APPENDIX Q

PRELIMINARY HAZARD ANALYSIS

WILPINJONG EXTENSION PROJECT

PRELIMINARY HAZARD ANALYSIS

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1 INTRODUCTION

The Wilpinjong Extension Project (the Project) is a proposed extension of open cut operations at the Wilpinjong Coal Mine for an additional operational life of approximately seven years. The Project is situated approximately 40 kilometres north-east of Mudgee, near the village of Wollar, within the Mid-Western Regional Council Local Government Area, in central New South Wales (NSW) (Figure 1). The Project is owned and operated by Wilpinjong Coal Pty Limited (WCPL), a wholly owned subsidiary of Peabody Energy Australia Pty Limited (Peabody Energy).

WCPL is seeking approval from the NSW Minister for Planning for a Development Consent under Division 4.1 of Part 4 of the *Environmental Planning and Assessment Act, 1979* for the Project. The application also includes the existing approved operations of the Wilpinjong Coal Mine. It is intended that should development consent be granted for the proposal with conditions satisfactory to the Proponent, the current Part 3A Project Approval 05_0021 would be surrendered.

This document is a Preliminary Hazard Analysis (PHA) for the Project.

The Secretary of the Department of Planning and Environment (DP&E) has provided the following requirements that may be relevant to the PHA:

> *Public Safety - including an assessment of the likely risks to public safety, paying particular attention to potential subsidence risks, bushfire risks, and the handling and use of any dangerous goods*;

Consistent with the Secretary's Environmental Assessment Requirements, this PHA addresses hazards relating to bushfire risks and dangerous goods; however, given the mining method proposed in the extension areas (e.g. open cut), subsidence risks are not applicable.

This PHA has been conducted to evaluate the hazards associated with the Project in accordance with the general principles of risk evaluation and assessment outlined in the NSW Department of Planning (DoP) (now DP&E) *Assessment Guideline: Multi-level Risk Assessment* (DoP, 2011a). This PHA also addresses the requirements of State Environmental Planning Policy (SEPP) 33 within the *Hazardous and Offensive Development Application Guidelines: Applying SEPP 33* (DoP, 2011b), and has been documented in general accordance with *Hazard Industry Planning Advisory Paper No.6: Hazard Analysis* (DoP, 2011c).

Assessed risks are compared to qualitative measures of consequence, likelihood and risk developed in accordance with Australian Standard/New Zealand Standard International Organisation for Standardisation (AS/NZS ISO) 31000:2009 *Risk Management – Principles and Guideline.* Further, this PHA considers criteria provided within *Hazardous Industry Planning Advisory Paper No.4: Risk Criteria for Land Use Safety Planning* (DoP, 2011d).

1.1 OBJECTIVE AND SCOPE

The objective of this PHA is to identify the off-site risks posed by the Project to people, their property and the environment and assess the identified risks using applicable qualitative criteria. In accordance with *Assessment Guideline: Multi-level Risk Assessment* (DoP, 2011a), this assessment specifically covers risks from fixed installations and does not encompass transportation by pipeline, road, rail or sea.

The PHA therefore considers off-site risks to people, property and the environment (in the presence of controls) arising from atypical and abnormal hazardous events and conditions (i.e. equipment failures, operator error and external events), with specific focus on fixed installations on-site. This assessment does not consider risks to WCPL employees or Peabody Energy owned property or risks that are not atypical or abnormal (e.g. long-term effects of typical dust emissions).

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LEGEND

- Mining Lease Boundary
- Exploration Licence Boundary
- Authorisation Boundary
- Local Government Boundary
- NSW State Forest
- National Park, Nature Reserve or State Conservation Area
- Mining Operation

Source: NSW Land & Property Information (2015); NSW Dept of Industry (2015); Geoscience Australia (2011)

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WILPINJONG EXTENSION PROJECT

Project Location

Figure 1

On-site environmental risks and potential long-term impacts are considered in the Environmental Risk Assessment (Appendix P of the Environmental Impact Statement [EIS]) and where relevant in the following other studies for the EIS:

- Appendix A - Noise and Blasting Assessment.
- Appendix B - Air Quality and Greenhouse Gas Assessment.
- Appendix C - Groundwater Assessment.
- Appendix D - Surface Water Assessment.
- Appendix E - Biodiversity Assessment Report and Biodiversity Offset Strategy.
- Appendix F - Aquatic Ecology Assessment.
- Appendix G - Aboriginal Cultural Heritage Assessment.
- Appendix H - Historic Heritage Assessment.
- Appendix I - Land and Soil Assessment.
- Appendix J - Road Transport Assessment.
- Appendix K - Geochemistry Assessment.
- Appendix L - Land Contamination Assessment.
- Appendix M - Economic Impact Assessment.
- Appendix N - Social Impact Assessment.
- Appendix O - Visual Assessment.

1.2 PRELIMINARY SCREENING PROCESS

Preliminary screening to determine the requirement for a PHA was undertaken for the Project, taking into account broad estimates of possible off-site effects or consequences from hazardous materials present on-site and their locations. Potentially hazardous industry is defined by the DoP (2011a) as having *potential for significant injury, fatality, property damage or harm to the environment in the absence of controls*.

In accordance with *Assessment Guideline: Multi-level Risk Assessment* (DoP, 2011a), it was determined that the Project is potentially hazardous as the possibility of harm to the off-site environment in the absence of controls could not be discounted.

According to *Assessment Guideline: Multi-level Risk Assessment* (DoP, 2011a), a Level 1 assessment (qualitative analysis) can be justified if the analysis of the facility demonstrates that there are no major off-site risks, if the technical and management controls are well understood and where there are no sensitive surrounding land uses.

The PHA review team considered this screening process and concluded that there is limited potential for scenarios with significant off-site consequences, the technical and management controls are well understood and that there are no sensitive surrounding land uses. Accordingly, the team implemented a Level 1 assessment (qualitative analysis) for this PHA.

1.3 STUDY METHODOLOGY

The methodology employed during the preparation of this PHA was as follows:

(i) Identify the hazards associated with the Project.

(ii) Analyse the consequence of identified hazardous events.

(iii) Qualitatively estimate the likelihood of hazardous events.

(iv) Propose risk treatment measures.

(v) Qualitatively assess risks to the environment, members of the public and their property arising from atypical and abnormal events and compare these to the risk criteria outlined in *Hazardous Industry Planning Advisory Paper No. 4: Risk Criteria for Land Use Safety Planning* (DoP, 2011d).

(vi) Recommend further risk treatment measures, if necessary.

(vii) Qualitatively determine the residual risk assuming the implementation of the risk treatment measures.

1.3.1 Preliminary Hazard Analysis Review Team

The above methodology was implemented during a PHA multi-disciplinary team-based risk review in January 2015. The review participants included technical advisors from WCPL including:

- Peabody Energy, Director Sustainable Development – Jamie Lees.
- Peabody Energy, Project Director – Mal Edwards.

1.3.2 Risk Management Process

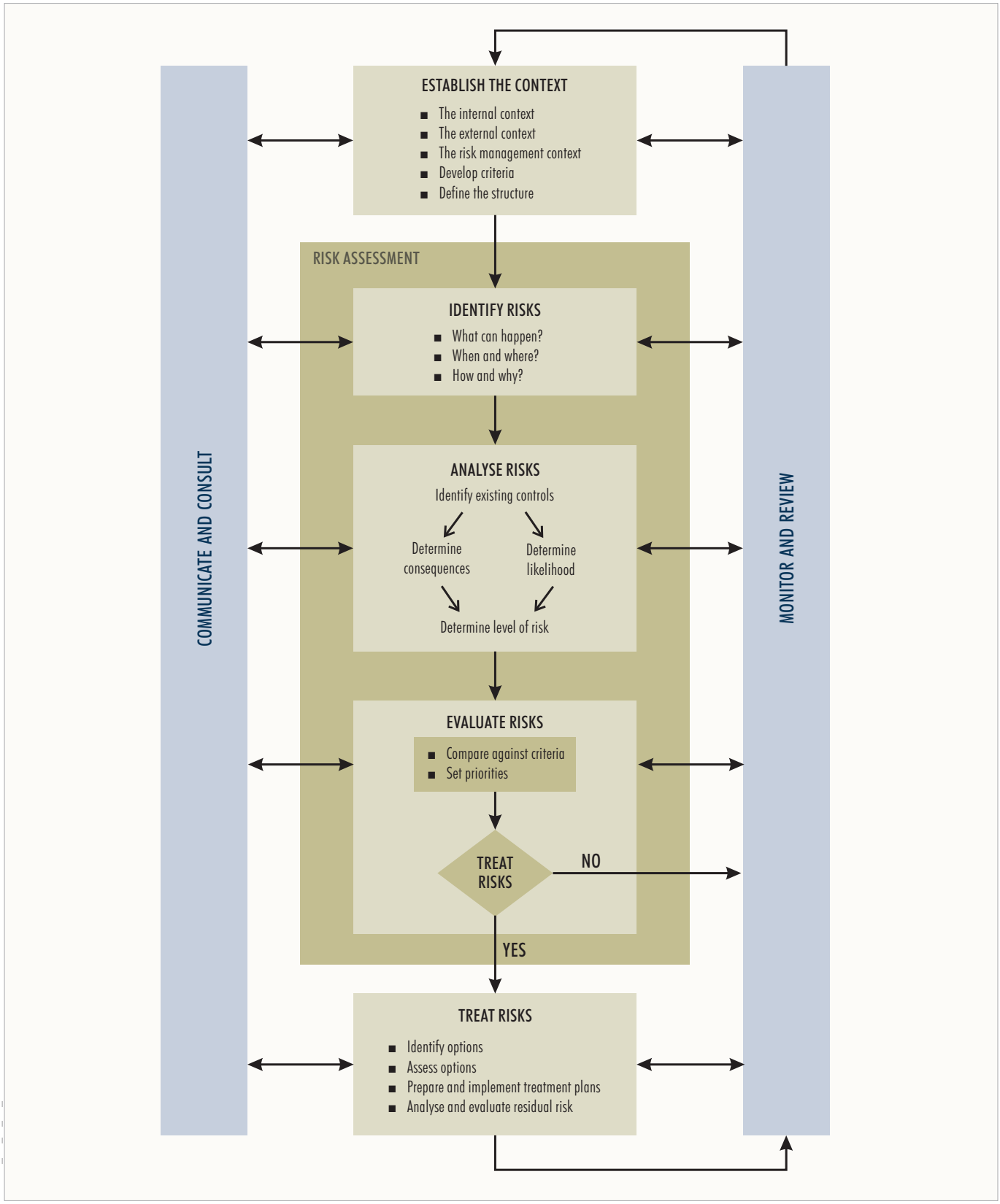
This PHA has been undertaken with regard to the risk management process described in AS/NZS ISO 31000:2009. The risk management process is shown schematically on Figure 2 and includes the following components:

- Establish the context – Sections 1 and 2.
- Identify risks – Section 3.2 and Attachment A.
- Analyse risks – Section 4 and Attachment A.
- Evaluate risks – Section 4 and Attachment A.
- Treat risks – Section 3.2.3 and Attachment A.

1.3.3 Risk Criteria

This PHA considered the following qualitative criteria (DoP, 2011d):

(a) All 'avoidable' risks should be avoided. This necessitates investigation of alternative locations and technologies, wherever applicable, to ensure that risks are not introduced in an area where feasible alternatives are possible and justified.



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Source: AS/NZS ISO 31000:2009 Risk Management - Principles and Guidelines

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WILPINJONG EXTENSION PROJECT

Risk Management Process

Figure 2

(b) The risks from a major hazard should be reduced wherever practicable, irrespective of the value of the cumulative risk level from the whole installation. In all cases, if the consequences (effects) of an identified hazardous incident are significant to people and the environment, then all feasible measures (including alternative locations) should be adopted so that the likelihood of such an incident occurring is made very low. This necessitates the identification of all contributors to the resultant risk and the consequences of each potentially hazardous incident. The assessment process should address the adequacy and relevance of safeguards (both technical and locational) as they relate to each risk contributor.

(c) The consequences (effects) of the more likely hazardous events (i.e. those of high probability of occurrence) should, wherever possible, be contained within the boundaries of the installation.

(d) Where there is an existing high risk from a hazardous installation, additional hazardous developments should not be allowed if they add significantly to that existing risk.

1.3.4 Qualitative Measures of Consequence, Likelihood and Risk

To undertake a qualitative risk assessment it is useful to define (in a descriptive sense) the various levels of consequence of a particular event, and the likelihood (or probability) of such an event occurring. Risk assessment criteria were developed during the 'Establish the Context' phase of the Risk Management Process (Section 1.3.2) in accordance with AS/NZ ISO 31000:2009.

In accordance with AS/NZ ISO 31000:2009, Tables 1, 2 and 3 were reviewed by WCPL and were considered to be consistent with the specific objects and context of this PHA.

Table 1
Qualitative Measures of Probability

Event	Likelihood	Description
A	Almost Certain	Happens often
B	Likely	Could easily happen
C	Possible	Could happen and has occurred elsewhere
D	Unlikely	Hasn't happened yet but could
E	Rare	Conceivable, but only in extreme circumstances

Source: Safe Production Solutions (2009).

Table 2
Qualitative Measures of Maximum Reasonable Consequence

	People	Environment	Asset/Production
1	Multiple Fatalities	Extreme environmental harm (e.g. widespread catastrophic impact on environmental values of an area)	More than $1 billion (B) loss or production delay
2	Permanent total disabilities, single fatality	Major environmental harm (e.g. widespread substantial impact on environmental values of an area)	$100 million (M) to $1B loss or production delay
3	Major injury or health effects (e.g. major lost workday case/permanent disability)	Serious environmental harm (e.g. widespread and considerable impact on environmental values of an area)	$5M to $100M loss or production delay
4	Minor injury or health effects (e.g. restricted work or minor lost workday case)	Material environmental harm (e.g. localised and considerable impact on environmental values of an area)	$250 thousand (k) to $5M loss or production delay
5	Slight injury or health effects (e.g. first aid/minor medical treatment level)	Minimal environmental harm (e.g. minor impact on environmental values of an area)	Less than $250k loss or production delay

Source: Safe Production Solutions (2009).

Table 3
Risk Ranking Table

Consequence		Probability				
		A	**B**	**C**	**D**	**E**
	1	1 (H)	2 (H)	4 (H)	7 (M)	11 (M)
	2	3 (H)	5 (H)	8 (M)	12 (M)	16 (L)
	3	6 (H)	9 (M)	13 (M)	17 (L)	20 (L)
	4	10 (M)	14 (M)	18 (L)	21 (L)	23 (L)
	5	15 (M)	19 (L)	22 (L)	24 (L)	25 (L)

Notes: L – Low, M – Moderate, H – High
Rank numbering: 1 – highest risk; 25 – lowest risk

Legend – Risk Levels:

	Tolerable
	ALARP – As low as reasonably practicable
	Intolerable

Source: Safe Production Solutions (2009).

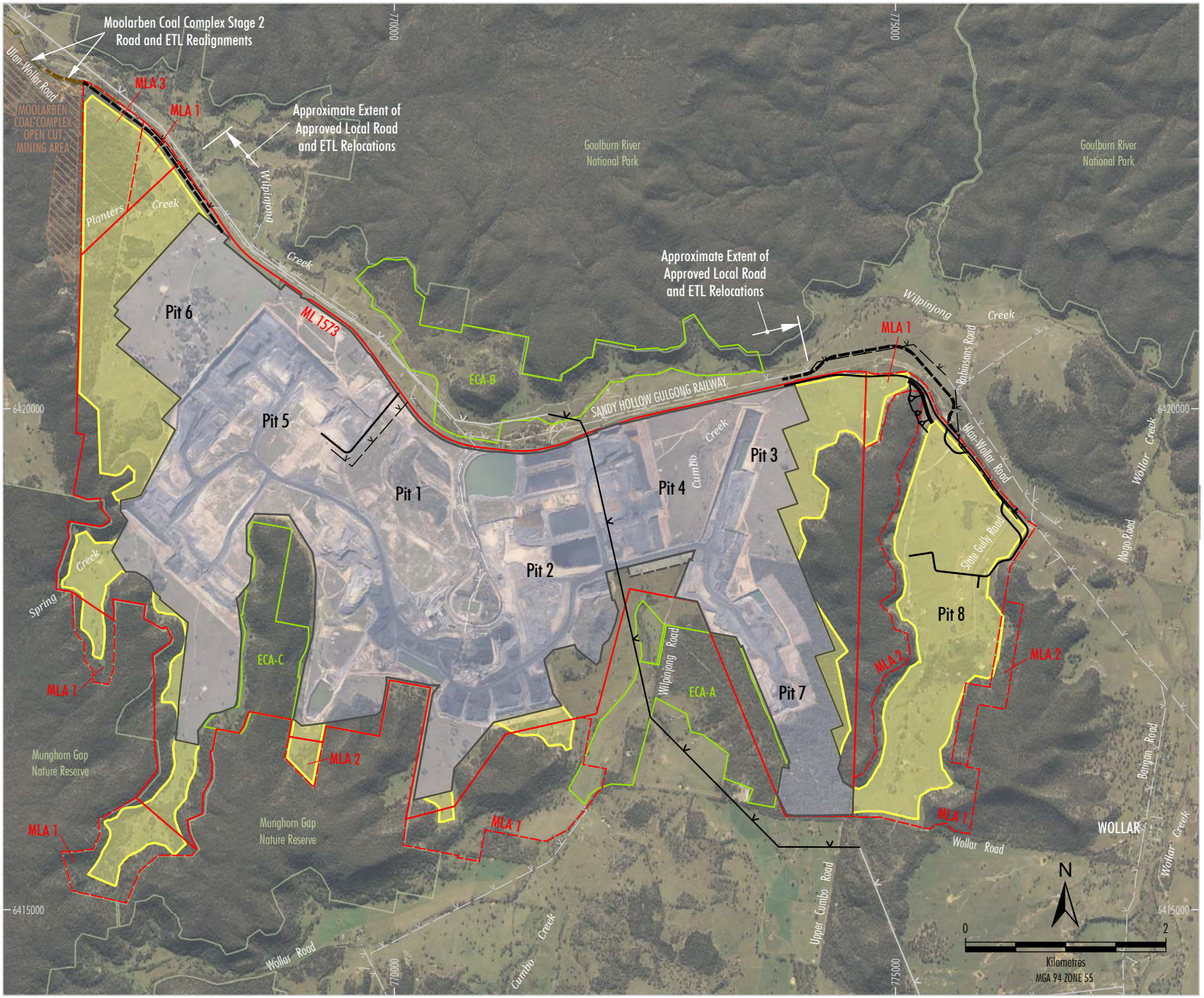
2 PROJECT OVERVIEW

The main activities associated with the development of the Project would include:

- open cut mining of run-of-mine (ROM) coal from the Ulan Coal Seam and Moolarben Coal Member in Mining Lease (ML) 1573 and in new Mining Lease Application areas in Exploration Licence (EL) 6169 and EL 7091;
- approximately 800 hectares (ha) of open cut extensions, including:
  - approximately 500 ha of incremental extensions to the existing open cut pits in areas of ML 1573 and EL 6169; and
  - development of a new open cut pit of approximately 300 ha in EL 7091 (Pit 8);
- continued production of up to 16 million tonnes per annum (Mtpa) of ROM coal;
- continued use of the Wilpinjong Coal Mine Coal Handling and Preparation Plant and general coal handling and rail loading facilities and other existing and approved supporting mine infrastructure;
- rail transport of approximately 13 Mtpa of thermal product coal to domestic and export customers (within existing maximum and annual average daily rail limits);
- relocation of a section of the TransGrid Wollar to Wellington 330 kilovolt electricity transmission line (ETL) to facilitate mining in Pit 8;
- various local infrastructure relocations to facilitate the mining extensions (e.g. realignment of Ulan-Wollar Road and associated rail level crossing, relocation of local ETLs and services);
- construction and operation of additional mine access roads to service new mining facilities located in Pits 5 and 8;
- construction and operation of new ancillary infrastructure in support of mining including: mine infrastructure areas, ROM pads, haul roads, electricity supply, communications installations, light vehicle roads, access tracks, remote crib huts, up-catchment diversions, dams, pipelines and other water management structures;
- extension of the approved mine life by approximately seven years (i.e. from approximately 2026 to 2033);
- a peak operational workforce of approximately 625 people;
- ongoing exploration activities; and
- other associated minor infrastructure, plant and activities.

A general arrangement of the Wilpinjong Coal Mine incorporating the Project is provided on Figure 3.

A description of the Project is provided in Section 2 of the Main Report of the EIS.



LEGEND

- Mining Lease Boundary
- Mining Lease Application Boundary
- Approved/Existing Open Cut and Contained Infrastructure Area
- Relocated Block Bank and Cumbo Creek Disturbance Area
- Proposed Open Cut Extension Area
- Proposed Public Road Realignment
- Proposed Pit 3/8 Haul Road
- Proposed Service Road
- Proposed Local ETL Realignment/Relocation
- Proposed Relocated TransGrid 330 kV ETL
- Existing Local ETL
- Existing TransGrid 330 kV ETL
- Enhancement and Conservation Area

Source: WCPL (2015); NSW Dept of Industry (2015)
Orthophoto: WCPL (Jun 2015; Jun 2014)

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WILPINJONG EXTENSION PROJECT

General Arrangement

Figure 3

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3 HAZARD IDENTIFICATION

The Project's potential hazards include the handling of hydrocarbons, chemicals and explosives. A brief description of these materials is presented below. The description below focuses on the existing facilities associated with the Wilpinjong Coal Mine that would continue to be used for the Project, and additional facilities proposed for the Project where relevant.

In addition, the stockpiling of coal has also been considered in this PHA.

3.1 DESCRIPTION OF HAZARDOUS MATERIALS

3.1.1 Hydrocarbons

Hydrocarbons used on-site include fuels (i.e. diesel and petrol), oils, greases, degreaser and kerosene.

Hydrocarbon storage facilities are constructed and operated in accordance with AS 1940:2004 *The Storage and Handling of Flammable and Combustible Liquids* and the NSW *Work Health and Safety Regulation, 2011*.

An oil/water separator is located at the mine facilities area to capture hydrocarbons from lubricant/oil/coolant unloading and dispensing concrete slabs. An oil skimmer is located at the washdown bay to capture hydrocarbons from washing vehicles. All waste hydrocarbons collected in the separators report to collection tanks prior to being collected and disposed of by a licensed contractor.

The hydrocarbon storage and management facilities have recently been upgraded to include two new oil/water separators for the expanded workshop, hydrocarbon storage and refuelling areas and a new fuel and oil dispensing facility south of the workshop.

Diesel and Petrol

Two self bunded 88,000 litre (L), two self bunded 110,000 L and one self bunded 70,000 L diesel storage tanks are located on-site.

For the Project, additional satellite mine infrastructure areas would be developed to service mining activities in Pits 5, 6 and 8. For Pit 8, this would include two additional 100,000 L self-bunded double-skinned diesel storage tanks. Consistent with existing fuel storages, these would be constructed and operated in accordance with AS 1940:2004.

Oils, Greases, Degreaser and Kerosene

Oil is classified as a combustible liquid (Class C2) by AS 1940:2004.

Oil is stored in two 55,000 L single-skinned dual compartment oil storage tanks, these tanks are stored in a bunded area. Coolant is stored in a 20,000 L dual skinned poly tank. A 25,000 L hydrocarbon storage tank is also maintained for storage of waste coolant and oil. Concrete between Bays 2 and 3 of the workshop is used for the storage of oil and grease pods.

A light vehicle workshop is approved to the north of Ulan-Wollar Road where contractors will service WCPL light vehicles. This facility will operate independently to the mine facilities area with its own hydrocarbon management and waste storage facilities.

3.1.2 Chemicals

The management and storage of chemicals at the Project would continue to be conducted in accordance with Peabody Energy's prescribed management procedures, Australian Standards and codes.

Flammable paints are stored on a containment pallet in a fenced compound, as well as in a locked cabinet inside the workshop.

WCPL operates ChemAlert, a comprehensive tracking, storage and chemical information management system. No chemical or hazardous material is permitted on-site unless a copy of the appropriate Safety Data Sheet (SDS) is available. All chemicals brought on-site are recorded in a register which will identify the type of product, dangerous goods class, liquid class, hazardous chemical class and the quantity held on-site. The inventory register will also identify the compatibility of materials and the emergency response procedures in the event of a spill.

Chemical storages are provided within the workshop and storage buildings and will be separated according to chemical type and storage requirements. Notifications, placarding and preparation of safety plans are in accordance with the *WorkCover Guideline for Dangerous Goods*.

3.1.3 Explosives

Explosives required for the Wilpinjong Coal Mine include initiating products and detonators, ammonium nitrate fuel oil and emulsion explosives.

Explosives on-site are stored and used in accordance with AS 2187.2:2006 *Explosives – Storage, Transport and Use – Use of Explosives*. AS 2187.2:2006 details the requirements for the safe storage, handling and land transport of explosives, safe storage distances from other activities and bunding requirements.

The explosives storage and blast reload facilities are currently located in the south-west of Pit 1. The explosives storage facilities may be relocated as required over the life of the Project.

3.1.4 Liquid and Non-Liquid Wastes

Solid and hazardous waste generated at the Wilpinjong coal Mine is removed from the site and disposed of by a licensed contractor. Any hydrocarbon affected soil or absorbent materials (e.g. sawdust) are treated at dedicated bioremediation area.

In accordance with Environment Protection Licence (EPL) 12425, waste tyres are disposed of on-site in the waste rock emplacements. Renovation and building and demolition works at residences and buildings located on Peabody Energy owned lands in the vicinity of Wilpinjong Coal Mine produce a range of building and demolition waste materials that require disposal. Inert waste components are disposed of on-site in accordance with the Waste Management Plan.

Sewage treatment facilities include three aerated sewage and pumping systems that discharge via an irrigation sprinkler system to within the rail loop, and the rehabilitation area near remote crib hut.

Additional satellite mine infrastructure areas would include smaller sewage treatment plants, with treated effluent also used for irrigation.

Waste materials are collected and sorted for recycling of paper, cardboard, metals, glass, air filters and oil filters.

3.2 HAZARD IDENTIFICATION PROCESS

3.2.1 Project Components

As this assessment specifically covers risks from fixed installations (in accordance with *Multi-level Risk Assessment* [DoP, 2011a] [Section 1.1]), the main focus of this assessment was on on-site storages, coal stockpile areas and water management structures. In addition, some additional risks relating to mining operations (e.g. blasting, open pit slumping and unplanned/unauthorised movement of mobile plant off-site) were indentified and included in this PHA.

3.2.2 Incident Classes

The following generic classes of incidents were identified:

- leak/spill;
- fire;
- explosion;
- theft;
- uncontrolled/unauthorised movement;
- excessive vibration or overpressure;
- loss of structural integrity;
- equipment malfunction;
- flyrock; and
- pit slope failure.

These incident classes were applied to the Project component areas to identify scenarios for which treatment measures were developed.

3.2.3 Project Risk Treatment Measures

A number of hazard control and mitigation measures are described in existing management plans which would be revised for the Project. The relevant management plans include:

- Blast Management Plan;
- Site Water Management Plan, including:
  - Cumbo Creek Relocation Plan;
  - Site Water Balance;
  - Erosion and Sediment Control Plan;
  - Surface Water Management and Monitoring Plan;
  - Groundwater Monitoring Program; and
  - Surface and Groundwater Response Plan.
- Rehabilitation Management Plan (contained in the Mining Operations Plan);
- Spontaneous Combustion Management Plan;
- Pollution Incident Response Management Plan;

- Air Quality Management Plan;
- Bushfire Management Plan; and
- Life of Mine Tailings Management Strategy; and
- Waste Management Plan.

In addition, the following hazard control and mitigation measures would be adopted for the Project:

- **Maintenance** – Ongoing and timely maintenance of all mobile and fixed plant and equipment in accordance with the recommended maintenance schedule, and consistent with the maintenance schemes required by legislation.
- **Staff Training** – Operators and drivers would be trained and (where appropriate) licensed for their positions. Only those personnel licensed to undertake skilled and potentially hazardous work would be permitted to do so.
- **Engineering Structures** – Mining and civil engineering structures would be constructed in accordance with applicable codes, guidelines and Australian Standards. Where applicable, Peabody Energy would obtain the necessary licences and permits for engineering structures.
- **Contractor Management** – All contractors employed by Peabody Energy would be required to operate in accordance with the relevant Australian Standards and NSW legislation.
- **Water Management** – As reported in Appendix D of the EIS, water management structures would be constructed to generally separate runoff from undisturbed areas and disturbed areas.
- **Coal Stockpile Management** – Coal stockpiles would be managed to reduce the potential for spontaneous combustion.
- **Storage Facilities** – Storage and usage procedures for potentially hazardous materials (i.e. fuels, lubricants and chemicals) would be developed in accordance with Australian Standards and relevant legislation. A register of chemicals and dangerous goods stored on-site would be kept up-to-date via a tracking, storage and chemical information management system.
- **Emergency Response** – Emergency response procedures manuals and systems would continue to be implemented.
- **Waste Management System** – Waste would be managed according to a hierarchy of waste control (avoidance, resource recovery and disposal). Waste disposal measures and a monitoring program are described in the Waste Management Plan.

4 RISK MANAGEMENT AND EVALUATION

Attachment A presents a qualitative assessment of risks associated with the operation of the Project. As described in Section 1.1, the assessment particularly evaluates the off-site risks of fixed installations at the Project to people, their property and the environment arising from atypical and abnormal hazardous events and conditions.

Hazard treatment measures have been proposed, where required, to produce a 'low' level of risk in accordance with the risk acceptance criteria described in Section 1.3.3. Proposed risk treatment measures are identified in Section 3.2.3.

The Level 1 assessment conducted is justified as this PHA demonstrates a societal risk in the negligible zone and there are no potential scenarios with significant off-site consequences in accordance with *Multi-level Risk Assessment* (DoP, 2011a) (Section 1.2).

5 REFERENCES

Department of Planning (2011a) *Assessment Guideline: Multi-Level Risk Assessment.*

Department of Planning (2011b) *Hazardous and Offensive Development Application Guidelines: Applying SEPP 33.*

Department of Planning (2011c) *Hazardous Industry Planning Advisory Paper No. 6: Hazard Analysis.*

Department of Planning (2011d) *Hazardous Industry Planning Advisory Paper No. 4: Risk Criteria for Land Use Safety Planning*.

Peabody Energy (2015) *Wilpinjong Extension Project – Geotechnical Advice.* Attachment 8 of the Environmental Impact Statement.

Safe Production Solutions (2009) *Illawarra Coal Holdings Bulli Seam Operations Environmental Risk Assessment*.

ATTACHMENT A

WILPINJONG EXTENSION PROJECT HAZARD IDENTIFICATION TABLE

Table A-1
Wilpinjong Extension Project Hazard Identification

Project Component	Incident Type	Scenario	Existing and Proposed Preventative Measures	Likelihood[1]	Consequence[2]	Risk[3]
On-Site Storage Hydrocarbons (i.e. fuels [diesel and petrol], oils, greases, degreaser and kerosene) and chemicals.	Leak/Spill	Failed tank or associated fittings, pump or pipework or operator error leading to off-site impacts including chemical or hydrocarbon contamination.	• Design (and construction) of structures/tanks/pipes and storage facilities to relevant standards and legislation. • Storage tanks/facilities located to minimise potential impacts of leaks/spills. • Bunding (or double-skinned tanks) of storage facilities/pipes to relevant standards and legislation. • Regular inspections and maintenance (where required). • Waste Management Plan. • Spill management equipment (i.e. spill kits), procedures and training. • Operator training and operational procedures. • Dangerous goods register (Safety Data Sheet [SDS]). • ChemAlert – chemical management system. • Emergency Management System. • Pollution Incident Response Management Plan.	D	3	17(L)

Table A-1 (Continued)
Wilpinjong Extension Project Hazard Identification

Project Component	Incident Type	Scenario	Existing and Proposed Preventative Measures	Likelihood[1]	Consequence[2]	Risk[3]
On-Site Storage (Cont.) Hydrocarbons (i.e. fuels [diesel and petrol], oils, greases, degreaser and kerosene) and chemicals.	Leak/Spill	Failed storage vessel due to collision or corrosion leading to off-site impacts including chemical or hydrocarbon contamination.	• Design (and construction) of structures/tanks/pipes and storage facilities to relevant standards and legislation. • Bunding (or double-skinned tanks) of storage facilities to relevant standards and legislation. • Storage tanks/facilities located to minimise potential impacts of leaks/spills. • Regular inspections and maintenance (where required). • Separation of tanks from refuelling areas. • Protection of storage facilities from collision (e.g. bollards). • Waste Management Plan. • Spill management equipment (i.e. spill kits), procedures and training. • Regular inspections and maintenance (where required). • Operator training and operational procedures. • Signage. • Dangerous goods register (SDS). • ChemAlert – chemical management system. • Emergency Management System. • Pollution Incident Response Management Plan.	D	4	21(L)

Table A-1 (Continued)
Wilpinjong Extension Project Hazard Identification

Project Component	Incident Type	Scenario	Existing and Proposed Preventative Measures	Likelihood[1]	Consequence[2]	Risk[3]
On-Site Storage (Cont.) Hydrocarbons (i.e. fuels [diesel and petrol], oils, greases, degreaser and kerosene) and chemicals	Fire/Explosion	Poor maintenance, poor design, incorrect storage of incompatible chemicals, collision or human error leading to off-site fire/explosion/fume emissions-related impacts.	• Design (and construction) of structures/tanks/pipes and storage facilities to relevant standards and legislation. • Storage tanks/facilities located to minimise potential impacts of fire/explosion. • Bunding (or double-skinned tanks) of storage facilities to relevant standards and legislation. • Protection of storage facilities from collision (e.g. bollards). • Availability of Rural Fire Service for quick response. • On-site emergency response team. • Regular inspections and maintenance. • Fire fighting equipment located in on-site vehicles and infrastructure (where appropriate). • Regular inspections and maintenance of fire fighting equipment. • Storage of chemicals/fuel/gas cylinders/oxy acetylene complies with relevant Australian Standards and New South Wales (NSW) legislation. • Dangerous goods register (SDS). • ChemAlert – chemical management system. • Bushfire Management Plan. • Dedicated on-site fire response equipment.	D	4	21(L)

Table A-1 (Continued)
Wilpinjong Extension Project Hazard Identification

Project Component	Incident Type	Scenario	Existing and Proposed Preventative Measures	Likelihood[1]	Consequence[2]	Risk[3]
On-Site Storage (Cont.) Hydrocarbons (i.e. fuels [diesel and petrol], oils, greases, degreaser and kerosene) and chemicals	Theft	Malicious act resulting in off-site impacts.	• Restriction of access to storage areas, including securing storage facilities. • Provision of adequate lighting around storage facilities. • Maintenance of a perimeter fence to reduce ease of access to the site. • Site security procedures including restricted key management system. • CCTV camera surveillance on-site. • Dangerous goods register (SDS). • ChemAlert – chemical management system. • Restricted access to unauthorised persons. • Security gates at entry points off access roads.	D	4	21(L)

Table A-1 (Continued)
Wilpinjong Extension Project Hazard Identification

Project Component	Incident Type	Scenario	Existing and Proposed Preventative Measures	Likelihood[1]	Consequence[2]	Risk[3]
On-Site Storage (Cont.) Run-of-mine (ROM) and product coal	Fire	Spontaneous combustion event leads to off-site fire related impacts (fume/ emissions).	• Design and management of ROM coal stockpiles (i.e. size, shape and stockpile age tracking). • Separation of stockpiles from potential adjacent fire hazards. • Regular monitoring of stockpiles. • Priority washing of selected ROM coal types and application of maximum storage times. • Spontaneous combustion propensity testing to inform management measures. • Spontaneous Combustion Management Plan. • Availability of site water carts and mining equipment. • Regular inspections and maintenance of fire fighting equipment. • Operator training. • Dedicated on-site fire response equipment. • Regular communication of stockpile status and active management.	E	5	25(L)
	Equipment Malfunction	Breakdown of dust suppression equipment combined with unfavourable weather conditions resulting in significant off-site dust emissions.	• Real-time air quality monitoring systems – modification of stockpiling/coal handling in event of elevated air quality levels off site. • Regular maintenance of dust suppression equipment. • Employment of additional/supplementary water carts. • Regular inspections of stockpiles.	E	5	25(L)

Table A-1 (Continued)
Wilpinjong Extension Project Hazard Identification

Project Component	Incident Type	Scenario	Existing and Proposed Preventative Measures	Likelihood[1]	Consequence[2]	Risk[3]
On-Site Storage (Cont.) Carbonaceous Waste Rock in In-pit Emplacements	Fire	Spontaneous combustion event leads to off-site fire related impacts (fume/ emissions).	• Housekeeping activities – site would be kept clean and tidy and fire hazards removed, where practicable. • Selective emplacement of carbonaceous waste materials (e.g. at depth in mine voids or encapsulation). • Ongoing monitoring of emplacements. • Spontaneous Combustion Management Plan. • Availability of site water carts and mining equipment. • Regular inspections and maintenance of fire fighting equipment. • Operator training. • Dedicated on-site fire response equipment.	E	5	25(L)
On-Site Storage (Cont.) Carbonaceous Waste Rock in Highwalls	Fire	Spontaneous combustion event leads to off-site fire related impacts (fume/ emissions).	• Housekeeping activities – site would be kept clean and tidy and fire hazards removed, where practicable. • Ongoing monitoring of highwalls. • Use of mobile equipment to cover spontaneous combustion area. • Spontaneous Combustion Management Plan. • Availability of site water carts and mining equipment. • Regular inspections and maintenance of fire fighting equipment. • Operator training. • Bushfire Management Plan. • Dedicated on-site fire response equipment.	E	5	25(L)

Table A-1 (Continued)
Wilpinjong Extension Project Hazard Identification

Project Component	Incident Type	Scenario	Existing and Proposed Preventative Measures	Likelihood[1]	Consequence[2]	Risk[3]
On-Site Storage (Cont.) Explosives	Fire/Explosion	Poor maintenance, poor design, collision or human error leading to off-site fire/explosion-related impacts.	• Design of explosives structures/tanks/pipes to relevant standards, including the relevant provisions of Australian Standard 4326-2008 *The Storage and Handling of Oxidising Agents*. Location of explosives storage facility selected to reduce potential off-site impacts. • Site policies, management plans (e.g. Blast Management Plan) and procedures (e.g. explosives procedures manual). • Containment structures. • Operator training. • Development and maintenance of appropriate fire breaks. • Availability of Rural Fire Service for quick response. • On-site emergency response team. • Bushfire Management Plan. • Dedicated on-site fire response equipment.	E	4	23(L)

Table A-1 (Continued)
Wilpinjong Extension Project Hazard Identification

Project Component	Incident Type	Scenario	Existing and Proposed Preventative Measures	Likelihood[1]	Consequence[2]	Risk[3]
On-Site Storage (Cont.) Explosives	Theft	Malicious act resulting in off-site impacts.	• Restriction of access to storage areas, including securing storage facilities. • Dedicated magazine for storage of explosives. • Location of explosives storage facility selected to be remote from public roads. • Maintenance of explosives inventory and regular auditing. • Explosives procedures manual. • Provision of adequate lighting around storage facilities. • Maintenance of a perimeter fence to reduce ease of access to the site. • Site security procedures including restricted key management system. • CCTV camera surveillance on-site which is monitored at the control room (manned 24 hours a day). • Restricted access to unauthorised persons. • Security gates at entry points off access roads.	E	4	23(L)

Table A-1 (Continued)
Wilpinjong Extension Project Hazard Identification

Project Component	Incident Type	Scenario	Existing and Proposed Preventative Measures	Likelihood[1]	Consequence[2]	Risk[3]
Construction/Development Project ancillary infrastructure, Transgrid 330 kilovolt (kV) electricity transmission line (ETL) relocation, public road relocation and other minor construction activities	Leak/Spill	Spill of diesel, oils, lubricants, solvents, sewage wastes or domestic wastes leading to offsite impacts on nearby watercourses or land.	• Site Water Management Plan. • Waste Management Plan. • Fuel, oils and lubricants stored in accordance with Australian Standards and NSW legislation. • Spill management equipment (i.e. spill kits), procedures and training. • Dangerous goods register (SDS). • ChemAlert – chemical management system. • Ground Disturbance Permit includes site construction runoff control (drains and sumps). • Existing site water management controls. • Construction specific environmental controls. • Operator training and operational procedures. • Emergency Management System. • Pollution Incident Response Management Plan. • Project-specific contractor management plan.	C	5	22(L)

Table A-1 (Continued)
Wilpinjong Extension Project Hazard Identification

Project Component	Incident Type	Scenario	Existing and Proposed Preventative Measures	Likelihood[1]	Consequence[2]	Risk[3]
Construction/Development (Cont.) Project ancillary infrastructure, TransGrid 330 kilovolt (kV) electricity transmission line (ETL) relocation, public road relocation and other minor construction activities	Fire/Explosion	Chemical/fuel/gas cylinders/oxy acetylene ignites by lightning strike, malicious act or human error leading to offsite impacts.	• Storage of Chemicals/fuel/gas cylinders/oxy acetylene complies with relevant Australian Standards and NSW legislation. • Fire fighting equipment located in on-site vehicles and infrastructure (where appropriate). • Regular inspections and maintenance of fire fighting equipment. • Availability of Rural Fire Service for quick response. • Bushfire Management Plan. • Dedicated on-site fire response equipment. • On-site emergency response team. • Project-specific contractor management plan.	D	5	24(L)

Table A-1 (Continued)
Wilpinjong Extension Project Hazard Identification

Project Component	Incident Type	Scenario	Existing and Proposed Preventative Measures	Likelihood[1]	Consequence[2]	Risk[3]
Construction/Development (Cont.) Project ancillary infrastructure, Transgrid 330 kV ETL relocation, public road relocation and other minor construction activities	Fire	Construction activity near diesel/chemicals storage results in a fire leading to off-site impacts.	• Staff training (including drills) and induction. • 'Hot work' permits. • Housekeeping activities - site would be kept clean and tidy and fire hazards removed where practicable. • Fire fighting equipment located in on-site vehicles and infrastructure (where appropriate). • Regular inspections and maintenance of fire fighting equipment. • Availability of Rural Fire Service for quick response. • Bushfire Management Plan. • On-site emergency response team. • Availability of mine ancillary plant to cut emergency fire breaks. • Dedicated on-site fire response equipment. • Project-specific contractor management plan.	C	4	18(L)
	Theft	Theft of construction materials and equipment leading to an off-site event causing injury.	• Storage facilities designed to Australian Standards and NSW legislation – including security measures. • Restriction of access to storage areas, including securing storage facilities. • Provision of adequate lighting around storage facilities. • Site security procedures, including restricted key management system. • Project-specific contractor management plan.	D	4	21(L)

Table A-1 (Continued)
Wilpinjong Extension Project Hazard Identification

Project Component	Incident Type	Scenario	Existing and Proposed Preventative Measures	Likelihood[1]	Consequence[2]	Risk[3]
Construction/Development (Cont.) Project ancillary infrastructure, Transgrid 330 kV ETL relocation, public road relocation and other minor construction activities	Uncontrolled/ unauthorised movement	Mobile plant or equipment parts move off-site in an uncontrolled/unauthorised manner results in a collision resulting in offsite impacts.	• Construction activities undertaken by appropriately licensed and competent personnel. • Planning of activities to minimise potential for off-site impacts. • Ground disturbance permit process – site demarcation prior to disturbance. • Environmental Management System. • Construction specific environmental controls. • Compliance with Wilpinjong Coal Pty Limited (WCPL) mechanical and electrical standards on mining lease areas. • Maintenance of construction equipment. • Project-specific contractor management plan.	D	4	21(L)
Other infrastructure and supporting systems Water management system (including water treatment plant), waste management system, on-site power reticulation and tailings pipelines	Leak/Spill	Leak or spill from water management system or equipment malfunction associated with water treatment facility of sewage treatment leading to off-site impacts associated with water quality.	• Site Water Management Plan. • Design (and construction) of water management infrastructure to relevant standards. • Automated monitoring of water quality (at water treatment facility) and equipped with shut off valves. • Dedicated personnel for pumping and water management. • Regular inspections of water containment structures and pipelines for structural integrity, effectiveness and for repair if needed to maintain their function. • Operator training and operational procedures. • Pollution Incident Response Management Plan. • Environmental Management System.	C	4	18(L)

Table A-1 (Continued)
Wilpinjong Extension Project Hazard Identification

Project Component	Incident Type	Scenario	Existing and Proposed Preventative Measures	Likelihood[1]	Consequence[2]	Risk[3]
Other infrastructure and supporting systems (Cont.) Water management system (including water treatment plant), waste management system, on-site power reticulation and tailings pipelines	Leak/Spill	Spill of diesel, oils, lubricants, solvents, sewage wastes or domestic wastes leading to impacts on nearby watercourses or land.	• Site Water Management Plan. • Waste Management Plan. • Waste oil is collected by a licensed contractor for off-site disposal. All domestic waste and recyclable products would be collected regularly by a licensed waste contractor. • Waste batteries and scrap metal disposed of in accordance with Waste Management Plan. • Licensed contractors in accordance with Australian Standards and NSW legislation. • Emergency Management System. • Regular inspections and maintenance. • Site policies, management plans and procedures. • Pollution Incident Response Management Plan.	D	5	24(L)

Table A-1 (Continued)
Wilpinjong Extension Project Hazard Identification

Project Component	Incident Type	Scenario	Existing and Proposed Preventative Measures	Likelihood[1]	Consequence[2]	Risk[3]
Other infrastructure and supporting systems (Cont.) Water management system (including water treatment plant), waste management system, on-site power reticulation and tailings pipelines	Fire	Malfunction of on-site power reticulation resulting in off-site fire-related impacts.	• Power reticulation designed to Australian Standards and legislation – including security measures. • Housekeeping activities – site would be kept clean and tidy and fire hazards removed, where practicable. • Power usage monitoring and alarms. • Fire fighting equipment located in on-site vehicles and infrastructure (where appropriate). • Regular inspections and maintenance of fire fighting equipment. • Availability of mine ancillary plant to cut emergency fire breaks. • Operator induction and ongoing training. • Availability of Rural Fire Service for quick response. • Bushfire Management Plan. • Dedicated fire fighting equipment. • On-site emergency response team.	D	3	17(L)
	Leak/Spill	Poor maintenance, design or human error results in failure of water management infrastructure resulting in off-site impacts associated with water quality.	• Design (and construction) of structures/tanks/pipes to relevant standards. • Site policies, management plans and procedures. • Operator training and operational procedures. • Burst pipe detection for outside of operational water management areas.	D	4	21(L)

Table A-1 (Continued)
Wilpinjong Extension Project Hazard Identification

Project Component	Incident Type	Scenario	Existing and Proposed Preventative Measures	Likelihood[1]	Consequence[2]	Risk[3]
Open Cut Operations Drill and blast, open cut stability and mobile plant operation	Flyrock	Blasting leading to flyrock damaging property/persons off-site.	• Blast Management Plan. • Planning and design of blast events to ensure adequate control and buffer distances. • Operational procedures- blasting undertaken by appropriately licensed personnel. • Where blasting occurs in close proximity to local roads, temporary closures would occur in accordance with the Blast Management Plan. • Where blasting occurs in close proximity to infrastructure, blasting operations would occur in accordance with the agreed management measures between the infrastructure owner and WCPL as described in the Blast Management Plan. • Temporary closure of railway in accordance with Australian Rail Track Corporation (ARTC) agreement.	D	4	21(L)
	Excessive vibration or overpressure	Vibration or overpressure causing damage to off-site infrastructure.	• Blast Management Plan. • Planning and design of blast events to ensure adequate control and buffer distances. • Operational procedures- blasting undertaken by appropriately licensed personnel. • Where blasting occurs in close proximity to infrastructure, blasting operations would occur in accordance with the agreed management measures between the infrastructure owner and WCPL as described in the Blast Management Plan. • Monitoring to validate blast design and performance.	D	4	21(L)

Table A-1 (Continued)
Wilpinjong Extension Project Hazard Identification

Project Component	Incident Type	Scenario	Existing and Proposed Preventative Measures	Likelihood[1]	Consequence[2]	Risk[3]
Open Cut Operations (Cont.) Drill and blast, open cut stability and mobile plant operation	Excessive vibration or overpressure	Vibration or overpressure causing damage to off-site sensitive Aboriginal or historic (European) heritage items.	• Blast Management Plan. • Planning and design of blast events to ensure adequate control and buffer distances. • Operational procedures- blasting undertaken by appropriately licensed personnel. • Monitoring to validate blast design and performance.	D	4	21(L)
	Pit slope failure	Slump or collapse of open cut walls (or final voids) resulting in damage to rail or road infrastructure.	• Consideration of the geotechnical advice and factors of safety described in Peabody Energy (2015) (Attachment C of the EIS). • Establishment of appropriate buffer distances determined by geotechnical assessment – including the maintenance of a buffer between the top of the open cut wall and the Sandy Hollow - Gulgong Railway. • Open cut walls designed to appropriate geotechnical standards. • Regular inspections and surveys of the open cut.	E	3	20(L)
	Uncontrolled/ unauthorised movement	Mobile plant or equipment parts move off-site in an uncontrolled manner.	• Operational activities undertaken by appropriately licensed and competent personnel. • Planning of activities to minimise potential for off-site impacts. • Bunds/berms on perimeter of operational areas to minimise potential for mining plant to move off-site. • Supervision by appropriately qualified persons (e.g. Open Cut Examiner).	E	4	23(L)

Table A-1 (Continued)
Wilpinjong Extension Project Hazard Identification

Project Component	Incident Type	Scenario	Existing and Proposed Preventative Measures	Likelihood[1]	Consequence[2]	Risk[3]
Open Cut Operations (Cont.) Drill and blast, open cut stability and mobile plant operation	Leak/Spill	Spill of diesel, oils or lubricants from mobile plant leading to impacts on nearby watercourses.	• Site Water Management Plan. • Regular inspections and maintenance where required. • Site policies, management plans and procedures. • Pollution Incident Response Management Plan. • Operator training and operational procedures. • Equipment maintained to original equipment manufacturer standards.	E	4	23(L)
On-site Interaction with TransGrid 330 kV ETL	Excessive vibration, overpressure or flyrock	Vibration or overpressure causing damage to on-site Transgrid 330 kV ETL results in off-site impacts.	• Blast Management Plan. • Planning and design of blast events to ensure adequate control and buffer distances. • Operational procedures- blasting undertaken by appropriately licensed personnel. • Monitoring to validate blast design and performance • Located in area of pit previously mined	D	4	21(L)
	Uncontrolled/ unauthorised movement	Mobile plant or equipment parts move in an uncontrolled manner causing damage to on-site Transgrid 330 kV ETL results in off-site impacts.	• Operational activities undertaken by appropriately licensed and competent personnel. • Planning of activities to minimise potential for interaction with Transgrid 330 kV ETL (e.g. use of only designated heavy vehicle crossing points). • Bunds/berms around 330 kV ETL to minimise potential for interaction. • Supervision by appropriately qualified persons (e.g. Open Cut Examiner).	E	3	20(L)
	Loss of structural integrity	Geotechnical design limits for tower foundations are exceeded in backfilled waste rock area. Results in unplanned movement of power infrastructure with offsite impacts.	• Geotechnical design of pylon foundations/footings. • Geotechnical assessment of materials/compaction predictions. • Programme of monitoring following installation to confirm settlement predictions and stability.	E	3	20(L)

[1] Refer to Table 1. [2] Refer to Table 2. [3] Refer to Table 3.