

# **VICKERY EXTENSION PROJECT**

## **ENVIRONMENTAL IMPACT STATEMENT**

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# **APPENDIX P**

## **PRELIMINARY HAZARD ANALYSIS**

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## 1 INTRODUCTION

The former Vickery Coal Mine and former Canyon Coal Mine are located approximately 25 kilometres (km) north of Gunnedah, in New South Wales (NSW) (Figure 1). Open cut and underground mining activities were conducted at the former Vickery Coal Mine between 1986 and 1998. Open cut mining activities at the former Canyon Coal Mine ceased in 2009. The former Vickery and Canyon Coal Mines have been rehabilitated following closure.

The Vickery Coal Project (herein referred to as the Approved Mine) is an approved, but yet to be constructed, project involving the development of an open cut coal mine and associated infrastructure, and would facilitate a run-of-mine (ROM) coal production rate of up to approximately 4.5 million tonnes per annum (Mtpa) for a period of 30 years.

Whitehaven Coal Limited (Whitehaven) is seeking a new Development Consent for extension of open cut mining operations at the Approved Mine (herein referred to as the Vickery Extension Project [the Project]). This would include a physical extension to the Approved Mine footprint to gain access to additional ROM coal reserves, an increase in the footprint of waste rock emplacement areas, an increase in the approved ROM coal mining rate and construction and operation of a Project Coal Handling and Preparation Plant (CHPP), train load-out facility and rail spur. This infrastructure would be used for the handling, processing and transport of coal from the Project, as well as other Whitehaven mines.

This Preliminary Hazard Analysis (PHA) forms part of an Environmental Impact Statement (EIS) which has been prepared to accompany a Development Application made for the Project in accordance with Part 4 of the NSW *Environmental Planning and Assessment Act, 1979*.

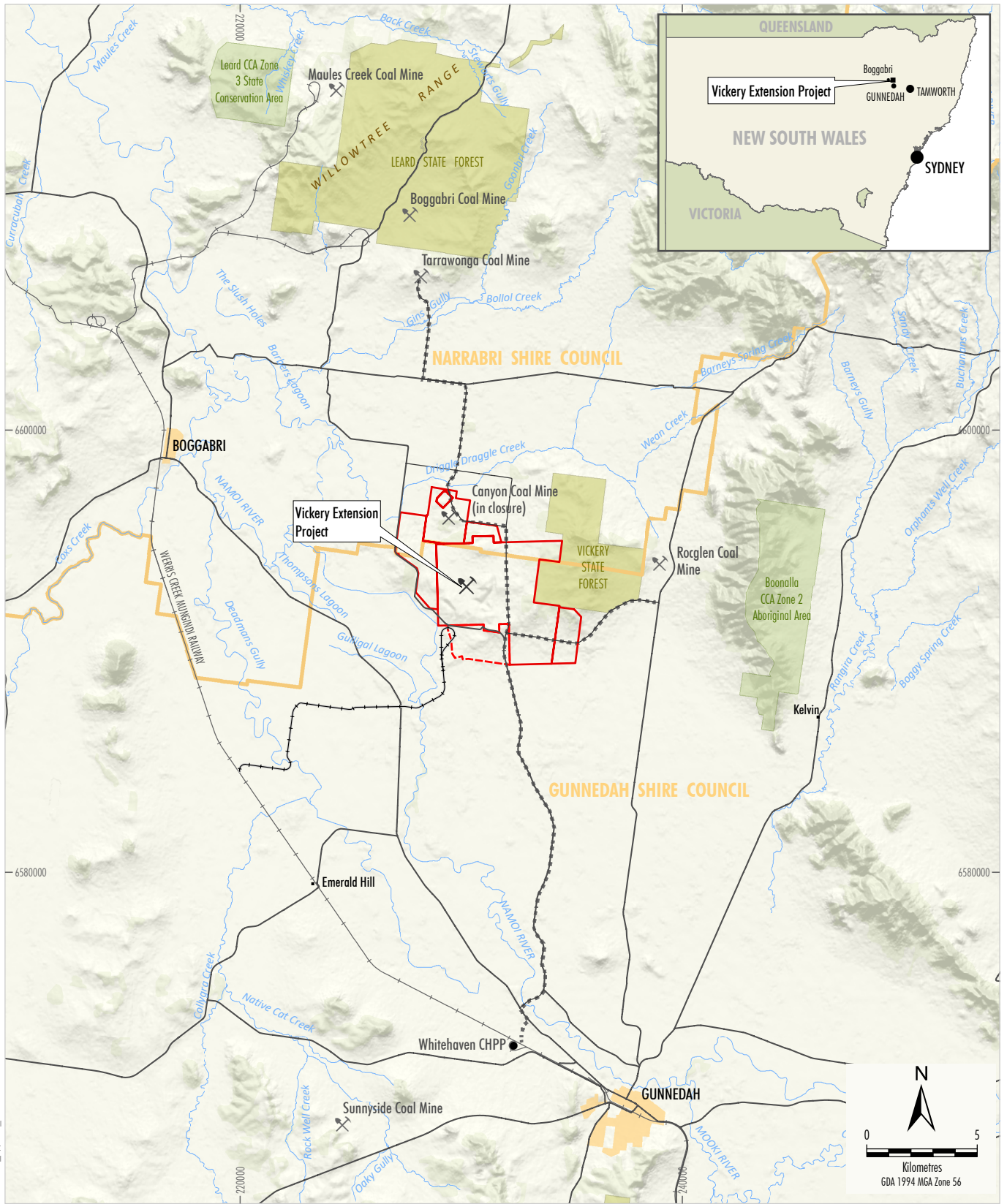
This PHA has been conducted as part of the EIS to evaluate the potential hazards associated with the Project in accordance with the general principles of risk evaluation and assessment outlined in NSW Department of Planning and Infrastructure (DP&I) *Multi-level Risk Assessment* (DP&I, 2011). This PHA also addresses the requirements of the NSW *State Environmental Planning Policy No. 33 - Hazardous and Offensive Development* and has been documented in general accordance with *Hazardous Industry Planning Advisory Paper (HIPAP) No. 6: Hazard Analysis* (NSW Department of Planning [DoP], 2011a).

Assessed risks are compared to qualitative risk assessment criteria developed in accordance with Australian Standard/New Zealand Standard International Organisation for Standardisation (AS/NZS ISO) 31000:2009 *Risk Management – Principles and Guidelines* (note also conforms with ISO 31000:2018 *Risk Management – Guidelines*) and in *HIPAP No. 4: Risk Criteria for Land Use Safety Planning* (DoP, 2011b).

### 1.1 OBJECTIVE AND SCOPE

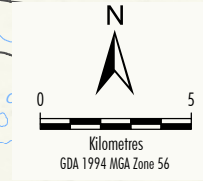
The objective of this PHA is to identify the off-site risks posed by the Project to people, their property and the environment and assess the identified risks using applicable qualitative criteria. In accordance with *Multi-level Risk Assessment* (DP&I, 2011), this assessment specifically covers risks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

This 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 failure, operator error and external events), with a specific focus on fixed installations on-site. This assessment does not consider risks to Whitehaven employees or Whitehaven 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 Tenement Boundary (ML & CL)
  - Mining Lease Application (MLA)
  - Local Government Boundary
  - State Forest
  - State Conservation Area, Aboriginal Area
  - Major Roads
  - ++ Railway
  - Approved Road Transport Route
  - ++ Indicative Project Rail Spur



**WHITEHAVEN COAL**  
**VICKERY EXTENSION PROJECT**  
**Project Location**

Source: LPMA - Topographic Base (2010); NSW Department of Industry (2015)

**Figure 1**

On-site environmental risks are assessed in the Environmental Risk Assessment (Appendix O of the EIS).

This report should be read in conjunction with the following studies conducted for the EIS:

- Groundwater Assessment (Appendix A of the EIS).
- Surface Water Assessment (Appendix B of the EIS).
- Flood Assessment (Appendix C of the EIS)
- Noise and Blasting Assessment (Appendix D of the EIS).
- Air Quality and Greenhouse Gas Assessment (Appendix E of the EIS).
- Biodiversity Assessment Report and Biodiversity Offset Strategy (Appendix F of the EIS).
- Aboriginal Cultural Heritage Assessment (Appendix G of the EIS).
- Agricultural Impact Statement (Appendix H of the EIS).
- Road Transport Assessment (Appendix I of the EIS).
- Economic Assessment (Appendix J of the EIS).
- Historic Heritage Assessment (Appendix K of the EIS).
- Visual Assessment (Appendix L of the EIS).
- Geochemistry Assessment (Appendix M of the EIS).
- Aquatic Ecology Assessment (Appendix N of the EIS).
- Environmental Risk Assessment (Appendix O of the EIS).
- Land Contamination Assessment (Appendix Q of the EIS).
- Social Impact Assessment (Appendix R of the EIS).

## 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 the possible off-site effects or consequences from hazardous materials present on-site and their locations. Potentially hazardous industry is defined in DP&I (2011) as having *potential for significant injury, fatality, property damage or harm to the environment in the absence of controls*.

In accordance with *Multi-level Risk Assessment* (DP&I, 2011), 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 *Multi-level Risk Assessment* (DP&I, 2011), 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 (Section 1.3.1) reviewed 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 *HIPAP No. 4: Risk Criteria for Land Use Safety Planning* (DoP, 2011b).
- (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 July 2012. The review participants included technical advisors from Whitehaven including:

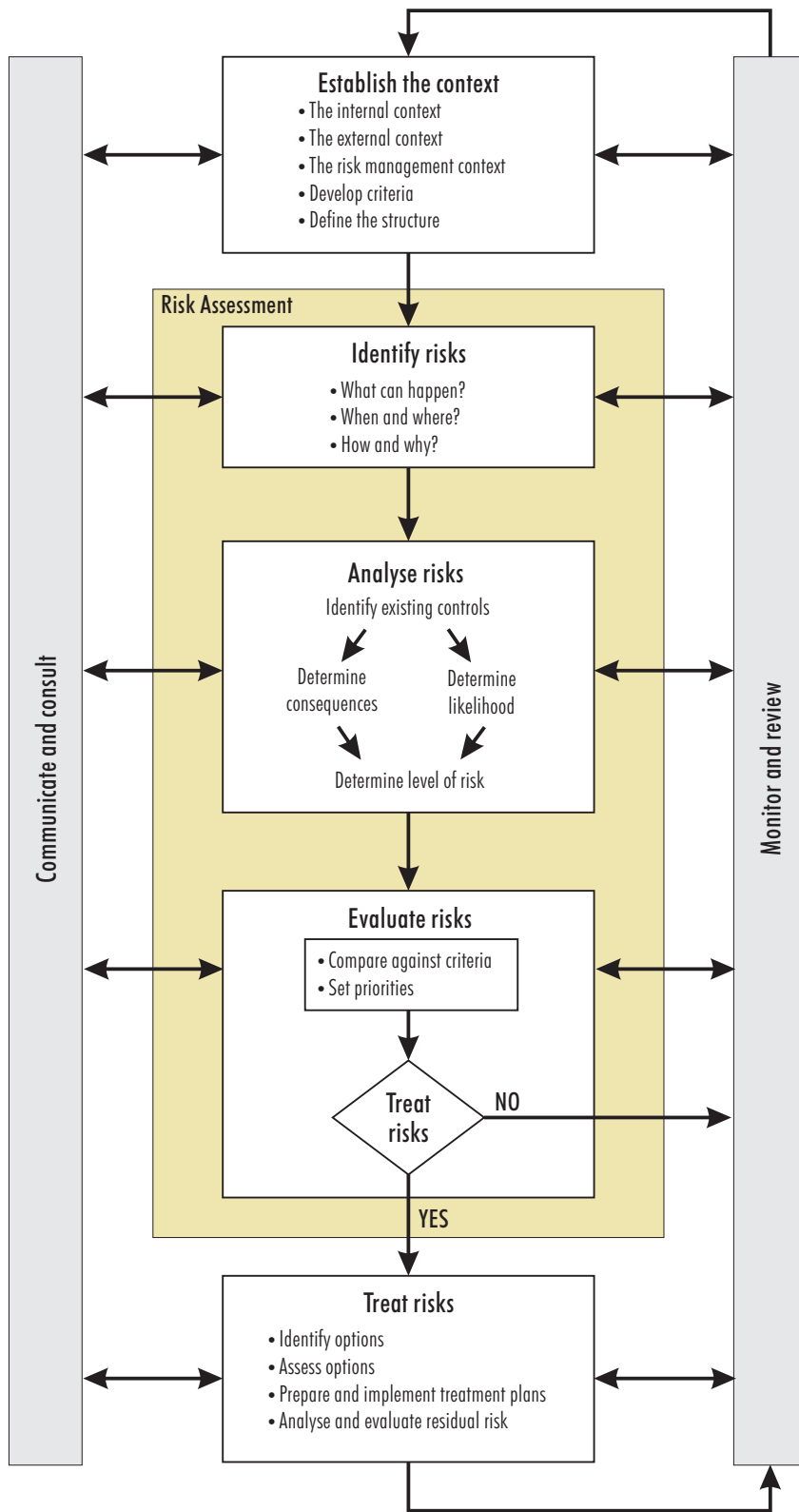
- Whitehaven – Project Development Manager – Vickery;
- Whitehaven – Group Environmental Manager; and
- Whitehaven – Environmental Officer.

This PHA was reviewed and revised for the Project in 2018 based on a review by the Whitehaven Health, Safety, Environment & Communities team and the Whitehaven Executive General Manager – Projects Delivery.

#### 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.



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

Figure 2

### 1.3.3 Risk Criteria

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

- (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.*
- (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/NZS ISO 31000:2009.

In accordance with AS/NZS ISO 31000:2009, Tables 1, 2 and 3 were reviewed by Whitehaven and were considered to be consistent with the specific objectives 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).

Combining the probability (Table 1) and consequence (Table 2), Table 3 provides a qualitative risk analysis to assess risk levels.

**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).

The hazard identification table (Attachment A) illustrates the systematic application of the above criteria for the Project.

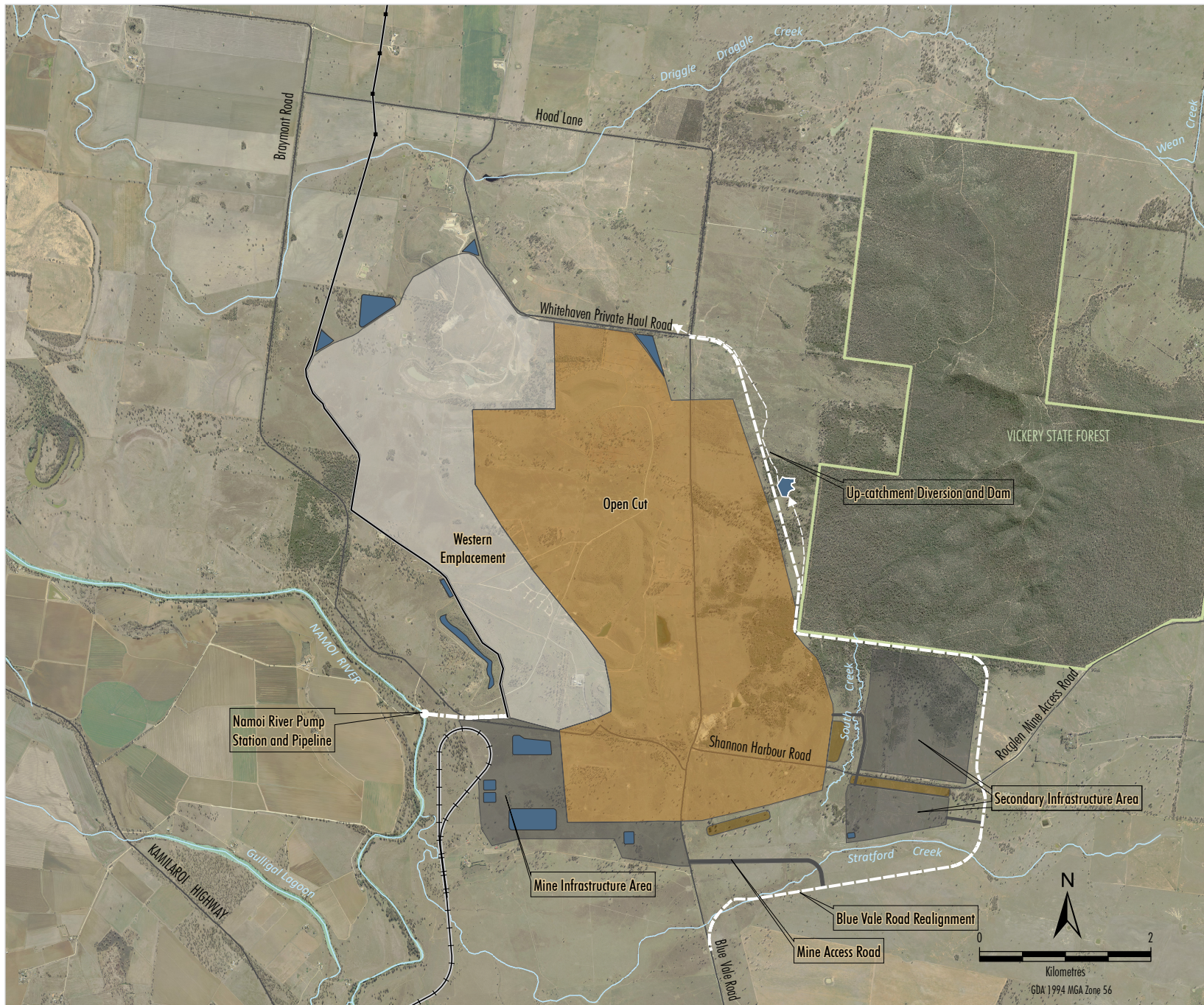
## **2 PROJECT OVERVIEW**

The Project involves mining the coal reserves associated with the Approved Mine, as well as accessing additional coal reserves within the Project area.

ROM coal would be mined by open cut methods at an average rate of 7.2 Mtpa over 25 years, with a peak production of up to approximately 10 Mtpa.

As described in Section 1, the Project would include a physical extension to the Approved Mine footprint to gain access to additional ROM coal reserves, an increase in the footprint of the waste rock emplacement areas, an increase in the approved ROM coal mining rate and construction and operation of the Project CHPP, train load-out facility, and rail spur. This infrastructure would be used for the handling, processing and transport of coal from the Project, as well as other Whitehaven mining operations.

Figures 3a and 3b illustrate the general arrangement of the Project. A detailed description of the Project is provided in Section 2 in the Main Report of the EIS.

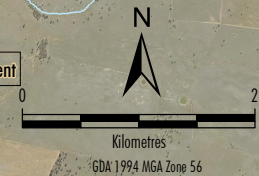


- LEGEND**
- State Forest
  - Project Components**
  - Indicative Extent of Open Cut
  - Indicative Extent of Out of Pit Waste Rock Emplacement
  - Indicative Extent of Infrastructure Area
  - Indicative Extent of Soil Stockpile
  - Indicative Extent of Water Storage
  - Indicative Mine Access Road Alignment
  - Indicative Namoi River Pump Station and Pipeline
  - Indicative Road Realignment
  - Indicative Up-catchment Diversion and Dam Location
  - Indicative Rail Spur Alignment
  - Indicative Location of Groundwater Bores and Pipeline

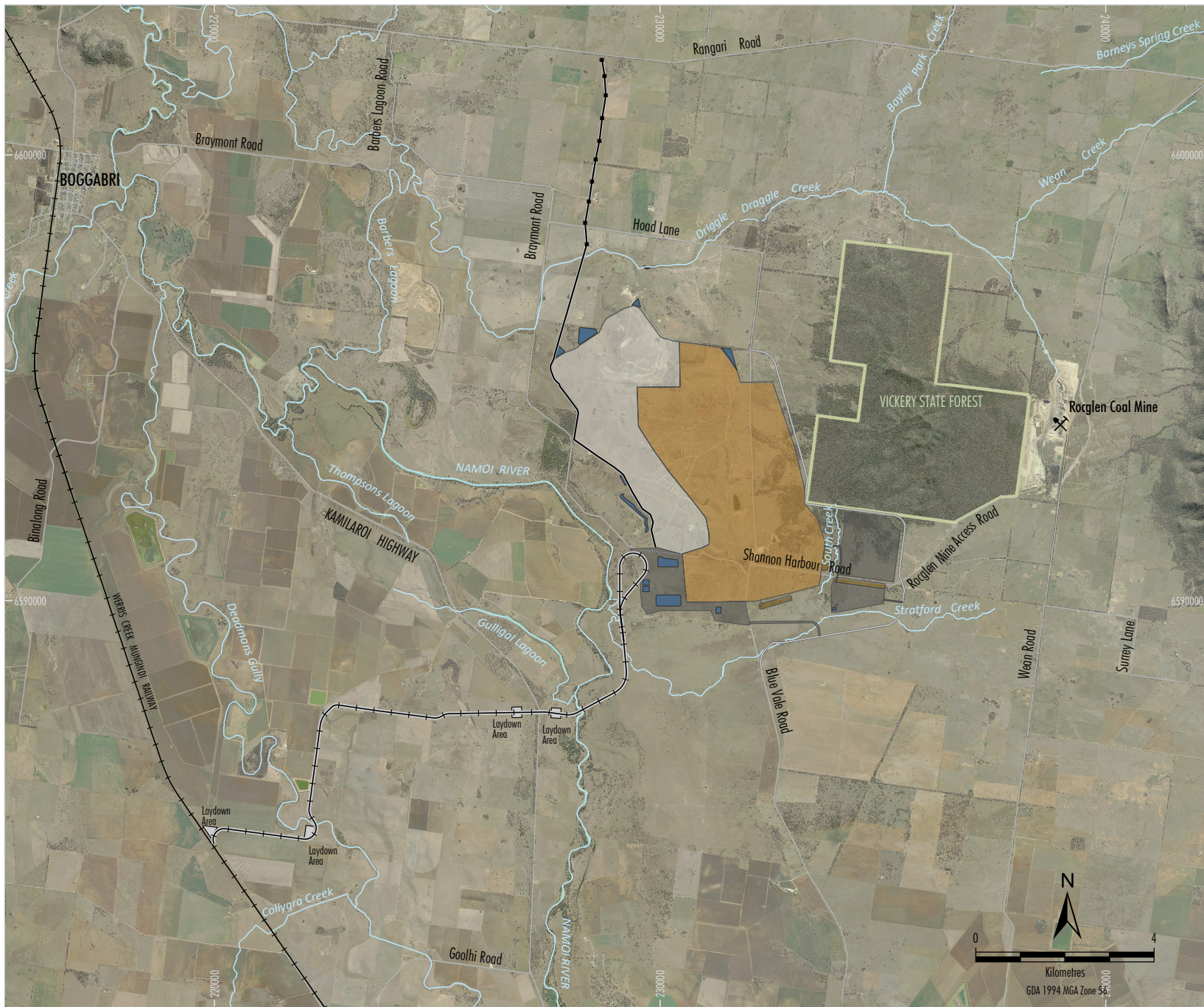
Source: Orthophoto - Department of Land and Property Information, Aerial Photography (July 2011); Department of Industry (2015); Essential Energy (2015)



**VICKERY EXTENSION PROJECT**  
**Project General Arrangement -**  
**Project Mining Area**



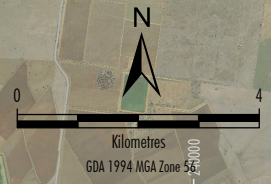
**Figure 3a**



- LEGEND**
- State Forest
  - Railway
- Project Components**
- Indicative Extent of Open Cut
  - Indicative Extent of Out of Pit Waste Rock Emplacement
  - Indicative Extent of Infrastructure Area
  - Indicative Extent of Soil Stockpile
  - Indicative Extent of Water Storage
  - Indicative Mine Access Road Alignment
  - Indicative Rail Spur Alignment
  - Indicative Location of Groundwater Bores and Pipeline
  - Indicative Road Realignment

Source: Orthophoto - Department of Land and Property Information, Aerial Photography (July 2011); Department of Industry (2015)

  
**VICKERY EXTENSION PROJECT**  
 Indicative Rail Spur Alignment and  
 Groundwater Bore Locations



**Figure 3b**

## 3 HAZARD IDENTIFICATION

### 3.1 DESCRIPTION OF HAZARDOUS MATERIALS

The major potentially hazardous materials required for the Project include hydrocarbons, explosive materials and chemicals. A brief description of these materials is presented below.

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

#### 3.1.1 Hydrocarbons

Hydrocarbons used at the Project during construction and operation would include fuels (diesel and petrol), liquid petroleum gas, oils, greases, degreaser, kerosene and minor quantities of other hydrocarbons (e.g. acetylene).

##### ***Diesel***

Diesel is classified as a combustible liquid by Australian Standard (AS) 1940:2004 *The Storage and Handling of Flammable and Combustible Liquids* (Class C1) for the purpose of storage and handling but is not classified as a dangerous good by the criteria of the Australian Code for the Transport of Dangerous Goods by Road and Rail (AGD Code) (National Transport Commission, 2007). In the event of a spill, diesel is damaging to soils and aquatic ecosystems and fires can occur if ignited (flash point 61 to 150 degrees Celsius).

The risks associated with the Project include diesel storage and usage.

The use of diesel at the Project and the construction and operation of all fuel storages would be undertaken in consideration of the requirements of AS 1940:2004.

##### ***Petrol***

Petrol is classified as a flammable liquid (Class 3) by AS 1940:2004 and as such is classified as a dangerous good by the criteria of the ADG Code (National Transport Commission, 2007). On-site petrol usage would be minor and petrol engine vehicles would be fuelled off-site.

##### ***Oils, Greases, Degreaser and Kerosene***

Oil is classified as a combustible liquid (Class C2) by AS 1940:2004. Procedures would be developed at the Project for the handling, storage, containment and disposal of workshop hydrocarbons (i.e. oils, greases, degreaser and kerosene) in accordance with AS 1940:2004. Workshop hydrocarbon spills and leaks would also be contained by impervious flooring/bunding and spill response equipment would be maintained on-site.

### **Liquefied Petroleum Gas**

LPG is classified as a flammable gas (Class 2.1) by AS 1940:2004 and as such is classified as a dangerous good by the criteria of the ADG Code (National Transport Commission, 2014). On-site LPG usage would be minor and limited to workshop requirements. Procedures would be developed at the Project for the handling, storage and containment of LPG.

### **Other Hydrocarbons**

Minor quantities of other hydrocarbons may be used at the Project for construction, development and maintenance activities (such as acetylene). The handling and storage of other hydrocarbons on-site would be conducted in accordance with Australian Standards and relevant codes.

#### **3.1.2 Explosive Materials**

Explosive materials required for the Project would include initiating products and bulk explosives. Explosives would be transported, stored, handled and used in accordance with Australian Standards.

Explosive materials would be stored in storage facilities located within the footprint of the Western Emplacement, the Vickery Open Cut or the mine infrastructure area (Figure 3a). Explosive materials may also be stored in appropriate off-site facilities.

Throughout the life of the Project, any on-site explosive storages may be relocated to appropriate locations depending on the progression of the open cut.

#### **3.1.3 Chemicals**

The management and storage of chemicals at the Project would be conducted in accordance with Australian Standards and relevant codes.

No chemicals or hazardous materials would be permitted on-site unless a copy of the appropriate Safety Data Sheet (SDS) is available on-site or, in the case of a new product, it is accompanied by a SDS.

#### **3.1.4 Liquid and Non-Liquid Waste**

Sewage and wastewater from on-site ablution facilities would be collected and treated in biocycle sewage treatment system and serviced by a licensed waste disposal contractor on an as-needs basis. Treated effluent would be irrigated at a small wastewater disposal area in accordance with the *Environmental Guidelines: Use of Effluent by Irrigation* (NSW Department of Environment and Conservation, 2004).

Used tyres from mining equipment would be stockpiled prior to being disposed of within the footprint of the open cut void as the open cut advances.

Waste hydrocarbons would be collected and stored on-site prior to being removed by a licensed contractor.

## 3.2 HAZARD IDENTIFICATION PROCESS

The Project hazard identification table (Attachment A) provides a summary of the potential on-site hazards identified for the Project and a qualitative assessment of the risks posed.

### 3.2.1 Project Components

As this assessment specifically covers risks from fixed installations (in accordance with *Multi-level Risk Assessment* [DP&I, 2011] [Section 1.1]), the main focus of this assessment was on on-site storage. Further discussion on the objectives and scope of the assessment are described in Section 1.1.

### 3.2.2 Incident Classes

The following generic classes of incident were identified:

- leaks/spills;
- fire;
- explosion; and
- theft.

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, mitigation and management measures could be described in management plans for the Project, for example:

- Blast Management Plan.
- Water Management Plan.
- Pollution Incident Response Management Plan.

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

- **Maintenance** – Maintenance of all mobile and fixed plant and equipment.
- **Staff Training** – Only those personnel authorised 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, Whitehaven would obtain the necessary licences and permits for engineering structures.
- **Contractor Management** – All contractors engaged by Whitehaven would be required to operate in accordance with the relevant Australian Standards and NSW legislation.
- **Water Management** – As reported in Appendix B of the EIS, water management structures would be constructed to 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 (e.g. fuels, oils, greases) would be developed in accordance with Australian Standards and relevant legislation.
- **Emergency Response** – Fire fighting and spill management equipment would be kept on-site in appropriate locations. Emergency response training, procedures, manuals and systems would continue to be implemented.



## **4 RISK MANAGEMENT AND EVALUATION**

Attachment A presents a qualitative assessment of risks associated with the construction and operation of the Project. The assessment evaluates the off-site risks of the Project with potential to impact on the environment, members of the public and their property, and with a focus on fixed installations (Section 1.1).

For this PHA, the 'site' was considered to be consistent with the Development Application Area, the Project rail spur and privately-owned portions of the Approved Road Transport Route.

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 1.3.4. Proposed treatment measures are identified in Section 3.2.3.

## 5 REFERENCES

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

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

Department of Planning and Infrastructure (2011) *Multi-level Risk Assessment*.

National Transport Commission (2007) *Australian Dangerous Goods Code*.

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

**ATTACHMENT A****VICKERY EXTENSION PROJECT HAZARD IDENTIFICATION TABLE**

**Vickery Extension Project Hazard Identification Table**

Project Component	Incident Type	Scenario	Existing and Proposed Preventative Measures	Likelihood <sup>1</sup>	Consequence <sup>2</sup>	Risk <sup>3</sup>
<b>On-Site Storage</b> Hydrocarbons (i.e. fuels [diesel and petrol], oils, greases, degreaser and kerosene), explosives and chemicals.	Leak/Spill	Failed tank or associated fittings, pump or pipework or operator error leading to off-site impacts including chemical or fuel contamination.	<ul style="list-style-type: none"> <li>• Storage tanks located to minimise potential impacts of leaks/spills.</li> <li>• Design of structures/tanks/pipes to relevant standards and legislation (including above ground installation, bunding, double walls or detection devices where required).</li> <li>• Bunding of storage facilities.</li> <li>• Construction of impervious workshop and washbay facilities.</li> <li>• Regular inspections and maintenance (where required).</li> <li>• Spill management equipment (i.e. spill kits), procedures and training.</li> <li>• Operator training.</li> <li>• Operational procedures.</li> <li>• Signage.</li> <li>• Emergency Management System.</li> </ul>	E	3	20(L)

**Vickery Extension Project Hazard Identification Table (Continued)**

Project Component	Incident Type	Scenario	Existing and Proposed Preventative Measures	Likelihood <sup>1</sup>	Consequence <sup>2</sup>	Risk <sup>3</sup>
<b>On-Site Storage (Continued)</b> Hydrocarbons (i.e. fuels [diesel and petrol], oils, greases, degreaser and kerosene), explosives and chemicals (Continued)	Leak/Spill (Continued)	Failed storage vessel due to mechanical impact or corrosion leading to off-site impacts including chemical or fuel contamination.	<ul style="list-style-type: none"> <li>• Design of structures/tanks/pipes to relevant standards legislation (including above ground installation, bunding, double walls or detection devices where required).</li> <li>• Bunding of storage facilities.</li> <li>• Protection of storage facilities (e.g. bollards).</li> <li>• Spill management equipment, procedures and training.</li> <li>• Regular inspections and maintenance (where required).</li> <li>• Operator training.</li> <li>• Operational procedures.</li> <li>• Signage.</li> <li>• Emergency Management System.</li> </ul>	D	4	21(L)
	Fire or Explosion	Poor maintenance, poor design, collision or human error leading to off-site fire/explosion/fume emissions-related impacts.	<ul style="list-style-type: none"> <li>• Design of structures/tanks/pipes/blasts to relevant standards.</li> <li>• Fire fighting equipment in appropriate locations.</li> <li>• Regular inspections and maintenance of fire fighting equipment.</li> <li>• Protection of storage facilities (e.g. bollards).</li> <li>• Operator training.</li> <li>• Emergency Management System.</li> </ul>	E	4	23(L)
	Theft	Malicious act that results in off-site impacts.	<ul style="list-style-type: none"> <li>• Restriction of access to storage areas, including securing storage facilities.</li> <li>• Provision of adequate lighting around storage facilities.</li> <li>• Installation of fencing and/or signage to discourage access to the site.</li> </ul>	D	3	17(L)

**Vickery Extension Project Hazard Identification Table (Continued)**

Project Component	Incident Type	Scenario	Existing and Proposed Preventative Measures	Likelihood <sup>1</sup>	Consequence <sup>2</sup>	Risk <sup>3</sup>
<b>On-Site Storage (Continued)</b> Run-of-mine (ROM) coal	Explosion	Coal dust explosion at coal stockpiles or coal handling infrastructure leads to off-site explosion related impacts.	<ul style="list-style-type: none"> <li>Housekeeping activities – site would be kept clean and tidy and fire hazards removed, where practicable.</li> <li>Water carts with water cannon available for stock pile dust suppression if required, as well as use of fixed stockpile sprays.</li> <li>Fire fighting equipment and spill kits in appropriate locations.</li> <li>Regular inspections and maintenance of fire fighting equipment.</li> <li>Operator training.</li> <li>Emergency Management System.</li> </ul>	E	3	20(L)
	Fire	Spontaneous combustion event leads to off-site fire related impacts (fume/emissions).	<ul style="list-style-type: none"> <li>Design of ROM pad.</li> <li>Fire fighting equipment in appropriate locations.</li> <li>Regular inspections and maintenance of fire fighting equipment.</li> <li>Operator training.</li> <li>Emergency Management System.</li> </ul>	E	4	23(L)

**Vickery Extension Project Hazard Identification Table (Continued)**

Project Component	Incident Type	Scenario	Existing and Proposed Preventative Measures	Likelihood <sup>1</sup>	Consequence <sup>2</sup>	Risk <sup>3</sup>
<b>Construction/Development</b> Project ancillary infrastructure, powerline, Project rail spur, public road relocation and other minor construction activities	Leak/Spill	Spill of diesel, oils, lubricants, solvents, sewage wastes or domestic wastes leading to off-site impacts on nearby watercourses or land.	<ul style="list-style-type: none"> <li>Water Management Plan.</li> <li>Fuel, oils and lubricants stored in accordance with Australian Standards and NSW legislation.</li> <li>Spill management equipment (i.e. spill kits), procedures and training.</li> <li>Dangerous goods register (SDS).</li> <li>Ground Disturbance Permit includes site construction runoff control (drains and sumps).</li> <li>Construction specific environmental controls.</li> <li>Operator training.</li> <li>Emergency Management System.</li> <li>Pollution Incident Response Management Plan.</li> </ul>	C	5	22(L)
	Fire	Construction activity near diesel/chemicals storage results in a fire leading to off-site impacts.	<ul style="list-style-type: none"> <li>Housekeeping activities - site would be kept clean and tidy and fire hazards removed where practicable.</li> <li>Fire fighting equipment in appropriate locations.</li> <li>Regular inspections and maintenance of fire fighting equipment.</li> <li>On-site emergency response team.</li> <li>Operator training.</li> <li>'Hot work' permits.</li> <li>Emergency Management System.</li> </ul>	C	4	18(L)

**Vickery Extension Project Hazard Identification Table (Continued)**

Project Component	Incident Type	Scenario	Existing and Proposed Preventative Measures	Likelihood <sup>1</sup>	Consequence <sup>2</sup>	Risk <sup>3</sup>
<b>Other infrastructure and supporting systems</b>	Leak/Spill	Leak or spill from Project water management system (e.g. coal contact water) leading to off-site impacts associated with water quality.	<ul style="list-style-type: none"> <li>Regular inspection and maintenance of water containment structures for structural integrity and effectiveness.</li> <li>Operator training.</li> <li>Water Management Plan.</li> <li>Pollution Incident Response Management Plan.</li> <li>Emergency Management System.</li> </ul>	C	4	18(L)
	Fire	Malfunction of on-site power reticulation resulting in off-site fire.	<ul style="list-style-type: none"> <li>Power reticulation designed to Australian Standards and legislation – including security measures.</li> <li>Housekeeping activities – site would be kept clean and tidy and fire hazards removed, where practicable.</li> <li>Fire fighting equipment in appropriate locations.</li> <li>Regular inspections and maintenance of fire fighting equipment.</li> <li>Power usage monitoring and alarms.</li> <li>On-site emergency response team.</li> <li>Operator training.</li> <li>Emergency Management System.</li> </ul>	D	4	21(L)

<sup>1</sup> Refer to Table 1.  
<sup>2</sup> Refer to Table 2.  
<sup>3</sup> Refer to Table 3.