24 Hazard and Risk

Section 24 Hazard and Risk

24.1 Introduction

24.1.1 Overview

The main aim of this section is to provide a qualitative risk assessment of hazards that may potentially be generated by the Alpha Coal Project (Rail) (herein referred to as the Project) upon the community. Mitigation measures to eliminate or minimise such hazards have also been identified in this section.

24.1.2 Methodology

Assessment of hazards and risks to the community and environment during the construction and operation stages of the Project has been undertaken through a Preliminary Hazard Analysis (PHA).

The following regulations and guidelines are applicable:

- Australian/ New Zealand Risk Management Standard AS/NZS 31000:2009;
- Australian Code for Transport of Dangerous Goods by Road and Rails (ADG, Code);
- Australian and New Zealand Standards for storage and handling of mixed classes of dangerous goods, in packages and intermediate bulk containers AS/NZS 3833:2007;
- Handbook 203 2006: Environmental Risk Management – Principles and processes;
- *Dangerous Goods Safety Management Act 2001* (DGSM Act);
- *Dangerous Goods Safety Management Regulation 2001* (DGSM Regulation)*;*
- NSW Department of Planning's Hazardous Industry Planning Advisory Papers (HIPAP) Number 3: Environmental Risk Impact Assessment Guideline;
- NSW Department of Planning's Hazardous Industry Planning Advisory Papers (HIPAP) Number 4 Guidelines for Hazard Analysis; and
- Rail Safety Management within Queensland 2001.

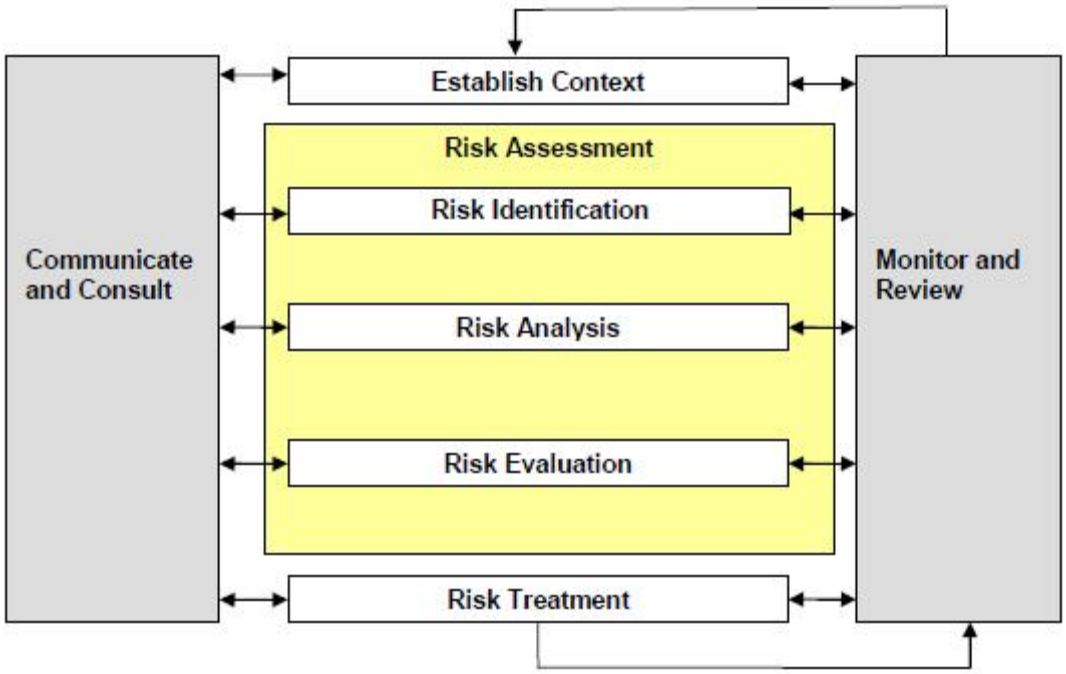
The risk assessment carried out in this Environmental Impact Statement (EIS) assumes that an ongoing hazard and risk assessment process will be undertaken throughout the life cycle of the Project. It is assumed that this process will focus on minimising risks to the environment and community as well as workers within and surrounding the Project corridor.

The PHA involves:

- identifying sensitive community and environmental receptors;
- reviewing those aspects of the Project that might present a hazard to the safety of the community and the environment;
- evaluating risk associated with each hazard;
- proposing mitigation measures; and
- reviewing residual risk with mitigation measures in place.

The Project's environmental risk framework integrates the process for managing environmental and community risk into its overall governance, strategy and planning, management, reporting processes, policies, values and culture. Risk is defined in terms of the effect of uncertainty it has on the Project's objectives. Schematically, the Risk Management Process (RMP) is depicted in Figure 24-1. The Project Risk Matrix used to rank each of the hazards and the definitions of each consequence and likelihood is demonstrated in Table 24-5.

Figure 24-1: Risk Management Process



Workplace health and safety issues are not included in this risk assessment. Statutory processes exist under the *Workplace Health and Safety Act 1995* (WHS Act) to manage workplace hazard and risk.

24.1.3 Sensitive Receptors

24.1.3.1 Human Receptors

The main human sensitive receptors are as follows:

- Receptor 1 (R1): The dwelling is located at chainage 338.5 km and is 113 m east of the Project corridor. The dwelling is located on a higher ground level than the Project corridor. Vegetation is predominantly grassy open woodland. Other activities include cattle breeding and fattening; and
- Receptor 2 (R2): This dwelling is located at chainage 404 km and is 260 m west from the Project corridor. The subject dwelling is located on higher ground than the Project corridor. Vegetation in immediate vicinity to the dwelling is quite sparse with some pockets of short shrubs. Other activities include cattle breeding and fattening.

These receptors are shown in Figure 2-1, Volume 3, Section 2 of this EIS. It is important to note that these receptors have been identified on the basis of aerial imagery and as such may not be fully occupied residences.

24.1.3.2 Environmental Receptors

Environmentally sensitive receptors are identified as follows:

- Belyando River near chainage 45 km;
- Native Companion Creek near chainage 40 km;
- Unnamed Creek near chainage 60 km;
- Sixteen Mile Creek near chainage 95 km;
- Mistake Creek near chainage 72 km;
- Lascelles Creek near chainage 100 km;
- Prebald Creek near chainage 135 km;
- Mclere Creek near chainage 140 km;
- Brown Creek near chainage 170 km;
- Logan Creek near chainage 175 km;
- Diamond Creek near chainage 195 km;
- Myra Creek near chainage 200 km;
- Eaglefield Creek near chainage 225 km;
- Suttor River near chainage 265 km;
- Rosella Creek near chainage 335 km;
- Brown River Creek near chainage 345 km;
- Pelican Creek near chainage 370 km;
- Table Mountain Creek near chainage 390 km;
- Hubert Creek near chainage 425 km;
- Capsize Creek near chainage 430 km;
- Bogie River near chainage 440 km;
- Sandy Creek near chainage 460 km;
- Finley Creek near chainage 465 km;
- Splitters Creek near chainage 485 km; and
- Saltwater Creek near chainage 500 km.

The Project corridor in its current alignment avoids all Reserves, National Parks and State Forests.

24.2 Project Hazard Identification

24.2.1 Overview

For the purposes of this EIS, hazard identification focuses on non-routine events that may result in impacts on sensitive receptors. Potential impacts arising from day to day operations are not included in this assessment. For example, impacts on the environment arising from sediment mobilisation by

rainfall are considered to be a day to day operational matter rather than a risk event and are addressed by day to day environmental management procedures. By contrast, an accident involving a fuel tanker transporting diesel to the site is considered a hazard.

The principle focus of risk assessment studies is off-site impacts; that is, impacts outside the boundaries of a proposed project which affect people, the environment, property and surrounding land uses. As specified in the *New South Wales Department of Planning, Hazardous Industry Planning Advisory Paper No. 3: Environmental Risk Impact Assessment Guideline* the studies apply to abnormal hazardous events and conditions. They are not intended to apply to continuous or normal operating emissions, for example air or water pollutants which are more appropriately dealt with by pollution control mechanisms and legislation. Compliance with regulatory requirements is mandatory. Hence, hazard identification assumes compliance with regulatory requirements, and therefore ignores deliberate releases of pollutants.

24.2.2 Environmentally Hazardous Substances

24.2.2.1 Overview

The Project will use a number of environmentally hazardous substances during construction and operations including those listed in the Australian Dangerous Goods Codes. Table 24-1 provides an indicative list of these substances to be used during the Project construction and operation activities.

Table 24-1: Indicative list of environmentally hazardous substances

Chemical Name (Shipping Name)	Concentration, percentage wt	D.G. Class	Hazchem Code	UN Number	Packaging group	Purpose/ Use
Diesel (Diesel)	None allocated.	3 (Class C1)*	3[Z]	1202	III	Fuel for vehicle operations.
Oils (Lubrication/ Hydraulic Oils)	None allocated.	3 (Class C2)**	None allocated.	None allocated.	None allocated.	Lubricate plant and equipment and replenish hydraulic systems.
Acetylene (Acetylene Dissolved)	> 98%	2.1	2[S]E	1001	None allocated.	Welding.
Aluminium sulphate (Alum)	47%	None allocated.	None allocated.	None allocated.	None allocated.	Water treatment chemical.
Oxygen (Oxygen)	> 98%	2.2	2[S]	1072	None allocated.	Welding.
Chlorine (Chlorine)	99.9%	2.3	2XE	1017	None allocated.	Water treatment chemical.

Chemical Name (Shipping Name)	Concentration, percentage wt	D.G. Class	Hazchem Code	UN Number	Packaging group	Purpose/ Use
Sodium hypochlorite (Sodium hypochlorite)	10-15% available chlorine	8	2X	1791	III	Wastewater treatment chemical.
Hydrochloric acid (Hydrochloric acid)	25-35%	8	2R	1789	II	Cleaning and stripping of steel.
Waste oil	None allocated.	None allocated.	None allocated.	None allocated.	None allocated.	Waste oil from equipment/ machinery.
Car batteries	None allocated.	None allocated.	None allocated.	None allocated.	None allocated.	Spent batteries from vehicles.
Used vehicle tyres	None allocated.	None allocated.	None allocated.	None allocated.	None allocated.	Spent wheel tyres from mine vehicles.

*: Class C1 – a combustible liquid that has a flashpoint of 150^{o}C or less

**: Class C2 – a combustible liquid that has a flashpoint exceeding 150^{o}C

24.2.2.2 Likely Quantities

Table 24-2 provides an indicative list of substances likely to be stored and used on site during the construction phase. Table 24-3 provides an indicative list of substances to be used at site during the operation phase. For location of the marshalling yard and camp sites refer to Figure 2-1, Volume 3, Section 2 of this EIS.

Table 24-2: Potential environmentally hazardous substances – construction phase

Chemical Name	Indicative Rate of Usage	Indicative maximum inventory onsite	Indicative Storage Details	Transport and Handling Details	Storage Location
Diesel	500 kL/yr	70 kL	2 x 35 kL above-ground storage tanks	Road transport by 57 kL fuel tanker to construction site storage tanks. Manual transfer to vehicles on-site	Construction site.
Diesel	Back-up power generator	10 kL	2 x 5 kL above-ground storage tanks	Road transport to camp sites by fuel tanker.	Near the diesel generator at camp sites.

Chemical Name	Indicative Rate of Usage	Indicative maximum inventory onsite	Indicative Storage Details	Transport and Handling Details	Storage Location
Oils	50 kL/yr	4 kL	4 x 1000 L Tanks	Road transport to construction site storage tanks.	Fuel farm and maintenance area.
Hydrochloric acid	10 kL/yr	2 kL	2 x 1000 L	Road transport to construction site storage tanks.	Construction site.
Chlorine	3 t/year	1 tonne	In cylinders	Road transport. Manual transfer to storage.	Water treatment plant.
Sodium hypochlorite	4 kL/year	0.5 kL	In tank	Road transport. Manual transfer to storage.	Sewage treatment plant.
Waste Oil	Quantity generated = >500 L per month	1 t	Waste oil bins, bunded	Manual transfer to licensed contractor vehicles for recycling.	Waste storage area.
Car Batteries	Quantity generated = 0.1 t	0.1 t	Waste container	Manual transfer to licensed contractor vehicles for recycling.	Waste storage area.
Waste tyres	Quantity generated = 10 t	10 t.	Concrete floor with roof	Return to tyre supplier for retreading or disposal.	Waste storage area.

Table 24-3: Potential environmentally hazardous substances – operation phase

Chemical Name	Indicative Rate of Usage	Indicative maximum inventory on site*	Indicative Storage Details	Transport and Handling Details	Storage Location
Diesel	3000 kL/yr	440 kL	4 x 110 kL above-ground storage tanks (bulk storage)	Road transport to marshalling yard by 57 kL fuel tanker B double type. Manual transfer to locomotives on-site.	Fuel farm at marshalling yard.

Chemical Name	Indicative Rate of Usage	Indicative maximum inventory on site*	Indicative Storage Details	Transport and Handling Details	Storage Location
Diesel	Back-up power generator	10 kL	2 x 5 kL above-ground storage tanks	Road transport from to marshalling yard by fuel tanker.	Near the diesel generator at marshalling yard.
Oils	300 kL per annum	40 kL	In tanks and drums	Road transport to marshalling yard. Manual transfer to vehicles on-site.	Marshalling yard.
Acetylene	Assumed 90 bottles per annum	245 m^3	In standard bottles	Road transport. Manual transfer to storage.	Store at marshalling yard.
Oxygen	Assumed 90 bottles per annum	245 m^3	In standard bottles	Road transport. Manual transfer to storage.	Store at marshalling yard.
Aluminium sulphate	Assumed 10 kL/year	4 kL	In tanks	Road transport. Manual transfer to storage.	Water treatment plant.
Sodium hypochlorite	4 kL/year	0.5 kL	In tank	Road transport. Manual transfer to storage.	Sewage treatment plant.
Waste Oil	Quantity generated = 10 tpa	2 tonne	Waste oil bins	Manual transfer to licensed contractor vehicles for recycling.	Waste storage area marshalling yard.
Batteries	Quantity generated = 0.1 t	0.1 tonne	Waste container	Manual transfer to licensed contractor vehicles for recycling.	Waste storage area marshalling yard.
Waste tyres	Quantity generated = 20 t	20 tonne	Waste storage area	Return to supplier for retreading or disposal off-site.	Waste storage area at marshalling yard.

Power for facilities at the marshalling yard is likely to be supplied by the local electricity service provider supplying power to the Abbot Point State Development Area (APSDA). Backup power at the marshalling yard and maintenance facility will be provided from power generators.

Solar power will be used for all remote wayside locations and points. Backup battery with adequate capacity will be provided to run signalling equipment for a minimum number of days depending upon worst case weather patterns.

24.2.2.3 Hazardous Properties

An indicative list of substances and quantities stored on site is provided in Table 24-1, Table 24-2 and Table 24-3. Hazardous properties in relation to environmental and community risks are identified below to support evaluation of risks.

Diesel

Diesel is a combustible liquid with a flash point of > 61.5^{o}C, specific gravity 0.85 at 15^{o}C and vapour pressure < 1 mm Hg at 25 ^{o}C. Due to the properties of diesel, there is no risk of violent explosion with a diesel fire. Diesel has very low solubility in water and is incompatible with strong oxidising agents.

Contact with eyes and skin will cause irritation. Inhalation of high concentrations will result in headaches, dizziness, nausea, vomiting, drowsiness or narcosis. The Time Weighted Average (TWA) National Occupational Health and Safety Commission (NOHSC) exposure standard for oil mist is 5 mg/m^{3}. Diesel is also toxic to plants and animals.

Oils (Lubrication and hydraulic)

Oils are typically clear green viscous liquids with specific gravity of 1.01 to 1.03 and a boiling point of 100 – 105^{o}C. They are an irritant to eyes and skin after prolonged exposure. When released into the environment, absorption to sediment and soil will be the predominant behaviour.

Bioaccumulation is unlikely due to the very low water solubility therefore bioavailability to aquatic organisms is minimal. Oils are toxic to plants and animals and coating of plants and animals with oil can cause death.

Acetylene

Acetylene is a highly flammable explosive used as a fuel in high temperature welding. It is a colourless gas with garlic like odour, a vapour pressure of 4700 kPa at 25^{o}C and a flash point of < 23^{o}C. Acetylene has a lower explosion limit of 2.5%. It is a non-toxic and non-irritating gas but in confined spaces will displace oxygen, potentially causing asphyxiation. As it is a gas and is typically used in small quantities, any leaks are unlikely to result in toxic effects in the environment.

Sodium hypochlorite

Sodium hypochlorite is a pale yellow-green coloured liquid. It is alkaline and miscible with water. It is stable under normal ambient and anticipated storage and handling conditions of temperature and pressure. It is incompatible with acids and metals. Swallowing can result in nausea, vomiting, diarrhoea, abdominal pain and chemical burns to the gastrointestinal tract. It is a severe eye irritant and corrosive to eyes. Contamination of eyes can result in permanent injury. It is a severe skin irritant and corrosive contact may cause skin burns.

Sodium hypochlorite is soluble in water and in large quantities, may raise pH and cause acute toxic effects to aquatic organisms.

Aluminium Sulphate

Aluminium sulphate is used as a water treatment chemical. It is a colourless odourless liquid with specific gravity of 1.30 to 1.32. It is irritating to eyes and skin.

It is slightly corrosive to metals and incompatible with alkalis (e.g. sodium hydroxide). It is non flammable but may evolve toxic aluminium/sulphur oxides when heated to decomposition.

Exposure to aluminium sulphate can cause chronic toxicity effects in aquatic organisms.

Hydrochloric acid

Hydrochloric acid is a colourless liquid. It is corrosive and may cause burning of mouth, throat and stomach. Ingestion may cause coughing, constriction of the throat due to swelling of the larynx and vomiting of blood. The exposed person may experience breathing difficulties. Exposure to eyes may cause ulceration and corneal burns and may result in permanent eye damage. Brief exposure to skin causes irritation while prolonged exposure may result in burns.

Hydrochloric acid is acidic. If a large spill occurred and entered surface waters, the water pH will drop and as a result impact upon the aquatic organisms.

Chlorine

Chlorine is a greenish, yellow gas or clear amber liquid and has pungent and suffocating bleach-like odour. Chlorine (liquefied gas) is highly irritable and corrosive to exposed tissues and to mucous membranes of the eyes and respiratory tract and may be fatal if inhaled. Cryogenic, or frostbite “burns” may be experienced when incorrectly handling chlorine (liquefied gas). Toxic doses of chlorine acutely affect cerebral energy metabolism, localised at the base of the brain.

Chlorine is soluble in water and causes acute toxic effects to aquatic plants and animals. In water, chlorine can also react with organic material to create chlorinated organic substances which may be toxic and may be persistent in the environment.

Oxygen

Oxygen is an oxidising, colourless and odourless gas. Contact with combustible material may cause fire.

It does not have any toxic properties to humans or other organisms.

Coal

Coal is not classified as a hazardous material as per the ADG Code. After mining, it occurs in irregular shape chunks, dense, greyish black to black colour. Coal is a naturally occurring material that is a mixture of many kinds of materials, such as organic and inorganic materials formed over long periods of time under pressure. Coal contains significant carbon, and smaller percentages of the elements hydrogen, oxygen, nitrogen, and sulfur. Inorganic compounds such as aluminium and silicon oxides constitute the ash.

Most of the constituents in coal are tightly bound and normally require exceptional circumstance such as presence of concentrated acid/alkali for contaminants to leach to the environment. On this basis, coal spills on land are not likely to result in any significant consequences to the environment. However, releases of coal to water can cause smothering of organisms, reduction in light penetration and discolouration of the water by release of coal fines.

Ingestion, skin contact or eye contact may cause irritation. Inhalation of coal dust may cause respiratory illnesses such as pneumoconiosis (chronic lung disease), bronchitis and emphysema in exposed workers. The Occupational Safety and Health Administration (OSHA) permissible exposure limit (PEL) for the respirable fraction coal dust with < 5% silica is 2.4 mg/m^3 time weighted average.

Coal is a flammable solid and may liberate hydrogen, methane, carbon monoxide, oxides of sulfur and hydrogen, coal tar pitch volatiles upon thermal decomposition.

24.2.2.4 Transport, Storage and Handling

General

The following general requirements will be applied to the transport, storage and handling of environmentally hazardous substances during both construction and operation of the Project:

- Material Safety Data Sheets (MSDS) for dangerous goods will be available at the main office and at storage locations during both construction and operation;
- procedures will be developed for loading, unloading and handling hazardous materials;
- transport activities will comply with requirements of the ADG Code;
- storages will conform to the requirements under relevant Australian Standards; and
- general requirements in relation to environmentally hazardous substances will be covered in inductions and reviewed in tool box talks.

Specific requirements for individual hazardous substances are outlined below.

Diesel

During the operation of the Project, diesel will be used by locomotives used to haul coal trains. It will be stored at the marshalling yard (refer to Figure 2-1, Volume 3, Section 2 of this EIS). During the construction of the Project, diesel will be used in dozers, graders, excavators, scrapers, dump trucks, rollers, backhoes, water carts, cranes and piling rigs and will be stored at the construction sites.

Diesel will be transported by road to bulk storage tank farm at marshalling yard and construction site. Trucks used to transport diesel will comply with all aspects of the ADG Code.

HPPL will maintain minimum inventory of fuels on site. The indicative maximum diesel storage during the operation phase will be 440 kL at the marshalling yard in four above ground tanks each with a capacity to hold 110 kL. Indicative maximum storage during construction phase will be 70 kL in two above ground tanks each with a capacity to hold 35 kL at the construction sites.

For both construction and operation, diesel storage tanks will not be interconnected and will be fully bunded on impervious surfaces. The tanks will be designed as per *AS 1940: 2004 – The storage and handling of flammable and combustible liquids (AS 1940)*.

All tank transfer operations will occur on an impervious surface with a spill collection system. Dedicated fuel tanker delivery and turn around area is provided to minimise risk of vehicle accident. Dedicated filling points for on-site construction vehicles will also be provided with impervious surfaces and containment using rollover bunds. Build-up of electrostatic charges will be prevented by bonding and grounding.

The marshalling yard will have a back-up diesel generator. The fuel storage tank for the back-up diesel generator will be filled from the day tank by a manually operated pump.

For diesel storage, the net capacity of each bund/compound will be the tank capacity plus the output of any fire water over a 20 minute period. This will also allow for containment of the Q100 rainfall event. Incident rainfall will drain to a sump and be transferred by a manually controlled pump to a

proprietary hydrocarbon treatment device before being reused on-site for dust suppression. Daily checks of the bunds for stormwater accumulation will be undertaken and procedures developed to direct management of water in the bunded areas.

There will be no pipes through the bunds and all valves will be designed to operate in a closed position and will require manual override to open. Intermediate refuelling tanks will be provided for heavy vehicles and light vehicles. These will be placed above ground and will be designed and constructed in accordance with AS 1940. Dedicated refuelling areas will be constructed adjacent to these refuelling tanks and will consist of bunded concrete surfaces with a drainage sump in one corner.

During the construction phase, maintenance and servicing of vehicles will be undertaken at contractor lay down areas or other appropriate facilities.

During construction, less mobile machinery and equipment will be refuelled using mobile tankers. Safe handling techniques will be practised during transfer operations to prevent spillage. Such refuelling will take place at least 20 m from any watercourse. Refuelling will be closely supervised by trained personnel and spill kits will be available on the mobile tanker truck to contain and clean up any spills during refuelling.

During operation, spill kits will be available at storage and refuelling areas to contain and clean up minor and moderate spills. Spillages will be immediately cleaned up with appropriate absorbent materials. Any contaminated material will be collected and placed in a labelled container for off-site disposal through a licensed contractor.

Personal protective equipment (PPE) for exposure control will consist of impervious material gloves for hand protection, safety glasses or face shield for eye protection and suitable personal clothing for body protection. All PPE will conform to the relevant Australian Standards.

Suitable fire fighting systems will be provided. In the event of fire, emergency response will include the use of carbon dioxide, dry chemical or foam and personnel who engage in emergency response activities will wear breathing apparatus. On site emergency response teams will be trained to undertake the necessary actions to address fire and other incidents that may arise within areas used for storage of hydrocarbon products and other hazardous materials.

Regular inspection of all petroleum product storage areas will be conducted. Results will be reported to the Site Manager.

Oils (Lubrication and hydraulic)

For construction and operation phases of the Project, oils will be transported by road. Indicative maximum storage quantity of oil will be 40 kL at the marshalling yard. Oils will be stored in drums or above ground tanks in the fuel farm and the marshalling yard within a bunded compound. Activities using oils will generally be conducted on a hard stand area, and drip trays will be provided at appropriate locations including during the transfer operations.

During construction, some servicing of larger, less mobile machinery will need to be undertaken outside these facilities. During operation, servicing of on-site equipments will also need to be undertaken. Appropriate risk assessment and controls will be put in place in such circumstances including:

- forward planning of the activity using a job safety and environmental assessment;

- use of drip trays wherever possible to collect any spills, particularly where work is to take place near waterways and other environmentally sensitive areas;
- immediate transfer of used oils to waste oil containers; and
- availability of spill kits, including containers for disposal of any contaminated material.

Oxygen

Compressed oxygen gas cylinders will be stored at the maintenance area in a specific storage area within the stores compound for gas bottles. They will be kept upright in a secure area on a firm floor to prevent falling. Procedures will be developed for emergency response in the event of a leak of oxygen from a cylinder. PPE and emergency response equipment will be provided.

Oxygen will be transported to site in individual cylinders by road. Transport will comply with the ADG Code.

The likelihood of exposure of the community or environment to harmful effects arising from transport or use of oxygen is very low. Likelihood of rupture of individual cylinders is low, and in the event of a rupture, the quantities contained in each cylinder are unlikely to cause any change in ambient oxygen concentrations outside the immediate area.

Acetylene

Acetylene bottles will be kept upright, in the secure area within the stores compound on firm floor to prevent falling. Bottles will not be stored near sources of ignition, oxidising agents, poisons, flammable liquids or combustible materials.

Procedures will be developed for emergency response in the event of a leak from a cylinder. PPE and emergency response equipment will be provided.

Response procedures will address fire and explosion risk from acetylene and personnel will be trained in safe use and emergency response. These procedures will minimise risk of fire arising from an incident involving acetylene impacting on sensitive community or environmental receptors.

Acetylene will be transported to site in individual cylinders by road. Transport will comply with the ADG Code.

The likelihood of exposure of the community or environment to harmful effects arising from transport or use of acetylene is very low. The likelihood of rupture of individual cylinders is low, and in the event of a rupture, the quantities contained in each cylinder are unlikely to result in exposure to harmful concentrations of acetylene outside the immediate area.

Chlorine

Chlorine will be transported to site and stored in individual cylinders. Transport will comply with the ADG Code. Chlorine gas bottles will be stored at the water treatment plants and will be automatically dosed to minimise contact and accidental release.

Storage will be in accordance with Australian Standard AS/NZS 2927: 2001 *The storage and handling of liquefied chlorine gas*. Personnel involved in water treatment processes will be trained in proper use of chlorine and in potential hazards such as contact with incompatible substances.

The overall quantities of chlorine used on the site are low and the likelihood of rupture of a chlorine cylinder is also very low. Accidental releases from the storage area would be in gaseous form and

would quickly disperse, thus presenting minimal likelihood of exposure of members of the community or the environment to harmful chlorine levels.

Aluminium Sulphate

Aluminium sulphate will be transported in bulk containers to site by road. Transport will comply with the ADG code. Aluminium sulphate containers will be stored in a secured, cool, dry, well ventilated area and away from alkalis and most metals. Dosing at the water treatment plant will be automated to minimise risk of human contact and accidental release. In the event of accidental release outside the water storage area, the quantities of aluminium sulphate are low enough that it is unlikely that the community or environmental receptors would be exposed to harmful levels.

Sodium hypochlorite

Sodium hypochlorite will be transported in bulk containers from Gladstone to site. The containers will be transported by trucks via most suitable roads. Transport will comply with the ADG code.

Sodium hypochlorite containers will be stored in a secured, cool, dry, well ventilated area and away from incompatible materials. Dosing at the wastewater treatment plant will be automated to minimise risk of human contact and accidental release.

The overall quantities of sodium hypochlorite used on the site are low and the likelihood of accidental release outside the wastewater treatment plant area is also very low. Accidental releases of small quantities of sodium hypochlorite from the storage area would quickly react with organic material. However it is unlikely to spread very far and such it is unlikely to expose members of the community or the environment to harmful levels.

Accidental overdosing of hypochlorite in the wastewater treatment process may result in harmful chlorine levels in treated wastewater. However as this is to be contained on site and reused, environmental and community exposure is likely to be limited.

24.2.3 Roads and Traffic

For the construction and operation phases, existing access at Bruce Highway, Bowen Developmental Road, Suttor Developmental Road, the new Cerito Elphinstone Road, the Gregory Developmental Road, and the Clermont Alpha Road will serve as the major access roads. If required, additional access paths will be identified by the construction contractor and access negotiated with landowners. Where private farm roads are to be used, this will be with negotiation with the landholder.

Volume 3, Section 17 provides further information on Project related traffic and an assessment of traffic impacts.

Transportation of diesel, chemicals and gases will be by road and is discussed in Section 24.2.2.4 below.

24.2.4 Rail Traffic

The Project corridor traverses Barcaldine Regional Council (BRC), Isaac Regional Council (IRC), the Whitsunday Regional Councils (WRC) and the APSDA at the northern end of the Project corridor. No major towns are located along the Project corridor.

The Project corridor will cross the following major roads:

- Suttor Developmental Road at chainage 250 km (grade separated crossing);
- Gregory Developmental Road at chainage 155 km (grade separated crossing);
- Kilcummin Diamond Downs Road at chainage 215 km (grade separated crossing);
- Collinsville – Elphinstone Road at chainage 315 km (level crossing);
- Bowen Developmental Road at chainage 325 km (grade separated crossing); and
- Bruce Highway at chainage 490 km (grade separated crossing).

A number of other minor roads will also be crossed, using level crossings. More information is provided in Volume 3, Section 17. The proposed level crossings will satisfy Australian Standard AS1742.7 – 2007: *Manual of uniform traffic control devices – Railway crossings.*

A 60 m wide corridor will be required for the track, drainage, access roads and other infrastructure to support the construction and operation of the Project. The tracks will have a design life of 50 years. HPPL proposes to fence the Project corridor to prevent cattle from accessing the work area. Large box culverts will be provided for cattle and landowner crossings.

For the transportation of 60 Mtpa of coal, seven trains per day will be required on average (14 train movements per day) on a single bi-directional track. Eight passing loops will be provided. It is proposed to install Train Order or the 'in-cab' signalling system for speed control and driver assistance. The wagons will have lip seals on the bottom dump doors to prevent coal loss through the doors, angled sills to prevent coal from remaining on the sills after loading and subsequently dislodging en-route, and a high body design which shrouds the coal payload resulting in reduced dust emissions.

The rail bridges will be designed in accordance with applicable standards such as the Australian Standard AS 5100: 2007 *Bridge Design Set* which considers flood forces and earthquake forces. Scour protection and erosion control measures will be provided during construction and in the overall design. Rock fall protection measures will be provided as required along the Project corridor. Rail traffic is discussed further in Volume 3, Section 17 of this EIS.

24.2.5 Marshalling Yard

A marshalling yard is proposed to be constructed at the northern end of the Project corridor within the APSDA. It will occupy an area of 6 km long by 500 m wide and will include approximately 25 km of track and facilities required for refuelling and servicing of wagons and locomotives, and fuel and lube oil storages. Hazards associated at the yard will be associated with the storage, handling and use of environmentally hazardous substances. These are described under Section 24.2.2.4.

24.2.6 Natural Hazards

24.2.6.1 Overview

A natural hazard is a naturally occurring situation or condition with the potential for loss or harm to the community or environment (SPP 1/03, 2003). Projects may increase the risk of certain natural hazards occurring, for example landslides and floods. The occurrence of natural hazards may also cause or exacerbate the effects of project-related hazards on the environment or community.

24.2.6.2 Tropical Cyclones

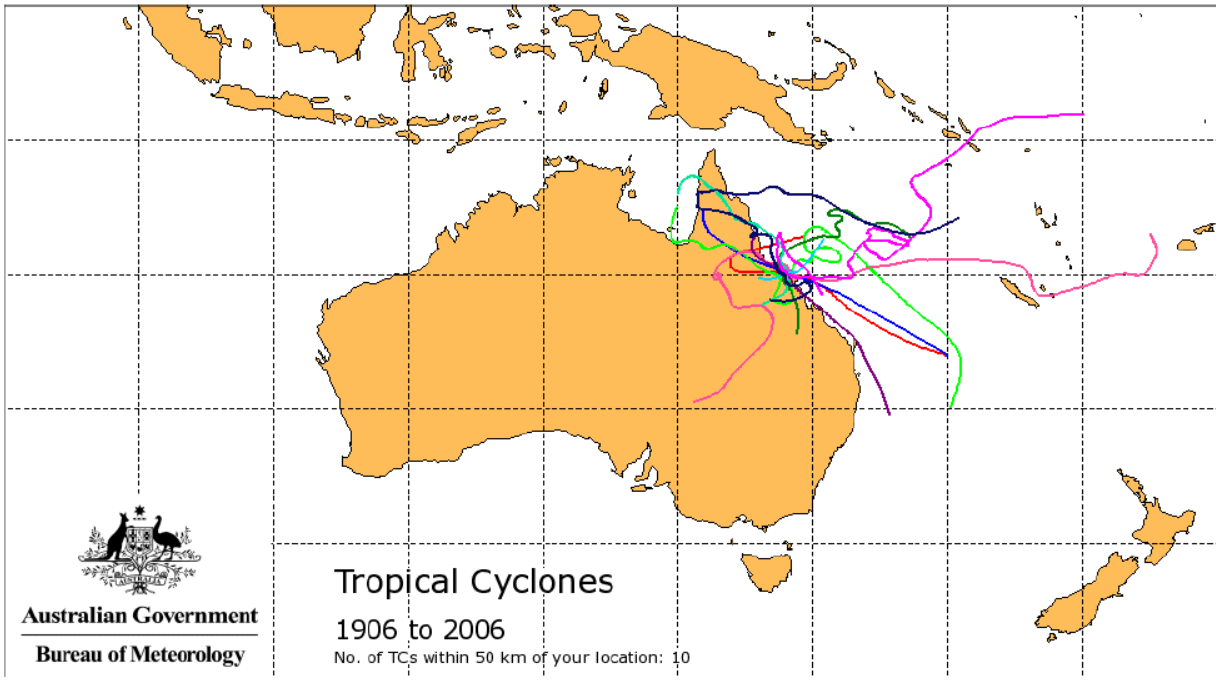
A tropical cyclone (TC) is an area of low pressure that develops into a major storm system, bringing heavy rains and strong winds. The TC Warning Centre of the Bureau of Meteorology (BoM) issues a tropical cyclone warning when a cyclone or developing cyclone is likely to affect coastal or inland communities. Australia's tropical cyclone season is usually from November to April inclusive and affects most of the Queensland coast. There are five categories of cyclones, with Category 1 being the weakest and Category 5 being the strongest (Table 24-4). Over the period of 1906 – 2006, a total of 10 TCs have passed within 50 km of Bowen (Figure 24-2).

Project structures at the marshalling yard including railway wagons and locomotives are likely to be exposed to cyclonic conditions. TC risks will be evaluated in the detailed design stage of the Project and appropriate design standards adopted to ensure that all structures, including those that contain hazardous materials, are designed to withstand wind and rain associated with cyclonic events. The Project itself will not increase the likelihood or severity of cyclones in the area.

Table 24-4: Wind speeds associated with Tropical Cyclones

Category	Wind Speed (kilometres per hour)	Potential Effects
1	Less than 125	Minimal house damage. Damage to some crops, trees and caravans. Boats may drag moorings.
2	125 – 164	Minor house damage. Significant damage to signs, trees and caravans. Heavy damage to some crops. Risk of power failure. Small boats may break moorings.
3	165 – 224	Some roof and structural damage. Some caravans destroyed. Power failure likely.
4	225 – 279	Significant roofing and structural damage. Many caravans destroyed and blown away. Dangerous airborne debris. Widespread power failures.
5	Greater than 279	Extremely dangerous with widespread destruction.

Figure 24-2: Tropical Cyclones within 50km of Bowen (1906 – 2006) (Source: BoM, 2010)



24.2.6.3 Tsunami

A tsunami is a sudden influx of water on shore from an earthquake, land slide or volcanic eruption beneath the ocean floor. A tsunami is not the same as a tidal wave, which is a term incorrectly used to describe tidal bores. Tidal bores are not a risk for the barge landing.

A sub marine disturbance does not necessarily have to occur in the coastal areas of Rockhampton for the wharf to be affected. Tsunamis have very long wavelengths[1] and their impact can be felt hundreds of kms away from the source point.

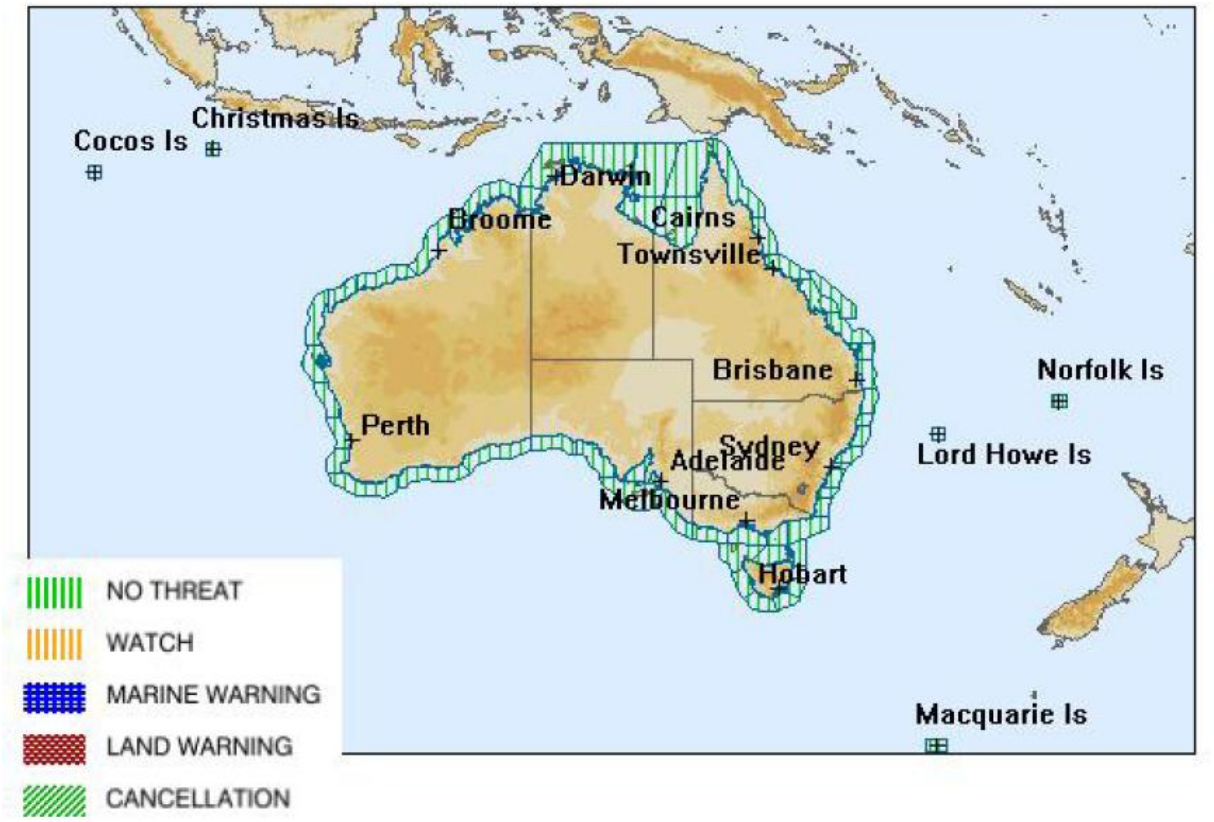
The BoM has an online warning system that can be viewed to determine any risk of tsunami at www.bom.gov.au/tsunami/index.shtml. The system displays a map that gives colour coded warnings to coastal regions of Australia (refer to Figure 24-3).

Marshalling yard is inland and is not likely to be directly exposed to a tsunami. However, the Project corridor is closer to the coast and as such it is possible that some wave action/water level increase may occur. This will be addressed in the Incident Response Plan (IRP) for the Project.

During the construction phase of the Project, the contractor and during the operation phase of the Project, the Project officials from HPPL will monitor the online system to determine the risk of tsunami for the northern end of the Project corridor.

[1] The wavelength of a wave is the distance between the crests of two waves. Wave period is the time it takes for two consecutive wave crests (or peaks) to pass a set point. In the case of a tsunami, this can be up to one hour.

Figure 24-3: Tsunami online warning system (Source: BoM, 2010)



24.2.6.4 Earthquake

Earthquakes are a risk everywhere and although they are not common in the Project area, the risk must still be considered. An online search for earthquakes recorded in the Bowen area revealed that the most recent earthquake recorded was of 5.7 magnitude on Richter scale at Lat -20.0 and Long 147.0 on 18 Dec 1913 northwest of Collinsville (Geoscience, 2010). Earthquake of 3.0 magnitude on the Richter scale recorded closest to the Project corridor was at Lat -22.375 and Long 147.277 on 18 Apr 1994. The earthquake hazard map of Australia for 1991 categorises the Project area as having an acceleration coefficient of between 0.03 to 0.09 with 10% chance of being exceeded in 50 years (Geoscience, 2010).

Earthquake risk will be quantified in the detailed design stage of the Project and appropriate earthquake design standards applied to all structures.

24.2.6.5 Bushfire

The Project corridor will pass through areas classified as low to medium bushfire hazard as identified from the relevant BRC, IRC and WRC Planning Schemes. The aim of the potential Bushfire Risk Area classification is to ensure appropriate design of proposed developments in potential bushfire prone areas is undertaken so as to minimise the number of people and properties subject to bushfire risk.

Australian Standard AS 3959-1999 *Construction of Buildings in Bushfire prone areas* will be consulted and complied with. HPPL has provided firebreak around the proposed construction camps.

The 60 m wide Project corridor required for the track, drainage, access roads and other infrastructure will be clear of any trees. HPPL will conduct separate studies to identify chainages passing through bush fire risk areas and will take preventive measures such as maintaining adequate fire break corridors and will liaise with local authorities to develop a response plan.

24.2.7 Hazard Analysis and Risk Assessment

Sections 24.2 and 24.2.6 provide an analysis of potential hazards to members of the community and the environment associated with the Project activities.

AS/NZS 31000 considers risk as exposure to the consequences of uncertainty or potential deviations from what is planned objective. Frequency or likelihood rather than probability is used to describe risk. Consequence is defined as an outcome of an impact and is described under the Consequence scale of the matrix risk assessment (refer to Table 24-5). Findings of the assessment are provided in Table 24-7.

Unmitigated high and moderate risks identified include the following:

- possibility of diesel spill either during transportation or storage;
- possibility of an injury or fatality during a road accident that is caused by increased vehicular traffic;
- bush fire risk for the Project; and
- possibility of injury or fatality during a railway accident.

Table 24-5: Project Risk Matrix

	Consequence				
Likelihood	**Severe (5)**	**Major (4)**	**Moderate (3)**	**Minor (2)**	**Negligible (1)**
Almost certain (5)	High	High	High	Moderate	Moderate
Likely (4)	High	High	Moderate	Moderate	Low
Possible (3)	High	High	Moderate	Low	Insignificant
Unlikely (2)	High	Moderate	Low	Insignificant	Insignificant
Rare (1)	Moderate	Moderate	Low	Insignificant	Insignificant

LIKELIHOOD CRITERIA	
Likelihood	Probability band
Almost certain (5)	The event is expected to occur (Frequency: > 90%). Could occur within months.
Likely (4)	The event will probably occur (Frequency: > 70-90%). Could occur annually.
Possible (3)	The event should occur at sometime (Frequency: > 30 -70%). Could occur in the next two to ten years.
Unlikely (2)	The event could occur (Frequency: 10 - 30%). Could occur once in the next 10 to 30 years
Rare (1)	The event will occur in exceptional circumstances (Frequency: <10%). Not likely to occur in next 30 years.

Table 24-6: Consequence criteria

Consequence	Criteria Definition	
Environment and Community		
Severe (5)	Serious environmental harm. Irreversible impacts or widespread impacts. Impacts on high conservation or special significance areas.	
	Total failure of the environmental control system.	
	Death or serious injury of more than 5 persons	
Major (4)	Material environmental harm. Significant impact which will adversely affect and will be long term.	
	Substantial failure of the environmental control system.	
	Death or serious injury of 1-5 persons	
Moderate (3)	Potential environmental harm that causes local adverse impacts.	
	Failure of the environmental control system.	
	Serious injury to one or more persons, significant disruption to daily activities results in severe financial loss	
Minor (2)	Environmental harm resulting in minor adverse impacts. Could be temporary.	
	Disruption to daily activities, possibly resulting in financial loss	
Negligible (1)	Environmental harm resulting in minimal impacts. Low temporary environmental impact.	
	Minor disruption to daily activities, no financial loss	
	No news item.	
RESPONSES		
Risk Level	**Delegate**	**Description**
High	Directors	Eliminate or reduce risk through additional control measures along with a documented action plan.
Moderate	General Managers	Risk must be eliminated or reduced. Requires a documented action plan.
Low	Senior Management	Acceptable with formal review. Documented action plans required.
Insignificant	Employee	Acceptable with review. Rationale must be documented.

Table 24-7: Risk register based on preliminary hazard assessment for the Project

			Risk Rating				Risk rating with controls in place		
Item No	Activity Description	Potential Consequences	Likelihood. Consequence		Risk rating	Control and Response Strategies	Likelihood, Consequence		Risk rating
1	Fuel tanker crash – single vehicle with rupture of one or more tanks	Release of diesel to soils if tank ruptures, resulting in soil contamination and vegetation health impacts. In case of large spills, release of diesel to rivers and creeks listed under Volume 3, Section 23.7.2 of this EIS, resulting in sediment and water contamination downstream and potentially impacting on aquatic ecosystems.	3	3	Moderate	All vehicles conform to ADG Code. Drivers trained in safe driving of the vehicle, including any speed limit restrictions dictated by road conditions. Zero tolerance for drugs and alcohol for all drivers. First aid, spill response (minor and moderate spills) and fire fighting equipment will be available with each fuel truck. Spill response equipment for larger spills available at marshalling yard for deployment. Drivers trained in spill response. Spill response procedures in place and implemented in the event of spills. Containment and immediate clean up of spills. Removal of contaminated soils and sediments and rehabilitation of damaged vegetation.	2	2	Insignificant

			Risk Rating				Risk rating with controls in place		
Item No	Activity Description	Potential Consequences	Likelihood. Consequence		Risk rating	Control and Response Strategies	Likelihood, Consequence		Risk rating
2	Fuel tanker crash – involving another vehicle.	Potential impacts will be similar to those identified for item 1, single vehicle crash with rupture of one or more tanks. Refer item 10 for impacts on occupants of other vehicle	3	3	Moderate	As for item 1	2	2	Insignificant
3	Vehicle carrying lubricating oils crashes and ruptures oil container.	Release of oil to soils if tank ruptures, resulting in soil contamination and vegetation health. Release to waterways. Impacts as per Item 1, but more localised due to lower volumes likely to be released and more viscous nature of material.	3	1	Insignificant	As for item 1	2	1	Insignificant
4	Vehicle carrying lubricating oils crashes with another vehicle and ruptures oil container.	Potential impacts will be similar to those identified for Item 3, single vehicle crash with rupture of one or more containers. Refer to Item 10 for impacts on occupants of other vehicle.	3	1	Insignificant	As for item 1	2	1	Insignificant
5	Vehicle carrying waste oil crashes and ruptures waste oil container	Release of oil to soils if tank ruptures, resulting in soil contamination and vegetation health. Release to waterways. Impacts as per Item 1, but more localised due to lower volumes likely to be released and more viscous nature of material.	3	1	Insignificant	As for Item 1.	2	1	Insignificant

			Risk Rating				Risk rating with controls in place		
Item No	Activity Description	Potential Consequences	Likelihood. Consequence		Risk rating	Control and Response Strategies	Likelihood, Consequence		Risk rating
6	Vehicle carrying waste oil crashes with another vehicle and ruptures waste oil container.	Potential impacts will be similar to those identified for Item 3, single vehicle crash with rupture of one or more containers. Refer to Item 10 for impacts on occupants of other vehicles.	3	1	Insignificant	As for Item 1.	2	1	Insignificant
7	Vehicle carrying chlorine cylinders crashes and results in chlorine gas leakage.	Chlorine may cause scorching of leaves in immediate vicinity of incident. Quantities are small and dispersion will be rapid.	2	1	Insignificant	All vehicles conform to ADG Code. Drivers trained in safe driving of the vehicle, including any speed limit restrictions dictated by road conditions. Zero tolerance for drugs and alcohol for all drivers. First aid kit in vehicle.	1	1	Insignificant
8	Vehicle carrying acetylene, oxygen and nitrogen gas cylinders crashes and results in gas leakage.	Very localised and very short term impact only. Release volumes will be negligible. Damage to plants and animals is unlikely. Release of acetylene/ oxygen may result in fire and explosion in presence of an ignition source.	2	1	Insignificant	Potential for ignition source will be unlikely as the trucks will comply with the requirements for transporting dangerous materials, including compatibility requirements.	1	1	Insignificant

			Risk Rating				Risk rating with controls in place		
Item No	Activity Description	Potential Consequences	Likelihood. Consequence		Risk rating	Control and Response Strategies	Likelihood, Consequence		Risk rating
9	Increased traffic along road to carry people from construction camp to work site resulting in an accident.	Death or injury to occupants of the vehicles. Damage to personal property (vehicle).	3	4	High	Traffic management plan developed in consultation with TMR and Councils. Project related traffic during daylight hours only where possible. Drivers trained in safe driving of the vehicle. Zero tolerance for drugs and alcohol for all drivers. First aid kits in all Project related vehicles.	2	4	Moderate
10	Increased traffic along roads to carry material from quarries and transportation of raw materials resulting in an accident.	Death or injury to occupants of the vehicles. Damage to personal property (vehicle).	3	4	High	As for Item 9.	2	4	Moderate
11	Diesel storage – spillages and leakages.	Contamination of surface waters either by direct release or leaching through soil. Contamination of groundwater. Damage to vegetation.	3	3	Moderate	All storages will comply with AS 1940 requirements, thus minimising the likelihood of rupture or leak that results in release to the environment. Procedures developed for all fuel transport and unloading operations. Personnel trained in procedures. Incident response plan to include diesel spills. All contaminated material to be collected and placed in secure containers for later disposal.	2	2	Insignificant

			Risk Rating				Risk rating with controls in place		
Item No	Activity Description	Potential Consequences	Likelihood. Consequence		Risk rating	Control and Response Strategies	Likelihood, Consequence		Risk rating
12	Spill or leak of diesel from mobile fuel tanker. Spill or leak of diesel from plant and equipment.	Potential to cause localised contamination to soil and damage to nearby vegetation.	2	1	Insignificant	Conduct regular inspection of all vehicles. Procedures developed for refuelling and cleaning up of minor spills. Spill response equipment available in vehicles and personnel trained in appropriate use	1	1	Insignificant
13	Maintenance of site vehicles and construction equipment resulting in spills of diesel and/or oils.	Potential to cause localised contamination to soil and damage to nearby vegetation.	3	2	Low	Provide hardstand areas for refuelling and maintenance activities. Provide spill collection and disposal systems. Develop procedures for these activities. Train staff to follow procedures and incident response.	2	1	Insignificant
14	Waste oil storage – spillages and leakages	Potential to cause localised contamination to soil and damage to nearby vegetation. Quantities are likely to be small (less than 100L) and material is viscous, reducing likelihood of flows to creeks.	2	2	Insignificant	Procedures developed for storing and handling oils and waste oils. Store oil and waste oil in secure containers in enclosed locations. Spill clean up equipment available at workshop and oil/waste oil storage areas. Personnel trained in use.	1	1	Insignificant

			Risk Rating				Risk rating with controls in place		
Item No	Activity Description	Potential Consequences	Likelihood. Consequence		Risk rating	Control and Response Strategies	Likelihood, Consequence		Risk rating
15	Hypochlorite spill from storage at sewage treatment plant	Potential impacts on ecosystems if released to surface waters or land.	2	2	Insignificant	Store and handle as per manufacturer's instructions. Comply with Australian Standards. Routine inspections. Dosing will be automated, minimising risk operator error.	1	1	Insignificant
16	Bush fire at camp site or construction site either from natural occurrence or from activities at camp site.	Loss of vegetation/habitat, loss of property, damage to pasture The Project area is not densely vegetated and population density is very low; life threatening bushfires are not anticipated.	3	3	Moderate	Maintain adequate fire breaks around camp sites. Liaise with local regulatory agencies to determine preventative and responsive measures. Train construction workers on bushfire management.	1	3	Low
17	Severe weather resulting in flooding.	Suspension in Project activities. Possibility of contamination of surface water bodies, damage to vegetation, soil contamination due to chemical/ fuel spillages. Sedimentation of surface water bodies due to construction related soils.	2	2	Insignificant	A Stormwater Management Plan (SMP) will be developed by the construction contractor. Adequate bunding arrangements at fuel and chemical storages to prevent contamination of surface water bodies.	2	1	Insignificant
18	Landslides along the Project corridor.	Suspension in Project activities. Potential for injuries to workforce or public. Contamination of surface water bodies.	3	2	Low	Conduct geotechnical investigation. Design to address issues around landslides.	2	2	Insignificant

			Risk Rating				Risk rating with controls in place		
Item No	Activity Description	Potential Consequences	Likelihood. Consequence		Risk rating	Control and Response Strategies	Likelihood, Consequence		Risk rating
19	Spills or leaks from wagons of coal trains.	Release of coal to land. Effects on lands within less than 50m from alignment. Depending on location of spills, coal may enter surface waters causing smothering of aquatic ecosystems. Only two residential houses have been identified within 500 m of the Project corridor.	2	2	Insignificant	Properly loaded wagons and wagons in good condition. Coal wagons of advanced design with majority of the wagon covered. These wagons will have lip seals on the bottom dump doors to prevent coal loss through the doors, angled sills to prevent coal from remaining on the sills after loading and subsequently dislodging en-route, and a high body design which shrouds the coal payload resulting in reduced dust emissions. Regular inspections and clean up.	2	1	Insignificant
20	Train derailment	Suspension of Project activities. Potential for injury or fatality of member of the community is low as alignment mostly crosses pastoral lands with very low population density. Potential for spillages of diesel, quantities of several hundred litres. Land contamination, potential for contamination of surface waters, and impact on aquatic life. Impact on downstream water users.	1	2	High	Rail design and operation meets Australian Standards. Emergency response plans will be developed. Workers will be trained to respond during emergencies.	1	2	Moderate

			Risk Rating				Risk rating with controls in place		
Item No	Activity Description	Potential Consequences	Likelihood. Consequence		Risk rating	Control and Response Strategies	Likelihood, Consequence		Risk rating
21	Train collisions	Likelihood of death or injury of member of the community is very low as the alignment passes through pastoral land with very low population density	1	2	High	In-cab signalling systems, train position identified through transponder/ GPS. Radio communication. Installation and proper functioning signalling system. Liaise with local hospitals.	1	2	Moderate
22	Collision between train and private vehicle	Road closures, injury or fatality to members of the public	2	4	High	Grade separated crossings on major roads, signalised crossings on minor roads (flashing lights and warning bell). Emergency response plan.	1	4	Moderate
23	Coal Train Fire	May cause a grass fire or bushfire. Area is sparsely vegetated and population density is very fires are not likely to be life threatening. Loss of vegetation and habitat, property damage and loss of pasture.	2	3	Low	Coal wagon of advanced design with most of the wagon covered. These wagons will have lip seals on the bottom dump doors to prevent coal loss through the doors, angled sills to prevent coal from remaining on the sills after loading and subsequently dislodging en-route, and a high body design which shrouds the coal payload resulting in reduced dust emissions and deposition along the Project corridor.	1	2	Insignificant

			Risk Rating				Risk rating with controls in place		
Item No	Activity Description	Potential Consequences	Likelihood. Consequence		Risk rating	Control and Response Strategies	Likelihood, Consequence		Risk rating
24	Persons accessing the construction area or Project corridor without authorisation.	Accidental death or injury to intruder. Intruder causes environmental incident, for example deliberately breaches fuel storage tanks or damage rail tracks.	2	2	Insignificant	The Project corridor will be fenced. Routine inspection will be conducted along the rail tracks. Adequate warning signs will be posted along the Project corridor. The fuel and chemical storage area will be fenced. Entry to camp sites will be restricted. Unauthorised person will be removed. Queensland Police will be notified. Injured person evacuated for medical treatment through Queensland Ambulance Services.	1	2	Insignificant

24.3 Incident Prevention and Response

24.3.1 Safety in Design

A number of the mitigation measures identified in Table 24-7 require particular designs to minimise risk of hazards from occurring. These measures include:

- design of fuel, oil and chemical storage areas in accordance with Australian Standards;
- design and maintenance of wagons to minimise the spillage of coal;
- design rail components to meet Australian Standards for earthquake and wind speed characteristics appropriate to the region; and
- meet Australian Standards in relation to rail and bridge design.

These measures must be incorporated in the design specifications in the engineering feasibility stage of the Project.

24.3.2 Incident Management Systems

An Incident Management Manual (IMM) will be prepared for the construction and operations phase. This manual will document the response systems that will be implemented in the event of an incident at the site.

The IMM will include prevention and response measures for hazards identified in Table 24-7 as having a moderate or higher risk, unmitigated.

HPPL has identified following emergency response priorities:

- safety and well being of all personnel;
- safety and well being of the community;
- minimise, to extent possible, environmental harm;
- minimise impacts on business assets as well as assets in the neighbourhood; and
- protecting the reputation of HPPL.

Preventative measures in the IMM proposed for the Project will include the following:

- conduct of regular Health, Safety, Environmental and Community (HSEC) Hazard and Risk Assessments;
- conduct of inspections, maintain records and audit for fire and safety hazards;
- identification of responsibilities and authorities;
- appointment of a health and safety officer and trained first aiders on site;
- developing and implementing induction training programs;
- conducting regular Job Hazard Analyses;
- conducting and reviewed periodically Risk Assessments;
- developing identified Emergency Response and Recovery Plans;
- developing suitable permit, tag and lockout procedures;

- developing and implementing appropriate record keeping systems;
- training; and
- auditing and continuous improvement.

In relation to incident response, the IMM will include:

- developing a suitable organisation chart for incident responses which will include overall responsibility for control of incidents, subsidiary responsibilities, appointment and training of fire fighters and fire wardens, first aid providers and other key roles;
- identification of training needs and provision of training;
- prevention of incidents;
- incident response measures;
- liaison with external authorities in the event of an incident, including:
  - Department of Infrastructure and Planning (DIP) – Abbott Point State Development Area ;
  - Regional Councils –BRC, IRC and WRC;
  - Department of Environment and Resource Management (DERM) for releases to land or surface waters;
  - Queensland Ambulance Service where members of the public or workforce are injured;
  - Queensland Fire and Rescue Service where fire is involved; and
  - Queensland Police Service.
- post incident recovery;
- auditing and inspection;
- incident reports and investigations;
- management reporting and responses; and
- for higher risk areas, specific plans will be developed.

These requirements will apply during both construction and operation stages of the Project.

24.3.3 Natural Hazard Emergency Response

The Project area especially the northern end of the corridor is in a known cyclone area and its low-lying coastal location also means that it may be vulnerable to flooding. Emergency Response procedures will be developed to ensure maximum protection of people and assets against the effects of tropical cyclones is in place. The strategy adopted will be:

(a) responsible housekeeping and appropriate preparation before commencement of the cyclone season;

(b) timely assessments of a developing cyclonic event; and

(c) effective responses.

This procedure will detail the preparatory steps to be taken by employees at site to ensure readiness in the event of a cyclone, the actions to be taken when a cyclone threatens the Project area and the

recovery activities necessary to resume normal operations as soon as possible after the cyclonic event has passed.

The worst case scenario could be spillage of hydrocarbons from the storages at the marshalling yard, in which case the Oil Spill Management Plan (OSMP) will be activated.

Closeout to emergency response will involve required clean ups, repair of damaged equipment and repair of infrastructure.

To address the possible bush fire risks along the Project corridor or within the construction camps, HPPL will prepare a plan which will protect people and assets. A reliable water supply to enable effective fire fighting if and when required will be ensured. The road layout will be designed to allow for easy and safe movements away from any encroaching fire. Fire breaks will be located around the development and will be sufficient to both serve as effective breaks and to allow continuous access for fire fighting vehicles.

HPPL will prepare a Natural Hazard Emergency Response Plan for natural hazard emergencies for the construction and operation phases, within the overall incident management framework.

24.3.4 Spill Management and Response

HPPL will develop procedures for responding to hydrocarbon and chemical spills. The objectives of this procedure will be:

- to ensure hydrocarbon and chemical spills are properly contained, treated, transported and disposed off; and
- to undertake exploration activities to ensure that the risk of hydrocarbon and chemical spills is minimised.

Regardless of the type of spill, the following order of response will always be applied:

- identify the material;
- control the source of the spill;
- contain the spread of material;
- clean-up affected area and report on an incident report form; and
- dispose of in an appropriate manner.

24.3.5 Fire/Explosion Emergency Response

The plan for emergency response to a fire or explosion will include immediate actions of raising alarms and taking life saving actions. The Emergency Controller will make an assessment of the situation including the environmental impact and access control to the site. The Emergency Controller will then plan accordingly for containment, for dealing with casualties and a survey for effects on the environment. The emergency will then be responded to for issues including fire management and containment, rescue, casualty management, and environmental impact actions. External agencies such as Queensland Fire and Rescue Services (QFRS) and Queensland Ambulance Services (QAS) will be contacted for required assistance. Recovery operations will then be initiated which include the restoration of essential services, provision of welfare, clean up, reconstruction and replenishment of stocks consumed during the emergency response. The plan will have all necessary information on

responsibilities, emergency contact details, communication procedures, training, fire protection equipment, first aid, post incident follow-up and review.

HPPL will prepare a suitable fire response plan for the Project before activities commence on the site. The construction contractor will prepare a suitable emergency response plan for emergencies during the construction phase. This plan will detail the specific planning, training and response requirements for fire/explosion emergencies and will also list contact details for state emergencies personnel.

For each construction camp, a fire management plan is to be prepared in consultation with the local fire service for each camp, identifying fire wardens, warning signal and evacuation and emergency procedures. All residents of the camp will be made aware of the requirements outlined in the fire management plan during induction training.

24.3.6 Traffic Management

A separate assessment of traffic and transportation issues has been undertaken to examine impacts of Project related traffic on both road safety and road operability (refer to Volume 3, Section 17 of this EIS). A traffic management plan (TMP) will be required to manage traffic related impacts and hazards during construction.

The contents of the traffic management plan are discussed in Volume 3, Section 17.5.

Incident response aspects of traffic and transport management will also be incorporated into an overall Incident Management System to be developed for the Project.

24.3.7 Incident Response Team

An Incident Response Team will be established at the site to ensure that adequately trained and equipped personnel are readily available in the event of an incident. The team will consist of volunteers from each operations including shift plus on-duty maintenance staff.

Members of the team will be trained in the following aspects in relation to environmental and community hazards:

- fire fighting;
- chemical, diesel and oil spill response and clean up;
- first aid; and
- responding to vehicular accidents.

HPPL will employ trained paramedics or similar.

24.3.8 Incident Response Equipment

In relation to environmental and community hazards, the proponent will have the following equipment available at the site to support incident response:

- first aid facilities;
- personnel protective equipment (PPE) as required to protect personnel involved in incident response activities; and
- suitable communication equipment to communicate during emergencies.

24.3.9 External Emergency Services

There will be first aid medical facilities available at the construction site as well as during operations. The on site first aid facility as well as strong workplace health and safety policies will minimise demand arising from construction incidents or during operations.

In relation to environmental and community hazards, HPPL will need to rely on the following external emergency services to assist in emergency response:

- Major Regional Health Facilities at Alpha, Barcaldine, Emerald, Clermont and Bowen;
- Queensland Fire and Rescue Services;
- Queensland Police Service; and
- Queensland Ambulance Service.

24.3.10 Project Decommissioning

At the completion of the construction activities for civil and track work, all temporary construction facilities and areas will be rehabilitated. These include but are not limited to:

- temporary construction camps;
- borrow areas;
- temporary access tracks and haul roads; and
- turkey nest dams.

Given the projected demand for coal export from the Galilee Basin, it is not expected that the Project will be decommissioned. Should the Project require decommissions a more detailed evaluation of these requirements and potential risks will be developed relevant authorities will be consulted as part of the Project closure process.

Information regarding the decommissioning of the Project corridor is detailed in Volume 3, Section 25 of this EIS.