



Murra Warra Wind Farm
Blasting Management Plan
Final

Author: Kevin Garthwaite

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Ref: 02418-006357

PLANNING AND ENVIRONMENT ACT	
<u>YARRIAMBICK</u>	PLANNING SCHEME
PERMIT NO. <u>PA1600128</u>	
ENDORSED PLAN	
SHEET <u>1</u>	OF <u>19</u>
SIGNED <u>[Signature]</u>	FOR
MINISTER FOR PLANNING	
DATE: <u>15/8/17</u>	

PLANNING AND ENVIRONMENT ACT	
<u>HORSHAM</u>	PLANNING SCHEME
PERMIT NO. <u>PA1600127</u>	
ENDORSED PLAN	
SHEET <u>1</u>	OF <u>19</u>
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MINISTER FOR PLANNING	
DATE: <u>15/8/17</u>	

ENDORSED TO COMPLY
WITH CONDITION
<u>49</u>
OF PLANNING PERMIT
<u>PA1600127 + PA1600128</u>

Revision History

Issue	Date	Author	Nature And Location Of Change
01	29 Mar 2017	Kevin Garthwaite	Final

The drawings and/or site plans included in this plan are based on layouts submitted by MWWF as part of its planning application for the Murra Warra Wind Farm project. The wind farm permits, (HRCC: PA1600127, YSC: PA1600128 and YSC PA1600129) allow actual locations of wind turbines to be subject to final micro siting up to 100 m and/or minor changes to access track locations and associated plant, equipment and construction facilities, within the boundary of existing constraints and as defined by the permits. The development can also be constructed in stages.

PLANNING AND DEVELOPMENT ACT
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EMERGENCY PLAN
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ON PLANNING PERMIT

Contents

1	OVERVIEW	1	
	<i>1.1 Introduction</i>		1
2	OBJECTIVES	2	
3	POLICY AND STATUTORY CONTEXT	2	
	<i>3.1 Relevant standards and guidelines</i>		2
4	RESPONSIBILITY FOR BLASTING	2	
5	KEY ISSUES	2	
	<i>5.1 Location of blasting</i>		2
	<i>5.2 Sensitive receivers and bores</i>		3
6	MANAGEMENT AND MITIGATION.....	6	
	<i>6.1 Transportation of explosive materials</i>		6
	<i>6.2 Storage of explosive materials</i>		6
	<i>6.3 Blasting</i>		6
	<i>6.3.1 Pre-blasting precautions</i>		6
	<i>6.3.2 Handling of explosive materials</i>		7
	<i>6.3.3 Drilling and loading operations</i>		7
	<i>6.3.4 Site clearance and post blast reoccupation</i>		8
7	CONCLUSION	8	
8	REFERENCES	8	
9	APPENDIX.....	9	

1 OVERVIEW

1.1 Introduction

The Blasting Management Plan has been prepared for the Murra Warra Wind Farm (MWWF) as part of the overall Environmental Management Plan (EMP) in response to planning permit conditions issued by the Minister for Planning PA1600127, PA1600128 and PA1600129.

A blasting plan is a risk control plan used in explosive blasting. It aims to ensure blasts do not harm people in the area and limit damage to the environment by adhering to the WorkSafe Guidance Note (WorkSafe, 2012).

This Blasting Plan has been produced by RES Australia in response to permits PA1600127 and PA1600128 condition 47 a-h

Permit Condition	Condition requirement	Plan Section
a	name and qualification of the person responsible for blasting	4
b	a description of the location of where explosives will be used	5.1
c	a plan showing the location of every licensed bore on any property with a boundary within 1 km of the location of the blasting	Not applicable
d	identification and assessment of any potentially sensitive site within 1 km of the location of the blasting, including the procedure for pre-blast and post-blast qualitative measurement or monitoring of the effects of the blasting on such sites.	5.2 6.3.1
e	the procedure for site clearance and post-blast re-occupation.	6.3.4
f	the procedure for the storage and handling of explosives.	Section 6 6.2 & 6.3.2
g	a requirement that blasting only can occur after at least 48 hours prior written notification of the intention to undertake blasting	Not applicable

	has been given to the occupants of the properties which are located in whole or in part within 1 km of the location of the proposed blasting.	
h	a requirement that blasting only be undertaken between the hours of 8am and 4pm.	6

In meeting the requirements of this plan it is taken that the requirements of Condition 16 of PA1600129 has also been met.

2 OBJECTIVES

The objectives of this Blast Management Plan are to:

- provide guidance for the preparation of task specific blasting plans;
- ensure a safe and risk controlled plan to explosive blasting,
- ensure blasts do not harm people in the area, and limit damage to the environment.

3 POLICY AND STATUTORY CONTEXT

3.1 Relevant standards and guidelines

AS 2187.2: Explosives - Storage and use. Part 2: Use of explosives and Appendix K - demolition of structures

Resource Safety (WA) guide, Guide to blast plan preparation, including mining operations.

WorkSafe Victoria Guidance Note: *Safe distances when using blasting explosives*

4 RESPONSIBILITY FOR BLASTING

At the start of construction the principal contractor will supply details of the party which will be contracted for undertaking blasting. The principal contractor will, undertake to ensure that the contractor is suitably qualified and that the required guidelines and procedures are followed including this Blast Management Plan. The details of all persons responsible for blasting will be notified to the responsible authority prior to the commencement of blasting.

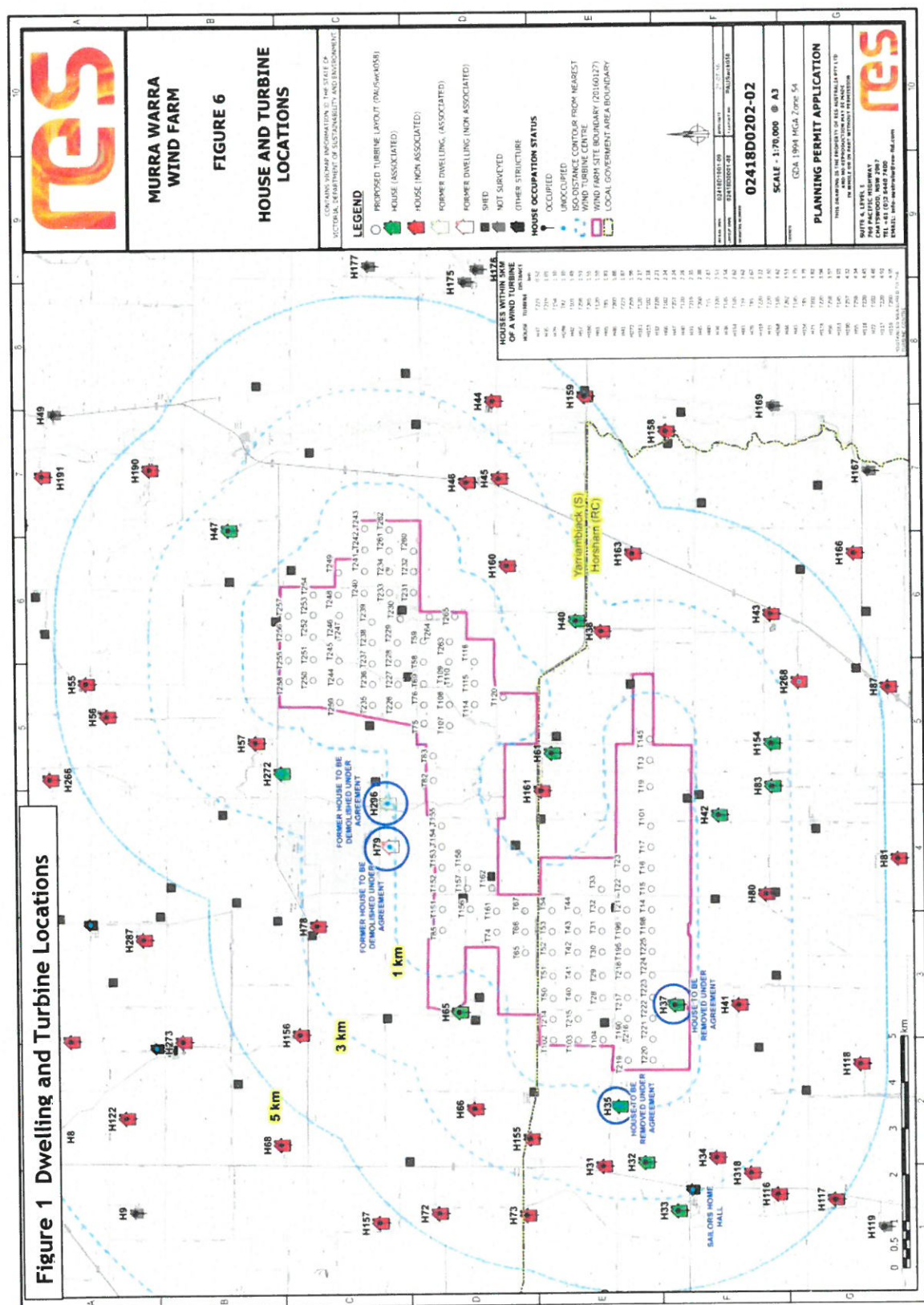
5 KEY ISSUES

5.1 Location of blasting

Blasting is unlikely to be required but may on occasions be required to deal with areas of localised hardness at turbine locations, and in the quarry.

5.2 Sensitive receivers and bores

There are no residences, licenced bores or statutory heritage sites within 1km of the site. The closest dwellings are shown in Figure 1. There are no statutory heritage sites within 1km of the site and any artefacts which are found during the Heritage Assessment will be relocated off the site in accordance with the Voluntary Cultural Heritage Management Plan. Sensitive Native Vegetation is shown in Figure 2.



6 MANAGEMENT AND MITIGATION

A series of management measures have been identified in order to minimise the impacts on the known environmental, social and heritage values. Common risks and risk control measures to consider for a Blast Management Plan from *WorkSafe Guidance Note - Blast Management Plans* have also been presented in Appendix A.

6.1 Transportation of explosive materials

All vehicles transporting explosive materials shall display all placards, lettering, and/or numbering required. Only authorized persons will transport and handle the explosives as designated by the authority of those licensed for this purpose, vehicles transporting explosive materials shall not be left unattended.

6.2 Storage of explosive materials

The storage area of all explosive materials shall be located on the site at a location approved by the supervising blasting engineer of the blasting subcontractor. Caps or other detonating devices will not be stored with explosives.

An accurate running inventory of all explosives and blasting agents stored at the site shall be maintained: two copies shall be maintained - one at the storage area and one in the main construction office which shall be set well back from the storage area.

The designated storage site, explosive transporting vehicles, and areas where explosives are being used shall be clearly marked and will display the required warning signs. A daily tally of all explosives delivered, used and stored will be maintained at the main Project construction office.

6.3 Blasting

The extent of blasting required will depend on the areas where extreme hardness is identified, however regardless of the extent, blasting will only occur between the hours of 8am and 4pm and in accordance with the management procedures outlined in this document.

6.3.1 Pre-blasting precautions

Overarching precautions in accordance with the planning conditions and other relevant guidelines are summarised below. These must be adopted pre blasting in addition to any specific precautions for the protection of persons and adjoining property established by the authorised blasting party.

Precautions must include the following:

- An On Site Blast Management Plan must be prepared by the shot firer in line with the WorkSafe Guidance Note for Blast Management Plans

- The location of bores, sensitive sites and properties within 1km of the blasting must be identified / verified prior to commencing blasting (not applicable to this site).
- All sensitive sites must be inspected pre and post blasting for existing condition with damage recorded through notes and photographs.
- Notification in writing of the intention of blasting must be provided to the occupants of the residences which are located in whole or in part within 1 km of the location of the proposed blasting 48 hours prior to blasting activities.
- A blasting mat will be placed over the blasting surface. The blasting mat will remain in place until all shots are fired in the blasting zone.
- Appropriate signs will be erected in the area of blasting activities.
- Special care will be taken with detonating cords and connectors to protect from the impact of falling rocks or other impeding objects.
- Vehicles equipped with radio transmitters and portable 2-way radios will not be permitted within 50m of blasting operations.

6.3.2 *Handling of explosive materials*

There shall be no smoking, open lights, or fire of any kind within 50m of any area where explosives are being handled. No source of ignition, except necessary means to light fuses or fire electric detonators, shall be permitted in an area containing loaded holes.

Containers of explosive materials shall be opened only with non-sparking tools or instruments. Metal slitters may be used for opening fiberboard boxes, paper bags or plastic tubes.

After loading of a blast is completed, all excess explosive materials and detonators shall be removed to a safe location or returned at once to the storage area, observing the same rules as when being conveyed to the blasting area.

6.3.3 *Drilling and loading operations*

Drilling and loading operations shall not be carried on in the same area. Drilling shall be separated from loaded holes by at least the depth of the loaded hole but in no case less than 20 metres.

The loading or loaded area shall be kept free of any equipment, operations, or persons not essential to loading; no vehicle traffic shall be permitted over loaded holes; the blast site shall be guarded or barricaded and posted with danger signs to restrict unauthorized entry.

No holes shall be loaded except those to be fired in the next round of blasting; after loading, all remaining explosive materials and detonators shall be immediately returned to an authorized magazine; no explosive materials or

loaded holes shall be left unattended at the blast site at any time. Cartridges shall be primed only in the number required for a single round of blasting.

6.3.4 *Site clearance and post blast reoccupation*

Prior to the firing of a shot, all persons in the danger area shall be warned of the blast and ordered to a safe distance from the area. Blasts shall not be fired until it is certain that every person has retreated to a safe distance and no one remains in a dangerous location.

Prior to the firing of a shot, a competent flag person shall be posted at all access points to danger areas.

All blasting operations shall use the following safety signals:

- (1) **Warning Signal** - a one-minute series of long audible signals 5 minutes prior to blast signal;
- (2) **Blast Signal** - a series of short audible signals 1 minute prior to the shot; and
- (3) **All Clear Signal** - a prolonged audible signal following the inspection of blast area.

Following the reoccupation of site, the sensitive sites identified during pre-blasting precautions must be once again inspected to assess any signs of damage including fragments from the blast. The condition of these sensitive sites is to be recorded in writing and with photographs. Comparison with the preconstruction inspection must be undertaken. If any signs of damage/impact are recorded restoration of the site must be agreed with the environmental manager for environment or heritage damage and the project manager for damage to property.

7 CONCLUSION

This Blast Management Plan provides direction to minimise impacts on blasting. In line with Work Safe Guidance Note - "Blast Management Plans", a task specific blast management plan must be prepared following the above direction as well as meeting the requirements of the Work Safe Guidance Note.

8 REFERENCES

Work Safe (2012 *Guidance Note: Blast management plans - advice on developing a blast management plan to control risk from explosive blasting*. April 2011.

ABS (2012) Australian Bureau of Statistics - 2011 Census QuickStats.
http://www.censusdata.abs.gov.au/census_services/getproduct/census/2011/quickstat/SSC20024?opendocument&navpos=220. Accessed 13 Sep 2012.

9 APPENDIX

Work Safe Guidance Note -

Blast management plans Common Risks and Control Measures

Blast management plan template

Information for shotfirers on what a blast management plan may look like.

April 2012

Background

A blast management plan (BMP) is a risk control plan used in explosive blasting. It aims to ensure blasts are well-planned, protect people in the area and limit damage to the environment.

Under the Dangerous Goods (Explosives) Regulations 2011 (Explosives Regulations), a BMP must be prepared by a licensed shotfirer before every blast. The Explosives Regulations specify what information should be included in a BMP (in accordance with AS 2187.2: *Explosives - Storage and use. Part 2: Use of explosives*) but do not specify the format of the BMP.

What to include in the BMP depends on the size, location, nature and complexity of the blasting operation. It may be part of a site safety plan to address all hazards and risks at the site. Where blasting routines are already established, such as within the boundaries of a quarry, the BMP still needs reviewing by a competent person before conducting each blast to include any changes and modifications required by the shotfirer.

For practical guidance on what should be in a BMP, refer to the WorkSafe Victoria Guidance Note, *Blast management plan*.

Template for a blast management plan

This guidance note includes a suggested template for a BMP that may be suitable for most blasting operations.

While there is no requirement to produce a BMP in this format, WorkSafe inspectors will expect to see a BMP in this or a similar format when they visit blasting sites.

The template has seven parts - blast summary, responsibilities, blast design and layout, types of explosives, permits for the location, risk management and record of the blast.

The template includes notes in the right column on critical details to consider when adapting the plan to suit the requirements of different conditions and different types of blasts. It also has a list of common risks and risk controls in the risk management section which may be appropriate to the particular site.

Blast Management Plan Template

Developed by the shotfirer to help comply with reg 130 (requirement to have a BMP) of the Dangerous Goods (Explosives) Regulations 2011

1. Summary of the blast	
Requirements	Details
Blast date:	Time:
Location of blast:	Street name and number, suburb/town, postcode, Work Authority No.
Objective of the blast:	Matters to consider include: <ul style="list-style-type: none"> Is the blast designed for demolition or extraction of ore, civil works, other? What are the key safety considerations? What are the key environmental considerations?

Guidance Note Blast management plan template

2. People responsible for the blast

This provides details of the relevant people allocated with responsibilities including the shotfirer, site supervisor, blast crew, security and the person (eg site manager) who authorised the blast at the site. Note – depending on the site, some people might have several roles.

Shotfirer

Requirements	Details		
Name and licensing details:	List other licences required eg licence to store explosives in a magazine.		
Company:	Name and address:		
Position:			
Contact details:	Tel:	Fax:	Mobile:
Email:			

Other key people (complete for each person)

Requirements	Details		
Name:			
Position:	Eg site supervisor.		
Responsibility:			
Company:	Name and address:		
Contact details:	Tel:	Fax:	Mobile:

Other people involved in the blast (complete for each person)

Requirements	Details		
Name:			
Position:	Eg blast crew member or security.		
Responsibility:			
Company:	Name and address:		
Contact details:	Tel:	Fax:	Mobile:
Email:			
Security card number, if applicable:			Expiry date:

Guidance Note Blast management plan template

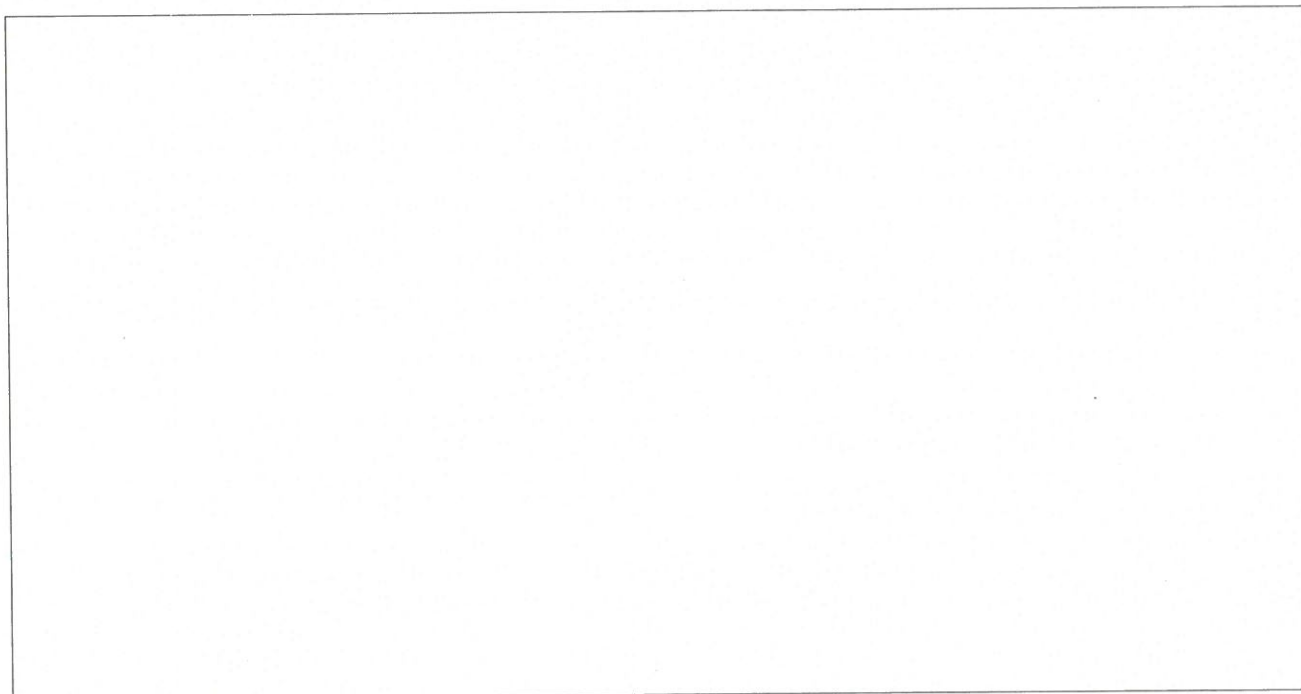
3. Blast design

This provides details of the layout of the blast, and its approval, in relation to the pattern, depth of holes and stemming designed to minimise the potential for fly rock or other incidents.

Requirements				Details	
Type of ground:		Eg hard or soft rock, sandy or reactive soils, hot ground.			
Number/diameter of holes:					
Net explosive quantity (NEQ) per hole:		Burden:			
Spacing and depth of hole:					
Type/height of stemming:					
Delay per hole:		Number of rows:			
Orientation:		YES/NO	Decking	YES/NO	
Blast mat/cover over site:		YES/NO	N/A or provide details		

Blast layout plan

This illustrates the blast pattern, spacing of holes, firing points and direction of the blast. The plan should include orientation, hole layout/spacing, any blast mats or covers, delays, burden, initiation point and firing lines.



Shotfirer	Manager	Approver of the plan
Name:	Signature:	Signature:
Date:	Date:	Date:

Guidance Note Blast management plan template

4. Explosives/charging

This details the quantity and types of explosives to be used and confirms whether procedures have been prepared for the storage and handling of explosives and for the conduct of the blast.

Requirements	Details	
Type of explosive:		
Detonating cord:		
Quantity of detonators:		
Quantity of packaged type:		
Quantity of bulk type:		
Total quantity of explosives used:		
Effective charge mass per delay (MIC) and power factor:		
Drilling procedures:	YES/NO	N/A or provide details
Loading and charging procedures:	YES/NO	N/A or provide details
Storage and handling procedures:	YES/NO	N/A or provide details

Initiation method

This provides details of the initiation and firing equipment to be used, recording of times tested and the function of equipment to be used in the blast.

Requirements	Details	
Safety fuse burn time (per metre) and length		
Electrical testing equipment (type/model):		
Continuity:	YES/NO	Resistance:
Signal tube:	YES/NO	
Electronic:	YES/NO	
Delays:	YES/NO	
Type and number:		
Initiation equipment exploder:	Make and model or the initiation method.	

5. Blast area permits and licences

This details the blast area (in relation to other structures and operations) and lists the permits related to the area.

Requirements	Details	
Blast location:		
Exclusion zone (m):		
Distance (m) to:	Nearest dwelling:	Nearest structure:
Nearest personnel:	Nearest public access:	
Nearest services (eg water/electricity):		
Blast permits/licences	YES/NO	
Details of permits/licences:	Include town blast permit where required and notification to WorkSafe if intending to demolish a building or structure or part.	
Supporting documents consulted:	List and summaries of reports, drawings, letters and records.	

Guidance Note Blast management plan template

6. Blast risk management

This summarises the risks identified during a risk assessment and the risk controls determined for the site and site security arrangements. Examples of risks and risk controls that may apply are provided.

Identified risk	Risk controls
Unauthorised access to blast area:	Restrict access to authorised persons; secure site with guarded gate.
Unauthorised access to explosives store/portable magazine:	Secure stores and restrict access to site.
Inadequate training and competency for staff:	<ul style="list-style-type: none"> Ensure shotfirers are licensed. Train personnel in explosives products and blast design. Develop and implement procedures to check training and competency.
Competency of contractors:	<ul style="list-style-type: none"> Review competency and training. Ensure drillers are competent and have required experience. Set minimum standards. State requirements in contracts.
Blasting procedure:	<ul style="list-style-type: none"> Develop and maintain safe blasting procedures. Involve competent people in development.
Inconsistent performance of explosives:	<ul style="list-style-type: none"> Use a reliable supplier. Test explosives. Develop procedures for use of explosives. Ensure shotfirers are licensed, competent and experienced.
Unreliable firing methods:	<ul style="list-style-type: none"> Use reliable products. Test safety fuses, if used, and other equipment. Ensure equipment is maintained by competent people. Develop procedures for checking firing method.
Hot ground causing premature firing:	<ul style="list-style-type: none"> Use appropriate firing method and types of explosives. Test in hot conditions. Check ground before designing the blast.
Damage to structures:	<ul style="list-style-type: none"> Evaluate the effect of ground vibration and air blast overpressure on structures or ground conditions. Revise blasting procedure to minimise damage.
Risk of fly rock:	<ul style="list-style-type: none"> Calculate quantity of explosives, stemming and capping. Conduct laser profiling. Conduct bore hole tracking. Provide appropriate supervision. Check blast pattern is as designed. Set up exclusion zones. Use blast mats. Use correct stemming material including size.

Guidance Note Blast management plan template

Security arrangements:		
Requirements	Details	
Security procedures for the site and the blast:	Matters to consider: <ul style="list-style-type: none"> ▪ manning of all entrances and exits ▪ closed circuit TV ▪ use of sentries and preventing access inside the exclusion zone ▪ documented sentry procedures provided to each sentry ▪ location of explosives storage keys ▪ warning signs ▪ procedures for emergency services vehicles. 	
Communication system/s between people involved or in the vicinity of the blast:	Matters to consider: <ul style="list-style-type: none"> ▪ two-way communication ▪ siren system ▪ communication to neighbours in a built up area ▪ back up communications system ▪ emergency services contact details. 	
Advanced warning:	YES/NO	N/A or provide details eg sirens, communication prior to firing.
Audible warning:	YES/NO	N/A or provide details eg sirens, use of verbal sequence for firing.
Sentries period:	YES/NO	N/A or provide details including number of sentries.
Signs:	YES/NO	N/A or provide details eg location and type.
Traffic management:	YES/NO	N/A or provide details eg documented procedure provided to sentries.
'ALL CLEAR' signal	YES/NO	Provide details, if required.

7. Record of the blast

This should be completed by the shotfirer after the blast. It covers weather conditions at the time of the blast, results of any monitoring and analysis of the blast which could be used to improve risk management at subsequent blasts.

Weather conditions

This provides details of the weather conditions at the time of the blast and whether any changes were necessary to the original blast plan due to changing conditions.

Requirements	Details	
Temperature:		
Wind:	Speed:	Direction:
Overall conditions:	Dry <input type="checkbox"/> Overcast <input type="checkbox"/> Wet <input type="checkbox"/> Sunny <input type="checkbox"/> Sultry <input type="checkbox"/> Thunder/lightning <input type="checkbox"/> Windy <input type="checkbox"/>	
Fire ban day:	N/A or detail restrictions that applied if on the day of a fire ban.	
Describe how weather conditions affected blast:	Detail any changes required due to the weather conditions on the day, such as: <ul style="list-style-type: none"> ▪ lightning activity affecting electrical firing ▪ wind direction affecting fly rock. Detail conditions causing delay, postponement or cancellation.	

Guidance Note Blast management plan template

Environmental monitoring This provides details of the type of equipment and any measurements taken during the blast as well as key environmental considerations for the blast to ensure that factors such as noise or vibration did not exceed acceptable levels. These measurements could be important should there be any complaint or incident as a result of a blast.			
Requirements		Details	
Environmental considerations and exposure limits required:		List environmental considerations for the location of the blast eg built up area, proximity to residential areas or community services such as schools, hospitals and aged care hostels.	
Monitoring equipment used:		Type:	Serial no: Location:
Details of measurements recorded during the blast:		Matters to consider: <ul style="list-style-type: none"> vibration measurements noise measurements. 	

Post blast analysis This assesses whether the blast design, firing and BMP met the objectives.		
Requirements		Details
Was there a misfire?	YES/NO	Provide details of any misfire, cause and rectification.
Was a misfire management system used and followed?	YES/NO	N/A or provide details: (Where procedures, worksheets or similar are prepared, reference them and attach to the BMP. Consider time lag prior to re-entry and assessment conducted by authorised personnel for general or other access)
Was any fly rock/fly generated?	YES/NO	N/A or provide details eg size, distance travelled, damage.
Results of post blast assessment and inspection	Provide details:	
Were there incidents/complaints?		N/A or provide details: (Records and actions taken to rectify where necessary. Notification to WorkSafe for incidents causing injury to any person or immediate risk to a person's health or safety or property damage)
Stock reconciliation:		
Are changes proposed to future blasts?	Include any proposed modifications for future blasts.	
Post blast comments:		

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Further information

Contact the WorkSafe Victoria Advisory Service on 1800 136 089 or go to worksafe.vic.gov.au

Australian Standards

AS 2187.2: Explosives – Storage and use. Part 2: Use of explosives and Appendix K – Demolition of structures
 Department of Consumer and Employment Protection
 Government of Western Australia, Guide to blast plan preparation, including mining operations
 WorkSafe Victoria Guidance Note: Blast management plans
 WorkSafe Victoria Guidance Note: Safe distances when using blasting explosives.