Central Queensland Coal Project

Chapter 20 – Health and Safety

Supplementary Environmental Impact Statement

CDM Smith

listen. think. deliver.

Central Queensland Coal Project

Chapter 20 – Health and Safety

20 December 2018

CDM Smith Australia Pty Ltd
ABN 88 152 082 936
Level 4, 51 Alfred Street
Fortitude Valley
QLD 4006
Tel: +61 7 3828 6900
Fax: +61 7 3828 6999

Table of Contents

List of Figures

List of Tables

20 Health and Safety

This chapter describes the existing values relating to the community health and safety that may be impacted during the life of the Central Queensland Coal Mine Project. Community health refers to the health status of a defined group of people and the actions and conditions, both private and public (governmental), to promote, protect, and preserve their health (McKenzie et al. 2005). It may also include the community's experience and expectations (Goodman et al. 2014). The focus on protecting community health examines the potential for Project emissions to impact on the physical or mental health of the community (noise, air, water contamination and waste). The examination of community safety also considers increased traffic generation and the import of workers into the community. Impacts encompass both accidental and proposed impacts and where necessary, mitigation and management strategies are identified, to minimise any risk to the community health and safety. Where possible, measures to enhance such values have also been outlined and assessed.

Matters raised in submission to the Environmental Impact Statement (EIS) relating to Chapter 20 – Health and Safety were focused on:

- Emergency planning and response;
- Potable water supply; and
- First Aid and infection control.

The following sections provide additional information in response to these submissions. Appendix A13 includes the full details of all submissions received for the Project.

20.1 Project Overview

Central Queensland Coal Proprietary Limited (Central Queensland Coal) and Fairway Coal Proprietary Limited (Fairway Coal) (the joint Proponents), propose to develop the Central Queensland Coal Mine Project (the Project). As Central Queensland Coal is the senior proponent, Central Queensland Coal is referred to throughout this Supplementary Environmental Impact Statement (SEIS). The Project comprises the Central Queensland Coal Mine where coal mining and processing activities will occur along with a train loadout facility (TLF).

The Project is located 130 km northwest of Rockhampton in the Styx Coal Basin in Central Queensland. The Project is located within the Livingstone Shire Council (LSC) Local Government Area. The Project is generally located on the "Mamelon" property, described as real property Lot 11 on MC23, Lot 10 on MC493 and Lot 9 on MC496. The TLF is located on the "Strathmuir" property, described as real property Lot 9 on MC230. A small section of the haul road to the TLF is located on the "Brussels" property described as real property Lot 85 on SP164785.

The Project will involve mining a maximum combined tonnage of up to 10 million tonnes per annum (Mtpa) of semi-soft coking coal (SSCC) and high grade thermal coal (HGTC). The Project will be located within Mining Lease (ML) 80187 and ML 700022, which are adjacent to Mineral Development Licence (MDL) 468 and Exploration Permit for Coal (EPC) 1029, both of which are held by the Proponent. It is intended that all aspects of the Project will be authorised by a site specific environmental authority (EA).

Development of the Project is expected to commence in 2019 with initial early construction works and extend operationally for approximately 19 years until the depletion of the current reserve, and rehabilitation and mine closure activities are successfully completed.

The Project consists of two open cut operations that will be mined using a truck and shovel methodology. The run-of-mine (ROM) coal will ramp up to approximately 2 Mtpa during Stage 1 (2019 - 2022), where coal will be crushed, screened and washed to SSCC grade with an estimate 80% yield. Stage 2 of the Project (2023 - 2038) will include further processing of up to an additional 4 Mtpa ROM coal within another coal handling and preparation plant (CHPP) to SSCC and up to 4 Mtpa of HGTC with an estimated 95% yield. At full production two CHPPs, one servicing Open Cut 1 and the other servicing Open Cut 2, will be in operation. Rehabilitation works will occur progressively through mine operation, with final rehabilitation and mine closure activities occurring between 2036 to 2038.

A new TLF will be developed to connect into the existing Queensland Rail North Coast Rail Line. This connection will allow the product coal to be transported to the established coal loading infrastructure at the Dalrymple Bay Coal Terminal (DBCT).

Access to the Project will be via the Bruce Highway. The Project will employ a peak workforce of approximately 275 people during construction and between 100 (2019) to 500 (2030) during operation, with the workforce reducing to approximately 20 during decommissioning. Central Queensland Coal will manage the Project construction and ongoing operations with the assistance of contractors.

This SEIS supports the EIS by responding to the submissions that were made during the public notification period regarding the original EIS and identifies the material changes to the Project.

20.2 Relevant Legislation

The key legislative controls for the protection of community health can be found in the *Environmental Protection Act 1994* (EP Act), the *Coal Mining Safety and Health Act 1999* (CMSH Act) and the *Public Health Act 2005*.

20.2.1 Environmental Protection Act 1994

The EP Act specifies general nuisance emissions including aerosols, fumes, light, noise, odour, particles, smoke and contamination that have the potential to create nuisance and health impacts. The subsidiary Environmental Protection Policies (EPPs) for Air, Noise and Water set out criteria to achieve community health and safety for such emissions. Section 9(a) of the EP Act identifies environmental values as 'a quality or physical characteristic of the environment that is conducive to ecological health or public amenity or safety'.

20.2.2 Coal Mining Safety and Health Act 1999

The object of the *Coal Mining Safety and Health Act 1999* (CMSH Act) is to protect the health and safety of people at, or who may be impacted by, a coal mine and to monitor and ensure that the risk of injury or illness is at an acceptable level. Central Queensland Coal is required to comply with the obligations and approvals of the CMSH Act and *Coal Mining Safety and Health Regulation 2001* (CMSH Regulation).

There are a number of coal mining health and safety standards made by the Minister under section 72(1) of the CMHS Act. These standards provide ways of achieving an acceptable standard of risk. Operators can manage risk differently but must be able to show that it is at least equivalent to the recognised standard to discharge their duty of care. The current approved Recognised Standards (RS) relevant to this chapter include:

- RS8: Conduct of Mine Emergency Exercises; and
- RS11: Training in Coal Mines.

20.2.3 Public Health Act 2005

Section 11 of the *Public Health Act 2005* defines 'public health risk'. The definition for public health risks outlines those activities, animals, substances or things that are to be a public health risk for the purposes of the Act and provides for specific public health risks to be prescribed by regulation. Information on assessing public health risks is set out in the guideline *Assessing Public Health Risks* under the Act. Public health risks are categorised as either a 'local government public health risk' or a 'State public health risk'. Generally, local governments are responsible for enforcing all public health risks set out in the Act except those related to lead and paint, which are enforced by Queensland Health. Environmental health officers are the main occupational group with skills and knowledge to be appointed as authorised persons.

20.3 Environmental Objectives and Performance Outcomes

20.3.1 Environmental Objectives

The objective for community health and safety is to construct and operate the Project in a way that protects the public health and amenity and community values of clean air, water, peaceful acoustic environment and safe roads.

20.3.2 Performance Outcomes

Central Queensland Coal's goal for community health and safety is to have no increase of health issues, nor injury or fatality to workers or the community from the construction or operation of the Project. To achieve this goal, the following objectives will be monitored against performance indicators during the construction and operation of the Project:

- To have no discharges of contaminates that may cause an adverse effect on the environment and to have no exceedances of the defined air quality objectives for dust deposition, outside the area of the mining leases and undertake the associated monitoring described in Chapter 12 – Air Quality;
- To have no decline in water quality that would impact on public amenity or public safety because of discharge water quality and flows (accidental or planned) from construction or operations;
- The release of sound to the environment from the activity is managed so that adverse effects on environmental values including health and wellbeing and sensitive ecosystems are prevented or managed;
- No outbreaks of pests because of onsite activities or significant increases in population which cause environmental damage or pose increased health risk (see Chapter 17 – Biosecurity);
- No public road users or mine personnel are injured because of traffic or traffic related impacts from the Project's construction or operation; and
- No incidents of fire or emergency because of onsite operations.

Community health and safety objectives will be monitored and reported against the nominated performance indicators as part of the Safety and Health Management System (SHMS). The performance will be reported into the health and safety committee and undergo management review. If objectives are not being met, an action plan will be put in place to improve performance.

20.4 Study Methodology

Studies undertaken and reported in this EIS were reviewed to identify baseline health and safety values, potential impacts and mitigation measures. Community receptors include consideration of surrounding landholders, downstream water users and community using the same transportation routes. Receptors were identified to assess the significance of public health and safety impacts because of the Project.

Potential impacts of mine affected water discharges, air emissions, noise and odour were identified through the development of the technical assessments in which the individual methodologies have been described in the following EIS chapters: Chapter 7 – Waste Management, Chapter 9 – Surface Water, Chapter 10 – Groundwater, Chapter 12 – Air Quality and Chapter 13 – Noise and Vibration.

Potential impacts to the community's safety from hazardous activities, increased traffic generation and increased workers from outside the community because of the Project are addressed in the following chapters:

- Chapter 6 – Traffic and Transport;
- Chapter 9 – Surface Water;
- Chapter 12 – Air Quality;
- Chapter 13 – Noise and Vibration;
- Chapter 19B – Economic; and
- Chapter 21 – Hazard and Risk.

A review of these chapters was undertaken to identify those which have the potential to impact beyond the mining lease boundaries and on the community public and health values.

20.5 Existing Health and Safety Community Values

The surrounding community is first defined and identified to understand the community health and safety values. Each existing community value and quality of that value has been identified.

20.5.1 Potentially Affected Population

The environment surrounding the Project area is comprised of cattle grazing and mining. The closest townships are:

- Ogmore, approximately 9 km northeast of the Project area;
- Marlborough, approximately 28 km southeast of the Project area;
- St Lawrence, approximately 49 km north of the Project area; and
- Rockhampton approximately 130 km south of the Project area.

A detailed demographic profile of the local area including population sectors that are particularly sensitive to environmental health factors such as children and the elderly is outlined in Chapter 19 – Social and Economic.

A number of sensitive receptors within a 10 km radius of the Project were identified. Areas considered to be a sensitive receptor, for this EIS have been described as a place where members of the community are likely to occupy, including: townships, homesteads, recreational areas, hospitals, libraries, public parks, schools, kindergartens and commercial businesses or workplaces. These receptors include locations where sensitive human health receptors such as young children and the elderly reside.

Several homesteads have been identified as potential sensitive receptors within and immediately surrounding the Project area. The nearest residential receptor (TSC Res 1) is located approximately 2.8 km from the edge of Open Cut 1. Note that the entire township of Ogmore has been counted as one sensitive receptor. The location of the Project in relation to the potential receptors is presented in Table 20-1 and Figure 20-1. Importantly, no hospitals, libraries, schools, or kindergartens are located within 10 km of the site. The nearest commercial business is the Tooloombah Creek Service Station which is located 3.1 km and 5.7 km from mine industrial area (MIA) / CHPP1 and MIA / CHPP2, respectively. The next nearest commercial businesses are in the townships of Ogmore and Marlborough, located approximately 9.2 km and 28 km to the northeast and southeast of the Project respectively. The Tooloombah Creek Recreation Reserve is located 3.7 km and 6.3 km from MIA / CHPP1 and MIA / CHPP2, respectively.

Table 20-1 Sensitive receptors within 10 kilometres

Receptor name	Distance to MIA / CHPP1 (km)	Distance to MIA / CHPP2 (km)
Ogmore Township	10.1	9.2
Oakdean	7.9	6.5
Bowman (uninhabited)	6.2	3.5
Strathmuir	8.8	5.1
Brussels	5.1	3.6
Neerim-1	8.8	7.2
Neerim-2	8.2	7.3
Tooloombah Creek Service Station	3.1	5.7
TSC Res 1	2.8	5.6
TSC Res 2	2.9	5.7
Bar H-1	7.3	6.6

Two additional sensitive receptors BAR H-2 and BAR H-3 were identified in the original EIS. These two receptors have been discarded from the assessment as: BAR H-2 is an unoccupied and dilapidated house that is unliveable and BAR H-3 is a pump hut.

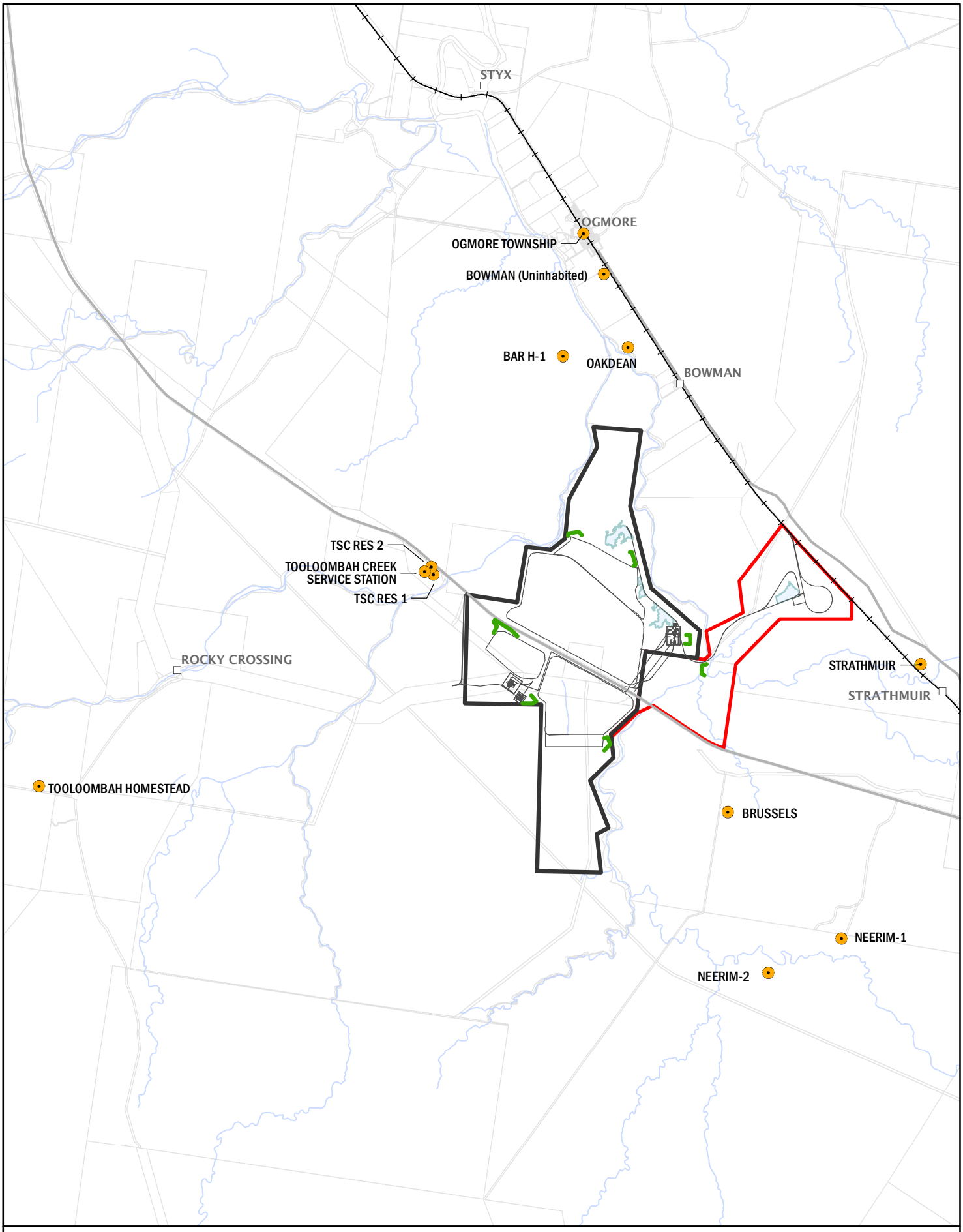
The owner of BAR H-2 has confirmed the house is unoccupied and the owner has no intent to return the former residence to a liveable standard. Should the house be returned to a liveable standard at some time in the future Central Queensland Coal will implement noise monitoring to ascertain any potential exceedances from operations.

20.5.2 Existing Water Users

There are several surface water entitlements in Tooloombah and Deep Creek for irrigation, stock and domestic supply. The entitlements that may be impacted by the Project by being located adjacent to or downstream of operations include the following:

- 119/CP900367- Irrigation entitlement located on parcel of land adjacent to the Mamelon property, separated by Deep Creek, and approximately 3 km downstream of mine infrastructure and environmental dam release point locations on Deep Creek;
- 1/RP616700 – Domestic / stock supply entitlement located on parcel of land adjacent to the Mamelon property and straddling Tooloombah Creek. The extraction point appears to supply a small off-stream storage on the western overbank of Tooloombah Creek, approximately 1 km downstream of the pit dewater dam discharge location; and
- 45/MPH26062 – Irrigation entitlement on parcel of land directly bordering the Project to the north and extracting approximately 6 km downstream of the pit dewater dam proposed discharge location on Tooloombah Creek.

Domestic and stock water users do not need a water licence under the *Water Act 2000*, therefore enquiries will continue to be made to property owners to identify any unregistered use of the water in Deep and Tooloombah Creeks. The Mamelon homestead has one groundwater bore to supply water for their stock and domestic uses; however, the ongoing use of this bore once mining operations commence is still to be decided.



N

0 1 2 km

Scale @ A4 1:110,000
Date: 16/10/18
Drawn: Gayle B.

Legend

- Sensitive receptor
- ML 80187
- ML 700022
- Mine infrastructure
- Environmental Dams
- Cadastral boundary
- Main Road
- North Coast Rail Line
- Watercourse
- Dam

Figure 20-1
Sensitive receptors

DATA SOURCE
Waratah Coal, 2018
QLD Open Source Data, 2018

CDM Smith

PARNWELLJA \\brbsvr1\PRO\Project\1000111 - Styx SEIS Post submission work\7Work\3GIS\DATA\MXD\Chapter 20_Supp_Report Health and Safety\1000111 sensitive receptor__20-1.mxd 16/10/2018

20.5.3 Existing Values

20.5.3.1 Air Quality

Clean air is valued by the community to ensure respiratory health. Excessive air pollutant emissions can cause various respiratory illnesses both short and long term, particularly in sensitive people. The air quality of the surrounding area varies seasonally and often contain dust from agricultural and mining activities, traffic on unsealed roads and naturally occurring wind-blown dust.

Ambient concentrations of air pollutants within the Project area have been established through an air quality monitoring campaign. These ambient concentrations have been used to assess the potential risk of air emissions, in particular microscopic dust emissions, from the Project on the health and wellbeing of local residents. The ambient concentrations of all air pollutants are below the air quality objectives for health and wellbeing as detailed in Schedule 1 of the *Environmental Protection (Air) Policy 2008* (EPP Air), meaning the air quality is relatively good. Given the rural characteristics of the Project area and the distance of the Project from its nearest sensitive receptors, the Project will not result in air emissions that potentially pose health impacts on local residents. Air quality management measures will nevertheless be provided as part of the Project to mitigate any potential risk to as low as reasonably practicable.

There are limited offensive industries in the region with municipal water treatment plants, feedlots, bushfires and minor odour sources from vehicle and farm machinery emissions.

A detailed assessment and discussion of air quality impacts is at Chapter 12 – Air Quality and Appendix A7 - Air Quality and GHG Technical Report.

20.5.3.2 Noise

Noise background levels can impact the wellbeing, comfort and health of the community. Excessive noise can seriously harm health and interfere with daily activities including sleep. Health effects may include stress, reduced immune responses and changes in social behaviour. Low-level noises can be annoying and can cause similar effects as high level noises.

Noise monitoring has been undertaken to quantify the existing ambient noise environment within and surrounding the Project area. The Project is located in a rural area typified by low background noise with the primary sources of noise being wind and animals. The Project area is dissected by the Bruce Highway and is adjacent to the North Coast Rail Line, both of which contribute daily to the ambient noise profile within the Project area. Furthermore, during the summer months insect generated background noise contributes to the ambient noise profile. There are no existing sources of vibration in the Project area. Aside from the intermittent traffic on the Bruce Highway and rail line, noise levels are relatively quiet and within the noise objectives set out in The Model Mining Conditions (MMC), published by the Department of Environment and Science (DES).

Noise modelling was undertaken to predict noise levels from the Project activities. Based on the results of this modelling, noise generation from construction earthworks for the preparation of the mining area and surface infrastructure areas will have the largest potential to impact the existing acoustic environment. This includes activities such as truck movements, blasting, constructing the TLF facility and power generation.

Based on the assessment undertaken at Chapter 13 – Noise and Vibration and Appendix A8 – Noise and Vibration Technical Report and noting, this is based on a combination of mining operations at Open Cut 2 and construction activities associated with the development of Open Cut 1, the day time, night time and evening periods are predicted to exceed the applicable criteria for the L_{Aeq} under

average conditions at TSC Res 1 and TSC Res 2. Exceedances for the day time and evening periods under average climatic conditions occur at the Tooloombah Service Centre and for the night time period only at BAR H-1 and Brussels.

Under worst case climatic conditions exceedances are expected for the day time, evening and night time periods for L_{Aeq} at TSC Res 1 and TSC Res 2, BAR H-1, Brussels and Strathmuir. Daytime and evening exceedances occur at the Tooloombah Service Centre under worst case climatic conditions. Evening and night time period exceedances under worse case climatic conditions occur at Oakdean and night time only at Neerim 1 and Neerim 2.

The day time, night time and evening periods are predicted to exceed the applicable criteria for the L_{A1} under average climatic conditions at TSC Res 1 and TSC Res 2. Exceedances for the night time period under average climatic conditions occur at BAR H-1, Brussels and Oakdean. Exceedances for the day time, evening and night time periods for L_{A1} under worst case climatic conditions occur at BAR H-1, Brussels, Strathmuir and TSC Res 1 and TSC Res 2. Exceedances for the night time and evening periods under worst case climatic conditions occur at Oakdean and night time only at Neerim 1 and Neerim 2. Tooloombah Service Centre is excluded from the night time period assessment as the facility does not open during this period.

Overall, while the noise generated from the Project are considered likely to exceed the Project criteria in certain circumstances, general mitigation measures have been developed to protect the ambient noise environment. Detailed assessment and discussion regarding noise and vibration impacts are at Chapter 13 – Noise and Vibration and Appendix A8 - Noise and Vibration Technical Report.

20.5.3.3 Water Supply

A clean and reliable water supply is essential for public health and safety. The health and safety values associated with water supply in the Project area include farm supply and use, stock water, drinking, recreation and industrial uses. As water represents an exposure pathway for any potential contaminants (hydrocarbons, metals, etc.) and spread of diseases (hepatitis A, parasites, etc.) which may affect community values, potential impacts on water quality and supply need to be managed.

Availability is also a major value of water supply as this region often experiences times of extreme drought

A reliable source of water is required for the construction and operation of the Project. The total water requirement from offsite supplies will vary in relation to water use and the availability of onsite supplies. Water supply options investigated for supplying raw water to the mine have included:

- Onsite capture (mine dewatering and rainfall harvesting);
- External supply; and
- Onsite reuse.

No one option is considered solely suitable for the Project. Water will be sourced using all available options, onsite and offsite water supplies and onsite reuse of water to have the most sustainable outcome available. During construction and the establishment of the external water supply, water will be required to be trucked in and stored onsite.

20.5.3.4 Surface Water

The Project is situated in the Styx River Basin. The primary surface water feature to directly traverse the Project area are Deep Creek and Tooloombah Creek, both of which flow into the Styx River. A number of farm dams of varying size are located within the Project area. No homesteads are located downstream which could be affected by planned or accidental releases from the Project's water storage infrastructure.

The ephemeral watercourses and wetlands (including farm dams) within the Project area and surrounding region are classified as moderately disturbed, and the background water and sediment quality reflects agricultural land use and the underlying geology, which accounts for some existing exceedances in water quality contaminants.

A search was carried out for allocated water entitlements from the downstream catchments associated with the Styx River. The nearest water entitlement is located approximately 1 km directly west of the Project area. It is considered unlikely that any impacts such as changes in stream flows and volumes will occur as the Project area will only extract water under 80% flow conditions, therefore these will likely occur during flood events.

It is noted that surrounding landholders have private water supply sources from both surface water and groundwater supplies, and domestic and stock water use is not required to be registered. There is some evidence of cattle access into Deep and Tooloombah Creeks just downstream of the Styx which suggests stock watering values.

All releases from the Project's dams will be carried out during periods of natural flow in the receiving waters. Furthermore, releases will occur at a rate which allows for the dilution of any potential contaminants within the receiving waters such that water quality guideline concentrations are maintained. A detailed assessment and discussion regarding surface water impacts are at Chapter 9 – Surface Water.

20.5.3.5 Groundwater

Groundwater in the region is primarily used for domestic, irrigation and stock water purposes. Daily extraction rates range from zero to greater than 1,000 litres (L) per day. Hydrostratigraphic units in the Project area include alluvial aquifers associated with major water courses, the coal measures, and weather and unweathered basement rocks. Water quality samples were obtained from a combination of Project specific monitoring bores along with 16 monitoring bores listed on the Groundwater Database – Queensland (GWDBQ) (see Chapter 10 – Groundwater). The groundwater salinity ranges from occasionally fresh to saline, with most of the samples falling into the unpalatable category for drinking water. However, according to the ANZECC and ARMCANZ (2000) guideline values, the groundwater salinity is suitable for most stock watering requirements (17 of 20 samples). Groundwater at the Project site is currently used by the landholder for stock purposes. Detailed assessment and discussion regarding groundwater are at Chapter 10 – Groundwater and Appendix A6 - Groundwater Technical Report.

20.5.3.6 Waste

Significant community value can be generated from waste programs, such as recycling, recovery of resources, food redistribution and other programs which minimise the volume of landfill. In these rural areas, landowners are responsible for the management and disposal of their own waste and any waste associated with their agricultural activities. This is done onsite or through private transportation to one of the local municipal resource recovery centres. The nearest bin station to the Project is located at Ogmore, which receives general household waste (see Chapter 7 – Waste Management). The nearest transfer stations are located at Marlborough which receives general household waste, green waste and metal and the Caves Waste Transfer Station which receives

general household waste, recycling: glass, cardboard, paper, plastics (with recycling symbol, numbers 1-7), aluminium cans and steel cans, oil, green waste. The Stanage Bay Landfill is the nearest landfill to the Project area.

As no accommodation facilities are proposed on site, and portable toilets will be supplied and managed by a licensed contractor, there will be no sewage effluent management required.

20.5.3.7 Transport

Communities value social connectedness, quality of life and road safety. These rural areas have heavily car dependent lifestyles with minimal available public transport. Transport infrastructure to be utilised by the Project includes:

- The existing road network comprising both State and local government controlled roads; and either; and
- Dalrymple Bay Coal Terminal at Mackay or the Wiggins Island or RG Tanna Coal Terminals at Gladstone.

The primary route for site access will be via the Bruce Highway.

There are no known school bus stops along the Bruce Highway near the Central Queensland Coal Mine access road. It is understood that a bus operates from Kooltandra, to the east, to transport students to and from Marlborough State School.

There are no Stock Routes in proximity to the Project area.

There has been a single recorded accident proximate to the Project (but was at a distance greater than 5 km from the Project frontage) in the preceding five-year period, which did not result in a fatality. The incident involved a single vehicle colliding with an object, causing the vehicle to veer off the carriageway. Disobeying road rules, fatigue, drink and drug driving and distraction and inattention are the key contributing factors to accidents. Further details including current road use, pavement loadings and safety statistics are detailed in Chapter 6 – Traffic and Transport and Appendix A4a – Road Impact Assessment.

20.5.3.8 Landscape Character and Visual Amenity

The Project area and surrounds are classified as generally flat to slightly undulating. Significant localities within the local government area are included in the protected estate or included in State forest reserves. The areas of known or potential nature conservation values which are of State or regional interest include the Great Barrier Reef World Heritage Area to the north of the Project, Tooloombah Creek Conservation Park to the west and Bukkulla Regional Park to the east. These areas provide landscape character and visual amenity values to the region. Vegetation cover generally consists of *eucalypt* and *casuarina* species interspersed with large cleared areas utilized for grazing and crop production.

Three sensitive receptors have the potential to be impacted by changes in the visual landscape because of the Project. Parts of the Project are potentially visible from three homesteads: Oakdean; Brussels and Neerim-2 (see Chapter 5 – Land for visual impact assessment).

20.5.3.9 Contamination of Livestock

The surrounding land uses are primarily identified as grazing native vegetation. These properties are generally used for cattle grazing. Cows grazing on pasture can be potentially contaminated by coal dust. Concerns have been voiced from various sources concerning the healthiness and healthfulness of cattle raised near a mining site on reclaimed strip-mined pastures. A study undertaken in Virginia in the United States examined the contamination of biological systems from a coal mine and the impacts on cattle. This study was conducted over a 14-year period with 50 beef cows. The overriding conclusion of this report supports the efficient or profitable production of beef cattle near mining practices. Cows would be expected to have a much greater exposure than humans to any elements because they are not only in open spaces continuously where they would breath contaminated particles, but virtually all of their ingested feed for many years would be subject to contamination by coal dust particles. The finding that none of the elements of concern had accumulated in these cows represents strong support for a lack of contamination of the environment with these elements (Whittier 2012).

20.5.3.10 Extreme Meteorological Events, Flood or Catastrophic Failure

As identified using State Planning Policy Hazard and Safety Mapping, the Project is located within a flood hazard area. The *Livingstone Shire Planning Scheme* (2005) Map O5A - Storm Tide Hazard and Bushfire Hazard Risk Analysis overlay map identifies the Project area primarily occupying land where the fire risk has been undetermined. Given the extensive clearing of remnant vegetation to support cattle grazing, and the gentle to undulating landscape, the area is assessed as having a 'low' and 'medium' bushfire threat. The potential for earthquakes and landslips to occur within or surrounding the Project has been determined as low. These risks are highly unlikely to be increased because of the Project affecting watercourses or ground conditions. Further discussion is provided at Chapter 21 – Hazard and Risk.

20.5.3.11 Health, Safety and Emergency Services

Several services near the Project area are required to support procedures for responding to potential incidents associated with the Project's activities. These services have been summarised in Table 20-2.

Table 20-2 Health, safety and emergency services

Service	Location
Ambulance	Marlborough St Lawrence (Honorary)
Police	Marlborough St Lawrence
Fire Stations	North Rockhampton Rockhampton
Rural Fire Station	Rockhampton
Hospital	Rockhampton
Helicopter Rescue (Capricorn Helicopter Rescue)	Rockhampton (with option onwards to Royal Brisbane Hospital)
Local Doctor	Rockhampton
Medical Practice	Rockhampton
Queensland Mines Rescue Station	Dysart Blackwater Rescue Station
Royal Flying Doctor Service	Rockhampton

20.6 Potential Impacts and Mitigation Measures

The Project activities have the potential to result in impacts to the existing health and safety community values. These potential impacts are:

- Decreased air quality because of dust generating activities and release of gases such as hydrogen and sulphide and carbon dioxide;
- Health effects and stress as a result of increased noise and vibration;
- Impacts to existing community water values;
- Introduction of pest fauna and flora;
- Reduced road safety from increased traffic on public roads; and
- Reduced safety from fatigue or fitness for duty.

The potential impacts and the associated mitigation measures are discussed in Table 20-3. The management measures are presented in the following sections.

20.7 Safety and Health Management System

In accordance with the CMSH Act, Central Queensland Coal will prepare and implement a SHMS that integrates risk management elements and practices to ensure the safety of workers, contractors and the community. The SHMS will be integrated with the Environmental Management System (EMS) and will include specific operating procedures that incorporate organisational structures, planning activities, responsibilities, site practices, procedures, processes, and identify resources required for the development, implementation, review and maintenance of the safety and health policy.

The objectives of the SHMS are to protect the safety and health of all site workers, contractors and visitors and ultimately the broader community, and to ensure compliance with all relevant legislation. An overview of the SHMS and its components is presented in Figure 20-2.

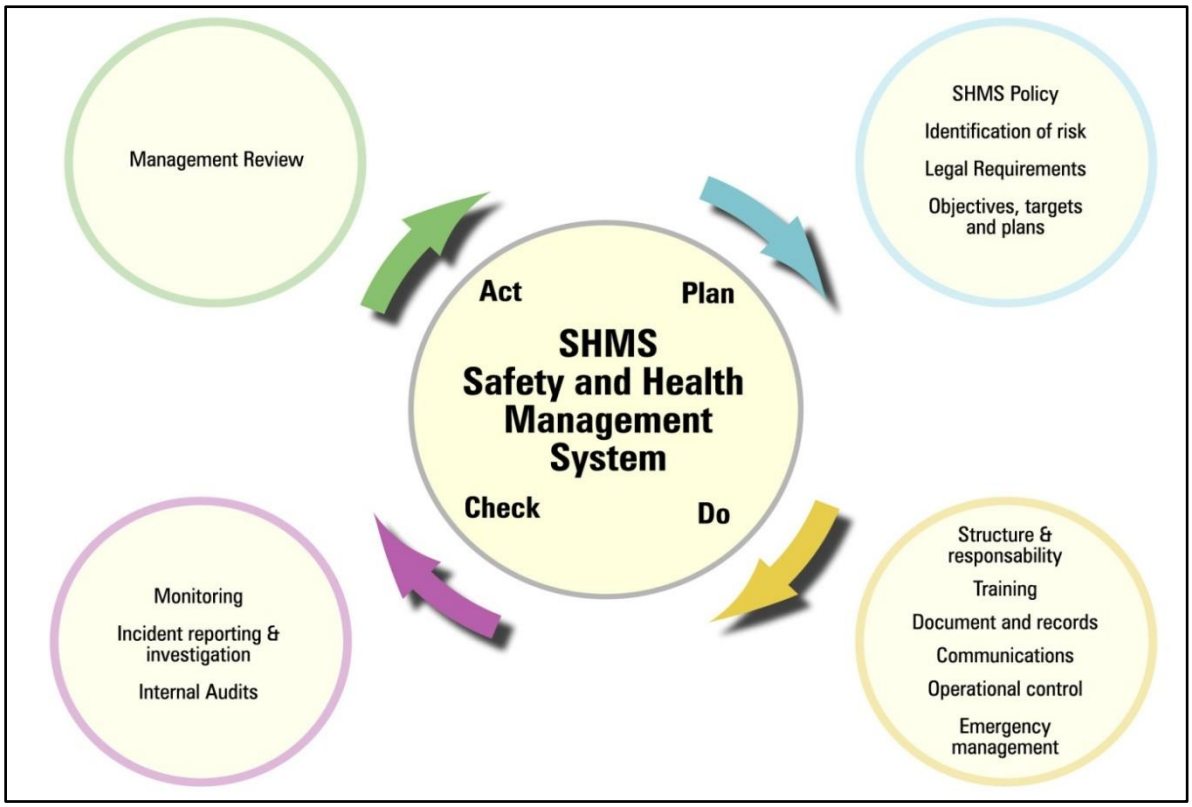


Figure 20-2 Components of the SHMS

20.7.1 General Contractor Requirements

While Central Queensland Coal will have overall charge of safety and health management onsite, each construction or operations contractor will provide a Safety Management Plan demonstrating their ability to manage the Project health and safety risks. It will provide a list of procedures and contingency plans relating to any specialised construction activities requiring specific safety management. The Contractor's Safety Management Plan will identify how the Contractor will achieve the requirements of this Safety Management Plan by defining their management strategies.

As part of the Safety Management Plan, the construction or operations contractor is required to ensure compliance with all legislative requirements relating to the construction or operational phases of the Project. Central Queensland Coal's expectation regarding safety and health standards will be provided to contractors at the time of tendering for work packages.

20.7.2 Training of Personnel

All employees and visitors will receive appropriate safety training to ensure they are aware of the risks and their responsibilities and are competent to carry out their work or activities onsite in an acceptable manner. To minimise the risks of non-inducted personnel using the haul roads to access the Project area, inductions may need to be undertaken at a security check point prior to accessing the transport corridor.

Safety requirements will be explained to all personnel during a site induction. Ongoing instruction will be provided via modular training packages and toolbox meetings. All inductions and ongoing instruction will be recorded on a Project register to ensure all staff have been inducted prior to commencing works and have received all necessary training. Personnel will be provided with more intensive training according to their role and accountability. The training will be modular and will include information on emergency management systems, safe work procedures, ground

disturbance procedures and other items required by the SHMS and the Recognised Standard 11 Training in Coal Mines mandated under the CMSH Act.

All employees (including subcontractors) will receive awareness instruction in the following areas:

- Safety and health policies;
- Safety Management Plan and related documents;
- Safety objectives and targets;
- Risk management;
- Understanding the regulatory requirements applying to the Project and their consequential responsibilities as a member of the Project team;
- Potential consequences of departure from procedures;
- Emergency procedures and responses; and
- Identification of their legal obligations.

Personnel performing tasks which carry higher than standard safety risks (for example working at heights) will receive additional induction and training in a modular format to further inform them of requirements, risks and controls. In addition, personnel must be certified as having completed induction and training processes and have gained appropriate experience, prior to undertaking such activities.

20.7.3 Communications

20.7.3.1 Internal Communications

Daily pre-start meetings will be held prior to commencing works and will itemise works to be undertaken for the day. Toolbox meetings will be held on a weekly basis by crews during construction and operational activities. These meetings are typically held to discuss and answer questions site personnel may have in relation to safety incidents that may have occurred onsite or within the industry. In addition, new safety management procedures or information will be discussed to ensure effective implementation. If requested by personnel or felt necessary by the Site Managers, Superintendents or Safety Advisors, specific management procedures already communicated to personnel will be reiterated during these meetings. Regular health and safety meetings will be held between the site safety team and site workers to discuss the progress, scheduling and location of activities over the site.

20.7.3.2 External Communications

Central Queensland Coal acknowledges one of the most important aspects of delivery for the Project will be the ongoing efficient and effective management of all interactions with the community and stakeholders, particularly if an event poses a risk to the community health and safety. The Project's Social Impact Strategy will be used as a guiding document for communication with stakeholders and is applicable to the construction and operation of the Project. The document will guide community involvement on the design, construction and commissioning of the Project, and closely interacts with the functions of the Integrated Risk Management System.

The key areas in which the Social Impact Strategy and the Integrated Risk Management System interact include:

- The requirement to inform the community and businesses on safety planning and management documents (such as site safety plans) to ensure their concerns are considered;
- The process of informing the community and local businesses about activities that may have an impact on surrounding communities (such as road works);
- The management of safety-related complaints and comments; and
- In the event of an emergency.

20.7.4 Emergency Planning and Response

An Emergency Response Plan (ERP) will be prepared as per legislative requirements and will be developed in consultation with the Queensland Fire and Emergency Services (QFES), Queensland Police Service (QPS), Queensland Ambulance Service (QAS) and the Department of Communities, Child Safety and Disability Services. Central Queensland Coal commits to providing a copy of the finalised ERP to each of these agencies upon completion of the document. The ERP will include a site map showing access and egress to all areas of the site and the requirement to install a visible sign from the roadside that clearly identifies emergency services entry to the Project area in the event of an emergency.

Central Queensland Coal will have on standby additional emergency service responses and capability which can be activated in the event of an emergency to avoid the strain on local regional services. The Site Senior Executive will ensure the mine has the resources and facilities for the mine's preparedness in reasonably foreseeable emergency situations.

The ERP will be developed to ensure that the potential consequence of emergency situations as identified in this report is minimised as far as possible. The ERP will form a critical component of the SHMS. Emergency situations that could arise, and considerations which relate to community health and safety during the development and operation of the Project include:

- Unplanned explosions which creates air and noise quality issues for surrounding receptors;
- Outbreak of illness or disease or pest infestation onsite;
- Traffic collisions (offsite and onsite): An increase in traffic will inherently increase the risk of collisions;
- Landing sites (Helipad) for rescue helicopters in case of emergency situations, including landing zone, flight paths, lighting, wind sock and any other relevant information;
- Contact details for relevant state emergency services; and
- Provision of an onsite contact for the local environmental health officer with Livingstone Shire Council.

Provisions will be made for a QAS paramedic to service the site. This paramedic will work with the health team to ensure time loss during emergencies / incidents are reduced where possible and provide paramedical services including but not limited to:

- Emergency patient care; and
- Certification in first-aid and low voltage rescue.

If a commercial paramedic is engaged in place of the QAS to provide paramedic services under the ERP, Central Queensland Coal will ensure the commercial paramedic has obtained a Section 18 Approval from the Chief Executive Queensland Health under the *Health (Drugs and Poisons) Regulation 1996*. Further consultation will occur with QAS to determine an appropriate source (i.e. local community support groups, commercial drug and alcohol service providers) to provide drug and alcohol testing and health and welfare checks.

The ERP will include regular emergency simulations to ensure emergency preparedness. Each year every mine is required under Recognised Standard 8 Conduct of Mine Emergency Exercises to conduct a major emergency exercise designed and organised by a committee convened under the auspices of the Site Senior Executive. In addition, regular minor emergency exercises will be conducted throughout each year to ensure the Project can adequately respond to an emergency. Central Queensland Coal commits to notifying QFES, QPS, QAS and CQ Rescue of planned exercises, either practical or tabletop, for attendance and participation.

It is not anticipated that first aid administered as part of the Project will involve an invasive procedure (i.e. the insertion of an instrument, appliance or other object into human tissue, organs, body cavities or body orifices) or activity that exposes the person or another person to blood or another bodily fluid. Should this change during the life of the Project, the need for an Infection Control Management Plan will be discussed with Queensland Health.

20.7.5 Public Complaint Resolution

Central Queensland Coal will, in the event of an appropriately made complaint, undertake an investigation to determine the cause and an appropriate solution. This will be developed in accordance with the Project's Social Impact Strategy.

20.7.6 Monitoring

As required by legislation and the SHMS, monitoring, inspection and reporting of safety performance during the construction or operational phases of the Project will be undertaken by the Safety Manager or their delegate. Results of all audits and inspections will be communicated to all Project workers and the community, as required.

20.7.7 Continual Improvement

The SHMS will be reviewed on an annual basis in accordance with Australian Standard/New Zealand Standard (AS/NZS) 4801:2001 Occupational Safety and Health Management Systems. The SHMS will be a dynamic document that will undergo regular review to ensure its effectiveness is maintained throughout the construction and operational phases of the mine site. The ongoing review process will include the compilation and assessment of data relating to safety and health issues, such as reported near misses, accident reports and general sickness data.

A critical aspect of the SHMS will be ensuring that health and safety community values are protected or enhanced. To ensure this objective is maintained, regular audits of the Project activities will be scheduled including:

- Third party audits conducted biannually;
- Internal audits conducted annually; and
- Documented health and safety inspections conducted weekly.

20.8 Qualitative Risk Assessment

The potential construction and operational phase impacts on the existing community's health and safety values before and after mitigation measures are implemented are shown at Table 20-3. Surface disturbances and above ground infrastructure are confined to the Project area and the identified sensitive receptors to the Project are described in Table 20-1 and shown in Figure 20-1. The Bruce Highway dissects the mining area and the North Coast Rail Line is located to the immediate east. Based on the assessment of the risk, the potential impacts range between low to extreme as defined below:

- Extreme – Works must not proceed;
- High – Works must not proceed until suitable mitigation measures have been adopted to minimise the risk;
- Medium – Acceptable with formal review. Documented action plan to manage risk is required; and
- Low – Acceptable with review.

Due to the separation distance between the MIA, the nearest sensitive receptor and the communities of Ogmore and Marlborough, adverse health and safety impacts associated with mining operations have generally been ranked as low. The shared use of the haul road by users, including potential users that have not completed site inductions accessing the Central Queensland mine area has been assessed as high. These risks are reduced to low within the application of risk management measures, as described in Table 20-3.

Further potential impacts have been examined in Chapter 7 – Waste Management, Chapter 9 – Surface Water, Chapter 10 – Groundwater, Chapter 12 – Air Quality, Chapter 13 – Noise and Vibration, Chapter 14 – Terrestrial Ecology, Chapter 19 – Social and Economic and Chapter 21 – Hazard and Risk.

Table 20-3 Qualitative risk assessment

Project phase	Potential impacts	Potential risk	Mitigation measures	Residual Risk
Health impacts from the emission of respirable dust				
Construction and Operation	Dust will be primarily generated from traffic on unsealed roads, civil works and wind on exposed stockpiles and disturbed ground. Dust has the potential to affect the health of individuals susceptible to respiratory conditions, such as the elderly or children, and workers near the source. Dispersion modelling as outlined in Chapter 12 – Air Quality, indicates the Project will comply with air quality objectives at all sensitive receptors. Therefore, potential short and long-term dust and air quality impacts are unlikely. Coal dust exposure has the potential for health impacts. Exposure to coal mine dust causes various pulmonary diseases, including coal workers' pneumoconiosis and chronic obstructive pulmonary disease. The National Institute for Occupational Safety and Health recommends that: ▪ Exposures to respirable coal mine dust should be limited to 1 mg/m^3 as a time-weighted average concentration for up to a 10-hour day during a 40-hour work week; and ▪ Exposures to respirable crystalline silica should be limited to 0.05 mg/m^3 as a time-weighted average concentration for up to a 10-hour day during a 40-hour work week.	Low	Mitigation will primarily involve minimising the potential for dust to be generated. This is achieved by: ▪ Watering disturbed areas likely to produce dust; ▪ Ongoing maintenance of plant and machinery to minimise emission generation; ▪ Dust covers and fine water sprays on crushing and processing plants where practicable and necessary; ▪ Watering and grading haul road with the application of dust sealant where necessary; ▪ Provision of windbreaks around stockpiles; ▪ Progressive revegetation of disturbed areas as mining operations develop; and ▪ Management of loads and loading techniques of trains to avoid spillage. In addition, real-time dust and particulate monitoring will be undertaken at select sensitive receptors and the Project area boundary to detect any air quality exceedances. Real-time monitoring will allow any exceedances to be correlated with onsite activities and meteorological conditions to determine the cause of the exceedance. Further dust and odour mitigation measures aimed at minimising adverse impacts to the community are detailed in Chapter 12 – Air Quality.	Low

Project phase	Potential impacts	Potential risk	Mitigation measures	Residual Risk
Nuisance from the emission of dust and odour				
Construction	Dust from the construction phase is unlikely to exceed the air quality objectives for health impacts at the nearest sensitive receptor. Dust may still cause a nuisance by creating additional cleaning from the deposition. Odour during the construction phase could result from the decomposition of organic waste or the release of methane. There is sufficient buffer distance between sensitive receptors and the site (1 km) to ensure the amenity of the area is not impacted.	Low	▪ Dust will be minimised through the measures outlined above; ▪ Odour will be minimised through the implementation of appropriate waste management practices; and ▪ Further dust and odour mitigation measures aimed at minimising adverse impacts to the community are detailed in Chapter 12 – Air Quality.	Low
Operation	Mining activities have the potential to release gases such as hydrogen sulphide and carbon dioxide, which can create unpleasant odours that are perceptible to humans near the release sites. It is anticipated that some odours may be released during operation; however, the quantity is not expected to adversely impact nearby residents or the local community.	Low	Odours generated from mining activities are unlikely to affect site works or sensitive receptors. Any odour related hazards are well addressed in legislation and relevant standards which will be complied with. Waste products will be taken offsite by licensed contractors to licenced facilities for disposal. Facilities will be set aside on site for waste transfer in areas set away from where personnel will be concentrated and protected from prevailing winds. These design controls will limit odours that are detrimental to personnel onsite or offsite.	Low
Reduction in the amenity from increased noise and vibration				
Construction	Noise and vibration will be generated during the construction phase by civil works, blasting activities and heavy and light vehicle traffic on public and private roads. An assessment of potential noise and vibration impacts is included in Chapter 13 – Noise and Vibration. The assessment indicates that construction noise generated impacts are only expected to exceed guideline criteria at Brussels, during adverse conditions and at and the two residents within 100 m of the Tooloombah Creek Service Station during average and worse conditions. Although vibration is expected to occur from blasting activities, compliance with vibration criteria can be typically achieved at separation distances of one to two km.	Medium	Noise and vibration assessments indicate that noise levels will not meet performance criteria at surrounding homesteads during the construction and operational phases. Key mitigation measures will be implemented which involve modifying the noise emitted from the source by installing noise attenuation devices or enclosing devices that emit significant noise levels. Blast parameters will be designed to ensure that airblast and vibration criteria are met. Workers near these devices will be required to wear appropriate hearing protection devices and all equipment used onsite will comply with AS 2436:1981 - Guide to Noise on Construction, Maintenance and Demolition Sites.	Low

Project phase	Potential impacts	Potential risk	Mitigation measures	Residual Risk
Operation	Noise has the potential to affect one's ability to sleep, study, relax and converse. Noise has been linked with cardiovascular disease, mental health effects and stress. Noise and vibration will be generated during the operation phase by civil works, blasting activities, loading of coal trains, conveying and stacking coal, crushing of coal and heavy and light vehicle traffic on public and private roads. A low frequency noise assessment was undertaken. The CHPP is the main source of low frequency noise, although haul trucks may also generate low frequency noise. Low frequency noise becomes more dominant over larger distance as high and middle frequency components dissipate. The assessment of potential noise and vibration impacts is included in Chapter 13 – Noise and Vibration. The assessment indicates unmitigated exceedances of noise guidelines are predicted to occur at a number of sensitive receptors, particularly at night. Mitigation measures proposed in Chapter 13 – Noise and Vibration will be implemented to minimise the potential impacts.	Low	Flyrock and excessive vibrations that result from blasting are unlikely to occur; however, a blast management plan that will be developed during detailed design to manage such issues should they occur. Ongoing real-time noise and vibration monitoring will be undertaken at nearby sensitive receptors and at selected locations on the Project area boundary to detect noise criteria exceedances. Chapter 13 – Noise and Vibration outlines further mitigation measures aimed at minimising adverse impacts to the community.	Low
Health impacts from the contamination of groundwater and surface water				
Construction and Operation	Potential impacts to existing community water values, including water degradation in dams and creek systems may occur through the planned or unplanned release of construction and mine generated water, surface runoff and failure of regulated dams. Such releases have the potential to impact local users who extract water from Deep Creek and Tooloombah Creek for irrigation and drinking water for stock. Studies indicate the groundwater aquifers are low permeability and therefore impede vertical and horizontal migration of groundwater. This indicates water within the coal seams is unlikely to be in good hydraulic connection with overlying and underlying aquifers where they occur. As a result, any water taken from the formation will	Medium	**Surface Water** Existing surface water conditions are generally typical of agricultural environments, showing high nutrients and turbidity levels. Further reduction in surface water quality will be minimised through the implementation of mitigation measures detailed in Chapter 3 – Description of the Project and Chapter 9 – Surface Water. Central Queensland Coal intends to collect and contain potentially contaminated surface runoff from the MIA, coal stockpile area and the TLF in several environmental dams. This water will be collected reused onsite for dust suppression and stockpile sprays.	Low

Project phase	Potential impacts	Potential risk	Mitigation measures	Residual Risk
	theoretically have a minimal impact on surrounding community relying on the aquifers water quality. The Project will generate and use recycled water which will be reused onsite (i.e. dust suppression and at the CHPP). As such, the potential for off-site impacts because of recycled water usage should be minimal. Dust accumulation on roof tops which enters rainwater tanks used for drinking at surrounding homesteads could lead to increased levels of toxins consumed. As most dust is predominantly from the overburden and small quantity consisting of coal the levels are minute and below drinking water trigger levels.		**Groundwater** The quality and level of groundwater will be monitored on a regular basis to ensure adverse effects do not occur because of the Project. In the event a privately owned bore is adversely affected because of the Project, discussions between the land owner and Central Queensland Coal will be held and a mutually agreed mitigation measure will be agreed upon (e.g. sink a new bore or provide monetary compensation). Further details relating to the mitigation measures are discussed in Chapter 10 – Groundwater. The mitigation measures proposed in Chapter 9 – Surface Water and Chapter 10 – Groundwater, have been designed to minimise the consequence and likelihood of such releases.	
Health impacts from effluent reuse				
Construction and Operation	Release of raw sewage from portable toilets can cause harm to humans and the environment through transmission of infection, illness and viruses. Such releases may occur from equipment failure, human error or other unplanned releases. Potential impacts to humans can arise from the reuse and recycling of water. Accidental discharge of contaminants into water bodies has the potential to impact on water extracted downstream of contamination. Potential contaminants with the potential to affect human health includes: ▪ Run-off containing suspended solids, dissolved contaminants; ▪ Suspended solids and dissolved solids; ▪ Hydrocarbons, detergents, solvents; and ▪ Bacteria and nutrients. Damage to mine water dams and sewage treatment plants can cause leakages or unplanned releases of effluent and untreated sewage.	Medium	Portable toilets will be managed by appropriately licenced contractors. No effluent waste will be treated or irrigated onsite. Mine water dams will be built to relevant standards and will be protected where required through barriers and other means. Infrastructure will be routinely serviced and monitored to ensure no leakage or damage has occurred or is likely to occur.	Low

Project phase	Potential impacts	Potential risk	Mitigation measures	Residual Risk
	These can cause harm to humans on and surrounding as well as downstream water users.			
Proliferation of disease, pests and vectors (such as insects, rodents etc.) from onsite activities				
Construction and Operation	Pest fauna within the Project area may include cane toads, house mice, rats and feral species such as pigs, cats and dogs. Increases in pest fauna has the potential to increase disease transmission and to increase the presence of potentially dangerous predators such as snakes. Surface water runoff will be collected in environmental dams where potential exists for the water to become stagnant if not used. Stagnant water has the potential to result in increased areas of breeding habitat for biting insects including mosquitoes and midges.	Low	Mitigation measures for pest fauna included in Chapter 14 – Terrestrial Ecology will be implemented to minimise the potential impact of pests. To mitigate against a possible increase in the abundance or distribution of pest and feral species, pest and weed management strategies will be include in the Land Use Management Plan (LUMP) will be prepared. The underlying principles of this plan will be used to manage the environment to minimise breeding through a range of practices and procedures implemented at the site. The plan will include a range of mitigation and management measures typically associated with removing access food and shelter typically used across mining sites in Queensland. The Plan will also include a mosquito and biting insect management section which will be prepared in accordance with Queensland Health's Guidelines to Minimise Mosquito and Biting Midge Problems in New Development Areas (Queensland Government 2002).	Low
Contamination, pest and disease risks from waste materials				
Construction and Operation	Increased use of a range of materials for construction and operation will generate waste products including packaging, liquid and solid wastes, as well as chemical wastes. Increased wastes that are incorrectly disposed have the potential to increase populations of vermin and potentially dangerous predators such as snakes, as well as increase odours. Increased waste generation also has the potential to strain the capacity of nearby refuse stations. Minor quantities of putrescible wastes are expected to be generated during the construction phase (less than 150 t per annum during construction and less than 400 t per annum during operation).	Low	The construction and operation of the mine will ultimately increase the volume and diversity of waste from the Project area, when compared to the existing land use. Typical mitigation measures will be undertaken in accordance with the *Environmental Protection (Waste Management) Policy 2000*, and will include the implementation of a hierarchical approach to waste management practices on site; purpose designed waste management and transfer zones located away from areas where personnel are concentrated; removal of wastes from site via licensed contractors; and the treatment of waste water at an onsite treatment plant. Treated waste water will then be discharged to a process water	Low

Project phase	Potential impacts	Potential risk	Mitigation measures	Residual Risk
	Waste materials have the potential to cause contamination to water and soil. The contamination of the surrounding land and pasture may impact cattle production or beef quality from a bioaccumulation of toxins. Studies have shown that coal dust does not seem to impact cattle production and there are current trials looking at the use of brown coal in improving soil fertility.		dam for reuse. Waste sludge will be removed from site by licensed contractors to a licensed disposal facility. Putrescible wastes will be handled and stored in sealed and lidded bins and regularly collected. The mitigation measures proposed in Chapter 7 – Waste Management have been designed to ensure offsite impacts from waste generation are minimised. Treatment of all waste tyres being temporarily stored with chemicals (such as Larvicide) will occur, this is to prevent mosquito breeding. Waste tyres will also be cut or punctured to prevent water pooling and hence the creation of favourable habitat for biting insects. Despite an overall increase in waste compared to baseline conditions, the cumulative impacts of waste generated are considered minor, due to the implementation of best practice protocols and a responsible waste management approach. Waste will be further minimised through the implementation of mitigation measures detailed in Chapter 3 – Description of the Project and Chapter 7 – Waste Management.	
Reduced road safety from increased traffic on public roads				
Construction	The main access route will be the Bruce Highway, providing the most direct access to the site from the local towns (i.e. Ogmore, St Lawrence, Marlborough and Rockhampton). Access to the Project area and MIA is via access roads from the Bruce Highway. During 2018 it is predicted that a total of 138 movements of heavy vehicles will be required. The construction workforce will be housed at existing accommodation at Marlborough, Ogmore, St Lawrence and Clairview which will require daily travel. Predicted traffic levels associated with the Project are discussed in Chapter 6 – Traffic and Transport. Increased traffic volumes, particularly along local government roads and school bus routes have the potential to impact not only residents but the wider community and also workers and contractors through an increased risk in accidents.	Medium	During operations, when production exceeds 5 Mtpa ROM, designated buses will be used to transport workers from designated pick up points. This will minimise the number of trips and vehicles utilising the road network. Central Queensland Coal drivers will be appropriately trained and licensed for the type of vehicle being operated. Vehicle use monitoring will be in place. Central Queensland Coal drivers will be appropriately inducted, with frequent information briefs and sessions conducted. Appropriate communications and passing plans will be utilised for road access. In addition, a Road-use Management Plan (RMP) will be implemented. Management measures that will be in the RMP include the use of pre-	Low

Project phase	Potential impacts	Potential risk	Mitigation measures	Residual Risk
Operation	The operations phase is anticipated to generate a total of 8,509 heavy vehicle movements at peak operations (2029) of the Project. Inherently increased vehicle movements on roads will increase the potential for collisions, primarily during the construction stage. Predicted traffic levels associated with the Project are discussed in Chapter 6 – Traffic and Transport. Increased traffic volumes, particularly along local government roads and school bus routes have the potential to impact not only residents but the wider community and also workers and contractors through an increased risk in accidents.	Medium	determined access route and all mine related heavy vehicle traffic will avoid travelling through school bus routes during pick up and drop off times. Central Queensland Coal will liaise with residents, Livingstone Shire Council and emergency services regarding proposed alterations to the existing road network. In addition, an Emergency Response Plan and a RMP will be prepared in accordance with relevant legislation requirements prior to the commencement of construction to address the abovementioned impacts (see Chapter 6 – Traffic and Transport for further mitigation measures).	Low
Use of private and light vehicles within the Central Queensland Coal Mine site				
Operations	Shared use of the haul road with light vehicles (including potential non-inducted users) sharing the haul roads with haul trucks carries a risk of a fatality if there were to be interaction with vehicle types. Workers, contractors and employees will use the haul roads to access the site.	High	Inductions to all personnel prior to access to the haul road. Standard Operating Procedures for private vehicles will include an escort for supervision and control. Ensure design of haul road considers safety of light vehicles and lines of sight to ensure light vehicles are seen. Install guide posts at regular intervals. Will be designed to ensure that a minimum of two pairs are observed along the road at any time. Other mitigation measures include: ▪ Design of haul roads that are fit for purpose, simple intersection design; ▪ Build separate heavy vehicle and light vehicle roads where possible; ▪ Conduct road safety audits regularly; ▪ Provide adequate sight distance through curves and crests; ▪ Post realistic speed limits; ▪ Use Australian Standard signs;	Low

Project phase	Potential impacts	Potential risk	Mitigation measures	Residual Risk
			▪ Provide good delineation; and ▪ Provide clear and consistent signage along haul roads. See Chapter 6 – Traffic and Transport for further mitigation measures.	
Extreme meteorological event, flood or catastrophic failure				
Construction and Operation	An extreme meteorological event, flood or catastrophic failure has the potential to cause emergency events which are catastrophic, with the potential to cause multiple fatalities and significant damage to property. Possible extreme metrological events identified in the risk assessment in Chapter 21 – Hazard and Risk are storms, floods and bushfires. Flooding has potential to occur within the Project area. Bushfire is a medium risk and has potential to cause stockpile combustion, however, there is sparse vegetation on and around the site. Storms and heavy rainfall events pose risk of mine pit flooding and infrastructure damage. Catastrophic events including explosions and mine wall failures have potential for multiple fatalities. See Chapter 21 – Hazard and Risk for further information.	Medium	Infrastructure will be designed to relevant standards and infrastructure will be appropriately located to avoid damage and avoid any flood impacts from events under 1 in 1,000 ARI. Climatic conditions will be monitored to allow for sufficient warning and preparedness before major meteorological events. A detailed risk assessment will be undertaken during concept, design, construction and operation phases to ensure all appropriate controls and monitoring are in place to avoid catastrophic failures onsite. An ERP will be developed in consultation with Queensland Fire, Queensland Police and Rescue Service and Queensland Ambulance Service. Provisions will be made for Queensland Ambulance Service paramedics to service the site. In the occurrence of such catastrophic failure events, the relevant services will be notified immediately.	Low
Reduced safety from fatigue or fitness for duty				
Construction and Operation	Fatigue has the potential to result in accidents with the potential to cause harm to mining operations, worker health and safety and the environment. Construction and operational events such as operating machinery has the potential to result in harm when the operator is suffering from fatigue. Consumption of alcohol or drugs can potentially result in adverse impacts during construction and operation. Anti-social behaviour can result in perceived or real anti-social behaviour related impacts to the public or workforce. Consumption of alcohol or drugs prior to or during	Medium	Fatigue management policies regarding both pre and post shift will be detailed in the SHMS. This plan will be developed prior to construction of the mine. Fatigue management will also be incorporated as part of the RMP developed by Central Queensland Coal. A Social Impact Strategy will be implemented which will include drug and alcohol management and an associated policy will be prepared, in consultation with the Queensland Ambulance Service, to discourage the consumption of alcohol amongst workers. At a minimum, the management will include:	Low

Project phase	Potential impacts	Potential risk	Mitigation measures	Residual Risk
	construction or mining operations has the potential to cause harm to other workers and the environment.		▪ Educating staff through noticeboards, pre-starts and toolboxes on the dangers of alcohol consumption; ▪ Drug and alcohol monitoring programs; and ▪ Provision of alternative activities for workers during down times. The consumption of alcoholic beverages will be managed in accordance with the Social Impact Strategy and strict testing regimes will be in place to ensure staff are not intoxicated or under the influence of alcohol during work hours. See Chapter 21 – Hazard and Risk for further details.	
Socio-economic health impacts				
Construction and Operation	People who live in areas with poorer socioeconomic conditions tend to have worse health than people from other areas (Australian Bureau of Statistics (ABS) 2010). The median total household income in the Livingstone area is quite like that of the Queensland and Australian median. Health issues including physical and mental can put a strain on Queensland Health and Emergency Services. Without the re-establishment of the mining industry in the region, the socio-economic status of the region will be positively impacted.	Medium	The Project has the potential to continue and improve employment in the region. The Project offers a good level of income and a significant number of job opportunities during both construction and operations for people residing in and around the region. The Project will provide the opportunity for indigenous job opportunities and training. Providing job opportunities in the region can help improve the health of those in the area. This will result in no extra demand on Queensland Health and Emergency Services.	Low

20.9 Conclusion

The potential impacts to existing values relating to the community health and safety for the Project area have been examined. Within a 10 km radius of the Project area there are eight inhabited homestead receptors, three uninhabited homesteads and a commercial place (Tooloombah Creek Service Station). The Ogmore township is approximately 9 km to the northeast, a service station on the Bruce Highway 1 km from the western boundary of the Project area and the Tooloombah Creek Recreation Reserve is 600m further west of the service station. The Project has potential health and safety impacts involving dust, noise and vibration, contamination of groundwater and surface water, pests and diseases and traffic incident risks.

The community values can be measured against clean air quality and relatively low background noise. Modelling for the Project predicts that the impacts to air quality will not exceed the health and wellbeing criteria at any identified offsite sensitive receptors. Dust from the construction and operational phase is unlikely to exceed the air quality objectives for health impacts at the nearest sensitive receptor. Noise mitigation measures are predicted to achieve compliance at two of the impacted sensitive receptors (Tooloombah Creek Service Station during the evening and at Strathmuir during the night). A Noise Management Plan is to be developed in consultation and engagement with potentially affected receptors to achieve alternative arrangements, in particular with the receptors at Brussels.

The surface water in the region holds limited recreational use as the creeks generally only flow during rain events. There is no known community consumption of water for domestic purposes downstream of the site. There is cattle access evidence into Deep and Tooloombah Creeks which suggests stock watering values.

The Project will result in an increase in traffic on the surrounding roads, thereby increasing the potential for vehicle incidents to occur. This will be managed through RMPs which minimise impacts to roads and particularly any school bus routes. It is anticipated that there will be cumulative impacts because of the Project; however, these will be managed via the RMP.

Other community impacts from the Project could be through the spread of pests, illness or disease. Central Queensland Coal will manage this through onsite waste management, pest control and provision of health care services for employees. Any outbreak which may pose a risk to the community health and safety will be managed in coordination with the Environmental Health Officer from the LSC and the Rockhampton Regional Council.

Through the adoption and implementation of management and mitigation strategies, it is expected that these health and safety implications identified have a low residual risk. As well as providing these mitigation strategies, Central Queensland Coal will implement a SHMS that integrates risk management elements and practices to ensure the safety of workers, contractors and the community.

20.10 Commitments

In relation to health and safety, Central Queensland Coal's commitments are provided in Table 20-4.

Table 20-4 Commitments – health and safety

Commitment
Prepare and implement a SHMS that integrates risk management elements and practices to ensure the safety of workers, contractors and the community.
Annual review of the SHMS in accordance with Australian Standard/New Zealand Standard (AS/NZS) 4801:2001 Occupational Safety and Health Management Systems.
Ensure all construction or operations contractors provide a Safety Management Plan demonstrating their ability to manage the Project health and safety risks, ensuring compliance with all legislative requirements relating to the construction or operational phases of the Project.
Appropriate safety training and Personal Protective Equipment will be provided to all employees and visitors.
Undertake an investigation in the event of an appropriately made complaint to determine the cause and appropriate solution.
Monitoring, inspection and reporting of safety performance during the construction or operational phases of the Project will be undertaken by the Safety Manager or their delegate.
In the event a privately owned bore is adversely affected as a result of the Project, discussions between the land owner and Central Queensland Coal will be held and a mutually agreed mitigation measure will be agreed upon (e.g. sink a new bore or provide monetary compensation).
Employ and induct appropriately trained and licensed drivers and conduct frequent information briefs and sessions conducted.
Liaise with residents, LSC and emergency services regarding proposed alterations to the existing road network.
Develop and implement an Integrated Risk Management System for the construction and operational phases of the Project.
Develop and implement a Noise Management Plan in consultation and engagement with potentially affected receptors to achieve alternative arrangements, in particular with the receptors at Brussels.
Prepare and implement a Road-use Management Plan in accordance with relevant legislation requirements prior to the commencement of construction.
Prepare an Emergency Response Plan in accordance with relevant legislation requirements, including training for emergency response personnel, prior to the commencement of construction.
Develop and implement social impact strategies relating to on and off -site safety and health management programs.

20.11 ToR Cross-reference Table

Table 20-5 ToR cross-reference

Terms of Reference	Section of the EIS
8.13 Hazards and safety	
Describe the potential risks to people and property that may be associated with the project in the form of a risk assessment for all components of the project and in accordance with relevant standards.	Section 20.8 and Chapter 21 – Hazard and Risk
The assessment should address the following matters: • potential hazards, accidents, spillages, fire and abnormal events that may occur during all stages of the project, including estimated probabilities of occurrence	Section 20.8 and Chapter 21 – Hazard and Risk

Terms of Reference	Section of the EIS
• hazard analysis and risk assessment in accordance with AS/NZS ISO 31000:2009 Risk management—principles and guidelines and with HB203:2006 Environmental risk management principles and processes	Chapter 21 – Hazard and Risk
• demonstrate that any major hazard facility involving dangerous and hazardous materials is appropriately located in accordance with the State Development Assessment Provisions, Module 13 – Major hazard facilities	Not applicable as no Major Hazard Facility is included in the Project
• identify all hazardous substances and any explosives to be used, transported, stored, processed or produced and the rate of usage; evaluate the risks associated with the secure storage, use and transportation of explosives to ensure the risks are within an acceptable standard in accordance with Australian Standard AS2187.11	Chapter 21 – Hazard and Risk
• potential wildlife hazards, including a development of a mosquito management plan in accordance with Queensland Health guidelines 2, natural events (e.g. cyclone, storm tide inundation, flooding, bushfire) and implications related to climate change and adaptation	Section 20.8 and Chapter 21 – Hazard and Risk
• describe natural hazards that may affect the site with at least a 1% AEP or 100 year ARI level, including mapping of the potential hazard areas at the site	Chapter 9 – Surface Water and Chapter 21 – Hazard and Risk
• how siting, layout and operation of the development will avoid or mitigate the risks, particularly with regard to the release of hazardous materials during natural hazard events	Section 20.8 and Chapter 21 - Hazard and Risk
• how natural processes and the protective function of landforms and vegetation will be maintained in sea erosion and storm tide inundation areas	Section 20.5.3.10. Not in a storm tide hazard area according to *Livingstone Shire Planning Scheme* (2005) Map O5A - Storm Tide Hazard and Bushfire Hazard Risk Analysis overlay map
• include an assessment of the risk that the project will damage the infrastructure of the Bruce Highway	Chapter 6 – Traffic and Transport
• Show in plan view, and in a number of cross sections of suitable scale, the depth of the excavations in the North and South pits adjacent to the Bruce Highway. Discuss how geotechnical stability can be assured, and erosion protection on exposed faces can be successfully implemented, on the long block of unmined material supporting the Bruce Highway across the middle of the Central Queensland Coal Project. Discussions should examine the case of maximum exposure on the face of the unmined material during mining operations, and on the long term stability of the Highway route after closure of the mine.	Chapter 6 – Traffic and Transport and Appendix A4b – Geotechnical Assessment
Provide details on the safeguards that would reduce the likelihood and severity of hazards, consequences and risks to persons, within and adjacent to the project area(s). Identify the residual risk following application of mitigation measures.	Section 20.8 and Chapter 21 – Hazard and Risk
Present an assessment of the overall acceptability of the impacts of the project in light of the residual uncertainties and risk profile.	Section 20.8
Provide an outline of the proposed integrated emergency management planning procedures (including evacuation plans, if required) for the range of situations identified in the risk assessment developed in this section.	Section 20.8

[1] *Australian Standard AS 2187*, Explosives-storage transport and use

[2] E.g. Queensland Health – *Guidelines to minimise mosquito and biting midge problems in new developments*, available from http://www.health.qld.gov.au/ph/documents/cdb/14804.pdf

Terms of Reference	Section of the EIS
Assess the risk of spontaneous combustion for the proposed coal mine and provide the following information: • describe the quality and quantity of carbonaceous waste material including coarse rejects and fine tailings stockpile at the mine site	Chapters 3 – Project Description and 21 – Hazard and Risk
• discuss the potential risk of spontaneous combustion from the coal and waste stockpile areas	Chapter 21 – Hazard and Risk
• discuss the prevention and control measures adopted for spontaneous combustion,	Chapter 21 – Hazard and Risk
• describe likely impacts of spontaneous combustion incidents on the receiving environment	Chapter 21 – Hazard and Risk
• develop and implement "spontaneous combustion management plan" by considering NSW spontaneous combustion management guidelines.[3]	Chapter 21 – Hazard and Risk
Outline any consultation undertaken with the relevant emergency management authorities, including the Local Disaster Management Group.	Section 20.7.4 and Chapter 1 - Introduction

[3] http://www.resourcesandenergy.nsw.gov.au/__data/assets/pdf_file/0007/419515/MDG-1006.pdf

http://www.resourcesandenergy.nsw.gov.au/__data/assets/pdf_file/0006/419514/MDG-1006-TR-spontaneous-combustion-management.pdf