

MINING OPERATIONS (BLOOMFIELD)

Blast Monitoring Program

Ver	Date	Description	By	Chk	App
1	240210	Final Draft	KH	SD	SD
2	090811	Revised Final Draft - incorporating Project Area as approved by Section 75W Modification	KH	GL	SG
3	31/5/12	Revised Final – incorporating DP&I consultation	GL		SG
4	25/7/17	Revised Final – Revised and Updated	GL		BC
5	3/11/17	Revised Final – incorporating DPE consultation	GL		BC

BLOOMFIELD MINING OPERATIONS

Blast Monitoring Program

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INTRODUCTION	<p>This blast monitoring program (BMP) has been prepared in response to Project Approval (Approval) 07_0087 granted under section 75J of the Environmental Planning and Assessment Act (EP&A) and the Modifications to the Approval granted in accordance with Section 75W of the Environmental Planning and Assessment Act 1979.</p> <p>Condition 14 of Schedule 3 requires the Proponent to <i>prepare and implement a blast monitoring program for the project to the satisfaction of the Director-General. The Program must:</i></p> <ul style="list-style-type: none"><input type="checkbox"/> <i>be submitted to the director General for approval within 6 months of the date of this approval; and</i><input type="checkbox"/> <i>include a protocol for evaluating blasting impacts on, and demonstrating compliance with, the blasting criteria in this approval for all privately owned residences and other structures.</i> <p>The blast monitoring program takes into consideration the Environmental Management Strategy (EMS) for the site, commitments stated in the Part 3A Environmental Assessment, and the various conditions outlined in schedules 2 to 5 of the Project Approval granted under Section 75 J of the Environmental Planning and Assessment Act 1979. In addition, conditions outlined in the Notice of Modification issued under Section 75W of the Environmental Planning and Assessment Act 1979.</p>
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BLOOMFIELD MINING OPERATIONS

Blast Monitoring Program

SCOPE

The Program applies to all blasting activities associated with Bloomfield's mining operations. The purpose of the BMP is to ensure the relevant conditions of the Approval are addressed, commitments made within the EA are followed and the various legislative and guidelines are followed. The primary objective is to monitor blasting impacts from the project. The BMP takes into account issues raised during the Environmental Assessment.

RELATIONSHIP WITH OTHER PLANS

The Environmental Management Strategy for the site establishes a frame work for environmental monitoring. The BMP is an integral component of the EMS and supports the overall environmental objectives for the site.

In addition to the BMP for the site which addresses the various requirements of the EP&A Act and POEO Act, the Explosives Management Plan for the site addresses the requirement of regulation 37 of the Coal Mine Health and Safety Regulation 2006, AS2187 Explosives standards Australian Explosive Code and MDG1025 Guideline for use of explosives in Open Cut Mines are addressed in the Explosives Management Plan.

The System is integrated with the Bloomfield Collieries Safety Management System and operates in conjunction with other appropriate Bloomfield Mine Site and Group Management Systems.

PROJECT APPROVAL CONDITIONS

Table 1 provides a summary of the relevant conditions of the Approval in relation to blasting and associated monitoring.

Table 1 RELEVANT PROJECT APPROVAL CONDITIONS (EXTRACT FROM SCHEDULE 3)

No	Category	Requirements	BMP Reference
5	Airblast overpressure limits	The Proponent shall ensure that the airblast overpressure level from blasting at the project does not exceed the criteria in Table 2 at any residence on privately-owned land.	Blast Criteria
6	Ground vibration and impact assessment criteria	The Proponent shall ensure that the ground vibration level from blasting at the project does not exceed the levels in Table 3 at any residence on privately-owned land.	Blast Criteria
7	Blasting hours and frequency	The Proponent shall carry out blasting on site only between 9 am and 5 pm Monday to Saturday. No blasting is allowed on Sundays and Public Holidays.	Hours and Frequency of Blasting
8	Blasting hours and frequency (cont)	The Proponent may carry out on the site a maximum of: (a) 2 blasts a day; and (b) 5 blasts a week, averaged over a 12 month period.	Hours and Frequency of Blasting
9	Operating conditions	During mining operations on site, the Proponent shall implement best blasting practice to: (a) protect the safety of people, property, public infrastructure, and livestock; and (b) minimise the dust and fume emissions from blasting at the project, to the satisfaction of the Director-General.	Blast Management

BLOOMFIELD MINING OPERATIONS

Blast Monitoring Program

Table 1 RELEVANT PROJECT APPROVAL CONDITIONS (EXTRACT FROM SCHEDULE 3)

No	Category	Requirements	BMP Reference
10		The Proponent shall not undertake blasting within 500 metres of any privately-owned land, unless suitable arrangements have been made with the landowner and any tenants to minimise the risk of flyrock-related impact to the property to the satisfaction of the Director-General.	Blast Management
11	Public notice	The Proponent shall: (a) notify the landowner/occupier of any residence within 2 kilometres of the mining area who registers an interest in being notified about the blasting schedule at the mine, or any other landowner nominated by the Director-General; (b) operate a blasting hotline, or alternate system agreed to by the Director-General, to enable the public to get up-to-date information on the blasting schedule at the project; (c) advertise the blasting hotline number in a local newspaper at least 4 times each year; and (d) publish an up-to-date blasting schedule.	Public Notices
12	Property inspections	The Proponent shall advise the owners of privately-owned land that they are entitled to a structural property inspection to establish the baseline condition of buildings and other structures on the property: (a) within 2 months of the date of this approval, for properties within 2 kilometres of blasting operations occurring at the date of this approval; and (b) at least 2 months prior to blasting within 2 kilometres of additional properties. If the Proponent receives a written request for a structural property inspection from any such landowner, the Proponent shall: <ul style="list-style-type: none"> • within 2 months of receiving this request commission a suitably qualified, experienced and independent person, whose appointment has been approved by the Director-General, to inspect the condition of any building or structure on the land (prior to blasting taking place within 2 km of the property, if possible), and recommend measures to mitigate any potential blasting impacts; and • give the landowner a copy of the property inspection report. 	Property Inspections
13	Property investigations	If any landowner of privately-owned land within 2 kilometres of blasting operations, or any other landowner nominated by the Director-General, claims that buildings and/or other structures on his/her land have been damaged as a result of blasting at the project after the date of this approval, the Proponent shall within 3 months of receiving this claim: (a) commission a suitably qualified, experienced and independent person, whose appointment has been approved by the Director-General, to investigate the claim; and (b) give the landowner a copy of the property investigation report. If this independent property investigation confirms the landowner's claim, and both parties agree with these findings, then the Proponent shall repair the damages to the satisfaction of the Director-General.	Property Investigations
14	Blast monitoring program	The Proponent shall prepare and implement a Blast Monitoring Program for the project to the satisfaction of the Director-General. This program must: (a) be submitted to the Director General for approval within 6 months of the date of this approval; and (b) include a protocol for evaluating blasting impacts on, and demonstrating compliance with, the blasting criteria in this approval for all privately-owned residences and other structures.	Blast Management, Evaluation of Blasting

BLOOMFIELD MINING OPERATIONS

Blast Monitoring Program

ROLES AND RESPONSIBILITIES

The company directors are responsible for the overall environmental performance of Bloomfield Colliery. Senior operational managers have direct responsibility for their areas of control while the environmental officer provides direction and advice to ensure that site environmental conformance is maintained. The principal environmental and operational managers are shown in Table 2.

Table 2 OPERATIONAL SITE MANAGEMENT TEAM

Position	Name
Managing Director	John Richards
Manager of Mining Development	Garry Bailey
General Manager Technical Services	Simon Grassby
Mine Manager	Brendon Clements
Blasting Supervisor	Mick Innes
Environmental Officer	Greg Lamb

METEOROLOGICAL MONITORING

In accordance with the Project Approval, a meteorological station was installed on site. The station is located (refer to Figure 1) near the active mining areas adjacent to an existing communications tower. The meteorological station monitors:

- ☐ rainfall;
- ☐ temperature;
- ☐ relative humidity;
- ☐ wind speed; and
- ☐ wind direction.

Meteorological conditions are taken into account when scheduling and undertaking blasting.

BLASTING CRITERIA

The blasting and vibration criteria specified in the Approval and EPL 396 are provided in Table 2 and 3.

Table 3 Airblast overpressure impact assessment criteria

Airblast overpressure level (dB(Lin Peak))	Allowable exceedance
115	5% of the total number of blasts in a 12 month period
120	0%

Table 4 Ground vibration impact assessment criteria

Peak particle velocity (mm/s)	Allowable exceedance
5	5% of the total number of blasts in a 12 month period
10	0%

HOURS AND FREQUENCY OF BLASTING

Blasting will only occur between 9 am and 5 pm Monday to Saturday. No blasting is permitted on Sundays and Public Holidays.

Blasts are restricted to a maximum of:

- (a) 2 blasts a day; and
- (b) 5 blasts a week, averaged over a 12 month period.

BLOOMFIELD MINING OPERATIONS

Blast Monitoring Program

BLAST PREDICTIONS

The levels of airblast and ground vibration have been predicted using the developed site laws for the mine. A summary of the blast modeling results for the closest affected receivers is contained in Appendix A. The results contained within the tables in Appendix A reflect the levels that would be experienced when blasting at the nearest point to residential receivers.

BLAST MANAGEMENT

The Explosives Management Plan for the site details the specific requirements of blasting and protocols followed by the blasting supervisor.

Each blast is planned and implemented to ensure compliance with regulatory requirements and approval conditions. A 500m exclusion zone is evacuated around all blasts and each monitored for airblast overpressure and ground vibration. Each blast is designed so that there is no damage to people, property or livestock.

A predictive meteorological modeling software program is utilised on the day of a blast to assist in planning blast operations. The software incorporates regional weather station data to predict daily weather events that may exacerbate overpressure impacts from blasting operations. Where predictions determine increased potential impacts then blast times are delayed to more favourable conditions or postponed. In addition, an automated weather station on site provides real time online data. This data is utilised to assist in determining whether a blast proceeds or is postponed. Factors such as wind speed and direction, cloud cover, blast location and blast size are all taken into consideration.

Any complaints are recorded and responded to in a timely and professional manner.

Residents who have requested to be notified about blasting will be contacted prior to each blast. Notices regarding blasting are advertised in local newspapers on a quarterly basis in addition to information provided on the company website.

Blast Protocol

A protocol has been established for designing, drilling, loading and firing each blast:

- ☐ 3D geological modeling used to determine likely depths to be shot;
 - ☐ Determine suitable blast pattern;
 - ☐ Determine suitable product (slurry or anfo) depending on ground conditions, strata conditions and expected weather;
 - ☐ Standard Depth Of Cover (SDOC) calculations used to determine suitable stemming height to contain air blast;
 - ☐ Determine sequence of blasting (ie order of firing);
 - ☐ Drill and load the pattern;
 - ☐ Determine time to fire shot based on predictive meteorological modeling and local weather conditions as described above; and
 - ☐ Shot fired in accordance with 'MinOp Blasting Checklist' for Bloomfield Colliery.
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BLOOMFIELD MINING OPERATIONS

Blast Monitoring Program

Blast Monitoring

To monitor the impacts of blasting, Bloomfield operate four blast monitors. The locations (Site N, M, G and H) are shown on Figure 1. The monitors record air blast overpressure and peak particle velocity.

Table 5: Blast Monitor Locations

Blast Monitor Site	Location
M	John Renshaw Drive, Buttai
N	Lings Road, Buttai
G	Buchana Road, Buchanan
H	Mt Vincent Road, Louth Park

Exceedances of blasting criteria outlined in Table 3 and 4 will be reported and investigated in accordance with Condition 6 Schedule 5 of PA 07_0087 and Condition R2 of EPL 396.

The blast monitoring results will be reported in the Annual Review in accordance with Condition 3 Schedule 5 of PA 07_0087.

PUBLIC NOTICES

In accordance with the requirements of the Approval (Condition 11 of Schedule 3), residences within 2 kilometres have been offered the option of being notified about the blasting schedule.

A blasting hotline contact phone number and an up-to-date blasting schedule is published on the Bloomfield Group website (www.bloomcoll.com.au). The blasting hotline contact phone number is also advertised in Maitland Mercury and Cessnock Advertiser at least four times per year.

PROPERTY INSPECTIONS

In accordance with the requirements of the Approval (Condition 12 of Schedule 3), landholders within 2 kilometers of blasting operations have been advised that they are entitled to a structural property inspection to establish baseline conditions.

Bloomfield has commissioned an independent expert who has been approved by the Director General to undertake structural inspections of properties as required by this condition of approval.

All landholders who have requested an inspection be made will be provided with a copy of the inspection report.

PROPERTY INVESTIGATIONS

In accordance with the requirements of the Approval (Condition 13 of Schedule 3), if a landowner makes a complaint about blasting and is located within 2 kilometres (or any other landowner nominated by the Director-General) of the blasting operations who had not previously requested a structural inspection, Bloomfield will commission an independent expert to investigate the claim.

The landowner will be given a copy of the report. If this independent property investigation confirms the landowner's claim, and both parties agree with these findings, then the Proponent shall repair the damages to the satisfaction of the Director-General.

BLOOMFIELD MINING OPERATIONS

Blast Monitoring Program

COMPLAINTS

Bloomfield's Environmental Management Strategy details the procedures for addressing any complaints including blasting issues that may be raised by the community. All complaints that are raised by the community and/or government agencies are recorded. Details for each are kept including:

- ☐ date and time of complaint;
- ☐ method by which the complaint was made;
- ☐ personal details of the complainant which were provided by the complainant or, if no such details were provided, a note to that effect;
- ☐ nature of the complaint;
- ☐ the action(s) taken in relation to the complaint, including any follow up contact with the complainant; and
- ☐ if no action was taken, the reason why no action was taken.

The complainant will be followed up to explain the outcome of the investigations. All complaints will be reported in the Annual Review.

EVALUATION OF BLASTING

Each blast is monitored and records kept by the blasting supervisor including the location, number of holes, and conditions etc. The blasting supervisor is also responsible for ensuring that blasting is scheduled between permissible hours and the allowable number of shots is not exceeded.

Post Blasting Protocol

A protocol has been established to ensure that records for each blast are kept and the results for each compared against the set criteria.

- ☐ Monitor and record results of each blast;
- ☐ Review results and compare against approved criteria;
 - ◆ if an exceedance is recorded a review of the blast is initiated immediately; or
 - ◆ if a community complaint received then review is initiated.
- ☐ If required, remedial action such as the appointment of an independent expert to assess as required by Condition 13 of Schedule 3 of the Approval is initiated.

Exceedance of Criteria

In the event that the vibration and/or overpressure criteria specified in Tables 3 and 4 are exceeded, a full investigation will be undertaken in accordance with Condition 6 Schedule 5 of PA 07_0087 and Condition R2 of EPL 396.

Investigation and Reporting of Exceedances

Within 7 days of detecting an exceedance of the blasting criteria specified in the Approval (Tables 3 and 4 above) a report will be provided to the Department of Planning and Infrastructure and Office of Environment and Heritage (formerly Department of Environment, Climate Change and Water)

The report will:

- (a) describe the date, time and nature of the exceedance/ incident;
- (b) identify the cause (or likely cause) of the exceedance/ incident;
- (c) describe what action has been taken to date; and
- (d) describe the proposed measures to address the exceedance/incident.

Bloomfield will follow recommendations of the investigation in order to address possible future occurrences.

BLOOMFIELD MINING OPERATIONS

Blast Monitoring Program

EMERGENCY MANAGEMENT

Potential hazards, relating to or resulting from the drill and blast operations, which could trigger an emergency, have been identified. Their methods of control are based primarily on prevention. Emergencies are managed through the MinOp Emergency Management System.

SYSTEMS REVIEW AND IMPROVEMENT

The ongoing effectiveness and efficiency of this Management System is monitored as part of the operation's day-to-day management. Feedback from this and other more formal reviews and/ or following special occurrences, form the basis for System improvement and re-design.

General Conditions of Review

In general Management Systems are reviewed and up-dated conditional as follows:

- ☐ Every three years; or
 - ☐ Following any modification to the project approval; or
 - ☐ Whenever there is a significant change to relevant legislation; or
 - ☐ If required to do so by the Regulations; or
 - ☐ Whenever there is a significant change to the operations; or
 - ☐ If required (in writing) to do so by the Chief Inspector; or
 - ☐ Whenever control measures are found to be ineffective either through:
 - ◆ changes to the working environment; or
 - ◆ changes to operating systems; or
 - ◆ subsequent risk assessments; or
 - ◆ the findings of an audit; or
 - ◆ following a fatality or dangerous incident that could reasonably have been expected to result in a fatality; or
 - ◆ following an assessment of a related safety alert.
-

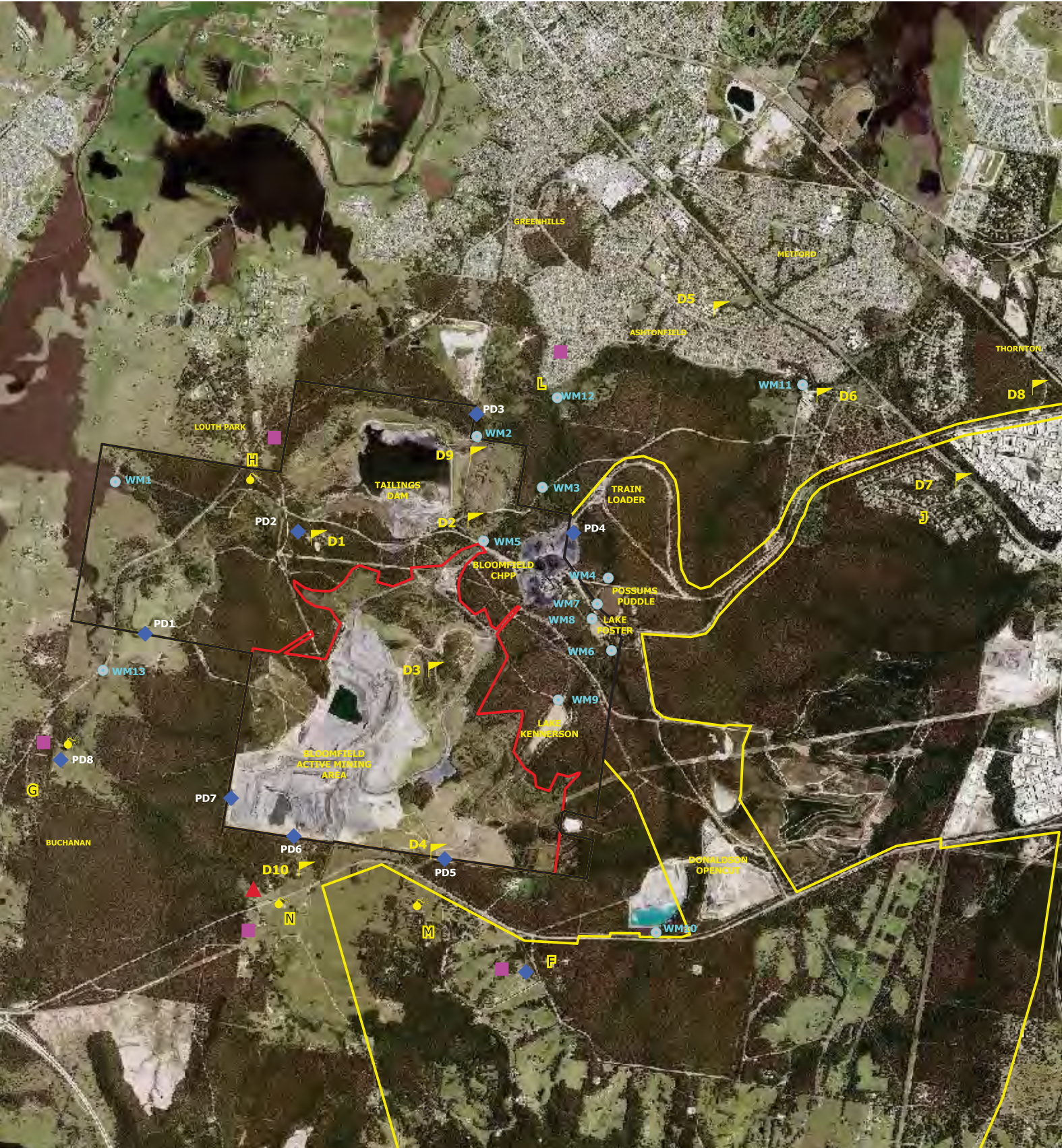
Continual Improvement

Operational activities will be subject to regular review to ensure conformance with commitment made in the EMS and subordinate plans and strategies. The blast monitoring program will be reviewed every three years or more frequently if required to identify areas that may require improvement.

The review process may include formalised procedures such as internal and external audits or feedback from consultation.

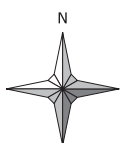
DOCUMENT MANAGEMENT

Copies of this document are managed under the Group Document Management, Management System. This document and other relevant documents are kept on site and are available to all employees.



LEGEND

0 1 km



- Bloomfield Project Area
- Abel Mine Project Area
- Bloomfield Mining Lease
- ▲ Blast Monitor
- ▲ Dust Monitor

- ▲ High Volume Air Sampler
- Noise Monitor
- ◆ Peizometers
- Water Monitoring



Bloomfield Colliery

Blast Monitoring Program

Figure 1 Environmental Monitoring Sites

Scale: 1:33,333

Date: January 2016
Photo: January 2016

Drawing: A3

BLOOMFIELD MINING OPERATIONS

Blast Monitoring Program

APPENDIX A

BLAST PREDICTIONS

(Source: Noise and Blast Impact Assessment - Heggies 2008)



**Table 19 Blasting Prediction Year 1**

Residential Location		Predicted Mine Blasting Level*	
		Airblast dB Linear	Ground Vibration mm/s
A	Weakleys Drive Beresfield	89.9	0.1
B	Yarrum Road Beresfield	85.5	0.1
C	Phoenix Road Black Hill (Ebenezer Park)	86.8	0.1
D	Black Hill School	95.9	0.3
E	Browns Road Black Hill	98.9	0.5
F	Black Hill Road Black Hill	97.8	0.5
G	Buchanan Road Buchanan	99.1	0.6
H	Mt Vincent Rd Louth Park	94.9	0.3
I	Lord Howe Dr. Ashtonfield	88.5	0.1
J	Kilarney Street Avalon Estate (Thornton)	88.0	0.1
K	Catholic Diocese	90.2	0.2
L	Kilshanny Avenue Ashtonfield	91.5	0.2
M	John Renshaw Drive Buttai	104.3	1.2
N	Lings Road Buttai	113.7	4.8

Note: * Predicted level based on MIC of approximately 90 kg

Table 20 Blasting Prediction Year 5

Residential Location		Predicted Mine Blasting Level*	
		Airblast dB Linear	Ground Vibration mm/s
A	Weakleys Drive Beresfield	90.8	0.1
B	Yarrum Road Beresfield	86.4	0.1
C	Phoenix Road Black Hill (Ebenezer Park)	87.6	0.1
D	Black Hill School	97.2	0.5
E	Browns Road Black Hill	98.9	0.6
F	Black Hill Road Black Hill	97.9	0.5
G	Buchanan Road Buchanan	102.1	1.0
H	Mt Vincent Rd Louth Park	96.5	0.4
I	Lord Howe Dr. Ashtonfield	89.4	0.1
J	Kilarney Street Avalon Estate (Thornton)	88.9	0.1
K	Catholic Diocese	90.9	0.2
L	Kilshanny Avenue Ashtonfield	92.6	0.2
M	John Renshaw Drive Buttai	103.5	1.2
N	Lings Road Buttai	113.0	4.8

Note: * Predicted level based on MIC of approximately 130 kg



Table 21 Blasting Prediction Year 10

Residential Location		Predicted Mine Blasting Level*	
		Airblast dB Linear	Ground Vibration mm/s
A	Weakleys Drive Beresfield	92.3	0.2
B	Yarrum Road Beresfield	87.9	0.1
C	Phoenix Road Black Hill (Ebenezer Park)	88.8	0.2
D	Black Hill School	96.8	0.5
E	Browns Road Black Hill	98.7	0.7
F	Black Hill Road Black Hill	98.1	0.6
G	Buchanan Road Buchanan	104.4	1.5
H	Mt Vincent Rd Louth Park	100.2	0.8
I	Lord Howe Dr. Ashtonfield	91.5	0.2
J	Kilarney Street Avalon Estate (Thornton)	90.7	0.2
K	Catholic Diocese	91.8	0.2
L	Kilshanny Avenue Ashtonfield	95.1	0.4
M	John Renshaw Drive Buttai	102.6	1.2
N	Lings Road Buttai	107.9	2.6

Note: * Predicted level based on MIC of approximately 200 kg

The blast prediction results presented in **Table 19** to **Table 21** demonstrate that predicted airblast and ground vibration levels will meet the DECC guidelines for blasting at all residences surrounding the development during all operational stages of the Bloomfield Project.



0 6/5/07 V01+0		DW PREPARED		JC CHECKED		REV DATE AMENDMENT / ISSUE DESCRIPTION	
Assessed Receiver Location		Project Application Area		CCL 761		FILE NAME: 30-1573 Appendix A.dwg	
						Heggies Pty Ltd Level 1, 14 Watt Street PO Box 1768 Newcastle NSW 2300 Email address newcastle@heggies.com.au Telephone 02 4908 4500 Facsimile 02 4908 4501	
						Appendix A Bloomfields Noise & Blasting Impact Assessment Location Map	
REVISION		DRAWING No.		001		0	



Greg Lamb
Environmental Officer
Bloomfield Colliery
PO Box 4
EAST MAITLAND NSW 2323

Dear Mr Lamb

**Bloomfield Coal Project (MP 07_0087)
Review of Management Plans**

I refer to your email dated 14 December 2017 providing the Department with several updated management plans addressing the Department's comments of 5 October 2017.

The Department has reviewed the below management plans and strategy for the Bloomfield Coal Project, which have been prepared in accordance with the mine's project approval:

- Noise Monitoring Program dated August 2017 (condition 4 of Schedule 3);
- Blast Monitoring Program dated July 2017 (condition 14 of Schedule 3);
- Landscape Management Plan dated August 2017 (condition 26 of Schedule 3);
- Rehabilitation Management Plan dated August 2017 (condition 27 of Schedule 3);
- Final Void Management Plan dated August 2017 (condition 28 of Schedule 3);
- Mine Closure Plan dated August 2017 (condition 29 of Schedule 3);
- Biodiversity Offset Management Plan dated July 2017 (condition 29B of Schedule 3); and
- Environmental Management Strategy dated July 2017 (condition 1 of Schedule 5).

I advise that the Secretary approves the above management plans and strategy. Please provide final copies of these plans to the Department at your earliest convenience and place copies on your website.

The Department considers that the revised Air Quality Monitoring Program (condition 16 of Schedule 3) has not adequately addressed the Department's previous comments. The Department's comments on this document are enclosed in **Attachment A**. The Department requests that this document be re-submitted by **8 January 2017**.

The Department notes that a revised Water Management Plan (condition 19 of Schedule 3) was not submitted and that an extension to submit by 31 December has been granted. It is also noted that the draft Aboriginal Cultural Heritage Management Plan has not been reviewed as it is understood that it is currently with the Mindaribba Land Council for consultation. The Department will review this plan once a final version is submitted.

Should you have any enquiries in relation to this matter, please contact Jessie Evans on the details above.

Yours sincerely,

Howard Reed

Director

Resource Assessments

as nominee of the Secretary

19-12-17