

ASSESSMENT REPORT

CADIA EAST GOLD/COPPER PROJECT Surface Preconditioning (Blasting) Modification 06_0295 – Mod 5

1 BACKGROUND

Cadia Holdings Pty Ltd (Cadia) owns and operates the Cadia Valley mining complex, located approximately 25 kilometres (km) southwest of Orange, in the Central Tablelands of New South Wales (see Figure 1). The complex is located within the Cabonne and Blayney Local Government Areas (LGAs).



Figure 1: Regional Context

The Cadia Valley mining complex includes the Cadia Hill open cut mine, the Ridgeway underground mine and the Cadia East underground mine, as well as the Blayney Dewatering Facility, which is located approximately 25 km east of the mining complex in the town of Blayney (see Figures 1 and 2).

The mining complex operates under the Cadia East project approval (PA 06_0295), granted by the then Minister for Planning on 6 January 2010. This approval consolidated and replaced 4 previous Ministerial consents regulating open cut and underground operations since 1998.

The Cadia East project approval has been modified 4 times, and allows Cadia to undertake the following activities until 30 June 2031:

- extract ore from the Cadia and Ridgeway mines;
- process up to 27 million tonnes (Mt) of ore a year; and
- transfer processed ore via a pipeline to the Blayney Dewatering Facility, where it is dewatered and transported via rail to Port Kembla for export.

The underground mining method (panel caving) at Cadia East involves controlled caving of the rock mass by undercutting a block of ore. Mining progresses by advancing the undercut level beneath the ore block. As part of this process Cadia must 'precondition' the ore body to enhance and control the caving process. Preconditioning involves drilling into the ore body and using hydraulic fracturing or blasting techniques to create artificial fractures in the rock.

Cadia has approval to undertake the following preconditioning activities:

- hydraulic fracturing and blasting from the underground workings into the ore body; and
- hydraulic fracturing from the surface into the overlying host rock (Modification 4).

Since Modification 4 was approved, Cadia has identified that the approved preconditioning activities may not allow the caving zone to propagate to the surface in a safe and controlled manner. This is because the upper portion of the caving zone consists of more competent and harder host rocks than was previously expected. Consequently, Cadia is proposing to include blasting in its surface preconditioning program.

2 PROPOSED MODIFICATION

The proposed modification would involve drilling from the surface followed by underground blasting within two zones (see Figure 3). Each zone would be approximately 60 m to 140 m in length at the surface, and the drilling would follow an 8 m by 8 m drill hole pattern. Each drill hole would be approximately 400 m deep, with a total drilling length for the precondition of up to 40,000 m (10,000 – 20,000 m per zone).

Blasting would be conducted progressively with approximately 6 holes fired per blast. Each blast would extend over 100 m vertical intervals, meaning that 4 levels would need to be preconditioned to develop artificial faults to the surface. With 9 blasts per level there would be a total of 36 blasts per zone (72 in total for two zones).

Each of the drill holes would be sealed with a blast mat prior to blasting to control noise emissions and overpressure.

The drill holes would be located within the approved Cadia East subsidence zone (i.e. the same location as surface hydraulic fracturing), and there would be no additional surface disturbance (see Figures 2 and 4).

Operation of the surface drilling rig would be undertaken 24 hours a day over a 6 month period. Blasting would occur during the day and evening periods (7 am until 10 pm) Monday to Saturday. This is consistent with the approved operating hours.

Full details of the proposed modification are included in Cadia's Environmental Assessment (EA) (see **Appendix C**).

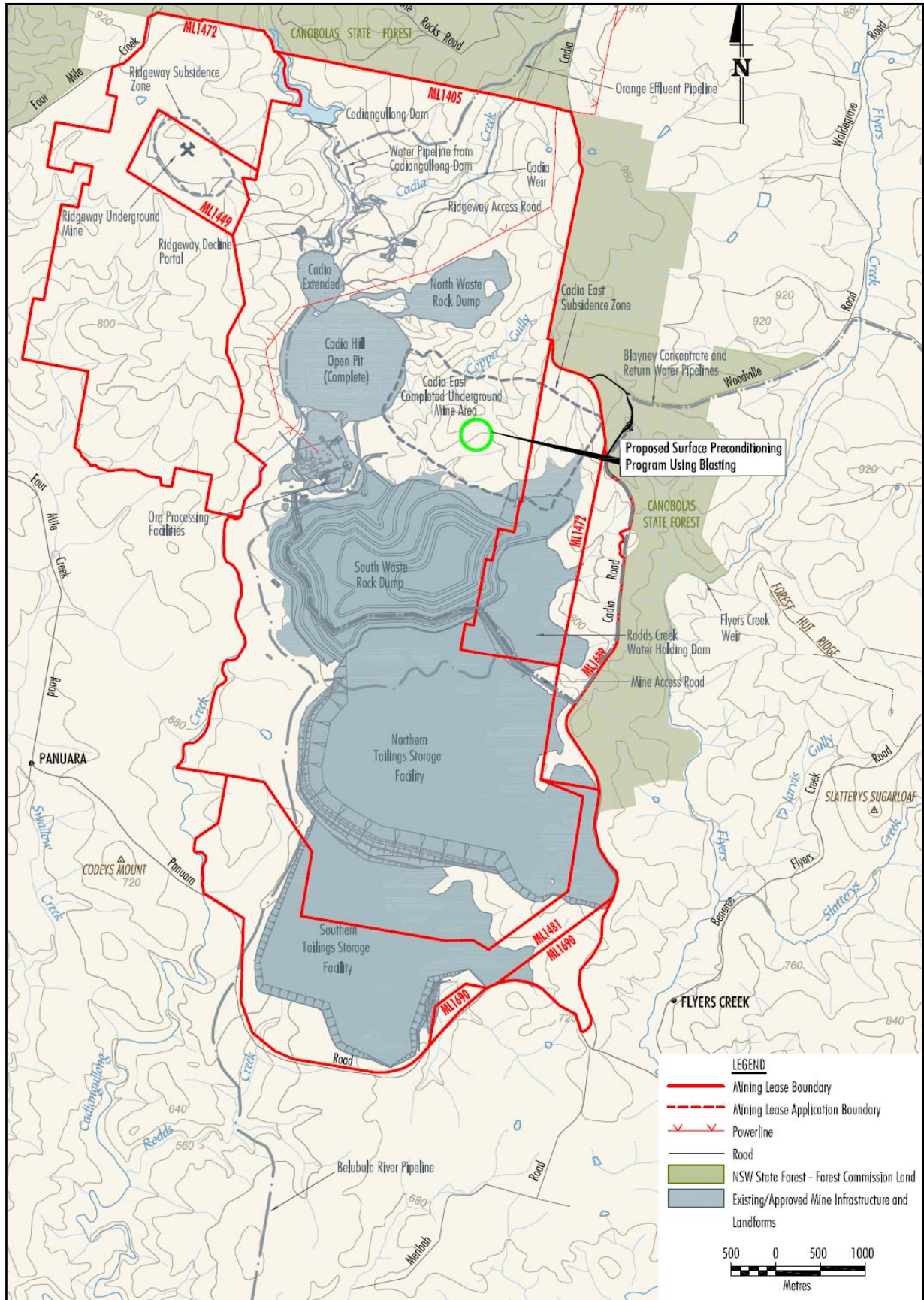


Figure 2: Existing Operations and Proposed Location of Surface Preconditioning

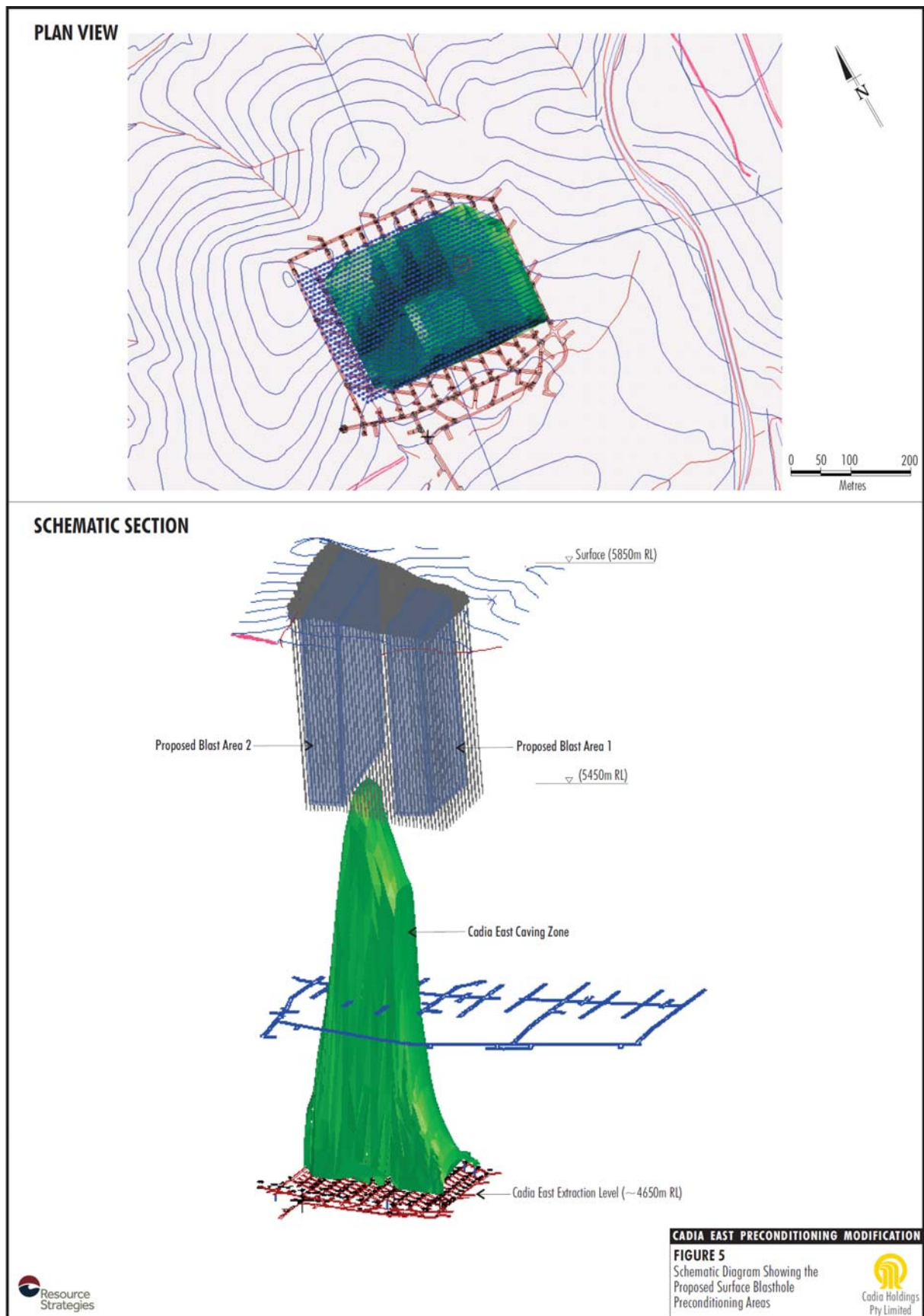


Figure 3: Blasting Zones



Figure 4: Approved Subsidence Zone

3 STATUTORY CONTEXT

3.1 Section 75W

The Cadia East Gold/Copper Project was approved under the former Part 3A of the *Environmental Planning and Assessment Act 1979* (EP&A Act). Part 3A was repealed on 11 October 2011, however the project remains a “transitional Part 3A project” under Schedule 6A of the EP&A Act. The proposed modification must therefore be considered under Section 75W of the EP&A Act, in accordance with the relevant savings provisions.

3.2 Approval Authority

The Minister for Planning is the approval authority for the modification application. However, under the former Minister’s delegation of 14 September 2011, the Director, Mining Projects may determine the application. This is because no public submissions objecting to the proposal were received, Blayney Shire Council and Cabonne Council did not object to the proposal and Cadia did not make any reportable political donations.

3.3 Modification

The Department is satisfied that the proposal can be characterised as a modification to the original approval rather than a new project in its own right. This is because, apart from surface-based blasting, the proposed preconditioning works would be consistent with the approved preconditioning works. Additionally, the proposed modification occurs within the existing subsidence zone and would not change the approved mining, processing and transport methods, extraction rate, operating hours, or the life of the project.

Consequently, the Department is satisfied that that the proposed modification is within the scope of Section 75W of the EP&A Act.

3.4 Environmental Planning Instruments

The Department has considered the relevant environmental planning instruments in its assessment and is satisfied that none of these instruments substantially govern the carrying out of the proposal.

4 CONSULTATION

The Department exhibited the application from 10 July until 24 July 2014, and made the EA publicly available on its website, at its Information Centre, and at Blayney Shire Council, Cabonne Council and Orange City Council.

The Department received submissions from 5 government agencies and 1 community member. No objections were received, and the community submission supported the proposed modification. A summary of the matters raised in submissions is provided below, and full copies of the submissions are included in **Appendix D**.

The Environment Protection Authority (EPA) raised no issues and confirmed that the noise and blasting conditions in Cadia's existing EPL could accommodate the proposed modification.

The NSW Office of Water (NOW) made general recommendations regarding water monitoring and water entitlements. NOW also confirmed that the proposed modification would not likely cause additional impacts on water resources beyond those assessed and approved under Cadia's existing approval.

The Division of Resources and Energy (DRE), Cabonne Council and Blayney Shire Council raised no issues and made no recommendations.

5 ASSESSMENT

In assessing the merits of the proposal, the Department has considered:

- the EA for the original project;
- the existing conditions of approval;
- the EA for the proposed modification;
- submissions on the application;
- relevant environmental planning instruments, policies and guidelines; and
- the requirements of the EP&A Act.

The Department believes that the key issues relate to potential impacts on groundwater resources, and potential noise and vibration emissions from the drilling rig and blasting. The assessment of these issues is summarised below. Based on its assessment, the Department is satisfied that all potential impacts resulting from the modification would be relatively minor and could be appropriately managed.

5.1 Groundwater

The EA includes a groundwater impact assessment undertaken by Australasian Groundwater and Environmental Consultants Pty Ltd (AGE), including a review of previous groundwater assessments for the site in the context of the proposed modification (AGE 2009, 2013 and 2014). The assessment accounted for both surface preconditioning activities (i.e. hydraulic fracturing and blasting).

There are 3 major hydrostratigraphic units within the project site and region, including the:

- overlying Tertiary basalt aquifer (the primary aquifer used by surrounding water users);
- underlying Silurian sequence (low yield aquifer, with higher yields along fractures); and
- Ordovician volcanistic basement rocks (very low yields, brackish water quality).

The modification would result in one key change to the groundwater aquifers within the approved subsidence zone: additional fracturing of the upper Tertiary and/or Silurian sequence along the proposed 140 m long by 400 m deep artificial fault planes that would result from blasting.

Monitoring data suggests that the aquifers within the proposed blasting areas are dry. However, if groundwater is present, it would be expected to drain into the fractures created within the artificial fault planes and move vertically towards the Cadia East underground workings.

The Department notes that seepage within this area has already been accounted for in the groundwater modelling for the Cadia East EA (2009). Therefore, the combination of blasting and hydraulic fracturing from the surface would not increase the amount of water draining from the surrounding aquifers into the Cadia East underground workings (i.e. no change to groundwater extraction amounts). As a result, the predicted location and magnitude of the regional groundwater drawdown would be the same as that already assessed and approved.

However, the combination of blasting and hydraulic fracturing activities would result in fractures to the surface approximately 3 years earlier than previously modelled in the Cadia East EA (2009). Consequently, NOW advised Cadia to ensure that it holds adequate water entitlements prior to this water take occurring.

Overall, the Department and NOW are satisfied that the proposed modification would have negligible additional impacts on groundwater above and beyond those already approved under the Cadia East Project.

The Department also notes that Cadia is required to review and if necessary update its Water Management Plan, including a review and revision of the existing management and monitoring plans to account for the proposed modification.

5.2 Blasting

The EA includes a blasting impact assessment undertaken by Wilkinson Murray. The assessment methodology was derived from actual measurements from blast monitoring on site, and the potential vibration impacts were predicted for the closest sensitive receivers located south and east of the site.

To achieve the blasting criteria under the existing conditions of approval, modelling indicates that a blast Maximum Instantaneous Charge (MIC) of up to 14,020 kg could be applied during the day, and 3,360 kg could be applied during the evening (see Table 1).

Table 1: *Blasting impact assessment criteria and the required blast MIC*

<i>Blasting impact assessment criteria</i>		<i>Required blast Maximum Instantaneous Charge to meet criteria</i>
<i>Time of blasting</i>	<i>Ground vibration (5% Exceedance)</i>	
Day (7 am – 6 pm)	5 mm/s	14,020 kg
Evening (6 pm – 10 pm)	2 mm/s	3,360 kg

Accordingly, Cadia proposes to apply the blast MIC's as set out in Table 1, and by doing so has committed to comply with the existing conditions of approval and therefore avoid any potential blasting impacts on sensitive receivers surrounding the mine.

The Department also notes and accepts that an assessment of blasting overpressure is not required because blasts would occur underground and the drill holes would be sealed.

The Department and the EPA are satisfied that the activities would comply with the existing blasting limits and that the proposed modification would not result in additional impacts on surrounding receivers.

Cadia proposes to continue monitoring blasting in accordance with its existing Blast Management Plan, which Cadia is required to update following the approval of any modifications.

5.3 Noise

The EA includes a noise impact assessment undertaken by Wilkinson Murray, including a review of existing and proposed noise emissions from the site.

The surface drilling rig would be the only additional noise emitting source associated with the modification. The Department notes that this was also the case for Modification 4.

The drilling associated with the proposed modification would not occur at the same time as the drilling previously approved under Modification 4, therefore a cumulative noise impact assessment of these 2 activities is not required.

The assessment found that under worst case conditions the proposed modification would not result in any exceedances of the night time project specific noise levels (PSNLs) at any receiver (i.e. the period when the most stringent PSNLs apply).

Consequently, the Department and the EPA are satisfied that noise emissions from the proposed modification would not result in any additional noise impacts to those already assessed and approved under the existing consent.

The Department notes that the existing approval requires Cadia to implement a range of noise mitigating, monitoring and management measures. Cadia is also required to review and revise its existing Noise Management Plan to account for the proposed modification. With these measures in place, the Department is satisfied that the proposed modification would not result in any appreciable noise impacts at sensitive receivers.

6 RECOMMENDED CONDITIONS

The Department has drafted a Notice of Modification (see **Appendix A**) for the proposed modification, as well as a consolidated version of the project approval as modified (see **Appendix B**). Cadia has reviewed and accepted the proposed amended conditions.

7 CONCLUSION

The Department has assessed the merits of the modification in accordance with the relevant requirements of the EP&A Act. Based on this assessment, the Department is satisfied that the modification would not result in any additional environmental impacts. The Department also notes that the proposed preconditioning can be undertaken with negligible additional impacts on groundwater resources and the amenity of surrounding receivers.

Additionally, the Department acknowledges that the proposed preconditioning is necessary to ensure that caving and subsidence advances within the required design and safety parameters.

Overall, the Department is satisfied that the benefits of the modification outweigh any residual costs. Consequently, the Department believes that the modification is in the public interest and should be approved.

8 RECOMMENDATION

It is recommended that the Director, Mining Projects, as delegate of the Minister for Planning:

- **considers** the findings and recommendations of this report;
- **determines** that the modification is within the scope of Section 75W of the EP&A Act;
- **approves** the modification application under Section 75W of the EP&A Act, subject to conditions; and
- **signs** the attached notice of modification (**Appendix A**).


6/8/14
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14/8/14
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APPENDIX A: NOTICE OF MODIFICATION

APPENDIX B: CONSOLIDATED PROJECT APPROVAL

APPENDIX C: ENVIRONMENTAL ASSESSMENT

APPENDIX D: AGENCY SUBMISSIONS