



CHAPTER 19 - HAZARDS AND SAFETY

STANMORE ID EXTENSION PTY LTD
ISAAC DOWNS EXTENSION PROJECT

TABLE OF CONTENTS

19.1	Introduction.....	19-1
19.2	Scope.....	19-1
19.3	Regulatory Framework.....	19-2
19.3.1	Health and Safety.....	19-2
19.3.2	Environmental Objective and Outcomes.....	19-2
19.4	Site Worker’s Health and Safety.....	19-3
19.4.1	Safety and Health Management System.....	19-3
19.4.2	Project – Mining Based Hazards.....	19-4
19.5	Risk Assessment Methodology.....	19-6
19.5.1	Hazard Identification and Analysis.....	19-6
19.5.2	Risk Assessment.....	19-7
19.5.3	Risk Management.....	19-9
19.6	Project Hazards and Controls.....	19-9
19.6.1	Project Context.....	19-10
19.6.1.1	Project Activities.....	19-10
19.6.1.2	Receptors and Workers.....	19-10
19.6.1.3	Land Interests and Use.....	19-10
19.6.2	Environmental Context.....	19-11
19.6.2.1	Surface Water.....	19-11
19.6.2.2	Air Quality.....	19-11
19.6.2.3	Noise and Vibration.....	19-11
19.6.3	Hazardous and Dangerous Substances.....	19-12
19.6.4	Explosives.....	19-12
19.6.5	External Factors and Natural Hazards.....	19-13
19.6.6	Changing Future Climate Hazards.....	19-15
19.6.7	Relevant Risk Management Requirements.....	19-16
19.7	Preliminary Hazards Identification.....	19-17
19.8	Hazard Analysis and Risk Assessment.....	19-39
19.8.1	Risk Evaluation - Transport.....	19-39
19.8.2	Risk Evaluation – Hydrocarbon Storage.....	19-40
19.8.3	Risk Evaluation – Construction and Installation.....	19-40
19.8.4	Risk Evaluation – Mining Operations.....	19-41
19.8.5	Risk Evaluation – Non-mining Waste Management.....	19-43
19.8.6	Risk Evaluation – Infrastructure.....	19-43
19.8.7	Risk Evaluation – Decommissioning.....	19-44
19.8.8	Risk Evaluation – Interaction with External Factors.....	19-44
19.8.9	Risk Evaluation – Summary.....	19-46
19.9	Risk Management.....	19-46
19.9.1	Risk Management.....	19-46
19.9.2	Project Site Layout.....	19-46
19.9.3	Construction Phase.....	19-47
19.9.4	Operational Phase.....	19-47
19.9.5	Risk Management - Natural Hazards.....	19-48
19.9.5.1	Flooding.....	19-48
19.9.5.2	Bushfires.....	19-50
19.9.5.3	Vector-borne Disease.....	19-50
19.9.5.4	Wildlife.....	19-50
19.9.5.5	Community Resilience.....	19-50

19.9.6	Risk Management - Site Hazards	19-51
19.9.6.1	Explosives	19-51
19.9.6.2	Fire.....	19-51
19.9.6.3	Vehicle Accidents.....	19-51
19.9.7	Risk Management – Climate Change	19-51
19.10	Safety Commitment	19-52
19.11	Conclusion	19-52
19.12	References	19-53

Tables

Table 19-1	Environmental Objectives and Outcomes – Hazards and Safety	19-2
Table 19-2	Hazard Identification - Project Worker’s Health and Safety	19-4
Table 19-3	Hazard Identification - Site Worker’s Health and Safety.....	19-8
Table 19-4	Likelihood Criteria	19-8
Table 19-5	Risk Analysis Matrix (Consequence and Likelihood)	19-9
Table 19-6	Hazardous and Dangerous Substances – Indicative Project Usage.....	19-12
Table 19-7	External Factors	19-14
Table 19-8	Mandatory and Recommended Risk Management Measures.....	19-16
Table 19-9	Hazard Identification	19-19
Table 19-10	Hazard Analysis for Transportation	19-39
Table 19-11	Hazard Analysis for Hydrocarbon Storage	19-40
Table 19-12	Hazard Analysis for Construction and Installation	19-41
Table 19-13	Hazard Analysis for Mining Operations	19-41
Table 19-14	Hazard Analysis for Non-mining Waste Management	19-43
Table 19-15	Hazard Analysis for Infrastructure	19-43
Table 19-16	Hazard Analysis for Decommissioning	19-44
Table 19-17	Hazard Analysis for Interactions with External Factors.....	19-45

Figures

Figure 19-1	Stages of the Risk Assessment Process.....	19-7
Figure 19-2	Project Infrastructure – Q1,000 Flood Extent - Operations	19-49

19. HAZARDS AND SAFETY

19.1 Introduction

This chapter describes the potential hazards and risks to people and property that may be associated with the Isaac Downs Extension Project (Project) in the form of a preliminary risk assessment. An emergency response plan (ERP) is provided for the Project (**Appendix AJ**). The identification and control of hazards and risks to people and property is an integral part of planning for Project construction, operations and closure, and will occur independently of the EIS process.

The potential hazards to people and property that may be associated with the Project are identified, and management measures are proposed for identified hazards. The potential hazards associated with the Project include accidents, spillages, abnormal events, hazardous substances, wildlife and natural hazards. The possible consequences and likelihoods of hazards are predicted to determine a residual risk rating.

19.2 Scope

This chapter focuses on hazards that result in non-routine or abnormal events which, if they occurred, would impact on identified people, property or land use. The key aspects included in the scope are as follows:

- Project hazards that could result in abnormal events capable of causing harm to people (onsite workers, visitors and the broader community) and property (within and surrounding the Project).
- Hazards and risks associated with transport, use, storage and disposal of hazardous and dangerous substances to ensure the proposed management presents acceptable risks to the site and surrounding land uses.
- External factors including natural hazards that result in risks over the Project lifespan.

The following aspects were excluded from the scope of this risk assessment:

- Hazards that comply with regulatory requirements, for example, licensed and approved releases of pollutants (e.g. air and noise emissions and mine water).
- Workplace health and safety hazards that could result in injury to workers during normal Project activities, as these hazards are appropriately managed in compliance with Queensland's coal mining safety and health legislation. These hazards are not included in the preliminary risk assessment for this EIS. However, they are summarised in Section 19.4.
- Predicted environmental and socio-economic Project impacts that are addressed in other chapters of the EIS.
- Existing mining operations at Isaac Plains Complex (IPC) (i.e. Isaac Plains Mine (IPM) and Isaac Downs Mine (IDM)), noting that the Project will be integrated into the safety and health management systems for IPC prior to commencement. Hazards associated with existing IPC operations will continue to be managed under the established Isaac Plains Complex - Safety and Health Management System (IPC - SHMS). These hazards include coal haulage, coal washing and processing, coal stockpiling, train loading and railing, mine industrial area operations, explosives storage, hydrocarbon storage and coarse reject and tailings disposal.

19.3 Regulatory Framework

19.3.1 Health and Safety

Compliance with Queensland's regulatory health and safety requirements is compulsory, and therefore, the Project's hazard identification processes have assumed compliance with regulatory requirements and relevant Australian guidelines, codes and standards applicable to the management and mitigation of hazards and risks at a Queensland coal mining operation. Hazard identification and recommended risk treatment measures have been identified based on the premise that legislation and relevant Australian guidelines, codes and standards are implemented whilst constructing, operating and decommissioning the Project. These include:

- *Coal Mining Safety and Health Act 1999* (CMSH Act) and *Coal Mining Safety and Health Regulation 2017* (CMSH Regulation) – which regulates the operation of coal mines, to protect the safety and health of persons at coal mines and persons who may be affected by coal mining operations.
- *Work Health and Safety Act 2011* (WHS Act) and *Work Health and Safety Regulation 2011* (WHS Regulation) – aims to secure the health and safety of workers and workplaces. Workers and others are to be given the highest level of protection from hazards and risks as is reasonably practicable.
- *Explosives Act 1999* (Explosives Act) – regulates the use, handling, transport, manufacturing, selling and storage of explosives.
- *AS/NZS ISO 31000:2009 Risk Management Principles and Guidelines* (ISO 31000) – provides a framework for managing risk and specifies the elements of the risk management process.
- *AS 1940:2004 The Storage and Handling of Flammable and Combustible Liquids* (AS1940) – includes the requirements and recommendations for the safe storage and handling of flammable liquids and dangerous goods Class 3. AS1940 also includes requirements and recommendations for the storage and handling of combustible liquids and provides minimum acceptable safety requirements for storage facilities, operating procedures, emergency planning and fire protection. It provides technical guidance that may assist in the storage and handling of flammable and combustible liquids.
- *Australian Code for the Transport of Dangerous Goods by Road & Rail (Edition 7.9)* - provides technical requirements for the land transport of dangerous goods across Australia.
- AS2187 - specifies requirements for the storage of explosives, and for the location, design, construction and maintenance of magazines.
- Queensland Health (2002) - Guidelines to minimise mosquito and biting midge problems in new development areas.

19.3.2 Environmental Objective and Outcomes

The final terms of reference (ToR) for the Project's environmental impact statement (EIS) nominates environmental objectives and outcomes for the hazards and safety assessment. Table 19-1 provides these environmental objectives and outcomes, and identifies where they have been addressed.

Table 19-1 Environmental Objectives and Outcomes – Hazards and Safety

Requirement	Environmental Objectives and Outcomes	EIS Reference
Terms of Reference	The construction and operation of the project must ensure:	
	• the risk of, and the adverse impacts from, natural and man-made hazards are avoided, minimised or mitigated to protect people and property	19.4, 19.5, 19.6, 19.7, 19.8, 19.9, 19.10

Requirement	Environmental Objectives and Outcomes	EIS Reference
	the community's resilience to natural hazards is maintained or enhanced	19.6, 19.6.5, 19.6.7, 19.9, 19.9.5
	the storage and handling of hazardous materials are appropriately located, designed and constructed to minimise health and safety risks to communities and individuals and adverse effects on the environment	19.6, 19.6.3, 19.6.7 17.5, 17.9, 17.10
	that any risk associated with explosives use, transportation, storage or manufacture is within an acceptable level, in accordance with the Explosives Act 1999 and codes and standards including the Australian Standard AS2187.1 Explosives - Storage, transport and use - storage	19.6, 19.6.4, 19.6.7, 19.8.4, 19.9.2, 19.9.6
	the project prevents or minimises the production of hazardous contaminants and waste	17.5, 17.9, 17.10
	if the production of hazardous contaminants and waste is unavoidable, the project treats and/or contains hazardous contaminants until their disposal at an approved facility.	17.5, 17.9, 17.10

19.4 Site Worker's Health and Safety

19.4.1 Safety and Health Management System

The safety and health management of Queensland's coal mining industry is strictly regulated under the CSMH Act and CSMH Regulation and is administered by the Mines Inspectorate as part of Resources Safety & Health Queensland (independent statutory body).

The key objectives of the CSMH Act are:

- To protect the safety and health of persons at coal mines and persons who may be affected by coal mining operations.
- To require that the risk of injury or illness to any person resulting from coal mining operations be at an acceptable level.
- To provide a way of monitoring the effectiveness and administration of provisions relating to safety and health under this Act and other mining legislation.

To help achieve these key objectives, the CSMH Act specifies the implementation of a safety and health management system, which is a single, comprehensive and integrated system for the management of all aspects of risks to safety and health in relation to the operation of a coal mine. The CSMH Regulation prescribes the required elements for a functional and effective safety and health management system.

The Project's safety and health requirements will be managed under the IPC – SHMS (i.e. as an established safety and health management system). The IPC - SHMS provides the standards, methods, procedures and management plans necessary to mitigate the risks associated with the Project and is designed to ensure legislative compliance (i.e. during construction, operation and decommissioning). Strict adherence to the IPC- SHMS will be required by the Project's workforce, contractors and visitors.

19.4.2 Project – Mining Based Hazards

Table 19-2 details the health and safety hazards that are likely to be present in normal, day-to-day activities during construction, operation and decommissioning of the Project. These hazards will be managed under the IPC – SHMS, Queensland’s broader workplace health and safety legislation, and relevant Australian standards, with hazards managed in accordance with these requirements during the construction, operation and decommissioning of the Project.

Table 19-2 Hazard Identification - Project Worker’s Health and Safety

Hazard	Description	Consequence	Risk Treatment Measures
Confined space	Suffocation	Fatality	Confined space permits; training; competency assessment; approved safe work methods.
Dehydration / Heat Stress	Working in hot conditions without sufficient water	Hospitalisation	Personal protective equipment (PPE); approved safe work methods; provide water; training; consideration of State Heatwave Risk Assessment management measures.
Disease vectors	Mosquito bites	Illness	PPE; provision of insect repellent (if required); permanent/ temporary water body management (including inspection and treatment if required); consideration of Queensland Health Guidelines to minimise mosquito and biting midge problems in new development areas (QH, 2002).
Dust	Clearing, excavation, unsealed roads	Respiratory issues	Equipment cabin standards (including air conditioning); dust suppression (e.g. road watering); PPE; air quality monitoring.
Equipment with moving parts	Failure to isolate correctly	Injury / fatality	Isolation permit system; testing and tagging procedures; maintenance of guarding and machinery; inspections; training; competency assessment; approved safe work methods; emergency management plan.
Explosives use	Unplanned detonation, struck by fly-rock	Injury / fatality	Approved safe work methods; qualified shot-firers; competency assessment; temporary exclusion zones; inspections; PPE; training; warning systems.
Exposure to hazardous substances	Oils, diesel, chemicals	Skin, eye irritation	PPE; training; material safety data sheet (MSDS); standards and procedures for transporting, handling, using and disposing of hazardous substances.
Falling objects	Object falls from height	Injury	PPE; barricade work areas; approved safe work methods; permit to work system.
Fatigue	Operating plant and equipment whilst tired	Injury / fatality	Fit for work program; fatigue management plan; traffic management plan; emergency management plan.
Fire	Buildings, vehicles, conveyors	Smoke inhalation / injury / fatality	Emergency exits; training; firefighting equipment; fire alarms; approved safe work methods; emergency management plan.

Hazard	Description	Consequence	Risk Treatment Measures
Improper machine operation	Trauma to the operator or nearby workers	Injury / fatality	Training; competency assessment; systems of authorisations; inspections; signage; traffic management plan; 'no go' zones; equipment warning alarms; approved safe work methods.
Interaction with mobile equipment	Worker hit by mobile equipment	Injury / fatality	Training; competency assessment; systems of authorisations; inspections; signage; traffic management plan; 'no go' zones; equipment warning alarms; approved safe work methods; dedicated pedestrian walkways; emergency management plan.
Lightning	Struck by lightning	Fatality	Storm procedures; lightning masts.
Manual Handling	Incorrect handling	Injury	Approved safe work methods; training; competency assessment; provide equipment fit for purpose; suitable allocation of resources.
Mobile equipment collisions	Impact trauma to driver / passenger(s)	Injury / fatality	Traffic management plan (including light and heavy vehicle separation); road design; training; competency assessment; fit for work program; fatigue management plan; approved safe working methods; vehicle proximity detention systems; emergency management plan.
Noise	Excessive noise from plant and equipment	Hearing loss	PPE; noise barriers; equipment location (source separation distance); equipment design (sound attenuation); noise monitoring.
Pinch points	Crush	Injury / fatality	Approved safe work methods; training, competency assessment; guarding; barricade work areas; signage; inspections; emergency management plan.
Slips and trips	Water, oil on ground, uneven surface, access and egress from equipment	Injury	Approved safe work methods; training; competency assessment; provide equipment fit for purpose; inspections.
Sunburn	Working in sun without protection	Skin damage	PPE; provision of sunscreen.
Welding and cutting	Fumes, hot metal, sparks	Poisoning, skin burn, foreign object in eye	PPE; approved safe work methods; permit to work systems; competency assessment; temporary work area barricading and signage.
Wildlife hazards	Snake bites	Injury / fatality	PPE; first aid training; emergency management plan.
Working at heights	Fall	Injury / fatality	Training; competency assessment; appropriate scaffolding and/or PPE; inspections; approved safe work methods; emergency management plan.

Hazard	Description	Consequence	Risk Treatment Measures
Working with electrical equipment	Electric shock / Electrocution	Injury / fatality	Qualified electricians; training; competency assessment; approved safe work methods; equipment standards and procurement process; equipment maintenance; testing and tagging procedures; inspections; barricade work areas; signage; isolation permit system; PPE; emergency management plan.

19.5 Risk Assessment Methodology

The preliminary risk assessment was undertaken in accordance with:

- ISO 31000
- Recognised Standard 02 Control of risk management practices – CSMH Act
- *HB203:2006 Environmental risk management principles and processes*
- *SA/SNZ HB 205:2017 Handbook: Managing health-and safety-related risk*
- *Queensland Emergency Risk Management Framework*.

This assessment considered identified stakeholders, Project processes and assets, environmental and external factors and relevant legislation, standards and guidelines. The three key stages in the methodology applied are shown in Figure 19-1, and are in line with ISO 31000. The processes and risk assessment techniques applied in each stage are discussed below.

19.5.1 Hazard Identification and Analysis

A hazard identification and analysis process was undertaken to identify Project hazards that could result in non-routine or abnormal scenarios (hazard events) with risks to people and property. Hazards were identified by considering historical industry data, the Project context, hazardous substances, regulatory triggers and external factors.

The hazard analysis involved:

- identifying the Project hazards and hazard sources
- analysis of causes of a hazard event
- determining the range of potential consequences
- identifying Project control measures.



Figure 19-1 Stages of the Risk Assessment Process

19.5.2 Risk Assessment

ISO 31000 states that risk analysis consists of determining the most likely highest impact consequences and their likelihood of resulting from the hazard event. The consequence and likelihood risk ranking matrix technique was applied to assign categories or scores for both likelihood and consequence to determine a risk severity rating. The assessment of risk included the following:

- Hazard events were grouped into scenarios or events.
- The consequence severity categories (refer to Table 19-3) were developed considering the existing environmental conditions and sensitivity of the value, receptor or land. The statistically reasonable maximum consequence from the occurrence of the hazard event was determined considering effective application of the proposed controls.
- Likelihood categories were developed based on frequency and probability scales (refer to Table 19-4). The time span of the hazard exposure determined if frequency (continual hazard exposure) or probability (infrequent hazard exposure periods) criteria was applied in assigning a likelihood category.
- A risk severity ranking was determined by applying the risk rating matrix presented in Table 19-5.
- Risk severity rankings were reviewed against applicable risk criteria to determine if the level of risk, after adoption of risk control measures, was ALARP).

Table 19-3 Hazard Identification - Site Worker's Health and Safety

Type of Loss	Consequence				
	1 (Insignificant)	2 (Minor)	3 (Moderate)	4 (Major)	5 (Severe)
Impact to People	Minor injury. Slight negative impact on individual health.	Significant reportable injury Major impact on health of several people.	Major injury to one or more persons. Severe health impacts on a number of people.	Single fatality Severe irreversible disability or impairment.	Multiple fatalities. Major permanent negative health impacts on a large number of people
Impact to Property / Land Use	Could cause minor damage <\$10K	Could cause moderate damage \$10K to \$100K	Could cause major damage \$100K to \$1M	Could cause severe damage \$1M to \$10M	Unplanned mine closure damage >\$10M
	<1% of property directly impacted	1 – 5 % of property directly impacted	5 - 20% of property directly impacted	20 - 50% of property directly impacted	>50% of property directly impacted
	Insignificant change to water availability or use	Minor, temporary change to water availability or use, with alternative supplies readily available	Major, temporary change to water availability or use, with alternative supplies available	Severe, long term change to water availability or use, with alternative supplies difficult to obtain	Permanent change to water availability or use, no alternative supplies
	Insignificant indirect impacts, land productivity unchanged	Moderate indirect impacts with isolated changes to land productivity, easily mitigated	Moderate indirect impacts with broad changes to land productivity, requiring standard mitigations	Severe indirect impacts with large scale changes to land productivity, requiring complex mitigations	Catastrophic indirect impacts with permanent changes to land productivity that cannot be mitigated

Table 19-4 Likelihood Criteria

Score	E (Rare)	D (Unlikely)	C (Possible)	B (Likely)	A (Almost Certain)
Frequency:	The event occurs > once in 100 years	The event occurs once in 50 to 100 years	The event occurs once in 25 to 50 years	The event occurs once in 2 to 25 years	The event occurs < once in 2 years
Probability: (during 25yr period)	<10% chance	10 - 35% chance	35 - 65% chance	65 - 90% chance	>90% chance

Table 19-5 Risk Analysis Matrix (Consequence and Likelihood)

		<u>Consequence</u>				
Type of Loss		1 (Insignificant)	2 (Minor)	3 (Moderate)	4 (Major)	5 (Severe)
<u>Likelihood</u>	A (Almost Certain)	Medium (11)	High (16)	High (20)	Extreme (23)	Extreme (25)
	B (Likely)	Medium (7)	Medium (12)	High (17)	High (21)	Extreme (24)
	C (Possible)	Low (4)	Medium (8)	Medium (13)	High (18)	High (22)
	D (Unlikely)	Low (2)	Low (5)	Medium (9)	Medium (14)	High (19)
	E (Rare)	Low (1)	Low (3)	Medium (6)	Medium (10)	Medium (15)

19.5.3 Risk Management

Risks were identified that were considered to pose unacceptable levels of risk or where additional risk treatment will be required to ensure risks are ALARP. Strategies and plans are proposed to improve existing controls or introduce new controls to reduce risk levels, where required. In the development of risk treatment controls the accepted hierarchy of controls was followed, which in order of preference is:

- eliminate the hazard or threat
- minimise or replace the hazard or threat
- control the risk using engineered devices that do not require human actuation
- control the risk using devices that require human actuation
- control the risk with procedures
- control the risk with PPE
- control the risk through administrative means (such as job rotation to limit exposures)
- control the risk with warnings and by raising awareness.

19.6 Project Hazards and Controls

A hazard is the potential to cause harm to life, health, property or environment, and is defined by the type of energy or the energy exchange interrupted. Contributing factors can cause hazards to result in an unplanned event which causes harm. The severity and frequency of this happening is the risk. The following key hazard areas have been identified for the Project:

- chemicals and hazardous substances
- explosives (e.g. storage and handling, abnormal blast)
- gravitational energies (e.g. high wall failure, flood levee failure, air blast overpressure)
- mechanical energies (e.g. transportation, equipment interaction)
- work environment (e.g. noise, wildlife, biological, ventilation)
- natural extreme weather events
- thermal energies (e.g. spontaneous heating or combustion).

19.6.1 Project Context

The Project context, and factors influencing the identification and sources of hazards, are described below.

19.6.1.1 Project Activities

The Project location and activities are described in detail in **Chapter 4**. The transport network in the Project area is described in **Chapter 18**. The Project's access for people, equipment and materials from the Peak Downs Highway will be via IDM and a bridge over the Isaac River. The Peak Downs Highway intersection at IDM was designed and approved in accordance with Department of Transport and Main Roads (TMR) and Austroads standards and has been in operation for a number of years and will continue for the Project's operation.

An access and haul road will be constructed between the Project and IDM and IPM, with a permanent bridge over the Isaac River to ensure all weather access and a route for coal haulage to IPM. This access arrangement will facilitate the continued use of IDM's mine industrial area (MIA), IDM's explosives storage area and IPM's coal handling and preparation plant (CHPP) for the Project. The existing road network within IDM and IPM will continue to be utilised by the Project, including the Peak Downs Highway underpass bridge between IDM and IPM for transport of ROM coal to the IPM CHPP.

A secondary access to the Project is proposed between Stanmore's Eagle Downs project (mining lease (ML) 70389) within mining lease application (MLA) 700083 and will involve construction of a bridge over Cherwell Creek. This secondary access is proposed for infrequent light vehicle use or potential use in emergencies if the primary access via IDM is restricted. There are no other public roads that will involve interaction with Project activities.

The majority of the Project's mining supplies (e.g. fuel, explosives) will come from local and regional towns and will be managed by IDM's existing facilities (e.g. MIA, explosives storage). **Chapter 18** provides estimates of vehicles that will be generated by Project activities and provides an assessment of the risks posed by the Project from traffic and transport activities.

Management of non-mining waste, including regulated waste, is described in **Chapter 17**.

19.6.1.2 Receptors and Workers

The nearest population centre is Moranbah, which is approximately 15 km northwest of the Project. Winchester Downs Homestead is the nearest residence (sensitive receptor) and is approximately 1 km from the Project's southern MLA boundary and 1.2 km from active mine working area. The Project's nearest sensitive receptors are described in **Chapter 4**.

Workers who live locally (e.g. Moranbah) will commute to site in private vehicles on a daily basis. Workers from regional areas will reside at worker's accommodation villages in Moranbah and near Coppabella, with a combination of buses and private vehicles used for transport from regional areas (e.g. Mackay) at the beginning and end of shift rosters. Some workers will fly into and from Moranbah or Mackay airport at the beginning and end of shift rosters. Workers residing in the worker's accommodation villages will be bused to and from the Project site on a daily basis.

19.6.1.3 Land Interests and Use

The existing land uses within and adjacent to the Project are described in **Chapter 7**. The land within and adjacent to the Project area is primarily used for cattle grazing and coal mining. There is limited infrastructure on the property within the Project area, being stock fencing, tracks, bores and cattle yards. The nearest active coal mining operations to the Project are IDM (abutting to the immediate north), IPM (approximately 10 km north) and Poitrel Mine (approximately 5 km east).

The Project's proposed transport corridor (including haul road) is described in Section 19.6.1.1.

19.6.2 Environmental Context

19.6.2.1 Surface Water

Surface water within and surrounding the Project area is limited, due to the ephemeral nature of the local watercourses. **Chapter 8** provides additional information on surface water resources. When available, surface water is used for stock watering. There is no general use of surface water by the public in the vicinity of the Project. As described in **Chapter 8**, the Project will not increase demand on external water supplies under all modelled climatic conditions.

Groundwater within and surrounding the Project area is used for stock watering and is limited by poor yield and quality. There are around 11 groundwater bores within and surrounding the Project area. Currently, about half of the 11 groundwater bores are in use. There is no known use of groundwater by the public. **Chapter 10** provides additional information on groundwater resources, including impact assessment and mitigation strategies.

Chapter 9 provides a detailed assessment of the Project's impacts on flooding during mining operations and post mining, including the change in flood levels and velocity for different flood events. **Chapter 9** describes the design of the levees for the Isaac River and Cherwell Creek to prevent the ingress of flooding up to the 0.1% annual exceedance probability (AEP) ('Q1,000') flood event during operations. In **Chapter 9** demonstrates that the residual void in the final landform design is outside the Q1,000 flood extent. There are no people or property, other than cattle infrastructure (e.g. fencing), that would be impacted by any change in flood levels or velocity during mining operations or post mining. Any stock within flood zones will be able to access higher ground during flood events.

The integration of the Project's operation with IDM and IPM has reduced its infrastructure requirements. The Project will require water management structures (e.g. dams, drains, pipelines, levees, gully diversion), a ROM pad, a go line (with heavy and light vehicle parking; self-bunded fuel, oil and lubricants storage tanks; and laydown / storage yards), a small crib area and office, power supply, roads (access and coal haulage) and planned mining operations. The Project's infrastructure will either be located outside the Q1,000 flood event level or will be protected to the same flood immunity by the planned levees along the Isaac River and Cherwell Creek. **Chapter 4** provides additional information on the Project's infrastructure.

The flood modelling provided in **Chapter 9** demonstrates that the Project activities will not increase the risk to people and property, possesses a low potential for the release of contaminants, and will not create additional health and safety impacts.

19.6.2.2 Air Quality

Potential Project and cumulative impacts on air quality, and proposed mitigation measures are described in **Chapter 15**. With the implementation of proposed mitigation measures, the Project is predicted to achieve the air quality objectives at all sensitive receptors. In addition, the proponent will make all reasonable efforts to enter an into an 'alternative arrangement' with the owners of Winchester Downs Homestead for potential amenity impacts.

Odour is not predicted to affect the health and safety of the community due to the lack of odour producing activities by the Project and the Project's separation distance from sensitive receptors.

In addition, the Project will be required to comply with strict statutory air quality criteria set by its environmental authority at defined sensitive receptors.

19.6.2.3 Noise and Vibration

Potential Project and cumulative impacts on noise and vibration levels, and proposed mitigation measures are described in **Chapter 16**. The Project is predicted to result in periodic exceedances of noise objectives at the closest sensitive receptor (Winchester Downs Homestead) during specific operational and climatic

conditions. The Project is predicted to achieve vibration related objectives for blasting activities at all sensitive receptors. The proponent will implement noise mitigation measures and will make all reasonable efforts to enter an into an 'alternative arrangement' with the owners of Winchester Downs Homestead for potential amenity impacts.

In addition, the Project will be required to comply with strict statutory noise and vibration criteria set by its environmental authority at defined sensitive receptors.

19.6.3 Hazardous and Dangerous Substances

Table 19-6 provides an indicative list of hazardous and dangerous substances to be used by the Project. IDM's MIA and explosives magazine will manage the majority of the Project's hazardous and dangerous substances in compliance with the IPC - SHMS. For operational efficiency purposes, smaller volumes of diesel, oils and lubricants will be stored within the Project's go-line area.

The actual total volumes of the Project's indicative hazardous and dangerous substances stored on-site are well below the 'major hazard facility' trigger thresholds under the WHS Regulation. Therefore, the Project is not classified as a 'major hazard facility'.

Table 19-6 Hazardous and Dangerous Substances – Indicative Project Usage

Substance	ADG Code	Quantity	Storage Location and Type	Use
Explosives (ANFO)	1.1D	Rate of usage: 10,000 t to 20,000 t per annum.	IDM's licensed magazine.	Blasting operations
Diesel	Class 3 PK III	50 KL total stored by IDM. 250 KL total stored at the Project. Rate of usage: 15 ML to 27 ML per annum.	Bunded area within IDM's MIA. Self-bunded tank within the Project's go-line area.	Heavy and light vehicles and plant operation
Oils: transmission oil, hydraulic oil, diesel engine oil, final drive oil, waste oil	Class 3	< 5,000 L total stored by IDM. < 20,000 L storage at the Project. Rate of usage: approximately 300,000 L per annum.	Workshop within IDM's MIA. Self-bunded storage within the Project's go-line area.	Heavy and light vehicles and plant maintenance
Lubricants and coolants	Class 3 (Class C2)	< 2,000 L total stored by IDM. < 2,000 L storage at the Project. Rate of usage: approximately 20,000 L per annum.	Workshop within IDM's MIA. Self-bunded storage within the Project's go-line area.	Heavy and light vehicles and plant maintenance

19.6.4 Explosives

It is anticipated that approximately 200,000 tonnes of explosives will be used over the Project's 15 year operational period. The rate of explosive use is generally between 10,000 t and 20,000 t per annum. The primary explosive to be used will be ammonium nitrate/fuel oil (ANFO). The blast initiation systems will be cast primers controlled by either non-electric initiation systems or electronic initiation systems.

The bulk raw materials used for blasting with ANFO are classed as dangerous goods but not explosives. The bulk raw materials are only converted to explosives when mixed at each blast hole. The transportation of the bulk raw materials to IDM will continue during the Project's mining operations in accordance with AS2187 and the Australian Explosives Code for the Transport of Explosives by Road and Rail. The transport of bulk raw materials to the Project from IDM will be conducted on an as required basis for blasting and will be managed in compliance with the IPC - SHMS.

For the Project's mining operations, IDM will continue to store bulk raw materials in a dedicated compound and cast primers and initiation systems in an isolated licensed magazine. IDM's magazine is separated by approximately 5 km from the nearest residence and the Peak Downs Highway. No bulk explosives will be stored within the Project area.

The generation of the explosives at each blast hole location will be executed in accordance with the 'Licence to Manufacture, Product Technical Specification sheets'; the 'Australian Explosives Industry Safety Group Code for Mobile Processing Units'; AS2187; and the Explosives Act. For the Project, the current explosives safety and security management system developed for IDM will continue to specify how explosives are transported, loaded and fired in accordance with the CSMH Act, the Explosives Act and AS2187. As per standard practice, access to the blast area will continue to be restricted during firing and include temporary internal road closure and evacuation warnings on-site before blasting, to ensure that persons are at a safe distance from the shot and, where necessary, wearing the appropriate PPE.

For the Project, IDM's storage compound will continue to operate under a security plan and blast management plan, which are compliant with AS2187. Management of the licensed magazine area is covered by the blast management plan.

The Project's explosive wastes will be negligible and will be disposed of on-site by putting the material down a blast hole and destroying it.

This risk from the Project's use of explosives and blasting will be maintained at an acceptable industry level by the continued use of a specialist explosives contractor licensed in the transport, handling, mixing and firing of explosives. Specialist blasting personnel will be used to ensure individual blast designs meet the air blast overpressure and vibration requirements outlined in **Chapter 16**.

The proponent is committed to ensuring explosives management over the operational life of the Project will be conducted in compliance with the relevant legislation, Australian Standards, codes and technical guidelines.

19.6.5 External Factors and Natural Hazards

Natural hazards or other external events that have the potential to trigger a hazard for the Project are described in Table 19-7. Potential natural disasters pose a risk to the Project and may also exacerbate certain hazards associated with the Project. Table 19-7 provides an indication of the severity and frequency of different natural hazards and external factors.

Table 19-7 External Factors

External Factor		Exposure and Relevance
Natural Hazards		
Major flood event		The potential for flooding of the Project area from the Isaac River (and its local tributaries) for various annual exceedance probability (AEP) rainfall events are described in Chapter 9. The Project's mining and infrastructure areas will be protected from flooding by levees for the Q1,000 flood event. Due to the Project's regional and remote location, there is no third party infrastructure which may be impacted by the minor changes in flooding as a result of the Project. Queensland's regional hazard prioritisation for flooding ranks the Mackay, Isaac and Whitsunday region as "3" (i.e. on a scale of 1-10, where 1 is the highest hazard ranking and 10 is the lowest hazard ranking) (QFES, 2023).
Coastal hazards		There are no coastal hazards applicable to the Project.
Earthquakes		There have been nine recorded earthquakes occurrence in the last 144 years in the Bowen Basin region, ranging from 1.2 to 4.5 in magnitude. Thus, there is a 6.25% probability of occurrence in any one year (Geoscience, 2019). QFES (2024) states that Queensland has overall, the lowest forecast earthquake hazard in Australia. This is due to the difference in the crustal regime in Queensland in comparison to other areas in Australia, such as Western Australia. The highest hazard areas in Queensland are in the Far North given the higher ground shaking that is associated with active-plate boundary events in the Banda Sea and New Guinea region. QFES (2024) describes for Moranbah the average return period and magnitude for a worst-case scenario (i.e. 1 in 9,500 year ARI for a 5.1 magnitude earthquake) and for a most likely scenario (i.e. 1 in 59,000 year ARI for a 5.7 magnitude earthquake). Magnitudes equivalent to Queensland's largest recorded earthquake (5.9 – 6.05, in 1918) are assessed to have an annual probability of 1 in 100,000 years. Earthquakes are low probability events and the probability of occurrence of these credible scenarios is low (QFES, 2024). Queensland's regional hazard prioritisation for earthquakes ranks the Mackay, Isaac and Whitsunday region as "8" (i.e. on a scale of 1-10, where 1 is the highest hazard ranking and 10 is the lowest hazard ranking) (QFES, 2023).
Tropical cyclone		Queensland Future Climate's¹ current and future cyclone hazard profile for the township of Moranbah (the Project's nearest regional centre) predicts a 1 in 50 year ARI for a Category 1 Cyclone with gusts to 31.6 m/s, predicts a 1 in 100 year ARI for a Category 2 Cyclone with gusts to 40.0 m/s, predicts a 1 in 500 year ARI for a Category 3 Cyclone with gusts to 55.3 m/s (worst case), predicts a 1 in 5,000 year ARI for a Category 4 Cyclone with gusts to 77.4 m/s (worst case) and predicts a 1 in 10,000 year ARI for a Category 5 Cyclone with gusts to 92.1 m/s. Moranbah, located inland in Queensland, experiences cyclones less frequently than coastal areas, but it can still be affected by the impacts of cyclones that make landfall further north or east.
Storms		Queensland's regional hazard prioritisation for severe thunderstorms ranks the Mackay, Isaac and Whitsunday region as "4" (i.e. on a scale of 1-10, where 1 is the highest hazard ranking and 10 is the lowest hazard ranking) (QFES, 2023). The Project area and surrounds has an average of 15 annual thunder days (Kuleshov et al, 2002).

¹ <https://www.longpaddock.qld.gov.au/qld-future-climate/tropical-cyclone/information/>

External Factor	Exposure and Relevance
Heatwaves	Over the life of the Project, there is expected to be an increase in heatwave frequency and heatwave duration, including hot days (>35°C) and hot nights (>20°C). Heatwave conditions possess direct impacts (e.g. health impacts) and indirect impacts (e.g. stress on electricity networks, emergency services, hospitals and transport infrastructure) (QFES, 2019).
Bushfire	The Project area and surrounds contains small areas mapped as a medium bushfire intensity risk. Grassland fires frequently occur after periods of rainfall which result in abundant growth that dries out in hot weather. Bushfires tend to occur when light and heavy fuel loads in Eucalypt forests have dried out, usually following periods of low rainfall. The Project's higher-risk bushfire season typically spans from July to December, occasionally extending into February, but bushfires can occur at any time of year². The specific timing and intensity can vary based on local conditions like vegetation, climate patterns, and weather events. Queensland's regional hazard prioritisation for bushfires ranks the Mackay, Isaac and Whitsunday region as "2" (i.e. on a scale of 1-10, where 1 is the highest hazard ranking and 10 is the lowest hazard ranking) (QFES, 2023).
Spontaneous combustion	Open cut mining produces carbonaceous waste material, which when exposed to air, is subject to low-temperature oxidation and, in some cases, spontaneous combustion. Factors that influence spontaneous combustion are the physical properties of the carbonaceous waste material (e.g. coal rank, moisture content, volatile matter, sulphur content) and environmental conditions (e.g. air pressure, relative humidity, wind speed, solar radiation).
Other External Factors	
Plane crash	The Project site is not within mapped airport environs.
Vehicle crash	Road usage is described in Section 19.6.1.
Sabotage / vandalism	There is potential for sabotage or vandalism from external sources. However, the Project's location limits access by potential saboteurs or vandals.
Wildlife and Disease	There are a number of wildlife species that are potentially dangerous to humans in the Project area, including dingoes, rats, pigs and various venomous snakes. Increasing potential freshwater breeding sites such as receding flood waters and pooling water can result in larger numbers of mosquitoes, which in turn increases the potential for outbreaks of mosquito-borne diseases. Notifiable diseases reported in Queensland include Barmah forest virus, Ross River virus, dengue fever and malaria. The Project area (i.e. Moranbah and surrounds) is not within an active dengue fever location³. However, the mosquitoes that transmit dengue fever may be present. The risk of other notifiable mosquito-borne diseases in the Project area is considered to be a low.

19.6.6 Changing Future Climate Hazards

Hazards associated with extremes of climate are described in **Chapter 6**, including temperature extremes, rainfall variability, tropical cyclones and bushfire risk. The potential impacts of climate change on the Project area are temperature increases, generally declining rainfall and increased evapotranspiration. It is possible that the frequency and intensity of storms and cyclones may increase and impact the Project. However, these are expected to be within the natural variation of extremes of climate. Risks associated with climate change are described in **Chapter 6**.

² <https://www.detsi.qld.gov.au/our-department/news-media/down-to-earth/bushfire-season-in-queensland>

³ <https://www.health.qld.gov.au/clinical-practice/guidelines-procedures/diseases-infection/diseases/mosquito-borne/dengue/virus-fever>

19.6.7 Relevant Risk Management Requirements

Mandatory and recommended risk management requirements which may be applicable to the Project are presented in Table 19-8 Mandatory and Recommended Risk Management Measures Table 19-8. These influence the possible hazard events, causes and ultimate residual risks from the Project as well as provide guidance on the development of risk management measures.

Table 19-8 Mandatory and Recommended Risk Management Measures

Key Elements	Risk Criteria
Stakeholders	
Sensitive receptors	• <i>AS 2436-1981: Guide to Noise Control on Construction, Maintenance and Demolition Sites</i> • <i>Environmental Protection (Noise) Policy 2019</i> • Statutory air quality and noise and vibration limits set by the Project's environmental authority • DNRME Guidelines: QGN22: Management of noise in mines
Construction and operational workforce	• Standards under the CSMH Act: ○ RS2: Control of risk management practices ○ RS8: Conduct of mine emergency exercises ○ RS11: Training in coal mines ○ RS14: Monitoring respirable dust in coal mines • Safe Work Australia publication: Workplace exposure standards for airborne contaminants (2024) • DNRME Guidelines: QGL02: Guideline for management of respirable crystalline silica in Queensland mineral mines and quarries, Version 2 May 2018
Property Risks	
Mine design and facilities layout	• Standards under the CSMH Act: ○ RS19: Design and construction of mine roads ○ RS9: Monitoring of sealed areas ○ RS10: Mine surveying and drafting
Open cut mine – use of mobile equipment	• Standards under the CSMH Act : ○ RS3: Explosion protection of diesel engines ○ RS13: Tyre, wheel and rim management • DNRME Guidelines: ○ QGN26: Electric propulsion systems used in self-powered earth moving machinery ○ QGN27: Collision prevention ○ QGN02: Isolation of plant

Key Elements	Risk Criteria
Open cut mine – use of explosives and explosive storage.	- Explosives Act - AS2187 - Australian Explosives Manufacturer Safety Committee (AEMSC) Code of Practice - DNRME Guideline: QGN10: Handling explosives (surface and quarry) - AS/NZS 2290.1:2014 <i>Electrical equipment for coal mines - Introduction, inspection and maintenance for hazardous areas</i> - QGN20: Management of oxides of nitrogen in open cut blasting - Dow’s Fire and Explosion Index Hazard Classification Guide
Chemical storage and use of toxic and flammable chemicals	- Standards under the CSMH Act: - RS17: Hazardous chemicals - State Planning Policy— state interest guideline, emissions and hazardous activities April 2016 - AS/NZS 2290.3:2018 <i>Electrical equipment for coal mines - Introduction, inspection and maintenance Gas detecting and monitoring equipment</i> - AS1940 - AS/NZS 4452:1997 <i>The Storage and Handling of Toxic Substances</i> - Safety Data Sheets for each hazardous chemical - DNRME Guideline QGL03 Guideline for hazardous chemicals - Safe Work Australia’s Code of practice: Managing risks of hazardous chemicals in the workplace
External Factors	
Natural hazards	- State Planning Policy Guidance for Natural Hazards, Risk and Resilience (Bushfire) (DSDMIP, 2019) “Bushfire Resilient Communities” Technical Guidelines (QFES, 2019) - Queensland Health Guidelines to minimise mosquito and biting midge problems in development areas (QH, 2002) - Queensland Bushfire Plan (QFES, 2020) - Queensland State Heatwave Risk Assessment 2019 (QFES, 2019) - Queensland 2023 State Disaster – Risk Report: Executive Summary (QFES, 2023) - Issac Regional Council’s Disaster and Emergency Management⁴

19.7 Preliminary Hazards Identification

Hazard identification, cause, potential consequences and risk treatment measures are described in Table 19-9. The hazard identification process identifies the non-routine hazards associated with the construction (C), operation (O) and decommissioning (D) of the mine and associated infrastructure taking

⁴ <https://www.isaac.qld.gov.au/Community/Disaster-and-Emergency-Preparedness/Disaster-and-Emergency-Management>

into account the Project description, natural hazards and estimated hazardous substances being stored and used on site.

Transport risks and potential interactions with other resource projects are also identified. Potential health and safety hazards to the site workers from routine operations are not included as these have been previously identified and can be addressed by compliance with relevant standards and regulations.

Currently, no operating petroleum or gas pipelines are located within the Project site or the nearby surrounding area. If required, future interactions with proposed gas pipelines overlapping or in the vicinity of the Project area will be managed in accordance with Queensland's relevant legislation.

No abandoned mines are located within the Project site or the nearby surrounding area.

Table 19-9 Hazard Identification

Activity / (Phase)	Phase (C,O,D)	Hazard	Cause / Initiating Event	Potential Consequences	Risk Control Measures
Transport					
Transporting personnel, equipment and materials to and from the site and within site	C,O,D	Vehicle accident	• Driver error • Fatigue • Road conditions • Vehicle collision	• Injury to site worker / public • Fatality to site worker / public • Property damage	IPC - SHMS: 'Fitness for Work' standard operating procedure (SOP) applies to all workers, including travelling to and from worker accommodation village, and will contain details of the measures to manage fatigue for shift rosters and for periods pre and post shifts. IPC - SHMS: 'Fitness for Work' SOP requires a Journey Management Plan for drive-in-drive-out workers and a Fatigue Management Plan for all workers. Monitoring of workforce hours and driver behaviours. Use of bus transport between accommodation village and site, thereby reducing number of vehicles on the Peak Downs Highway and other local roads. No interaction between mine vehicles on haul road and traffic on Peak Downs Highway, as all mine vehicles will use the existing underpass beneath the Highway (i.e. for coal haulage from the Project to IPM's CHPP). On-site roads are constructed based on the IPC – SHMS: 'Risk assessment process for the design and construction specifications for mine roads'.

Activity / (Phase)	Phase (C,O,D)	Hazard	Cause / Initiating Event	Potential Consequences	Risk Control Measures
					IPC - SHMS: 'Vehicle Interactions – Principal Hazard Management Plan' provides the minimum requirements to control and minimise the risks associated with vehicle interaction. IPC - SHMS: 'Training and Assessment' supports safe and competent work practices. IPC - SHMS: 'Induction and Familiarisation' details general site requirements. IPC - SHMS: 'Emergency Response Plan' outlines the requirements for the management of an emergency.
	C,O,D	Vehicle accident – existing access road with Peak Downs Highway	- Driver error - Lack of familiarity with intersection	- Injury to site worker / public - Fatality to site worker / public - Property damage	The access intersection with Peak Downs Highway is designed in accordance with Austroads and TMR Guidelines (refer to Chapter 18). The Project will not result in a material change in the frequency of use of the intersection. Access road maintenance schedule. IPC - SHMS: 'Induction and Familiarisation' details general site requirements. IPC - SHMS: 'Emergency Response Plan' outlines the requirements for the management of an emergency.
Transport of hazardous and dangerous materials <i>(IDM's exiting facilities will continue to manage hazardous)</i>	C,O,D	Fire Spill, leak Fumes	- Driver error - Vehicle collision	- Property damage - Injury / fatality to site worker	Transportation of hazardous and dangerous goods is to comply with requirements of Australian Dangerous Goods Code.

Activity / (Phase)	Phase (C,O,D)	Hazard	Cause / Initiating Event	Potential Consequences	Risk Control Measures
<i>and dangerous materials. As required, hazardous and dangerous materials will be transported to the Project site.)</i>			- Failure of equipment - Failure to comply with procedures	- Injury / fatality to public - Health impacts from contamination (soil, water, groundwater)	Undertaken by licensed transport company and vehicle. Comply with Explosives Act and AS 2187 requirements. IPC - SHMS: 'Transporting Explosives' SoP sets the sets guidelines for the transportation of explosives. IPC - SHMS: 'Manufacturing, Storing, Transporting and Delivering Explosives' SoP sets the guidelines for manufacturing, storing, transporting, and delivering explosives. IPC - SHMS: 'Training and Assessment' supports safe and competent work practices. IPC - SHMS: 'Hazardous Substances' SoP outlines the requirements for the management of hazardous substances. IPC - SHMS: 'Action to be taken when a Fire is Discovered' SoP outlines the requirements for the management of an unplanned fire. IPC - SHMS: 'Emergency Response Plan' outlines the requirements for the management of an emergency.
Hydrocarbon Storage					
Storage of fuel and oils	C,O,D	Spill, leak	Failure of equipment	Property damage	Fuel storage designed and operated in accordance with AS1940.

Activity / (Phase)	Phase (C,O,D)	Hazard	Cause / Initiating Event	Potential Consequences	Risk Control Measures
<i>(For operational efficiency purposes, diesel, oils and lubricants will be stored in self-bunded tanks within the Project’s go-line area. Diesel, fuel and oils will also be stored at the IDM MIA.)</i>			Failure to comply with procedures	Health impacts from contamination (soil, water, groundwater)	IPC - SHMS: ‘Environmental Management Plan – Appendix H ECP Chemicals and Fuel Management’ provides the framework for the safe management of dangerous goods and hazardous substances (storage and use). IPC - SHMS: ‘Hazardous Substances’ SoP outlines the requirements for the management of hazardous substances. IPC - SHMS: ‘Training and Assessment’ supports safe and competent work practices. IPC - SHMS: ‘Action to be taken when a Fire is Discovered’ SoP outlines the requirements for the management of an unplanned fire. IPC - SHMS: ‘Emergency Response Plan’ outlines the requirements for the management of an emergency. Mandatory requirements of the Code of practice: Managing risks of hazardous chemicals in the workplace implemented.
	C,O,D	Fire, explosion	- Ignition source or fire - Failure of equipment - Failure to comply with procedures	- Injury to site worker - Fatality to site worker - Property damage	
Construction and Installation					
Clearing and earthworks	C	Erosion	- Heavy rainfall - Failure to comply with erosion and sediment control plan	Property damage	Implementation of an approved erosion and sediment control plan. Implementation of an approved surface water management plan. Implementation of an approved progressive rehabilitation and closure plan.

Activity / (Phase)	Phase (C,O,D)	Hazard	Cause / Initiating Event	Potential Consequences	Risk Control Measures
	C	Wildlife (e.g. venomous snakes)	Disturbance / clearance of habitat	- Injury to site worker - Fatality to site worker	IPC - SHMS: 'Induction and Familiarisation' details general site requirements. IPC - SHMS: 'Training and Assessment' supports safe and competent work practices. PPE. Employment of a licensed spotter catcher for vegetation clearance. IPC - SHMS: 'Emergency Response Plan' outlines the requirements for the management of an emergency.
Construction and installation of infrastructure (e.g. bridges and go-line facilities)	C	Fire Transport and handling of construction materials	- Works such as welding, grinding in combination with high winds - Equipment failure - Poor work practices	- Fatality to site worker - Injury to site worker - Property damage	IPC - SHMS: 'Training and Assessment' supports safe and competent work practices. IPC – SHMS: 'Monitoring for Workers Exposure to Hazards' SoP sets the guidelines for monitoring workers exposure to mine site hazards. IPC - SHMS: 'Action to be taken when a Fire is Discovered' SoP outlines the requirements for the management of an unplanned fire. IPC - SHMS: 'Safety and Health Management Plan' describe the framework, structure and methodology used to develop, implement and maintain the SHMS. IPC - SHMS: 'Emergency Response Plan' outlines the requirements for the management of an emergency.

Activity / (Phase)	Phase (C,O,D)	Hazard	Cause / Initiating Event	Potential Consequences	Risk Control Measures
Construction of the flood protection levees	C	Flooding during construction Future failure of the levees	- Inundation of flood waters - Improper construction	- Fatality to site worker - Injury to site worker - Property damage	Levees are constructed in compliance with the 'Guideline - Structures which are dams or levees constructed as part of environmentally relevant activities (ESR/2016/1934 Version 9.04)' (DETSI 2024) and the 'Guideline - Manual for assessing consequence categories and hydraulic performance of structures (ESR/2016/1933)' (DETSI 2024). Levees are constructed prior to mining, preferably during the dry season. Construction activities cease if inundation from flood waters is predicted.
Mining Operations					
Topsoil and subsoil stripping, transfer and storage	O	Erosion	- Heavy rainfall - Failure to comply with erosion and sediment control plan	Property damage	Implementation of an approved erosion and sediment control plan. Implementation of an approved surface water management plan. Implementation of an approved progressive rehabilitation and closure plan.
	O	Wildlife (e.g. venomous snakes)	- Disturbance - Clearance of habitat	- Injury to site worker - Fatality to site worker	IPC - SHMS: 'Induction and Familiarisation' details general site requirements. IPC - SHMS: 'Training and Assessment' supports safe and competent work practices. PPE. Employment of a licensed spotter catcher for vegetation clearance.

Activity / (Phase)	Phase (C,O,D)	Hazard	Cause / Initiating Event	Potential Consequences	Risk Control Measures
					IPC - SHMS: 'Emergency Response Plan' outlines the requirements for the management of an emergency.
Hauling coal to IPM's CHPP from the Project's RoM Pad, via the Project's and IPM-IDM's integrated haul roads, and the Isaac River Bridge	O	Vehicle accident	- Driver error - Vehicle collision - Vehicle roll over	- Injury to site worker - Fatality to site worker - Property damage	No interaction between mine vehicles on haul road and traffic on Peak Downs Highway, as all mine vehicles will use the existing underpass beneath the Highway (i.e. for coal haulage from the Project to IPM's CHPP). On-site roads are constructed based on the IPC – SHMS: 'Risk assessment process for the design and construction specifications for mine roads'. IPC - SHMS: 'Fitness for Work' SOP requires a Fatigue Management Plan for all workers. IPC - SHMS: 'Training and Assessment' supports safe and competent work practices. IPC - SHMS: 'Induction and Familiarisation' details general site requirements. IPC - SHMS: 'Emergency Response Plan' outlines the requirements for the management of an emergency. IPC - SHMS: 'Vehicle Interactions – Principal Hazard Management Plan' provides the minimum requirements to control and minimise the risks associated with vehicle interaction. A review will be undertaken to address the dual use of the Isaac River bridge by road trains and heavy vehicles.

Activity / (Phase)	Phase (C,O,D)	Hazard	Cause / Initiating Event	Potential Consequences	Risk Control Measures
	O	Dust	- High winds - Unsealed roads	- Vehicle accident/collision - Property damage	Dust control measures (e.g. haul road watering). IPC - SHMS: 'Environmental Management Plan – Appendix F ECP Air Quality' provides the framework for air quality management in relation to sensitive receptors. IPC - SHMS: 'Dust Management Plan' sets guidelines for managing dust in relation to the CSMH Act and CSMH Regulation.
Overburden removal	O	Landslide in dump area, high wall failure.	- Heavy rainfall - Geotechnical instability	- Injury to site worker - Fatality to site worker - Property damage	Geotechnical stability assessments of dumps and highwall. Seismic exploration to define fault direction and extent across resource area as part of geotechnical assessment. IPC - SHMS: 'Geotechnical – Principal Hazard Management Plan' provides the minimum requirements to control and minimise the risks associated with geotechnical ground and strata conditions. IPC – SHMS: 'Risk assessment process for Spoil Dumps and Excavated Faces' is applied to identify, assess, evaluate, and establish appropriate controls for risks associated with spoil dumps and excavated faces. Mine planning accounts for known geotechnical stability issues based on the assessed risks. IPC – SHMS: 'Monitoring for Workers Exposure to Hazards' SoP sets the guidelines for monitoring workers exposure to mine site hazards.

Activity / (Phase)	Phase (C,O,D)	Hazard	Cause / Initiating Event	Potential Consequences	Risk Control Measures
					Controlled access, including barriers as defined by IPC – SHMS: ‘Safety Barriers Standard’. Stop operations if there are indications of critical instability. Implementation of an approved surface water management plan. IPC - SHMS: ‘Emergency Response Plan’ outlines the requirements for the management of an emergency.
	O	Landslide / end wall failure.	- Heavy rainfall - Isaac River in flood	- Injury to site worker - Fatality to site worker - Property damage	Geotechnical stability assessments of end wall. Seismic exploration to define fault direction and extent across resource area as part of geotechnical assessment. Mine planning accounts for known geotechnical stability issues based on the assessed risks. IPC - SHMS: ‘Geotechnical – Principal Hazard Management Plan’ provides the minimum requirements to control and minimise the risks associated with geotechnical ground and strata conditions. IPC – SHMS: ‘Risk assessment process for Spoil Dumps and Excavated Faces’ is applied to identify, assess, evaluate, and establish appropriate controls for risks associated with spoil dumps and excavated faces. IPC – SHMS: ‘Monitoring for Workers Exposure to Hazards’ SoP sets the guidelines

Activity / (Phase)	Phase (C,O,D)	Hazard	Cause / Initiating Event	Potential Consequences	Risk Control Measures
					for monitoring workers exposure to mine site hazards. Backfill against end wall with in-pit spoil. Cessation of mining activities within pit area, if required. IPC - SHMS: 'Emergency Response Plan' outlines the requirements for the management of an emergency.
	O	Dragline bench failure	- Heavy rainfall - Geotechnical instability	- Injury to site worker - Fatality to site worker - Property damage	Geotechnical stability assessments of dragline bench. Mine planning accounts for known geotechnical stability issues based on the assessed risks. IPC - SHMS: 'Geotechnical – Principal Hazard Management Plan' provides the minimum requirements to control and minimise the risks associated with geotechnical ground and strata conditions. IPC – SHMS: 'Monitoring for Workers Exposure to Hazards' SoP sets the guidelines for monitoring workers exposure to mine site hazards. Regular inspections and communications. Operational controls for water removal from pit floor and dragline bench. IPC - SHMS: 'Emergency Response Plan' outlines the requirements for the management of an emergency.

Activity / (Phase)	Phase (C,O,D)	Hazard	Cause / Initiating Event	Potential Consequences	Risk Control Measures
Levee operations (Isaac River and Cherwell Creek)	O	Levee failure (engineering failure, piping failure)	- Heavy rainfall - Isaac River and Cherwell Creek are in flood	- Injury to site worker - Fatality to site worker - Property damage	Levees are constructed and operated in compliance with the 'Guideline - Structures which are dams or levees constructed as part of environmentally relevant activities (ESR/2016/1934 Version 9.04)' (DETSI 2024) and the 'Guideline - Manual for assessing consequence categories and hydraulic performance of structures (ESR/2016/1933)' (DETSI 2024). Levees are designed, certified, operated and annually inspected as specified by 'Appendix C' of the 'Guideline - Manual for assessing consequence categories and hydraulic performance of structures (ESR/2016/1933)' (DETSI 2024). Levees are designed and constructed to ensure immunity from a Q1,000 flood event. Where possible, the Project activities are located outside the Q1,000 flood, level, or protected by the Q1,000 levee, to significantly reduce the risk of flood inundation. IPC - SHMS: 'Emergency Response Plan' outlines the requirements for the management of an emergency.
ROM coal storage	O	Spontaneous combustion	Stockpiling of ROM coal	- Property damage - Health impacts from contamination (air, soil, water, groundwater)	Regular monitoring of ROM coal stockpile. Response measures including moving or watering stockpiles with signs of combustion.

Activity / (Phase)	Phase (C,O,D)	Hazard	Cause / Initiating Event	Potential Consequences	Risk Control Measures
					Measures include wind protection, stockpile compaction, stockpile height and orientation, and minimising time on ground. If required, a spontaneous combustion management plan will be developed and implemented. IPC – SHMS: ‘Monitoring for Workers Exposure to Hazards’ SoP sets the guidelines for monitoring workers exposure to mine site hazards. IPC - SHMS: ‘Action to be taken when a Fire is Discovered’ SoP outlines the requirements for the management of an unplanned fire. IPC - SHMS: ‘Emergency Response Plan’ outlines the requirements for the management of an emergency.
Explosives use for blasting operations (<i>The Project will use explosives on an as required basis for mining operations. IDM’s explosive storage area will continue to function as the main storage facility.</i>)	O	Blasting results in fly rock	- Incorrect application of blasting procedures - Changing weather events - Unauthorised access to blast exclusion zone	- Property damage - Injury / fatality site worker - Injury / fatality public	Explosive use for blasting is conducted in compliance with accordance with the <i>Explosives Act 1999</i> and codes and standards including AS2187. IPC – SHMS possesses nine specific SoPs for the management of explosives use in compliance with the CSMH Act and CSMH Regulation. A drill and blast plan and procedures are developed and implemented by an appropriately qualified person. The equipment used is fit for purpose.

Activity / (Phase)	Phase (C,O,D)	Hazard	Cause / Initiating Event	Potential Consequences	Risk Control Measures
					Drilling and blasting activities are controlled by an appropriately qualified person. A blast exclusion zone is established and managed for each blast. Landholders are notified before each blast. Site personnel are notified, and signage is erected before each blast. Site access is controlled for each blast. IPC - SHMS: 'Training and Assessment' supports safe and competent work practices. IPC - SHMS: 'Induction and Familiarisation' details general site requirements. IPC – SHMS: 'Monitoring for Workers Exposure to Hazards' SoP sets the guidelines for monitoring workers exposure to mine site hazards. IPC - SHMS: 'Emergency Response Plan' outlines the requirements for the management of an emergency.
	O	Accidental explosion	- Incident at explosives storage - Incorrect storage	- Property damage - Injury / fatality site worker - Injury / fatality public	IDM's explosives storage area (blast magazine) will be separated from the Project's mining activities by >1,000m. IDM's explosives storage area (blast magazine) will continue to be separated from Peak Downs Highway by 5,000m.

Activity / (Phase)	Phase (C,O,D)	Hazard	Cause / Initiating Event	Potential Consequences	Risk Control Measures
					IDM's explosives storage area (blast magazine) will continue to be separated from nearest residence by 5,000m. All explosives stored securely with access controls, in accordance with the Explosives Act and AS2187. Only appropriately qualified personnel will be authorised to store and handle explosives. IPC – SHMS possesses nine specific SoPs for the management of explosives use in compliance with the CSMH Act and CSMH Regulation. IPC - SHMS: 'Emergency Response Plan' outlines the requirements for the management of an emergency.
	O	Excessive vibration and airblast overpressure	Incorrect application of blasting procedures	- Property damage - Injury site worker - Injury public	IPC - SHMS: 'Identifying and Controlling Blast Hazards' SoP sets the guidelines for identifying and controlling blasting hazards. Monitor blast events (as required) to identify issues for management actions. Blasts not in accordance with design parameters will be investigated by an appropriately qualified person and procedures will be modified to ensure compliance. IPC - SHMS: 'Environmental Management Plan – Appendix E ECP Noise and Vibration' provides the framework for noise and

Activity / (Phase)	Phase (C,O,D)	Hazard	Cause / Initiating Event	Potential Consequences	Risk Control Measures
					vibration management in relation to sensitive receptors.
Non-mining Waste Management					
Non-mining waste management – storage, transfer and disposal <i>(The Project’s non-mining waste may also be transferred in small quantities to IDM for management by the existing facilities and contractual waste removal/disposal arrangements for regulated and non-regulated waste.)</i>	C,O	Vermin	Failure to comply with procedures	Health impacts	IPC - SHMS: ‘Environmental Management Plan – Appendix G ECP Waste Management’ provides the framework for safe and efficient waste management. IPC - SHMS: ‘Induction and Familiarisation’ details general site requirements.
		Uncontrolled release	Failure to comply with procedures	Health impacts from contamination (soil, water, groundwater)	Refer to non-mining waste management chapter (Chapter 17) for management measures.
Infrastructure					
Go-line infrastructure	C,O,D	Fire or flooding, release of contaminants	- Failure to comply with procedures - Design failure	- Property damage - Health impacts from contamination - Injury to site worker - Fatality to site worker	Designed and constructed in accordance with relevant standards. Go-line is situated outside the Q1,000 flood zone. IPC - SHMS: ‘Environmental Management Plan – Appendix H ECP Chemicals and Fuel Management’ provides the framework for the safe management of dangerous goods and hazardous substances (storage and use). IPC - SHMS: ‘Action to be taken when a Fire is Discovered’ SoP outlines the requirements for the management of an unplanned fire. IPC - SHMS: ‘Emergency Response Plan’ outlines the requirements for the management of an emergency.

Activity / (Phase)	Phase (C,O,D)	Hazard	Cause / Initiating Event	Potential Consequences	Risk Control Measures
Water management infrastructure	O	Uncontrolled release of mine affected water	- Dam failure - Dam not constructed or operated in accordance with design parameters	- Property damage - Health impacts from contamination	Dam design by an appropriately qualified person. Dam construction to the design parameters. Inspection and maintenance regime, including after extreme rainfall events. Implementation of an approved surface water management plan. Water transfer infrastructure (pipes) to link with IDM's water management structures.
Electrical infrastructure (The Project will link to the IDM's existing electrical infrastructure.)	C,O,D	Electrocution	- Unauthorised use or interference with electrical infrastructure - Electrocution from improper work practices	Injury / fatality public or site worker	Electrical infrastructure will be designed, constructed, operated and decommissioned by appropriately qualified people. Warning signage will be installed along electrical infrastructure. IPC - SHMS: 'Electrical Management Plan' assists the Electrical Engineering Manager in controlling and managing the mine's electrical activities. IPC - SHMS: 'Monitoring for Workers Exposure to Hazards' SoP sets the guidelines for monitoring workers exposure to mine site hazards.
Decommissioning					
Remediation of contaminated land	D	Release (leaching)	Failure to comply with remediation plan	Health impacts from contamination (soil, water, groundwater)	Implementation of an approved progressive rehabilitation and closure plan. All contaminated land will be remediated as prescribed the <i>Environmental Protection Act 1994</i> and the related guidelines.

Activity / (Phase)	Phase (C,O,D)	Hazard	Cause / Initiating Event	Potential Consequences	Risk Control Measures
Removal of infrastructure	D	Fire Transport and handling of deconstructed materials Electrocution	- Works such as welding, grinding in combination with high winds - Equipment failure - Poor work practices	- Fatality to site worker - Injury to site worker	IPC - SHMS: 'Training and Assessment' supports safe and competent work practices. IPC – SHMS: 'Monitoring for Workers Exposure to Hazards' SoP sets the guidelines for monitoring workers exposure to mine site hazards. IPC - SHMS: 'Action to be taken when a Fire is Discovered' SoP outlines the requirements for the management of an unplanned fire. IPC - SHMS: 'Safety and Health Management Plan' describe the framework, structure and methodology used to develop, implement and maintain the SHMS. IPC - SHMS: 'Emergency Response Plan' outlines the requirements for the management of an emergency.
External Factors					
External factors	C,O,D	Sabotage or protest	Security breach	- Injury to public / site worker - Property damage	Security management plan. Site fencing.
	C,O,D	Disease outbreak	Virus, etc	- Illness to public / site worker - Fatality to public / site worker	IPC - SHMS: 'Maintaining Hygienic Work Environment' SoP sets the guidelines for maintaining a hygienic work environment. IPC - SHMS: 'Emergency Response Plan' outlines the requirements for the management of an emergency.

Activity / (Phase)	Phase (C,O,D)	Hazard	Cause / Initiating Event	Potential Consequences	Risk Control Measures
	C,O,D	Vector borne disease (including mosquitoes)	Proliferation of vector borne disease carriers, including mosquitoes	- Illness to public / site worker - Fatality to public / site worker	Mosquito control programs including surveillance, reducing stagnant water and spraying (as required). Mosquito management plan in accordance with Queensland Health Guidelines to minimise mosquito and biting midge problems in development areas (QH 2002)
Unauthorised access to land	C,O,D	Unauthorised entry to land	- Vehicle accident - Coincident with blasting	- Injury to public / site worker - Fatality to public / site worker - Property damage	Access restricted to designated access road. Site access procedures, fencing, gates, security and signage. IPC - SHMS: 'Induction and Familiarisation' details general site requirements.
Interaction with overlapping coal seam gas (CSG) activities	C, O, D	Overlapping resource tenements.	- Vehicle accident - Coincident with blasting	- Injury to public / site worker - Fatality to public / site worker - Property damage	All overlapping coal mining and CSG activities undertaken in accordance with relevant legislation for managing interactions, including if required joint development plans and joint interaction management plans.
Interaction with other mining projects	C, O, D	Unauthorised access on Project mining leases by other operators.	- Vehicle accident - Coincident with blasting	- Injury to public / site worker - Fatality to public / site worker - Property damage	Access restricted to designated access road. Site access procedures, fencing, gates, security and signage. Communication protocols.
Interaction with feral animals, wildlife, cattle	C,O,D	Feral animals, wildlife	Vehicle accident	- Injury to public / site worker - Fatality to public / site worker	Speed limits on internal roads. Fencing to separate landholder grazing areas from the Project area.

Activity / (Phase)	Phase (C,O,D)	Hazard	Cause / Initiating Event	Potential Consequences	Risk Control Measures
				Property damage	
Bushfire	C,O,D	Intense fire with potential to impact people and property	- Cause external to Project (e.g. lightning) - Fire sparked by Project activities	- Injury to public / site worker - Fatality to public / site worker - Property damage	Bushfire management plan. Communication with relevant authorities / agencies. IPC - SHMS: 'Action to be taken when a Fire is Discovered' SoP outlines the requirements for the management of an unplanned fire. IPC - SHMS: 'Emergency Response Plan' outlines the requirements for the management of an emergency. IPC - SHMS: 'Training and Assessment' supports safe and competent work practices. IPC - SHMS: 'Induction and Familiarisation' details general site requirements.
Flood event	C,O,D	Flooding event 1% AEP or greater. Release of contaminants.	Intense rainfall	Property damage	For the protection of mining operations (pit area) and infrastructure, levees are designed and constructed to ensure immunity from a Q1,000 (0.1% AEP) flood event. Where possible, the Project activities are located outside the Q1,000 (0.1% AEP) flood level to significantly reduce the risk of flood inundation. IPC - SHMS: 'Emergency Response Plan' outlines the requirements for the management of an emergency. Implementation of an approved surface water management plan.

Activity / (Phase)	Phase (C,O,D)	Hazard	Cause / Initiating Event	Potential Consequences	Risk Control Measures
					Water transfer infrastructure (pipes) to link with IDM's water management structures.
Cyclone or storm event	C,O,D	Destruction natural event. Release of contaminants.	Intense rainfall and wind	Property damage	IPC - SHMS: Risk assessment process to identify, access, evaluate and establish appropriate controls for risks associated with severe weather events. IPC - SHMS: 'Emergency Response Plan' outlines the requirements for the management of an emergency. Cyclone rated infrastructure. Weather monitoring.
Heatwave	C,O,D	Health impacts Equipment damage	Extended periods of high ambient temperatures	- Injury to public / site worker - Property damage	IPC - SHMS: Risk assessment process to identify, access, evaluate and establish appropriate controls for risks associated with severe weather events. IPC - SHMS: 'Personal Protective Equipment' SOP sets the guidelines for personal protective equipment (e.g. for the purpose of heat stress). IPC - SHMS: 'Fitness for Work' SOP requires a Fatigue Management Plan for all workers. IPC - SHMS: 'Monitoring for Workers Exposure to Hazards' Procedure sets the guidelines for monitoring workers exposure to hazards (e.g. heat stress). Weather monitoring.

19.8 Hazard Analysis and Risk Assessment

This section outlines the risk analysis undertaken in accordance with the method described in Section 19.5 and using the hazard identification table in Section 19.7. The risk analysis takes into account the risk treatment measures included in the hazard identification table on the basis that it is expected that all legal requirements, relevant standards, guidelines and codes of practice will be implemented in the design, construction, operation and decommissioning of the Project. The objective of the risk analysis is to determine whether the residual risks (i.e. risks after proposed mitigations measures) are tolerable and, if they are not, then to propose additional risk treatment measures.

Where the residual risk is determined as high or extreme, these activities are considered for additional risk mitigation.

Tables have been prepared for the following hazards and associated risks:

- Transportation (Table 19-10)
- Hydrocarbon storage (Table 19-11)
- Construction and Installation (Table 19-12)
- Mining Operations (Table 19-13)
- Non-mining waste Management (Table 19-14)
- Infrastructure (Table 19-15)
- Decommissioning (Table 19-16)
- Interaction with External Factors (Table 19-17)

19.8.1 Risk Evaluation - Transport

The risk levels to people and property associated with transportation activities are summarised in Table 19-10. Risk levels were assessed as low to medium depending on the type of hazard. The risk evaluation did identify that the consequence of certain hazards associated with transportation activities possessed the potential to be severe (e.g. fatalities). However, with the application of the risk control measures defined in Table 19-9, in each case the likelihood was evaluated as rare, and therefore, the risk level for these hazards were assessed as medium. No high or extreme risks were identified.

Table 19-10 Hazard Analysis for Transportation

Activity	Phase	Hazard	Potential consequences	Consequence	Likelihood	Risk level
Transporting personnel, equipment and materials to and from the site and within site	C,O,D	Vehicle accident	Injury to public / site worker	3	D	Medium
			Fatality to public / site worker	5	E	Medium
			Property damage	3	E	Medium
	C,O,D	Vehicle accident – Continued use of the access road with Peak Downs Highway	Injury to public / site worker	3	D	Medium
			Fatality to public / site worker	5	E	Medium
			Property damage	3	D	Medium

Activity	Phase	Hazard	Potential consequences	Consequence	Likelihood	Risk level
Transport of hazardous and dangerous materials	O	Fire Spill, leak	Injury to public / site worker	3	E	Medium
			Fatality public / site worker	5	E	Medium
			Health impacts from contamination	2	D	Low
			Property damage	3	E	Medium

19.8.2 Risk Evaluation – Hydrocarbon Storage

The risk levels to people and property associated with hydrocarbon storage activities are summarised in Table 19-11. Risk levels were assessed as low to medium depending on the type of hazard. The risk evaluation did identify that the consequence of certain hazards associated with hydrocarbon storage activities possessed the potential to be severe (e.g. fatalities). However, with the application of the risk control measures defined in Table 19-9, in each case the likelihood was evaluated as rare, and therefore, the risk level for these hazards were assessed as medium. No high or extreme risks were identified.

Table 19-11 Hazard Analysis for Hydrocarbon Storage

Activity	Phase	Hazard	Potential consequences	Consequence	Likelihood	Risk level
Storage of fuel and oils	C,O,D	Spill, leak	Property damage	2	D	Low
			Health impacts from contamination	2	D	Low
	C,O,D	Fire, explosion	Injury to site worker	3	E	Medium
			Fatality site worker	5	E	Medium
			Property damage	2	D	Low

19.8.3 Risk Evaluation – Construction and Installation

The risk levels to people and property associated with construction and installation activities are summarised in Table 19-12. Risk levels were assessed as low to medium depending on the type of hazard. The risk evaluation identified that the consequence of certain hazards associated with construction and installation has the potential to be severe (e.g. fatalities). However, with the application of the risk control measures defined in Table 19-9, in each case the likelihood was evaluated as rare, and therefore, the risk level for these hazards were assessed as medium. No high or extreme risks were identified.

Table 19-12 Hazard Analysis for Construction and Installation

Activity	Phase	Hazard	Potential consequences	Consequence	Likelihood	Risk Level
Clearing and earthworks	C	Erosion	Property damage	2	D	Low
	C	Wildlife (e.g. venomous snakes)	Injury to site worker	3	D	Medium
			Fatality site worker	4	E	Medium
Construction and installation of infrastructure	C	Fire	Injury to site worker	3	D	Medium
			Property damage	2	D	Low
	C	Transport and handling of construction materials	Fatality site worker	4	E	Medium

19.8.4 Risk Evaluation – Mining Operations

The risk levels to people and property associated with mining operations are summarised in Table 19-13. Risk levels were assessed as low to medium depending on the type of hazard. The risk evaluation did identify that the consequence of certain hazards associated with mining operations possessed the potential to be severe (e.g. fatalities). However, with the application of the risk control measures defined in Table 19-9, in each case the likelihood was evaluated as rare, and therefore, the risk level for these hazards were assessed as medium. No high or extreme risks were identified.

Table 19-13 Hazard Analysis for Mining Operations

Activity	Phase	Hazard	Potential consequences	Consequence	Likelihood	Risk level
Topsoil and subsoil stripping, transfer and storage	O	Erosion	Property damage	2	D	Low
		Wildlife (e.g. venomous snakes)	Injury to site worker	3	D	Medium
			Fatality site worker	4	E	Medium
Hauling coal to IPM's CHPP from the Project's RoM Pad, via the Project's and IPM-IDM's integrated haul roads, and the Isaac River Bridge	O	Vehicle accident	Injury to site worker	3	D	Medium
			Fatality to site worker	5	E	Medium
			Property damage	2	C	Medium
	O	Dust	Vehicle accident / collision	3	D	Medium
			Property damage	2	C	Medium

Activity	Phase	Hazard	Potential consequences	Consequence	Likelihood	Risk level
Overburden removal	O	Landslide in dump area, high wall failure	Injury to site worker	3	D	Medium
			Fatality to site worker	5	E	Medium
			Property damage	2	C	Medium
	O	Landslide / end wall failure leading to levee failure	Injury to site worker	3	E	Medium
			Fatality to site worker	5	E	Medium
			Property damage	3	E	Medium
	O	Dragline bench failure	Injury to site worker	3	E	Medium
			Fatality to site worker	5	E	Medium
			Property damage	3	E	Medium
Levee operations	O	Levee failure	Injury to site worker	3	E	Medium
			Fatality to site worker	5	E	Medium
			Property damage	3	E	Medium
ROM coal storage	O	Spontaneous combustion	Property damage	2	C	Medium
			Health impacts from contamination (soil, water, groundwater)	2	D	Low
Explosives	O	Unauthorised access and use	Injury to public / site worker	3	E	Medium
			Fatality public / site worker	5	E	Medium
			Property damage	3	E	Medium
	O	Blasting results in fly rock	Injury to public / site worker	3	D	Medium
			Fatality public / site worker	5	E	Medium
			Property damage	2	E	Low
	O	Accidental explosion	Injury to site worker	3	D	Medium
			Fatality site worker	5	E	Medium
			Property damage	2	E	Low

Activity	Phase	Hazard	Potential consequences	Consequence	Likelihood	Risk level
	O	Excessive vibration and airblast overpressure	Injury to public / site worker	3	E	Medium
			Property damage	2	E	Low

19.8.5 Risk Evaluation – Non-mining Waste Management

The risk levels to people and property associated with non-mining waste management activities are summarised in Table 19-14. Waste management is described in **Chapter 17**. Based on the implementation of the planned risk control measures (Table 19-9), risks associated with waste management were assessed as either low or medium. No high or extreme risks were identified.

Table 19-14 Hazard Analysis for Non-mining Waste Management

Activity	Phase	Hazard	Potential consequences	Consequence	Likelihood	Risk level
Waste management – storage, transfer and disposal	C,O	Vermin	Health impacts	1	E	Low
		Uncontrolled release	Health impacts from contamination (soil, water, groundwater)	2	C	Medium

19.8.6 Risk Evaluation – Infrastructure

The risk levels to people and property associated with the construction, operation and decommissioning of infrastructure are summarised in Table 19-15. Risk levels were assessed as low to medium depending on the type of hazard. The risk evaluation did identify that the consequence of certain hazards associated with the construction, operation and decommissioning of infrastructure possessed the potential to be severe (e.g. fatalities). However, with the application of the risk control measures defined in Table 19-9, in each case the likelihood was evaluated as rare, and therefore, the risk level for these hazards were assessed as medium. No high or extreme risks were identified.

Table 19-15 Hazard Analysis for Infrastructure

Activity	Phase	Hazard	Potential consequences	Consequence	Likelihood	Risk level
Go-line infrastructure	C,O	Fire, flood and / or release of contaminants	Injury to site worker	3	E	Medium
			Fatality to site worker	5	E	Medium
			Property damage	2	C	Medium
			Health impacts from contamination	2	D	Low
	C,O		Property damage	2	D	Low

Activity	Phase	Hazard	Potential consequences	Consequence	Likelihood	Risk level
Water management infrastructure		Uncontrolled Release of mine affected water	Health impacts from contamination	2	D	Low
Electrical Infrastructure	C,O,D	Electrocution from unauthorised access	Fatality to public	4	E	Medium
		Electrocution from improper work practices	Fatality to site worker	4	E	Medium

19.8.7 Risk Evaluation – Decommissioning

The risk levels to people and property associated with decommissioning activities are summarised in Table 19-16. Risk levels were assessed as low to medium depending on the type of hazard. The risk evaluation did identify that the consequence of certain hazards associated with decommissioning possessed the potential to be severe (e.g. fatalities). However, with the application of the risk control measures defined in Table 19-9, in each case the likelihood was evaluated as rare, and therefore, the risk level for these hazards were assessed as medium. No high or extreme risks were identified.

Table 19-16 Hazard Analysis for Decommissioning

Activity	Phase	Hazard	Potential consequences	Consequence	Likelihood	Risk level
Remediation of contaminated land	D	Release (leaching)	Health impacts from contamination (soil, water, groundwater)	2	D	Low
Removal of infrastructure	D	Fire Transport and handling of deconstructed materials	Injury to site worker	3	E	Medium
			Fatality to site worker	5	E	Medium

19.8.8 Risk Evaluation – Interaction with External Factors

The risk levels to people and property associated with external factors are summarised in Table 19-17. Risk levels were assessed as low to medium depending on the type of hazard. The risk evaluation did identify that the consequence of certain hazards associated with external factors possessed the potential to be severe (e.g. fatalities). However, with the application of the risk control measures defined in Table 19-2Table 19-9, in each case the likelihood was evaluated as rare, and therefore, the risk level for these hazards were assessed as medium. No high or extreme risks were identified.

Table 19-17 Hazard Analysis for Interactions with External Factors

Activity	Phase	Hazard	Potential consequences	Consequence	Likelihood	Risk level
External factors	C,O,D	Sabotage Protest	Injury to public / site worker	3	E	Medium
			Property damage	3	E	Medium
	C,O,D	Disease outbreak	Illness to public / site worker	3	E	Medium
			Fatality to public / site worker	5	E	Medium
	C,O,D	Vector borne disease (including mosquitoes)	Illness to public / site worker	3	E	Medium
			Fatality to public / site worker	4	E	Medium
Unauthorised access to land	C,O,D	Unauthorised entry to land	Injury to public / site worker	3	D	Medium
			Fatality to public / site worker	4	E	Medium
			Property damage	2	D	Low
Interaction with overlapping coal seam gas (CSG) activities	C,O,D	Overlapping resource tenements	Injury to public / site worker	3	D	Medium
			Fatality to public / site worker	4	E	Medium
			Property damage	2	D	Low
Interaction with other mining projects	C,O,D	Unauthorised access on Project mining leases by other operators	Injury to public / site worker	3	D	Medium
			Fatality to public / site worker	4	E	Medium
			Property damage	2	D	Low
Interaction feral animals, wildlife and cattle	C,O,D	Cattle, livestock, wildlife	Injury to public / site worker	3	D	Medium
			Fatality to public / site worker	4	E	Medium
			Property damage	1	D	Low
Bushfire	C,O,D	Bushfire	Injury to public / site worker	3	D	Medium
			Fatality to public / site worker	5	E	Medium
			Property damage	3	D	Medium
Flood event	C,O,D	Flood event	Property damage	3	D	Medium
Cyclone or storm event	C,O,D	Cyclone or storm event	Property damage	3	D	Medium

Activity	Phase	Hazard	Potential consequences	Consequence	Likelihood	Risk level
Heatwave	C,O,D	Extended periods of high ambient temperatures	Injury to public / site worker	2	C	Medium
			Property damage	2	C	Medium

19.8.9 Risk Evaluation – Summary

The hazard and safety risk assessment demonstrates that the residual risks over the life of the Project are low or medium, and therefore, are considered acceptable from a health and safety perspective for people and property. The risk management measure for the Project's activities provided in Table 19-9 are comprehensive and in many cases are compulsory compliance requirements under the CSMH Act and CSMH Regulation. The IPC - SHMS will provide the framework for the identification, evaluation and management of potential hazards and risks over the life of the Project. An ERP for the Project is provided in **Appendix AJ**.

Based on the full implementation of the risk management measures, IPC - SHMS and ERP, it is expected that the objectives and performance outcomes for the Project's hazards and safety, as described in Section 19.3.2, will be achieved.

19.9 Risk Management

19.9.1 Risk Management

The potential risks over the construction, operational and decommissioning phases of the Project will be managed by the IPC - SHMS in compliance with the CSMH Act and CSMH Regulation. The performance of the IPC- SHMS will continue to be evaluated by the proponent and regulated by Resources Safety & Health Queensland (RSHQ), as the independent regulator responsible for overseeing safety and health in Queensland's coal mining industry.

The proponent will undertake a detailed assessment of the Project's hazards and risks in accordance with the IPC - SHMS, and if required, will develop new SoPs, safety management plans, safety inspection regimes, safe work instructions and/or safety standards for inclusion and implementation to ensure the continued protection of people and property. Over the life of the Project, the IPC – SHMS will also ensure job safety and environmental analyses will be undertaken prior to the commencement of any activity or in the event of a change to the work environment.

The preliminary risk assessment in this chapter did not consider environmental impacts as they are assessed in other sections of the EIS. Routine operational health and safety risks have been identified and will be managed in accordance with the applicable legislation, standards and codes of practice.

19.9.2 Project Site Layout

As described in Section 19.2, the Project will utilise IPC's existing infrastructure for coal processing, machinery maintenance, hydrocarbon storage, explosive storage, administration, water supply and access. The safety aspects of these activities will continue to be managed by the IPC -SHMS. The Project's continued use of IPC's existing infrastructure provides safety, economic and environmental benefits.

The location of the Project's new infrastructure is detailed in **Chapter 4** and has largely been dictated by the mine plan, which is designed to allow the most safe and efficient extraction of the coal resource. Where possible, the location of mining infrastructure has been selected to minimise environmental

impacts. The alignment of the Isaac River Bridge is based on engineering considerations and the supporting linkages with IDM.

To minimise flooding risks from the Isaac River and Cherwell Creek, the Project's infrastructure will either be located outside the Q1,000 flood event level or will be protected to the same flood immunity by the planned levees along the Isaac River and Cherwell Creek. No mining activities will be allowed within the Project's flood risk zones until the levees are constructed and certified for operation as specified by 'Appendix C' of the 'Guideline - Manual for assessing consequence categories and hydraulic performance of structures (ESR/2016/1933)' (DETSI 2024).

If possible, construction of the Project's infrastructure within the Isaac River and Cherwell Creek flood zones will occur during the dry season. If not possible, construction activities will be carefully planned, take into account potential flood risks, and possess evacuation procedures based on weather and flood monitoring.

19.9.3 Construction Phase

The health and safety requirements of the Project's construction phase will be managed in accordance with the IPC – SHMS; *ISO 45001:2018 Occupational health and safety management systems – Requirements with guidance for use*; and all applicable legislation, standards and codes of practice.

The health and safety requirements of the Project's construction phase will focus on hazards related to both site operations and potential off-site impacts, and as a minimum, will cover the following:

- Familiarisation with past and proposed construction operations and a review of construction and commissioning programs and plans.
- A safety review of all construction activities including the identification and analysis of hazards and risks and the implementation of appropriate construction risk control measures.
- A safety assurance including verification that the design or planning intent is maintained throughout the construction period via safety management systems and pre-commissioning checks.
- The incorporation of change management procedures during construction.

19.9.4 Operational Phase

The health and safety requirements of the Project's operational phase will be managed in accordance with the IPC - SHMS; *ISO 45001:2018 Occupational health and safety management systems – Requirements with guidance for use*; and all applicable legislation, standards and codes of practice.

The IPC - SHMS will continue to apply the risk management principles of ISO 31000 to identify hazards, assess risks and develop suitable risk control measures for the operational phase of the Project.

The IPC - SHMS possesses an extensive range of SoPs, safety management plans, risk assessment guidance, safety inspection regimes, safe work instructions and safety standards that have been specifically developed in compliance with the CSMH Act and CSMH Regulation to ensure the operational phase of the Project protects people and property.

Under the IPC - SHMS, hazards, risks and risk control measures identified during the Project's risk assessment processes will be documented in a risk register. The Project's risk register will be updated prior to the introduction of new plant or equipment; if a change in operations, conditions or plant occurs; after an incident; and at least annually as part of a review process.

If a Project risk is identified as high or extreme, additional risk control measures will be developed, assessed and implemented to ensure that risks are made ALARP. Under these circumstances, the IPC - SHMS may require updating through the addition of new or the modification of existing SoPs, safety management plans, risk assessment guidance, safety inspection regimes, safe work instructions and safety standards.

The IPC - SHMS will effectively manage the Project hazards identified in Table 19-9 and any new hazards identified over the life of the Project by the processes and circumstances previously advised in this chapter.

The effectiveness and compliance of the IPC - SHMS over the Project's life will continue to be verified by regular internal safety audits and external compliance inspections/audits by RSHQ.

19.9.5 Risk Management - Natural Hazards

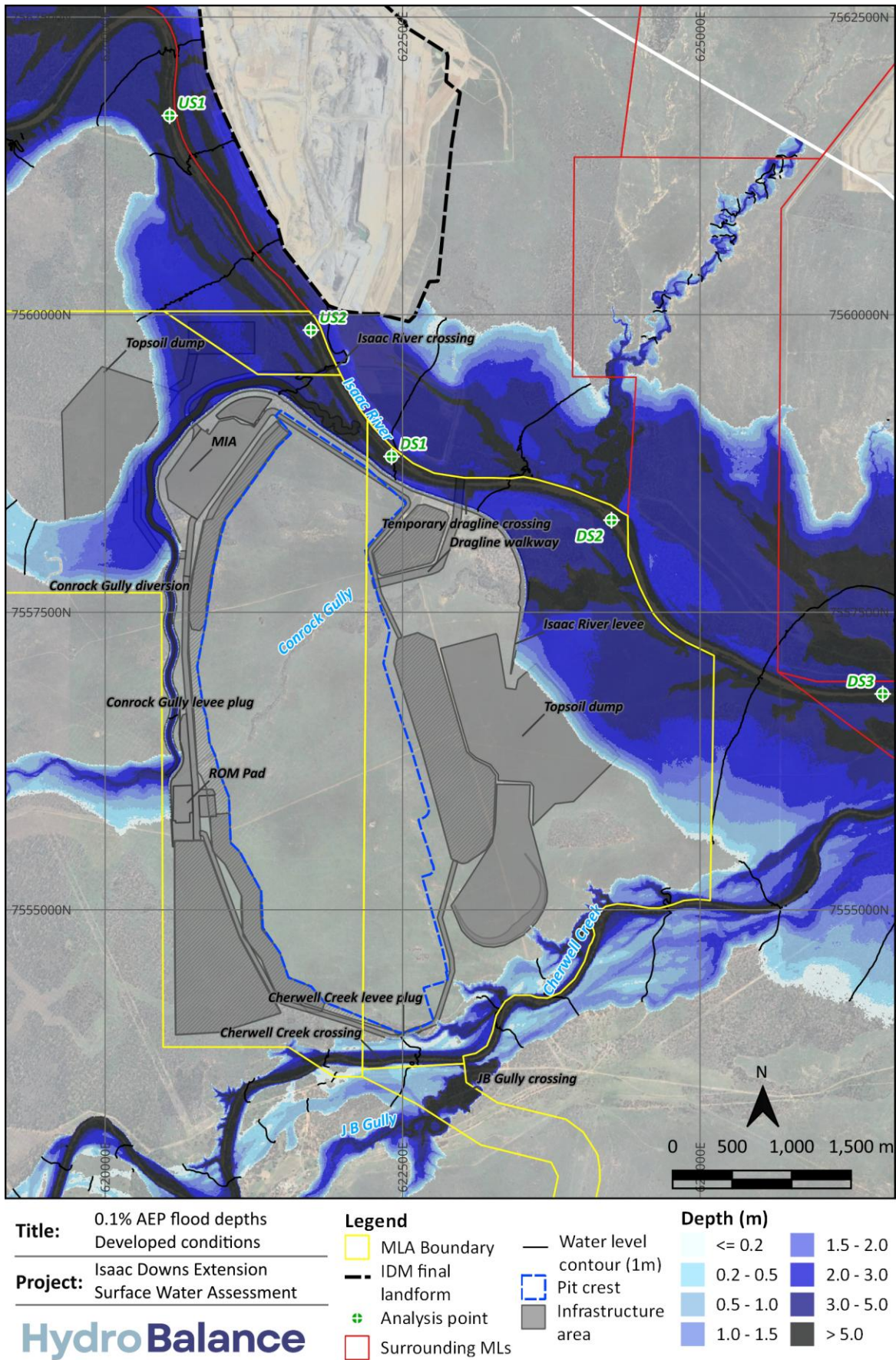
19.9.5.1 Flooding

Chapter 9 describes the potential for flooding of the Project area from the Isaac River (and its local tributaries) for various annual exceedance probability (AEP) rainfall events and the location.

To manage the risk of flooding, where possible, the Project's permanent infrastructure will be located outside the Q1,000 flood limit, and flood levees designed for a Q1,000 flood event will be constructed along the Isaac River and Cherwell Creek to protect the Project's mining activities (operational phase) and infrastructure. Figure 19-2 provides the Q1,000 flood limit in relation to the Project's permanent infrastructure. The flood levees will be constructed prior to the commencement of mining within the existing Q1,000 flood limit. **Chapter 4** presents the location of the Project's flood levees.

During the life of the Project, the level of the Isaac River will be monitored during periods of high rainfall, using real time information from flow and/or level gauges. During the Project's construction phase, if there is a risk of flood inundation, construction activities will cease and equipment will be relocated to 'high ground'.

During the Project's construction phase, if the Isaac River's flood level interacts with the levees, the hazard of levee failure and/or over-topping will be assessed, and if required, workers and equipment from the Project's construction and mining area within the existing Q1,000 flood limit may be evacuated as a precautionary (risk control) measure.



19.9.5.2 Bushfires

A bushfire management plan (BMP), addressing the construction, operational and decommissioning phases of the Project, forms a component of the Project's ERP provided in **Appendix AJ**. The Project's BMP includes:

- a bushfire hazard analysis
- mitigation strategies to align with the development outcomes in Part E of the State Planning Policy July 2017 – Natural Hazards, Risk and Resilience – bushfire (DSDMIP 2019a)
- details of the proposed ongoing management of fuel loads across the Project area through various means, including any asset protection zone(s) proposed to protect the Project's infrastructure.

Over the life of the Project, the BMP and any subsequent updates of the plan will be submitted to Queensland Fire and Emergency Services' nominated contact.

19.9.5.3 Vector-borne Disease

While the potential for the Project to result in the spread of mosquito-borne disease is low, a mosquito management plan (MMP) is included as a component of the Project's ERP provided in **Appendix AJ**. The Project's MMP was developed in accordance with the Queensland Health Guidelines to minimise mosquito and biting midge problems in development areas (QH 2002).

As specified in the Queensland Health Guidelines to minimise mosquito and biting midge problems in development areas (QH 2002), the most appropriate way to control mosquitoes is to prevent their breeding cycle. It is important to address potential mosquito problems before there is a significant increase in the adult population. Where required, mosquito control programs will integrate a variety of control strategies (i.e. surveillance, reducing stagnant water and spraying).

Any incidence of vector-borne disease will be referred to a doctor, with subsequent notification to Queensland Health. Additional treatment measures may be required if the incidence of disease increases beyond background levels in the general community. It is expected that Queensland Health will provide adequate monitoring of incidence of the known vector-borne diseases, provide public advice on known outbreaks and will implement appropriate programs to control any outbreaks. It is highly unlikely that the Project will result in a significant increase in the incidence of vector-borne disease in the Isaac Regional Council area.

19.9.5.4 Wildlife

Table 19-9 outlines the Project's risk control measures for potential interactions with wildlife. In general, inductions will be conducted to make employees and site visitors aware of wildlife hazards and training will be provided to employees to further minimise the risks associated with wildlife hazards. Mandatory PPE will also provide additional protection in the event of a wildlife incident (e.g. safety boots, long pants).

If first aid is required for an incident involving wildlife, the IPC - SHMS possesses a procedure that ensures adequate facilities, equipment and people trained in first aid skills are available (e.g. suitably trained personnel, adequate on-site facilities, effective transportation to the nearest medical facility).

If an incident occurs involving wildlife, a risk assessment would be conducted consistent with the IPC - SHMS, and as required, applicable hazard and risk control measures would be updated to minimise future risks.

Further details for emergency situations involving wildlife are included in the Project's ERP (**Appendix AJ**).

19.9.5.5 Community Resilience

The Project's interaction with natural hazards has been assessed from a risk identification and management perspective (Section 19.6.5, Table 19-9 and Section 19.8.8). This assessment process did not identify any aspects of the Project's construction, operation and decommissioning that would negatively

affect the local community's resilience to natural hazards. Consequently, no additional risk management measures are required outside what is already currently proposed for the Project.

19.9.6 Risk Management - Site Hazards

19.9.6.1 Explosives

Explosives used over the life of the Project will be managed in accordance with the IPC - SHMS, Explosives Act and AS2187.

Explosive storage for the Project will utilise IDM's blast magazine. This explosive storage facility is secure, possesses adequate security, is located at a safe distance (at least 1 km) from other mine infrastructure and activities, and is 5 km from the Peak Downs Highway and the nearest receptor.

For the Project's explosive use, a blast management plan will be utilised to specify how blasts will be designed and managed, and to ensure the necessary exclusion zone for all people during blasting.

Table 19-9 outlines the Project's risk control measures for explosives use and further details on the Project's safe management of explosives are provided in Section 19.6.4.

19.9.6.2 Fire

An on-site fire response capability will be maintained and supported over the life of the Project in accordance with the IPC - SHMS.

As a minimum, the following fire control measures will be implemented for the Project.

- Preventive measures will be applied to control potential ignition sources.
- Preventive maintenance will be undertaken to minimise the risk of machinery and other fires.
- Specific fire training will be conducted to educate the workforce.
- A competent and experienced team of employees will be available for fire response duties.
- Suitable fire-fighting equipment and facilities will be available on-site and fire-fighting equipment will be maintained by a certified supplier.
- An ERP will include a response for fires and fire-fighting drills will be conducted on a routine basis.

Table 19-9 outlines the Project's risk control measures for fire incidents.

Further details on the management of bushfires and emergency situations involving fire are included in the Project's ERP (**Appendix AJ**).

19.9.6.3 Vehicle Accidents

Table 19-9 details the Project's risk control measures for vehicle accidents. These risk control measures are primarily provided by the IPC - SHMS and focus on fatigue management, fit-for-work standards, the competent and safe operation of mobile equipment, and the provision of a plan to control and minimise the risks associated with vehicle interactions.

The Project's ERP provided in **Appendix AJ** includes emergency management of vehicle accidents.

19.9.7 Risk Management – Climate Change

Climate change has been considered in the development of the control measures for the management of the Project's hazards and risks. Importantly, the IPC - SHMS is a dynamic safety and hazard management system, and as a result, will be able to manage new or changing hazards and risks that may arise from the influence of climate change over the life of the Project. Section 19.9.4 overviews how this adaptive process functions to ensure the Project's hazards and risks will continue to be appropriately managed to protect people and property.

19.10 Safety Commitment

The proponent is committed to the safe operation of the Project by ensuring:

- the identification and control of the Project's hazards and risks to people and property
- hazard and risk management is an integral part of planning over the life of the Project to reduce the hazards and risks to people and property to an acceptable level
- adequate resources are provided for the Project's safety management
- compliance with safety and health legislation, Australian Standards, codes and guidelines.

19.11 Conclusion

Potential hazards and risk to people and property were identified through a preliminary risk assessment for the Project, undertaken in accordance ISO 31000. This hazard identification and risk assessment focused on abnormal hazardous events and conditions that may affect site workers and visitors and near neighbours during normal, on site activities. Compliance with Queensland's coal mining safety and health legislation will manage the identified hazards and risks during the Project's construction, operation and decommissioning.

Potential public health and safety concerns, natural hazards and hazardous substances proposed for Project use were identified, including their likely cause and consequences. The hazard identification process also identified the non-routine hazards associated with Project construction, operation and decommissioning. Climate change factors were considered as part of the evaluation process. Risk treatment and management measures were proposed to mitigate these risks.

The risk assessment for each potential hazard further considered residual risk (i.e. risk after mitigation) with a view to identifying any residual high or extreme risks requiring additional mitigation. The residual risk assessments focussed on:

- transport of people, equipment, materials and fuel
- hydrocarbon storage
- construction and installation
- mining operations, including use of explosives and potential for geotechnical failure of mining areas
- non-mining waste management
- infrastructure areas
- decommissioning
- external factors (e.g. bushfires, flooding).

No high or extreme residual risks were identified. Nevertheless, risk management measures have been proposed, and an emergency management plan has been provided in **Appendix AJ**.

To ensure compliance with Queensland's coal mining safety and health legislation, the Project will operate in accordance with the IPC – SHMS, which is a dynamic and structured safety and hazard management system designed to protect people and property.

In summary, the Project is expected to result in low to medium risks to people and property during its construction, operation and decommissioning, and achieve the Project's objectives and performance outcomes for hazards and safety.

19.12 References

American Institute of Chemical Engineers 1994, 'Dow's Fire & and Explosion Index Hazard Classification Guide (7th Edition)'.

Australian Explosives Manufacturers Safety Committee 1999, 'Code of good practice: precursors for explosives (Edition 1)'.

Coal Mining Safety and Health Act 1999 (Queensland).

Coal Mining Safety and Health Regulation 2017 (Queensland).

Department of Employment, Economic Development and Innovation (DEEDI) 2011, 'Queensland Guidance Note QGN 20 Management of oxides of nitrogen in open cut blasting (Version 3)'.

Department of Energy and Climate (DEC) 2024, 'Climate change in the Mackay, Isaac and Whitsunday region (Version 2)'.

Department of Environment, Tourism, Science and Innovation (DETSI) 2024, 'Guideline - Manual for assessing consequence categories and hydraulic performance of structures (ESR/2016/1933)'.

Department of Environment, Tourism, Science and Innovation (DETSI) 2024, 'Guideline - Structures which are dams or levees constructed as part of environmentally relevant activities (ESR/2016/1934 Version 9.04)'.

Department of Natural Resources and Mines (DNRM) 2008, 'Guidance Note QGN10 Handling Explosives in Surface Mines and Quarries (Version 4)'.

Department of Natural Resources and Mines (DNRM) 2014, 'QGN 22 Guidance Note for Management of Noise in Mines Mining and Quarrying Safety and Health Act 1999 Coal Mining Safety and Health Act 1999 (Version 1)'.

Department of Natural Resources and Mines (DNRM) 2017, 'Guidance Note QGN 26 Electrical propulsion systems used in self-powered earth moving machinery'.

Department of Natural Resources, Mines and Energy (DNRME) 2019, 'QGL03 Guideline for Hazardous Chemicals'.

Department of Natural Resources, Mines and Energy (DNRME) 2019, 'Guidance Note QGN 02 Isolation of plant'.

Department of Natural Resources, Mines and Energy (DNRME) 2020, 'QGL02 Guideline for management of respirable dust in Queensland mineral mines and quarries (Version 3)'.

Department of State Development, Infrastructure, Local Government and Planning (DSDMIP) 2018, 'State Planning Policy – state interest guidance material - Emissions and hazardous activities'.

Department of State Development, Infrastructure, Local Government and Planning (DSDMIP) 2019, 'State Planning Policy Guidance for Natural Hazards, Risk and Resilience (Bushfire)'.

Environmental Protection (Noise) Policy 2019 (Queensland).

Explosives Act 1999 (Queensland).

<https://www.detsi.qld.gov.au/our-department/news-media/down-to-earth/bushfire-season-in-queensland>

<https://www.disaster.qld.gov.au/queensland-emergency-risk-management-framework>

<https://www.health.qld.gov.au/clinical-practice/guidelines-procedures/diseases-infection/diseases/mosquito-borne/dengue/virus-fever>

<https://www.isaac.qld.gov.au/Community/Disaster-and-Emergency-Preparedness/Disaster-and-Emergency-Management>

<https://www.longpaddock.qld.gov.au/qld-future-climate/tropical-cyclone/information/>

<https://www.stateoftheenvironment.detsi.qld.gov.au/climate-change/management-responses/policy-and-programs/state-heatwave-risk-assessment>

National Transport Commission 2024, 'Australian Code for the Transport of Dangerous Goods by Road & Rail (Edition 7.9)'.

Queensland Fire and Emergency Services (QFES) 2019, '“Bushfire Resilient Communities” Technical Guidelines'.

Queensland Fire and Emergency Services (QFES) 2019, 'Queensland State Heatwave Risk Assessment 2019'.

Queensland Fire and Emergency Services (QFES) 2023, 'Queensland 2023 State Disaster – Risk Report: Executive Summary'.

Queensland Fire and Emergency Services (QFES) 2024, 'Queensland Bushfire Plan'.

Queensland Fire and Emergency Services (QFES) 2024, 'Queensland 2024 – State Earthquake Risk Assessment'.

Queensland Health (QH) 2002, 'Guidelines to minimise mosquito and biting midge problems in new development areas'.

Resources Safety & Health Queensland 2024, 'Guidance Note QGN 27 Collision Prevention'.

Safe Work Australia 2023, 'Code of practice: Managing risks of hazardous chemicals in the workplace'.

Safe Work Australia 2024, 'Workplace exposure standards for airborne contaminants (2024)'.

Standards Australian: *AS 1940:2004 The Storage and Handling of Flammable and Combustible Liquids*.

Standards Australian: *AS 2187 Explosives - Storage, Transport and Use*.

Standards Australian: *AS/NZS 2290.1:2014 Electrical equipment for coal mines - Introduction, inspection and maintenance for hazardous areas*.

Standards Australian: *AS/NZS 2290.3:2018 Electrical equipment for coal mines - Introduction, inspection and maintenance Gas detecting and monitoring equipment*.

Standards Australian: *AS 2436-1981: Guide to Noise Control on Construction, Maintenance and Demolition Sites*.

Standards Australian: *AS/NZS 4452:1997 The Storage and Handling of Toxic Substances*.

Standards Australian: *AS/NZS ISO 31000:2009 Risk Management Principles and Guidelines*.

Standards Australian: *'HB 203:2006 Environmental risk management — Principles and process'*.

Standards Australian: *'SA/SNZ HB 205:2017 Handbook: Managing health-and safety-related risk'*.

Work Health and Safety Act 2011 (Queensland).