (Cardno, 2010).
- There is no timeline to address improved treatment of the discharge (eg. reverse osmosis) or what water quality objectives will be set or met.

Response

Details on mine water discharges into Tea Tree Hollow were provided in the *water management system and site water balance* and *surface water impact assessment* that accompanied the EIS (AECOM 2018). These included details on the existing water management system and how this system would be upgraded for the Project. Section 4.2 of the *water management system and site water balance* and Chapter 10 of the *surface water impact assessment* stated that Tahmoor Coal is licenced to release treated water from its water management system in accordance with its environment protection licence (EPL). They also stated that under the EPL, there is also a requirement to enhance treatment of water prior to release via Pollution Reduction Program 22 which involves the development and commissioning of a water treatment plant (WTP) to reduce the concentrations of arsenic, nickel and zinc in mine water released from the consolidated Licensed Discharge Point 1.

A WWTP was constructed in June 2015 to treat up to 6 megalitres per day (ML/d) of mine water. The plant was not able to be commissioned and it was determined that reverse osmosis was the appropriate technology to treat the water.

A new reverse osmosis plant is currently in the tender phase of project implementation. A pilot plant will be commissioned in the first instance to provide a greater certainty to the performance of the reverse osmosis plant. The treatment objectives as specified by the EPA for the new WTP are given below:

- Arsenic: 0.013 milligrams per litre (mg/L);
 - Nickel: 0.011 mg/L;
 - Zinc: 0.008 mg/L;
 - pH 6.5-8.0;
 - Conductivity 350 microsiemens per centimetre;
 - Bicarbonate Alkalinity 185 mg/L;
 - Total Nitrogen 0.25 mg/L;
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- Aluminium (dissolved) 0.055 mg/L; and
- Copper (dissolved) 0.0014 mg/L.

The results of predictive modelling of the water management system over the remaining mine life indicated that total discharges from the pit top of the combined existing Tahmoor operation and the proposed Project are unlikely to increase above current LDP1 volume limits. On the basis of the above, it is expected that the Project would not result in adverse water quality impacts due to releases and overflows from the site water management system.

Comment

- Due to high level of uncertainty in groundwater model predictions, there remains a residual concern that the Amendment Project still predicts minor impacts to Thirlmere Lakes within the Greater Blue Mountains World Heritage Area.

Response

Potential impacts of the Project on Thirlmere Lakes have been comprehensively addressed in the EIS (AECOM 2018), PAR (AECOM 2020) and *second amendment report* (EMM 2020).

Conservative predictions of groundwater drawdown at Thirlmere Lakes were made in the *groundwater assessment* that accompanied the PAR. Effects on the lake themselves were described in the *surface water assessment* as “negligible increase in... leakage” from the lakes to groundwater, and the consequent effect on lake levels “would be imperceptible and unmeasurable in the field and very small compared to natural variability”.

This finding is supported by the key finding from the NSW government’s Thirlmere Lakes Research Program (TLRP) regarding the historical effects of mining at Tahmoor Mine, which is much closer to the lakes than Tahmoor South: This states “Current evidence does not show that the lake water levels are influenced by changes in the deep groundwater table (or nearby longwall mines)” (WRL 2020).

Taken together, these conclusions indicate that there is no need to mitigate or offset impacts at Thirlmere Lakes due to historical Tahmoor operations or due to the Project.

The final TLRP report is due in early 2021. In the case that the final report reaches different conclusions, there may be a need to consider mitigation options, however any effects are highly unlikely to be due to the more distant Project.

Comment

- EES is meeting with the proponent in the week commencing 17/8/20 to discuss this matter in further detail. The outcome of this meeting will inform further detailed comments regarding streams and watercourses, to be provided following this submission.

Response

This comment is noted. A response to the presentation made by EES during the meeting in the week commencing 17 August 2020 is provide in Attachment I.

5. Resources Regulator

The Resources Regulator provided two advices – one formally by letter, and one via email post submission of the letter. This section responds to both.

Comment

The revegetation strategy involves the re-establishment of native trees, shrubs and grassland as outlined in Section 3.3.3 of the Rehabilitation Strategy. However, further detail is required to specify the target vegetation communities that exist in the surrounding natural landscape adjacent to the mine as a means to clarify rehabilitation obligations for the site.

Response

While Tahmoor Coal agrees that further detail is required to specify target vegetation communities for the rehabilitation of the REA, it disagrees that this detail is required at this stage of the approval process for the Project. These details will be provided as a part of a detailed rehabilitation plan for the REA which, Tahmoor Coal, expects will be required as part of the conditions of any development consent, should it be granted. Tahmoor Coal is happy to consult with the Resources Regulator during the preparation of this plan.

It is noted that Tahmoor Coal has successfully rehabilitated the REA with vegetation communities that exist in the surrounding landscape.

Comment

Further information on the design of the surface water drainage network on the revised final landform and how runoff will be conveyed off a steeper areas without causing issues relating to erosion, exposure of rejects material in the long term and potential downstream sedimentation. Noting that the Regulator has previously issued statutory directions to Tahmoor to address erosion issues on the existing REA.

Response

Again, while Tahmoor Coal agrees that further detail is required on the surface water drainage network during and post rehabilitation of the REA, it disagrees that this detail is required at this stage of the approval process for the Project. These details will be provided as a part of a detailed water management plan for the REA which, Tahmoor Coal, expects will be required as part of the conditions of any development consent, should it be granted. Like the rehabilitation plan, Tahmoor Coal is happy to consult with the Resources Regulator during the preparation of this plan.

Comment

It is noted that the area where the REA is to be increased in height by 10 metres will overlay existing rehabilitation that has been established by more modern revegetation practices. Given the potential risks of increasing the height of the emplacement area as detailed above, further options should be explored in regards to the emplacement of reject material to the northern part of the existing REA where the standard of rehabilitation is more commensurate with earlier revegetation practices. Emplacement activities in this area may present an opportunity to improve the standard of the existing rehabilitation in the northern area of the REA.

Response

The revisions to the design of the REA have been undertaken to reduce impacts to SSTF. They have been undertaken at a level to ensure that the proposed landform will be stable during land forming, and as a final landform. Notwithstanding this, the design of the REA is preliminary and will be finalised as part of the detailed design phase post approval, if granted. During this detailed design phase, and as stated above, a detailed rehabilitation plan will be prepared. This plan will consider and document rehabilitation practices to provide vegetation communities commensurate with adjoining communities.

Comment

There is a lack of information in the Rehabilitation Strategy in regards to the characterisation of reject material to justify the associated capping design that will be required to sustain the rehabilitation outcome (native and grassland). Further information is required to address risks associated with potential spontaneous combustion, root penetration into the emplacement area which may have a detrimental impact to long term vegetation health.

Response

The rehabilitation strategy was, as its names suggests, a strategy only. Further detail, including the nature of the capping material (top and sub soils) will be provided and detailed in the rehabilitation plan, which, Tahmoor Coal, expects will be required as part of the conditions of any development consent, should it be granted.

Comment

There is also a lack of information in regards to the quantity and source of capping material required and whether the material can be wholly sourced on site.

Response

Details on the source of capping material have been provided in the EIS (AECOM 2018), the PAR (AECOM 2020) and *second amendment report* (EMM 2020a). These need to be read in conjunction with each other. Further details will be provided in the rehabilitation plan, which, Tahmoor Coal, expects will be required as part of the conditions of any development consent, should it be granted.

Comment

Section 3.3 of the Rehabilitation Strategy outlines the topsoil management approach for the REA. Given that the type of natural soils on site will require further amelioration as well as substitution with material from off site, the Rehabilitation Strategy should not limit the import of topsoil only. The text should be updated to allow other alternative materials such as organics if the need is identified in the future.

Response

This comment is noted. Tahmoor Coal will import topsoil and other rehabilitation medium if required. This will be documented in the rehabilitation plan.

Comment

The proposed removal of the two longwalls is expected ... to critically reduce the risks of subsidence to the Sydney-to-Melbourne Railway at a location where the railway intersects two major gas pipelines (with diameters of 864mm and 203mm, respectively). In the view of MSI, the infrastructure intersection makes it impossible or extremely difficult to control the risks of subsidence to both the railway and the gas pipelines which are buried underneath the railway tracks. As a result of the proposed removal of LW107B & LW108B, risk of subsidence at the infrastructure intersection should be critically reduced, ...

Response

This comment is noted. However, based on experience and expert advice, Tahmoor Coal is of the view, that subsidence risks associated with the Sydney-to-Melbourne Railway at a location where the railway intersects two major gas pipelines could have been appropriately managed irrespective of the removal of LW107B and LW108B under existing mining practices at the mine and mining methods proposed as part of the Project.

Comment

The Mine Safety Inspectorate within the Resource Regulator is responsible for ensuring the mine operators' compliance with the Work Health and Safety (WHS) legislation, in particular, the effective management of risks associated with the principal hazards as specified in the Work Health and Safety (Mines and Petroleum Sites) Regulation 2014. The Mine Safety Inspectorate will undertake assessments of the mine operators' proposed mining activities under clause 33 of the Work Health and Safety (Mines and Petroleum Sites) Regulation 2014 as well as necessary regulatory actions in response to any identified non-compliance.

Response

This comment is noted.

Comment

The Resource Regulator reserves the right to communicate with you with regard to significant WHS matters.

Response

This comment is noted.

Comment

In addition to the Resources Regulator letter dated 8 September 2020 (LETT0004927) in regards to the above matter, I would also like to request further information from the proponent in regards to the long term strategy for the management of water from the upstream catchment of the Reject Emplacement Area (REA). This matter has previously been raised by the Resources Regulator to Tahmoor Colliery whereby the proposed under-drainage works present an unacceptable risk that if the pipes were to block or fail post closure it could lead to significant impacts to the stability of the REA and potential downstream pollution. As such, the Regulator requests that Tahmoor address this matter as part of the Amendment Report.

Response

The comments regarding concerns with long-term water management at the REA are noted. However, again, these matters will be considered and addressed as part of the detailed design phase of the REA and documented within a water management plan. Again, Tahmoor Coal is happy to consult with the Resources Regulator during the preparation of this plan.

6. Wollondilly Shire Council

WSC's advice contained two attachments – one regarding potential impacts to the Bargo Waste Management Centre (BWMC), and one which is more general in nature. This letter principally responds to the advice regarding the BWMC because responses to the advice raised in the general attachment have been provided in responses in other sections of this letter.

Comment

The purpose of this letter is to put the Department on notice of Council's objection to the mine extension with respect to the impacts on the Bargo Waste Management Centre (BWMC), in the strongest terms. A further detailed submission from Council's solicitors will be provided shortly.

Response

WSC's objection to the Project with respect to the BWMC is disappointing, and inconsistent with both discussions previously held with the Council on this matter, and Council's advice to DPIE dated 29 April 2020. It is noted that in this advice to DPIE, WSC stated:

"Council's submission expressed concern over the Bargo Waste Management Centre experiencing full subsidence and requested consultation and greater analysis. **Council officers from the Waste Management Section have expressed satisfaction at the response by SIMEC to these expressed concerns.** Clarification is however requested over whether the rehabilitation of any impacts to the facility identified as being attributable to mine subsidence will be funded in accordance with the *Coal Mine Subsidence Compensation Act 2017*."

Emphasis added.

Tahmoor Coal was of the view that based on discussions with WSC, concerns regarding potential impacts to the BWMC had been resolved.

Tahmoor Coal is continuing to work with WSC regarding the BWMC. This includes forming a technical committee to identify potential impacts, assess the potential impacts, consider options and select measures to control potential impacts to the site. Further details on this technical committee are provided below in this letter.

Comment

The BWMC is a Council managed landfill facility, which services the local community, predominately the southern townships of Wollondilly including Bargo, Tahmoor, Thirlmere and Picton. The facility has been in operation since 1966 and is nearing the end of its landfill operational life. The landfill operation commenced prior to the declaration of mines subsidence in the district and; therefore, was not designed to consider mining subsidence impacts. Council is proposing that a waste transfer station will be commissioned at this site under its current EPA licence.

The potential impacts associated with mining operations on the condition of surface and subsurface BWMC infrastructure is of strong concern. The concerns are both operationally and from a licence compliance perspective, even after the eventual closure of the landfill.

In the Response to the Council submission on Tahmoor South proposal and EIS, SIMEC, in regards to BWMC, suggested that subsidence impacts on the facility were considered to be low, even though the impacts potentially result in slope instability and disruption to surface water and waste water treatment. Council believes that the potential resulting breaches of its EPA licence have not been considered in this assessment and, in part, leaves uncertainty regarding environmental risks as well as a question over permissibility with the proposal and its impacts on an existing facility.

Whilst Council appreciates that damage to assets can be engineered to reduce impacts and can be rectified if damaged by subsidence, Council's main concern is that the impacts may cause a breach its EPA Licence by causing discharge and in turn pollution of waters or air in contrary to the Protection of the Environment Operations Act 1997.

Therefore Council would like to understand how a consent under the Environmental Planning & Assessment Act 1979, could be issued when it surmises that there would be probably damage to a licenced facility and in turn cause a potential breach of the Protection of the Environment Operations Act 1997.

Response

It is noted that the BWMC is a landfill constructed in 1966. It is also noted that the landfill was constructed prior to the land it sits on being within a mine subsidence district. It is also noted that the landfill is unlikely to be constructed with any liner. Tahmoor Coal has not been provided with any water quality monitoring data undertaken at or surrounding the site of the landfill, so is unaware of its performance against existing environment protection licence (EPL) discharge criteria or against ANZECC criteria.

Notwithstanding the above it is noted that Tahmoor Coal has mined directly beneath and adjacent to many properties with EPL, including properties with EPLs for waste facilities. Examples include:

- a gravity and pressurised sewerage system at Tahmoor, Thirlmere and Picton;

- the Picton Recycled Water Plant;
- a waste management facility at Picton;
- wastewater treatment ponds at Tahmoor; and
- sewer pumping at a residential estate.

Tahmoor Coal has also mined beneath petrol stations and railway lines, among other sites that have EPLs.

Tahmoor Coal has successfully implemented risk controls and mitigation measures to avoid breaches of these EPL conditions due to mine subsidence movements and impacts.

Controls can be implemented (as detailed below) to ensure that the BWMC remains safe and serviceable during and after mining, without mine subsidence causing an exceedance of EPL conditions.

With respect to the BWMC, the specific concerns regarding conditions of the EPL are not yet known. As stated above, it is also not known how the current operations at BWMC are performing relative to EPL conditions. In order to best assess control and mitigation measures, it would be preferable to have this information provided by WSC.

Technical committee

Since 2004, Tahmoor Coal has developed measures in consultation with WSC to successfully control risks to Council's assets (mainly local roads and associated infrastructure) prior to and during the extraction of LW22 to LW 32 and LW W1-W2 within the Tahmoor North lease.

For example, a technical committee has previously been established to manage impacts on WSC infrastructure, which include representatives from Tahmoor Coal, WSC, MSEC (mine subsidence engineer) and when structures have been affected, JMA Solutions (structural engineer).

In addition, a specific technical committee was established with respect to Council's Wollondilly Emergency Control Centre, which included structural engineer JMA Solutions. A geotechnical engineer (GHD Geotechnics) was also engaged to conduct slope instability assessments.

It is envisaged that Tahmoor Coal and WSC would establish a technical committee to manage potential impacts on the BWMC due to the extraction of proposed longwalls as part of the Project. In addition to the mine subsidence engineer, Tahmoor Coal has engaged geotechnical engineer Douglas Partners to assess the landfill site.

WSC's specialist engineer could be included on the technical committee, particularly with respect to the management of the leachate collection system and monitoring of surface water and groundwater at the site. Tahmoor Coal can appoint alternative specialist engineers as required.

It is envisaged that the roles of the technical committee would be to:

- identify potential hazards on the site due to mine subsidence;
- assess identified risks; and
- consider options and select measures to control risks to ensure that the site remains safe and serviceable during and after mining, including ensuring that mine subsidence does not result in exceedances of EPL conditions.

A subsidence management plan would be developed by MSEC on behalf of the technical committee, which describes the hazards that have been identified, the findings of the risk assessment(s), and the selection of risk control measures.

Technical investigations

Tahmoor Coal commenced technical investigations at the BWMC in October 2019 with an inspection by Douglas Partners and MSEC (with Council's consent). Further investigations and assessment has stalled as the technical data requested to allow Tahmoor Coal to continue its assessment has not yet been provided by WSC.

Provision of this information will enable the best technical assessments to be conducted and processes implemented.

In the absence of data, the following way forward is proposed to demonstrate that it is feasible to mine directly beneath the BWMC and ensure that the BWMC remains safe and serviceable during and after mining, without mine subsidence causing an exceedance of EPL conditions. Key considerations include:

- management of risks to buildings and structures;
- management of risks to weighbridge;
- management of risks to landfill slopes;
- management of risks to surface water drainage; and
- management of risks to leachate collection system.

Buildings and structures

The buildings and structures on site are relatively light weight, with small footprint sizes.

There is extensive history of successfully managing risks to the structures, which involve pre-mining structural inspection, visual inspections during and repairs if required. A similar subsidence management strategy will be implemented for BWMC structures.

Weighbridge

Tahmoor Coal has extensive experience in managing potential subsidence impacts on sensitive equipment such as a weighbridge. This includes a weighbridge at Ingham's Turkey Processing Plant.

It is planned to manage potential impacts on the weighbridge as follows:

- pre-mining maintenance inspection, including re-calibration if necessary;
- monitor ground movements around the weighbridge during mining;
- monitoring condition of weighbridge during mining;
- conduct maintenance inspections during and after mining, if required (this includes re-calibrating if necessary); and
- adjusting or repairing the weighbridge if required.

Landfill slopes

As previously indicated, Douglas Partners has inspected and assessed the existing landfill slopes at the BWMC. The results of this inspection indicate:

- There have been no landfill slips since 2005, following construction of a new surface treatment pond and regrading of surface slopes at BWMC.
- The eastern side of the landfill are steeper than the target slope of 1 in 3 (V:H) but it is understood that BWMC plan to regrade this slope.
- The likelihood of slope instability is assessed as low. The predicted mining-induced changes to the slopes are an order of magnitude less than the existing slopes. This is consistent with extensive experience of mining beneath slopes at Tahmoor Mine and elsewhere.

The following measures are considered feasible to control risks to the slopes:

- ensure slopes are well compacted with drainage structures well maintained prior to and during mining;
- regrade slopes if required prior to mining;
- construct additional measures to strengthen slopes if required –for example gabion walls, or geotextile mats;
- revegetate permanent slopes, if required;
- monitor slopes during mining, including visual inspections and ground surveys;
- provide additional support to slopes in the unlikely event that instability is observed; and
- consideration and selection of controls would be made by the technical committee.

Surface water drainage

Existing drainage at the BWMC consists of unlined surface trenches around the perimeter of the landfill, draining into a relatively upgraded but unlined surface water treatment pond.

The following measures are considered feasible to control risks to the surface water drainage system:

- install flexible waterproof liner to surface trenches prior to mining;
- install a flexible waterproof liner in the pond prior to mining;
- remove untreated surface water collected in the pond prior to mining;
- monitor drainage trenches and the pond during mining, including visual inspections and ground surveys;
- periodically remove untreated surface water collected during mining to minimise the amount of contamination if subsidence impacts occur;
- repair drainage structures if required during mining – seal cracks to trenches, dewater and treat cracks to pond walls if required; and
- consideration and selection of controls would be made by the technical committee.

Leachate collection system

It is understood that the current system at the BWMC consists of the surface water drainage system, with monitoring of leachate infiltrated into or generated from within the landfill. Further information is requested from WSC regarding the existing system.

It is understood that Council plans to install a leachate collection system along the toe of the eastern batter. Further information is requested from WSC regarding the design of this system, and whether the design has taken mine subsidence movements into account.

The following measures are considered feasible to control risks to the leachate collection system:

- implement control measures as described for surface water drainage;
- conduct investigations to understand the amount of leachate that is present in the landfill (awaiting data to be supplied);
- conduct baseline condition assessment of leachate collection system prior to mining;
- conduct baseline water quality monitoring of pools and surface water in tributary to Dog Trap Creek upstream and downstream of the BWMC;
- install measures to reduce the amount of surface water than can infiltrate the fill –this is routinely conducted already by BWMC by covering waste with clay;
- install measures to intercept, drain and capture leachate from the existing fill –install perforated pipes (or additional pipes if some installed as part of WSC’s planned installation);
- remove untreated surface water collected in the pond prior to mining;
- monitor leachate collection system during mining, including visual inspections and ground surveys;
- consider monitoring displacements within the landfill (i.e. install inclinometers);
- consider monitoring water levels within the landfill;
- monitor water quality in pools and within near surface water in the tributary to Dog Trap Creek upstream and downstream of the BWMC;
- seal cracks in capping layers in the landfill during mining;
- repair leachate collection system if required;
- periodically remove untreated surface water collected during mining to minimise the contamination if subsidence impacts occur; and
- decisions on which controls to select and implement would be made by the technical committee.

Comment

| |
|---|
| Council would like to raise with the consent authority a concern that to grant consent for the revised mining proposal under our operational licenced waste facility may not be permissible under the EP&A Act. Essentially, Council requests that the DPIE impose conditions which eliminate or mitigate |
|---|

the adverse impacts on BWMC and; therefore, the extent of mining may need to be adapted to avoid and minimise impacts. If modification of the mining plan is not immediately possible, to insist that the consent authority refuse to grant development consent to the mine extension until appropriate and agreed mitigation measures are developed.

Response

While this is a matter for the consent authority, Tahmoor Coal does not agree with WSC's preposition that the granting of consent for the Project may not be permissible, or that the extent of mining may need to be adapted to avoid and minimise impacts. As demonstrated above, it is Tahmoor Coal's view that subsidence and related impacts at the BWMC can be appropriately managed without requiring the proposed extent of mining to be adapted or revised to avoid or minimise impacts.

7. Department of Planning, Industry and Environment

Comment

Provide one figure illustrating key built features within the development area in relation to the proposed amended longwall layout (combining key information in Drawings No. MSEC1123- 11 to 17, 19 and 20).

Response

This figure has been prepared and is attached to this letter – see Attachment D.

Comment

Provide one figure illustrating the natural features within the development area in relation to the proposed amended longwall layout (combining information in Drawings MSEC1123-09 and 10).

Response

This figure has been prepared and is attached to this letter – see Attachment E.

Comment

Include a label for geological faults T1 and T2 on Drawing MSEC1123-6.

Response

A label for these faults has been provided on the relevant drawing – see Attachment F.

Comment

Confirm the total length of the cliff along Dog Trap Creek (C_02280) which is located directly above proposed LW103B.

Response

The total length of the cliffs along Dog Trap Creek was provided in Table 5.8 of the *subsidence assessments* contained in the EIS (AECOM 2018), PAR (AECOM 2020) and *second amendment report* (EMM 2020a). This is repeated below:

Table 5.8 Details of cliffs within limit of vertical subsidence

| Cliff Ref. | Overall Length (m) | Maximum Height (m) | Stream System | Location relative to proposed longwall mining |
|------------|--------------------|--------------------|----------------|---|
| C_01080 | 50 | 15 | Dog Trap Creek | Not directly mined beneath |
| C_02280 | 55 | 10 | Dog Trap Creek | Directly above proposed longwall mining area |
| C_03140 | 50 | 15 | Dog Trap Creek | Not directly mined beneath |
| C_04570 | 20 | 10 | Dog Trap Creek | Not directly mined beneath |
| C_07100 | 45 | 10 | Dog Trap Creek | Not directly mined beneath |
| C_11650 | 25 | 15 | Dog Trap Creek | Not directly mined beneath |

Comment

Provide further information on previous experiences of undermining waste management facilities such as the Bargo Waste Management Centre, in particular wastewater and leachate collection, storage and treatment systems. Include a description of subsidence-related impacts, and mitigation and management measures implemented (including effectiveness).

Response

This comment has been addressed in the response to WSC's advice on the BWMC.

Comment

Provide a 'Make-Good Strategy' for the predicted impacts to registered and unregistered bores surrounding the proposed development. The strategy should identify water supply compensation arrangements that would be applicable under the Coal Mine Subsidence Compensation Act 2017 (from direct damage to bore structures) and compensation arrangements outside of this legislative regime due to water supply reductions from drawdown in excess of the 2 m drawdown criterion of the Aquifer Interference Policy (AIP). The strategy should include Tahmoor Coal's:

- in-principle approach to implementing make good arrangements as the project progresses;
- details of the nature of make good options for impacted bore water supplies, including the technical feasibility of each option; and
- a 'make good' process that considers timeframes and potential dispute resolution options.

Response

Details of a make good strategy are provided below.

Objective

Landholders who have a registered bore are made good (i.e. no worse-off) if performance of the bore is impacted by mining.

Arrangements for Project impacts

The make good arrangements proposed for the Project would be similar to the arrangements currently undertaken at Tahmoor Mine (i.e. Tahmoor North).

The make good process would be staged by Tahmoor Coal in accordance with the proposed mining schedule and the results of predictive groundwater modelling. Contact would be made with landholders whose registered bores are predicted to be impacted more than 2 m NSW Aquifer Interference Policy (AIP) criterion from Tahmoor Coal, at least 2 years prior to the modelled impact, or whose bores are at risk of subsidence related impacts. Landholders would be approached and provided details as to likely make good provisions based on the level of risk of the bore being impacted as determined by the risk rating provided in the second amendment report (EMM 2020a) and as updated from groundwater data from mining as it is carried out.

Following contact with the landholders (and pre-any mining induced damage), a site survey would be undertaken to verify bore details – location, depth, condition of bore and pump, standing water levels and usage (where possible). This information would be provided to the land owner so that they have the same baseline information as Tahmoor Coal. This will provide both parties with a thorough understanding of the current bore condition and provide a reference point for comparison with subsequent bore assessments as mining is carried out. The verified bore data will also be included in updates to the groundwater model.

There are a number of options for making good any bore impact based on individual bore details and characteristics, including:

- bore maintenance – where physical adjustments to bores and regular maintenance of the bore are required to return it to its pre-mining condition;
- payment of additional costs for increased pumping – in some cases, increased pumping would only be required to maintain bore yield;
- deepening the bore to return it to its pre-mining production;
- replacement of the bore – this may be required when deepening an existing bore is not possible (e.g. the bore has partially collapsed or the bore hole is not straight or vertical); and
- provision of an alternative water supply while other measure are being undertaken – this could include connection to the town water supply or the provision of on-site storage (e.g. dam or water tanks).

Once the details of the bore have been documented and potential impacts understood (based on groundwater modelling), the landholder and Tahmoor Coal would negotiate a make good agreement. This agreement would include specific make good measures and outline a potential timeframe for undertaking these measures, if required.

The make good agreement would include and consider the conditions of any development consents, the provisions of the AIP and the NSW *Coal Mine Subsidence Compensation Act 2017*.

Tahmoor Coal would monitor groundwater levels at dedicated monitoring bores and verify the groundwater model as mining progresses. This will allow the accuracy of drawdown predictions at landholder bores to be monitored and assessed over time.

Should a bore be impacted because of mining, the make good agreement would be implemented.

Dispute resolution process

Any make good agreement will include a dispute resolution process. For make good measures associated with a claim lodged in accordance with *NSW Coal Mine Subsidence Compensation Act 2017*, a dispute resolution process is detailed in the approved procedures supporting the Act. If a process is not specified by the development consent conditions, there are a number of options that could be agreed with the landholder.

The dispute resolution process will include a process for negotiation, and, if required, mediation. If mediation fails, options for dispute resolution include:

- appointment of an agreed third-party expert to determine any technical issues that are in dispute; or
- referral to the Secretary of the NSW Department of Planning, Industry and Environment (DPIE).

Comment

Provide further information on water supply bores which are predicted to be impacted by cumulative groundwater drawdowns in excess of the 2 m drawdown criterion of the AIP and that may require make-good provisions. Information should include how make-good requirements would be managed between the applicable mines (ie. Tahmoor North, Tahmoor South, BSOs and Dendrobium).

Response

Bores predicted to be affected by the Project have been identified and classified by the perceived risk of effects being discernible and requiring make-good. This classification was based on model predictions of drawdown, proximity to longwalls and a review of historical effects and requirements for make-good on bores around the Tahmoor (North) mine operation. That part of the Tahmoor Mine has been using longwall methods since 1987 (i.e. >30 years), and only twice in that time have make-good arrangements been required.

However, we note that DPIE have requested details about the cumulative effects of the Project with nearby mines. Of primary relevance are

- Tahmoor North, operated by SIMEC.
- BSO (Appin), operated by South32 Illawarra Metallurgical Coal (IMC).

Dendrobium Mine, also operated by South32 IMC, is more distant from Tahmoor: existing workings at Dendrobium are 11 km southeast of the Project, while proposed (but as yet unapproved) longwalls in Dendrobium Area 5 would be at least 6 km south east. Furthermore, Dendrobium Mine is located within the Special Area (water supply catchment), and as a result, there are no private bores in close proximity to Dendrobium and relevant to the Project.

As in the groundwater assessment that accompanied the *second amendment report* (HydroSimulations, 2020), the predicted maximum drawdown and distance to longwall areas for each

registered water supply bore around the Project has been used to classify the risk of each registered bore being affected by mining operations to a noticeable degree and requiring some make-good actions to be carried out.

Figure 33 presents the results of the modelled assessment of maximum drawdown due to mining for all bores where the cumulative drawdown is predicted to be >2 m. The figure illustrates the total predicted drawdown and illustrates that share between Tahmoor (north), the Project and other mines (specifically the BSO Mine), which is located to the north and east of Tahmoor.

Following the drawdown assessment, the consideration of distance to longwalls has been added to the risk assessment. The risk classification is based on (HydroSimulations, 2020), the historical and approved mine plan for Tahmoor (Tahmoor North), and the simulated BSO mine plan. The classification is shown in Table 1 and is based on the operational history and the record of 'make good' at Tahmoor North as well as the AIP 2 m threshold.

Table 1: Risk of a bore requiring 'make good'

| Risk rating | Criteria | Justification |
|--------------|---|---|
| High | Above longwalls and pillars. | Groundwater drawdown plus the likelihood of subsidence (strata deformation) likely to affect bore integrity. Historical effects on a bore above a pillar at Tahmoor North have required 'make' good. |
| Moderate | Model predicts a maximum drawdown greater than 10 m and within 1 km of a panel. | A drawdown of greater than 10 m is probably approx. 10-30% of available drawdown, but potentially more. Historical effects on a bore 250 m from panels at Tahmoor North have required 'make' good. The distance selected (1 km) is deliberately conservative. |
| Moderate-low | Model predicts a maximum drawdown greater than 10 m and beyond 1 km from a panel. | Drawdown due to mining of this magnitude at this distance is only predicted in deeper bores, and so would be a fraction of the expected available drawdown. |
| Low | Model predicts a maximum drawdown between 2-10 m. | Drawdown of this magnitude is a fraction of available drawdown expected in this environment and is approaching seasonal variation. |
| Negligible | Model predicts a maximum drawdown of less than 2 m | Below AIP 'minimal harm' threshold. |

Figure presents the risk classification for each of the bores predicted to be affected >2 m by cumulative mining effects. It should be noted that proximity to longwalls, especially within 250 m, over-rides any modelled drawdown – this is because within that distance the deformation of strata is more likely and more likely to result in discernible changes in bore yield and/or water quality.

Figure4 also identifies a small number of bores where:

- A. the predicted cumulative drawdown >2 m, and
- B. the drawdown due to SIMEC's operations (i.e. Tahmoor and Tahmoor South) and South32's BSO mine are of similar magnitude (i.e. the split is between 30-70% and 70-30%), and
- C. therefore, that the responsibility and cost of 'make-good' might need to be shared.

These 11 bores are listed in Table 2. The key thing to note is that 10 of these bores are classified as being at 'low' risk of requiring make-good arrangements. This is due to the relatively low magnitude of drawdown predicted compared to available drawdown in bores in this area, and the distance from longwalls. The last bore of the 11 (GW111842, located 2.8k m from Tahmoor North) is classified as being at low-moderate risk given that the predicted drawdown is greater (at almost 17 m) due to the bore being attributed to a deeper aquifer based on available construction information.

Table 2: Bores where two mine operators contribute similar drawdown to cumulative effects

| GW works # | Easting | Northing | Purpose | Predicted max drawdown [m] | | | | | Distance from bore to longwalls | | | Risk of requiring make-good | Tahmoor drawdown as % cumulative |
|------------|---------|----------|--------------|----------------------------|---------------|-------------|---------------|-------------------|---------------------------------|---------------|-------------|-----------------------------|----------------------------------|
| | | | | Tahmoor (Nth) | Tahmoor South | Other Mines | Tahmoor total | Cumulative Mining | Tahmoor South | Tahmoor (Nth) | Other Mines | | |
| GW019590 | 282131 | 6207118 | Water supply | 0 | 1.9 | 0.9 | 1.9 | 2.8 | 3660 | 2130 | 3590 | Low | 68% |
| GW031294 | 279732 | 6205706 | Irrigation | 0 | 6.2 | 3.1 | 6.2 | 9.3 | 950 | 850 | 5910 | Low | 67% |
| GW059106 | 282268 | 6207800 | Irrigation | 0 | 1.4 | 0.8 | 1.4 | 2.2 | 4330 | 2270 | 2900 | Low | 64% |
| GW062661 | 282609 | 6207469 | Domestic | 0.04 | 2.3 | 1.4 | 2.3 | 3.8 | 4250 | 2610 | 3150 | Low | 62% |
| GW100455 | 281877 | 6207020 | Livestock | 0 | 2 | 1 | 2 | 3 | 3400 | 1880 | 3760 | Low | 67% |
| GW104466 | 277332 | 6217528 | Domestic | 1.3 | 0.1 | 1.2 | 1.4 | 2.6 | 10250 | 1210 | 5400 | Low | 55% |
| GW105787 | 282092 | 6209593 | Domestic | 0.9 | 0.3 | 1.5 | 1.23 | 2.8 | 5440 | 2670 | 1400 | Low | 44% |
| GW106546 | 282785 | 6206765 | Domestic | 0 | 2.8 | 1.4 | 2.8 | 4.2 | 3990 | 2790 | 3830 | Low | 67% |
| GW108155 | 279212 | 6217250 | Domestic | 1.2 | 0.1 | 2.8 | 1.3 | 4.2 | 10250 | 960 | 3500 | Low | 32% |
| GW111047 | 280015 | 6206037 | Domestic | 0 | 4.7 | 2.4 | 4.7 | 7.1 | 1390 | 660 | 5480 | Low | 66% |
| GW111842 | 282654 | 6205664 | Irrigation | 0 | 10.8 | 5.9 | 10.8 | 16.7 | 3430 | 2850 | 4940 | Mod-Low | 65% |

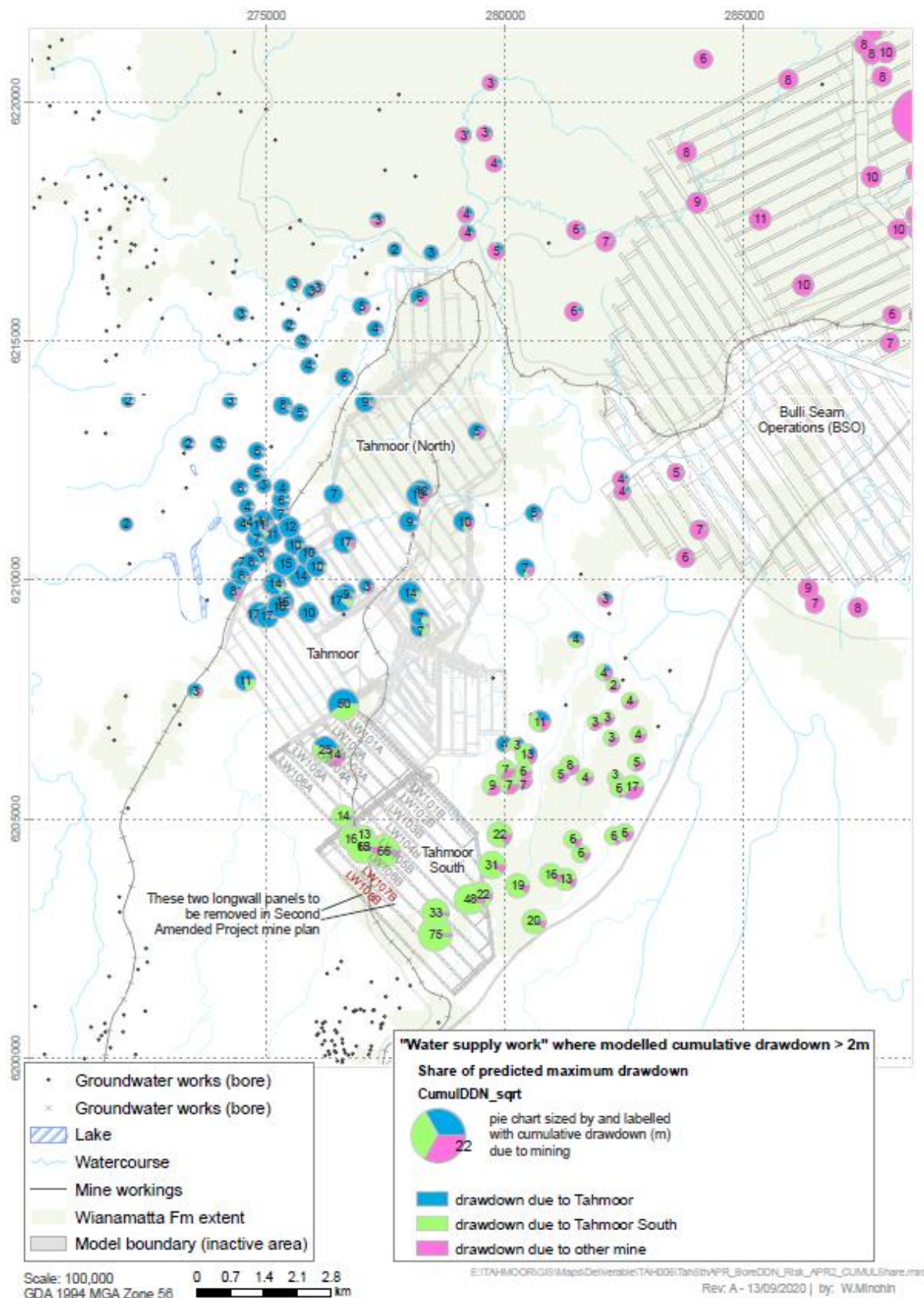


Figure 3: Share of bore drawdown due to cumulative mining effects

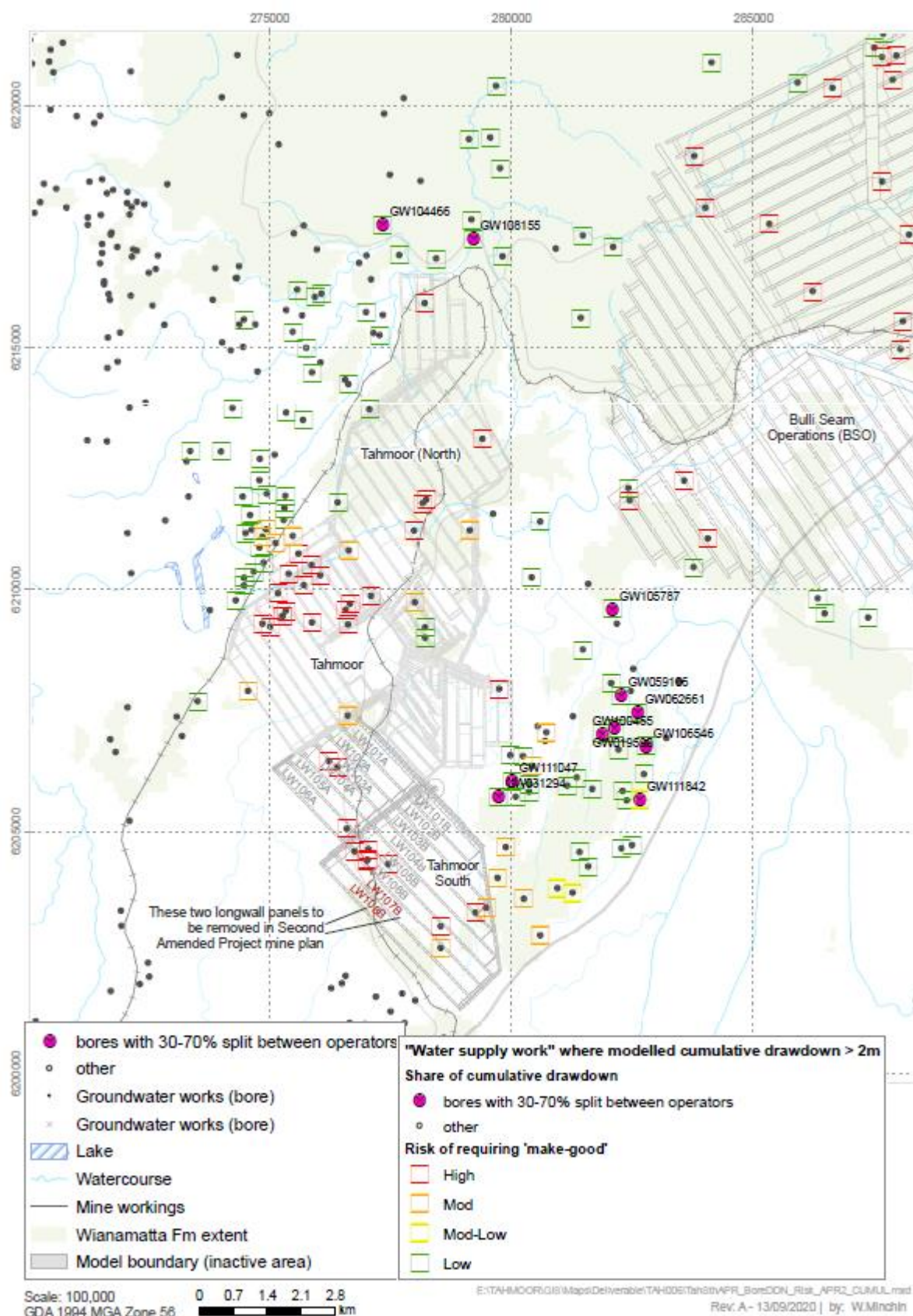


Figure 4: Risk of impacted bore yield and requirement for make-good due to cumulative mining effects

Tahmoor Coal will liaise with adjacent mines and seek to establish a committee and protocols for managing cumulative impacts to bores. The goal of the committee being to ensure that a landholder does not suffer any detriment due to their bore being impacted by more than one mine.

To implement make good arrangements for bores predicted to be cumulatively impacted by mining—that is, impacted more than the 2 m AIP criterion. It is envisaged that the process and the arrangements would be the same as those documented for Project alone impacts.

Tahmoor Coal and the adjacent mines would resolve which bores are monitored by which company. This would potentially be based on the contribution of the modelled degree of impact on the bore.

In addition, Tahmoor Coal and the adjacent mines would resolve the proportion of costs for implementing make good options if required, again potentially based on modelled degree of impact.

The protocols for the proposed committee would include a dispute resolution process to ensure resolution if the mines cannot resolve their level of contribution to any bore impact.

Comment

Provide a map outlining the extent of the original Mine Subsidence District declared in 1975 (to differentiate with the current extension proclaimed in 1994).

Response

A map outlining the extent of the original mine subsidence district declared in 1975 (to differentiate with the current extension proclaimed in 1994) has been prepared— see Attachment G.

Comment

The Department notes that removal of LWs 107B and 108B has reduced cumulative groundwater inflow by 4,100 to 6,400 ML. Please provide this figure as a percentage reduction and provide the total cumulative volume of groundwater inflows over the life of the mine.

Response

Over the life of the Project as documented in the PAR (AECOM 2020), groundwater modelling predicted that groundwater inflow or take would be approximately 23,800 ML (range between 15,000 and 32,700 ML). The removal of LW107B and LW108B, as part of the *second amendment report* (EMM 2020a), is predicted to reduce cumulative inflow by 4,100-6,400 ML. This is equivalent to 20-27% of the previously predicted total inflow. The best estimate for the cumulative total groundwater inflow for the life of the Project as documented in the *second amendment report* is approximately 18,500 ML (range between 10,900 and 26,300 ML).

For context, the cumulative inflow at Tahmoor (Tahmoor North) to 2020 has been approximately 34,000 ML.

Comment

Clarify the number and location of pools along Tea Tree Hollow, Tea Tree Hollow Tributary 1 and Dog Trap Creek that would potentially be impacted by the proposed development, including the likelihood of “Type 3” impacts to each pool. Note: the numbers referenced in Surface Water Impact

Assessment (SWIA) (Section 6.2, Appendix D of the Amended Project Report) are incomplete/inconsistent (refer to table below).

Response

A response to this matter is provided in the letter from HEC in Attachment I.

Comment

Clarify the percentage of pools that are predicted to be impacted for valley closure greater than 475mm.

Response

A response to this matter is provided in the letter from HEC in Attachment I.

Comment

Updated Figures 36 and 37 of the SWIA to include all potentially impacted pools, as well as a location reference for Wirrimbirra Sanctuary.

Response

Updated figures have been prepared – see Attachment H.

Comment

Explain how avoiding mining beneath all 3rd order streams, and thereby reducing total ROM coal production from 33 Mt to 32 Mt, would make the proposal not economically viable (as advised on page 75 of the Second Amendment Report).

Response

It appears that there is a misunderstanding between the response to the Aboriginal Cultural Heritage section (vi) and the response to the Water and Subsidence section (vii) of the Second Amendment Report.

Reducing the lengths of LW101B and LW103B would reduce the total of ROM coal extracted by 1 Mt, impacting resource recovery and benefits. This is different to avoiding mining beneath all 3rd order streams, regardless of their significance. The reason for this is that the removal of mining from under all 3rd order streams would lead to reductions to LW101A, LW102A, LW103A, LW101B, LW103B and LW104B which would result in a significant reduction to the length of six of the 12 longwalls proposed, with four of these six longwalls already at the lower end of the viable range, particularly when considering the cost of the development works required to access these longwalls.

Comment

Provide a summary of the response and material provided to the Biodiversity and Conservation Division on 17 August 2020 regarding flow losses to creeks and adequacy of baseline data.

Response

A response to the material provided to BCD on 17 August 2020 has been provided in the letter from HEC in Attachment I.

Comment

We note the information provided about the rehabilitation of cracks in Redbank and Myrtle creeks. Please provide additional examples of successful rehabilitation of 3rd order (or higher) streams, particularly in the Southern Coalfield.

Response

Various techniques have been previously adopted to successfully reduce subsidence impacts to streams associated with longwall mining at other operations in the Southern Coalfield. A summary of these methods, their possible application to different situations and their limitations is provided in the table below.

Proposed Stream Remediation Techniques

| Restoration Technique | Description | Applications and Limitations |
|----------------------------------|---|--|
| Hand grouting | Sealing of cracks exposed on the surface using hand applicators. A variety of sealants can be used including sealants that can be applied under water. | Limited to surface cracks which can be accessed using hand held application equipment. |
| Shallow pattern grouting | Drilling shallow holes using small hand held drilling equipment and low pressure injection of a grout using a portable pump. Grouts used successfully on the Georges River (by Illawarra Coal) incorporated a cement mix that can be used with or without additives (e.g. bentonite). | Used to seal shallow fractures in rock bars and pools. Applicable to sensitive areas where access for larger equipment is problematic. Better results can be obtained if the target fractures are dewatered. |
| Deep pattern or curtain grouting | Drilling deeper holes using traditional air and or reverse circulation drilling rigs. Higher pressure grouting techniques can also be used. Grouts used successfully on the Georges River incorporated a cement-bentonite mix. | Used to seal fracture networks at greater depths. Can seal larger and deeper fractures. Larger equipment may necessitate constructing access tracks. Less suitable for remote or difficult access sites. |
| Deep angle hole cement grouting | Remote directional drilling techniques can be used to access otherwise inaccessible sites. The same grouting methods as deep pattern/curtain grouting outlined above can be used. | Specialised technique which can be used in situations where drill access is available close to target site. |
| Polyurethane (PUR) grouting | Use of expanding PUR grouts to seal fracture networks. PUR, which is a rapid setting grout that sets under water, is pumped into closely spaced drill holes (pattern drilling) and fractures filled systematically from the "bottom up". | Technique used successfully on Waratah Rivulet by Helensburgh Coal Pty Ltd. Can be used under water and under low flow conditions. Can be used to fill large aperture fractures in stages. |

Examples of successful rehabilitation works in the Southern Coalfields include:

- South 32 - Remediation works using a variety of methods including, hand mortaring, pattern grouting, curtain grouting, permeation grouting, deep-angled hole grouting and impermeable lining methods have successfully restored pool water levels and surface flow in the Georges River at Pools 8, 9, 14, 15 and 16, Marhneys Hole and Jutts Crossing.
- Metropolitan Colliery - Pools A to G1 on the Waratah Rivulet, as well as Pool ETO on Eastern Tributary have successfully restored pool water levels and surface flow using the grout curtain method.

The full range of available techniques would be considered by Tahmoor Coal in the design of any future stream restoration programs should these be required.

Prior to the implementation of remediation, the following preparatory work would be undertaken:

- obtaining required regulatory approvals;
- planning and securing land access agreements;
- preparing relevant management plans and protocols;
- preparing high resolution detailed pool and rock bar mapping.

Conclusion

Should you have any queries regarding this letter, please do not hesitate to contact Zina Ainsworth on phone: 0438 284 106.

Yours sincerely,



Zina Ainsworth
Environment and Community Manager
Tahmoor Coal

References

AECOM 2018, *Tahmoor South Project - Environmental Impact Statement*, prepared for Tahmoor Coal Pty Ltd by AECOM Australia Pty Ltd.

AECOM 2020, *Tahmoor South Project - Project Amendment Report*, prepared for Tahmoor Coal Pty Ltd by AECOM Australia Pty Ltd.

EMM 2020a, *Tahmoor South Project – Second amendment report*, prepared for Tahmoor Coal Pty Ltd by EMM Consulting Pty Ltd.

EMM 2020b, *Tahmoor South Project: Wirrimbirra Sanctuary – Statement of Heritage Impact*, prepared for Tahmoor Coal Pty Ltd by EMM Consulting Pty Ltd.

WRL 2020, *Understanding Thirlmere Lakes Water Balance*, presentation to Thirlmere Lakes Science Day, Water Research Laboratory.

Attachment A – Site impact recording form

Attachment B – Quarterly progress report – Myrtle and Redbank creeks CMAP

Attachment C – Myrtle Creek Aquatic Monitoring Report

Attachment D – Updated figure illustrating key built features within the development area

Attachment E – Updated figure illustrating natural features within development area

Attachment F – Updated figure showing geological faults T1 and T2

Attachment G – Map outlining the extent of the original Mine Subsidence District declared in 1975

Attachment H – Updated figures including impacted pools and location of Wirrimbirra Sanctuary

Attachment I – Response to surface water matters by HEC