



**Enhance Place Pty Limited**

ABN: 31 077 105 867

**BLAST MANAGEMENT PLAN**

# ***Blast Management Plan***

***for the***

## ***Pine Dale Coal Mine (Including the Yarraboldy Extension)***



***Prepared by:***

**R.W. Corkery & Co. Pty Limited**

***In Conjunction with:***

**Enhance Place Pty Limited**

February 2011





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## ***Pine Dale Coal Mine (Including the Yarraboldy Extension)***

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## ACRONYMS USED THROUGHOUT THIS REPORT

AEMR	-	Annual Environmental Management Report
BMP	-	Blast Management Plan
DoP	-	Department of Planning
I&I NSW	-	Industry and Investment NSW
MIC	-	Maximum Instantaneous Charge
RTA	-	NSW Roads and Traffic Authority



## 1. INTRODUCTION

This Blast Management Plan (BMP) has been prepared for the Pine Dale Coal Mine, incorporating the Yarraboldy Extension, (“the mine”) in accordance with *Schedule 3 Condition 15* of Project Approval 10\_0041 which requires that the BMP:

- a) be prepared in consultation with DECCW and Council, and submitted to the Director-General for approval prior to undertaking any blasting on-site;
- b) describe the blast mitigation measures that would be implemented to ensure compliance with the relevant conditions of this approval (see Section 4 and **Appendix 1**);
- c) describe the measures that would be implemented to ensure the public can get up-to-date information on the proposed blasting schedule on site (see Section 7);
- d) include a blast monitoring program to evaluate the performance of the project (see Section 5); and
- e) include a protocol that has been prepared in consultation with the owners of all other operating open-cut mines within 2km of the site for minimising and managing the cumulative blasting impacts of the mines (see Section 6).

It is noted that all blasting within the original Pine Dale Coal Mine has ceased. Therefore, the details presented within the BMP relate to blasting within the Yarraboldy Extension area (see **Figure BM1**).

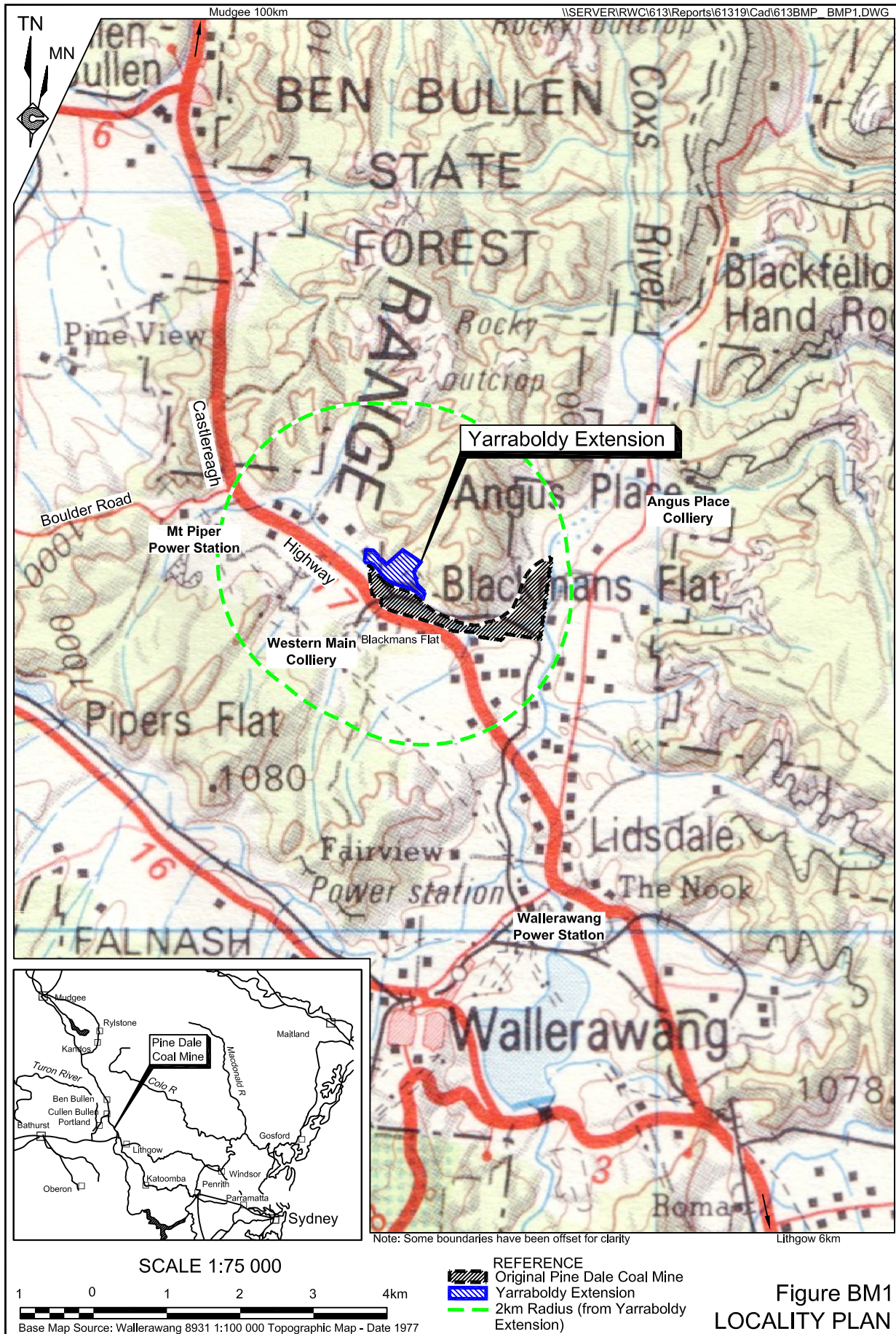
## 2. OBJECTIVES

The objectives of the BMP include the following.

- To ensure relevant Project Approval requirements, including the airblast overpressure and ground vibration criteria and flyrock management, are achieved.
- To ensure that blasting does not pose risks to either public or livestock safety in the surrounding area.
- To ensure that blasting does not cause damage to public or private property in the surrounding area.
- To verify compliance with approval requirements through blast monitoring.
- To ensure that any complaints are responded to in a timely and consistent manner.
- To operate a suitable system to enable the local community / residents within a 2km radius of the blast area to get up to date information on the proposed blasting schedule on the site, any required road closures and any alterations to the schedule in a timely fashion.









### 3. APPROVAL REQUIREMENTS

Conditional requirements within Project Approval 10\_0041 relevant to the BMP include the following.

#### **Blasting Criteria**

##### **Schedule 3 Condition 8**

*The Proponent shall ensure that the blasting on site does not cause exceedances of the criteria in Table 5.*

**Table 5: Blast impact criteria**

<b>Location</b>	<b>Airblast overpressure (dB(Lin Peak))</b>	<b>Ground vibration (mm/s)</b>	<b>Allowable exceedance</b>
Residence on privately-owned land	115	5	5% of the total number of blasts over a period of 12 months
	120	10	0%

#### **Blasting Hours**

##### **Schedule 3 Condition 9**

*The Proponent shall only carry out blasting on site between 10am and 3pm Monday to Friday inclusive. No blasting is allowed on weekends or public holidays, or at any other time without the written approval of Director-General.*

#### **Blasting Frequency**

##### **Schedule 3 Condition 10**

*The Proponent shall not carry out more than 1 blast a day on site, unless an additional blast is required following a blast misfire.*

*Note: A blast may involve a number of explosions within a short period, typically less than two minutes.*

#### **Property Inspections**

##### **Schedule 3 Condition 11**

*If the Proponent receives a written request from the owner of any privately-owned land within 2 kilometres of the approved open cut mining pit on site for a property inspection to establish the baseline condition of any buildings and/or structures on his/her land, or to have a previous property inspection report updated, then within 2 months of receiving this request the Proponent shall:*

- (a) *commission a suitably qualified, experienced and independent person, whose appointment has been approved by the Director-General, to:*
  - *establish the baseline condition of the buildings and/or structures on the land or update the previous property inspection report; and*
  - *identify any measures that should be implemented to minimise the potential blasting impacts of the project on these buildings and/or structures; and*
- (b) *give the landowner a copy of the new or updated property inspection report.*



## **Property Investigations**

### **Schedule 3 Condition 12**

*If the owner of any privately-owned land within 2 kilometres of the approved open cut mining pit on site claims that the buildings and/or structures on his/her land have been damaged as a result of blasting on site, then within 2 months of receiving this claim the Proponent shall:*

- (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.*

*If the Proponent or landowner disagrees with the findings of the independent property investigation, then either party may refer the matter to the Director-General for resolution.*

## **Operating Conditions**

### **Schedule 3 Condition 13**

*The Proponent shall*

- (a) implement best blasting management practice on site to:*
  - protect the safety of people and livestock in the surrounding area;*
  - protect public or private property in the surrounding area; and*
  - minimise the dust and fume emissions of the blasting;*
- (b) co-ordinate the blasting on site with the of blasting all mines operating in the vicinity of the site to minimise the cumulative blasting impacts of the mines; and*
- (c) operate a suitable system to enable the public to get up-to-date information on the proposed blasting schedule on site,*

*to the satisfaction of the Director-General.*

### **Schedule 3 Condition 14**

*The Proponent shall not carry out blasting on site within 500 metres of any privately-owned land or any public road unless the Proponent has:*

- (a) demonstrated to the satisfaction of the Director-General that the blasting can be carried out without compromising the safety of people, or damaging buildings and/or structures; and*
- (b) updated the Blast Management Plan to include the specific measures that would be implemented while blasting is being carried out within 500 metres of the land or public road.*



## **Notification of Landowners**

### **Schedule 4 Condition 1**

*By the end of April 2011, the Proponent shall notify in writing the owners of:*

- b) any residence on the land listed in Table 3 of Schedule 3 that they are entitled to ask for additional noise mitigation measures to be implemented at their residence at any stage during the project; and*
- b) any privately-owned land within 2 kilometres of the approved open cut mining pit on site that they are entitled to ask for an inspection to establish the baseline condition of any buildings or structures on their land, or to have a previous property inspection report updated.*

### **Schedule 4 Condition 2**

*Within 2 weeks of obtaining monitoring results showing:*

- a) exceedances of the relevant criteria in Schedule 3, the Proponent shall notify the affected landowners and/or tenants in writing of the exceedance, and provide regular monitoring results to each of these parties until the project is complying with the relevant criteria again;*

## **4. BLAST MANAGEMENT**

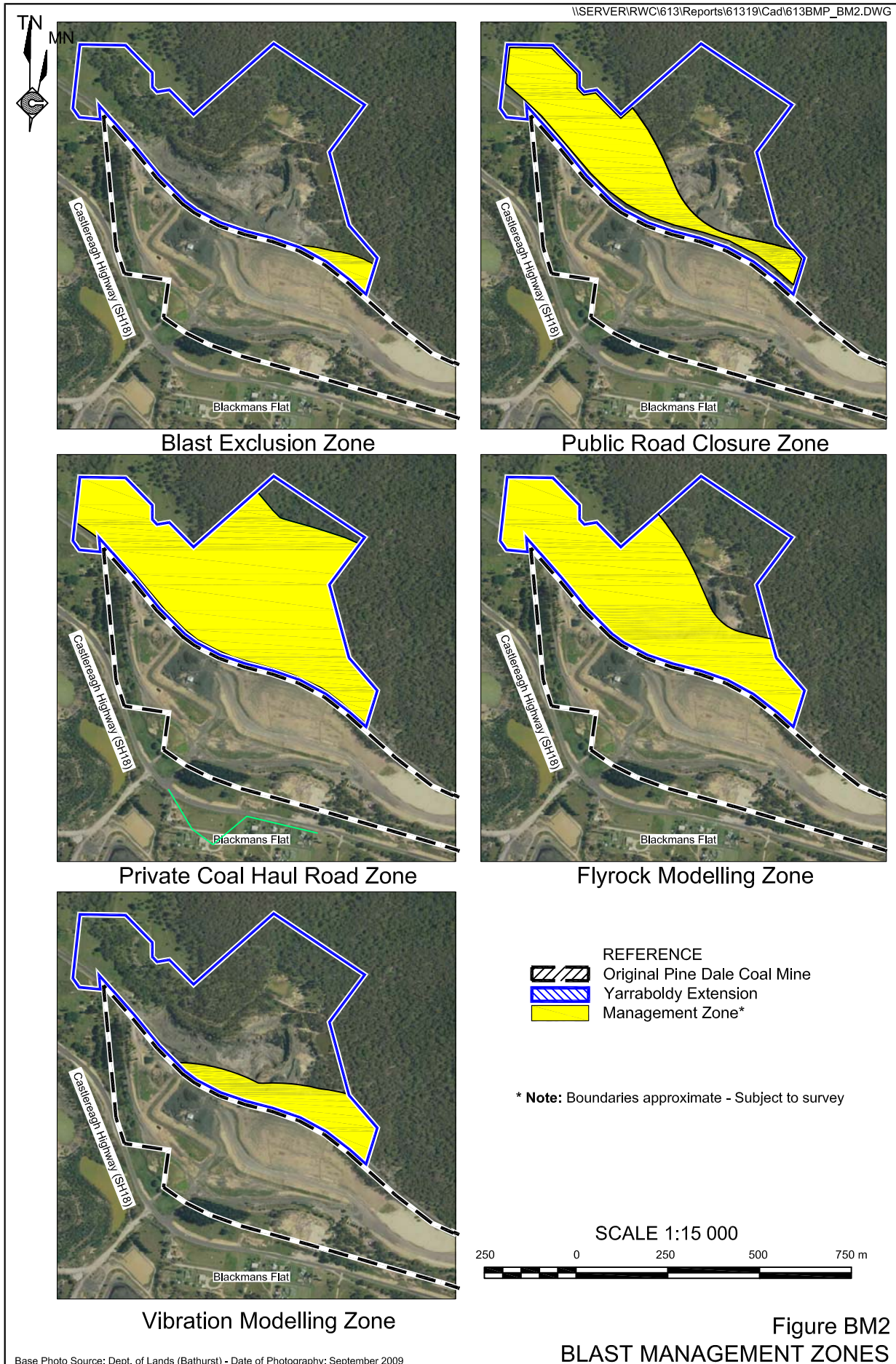
### **4.1 RESIDENTIAL PROXIMITY AND ROAD ACCESS**

Blast modelling undertaken to date indicates that blasting at the Pine Dale Coal Mine can be undertaken at a distance of up to 400m without compromising safety. Therefore, in order to ensure public safety, no blasting will be undertaken within 400m of any residence or privately owned land (Blast Exclusion Zone) without prior agreement of the landowner. Additionally, prior to blasting within 400m of the Castlereagh Highway boundary fence (Public Road Closure Zone) or the Private Coal Haul Road (Private Coal Haul Road Closure Zone), the road will be closed in accordance with a Road Closure Management Plan prepared and implemented to the satisfaction of the RTA (see **Appendix 1**).

**Figure BM2** displays the location of the Initial Blast Exclusion and Road Closure Zones whilst **Figure BM3** displays residence locations within 2km of the likely blasting operations within the Yarraboldy Extension area.

**Table BM1** identifies the distance from each residence within 1km of the Yarraboldy Extension Area to the closest point of the Public Road Closure Zone, ie. the closest potential blast site.





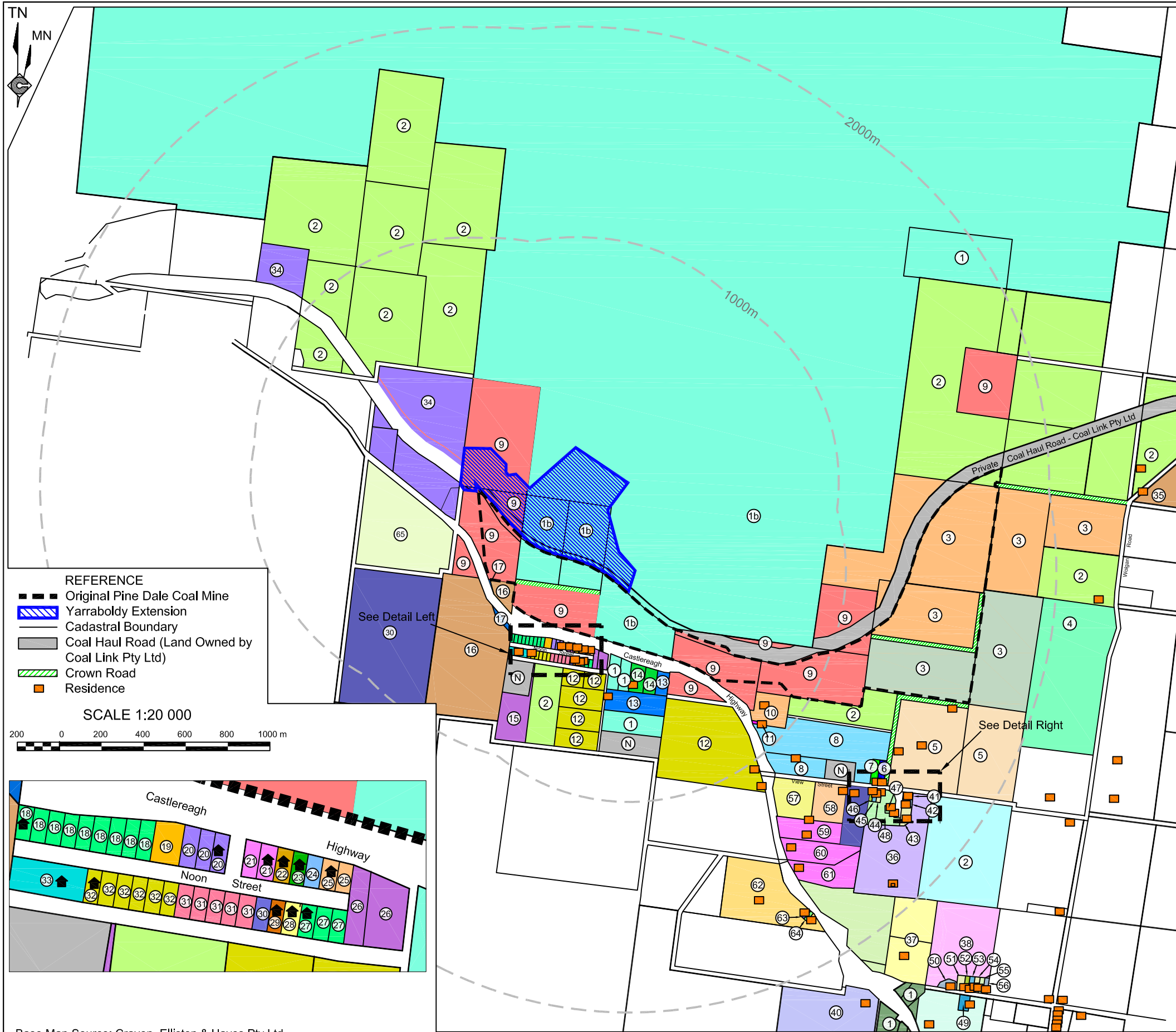
Base Photo Source: Dept. of Lands (Bathurst) - Date of Photography: September 2009

**Figure BM2**  
**BLAST MANAGEMENT ZONES**





\\SERVER\I\W\613\Reports\61319\Cad\613BMP\_4A.4 Ownership.DWG



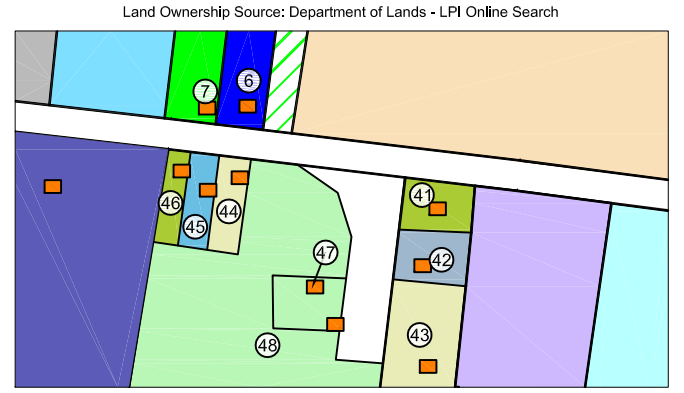
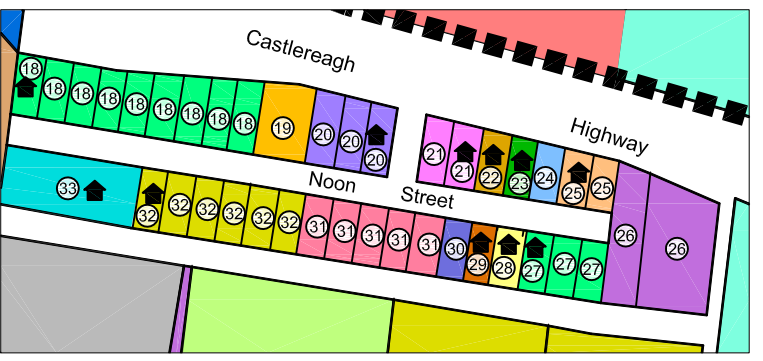
Reference	Owner
1	Crown Land
1b	Ben Bullen State Forest (Forests NSW)
2	Centennial Fassifern Pty Limited
3	G. & A. Jenkins
4	A. Fraser
5	J. & S. Rensen
6	R. & H. Taylor
7	S. Jordan
8	N. & J. Watson
9	Reference Not Held
9	Enhance Place Pty Ltd
10	P. & E. Barnes
11	C. Jonkers & J. Favell
12	M. Brown
13	J. Cope
14	J. Cherry
15	State Land Services
16	GC Springvale Pty Limited & Samsung Development (Aust) Pty Limited
17	Centennial Springvale & Samsung Development (Aust) Pty Limited
18	T. Edwards
19	N. Weber
20	W. Doherty
21	E. Morris
22	D. Newsome
23	C. & A. Forrest
24	The Council of the Shire of Blaxland
25	E. Hughes
26	The Trustees of the Catholic Church
27	R. & B. Pyne
28	J. & J. Kershaw
29	J. Young
30	The Council of the City of Lithgow
31	T. Wilke
32	W. Vincent
33	C. Green
34	Delta Electricity
35	J. & P. Sharp
36	B. Coombs
37	N. Brackenrig
38	Speirs
39	C. & J. Applin
40	N. & B. Hunter
41	R. McKinnon
42	C. & K. Cracknell
43	P. & S. Howarth
44	S. Fabian
45	K. Nentwig & O. Byrnes
46	R. & C. Baldock
47	D. Walsh & L. Delforce
48	D. Walsh & L. Walsh
49	N. Bulkeley
50	F. & J. McDonald
51	D. & T. Speirs
52	M. & E. Bailey
53	R. Matthews & J. Gossow
54	G. & L. Connor
55	S. Boyd
56	J. Stewart
57	G. McGuinness
58	T. Davidson
59	B.E. Bowerman
60	B.E. Bowerman
61	B.E. Bowerman
62	P. & C. Van Der Veldon
63	M. Orchard
64	D. Lewis
65	Centennial Springvale Pty Limited & Springvale SK Kores Pty Limited

**REFERENCE**

- Original Pine Dale Coal Mine
- Yarraboldy Extension
- Cadastral Boundary
- Coal Haul Road (Land Owned by Coal Link Pty Ltd)
- Crown Road
- Residence

**SCALE 1:20 000**

200 0 200 400 600 800 1000 m



Base Map Source: Craven, Elliston & Hayes Pty Ltd

Land Ownership Source: Department of Lands - LPI Online Search

**Figure BM3**  
**SURROUNDING RESIDENCES**

**Table BM1**  
**Details of Residences within 1km of Pine Dale Coal Mine**

Reference Number*	Owner	Distance / Direction from Residence to Public Road Closure Zone^
10	P & E Barnes	890m NW
11	C. Jonkers & J. Favell	940m NW
13	J. Cope	600m NNW
14	J. Cherry	530m NNW
18	T. Edwards	460m N
20	W. Doherty	420m N
21	E. Morris	415m N
22	D. Newsome	410m N
23	C & A. Forrest	410m N
25	E. Hughes	410m N
27	R. & B. Pyne	460m N
28	J. & J. Kershaw	470m N
29	J. Young	470m N
32	W. Vincent	500m N
33	C. Green	510m N

\*Refer to **Figure BM3**. ^Subject to survey

## 4.2 BLASTING REQUIREMENTS AND FREQUENCY

### 4.2.1 Blasting Requirements

Within the Yarraboldy Extension area, the weathered upper overburden material will be removed using free dig or rip and push methods although blasting will be required for the more competent overburden and the interburden. Additionally, in the event that coal seams present are more competent, limited blasting may also be undertaken to condition the coal prior to loading. There will not be any blasting undertaken within the Blast Exclusion Zone with all material mined using rip and push or free dig methods.

### 4.2.2 Frequency

The frequency of blasting will generally be approximately once per week, depending on the depth of cover and the location within the Yarraboldy Extension area. No more than one blast per day would occur, unless a misfire requires re-blasting.

## 4.3 BLASTING HOURS

Blasting hours will be limited to the hours between 10:00am and 3:00pm Monday to Friday (excluding public holidays) in accordance with *Schedule 3 Condition 9*. Blasting will only be undertaken outside these hours if required for safety reasons such as following a misfire or adverse atmospheric conditions. In such an event, the Department of Planning would be notified within 24 hours with an explanation of the circumstances.



#### 4.4 BLASTING PARAMETERS

The blasting parameters for all blasts within 500m of the Castlereagh Highway boundary fence will be determined by blast modelling undertaken by the blasting contractor on a blast by blast basis (see Section 4.6). However, **Table BM2** outlines the typical blast design parameters for blasts undertaken at a distance greater than 500m from the Castlereagh Highway. The blast design parameters have been determined based on experience at the original Pine Dale Coal Mine but may be refined based on site specific conditions and monitoring results.

**Table BM2**  
**Typical Blast Design Parameters**

Blast Hole Diameter	89mm to 210mm
Blast Hole Depth	Up to 20m
Blast Hole Spacing	Up 48.0m <sup>2</sup>
Depth of Stemming	Dependent upon Modelling
Area of Blast	Up to 10 000m <sup>2</sup>
Size of Blast	Up to 200 000m <sup>3</sup> (dependent on stripping ratio)
Bulk Explosive Types	ANFO Throwmax, Aquamax, Softload
Powder Factor	0.30 – 0.60 kg/bcm*
Maximum Instantaneous Charge (MIC)	Typically up to 350kg depending on the individual factors of each blast.
Maximum Charge per Hole	
Initiation System	Non electric (NONEL) and / or electronic
* bcm – bank cubic metre	

#### 4.5 SHOTFIRING AND EXPLOSIVES SYSTEM

All blasting activities undertaken will be in accordance with the *Pine Dale Open Cut Mine Shotfiring and Explosives System*. The Shotfiring and Explosives System has been written and implemented to comply with Clause 37, of the *Coal Mine Health and Safety Regulation 2006*. The Shotfiring and Explosive System covers the following matters.

- Rules and Regulations relating to explosives, detonators, delays, shotfirer's equipment, drilling, clearing and charging of blast holes, shotfiring and shotfiring procedures, misfire rules and conveyance and use of bulk explosives.
- Blast design, modelling and initiation sequence.
- Shotfiring practices.
- Environmental considerations.
- Shotfiring checklists.
- A series of documented procedures.





#### 4.6 FLYROCK MODELLING

Prior to any blasts within 500m of the Castlereagh Highway boundary fence, flyrock modelling will be completed to:

- confirm that blasts less than 500m from the Castlereagh Highway boundary fence but greater than 400m can be undertaken safely without the need for temporary road closure and to confirm the required design parameters; and
- confirm the required safe blast design parameters for blasts less than 400m from the Castlereagh Highway together with the required distances from the blast for which the highway must be closed.

The required inputs for the blast model will be provided to the blasting contractor prior to the blast and include the following.

1. Drill plan.
2. Hole diameter
3. Hole depth.
4. Water depth in drill hole (if applicable) - to select appropriate bulk explosive.
5. Face burden and orientation measured.
6. Drill logs (see **Appendix 2**) for each hole to identify hardness of rock noting any soft material, voids or broken ground – to determine stemming length, weight of explosive and column height of explosive.
7. Surveyed location of drill holes to calculate distance from drill hole to sensitive locations (ie. residences, boundaries of privately owned land and the Castlereagh Highway boundary fence).

#### 4.7 VIBRATION MODELLING

Prior to any blasts within 600m of a residence, vibration modelling will be completed to ensure that the blast design is unlikely to cause exceedances of the vibration criteria specified in *Schedule 3 Condition 8* of Project Approval 10\_0041 (see Section 3). The required inputs for the model will be similar to those required for flyrock modelling.

It is noted that, airblast / overpressure modelling is not proposed as blasts designed to meet flyrock and vibration requirements will also invariably meet airblast / overpressure criteria.

#### 4.8 BLASTING EMISSIONS AND MITIGATION

The potential undesirable effects of blasting include:

- flyrock;
- air vibrations (noise and airblast);
- ground vibrations; and
- dust and fumes.



In order to minimise such undesirable effects of blasting at surrounding residences and users of the Castlereagh Highway and Private Coal Haul Road, the following mitigation measures will be implemented.

### **Flyrock**

- Exclusion of blasting within 400m of any residence or privately owned land (Blast Exclusion Zone).
- Road closure for all blasting within 400m of the Castlereagh Highway boundary fence (Public Road Closure Zone).
- Road closure for all blasting within 400m of the Private Coal Haul (Private Coal Haul Road Closure Zone).
- No free face blasting within 600m of residences when the free face is orientated towards the residences.
- Downblast face holes (ie. reduce the explosive charge within holes close to the exposed face) when blasting within 600m of the Castlereagh Highway boundary fence when the free face is orientated towards the highway.
- Undertaking Flyrock / Risk Evaluation modelling using Blasting Solutions Software, or equivalent, for all blasts within 500m of the Castlereagh Highway boundary fence (see Section 4.6 and **Figure BM2**).
- Ensure that a safety factor of two is applied to the maximum modelled flyrock trajectory distance.
- Use of the lowest practicable MIC or charge mass per delay.
- Ensuring burden distances and stemming lengths are such that explosion gases are virtually devoid of energy by the time they engage into the atmosphere.
- Ensuring that charges consistently detonate in carefully designed sequences as modelled.

### **Air Vibrations (Noise and Airblast)**

- Orientation of the blast faces away from or at an oblique angle to nearby residences where practicable.
- Accurately locating blast holes in accordance with the blast design.
- Ensuring the burden distance, hole spacing and stemming depth are carefully designed to be just sufficient to break the rock to the required size and then implemented precisely.
- Using appropriate materials, e.g. aggregates or competent drill cutting for blast hole stemming.
- Ensuring the charges detonate in the correct sequence and with inter-row delays that provide good progressive relief of burden.



- Avoiding initiation of blasts when there is a high probability of a temperature inversion or there is a heavy cloud cover such as exists during a thunderstorm.
- Avoiding initiation of blasts where other adverse weather conditions exist, eg. rain, fog, mist.
- Monitoring of wind direction and speed at proposed time of blast, should the prevailing wind be generally towards the residences, the blast shall be delayed until more favourable wind directions present subject to the approved blasting hours.

### **Ground Vibrations**

- Ensuring that the burden distance and effective sub-drilling are not too large so that most of the energy is consumed in providing good fragmentation and adequate displacement.
- Reducing the MIC or charge mass delay to the lowest practicable level.
- Undertaking Multi-Deck Seed Wave Vibration Analysis Modelling using Blasting Solutions Software, or equivalent, for all blasts within the Vibration Modelling Zone (600m of any residence) (see Section 4.7 and **Figure BM2**).

### **Dust / Fumes**

- Ensuring that stemming column lengths are such that any possible dust ejection velocities are low.
- Monitoring of wind direction and speed at proposed time of blast, should the prevailing wind be generally towards the residences, the blast shall be delayed until more favourable wind directions present subject to the approved blasting hours.
- Loading bulk explosive product that is suitable to the ground conditions.
- Ensuring shot sleep times (ie. duration explosives remain within the holes prior to blasting) are within the technical guidelines of the bulk explosive.
- Ensuring shot surface preparation minimises, as far as practicable, fine particles that may become airborne during the blast event.

The adoption of the above mitigation measures will be used to ensure that:

- the safety of mine personnel, visitors, local residents, local road users and stock is not compromised;
- ground vibration is maintained at acceptable levels and does not compromise the integrity of nearby buildings, structures and aboveground or underground facilities or services;
- noise and airblast levels at nearby residences are within applicable limits / criteria; and
- dust / fume generation is minimised and maintained at acceptable levels.



## 5. BLAST MONITORING

The following blast monitoring practices will be implemented throughout the life of the mine.

**WHAT: Air Blast Overpressure and Ground Vibration**

**WHEN:** During all blasts (typically weekly).

**WHERE:** At the nearest sensitive receiver to the blast (refer to **Figure BM3**) – to be determined by the blasting contractor.

**WHO:** DownerEDI Mining/Blasting Services – (blast contractors) or others, as appointed.

**HOW:**

1. A microphone and a geophone or seismograph will be set up prior to the blast event at the nominated monitoring location(s).
2. Airblast pressure measurements are to be taken in accordance with AS2187.2-2006<sup>1</sup> (or latest version), and no less than 3.5m from a building or structure. Units of measurement will be dB<sub>(Lin Peak)</sub>.
3. Ground vibration (peak particle velocity) will be undertaken in accordance with AS2187.2-2006<sup>1</sup>, and not more than 30m from the building / residence. Units of measurement will be mm/s.
4. The monitoring equipment will be calibrated and trigger levels set prior to each blast to reflect wind conditions.
5. A verbal report of recorded overpressure and vibration will be provided to the Manager Mining Engineering or Open Cut Examiner on the day of the blast.
6. A written report of all monitoring results for each blast will be produced within 1 week following the blast for actioning by the Company (if over criteria) and/or for reporting.

**WHAT: Flyrock**

**WHEN:** Following each blast (typically weekly)

**WHERE:** Surrounding the blast area

**WHO:** Manager Mining Engineering / Open Cut Examiner (OCE) / Shotfirer / Blast Contractor

**HOW:**

1. Any adverse flyrock surrounding the blast area will be documented (either through video of the blast and / or visual inspection following the blast).
2. A verbal report of any observed flyrock will be provided to the Manager Mining Engineering or Open Cut Examiner on the day of the blast.

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<sup>1</sup> Standards Australia, 2006, AS2187.2-2006. Explosives – Storage and Use – Use of Explosives.



3. A written report of any adverse flyrock distribution will be included with the airblast overpressure and ground vibration report produced within 1 week following the blast.
4. This report shall be referenced for the modelling / design of the next blast.

**WHAT: Structural Integrity Inspection / Investigation**

**WHEN:** Within 2 months of a written request / claim from the owner of any privately owned land within 2km of the Yarraboldy open cut area.

**WHERE:** Buildings or structures identified by resident / landowner

**WHO:** Qualified person approved by DoP.

- HOW:**
1. The approved qualified person will inspect the identified building at an agreed time with the resident/ landowner.
  2. The resident / landowner will be supplied with the inspection report within 2 months of the written request / claim.

Note: Refer to Project Approval 10\_0041 *Schedule 3 Conditions 11 and 12* (see Section 2).

## **6. BLAST SCHEDULING PROTOCOL**

In order to minimise the potential for cumulative blasting impacts with surrounding mining operators, the following blast scheduling protocol will be utilised.

1. At the commencement of operations and annually thereafter, the operators of open cut mines within 2km of the Yarraboldy open cut area will be contacted to establish / confirm appropriate contact details for personnel responsible for blast scheduling.
2. Prior to notifying surrounding residents / the local community of a scheduled blast at the Pine Dale Coal Mine – Yarraboldy Extension the appropriate personnel at the surrounding mines will be contacted to confirm that blasts at those operations are not scheduled for the same time, or day (where practicable) and to inform them if any road closures are required.
3. In the event that two blasts are scheduled for the same time, or the timing of any road closures will present an operational issue at the neighbouring mine, the scheduling for the blasts would be negotiated.
4. Surrounding residences and the local community will then be notified of the blast schedule for the Pine Dale Coal Mine – Yarraboldy Extension (see Section 7).



## 7. NOTIFICATION PROCEDURES

The following notification procedures will be followed.

- Before the 31 April 2011, the owners of any privately owned land within 2km of the Yarraboldy open cut area will be notified in writing of their entitlement to a building inspection or to have a previous inspection report updated (refer to Section 5 for inspection procedure).
- In the event that air blast or vibration exceed the applicable criteria (see Section 3), within 2 weeks of receiving the monitoring result, the affected landowner will be notified in writing of the exceedance and provided with a copy of monitoring results until compliance is demonstrated.
- The existing blast notification board will be maintained outside the entrance to the Pine Dale Coal Mine in its position that is readily visible to motorists travelling on the Castlereagh Highway. The notification board includes the date and time of the next scheduled blast and the blasting hotline telephone number.
- Two signs will be erected on the Castlereagh Highway providing details including the date and time of any required public road closures. Details of the times / duration of any road closures will also be included on the blast notification board.
- All residents / landowners within 2km of the Yarraboldy Extension area will be provided with a written notification on a weekly basis, if blasts are programmed, which will include:
  - a schedule of planned blasting event;
  - the likely blast location, date and time of day for scheduled blast;
  - notice of the blast hotline telephone number which can be phoned to receive updates regarding scheduled blasts; and
  - notice that any changes to the blast schedule will be displayed on the blast notification board (and a description of the board's location).

A record of all written notifications will be retained on file.

- Should the blasting schedule change, all registered residents / landowners will be advised prior to implementation of the revised schedule and the blast notification board updated. Records of the advice will be retained on file.

## 8. BLAST MANAGEMENT PROTOCOL

When undertaking a blast, the following checks will be undertaken prior to the day of the blast.

- Confirmation that any required flyrock or vibration modelling has been completed.
- Confirmation of the need for any road closures and organisation of required traffic controllers (see **Appendix 1**).
- Confirmation that public notification has been completed (see Section 7).



- Confirmation that surrounding mines have been consulted (see Section 6).

On the day of the blast the following checks will be undertaken.

- Confirmation that the predicted weather conditions are suitable for completion of the blast.
- Lock the entrance gates to the mine.
- Ensure that the surrounding area is clear of all persons and mobile equipment within the safety limits determined by the shotfirer and Manager Mining Engineering and / or Open Cut Examiner.
- Ensure that the Road Closure Management Plan is implemented where road closures are required.
- Ensure that the shot is cleared prior to re-opening access to the mine.
- Ensure that preliminary blast monitoring results are received on the day of the blast and any exceedances are reported (see Section 10).

## **9. COMPLAINTS AND DISPUTE MANAGEMENT**

The complaints hotline will be managed by the Manager Mining Engineering. Blast related complaints will be received and acted upon in accordance with the complaints handling process outlined within the Environmental Management Strategy. In the event that a complaint cannot be resolved or a dispute arises as a result of a property inspection or investigation, the matter would be referred to the dispute resolution process outlined within the Environmental Management Strategy.

## **10. REPORTING AND DOCUMENTATION**

A written record (including diagrams where relevant) will be prepared by the blast contractor and retained by the Manager Mining Engineering for all blasts including details of:

- amount and types of explosives used;
- blast location;
- number of shots;
- number of misfires;
- weather conditions;
- monitoring locations; and
- monitoring results (ground vibration, air blast and flyrock).

A summary of this data will be presented in each AEMR and the appropriate distances for the various blast management zones reviewed.

In the event of an exceedance of the blasting criteria, the DoP and DECCW will be notified as soon as practicable and a report will be prepared and submitted to the DoP and DECCW within 7 days of the exceedance in accordance with *Schedule 5 Condition 6* of PA 10\_0041. Also, in





accordance with *Schedule 4 Condition 2*, any affected landholder will also be notified in writing of any exceedances within 2 weeks of receiving the monitoring results. Blast mitigation and management measures for future blasts will be reviewed and additional monitoring undertaken to demonstrate compliance.

Details of all notifications will be recorded and retained on file and details of all received complaints will be reported in the Annual Environmental Management Report (AEMR) and Annual Return for Environment Protection Licence 4911. Any non-compliances with blasting criteria and any actions undertaken to avoid future non-compliance will also be reported within the AEMR and Annual Return.

## 11. RESPONSIBILITY AND ACCOUNTABILITY

The procedures and management measures presented in the BMP along with the Pine Dale Shotfiring and Explosives System will be made available to all members of the workforce on site. The responsible workforce will be made aware of the procedures through inductions, training (as required) and regular toolbox talks / meetings.

The ultimate responsibility for the implementation of this Management Plan and procedures is the Manager Mining Engineering.

**Table BM3** outlines the accountable positions and tasks.

**Table BM3**  
**Accountable Positions and Tasks (Blasting)**

Position	Accountable Task
Manager Mining Engineering	<ul style="list-style-type: none"> <li>• Ensure all resident notification is undertaken and records of all verbal or written notifications are maintained.</li> <li>• Ensure that all complaints are appropriately followed up.</li> <li>• Accurately reporting complaints and blast monitoring data in the AEMR and Annual Return.</li> <li>• Ensuring appropriate remedial / mitigation actions are implemented as required in conjunction with the Blast Contractor.</li> </ul>
Manager Mining Engineering / Open Cut Examiner / Shotfirer	<ul style="list-style-type: none"> <li>• Ensure that the Blast Management Protocol is followed for all blasts.</li> <li>• Ensure that all blasts are conducted in accordance within the specified times and blast design parameters.</li> <li>• Ensure that road closure procedures are implemented for all blasts within the Road Closure Zones.</li> <li>• Ensure blast monitoring is undertaken in accordance with these procedures.</li> <li>• Ensure any exceedances of monitoring criteria are reported in accordance with this management plan and approval conditions.</li> </ul>
Drill Rig Operator / Open Cut Examiner / Blast Contractor	<ul style="list-style-type: none"> <li>• Ensure that the hole location, diameter, spacing and depth is within the parameters provided.</li> </ul>
Shotfirer / Open Cut Examiner / Blast Contractor	<ul style="list-style-type: none"> <li>• Ensure that all instructions within the Pine Dale Open Cut Mine – Shotfiring and Explosives System are followed.</li> <li>• Ensure that all blast design parameters including MIC and required stemming depths are followed precisely.</li> </ul>



# Appendix 1

## Road Closure Management Plan

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## **1. OBJECTIVE**

To safely manage temporary road closures when blasts are within 400m of a public road or when it is considered a blast may affect a public road or the Private Coal Haul Road.

## **2. SCOPE**

The purpose of this management plan is to define the measures required for the safe practice of road closure for the Castlereagh Highway and Private Coal Haul Road when blasts occur within the applicable Road Closure Zones or flyrock modelling indicates road closure is required. A traffic control plan for the closure of the Castlereagh Highway will also be prepared by the traffic control contractors in accordance with applicable RTA guidelines and standards and to the satisfaction of the RTA.

## **3. NOTIFICATION OF ROAD CLOSURE**

The public will be notified a minimum of 7 days prior to blasting requiring closure of the Castlereagh Highway via signage on the Castlereagh Highway and the blast notification board outside the light vehicle entrance. The signs will include details of the date and times of the road closure and will be Size B Class 1 steel signs in accordance with the Traffic Control at Worksites Manual 2010. The signs will include magnetic dates / times to allow these to be updated as required.

Emergency services and Lithgow City Council will also be notified of planned closures of the Castlereagh Highway in writing (email or facsimile) 7 days prior to the blast. Emergency services to be notified include the following.

- Ambulance Services.
- Police (local area command).
- Fire and Rescue NSW (area control).
- State Emergency Service (local).

Surrounding mines will be notified of planned road closures as part of the blast scheduling protocol.

The NSW Manager for Giacci, or his nominated delegate, or Private Haul Road Contractor as appointed, who coordinates all transport on the Private Coal Haul Road, will also be notified on the day of a blast requiring temporary closure of the Private Coal Haul Road.

## **4. TIMING AND DURATION OF ROAD CLOSURE**

Road closures will occur only within the approved blasting hours (10:00am to 3:00pm). It is anticipated that vehicle access during road closures will generally be restricted for a duration of up to approximately 15 minutes which will allow the shotfirer and senior mining official to inspect the shot to ensure there are no misfires and traffic controllers to subsequently inspect the road for flyrock.



## 5. ROAD CLOSURE PROCEDURE

1. Prior to the blast, the shotfirer and / or Blast Contractor will determine the number of blast sentries / traffic controllers required to ensure that the roads are clear of vehicles and people and be positioned at key points along the road.
2. Sentries / traffic controllers will operate from motor vehicles with appropriate signage, lighting and two-way radios capable of communicating with each other and the shotfirer. All sentries / traffic controllers will be in position at least 10 minutes prior to the blast
3. The shotfirer will contact all sentries / traffic controllers to ensure that they are in position and ready to close the roads. The shotfirer will not proceed to prepare the blast for firing until all sentries / traffic controllers have been confirmed to be in position.
4. Once the blast has been prepared for firing, the shotfirer will instruct the traffic controllers to close the road and sentries to ensure the roads are clear of vehicles and people.
5. The shotfirer will again contact all sentries / traffic controllers to ensure that all roads have been closed and are clear.
6. Once the blast has been fired, it will be inspected by the shotfirer who will then provide the 'all clear' for the roads to be inspected for any flyrock and, when appropriate, re-opened to traffic.

## 6. ROAD CLEANUP PROCEDURE

In the event that flyrock or debris is found on the Castlereagh Highway or Private Coal Haul Road, the traffic controllers and sentries for that road will remain in position until the flyrock or debris is cleared from the road. Once cleared, the road will be re-opened to traffic.

## 7. EMERGENCY ACCESS

Communications between shot-firer and the sentries stationed at the road closure will remain open such that the blast can be delayed to allow emergency services vehicles through the closure, if required.



# Appendix 2

## Drill Log

(No. of pages including blank pages = 1)



**Drill and Loading  
Record**

**Blast Summary**

Blast State	Hole Count	Length	Volume	Avg Depth	Max Depth	Min Depth	Charged	PF	Current
Design									
Drilled									
Dipped									
Charged									

Shot No : PineDaleShot1						Product Loaded (kg or m)					Stem
Hole ID	Design Depth	Drill Depth	Comment	Measured Depth	Water Depth	Toe	Gravel	Middle	Gravel	Top	
A1											
A2											
A3											
A4											
A5											
A6											
A7											
A8											
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