



ENVIRONMENT PROTECTION AUTHORITY



Mr Howard Reed
NSW Department of Planning and Infrastructure
GPO Box 39
SYDNEY NSW 2001

Attention: George Mobayed



Dear Mr Reed,

I refer to the Project Application, Environmental Assessment (EA) and accompanying information provided for the proposed Tomingley Gold Project (ref 10_0155) received by the Environment Protection Authority (EPA) on 11 November 2011.

Please note the regulatory responsibilities of the Office of Environment and Heritage (OEH) are now carried out by the Environment Protection Authority (EPA).

The EPA has reviewed the information in the EA and has determined that it is able to support the proposal subject to the Department of Planning (DoP) seeking the important amendments to the draft Statement of Commitments, identified in **Attachment A** and subject to the proponent addressing the information requirements outlined below and in **Attachment B**. **Attachment B** also contains the EPA's assessment of the proposal, including justification for the amendments and request for additional information.

Following its review of the information in the EA, the EPA notes additional information is required for the EPA to adequately assess impacts of the project on biodiversity, groundwater, hazardous material management, waste, air, noise and surface water. The additional information requirements are summarised below and are discussed in detail in **Attachment B**.

Biodiversity

Further information/clarification is required regarding impacts on vegetation and the proposed Compensatory Habitat Strategy.

Groundwater

Further information/clarification is required regarding the proposed measures to protect groundwater from pollution.

Hazardous Materials Management

Further information/clarification is required regarding the proposed measures to protect fauna and the environment in general from the use of cyanide onsite.

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Waste

Further information/clarification is required regarding disposal of waste tyres.

Air

Further assessment/information is required regarding the Air Quality Impact Assessment and impacts on local air quality.

Noise

Further assessment/information is required regarding the Noise Impact Assessment and impacts on local noise amenity.

Surface Water

Further information/clarification is required regarding the proposed measures to protect surface water from pollution.

It should be noted adoption of the recommendations regarding the need for additional information are integral to the EPA's ongoing support for the proposal.

The EPA recommends that the proponent be required to provide the additional information specified above and that the EPA is provided with a further opportunity to review this new information before the project proceeds to the determination stage.

It is also expected that the EPA will be given an opportunity to review the draft Director-General's Environmental Assessment report for this proposal prior to finalisation. If the amendments to the draft Statement of Commitments are not included to the satisfaction of the EPA, we will be recommending that they are included as Conditions of Approval, if approval is recommended by the Department of Planning (DoP).

If the DoP determines the project application by granting consent, the EPA recommends that the conditions of approval provided at **Attachment C** are incorporated into the consent.

The EPA would also appreciate receiving a copy of the submissions received by the DoP (or a report summarising these submissions) in response to the exhibition of the Environmental Assessment. This is to assist the EPA to review the draft Director-General's Report and to recommend additional conditions of approval, if required.

The EPA notes that the proposal will require an environment protection licence pursuant to the *Protection of the Environment Operations Act 1997* to commence construction activities and to operate. The proponent will need to make a separate application to the EPA to obtain this licence once development project approval is granted.

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Should you have any queries regarding the EPA's submission, please contact myself at the Dubbo Office of the EPA on (02) 6883 5367.

Yours sincerely



15/12/11

BRAD TANSWELL
A/Head Pesticides, Operations and Planning
Environment Protection Authority NSW

Attachment A – Proposed Amendments to Draft Statement of Commitments
Attachment B – Assessment and Justification
Attachment C – Recommended Conditions of Consent

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48-52 Wingewarra Street Dubbo NSW
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ATTACHMENT A

Proposed Amendments to the Draft Statement of Commitments

HAZARDOUS CHEMICAL AND WASTE MANAGEMENT

Item 20 – The EPA recommends an additional heading be created for “Hazardous Chemical and Waste Management”. The EPA also recommends that a commitment be added to this section to read:

“Sodium Cyanide and other Toxic Chemicals will be stored in accordance with the requirements of AS/NZS 4452- The Storage and Handling of Toxic Substances.”

The EPA notes storage requirements for sodium cyanide and other toxic chemicals may not have been satisfied by the measures outlined in the EA.

Item 20 – The EPA also recommends that a commitment be added to this section to read:

“A Reagent Management Plan will be prepared prior to commencement of Works.”

The EPA also recommends that the timing for the above commitment reads:

“Following Project Approval and prior to commencement of Works.”

Item 20 – The EPA also recommends that a commitment be added to this section to read:

“The Reagent Management Plan will identify measures that would be implemented to ensure the appropriate transportation, handling, storage and use of this material.”

Item 20 – The EPA recommends an additional commitment be added to this section to read:

“Dangerous Goods will be transported in accordance with the requirements of the “Australian Code for the Transport of Dangerous Goods by Road and Rail- Current Edition.”

GROUNDWATER

Item 6.0 – The EPA recommends an additional commitment be added to this section to read:

“Undertake monitoring of groundwater underlying and in vicinity of potentially polluting surface infrastructure to ensure groundwater is not polluted.”

GENERAL AMENDMENTS

The draft Statement of Commitments should be updated to reflect commitments identified following provision of additional information outlined in **Attachment B**.

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ATTACHMENT B

Assessment of the Proposal and Justification of Proposed Amendments to the Draft Statement of Commitments and Request for Additional Information

BIODIVERSITY IMPACTS

The EA requirements of the EPA and the DoP require proponents to present justification of their preferred option based on four key thresholds – including *'whether or not the proposal, together with actions to avoid or mitigate impacts or compensate to prevent unavoidable impacts will maintain or improve biodiversity values'*.

In summary our review of the Environmental Assessment (EA) has concluded that:

- a) **Avoid** - It appears that the EA has now clarified all proposed avoidance measures.
- b) **Mitigate** - No specific comments at this time.
- c) **Offset** - The Biodiversity Offset Strategy (BOS) has applied and met the requirements of the BioBanking Assessment Methodology. However some aspects of the BOS still require clarification.

Further details and recommendations are provided below.

Offset Proposal

Issue: Some inaccuracies remain in the proposed Biodiversity Offset Strategy (BOS). Clarification of the area to be included in the offset is required.

Background:

It is noted that the proponent has now used the BioBanking Assessment Methodology (BBAM) to assess the development and offset sites. From the information presented in the EA, it appears that only 'contiguous' native vegetation remnants to be impacted within the Mine Site have been assessed using BBAM, with a portion of the mapped 'isolated paddock trees' excluded from the assessment. It is also noted that the Ecology Assessment implies that part of the offset may be used towards compensating for the impacts of the proposed Peak Hill-Tomingly transmission line, which is subject to a separate Part 5 Assessment. Please note that our assessment of the offset is limited to consideration of the development as proposed in the Part 3A application only.

The EA still presents confusing statements regarding the location of the offset in relation to proponent owned land and some proposed infrastructure:

- o It appears that a portion of the proposed offset may overlap with the proposed water pipeline, proposed transmission line relocation, proposed optic fibre cable relocation and amenity bund(s). The EA does not specifically clarify these impacts in relation to the offset.

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- Figures A10.1 and A10.2 in the BioBanking assessment include all native vegetation remnants that were mapped in the 'Study Area', including native vegetation which is stated elsewhere in the EA to be excluded from the BOS. It is not clear then whether the hectare figures provided in Table A10.3 for 'Total Area within the Study Area' (and subsequent offset area estimates) takes into account the exclusion of some remnants from the offset (there also appears to be a mistake in this table where 4.9ha of Poplar Box – Belah Woodland is listed as being impacted when elsewhere it is identified as not being impacted). It is important that the issue of what has been included in the 'Study Area' is clarified, so that it is clear that the BBAM has not been applied to areas which will not actually be included in the BOS.

It would be clearer if the EA contained a figure which only includes those mapped areas that will form part of the offset, and confirms which hectare estimates apply to actual BOS versus the wider Study Area. This map should also clearly indicate the location of the offset in relation to the location of all infrastructure and areas of disturbance.

The BioBank calculations supplied have also been reviewed and some inaccuracies are noted, arising from the consultant:

- including some revegetation in the loss component of the assessment;
- concluding that one vegetation type is in low condition when the plot data does not support that conclusion; and
- failing to place the 100 ha assessment circle over the area of greatest change therefore underscoring the landscape change.

Using the data submitted with the EA the EPA has re-run the assessment and has determined that the required credits are actually:

- *Community 1: Inland Grey Box Tall Grassy Woodland (Benson 76)* - 169 credits (not 113)
- *Community 3: Fuzzy Box – Inland Grey Box Woodland (Benson 201)* – 39 credits (not 30)
- *Community 5: Belah/Black Oak –Western Rosewood – Wilga Woodland (Benson 57)* – 589 credits (not 453)

Whilst the credit requirements for the development have still been exceeded in the proposed offset, it remains important to be clear about the credits required and generated by the offset in the event the proponent seeks to use the excess credits towards another proposal.

Secondly, the EA has incorrectly claimed a Tier 2 'No Net Loss' outcome for all vegetation communities. A 'No Net Loss' outcome can only be achieved where the offsetting requirement is met according to the credit calculator. This includes meeting the credit requirements for each vegetation community to be impacted, rather than looking only at the overall number of credits provided for an offset. Therefore the proposal has met a Tier 2 outcome for two vegetation communities (Communities 1 and 3) because the credit requirement for these communities has been met. However, in the case of 'Community 5' the proposal does not provide the full number of credits as required by the BBAM. Hence the proposal provides a Tier 3 'Mitigated Net Loss' outcome for Community 5.

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Nevertheless the EPA remain of the view that the offset is not the most desirable design with a poor edge to area ratio and will also be subject to all the indirect impacts of adjacent operations for the life of the mine.

b) Offset Security

The EA still presents conflicting information regarding the security of the offset. Part 4 – Ecology Assessment states that the offset would not be afforded long term protection through land tenure, however Section 4: Assessment and Management of Key Environmental Issues and the Statement of Commitments notes that in-perpetuity conservation arrangements would be implemented.

Recommendations:

That, prior to granting any approval to the project, the Department of Planning and Infrastructure:

- **Clarify with the proponent the exact location of all infrastructure in relation to the proposed offset (including proposed amenity bunds and relocated powerlines and optic fibre cables that are not included on the offset maps) and determine whether these impact the proposed offset.**
- **Require the proponent to commit to a clearly defined BOS, which includes clear map of the specific areas to be included within the offset, excluding other remnant vegetation.**
- **Clarify with the proponent whether the BBAM has included areas of native vegetation or proposed revegetation that will not actually form part of the offset.**
- **Require the proponent to implement suitable in-perpetuity conservation arrangements for all components of the BOS. The EPA prefers the proponent to implement one of the following methods:**
 - **Biobanking Statement/Agreement**
 - **Conservation Agreement**
 - **Trust Agreement or**
 - **Planning Agreement.**

The Statement of Commitments should be updated to reflect commitments to implementing the BOS as discussed above.

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GROUNDWATER

1) Further information/clarification is required regarding the proposed measures to protect groundwater from pollution.

The EA makes reference to lining several contaminated or dirty water/waste storage structures with compacted clay, to achieve a permeability of 1×10^{-9} m/s or less. These structures include:

- The 2 dewatering ponds;
- Raw Water Dams; and
- Process Water Dams.

Recommendations:

Further information regarding construction of these clay liners is required. This includes the location of liners (e.g. floor and walls), overall thickness of liners, thickness of successive layers, gradients of sides of structures of clay liners etc for the structures referred to above.

The EPA's standard requirement for these types of liners is to achieve a permeability of 1×10^{-9} metres per second (m/s) or less with a re-compacted clay liner of at least 90 centimetres (cm) in thickness. Where the proposed liner will not meet this thickness and the natural geology of the site in conjunction with constructed clay liners is considered sufficient in meeting this requirement, sufficient evidence must be provided in support of this to demonstrate the construction will be adequate to prevent pollution of groundwater (e.g. geological evidence, groundwater modelling etc).

2) Details of the proposed QA/QC program must also be provided to ensure earthworks (compaction etc) are undertaken in the appropriate manner and the design criteria are achieved.

3) Further information is required regarding the proposed groundwater monitoring network particularly around the TSF, but also any other groundwater monitoring across the site. This includes the number and locations of piezometers, as well as parameters to be monitored.

Noting it is the EPA's expectation that piezometers are located in strategic locations, depending on the location of structures with the greatest risk to groundwater and other factors such as groundwater flow direction etc. This would include locating piezometer up gradient and down gradient of structures with the greatest risk to groundwater.

Information must also be provided regarding the reasoning behind the proposed groundwater monitoring network (locations of monitoring points, depth of groundwater monitoring bores, parameters monitored etc).

Groundwater Monitoring is discussed further under the heading "Water" in Attachment C.

It is noted that the floor of the TSF will be lined with 900 millimetres (mm) of material compacted to achieve a permeability of less than 1×10^{-9} m/s. Whilst this meets the requirements of the EPA in terms of lining, at this rate, the contaminants in the waste gold processing slurry still have potential to permeate from the TSF within about 28 years of commencement of use of the facility.

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Recommendations:

Given the nature of the gold processing slurry and the potential legacy of the contaminants to be stored in the TSF, it is recommended that the proponent be requested to provide:

- i) an assessment of the long term fate of contaminants in the TSF;
- ii) an assessment of potential impacts on groundwater quality in the longer term, against ANZECC 2000 criteria for any beneficial uses likely to be impacted; and
- iii) longer term arrangements for management, monitoring and response to any such impacts beyond the operational life of the proposed mine.

The Statement of Commitments should be updated to reflect commitments to implement measures to protect groundwater as discussed above.

HAZARDOUS MATERIAL MANAGEMENT

In 2010 the Department of Health and Aging National Industrial Chemical Notification and Assessment Scheme (NICNAS) finalised their assessment report on the use of sodium cyanide at gold mines. The report was entitled "Priority Existing Chemical Assessment Report No 31- Sodium Cyanide" (the NICNAS report).

This document makes recommendations regarding concentration limit controls in conjunction with other wildlife exposure minimisation strategies to protect wildlife. This in conjunction with existing EPA policy on sodium cyanide use in mines sets the basis for licensing cyanide use at mines in NSW.

To ensure consistency with the policy documents mentioned above cyanide limits set by the EPA at new mine sites are developed to ensure zero fauna deaths at Tailing Storage Facilities (TSF's).

Licence limits for Week Acid Dissociable (WAD) cyanide are to be applied to the tailings as they are freshly discharged to the TSF. A sample taken at the edge of the TSF is not an acceptable sampling location.

The NICNAS report mentioned above makes recommendations regarding concentration limit controls in conjunction with other wildlife exposure minimisation strategies to protect wildlife. This is contained in *Table 5a: Framework for Management of Risks to Wildlife from Sodium Cyanide Use in Gold Mining* in the NICNAS report mentioned above.

The EPA's policy on setting licence limits for cyanide at TSFs is to set limits in line with the categories of protection afforded to wildlife as referred to in Table 5a of the NICNAS report to ensure an adequate level of protection is provided to wildlife. In accordance with the requirements of NICNAS, measures to protect wildlife must be provided upfront and cannot be provided in retrospect.

It is noted that the NICNAS report indicates all categories of cyanide facilities (outlined in Table 5a of NICNAS) must employ wildlife exclusion actions (such as fencing around the base of TSFs and floating balls on ponded areas for example) upfront and not in retrospect. This requirement is regardless of the concentration limit.

Section 4.5.7.3.4 of the EA outlines proposed management measures to reduce potential for exposure of fauna to cyanide including limiting the concentration of WAD cyanide discharged to the Tailings Storage Facility (TSF) to a 90th percentile of 30mg/L and maximum concentration of

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less than 50 milligrams per litre (mg/L) in conjunction with a number of other wildlife exposure minimisation strategies to protect wildlife. Based on the information provided in the EA the EPA is of the opinion the site should be able to be managed in accordance with Category 2 of NICNAS.

The EA identifies a number of threatened species that have potential to access cyanide laden water within the TSF. It is the EPA's preference that control of concentration limits should be used as a primary means of preventing impact in preference to other wildlife exposure minimisation strategies as this is the most effective measure to protect wildlife.

Due to the presence of threatened species at and in vicinity of the site and to ensure consistency with EPA policy, the EPA would consider concentration limits of 20 mg/L (90th percentile) and 30 mg/L (maximum) for WAD cyanide discharged at the TSF appropriate in this scenario. This is consistent with similar mining developments recently approved in the region. If the proponent is able to meet these limits the EPA would be amenable to allowing a reduction in wildlife monitoring frequency to the proposed frequency of once per week as proposed (noting category 2 of NICNAS requires monitoring 2-3 times per week).

It is also noted that category 2 NICNAS facilities require preparation of a response program in case impacts do occur, which has not been accounted for in the proposed management measures.

Recommendations:

Clarification is required regarding:

- 1) Whether the proponent is able and willing to commit to discharge limits of 20mg/L (90th percentile) and maximum of 30mg/L of WAD cyanide at the discharge point to the proposed TSF to ensure consistency with EPA policy.**
- 2) Depending on 1) above clarify wildlife monitoring requirements to ensure compliance with category 2 of NICNAS.**
- 3) Provide further information on a response program in case impacts occur and provide a commitment to prepare a formal Response Program.**
- 4) Provide confirmation that proposed wildlife exposure minimisation strategies will be provided upfront and not in retrospect.**

This information will assist the EPA in determining suitable concentration limits for discharge to the proposed TSF and what monitoring and controls details need to be included on the licence.

The Statement of Commitments should be updated to reflect commitments regarding wildlife exposure minimisation strategies to cyanide as discussed above.

WASTE

Table 2.6 of the EA provides details of non-productive wastes that will be generated throughout the life of the project and how each class of waste would be stored or managed. Under the "tyres" heading it is indicated that if re-use or recycling of tyres is not practicable, then used tyres would be encapsulated within the waste rock emplacements.

This is not considered an appropriate means of disposal due to potential problems associated with achieving required compaction rates and to ensure tyres do not 'float' to the surface, which may have implications in terms of rehabilitation. It is recommended consideration be given to offsite

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reuse or recycling of waste tyres or return to supplier options. If this is deemed not practical suitable alternate onsite methods of disposal should be reconsidered.

Recommendations:

That further consideration be given to offsite reuse or recycling of waste tyres or return to supplier for appropriate disposal options.

The Statement of Commitments should be updated to reflect commitments regarding reuse, recycling or disposal of waste tyres as discussed above.

AIR

In summary, exceedances of the 24-hr PM₁₀ criterion (50 µg/m³) are predicted for some receptors to the north of the Mine Site. These impacts will occur during the operation of Waste Rock Emplacement (WRE) 2 and WRE 3 located in close proximity to nearby receptors (this is discussed further below). The EPA notes that based on the meteorological data used for the assessment, the zone of affection would likely extend further north to include additional receptors than predicted.

Further, the AQIA has not addressed non-particulate emissions such as cyanide from residue storage facility and vehicular emissions; these sources must be included in the Air Quality Impact Assessment (AQIA) and Air Quality Management Plan (AQMP).

Receptors to the north of Mine Site will be most vulnerable to adverse air quality impacts during the first four years of mining, due to WRE2 and WRE3

Worst-case impacts at the sensitive receptors are predicted for Scenarios 2 & 3 (the end of Years 1 and 2 respectively). These scenarios model the active use of the waste residue emplacement areas WRE2 and WRE3, where the former is located immediately to the south of the residential zone, and the latter immediately south east. TSP emission rates of up to 90,000 kilograms per year (kg/year) (Year 2) are predicted due to hauling of extracted waste material from the open cut pits to these waste areas. Maximum project-only 24-hr PM₁₀ concentrations are predicted to exceed 30 micrograms per cubic metre (µg/m³) during this phase (*Tables 8.2 and 8.3 AQIA*).

The operation of WRE 2 would have ceased by the end of Year 4 following vegetative rehabilitation (though WRE 3 would remain active). Predictions of 24-hr PM₁₀ concentrations reflect this change of mine plan (maximum project-increment reduces to 26 µg/m³; Table 8.4). Comparison of frequency distributions for predicted 24-hr PM₁₀ concentrations also reflect this improvement in air quality (Figures 35-37 AQIA), with reduced frequency of predictions above 25 µg/m³.

Following the shutdown of WRE 2, the zone of affection will move closer to the northern boundary of the Mine Site and away from the cluster of residential receptors. As a result, fewer residents will experience project-increments consequential to exceedances of the OEHS 24-hr PM₁₀ criterion.

Emissions of non-particulate pollutants from the project such as cyanide emissions have not been addressed in the AQIA

Given the use of cyanide in gold extraction, it is understood that residual amounts of cyanide would be deposited with the Tailings Storage Facility (TSF). It would be expected that the TSF when operational would be a source of cyanide and population exposure to cyanide vapour

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emission would be of concern from this Project. The AQIA has not addressed this aspect of the project.

It would be expected that ore crushing and screening operations would also contribute to metallic emissions, which are not addressed in the assessment undertaken.

Emissions from mobile fleet sources on the Mine Site have not been addressed.

TAPM-generated wind data for the Mine Site does not appear to accurately reflect observations and the zone of affection may extend further north of Mine Site than predicted

The EA (pp 4-9) states that "PAEHolmes (2011)... reviewed meteorological data from the closest suitable meteorological station to the Mine Site, namely the Peak Hill Gold Mine Meteorological Station operated by the Proponent". And, "a review of the meteorological data indicated that calm conditions (winds less than 0.5m/s) were recorded at the weather station for 24.6% of the time during 2003". The modelling uses TAPM-generated meteorology on the basis that "PAEHolmes (2011) suggest that this was an unusually high proportion of calm conditions."

This assumption is questionable, not only due to lack of justification, but also because it disagrees with the *Bureau of Meteorology* long-term averages for Peak Hill Post Office which shows 22% to 29% calms on an annual basis. Peak Hill is located 15 kilometres (km) south of the Mine Site and has undulating terrain to the east, a topographical feature very similar to the Mine Site.

However, TAPM-generated wind data for the Mine Site (Fig 8, pp 6-52 AQIA) has different patterns to Peak Hill observations (Fig 5, pp 6-49). In particular, the predicted wind roses for the Mine Site have an insignificant proportion of calms (9%) compared to the observed data for Peak Hill sourced from BOM and the Proponent's weather station. Further, the wind roses derived for the Mine Site also lack the dominant southern winds typically observed at Peak Hill.

While the low percentage of calms may be attributed to the use of TAPM (known for under-predicting calm conditions), the lack of a significant southern wind sector component suggests that the meteorological data generated for the assessment is of questionable quality. The AQIA predicts cumulative exceedances of the EPA's 24-hr PM₁₀ criterion at Receptors 3, 28, 29, 32, 33 and 40 only, out of the 29 residences clustered to the north of the Mine Site. It follows that the EPA's air quality impact assessment criteria will be exceeded at a greater number of residences than has been reflected in the AQIA.

Source of background PM₁₀ concentration used to derive cumulative 24-hr PM₁₀ concentrations is unclear

The AQIA states that "... continuous records of 24-hour PM₁₀ concentrations are not available for this site. As the site has HVAS monitors recording TSP only there are no PM₁₀ data available...". On the other hand, it also states that "VEPA recommends that the monitored 70th percentile PM₁₀ concentration (in this case 25µg/m³) be added to the maximum prediction at each sensitive receptor..... Using the VEPA 70th percentile approach, a level of 25µg/m³ can be added to the maximum 24-hour average modelling predictions for each receptor."

The above statements are contradictory. While the lack of monitoring data is evident from the AQIA, the data used to source the background PM₁₀ concentration (25 µg/m³), and its relevance to the study site remains unclear.

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Additional measures to those outlined in the Statement of Commitments must be included in the Air Quality Management Plan

The Statement of Commitments (SoC) outlines some measures which must be strictly applied to limit emissions due to activities associated with WRE 2 and WRE 3. These are included in Attachment C, for emphasis. Additional measures such as imposition of speed zones and Level 2 watering of haul roads are recommended.

Measures for controlling major non-wind erosion sources such as road grading must be included.

Meteorology and air quality measurements must be incorporated to effectively manage the operations and limit adverse impacts. Further details on the proposed air quality monitoring program are discussed in Attachment C.

Recommendations:

That the Air Quality Impact Assessment be revised to address the issues identified above.

The Statement of Commitments should be updated to reflect additional commitments identified following the revised assessment as discussed above.

NOISE

The following clarifications and/or additional information are required for the EPA to assess the full impacts of the project in terms of noise and blasting.

- Table 10 of the Noise and Blasting Assessment (NBA) identifies the locations and dates during which unattended noise monitoring was undertaken, together with the ambient LA90(15min) noise levels during day/evening and night time. Monitoring was undertaken in May 2009 at some locations and during October 2009 at locations R3 and R23. Further information, explanation and justification should be provided as to why R3 and R23 were monitored at a different time and season, including further assessment of the implications (if any) of this on the overall noise assessment.
- The EPA notes Table 11 of the NBA shows the results of operator-attended noise surveys at locations R1 to R5; these were undertaken at the end of May 2009 and not concurrently with the unattended noise monitoring during early May and October 2009. Further information should be provided to confirm that the operator-attended survey results were still representative of the noise environment during the unattended monitoring sessions.
- Section 6.3 of the NBA discusses the concept of a 'principal haulage route' with reference to Tomingley West Road and Tomingley – Narromine Road. It is unclear whether the local authority has formally identified these roads as 'principal haulage routes' and confirmation should be provided that this is the case before adopting the collector road criteria for these roads. Section 11.1.1 of the NBA states that "Tomingley West Road is a local road administered by Narromine Shire Council".

This information is required to confirm that the project specific operational noise, construction noise, sleep disturbance, road traffic and blasting criteria presented in Section 6 of the NBA have been derived correctly.

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- Section 7.2.2 of the NBA states that the overall LAeq sound power levels (SWL) for mine equipment in Table 25 are indicative only, and that the total mine SWL is to be used to manage on-site noise emissions. In contrast, however, the second last paragraph of this section states that reasonable and feasible noise controls to be adopted in the modelling and assessment of noise impacts include achieving the SWLs in Table 25. These two statements should be reconciled to clarify this apparent inconsistency.
- The NBA in Section 10.2 should show the expected distances between residences and pipeline construction activities at their closest point.
- Although the EPA does not regulate structural damage due to blasting, it is noted that Section 12.2.2 identifies an offset distance of 105m as corresponding to a 50 millimetre per second (mm/s) structural damage vibration level at the Newell Highway Underpass. The text then goes on to say that monitoring is strongly recommended when blasting is to take place within 70m of the underpass, well within this range. It is possible that this statement is in error and the distances should be reviewed and clarified.
- The EPA notes that blast MICs at the mine may need to be reduced in some cases to achieve the ANZECC 115dBL airblast criterion, and that monitoring should be undertaken for all blasts at the site.

Recommendations:

That the Noise Impact Assessment be revised to address the issues identified above.

The Statement of Commitments should be updated to reflect additional commitments identified following the revised assessment as discussed above.

WATER

The EPA's review of the EA in terms of surface water management has identified the need for additional information where this information is fundamental to assessing the likely impacts of the proposal and cannot therefore be provided as an approval condition. The primary issues of concern are:

- whether the entire mine site will be isolated from a 100 year ARI flood event;
- minimum freeboards to be maintained in the Tailings Storage Facility (TSF) and the process and raw water dams and an assessment of water quality impacts in the event of overtopping;
- the potential longer term impacts from, fate of, management and monitoring of contaminants placed in the TSF;
- flocculants to be used to treat water captured in sediment basins;
- erosion and sediment control measures for pipeline construction;
- management of groundwater pumped from the open cut voids;
- post closure water management; and
- the need for consolidated surface and groundwater monitoring programs.

These issues are discussed individually below.

Mine Site Flood Management

It appears the proposal is designed to exclude flood waters from a 100 year ARI event from entering mine structures and operational areas. However, there is no categorical statement of this nature.

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Recommendation:

It is recommended that the assumption noted above be confirmed with the proponent.

The remainder of the EPA's comments assumes the mine has been isolated from all off-site waters (except that piped in for potable and process water supply).

Tailings Storage Facility, Process and Raw Water Dam Freeboards

It is noted that the Tailings Storage Facility (TSF) will be designed to store 4.8 million cubic metres (m³) of material, and that the expected volume of residue is 3.9 million m³ over the mine life. It is also noted that the TSF will be constructed in stages and as such it is unclear what freeboard depth will be maintained at any point in time to prevent overtopping during a rainfall event. Similarly, it is unclear what freeboard will be maintained in the process water and raw water dams.

Should these dams overtop it is noted from Figure 2.5 that there will be catch banks and channels on the south and southwestern sides of the site that will direct this flow to sediment basins. However, given the nature of the tailings and the potential elevated salinity in the raw water and process water dams, such an overtopping event would compromise the primary purpose of erosion and sediment control measures.

Recommendation:

It is recommended that the proponent be requested to provide further information about:

- **the minimum freeboard that will be maintained in each of these dams/facilities at any time;**
- **the probability of the proposed minimum freeboard being overtopped; and**
- **an assessment of the water quality impacts from these dams in the event they are overtopped against relevant ANZECC 2000 benchmarks, taking into account dilution from expected flow volumes in rainfall events that cause the overtopping.**

Erosion and Sediment Control

Sediment Basin Design Sizing

The EA (*Surface Water Assessment*) proposes five sediment basins sized for the 5-day, 90th percentile rainfall depth (35.6mm) consistent with Landcom (2004) and DECC (2008). The proponent notes that DECC (2008) suggests that sediment basins for a mine such as this should be designed for the 10 or 20-day event. Please note that the extended duration recommended by DECC (2008) for mine sites is designed to maximise the volume of water available for on-site re-use, rather than the effectiveness of the system to manage sediment and ultimately discharge quality. That is, the proposed basin sizing is adequate and the proponent will simply need to undertake more intensive management to return the sediment basins to design rainfall capacity within 5 days following each rainfall event than would have been the case if they were designed for a 10 or 20 day management cycle.

Notwithstanding the above, we note that the maximum harvestable right allowance for the site is 51.0 Megalitres (ML) of storage, and that the proposed total capacity of the 5 sediment basins is 46.32ML. There is scope to increase the sediment basin sizes and remain within this limit.

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Recommendation:

It is recommended that the proponent consider increasing the sediment basin sizes to a cumulative 51ML to maximise the potential for on-site reuse and minimise the water extraction needs and energy requirements from sourcing this additional water from the proposed pipeline.

Sediment Basin Discharge

The proposal indicates that a discharge quality of less than 50 milligrams per litre (mg/L) TSS will be achieved, which is consistent with licensing requirements across most other mining operations. The achievement of this discharge quality within 5 day management periods may require the use of flocculants. Selection of a flocculating agent, if required, should aim for a low impact product.

The EPA recommends that the proponent use flocculants that have a Lethal Concentration 50 (LC50) of >100 mg/L.

Toxicity tests should be assessed against a waterflea (eg cladoceran), a relevant fish species for the area and a freshwater alga to provide confidence that the flocculant is suitable, noting that cationic flocculants are often the most toxic and that some anionic flocculants can have low toxicity to fish but high toxicity to waterfleas.

Recommendation:

It is recommended that the proponent provide information about the type, toxicity and management of flocculants proposed to treat water captured in sediment basins. In the absence of further information the EPA will use a licence limit for polyelectrolyte flocculants used in sediment basins of LC50 less than 100mg/L.

Monitoring of Sediment Basin Discharges

The EA includes a commitment to monitor surface water quality for pH, electrical conductivity, total suspended solid concentration and oil and grease levels at licensed discharge points, receiving waters and clean, dirty and dewatering dams.

The environmental assessment (*Soils and Land Capability Assessment*) indicates that the majority of the material within 4m of the surface has moderately low salinity and that topsoil is slightly acidic, and the pH increases rapidly with depth. The proposed monitoring parameters are suitable given this information. However, waste rock emplacements are rehabilitated overtime by placing topsoil back on top. There will be some time where this waste rock is exposed to surface runoff to sediment basins within the mine site. While we note that the waste rock has low acid forming potential, there may be some other contaminants that are able to be eroded or leached from rock surfaces prior to top soil placement.

Recommendation:

As a precautionary measure it is recommended that pH, electrical conductivity and a full scan of metals that may be contained in waste rock also initially be monitored in the sediment basins before any discharge to receiving waters, and that this

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monitoring be included in a water management plan for the site (see recommended approval conditions under "Water" heading in Attachment C).

This monitoring may be removed once it is demonstrated that pH, salinity and relevant metal levels potentially associated with stormwater runoff from disturbed and rehabilitating surfaces do not impact on the water quality objectives of receiving waters.

Open Cut Void De-Watering and Onsite Groundwater Reuse

The proposed open cuts will intercept fractured groundwater-bearing layers with subsequent inflows into the open cut void. The proposal indicates this groundwater will be pumped to one of two dewatering ponds for use in processing and dust suppression and that the salinity, potential heavy metals and the presence / absence of cyanide will be monitored.

The environmental assessment indicates that deep groundwater water in the vicinity of the site is saline with an electrical conductivity (EC) range of 10,800 micro-Siemens per centimetre ($\mu\text{S}/\text{cm}$) to 27,000 $\mu\text{S}/\text{cm}$. This EC range has an irrigation water salinity rating of extreme (ANZECC guideline classification scheme).

The environmental assessment also indicates elevated concentrations of chloride and sodium in the groundwater. A high proportion of sodium in soil can result in soil sodicity, a condition that makes soils erodible and dispersible, limits water infiltration and reduces hydraulic conductivity. This in turn limits leaching which may produce saline subsoils as salt accumulates in the soil profile. The use of groundwater from the voids for dust suppression or site rehabilitation will therefore require close management to avoid these soil impacts.

Further, the environmental assessment identifies elevated levels of bicarbonate in the groundwater. Given the duration of the project, this may eventually lead to a relatively high concentration of bicarbonate in the soil due to evapotranspiration. As a result, calcium and magnesium may precipitate as insoluble carbonates, making them unavailable to vegetation and impacting on soil structure through an increased sodium adsorption ratio.

In general, the deeper groundwater on its own appears to be unsuitable for most reuse applications involving land irrigation of land including dust suppression. Careful management will therefore be necessary such as shandyng with fresher water sources, and assessment and management of sodicity impacts, impacts on soils and vegetation that may be irrigated, losses to sediment ponds that capture runoff from the amenity bund area that is then discharged to the environment, increased erosion due to sodicity impacts on soils, impacts on reduced soil quality and associated reduction in viability of post-mining land use.

Recommendation:

Given the nature of the groundwater and its potential impacts on soil and vegetation, it is recommended that the proponent prepare Groundwater Reuse Procedures as part of a broader Groundwater Management and Monitoring Plan. This recommendation forms part of the proposed approval conditions provided in Attachment C.

Note that the groundwater reuse management plan may require shandyng or additional treatment of groundwater, or alternative groundwater disposal options. Any reduction in the amount of groundwater able to be used on-site as a consequence of this groundwater

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reuse management plan will require the proponent to review the water balance provided in the environmental assessment.

Post Closure Water Management

Tailings Storage Facility

Although the proponent has committed to a shallow groundwater monitoring program to confirm the integrity of the TSF (s4.13.3.2), it is unclear what duration for which this monitoring would be undertaken. It is noted that the floor of the TSF will be lined with 900 mm of material compacted to achieve a permeability of less than 1×10^{-9} m/s. At this rate, the contaminants in the waste gold processing slurry may permeate from the residue storage facility within about 28 years of commencement of use of the facility.

Recommendations:

Given the nature of the gold processing slurry and the potential legacy of the contaminants to be stored in the TSF, it is recommended that the proponent be requested to provide:

- iv) an assessment of the long term fate of contaminants in the TSF;**
- v) an assessment of potential impacts on groundwater quality in the longer term, against ANZECC 2000 criteria for any beneficial uses likely to be impacted; and**
- vi) longer term arrangements for management, monitoring and response to any such impacts beyond the operational life of the proposed mine.**

Process water dam

Process wastewater is reused during the mining process. However, it is not clear how the remaining process water will be managed after mining operations are completed.

Recommendation:

It is recommended that the proponent be requested to advise how all residual water will be managed at the end of the mining operations.

The material used to construct process water dams may also be contaminated during the mine life and should be considered as part of waste management in the decommissioning of the dam and rehabilitation of the site.

Bunding of the Carbon in leach Process Area and Chemical Storage Areas

The proponent should consider any reduction in effective volume of banded areas due to the cumulative volume of all the containers stored and whether there is any likelihood that more than one container could fail at a time. For example, if damage to one container is likely to damage another then the size of the containment area may need to be increased.

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ATTACHMENT C

Recommended Conditions of Consent

NOISE

Limit Conditions

L6.1 Noise generated at the premises must not exceed the noise limits in the table below. The location groups referred to in the table below are indicated by Table 4 of 'Tomingley Gold Project – Noise and Blasting Assessment' (NBA) prepared by SLR Consulting dated September 2011 (Report Number 10-7910R1D10 Draft 10).

Noise Assessment Group	Location	NOISE LIMITS dB(A)			
		Day	Evening	Night	
		L _{Aeq} (15 minute)	L _{Aeq} (15 minute)	L _{Aeq} (15 minute)	L _{A1} (1 minute)
A	All receivers	37	37	37	47
B	All receivers	36	36	36	46
C	R3	49	38	38	48
	R29	48	37	37	47
	All other receivers	46	37	37	47
D	All receivers	43	38	38	48
	Any other residential receiver	35	35	35	45

L6.2 For the purpose of condition L6.1;

- Day is defined as the period from 7am to 6pm Monday to Saturday and 8am to 6pm Sunday and Public Holidays.

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- Evening is defined as the period 6pm to 10pm.
- Night is defined as the period from 10pm to 7am Monday to Saturday and 10pm to 8am Sunday and Public Holidays.

L6.3 The noise limits set out in condition L6.1 apply under all meteorological conditions except for the following:

- a) Wind speeds greater than 3 metres/second at 10 metres above ground level.
- b) Stability category F temperature inversion conditions and wind speeds greater than 2 metres/second at 10 metres above ground level; or
- c) Stability category G temperature inversion conditions.

L6.4 For the purposes of condition L6.3:

- a) Data recorded by a meteorological station installed on site must be used to determine meteorological conditions; and
- b) Temperature inversion conditions (stability category) are to be determined by the sigma-theta method referred to in Part E4 of Appendix E to the NSW Industrial Noise Policy.

L6.5 To determine compliance:

- a) with the $L_{eq(15\text{ minute})}$ noise limits in condition L6.1, the noise measurement equipment must be located:
 - approximately on the property boundary, where any dwelling is situated 30 metres or less from the property boundary closest to the premises; or
 - within 30 metres of a dwelling façade, but not closer than 3m, where any dwelling on the property is situated more than 30 metres from the property boundary closest to the premises; or, where applicable
 - within approximately 50 metres of the boundary of a National Park or a Nature Reserve.
- b) with the $L_{A1(1\text{ minute})}$ noise limits in condition L6.1, the noise measurement equipment must be located within 1 metre of a dwelling façade.
- c) with the noise limits in condition L6.1, the noise measurement equipment must be located:
 - at the most affected point at a location where there is no dwelling at the location; or
 - at the most affected point within an area at a location prescribed by conditions L6.5(a) or L6.5(b).

L6.6 A non-compliance of condition L6.1 will still occur where noise generated from the premises in excess of the appropriate limit is measured:

- at a location other than an area prescribed by conditions L6.5(a) and L6.5(b); and/or
- at a point other than the most affected point at a location.

L6.7 For the purposes of determining the noise generated at the premises the modification factors in Section 4 of the NSW Industrial Noise Policy must be applied, as appropriate, to the noise levels measured by the noise monitoring equipment.

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L7 Blasting Limits

- L7.1 The airblast overpressure level from blasting operations at the premises must not exceed 115dB (Lin Peak) at any noise sensitive locations for more than five per cent of the total number of blasts over each reporting period. Error margins associated with any monitoring equipment used to measure this are not to be taken into account in determining whether or not the limit has been exceeded.
- L7.2 The airblast overpressure level from blasting operations at the premises must not exceed 120dB (Lin Peak) at any time at any noise sensitive locations. Error margins associated with any monitoring equipment used to measure this are not to be taken into account in determining whether or not the limit has been exceeded.
- L7.3 Ground vibration peak particle velocity from the blasting operations at the premises must not exceed 5mm/sec at any noise sensitive locations for more than five per cent of the total number of blasts over each reporting period. Error margins associated with any monitoring equipment used to measure this are not to be taken into account in determining whether or not the limit has been exceeded.
- L7.4 Ground vibration peak particle velocity from the blasting operations at the premises must not exceed 10mm/sec at any time at any noise sensitive locations. Error margins associated with any monitoring equipment used to measure this are not to be taken into account in determining whether or not the limit has been exceeded.
- L7.5 Blasting at the premises may only take place between 9:00am- 5:00pm Monday to Friday. Blasting is not permitted on public holidays.
- L7.6 Blasting outside of the hours specified in L7.5 can only take place with the written approval of the Environment Protection Authority (EPA).

M8 Requirement to Monitor Noise

M8.1 *To assess compliance with Condition L6.1, attended noise monitoring must be undertaken in accordance with Conditions L6.5 and:*

- a) at each one of the locations listed in Condition L6.1;
- b) occur annually in a reporting period;
- c) occur during each day, evening and night period as defined in the NSW Industrial Noise Policy for a minimum of:
 - 1.5 hours during the day;
 - 30 minutes during the evening; and
 - 1 hour during the night.
- d) occur for three consecutive operating days.

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Reporting Conditions

R4 Noise Monitoring Report

A noise compliance assessment report must be submitted to the EPA within 30 days of the completion of the yearly monitoring. The assessment must be prepared by a suitably qualified and experienced acoustical consultant and include:

- a) an assessment of compliance with noise limits presented in Condition L6.1; and
- b) an outline of any management actions taken within the monitoring period to address any exceedences of the limits contained in Condition L6.1.

Additions to Definition of Terms of the licence

- NSW Industrial Noise Policy - the document entitled "New South Wales Industrial Noise Policy published by the Environment Protection Authority in January 2000."
- Noise - sound pressure levels' for the purposes of conditions L6.1 to L6.7.

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AIR

An *Air Quality Management Plan* (AQMP) should be developed with key focus on best practice management of activities associated with the Waste Rock Emplacement (WREs) (further recommendations are made below), amongst other significant sources (grading roads, crushing areas, haul roads). The AQMP should incorporate an Air Quality Monitoring Program.

An Air Quality Management Plan (AQMP) for the Mine Site must be prepared

Various sources of wind-blown and mining-generated dust must be included in the management plan, which must outline all pro-active and reactive measures to be put in place.

The AQMP must identify best management practice for all key sources

The key sources/activities addressed in the AQMP (in order of magnitude of dust emissions) must be:

- Haul roads from open pits to ROM pad;
- Shovels/Excavators/Front End Loaders loading open pit ore to trucks;
- Haul roads from open pits to waste emplacement areas (WREs);
- Grading roads;
- Drilling and blasting activities;
- Primary and secondary crushing units; and
- Overburden dumps (or WREs) and tailings storage areas.

Relevant measures to be adopted for most of the above are included in Tables 9.1 and 9.2 of AQIA (included overleaf). However, additional measures should be identified, in particular for all activities associated with the operation of the WREs, grading of roads and tailings storage facility (as discussed next).

The Air Quality Management Plan must place a high priority on best practice management of activities associated with WRE 2 and WRE 3

- a. Noting that road haulage to these waste dump areas would be one of the higher emitting activities, the following should be applied as minimum:
 - *Limit development of minor roads as far as practicable.*
 - *Clearly mark all roads with marker posts or equivalent to control their locations, especially when crossing large overburden emplacement areas.*
 - *Speed limits must be imposed and Level 2 watering undertaken for all haul roads.*
 - *Rehabilitate all roads as soon as practicable once no longer required.*
- b. Other relevant measures would be in managing the waste dump area:
 - *Disturb only the minimum area necessary.*
 - *Shape, topsoil and rehabilitate completed sections of the waste rock emplacements as soon as practicable.*
 - *Limiting dozer movements on the stockpiles.*

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- c. Further, this source must receive priority in the process of developing the proposed Air Quality Monitoring Program. Day-to-day operations must be managed with due consideration for prevalent meteorological conditions. For example, the AQIA (pp 6-20) states "*dozers working on waste dumps have been assumed to occur between the hours of 6am and 7pm.*" The proposed operational hours should be reviewed daily upon considering prevalent meteorological conditions, and limited operational hours during unfavourable conditions must be imposed, with provisions to stop work during adverse conditions.
- d. The possibility of reduced areas and relocation of the waste dump areas should be considered to gain further improved air quality benefits.

Grading of roads must be managed to limit particulate emissions

Conditions must be imposed for this activity including watering of roads (active measure) and provisions to stop work under windy conditions (reactive measure).

Measures to limit emissions from the Tailings Storage Facility must be outlined in the Air Quality Management Plan

A management plan for this potentially major source of particulates, heavy metals and cyanide must be prepared outlining day-to-day and long-term management of this source. The plan must inform how the dam would be managed during active-use and post-mining phases so as to avoid adverse off-site impacts.

The AQMP must incorporate an air quality monitoring program

The use of a meteorology and air quality station will be necessary for the day-to-day operations at the Mine Site. Recommendations for the air quality monitoring program are outlined here.

e. *Establish reliable ambient particulate monitoring program*

- Nominate and establish a network of real-time particulate monitoring sites within and beyond the Project boundary for the purpose of gauging project activity emissions on short time-scales (i.e., less than 1-hour). These monitoring sites shall be referred to as "management monitoring" sites and monitoring data used for informing day-to-day reactive management measures. The management monitors should be fit-for-purpose but need not comply with AM-22.
- Nominate and establish a suitable number of ambient PM₁₀ monitoring sites at relevant locations for the purpose of determining compliance with the EPA 24-hr average concentration criterion (50 µg/m³). These shall be referred to as "compliance-monitoring sites". The compliance-monitoring program must be maintained so as to be capable of continuously monitoring the parameters specified in the following table.

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Parameter	Units of measure	Frequency	Averaging Period	Sampling Method
PM ₁₀	µg/m ³	Continuous	24-hour	AM-22
Additional requirements				AM-1 & AM-4
- Siting				AM-2 & AM-4
- Measurement				

f. **Design the particulate monitoring program to establish trigger levels for reactive management of on-site emissions**

- Identify short-term (i.e., less than 1-hour) particulate concentration trigger level(s) at "management monitoring sites" consistent with achieving 24-hr averages of 50 µg/m³ at "compliance-monitoring" site(s).
- Alert the mine manager when particulate levels exceed the nominated trigger level(s).

g. **Establish a reliable meteorological monitoring station**

A real-time meteorological weather station must be established and maintained on-site so as to be capable of continuously monitoring the parameters specified in the following table.

Parameter	Units of measure	Frequency	Averaging Period	Sampling Method
Rainfall	mm	Continuous	1 hour	AM-4
Wind direction @ 10 metres	°	Continuous	15 minute	AM-2 & AM-4
Wind speed @ 10 metres	m/s	Continuous	15 minute	AM-2 & AM-4
Additional requirements				AM-1 & AM-4
- Siting				4
- Measurement				AM-2 & AM-4

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h. **Establish trigger levels for reactive management of on-site emissions**

- Identify meteorological parameters, such as wind speed categories and wind direction (at specified averaging periods) that would form the trigger(s) for the operational management of specific particulate-generating mining activities.
- Alert the mine manager when the nominated trigger(s) are tipped.

i. **Identify management strategies**

Options to be adopted in response to meteorological and ambient particulate concentration triggers, for the reactive management of specific particulate-generating activities should be outlined, including the following as a minimum:

- All specific activities that are particulate-generating must be identified.
- Avoid high particulate-generating activities during adverse wind conditions, such as when winds are blowing directly towards the nearest sensitive receptors.
- Cease or reduce excavator and dozer operations when prevailing winds are in the direction of sensitive receptors.
- The mine manager must be provided with weather updates consistent with alerting to sudden onset of strong winds to enable timely application of water sprays necessary to reduce the potential for wind erosion.

ABORIGINAL CULTURAL HERITAGE

The proponent must prepare and implement an Aboriginal Cultural Heritage Management Plan

The OzArk Aboriginal Cultural Heritage (ACH) Assessment for the Tomingley Narromine Water Pipeline indicates Aboriginal objects are likely to be harmed in areas identified as having evidence of Aboriginal objects or where the presence of Aboriginal objects is likely. Mitigation strategies will need to provide assurances for the appropriate management of these sensitive areas.

The EPA expects that sufficient detail is considered when preparing the Aboriginal Cultural Heritage Management Plan (ACHMP) with regards to strategies to avoid objects or where this is not possible to minimise harm to objects. Specifically, the EPA considers that appropriate artefact analysis is undertaken of Aboriginal objects that will be harmed.

The EPA considers that all ACH information contributes to a regional context including the archaeological record. Future development in the region will be better informed from data gathered of artefact characteristics and their landscape pattern irrespective of sensitivity interpretations determined at the local level. The EPA is available to discuss the preparation of the ACHMP.

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WATER

Pipeline Construction

The proposal includes construction of a water pipeline to the mine site from the 'Woodlands' bore(s). This is over a considerable distance of 46 kilometres and so erosion and sediment control measures are an important consideration during construction, although no information appears to be included in the environmental assessment on this matter. It is recommended that the following approval condition be incorporated into DoP's final approval:

The proponent must install and manage erosion and sediment control measures during the construction of the water pipeline to the mine site from the 'Woodlands' bore(s) in accordance with the requirements of Managing Urban Stormwater – Soils and Construction – Volume 2A Installation of services

Surface Water Discharges

It is recommended that the following approval condition be incorporated into DoP's final approval:

The Proponent must ensure that all surface water discharges from the site comply with:

- (a) Section 120 of the POEO Act;***
- (b) a maximum of 50 milligrams per litre (mg/L) of suspended solids in any discharge of water from sediment basins, and any other discharge limits (both volume and quality) that may be specified by licensing instruments issued under environment protection legislation administered by the EPA.***

Water Management Plan

It is recommended that the following approval condition be incorporated into DoP's final approval:

The Proponent must prepare a Water Management Plan for the project. This plan must:

- (a) be prepared by suitably qualified and experienced person(s);***
 - (b) address construction, operation and post closure monitoring, management and response arrangements; and***
 - (d) include:***
 - a Site Water Balance;***
 - an Erosion and Sediment Control Plan;***
 - a Groundwater Management and Monitoring Plan;***
 - a Surface Water Monitoring Program; and***
 - a Surface and Ground Water Response Plan to respond to issues identified by the surface and groundwater monitoring programs.***
- The site water balance must include, as a minimum, a description of the conditions under which the capacity of the TSF, raw water or process water dam(s) may be exceeded and the likely water quality that could be discharged and its fate, plus contingencies for minimising impacts if these dams are close to exceeding capacity. The management of process mine water that remains following the completion of mining must be addressed in the water management plan.***

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The Surface Water Monitoring Program must include, as a minimum, the following components:

- (a) detailed baseline data on current surface water flows and quality in creeks and other waterbodies that could be affected by the project;**
- (b) surface water quality and stream health assessment that includes representative baseline survey of current aquatic life in drainage lines upstream and downstream of the mine site prior to commencement of construction;**
- (c) an initial surface water quality characterisation assessment of water quality in sediment basins and other water storage structures on the mine site to ensure they are collecting water of a quality consistent with their design purpose, and must include but not necessarily be limited to monitoring for pH, electrical conductivity, a full scan of metals, and total and WAD cyanide. The water quality monitoring conducted for this characterisation assessment must continue until such time as the EPA is satisfied that water quality in each of the surface water management structures is consistent with their respective design purposes and that the surface water can be managed in accordance with EPL conditions;**
- (d) an on-going monitoring program for operational and post closure stages of the mine, including specification of analytes, sampling frequency, sampling locations and triggers for management response, for:**
 - sediment basins including salinity and toxicants;**
 - reuse dams;**
 - discharges from the mine site;**
 - surface water flows, quality, and impacts on water users outside the mine site;**
 - stream health and channel stability in downstream waterways.**

The Groundwater Management and Monitoring Plan must include, as a minimum, the following components:

- (a) Groundwater Reuse Management Procedures that ensures salinity, sodicity and bicarbonate levels in groundwater used on-site is fit-for-purpose and managed to prevent:**
 - cumulative impacts on soil and vegetative condition;**
 - impacts on water quality in sediment basins; and**
 - impacts on permeability of pond linings.**

The Groundwater Reuse Management Procedures must include a detailed monitoring program that specifies relevant parameters and sampling frequency for any groundwater to be used on the site. The program must be designed to the satisfaction of the EPA.

- (b) an initial groundwater quality characterisation assessment of groundwater quality collected on the mine site. The groundwater quality monitoring conducted for this characterisation assessment must continue until such time as the EPA is satisfied that monitoring results have been adequately addressed by the Groundwater Reuse Management Procedures;**

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- (c) ***an on-going TSF groundwater monitoring program designed to assess the effectiveness of the TSF in containing contaminants. This monitoring program must operate at operational and post closure stages of the mine until such time as EPA approves the cessation of the program. The on-going TSF facility monitoring program must include specification of analytes, sampling frequency, sampling location and depths and triggers for management responses.***

Unless otherwise adequately justified by the proponent to the satisfaction of the EPA, the monitoring required by (b) and (c) above must include sample analysis for pH, EC, TDS, DO, redox potential, major cations and anions, acidity, alkalinity, TSS, a full scan of metals, bicarbonate, calcium, chloride and sulphate.

The monitoring required by (c) above must also include sample analysis for WAD cyanide.

Note: Relevant indicators and sampling frequencies may be revised over time.

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