Section 15

HAZARD AND RISK

15. Hazard and Risk

15.1 Methodology

A desktop review was undertaken to identify and discuss potential hazards and risks associated with the construction and operation of the Project. A risk assessment matrix (see Table 15-1) was developed to assist in establishing the likelihood and consequences of any potential hazards and associated risks.

Risk areas for this Project can be broken into the following elements:

- Construction; and
- Operation (including maintenance).

Excluded from this risk assessment are all elements outside the physical bounds of this EIS, including:

- Interaction with the Moura Rail Line;
- Gladstone Port facilities; and
- The proposed Wandoan Mine Project.

The analysis of the associated hazards and risks is based on information obtained from the Queensland Emergency Services Department for Fire and Ambulance Services (DES), QR Ltd, the Queensland Government and the Department of Main Roads (DMR). Available and released historical data is limited; therefore this assessment is qualitative in nature only. The mitigation section of the risk assessment table proposes engineering mitigation measures to be considered for the design stage of the Project contains as well as mitigation to be carried out by the Construction Manager during construction and the Rail Manager during operation.

15.2 Legislative Framework

The hazards and risk analysis was undertaken in conjunction with relevant State and Commonwealth legislation, codes and guidelines including:

- Australian and New Zealand Standards for the storage and handling of mixed classes of dangerous goods, in packages and intermediate bulk containers (AS/NZS 3833:200);
- Australian and New Zealand Standards for Risk management (AS/NZS 4360:2004);
- Australian Code for the Transportation of Dangerous Goods by Road and Rail 7th Edition;
- Australian Dangerous Goods Code (ADG Code), 7th Edition;
- *Dangerous Goods Safety Management Act 2001*;
- *Dangerous Goods Safety Management Regulations 2001*;
- Handbook 76:2004: Dangerous Goods: Initial Emergency Response Guide (HB 76:20004);
- Handbook 436:2004 Guidelines to AS/NZS Risk Management (HB 436:2004);
- *Integrated Planning Act 1997*;
- *Occupational Health and Safety Act 1995*;
- *Occupational Health and Safety Regulations 1997*;

- Rail Safety Management within Queensland 2001;
- State Planning Policy 1/03: Mitigating the Adverse Impacts of Flood, Bushfire and Landslide;
- *Transport Infrastructure (Rail) Regulation 1996*;
- Transport Infrastructure (Dangerous Goods by Rail) Regulation 2002; and
- Transport Operations (Road Use Management-Dangerous Goods) Regulation 1998.

15.3 Potential Hazards and Risks

During the construction phase it is assumed that three construction camps, housing about 300 personnel each, will be established at locations along the route strategic to the construction as shown in Map 4 – Indicative Construction Camp Locations in the Map Folio and described in the Preliminary Construction methodology (Connell Hatch 2008c). The relative remoteness of the Project means that construction equipment and personnel will need to be transported significant distances. The existing environment may be exposed to blasting, dust, waste, dangerous goods and hazardous materials, vegetative clearing and other conditions as listed in the risk assessment for the construction phase. Mitigation measures have been proposed to manage the risk where possible, thereby reducing the potential impact on the existing environment during the construction phase.

During the operational phase the existing environment may be exposed to coal dust, waste, and other conditions as listed in the risk assessment for the operation phase. Mitigation measures and rehabilitation measures have been proposed to reduce potential impact risks during the operation phase.

For both construction and operation, the mitigation measures for each impact event are designed to contain the risk of triggering further events or incidents, thus reducing the risks of cumulative impacts on surrounding land uses.

The main risks associated with the construction of a project of this nature include, but are not limited to:

- Fire (see also Section 3 and Map 5 – Bushfire Risk in the Map Folio);
- Explosion of fuels and/or construction materials;
- Gas leaks or imminent explosion;
- Structural collapse;
- Natural disaster (see also Section 3);
- Bomb or arson threat;
- Acts of sabotage;
- Accident, serious bodily injury or illness;
- Hazardous or dangerous goods spill; and
- Electrocution.

The main risks associated with the operation of a project of this nature include, but are not limited to:

- Level crossing emergency;
- Person hit by train;

- Derailment;
- Collision;
- Fires;
- Track obstructions;
- Leakage or spill of dangerous goods; and
- Leakage or spill of hazardous materials.

15.4 Inventory of Potential Dangerous Goods and Hazardous Substances

An inventory of potential dangerous goods and hazardous substances to be used during the construction phase of the Project has been developed and is included in Appendix N. This inventory details the chemical composition of specific construction products, their application and estimated quantities to be used on any individual construction site.

15.5 Risk Assessment Matrix

The following table outlines the consequences and likelihood criteria used for the development of the risk assessment for the construction and operation of the Project.

Table 15-1: Risk Status Determination Matrix

Likelihood \ Consequence	Insignificant	Minor	Moderate	Major	Catastrophic
Probable	H	H	E	E	E
Likely	M	H	H	E	E
Possible	L	M	H	E	E
Unlikely	L	L	M	H	E
Rare	L	L	M	H	H

Risk Status Key

L – Low

M – Medium

H – High

E – Extreme

Matrix adopted from HB 436:2004 Risk Management Guidelines, Companion to AS/NZS 4360:2004

Table 15-2: Consequence Criteria: Descriptors

Consequence	General Description	Health and Safety	Community/ Government/ Reputation/ Media	Legal	Relationships (Client, Sub-contractor, etc.)	Services (includes water, electricity and sewage)	Environmental Effects
Insignificant	No injuries; low financial loss	No injuries	Minor complaints	Legal action unlikely	Damage easily rectified by Construction Manager during construction and the Rail Manager during operation	Failure of a service with a known workaround	No lasting effect. Low level impacts on biological or physical environment. Limited damaged to minimal area of low significance
Minor	Minor injuries, not requiring medical treatment; minor financial loss	Minor first aid treatment required only	Public concern restricted to local complaints	Low-level legal matter	Concerted effort by Construction Manager during construction and the Rail Manager during operation to rectify damage	Minor failure of a service on a local basis	Minor effect on biological or physical environment. Minor short term damage to small area; limited significance
Moderate	First aid treatment; on-site release immediately contained; medium financial loss	Reversible injury requiring hospitalisation	Minor, adverse local public or media attention and complaints	Minor legal issues, non-compliance and breaches of regulations	Serious issue requiring the Joint Venture Management involvement	Moderate failure of a service on a local basis	Moderate effect on biological or physical environment but not effecting ecosystem. Moderate short-medium term widespread damage (e.g. fuel spill causing impacts to local creeks)

Consequence	General Description	Health and Safety	Community/ Government/ Reputation/ Media	Legal	Relationships (Client, Sub-contractor, etc.)	Services (includes water, electricity and sewage)	Environmental Effects
Major	Medical treatment required; on-site release contained with outside assistance; high financial loss	Moderate irreversible injury or impairment (<30%) to several people	Serious public or media outcry with international coverage	Serious breach of regulation or investigation or report to authority with prosecution and/or fine possible	Very critical issues that require the Joint Venture Management involvement and intervention	Serious failure of a key service on a local basis	Serious environmental effects with some impairment of ecosystem function (e.g. displacement of a species). Relatively widespread medium-long term impacts
Catastrophic	Extensive injuries; off-site release with detrimental effects; major financial loss	Fatalities or significant irreversible injury to greater than 10 people	International media condemnation	Very significant fines and prosecutions. Multiple litigation actions	Irreparable damage that necessitates the Joint Venture Management involvement and intervention	Fundamental failure of a key service on a local basis	Significant environmental impact with impairment of ecosystem function. Long-term, widespread impacts on significant environment (e.g. unique habitat, national park). Irreversible impacts on the environment

Source: Adapted from HB 436:2004 Guidelines to Risk Management

Table 15-3: Likelihood Criteria: Descriptors

Likelihood	
Probable	Impact will be evident repeatedly along the preferred alignment
Likely	Impact is likely and will occur more than once along the alignment
Possible	Impact may occur at a single point along the alignment
Unlikely	Points of impact have not been identified, but may occur along the alignment
Rare	Points of impact have not been identified, and are not expected to occur along the alignment

Source: Adapted from HB 436:2004 Guidelines to Risk Management

15.6 Construction Phase Hazards and Risk

The following table outlines the risk assessment for the construction phase of the Project.

Table 15-4: Potential Construction Phase Hazards and Risks

Identifier	Impact/Event	Consequences	Consequence Rating	Likelihood Rating	Risk Assessment Ranking	Mitigation Measures	Risk Assessment Ranking After Mitigation		
							Consequence Rating	Likelihood Rating	Risk Assessment Ranking
1	Storage and handling of packaged dangerous goods and hazardous materials at the construction site.	Small spillages or leaks of less than 50 L or 50 kg, that causes minor contamination of creeks, soils, vegetation, land, including temporary damage to local fauna and flora and minor injury to people only requiring first aid treatment.	**Minor** Small spillage, localised impact on environment, no lasting effect	Possible	Medium	Administration: Ensure that all contractors have emergency procedures in place and that the procedures are followed correctly. Contactors must inspect dangerous goods and hazardous substance storage facilities on a regular basis to ensure the facilities are well maintained and functioning correctly. Additionally, the procedures for the handling of dangerous goods should be reviewed at least quarterly to ensure compliance with all related legislation. Emergency procedures (including all Material Safety Data Sheets) must be kept at the construction site at all times and be made readily available to all staff and emergency services upon request. Note: It is assumed all staff will have been trained to follow emergency procedures. Engineering: All construction storage facilities (including bunding) used for the storage of dangerous goods must be designed in accordance with all relevant and related legislation.	Minor	Unlikely	Low

Identifier	Impact/Event	Consequences	Consequence Rating	Likelihood Rating	Risk Assessment Ranking	Mitigation Measures	Risk Assessment Ranking After Mitigation		
							Consequence Rating	Likelihood Rating	Risk Assessment Ranking
2	Storage and handling of bulk (greater 200 L or 200 kg) dangerous goods and hazardous material at the construction site.	Medium to large spill of greater than 50 L or 50 kg, causing contamination of creeks, soil, vegetation, land contamination, including moderate short term-medium damage to local fauna and flora and injury to people requiring hospital treatment.	**Moderate** Not limited to a localised area, short-medium impacts on the environment	Unlikely	Medium	Administration: Ensure that all contractors have emergency procedures in place and that the procedures are followed correctly. Contractors must inspect dangerous goods and hazardous substance storage facilities on a regular basis to ensure the facilities are well maintained and functioning correctly. Additionally, the procedures for the handling of dangerous goods should be reviewed at least quarterly to ensure compliance with all related legislation. Furthermore, emergency procedures (including all Material Safety Data Sheets) must be kept at the construction site at all times and be made readily available to all staff and emergency services upon request Note: It is assumed all staff will have been trained to follow emergency procedures. Engineering: All construction storage facilities (including bunding) used for the storage of dangerous goods must be designed in accordance with all relevant and related legislation in conjunction with the Australian and New Zealand Standards.	Minor	Rare	Low

Identifier	Impact/Event	Consequences	Consequence Rating	Likelihood Rating	Risk Assessment Ranking	Mitigation Measures	Risk Assessment Ranking After Mitigation		
							Consequence Rating	Likelihood Rating	Risk Assessment Ranking
3	The operation and maintenance of site vehicles and construction equipment resulting in the spillage of grease/oils or fuels.	Minor spillages of less than 50 L or 50 kg, leaks, contamination of creeks, soil, vegetation, land contamination, land contamination, localised damage to nearby fauna and flora.	**Minor** Localised impact on environment, no lasting effect	Possible	Medium	Administration: Where practical the maintenance of vehicles and construction equipment must not be carried out at the construction site. In the event that onsite maintenance is required ensure that all contractors have emergency procedures in place and that the procedures are followed correctly. Contactors must inspect vehicles and construction equipment on a regular basis to ensure that all vehicles are in good working order and are well maintained. Note: It is assumed all staff will have been trained to follow emergency procedures Engineering: In the event that maintenance needs to be preformed at the construction site, contractors must use suitable portable chemical bunding for the capture of any potential fuel or oil/grease leaks. All captured fuel or oil/grease must be disposed of in accordance with all relevant legislation.	Minor	Unlikely	Low

Identifier	Impact/Event	Consequences	Consequence Rating	Likelihood Rating	Risk Assessment Ranking	Mitigation Measures	Risk Assessment Ranking After Mitigation		
							Consequence Rating	Likelihood Rating	Risk Assessment Ranking
4	Severe weather event resulting in flooding from extreme rainfall, storm activity.	Short term suspension of the Project, possibility of minor injury, debris at the construction site, contamination of the creeks with soils, machinery equipment, vegetation and possible chemicals, destruction of railway under construction, minor financial losses, inaccessibility to construction site for emergency services.	**Minor** Localised flooding of low lying section of the preferred alignment	Likely	High	Administration: Contractors are to develop and implement a Stormwater Management Plan (SMP) that clearly identifies potential flood sections along the alignment. The SMP must include emergency procedures, contact numbers and an action plan outlining 'what to do in the event of a flood'. Engineering: All contractors must, where possible, provide sandbag and/or bunding protection at the points of intersections of the construction site and local creeks.	Minor	Possible	Medium
5	Landslides resulting from earth works.	Injury, fatality, significant impacts on the surrounding environment, major financial losses, short term loss of public access or increased congestion, debris over construction site, contamination of the creeks with soils, destruction of railway under construction, inaccessibility to construction site for emergency services.	**Moderate** Moderate short-medium term widespread damage with a temporary effect on the local environment.	Possible	High	Administration: Ongoing risk assessments will be conducted based on the changing environment. Ensure that all contractors have emergency procedures in place and that they are followed correctly. Furthermore, contactors must inspect the slope cut in (where possible) on a regular basis to ensure that the slope structures are not suffering from stress or strain due to construction. Note: It is assumed that all staff will have been trained to follow emergency procedures. Engineering: For engineering mitigations refer to Section 4.	Moderate	Possible	High

Identifier	Impact/Event	Consequences	Consequence Rating	Likelihood Rating	Risk Assessment Ranking	Mitigation Measures	Risk Assessment Ranking After Mitigation		
							Consequence Rating	Likelihood Rating	Risk Assessment Ranking
6	Bushfires either from a natural occurrence or from construction works.	Injury, project delay, significant impacts on the surrounding environment, short term loss of site access, destruction of railway under construction, contamination of the local creeks, financial losses, loss of access to the local community services and facilities, inaccessibility to construction site for emergency services.	**Moderate** Localised fire path due to lack of vegetation surrounding the preferred alignment	Unlikely	Medium	Administration: Ensure that all contractors have emergency procedures in place and that they are followed correctly. Construction equipment such as welding materials, grinders, etc. must be fully maintained and where relevant the erection of welding and grinding tents should be carried out. Ensure construction site is kept clean and cleared at all times. Note: It is assumed all staff will have been trained to follow emergency procedures. Engineering: Design fire breaks along the alignment to reduce the movement of the bushfire with the assistance of the State Emergency Services. Ensure any activity required during the construction phase that could cause sparks are carried out in accordance with the relevant legislation in conjunction with the Australian and New Zealand Standards.	Minor	Unlikely	Medium

Identifier	Impact/Event	Consequences	Consequence Rating	Likelihood Rating	Risk Assessment Ranking	Mitigation Measures	Risk Assessment Ranking After Mitigation		
							Consequence Rating	Likelihood Rating	Risk Assessment Ranking
7	Increase in traffic delays to local residents where preferred alignment crosses roadways with potential minor accidents resulting from changed traffic conditions during the construction phase.	Injury, traffic delay, increased localised traffic congestion, short term loss of public access, possibility of increased vehicle accidents, disgruntled local residents.	**Moderate** Localised to sections under construction	Probable	Extreme	Administration: All contractors are to develop and implement a Traffic Management Plan (TMP) in conjunction with DMR and local government for the construction phase. Traffic controllers must be employed where applicable for traffic management. Reduced road speeds, people at work and other cautionary signs are to be erected during the construction phase. Engineering: Refer to Section 10.	Minor	Probable	High
8	Wildlife hazards such as snakes and other venomous creatures.	Injury, possible fatalities, delays in the Project, possible infestation of construction machinery, medical treatment with possible hospitalisation.	**Major** Localised to bushland section under construction	Unlikely	High	Administration: Ensure that all contractors have emergency procedures in place and that they are followed correctly. Ensure an adequate supply of first aid equipment and that first aid officers are trained for venomous creature's bites. Where an encounter occurs employ qualified persons in the removal of venomous creatures to rectify the situation. Note: It is assumed all staff will have been trained to follow emergency procedures.	Minor	Rare	Low

Identifier	Impact/Event	Consequences	Consequence Rating	Likelihood Rating	Risk Assessment Ranking	Mitigation Measures	Risk Assessment Ranking After Mitigation		
							Consequence Rating	Likelihood Rating	Risk Assessment Ranking
9	Disease vectors such as dysentery, tetanus, hepatitis, flu and other airborne or water viruses.	Illness, financial losses, delays to the Project, possible hospitalisation of workers.	**Major** Localised to the construction section of the preferred alignment	Rare	High	Administration: Ensure that all contractors are up-to-date with all vaccination requirements. Ensure that only potable water is consumed at the construction site. All contractors are to adhere to the Occupational Health and Safety Guidelines relating to working on a construction site. Engineering: Ensure the supply of potable water to the construction site is carried out in accordance with the Occupational Health and Safety Guidelines. Installation of amenities in accordance with the Occupational Health and Safety Guidelines.	Minor	Rare	Low
10	Protests and vandalism at the construction site.	Possible injuries, delays in the Project, financial losses, negative publicity, destruction of machinery.	**Minor** Localised to the construction section of the preferred alignment	Rare	Low	Administration: Ensure that all contractors are aware of the potential of protests and vandalism and that an action plan is developed and actioned. Ensure that a media communication's officer is available for any negative media coverage. Engineering: Where necessary and/or possible, provide suitable security measures for machinery and site property.	Insignificant	Rare	Low

Identifier	Impact/Event	Consequences	Consequence Rating	Likelihood Rating	Risk Assessment Ranking	Mitigation Measures	Risk Assessment Ranking After Mitigation		
							Consequence Rating	Likelihood Rating	Risk Assessment Ranking
11	Workforce strikes.	Financial losses, negative publicity, delays to the Project, prolonged disruptions to local residents.	**Major** Major financial losses and delays to the project	Rare	Medium	Administration: Ensure all contractual obligations are met at the start of the project pertaining to wages and work conditions. Ensure open communications with all contractors and management. Ensure that a media communication's officer is available for any negative publicity.	Insignificant	Unlikely	Low
12	Delays in the arrival and supply of construction materials.	Financial losses, delays to project, prolonged disruptions to local residents.	**Major** Major financial losses and delays to the project	Rare	Medium	Administration: Ensure all contractual obligations are met at the start of the project pertaining to construction material supplies. Ensure availability of required supplies prior to the commencement of the project.	Insignificant	Unlikely	Low

Identifier	Impact/Event	Consequences	Consequence Rating	Likelihood Rating	Risk Assessment Ranking	Mitigation Measures	Risk Assessment Ranking After Mitigation		
							Consequence Rating	Likelihood Rating	Risk Assessment Ranking
13	Noise and vibration during construction phase.	Nuisance noise and vibration, minor effects to localised fauna, hostile local community reaction, localised complaints to the Environmental Protection Agency and Local Council, negative publicity.	**Minor** Localised events, complaints driven	Probable	High	Administration: Ensure all contractors are made aware of the effects of noise and vibration to the local community and area. Develop and implement a Management Plan to control the effects of noise and vibration ensuring control of restricted hours for construction. Engineering: Refer to Section 8 for mitigation measures.	Minor	Possible	Medium
14	Dust and other air quality issues.	Nuisance dust and pollution, hostile local community reaction, localised complaints to the Environmental Protection Agency and Local Council, negative publicity.	**Minor** Localised event, complaints driven	Possible	Medium	Administration: Ensure all contractors are made aware of the effects of dust and pollution to the local community and area. Develop and implement a Management Plan to control the effects of dust and pollution. Engineering: Refer to Section 7 for mitigation measures.	Minor	Possible	Medium

Identifier	Impact/Event	Consequences	Consequence Rating	Likelihood Rating	Risk Assessment Ranking	Mitigation Measures	Risk Assessment Ranking After Mitigation		
							Consequence Rating	Likelihood Rating	Risk Assessment Ranking
15	Waste generation and management.	Negative local community reaction, localised complaints to the Environmental Protection Agency and Local Council, negative publicity, possible contamination to localised fauna and flora, negative visual impact.	**Moderate** Localised event, negative visual impact	Possible	High	Administration: Develop and implement a Waste Management Plan to monitor and control the effects of construction waste. Engineering: Refer to Section 9 mitigation measures.	Minor	Possible	Medium
16	Unapproved clearing during construction.	Permanent damage to the environment, displacement of fauna and flora, breach of vegetation and clearing regulations, negative localised complaints to the Environmental Protection Agency and Local Council, negative publicity.	**Major** Permanent damage to the environment	Unlikely	High	Administration: Clearly identify and map areas for clearance. Ensure clearing permits are obtained from the relevant authorities. Where applicable conduct regular audits of the prospective site to ensure correct clearance is being carried out. Refer to Section 5 for management measures.	Moderate	Rare	Medium

15.7 Potential Operation Phase Hazards and Risks

The following table outline is the risk assessment for the Operation Phase of the Project.

Table 15-5: Operation Phase Hazards and Risks

Identifier	Impact/Event	Consequences	Consequence Rating	Likelihood Rating	Risk Assessment Ranking	Mitigation Measures	Risk Assessment Ranking After Mitigation		
							Consequence Rating	Likelihood Rating	Risk Assessment Ranking
1	Major rail accident (>1 fatality, vehicular involvement).	Rail closure, multiple injuries, fatalities, derailment, debris on railways, destruction of the railway, major delays in coal haulage activities, financial losses.	**Catastrophic** Localised event, multiple injuries, fatalities	Possible	Extreme	Administration: Ensure that emergency procedures are in place and that communications with the relevant emergency authorities are continuous during the event. Ensure that local hospitals are equipped with adequate medical supplies. Develop an emergency rescue and evacuation plan. Note: It is assumed all staff will have been trained to follow emergency procedures. Engineering: Provide suitable access points for emergency vehicles along the multi-user corridor in accordance with relevant emergency services legislation. All road and rail crossing points must have the appropriate signage erected and protection installed as appropriate.	Catastrophic	Possible	Extreme

Identifier	Impact/Event	Consequences	Consequence Rating	Likelihood Rating	Risk Assessment Ranking	Mitigation Measures	Risk Assessment Ranking After Mitigation		
							Consequence Rating	Likelihood Rating	Risk Assessment Ranking
2	Minor rail accident (no fatalities, vehicular involvement, injury).	Rail closure, injury, delays in coal haulage activities, financial losses, injuries, debris on rail tracks, possible derailment.	**Minor** Minor injuries, localised event	Possible	Medium	Administration: Ensure that emergency procedures are in place and that communications with the relevant emergency authorities are continuous during the event. Ensure that local hospitals are equipped with adequate medical supplies. Develop an emergency rescue and evacuation plan. Note: It is assumed all staff will have been trained to follow emergency procedures. Engineering: Provide suitable access points for emergency vehicles along the multi-user corridor in accordance with relevant emergency services legislation. All road and rail crossing points must have the appropriate signage erected and protection installed as appropriate.	Minor	Possible	Medium
3	Minor spillage of dangerous goods, or hazardous substances along the preferred alignment.	Injury, minor damage to the environment, contamination of waterways with chemicals toxic to fauna, flora and humans, land and soil contamination, major delays in coal haulage activities.	**Minor** Small spillage, localised impact on environment, no lasting effect	Possible	Medium	Administration: Ensure that spillage response procedures are in place and that communications with the relevant authorities are notified as soon as practicable. The transportation of dangerous goods should only be carried out in accordance with the Australian Dangerous Goods Code by Road and Rail. Note: It is assumed all staff will have been trained to follow spillage response procedures. Engineering: Provide suitable access points for spillage response vehicles along the multi-user corridor in accordance with relevant emergency services legislation.	Minor	Possible	Medium

Identifier	Impact/Event	Consequences	Consequence Rating	Likelihood Rating	Risk Assessment Ranking	Mitigation Measures	Risk Assessment Ranking After Mitigation		
							Consequence Rating	Likelihood Rating	Risk Assessment Ranking
4	Flooding of low lying sections of the preferred alignment.	Rail closure, injury, delays in coal haulage activities, financial losses, injuries, debris on rail tracks, debris over track.	**Insignificant** Localised event, no injuries	Unlikely	Low	Administration: Ensure that emergency procedures are in place and that communications with the relevant emergency authorities are continuous during the event. Note: It is assumed all staff will have been trained to follow emergency procedures. Engineering: Provide suitable access points for emergency vehicles along the multi-user corridor in accordance with relevant emergency services legislation. Provide relevant emergency equipment.	Insignificant	Unlikely	Low
5	A severe weather event, including storm, hail and/or cyclone.	Rail closure, injury, delays in coal haulage activities, financial losses, injuries, debris on rail tracks, debris over track.	**Minor** Localised damage that can be easily cleared	Unlikely	Low	Administration: Ensure that emergency procedures are in place and that communications with the relevant emergency authorities are continuous during the event. Note: It is assumed all staff will have been trained to follow emergency procedures. Engineering: Provide suitable access points for emergency vehicles along the multi-user corridor in accordance with relevant emergency services legislation. Provide relevant emergency equipment.	Minor	Unlikely	Low

Identifier	Impact/Event	Consequences	Consequence Rating	Likelihood Rating	Risk Assessment Ranking	Mitigation Measures	Risk Assessment Ranking After Mitigation		
							Consequence Rating	Likelihood Rating	Risk Assessment Ranking
6	Fire out-break on land surrounding the preferred alignment.	Smoke hazard, road closure, rail closure, injury, delays in coal haulage activities, financial losses, injuries, debris on rail tracks, debris over track.	**Moderate** Localised impact on physical and biological environment	Possible	High	Administration: Ensure that emergency procedures are in place and that communications with the relevant emergency authorities are continuous during the event. Note: It is assumed all staff will have been trained to follow emergency procedures. Engineering: Maintenance of fire breaks within rail land. Provide suitable access points for emergency vehicles along the multi-user corridor in accordance with relevant emergency services legislation.	Minor	Unlikely	Low

Identifier	Impact/Event	Consequences	Consequence Rating	Likelihood Rating	Risk Assessment Ranking	Mitigation Measures	Risk Assessment Ranking After Mitigation		
							Consequence Rating	Likelihood Rating	Risk Assessment Ranking
7	Changed future climatic conditions and frequency/intensity of weather events	Infrastructure damage and failure, rail closure, delays in coal haulage activities, injury, financial losses, increase maintenance costs, debris on rail tracks, debris over track.	**Moderate** Localised impact on physical and biological environment	Possible	High	Administration: The Proponent should review the technical feasibility and viability of potential climate change adaptation strategies. Risks should be identified through a risk management workshop and appropriate mitigation strategies agreed. Engineering: choose design standards and select appropriate construction materials to ensure the structural integrity and durability of infrastructures within the range of expected changes in climatic conditions. Opportunities to integrate new technologies into design and environmental controls should be identified and incorporated where possible. Make provision for a possible change in maintenance regimes to accommodate acceleration in the degradation of material and structures.	Minor	Unlikely	Low
8	Coal Spillages (majority of carriages spilling).	Contamination of the surrounding environment, possible damage to the rail track, negative publicity, injury, possible contamination of local creeks.	**Minor** Minor, localised impact on environment	Likely	High	Administration: Train operators must develop an EIRMR as part of the Access Agreement. Train operators must also notify and liaise with the local Environmental Protection Authority and Emergency Services in the event of a coal spillage.	Minor	Unlikely	Low

Identifier	Impact/Event	Consequences	Consequence Rating	Likelihood Rating	Risk Assessment Ranking	Mitigation Measures	Risk Assessment Ranking After Mitigation		
							Consequence Rating	Likelihood Rating	Risk Assessment Ranking
9	Level crossing emergencies.	Injury, fatalities, debris on track, environmental damage, chemical spills, delays in coal haulage activities, evacuation, traffic congestion, financial losses, negative publicity.	**Major** Multiple injuries and death, < 40 people.	Unlikely	High	Administration: Ensure that emergency procedures are in place and that communications with the relevant emergency authorities are continuous during the event. Ensure all operational procedures pertaining to the movement of trains is followed in accordance with the relevant act and regulations. Train operators must develop an EIRMR as part of the Access Agreement. Note: It is assumed all staff will have been trained to follow emergency procedures. Engineering: Erect appropriate warning signs at railway crossings. Provide adequate pedestrian safety guards at level crossings, where appropriate.	Moderate	Unlikely	Medium

Identifier	Impact/Event	Consequences	Consequence Rating	Likelihood Rating	Risk Assessment Ranking	Mitigation Measures	Risk Assessment Ranking After Mitigation		
							Consequence Rating	Likelihood Rating	Risk Assessment Ranking
10	Train collision.	Injury, fatalities, environmental damage, delays in coal haulage activities, evacuation, traffic congestion, financial losses, negative publicity, chemical spills.	**Major** Multiple injuries and death, < 40 people.	Unlikely	High	Administration: Ensure that emergency procedures are in place and that communications with the relevant emergency authorities are continuous during the event. Ensure all operational procedures pertaining to the movement of trains is followed in accordance with the relevant act and regulations. Train operators must develop an EIRMR as part of the Access Agreement. Note: It is assumed all staff will have been trained to follow emergency procedures. Engineering: Provide suitable access points for emergency vehicles along the multi-user corridor in accordance with relevant emergency services legislation.	Moderate	Unlikely	Medium

Identifier	Impact/Event	Consequences	Consequence Rating	Likelihood Rating	Risk Assessment Ranking	Mitigation Measures	Risk Assessment Ranking After Mitigation		
							Consequence Rating	Likelihood Rating	Risk Assessment Ranking
11	Train derailment.	Injury, possible fatalities, localised damage to the surrounding environment, contamination of local creeks, spillage of fuel, possible spillages of dangerous goods, damage to rail tracks, financial losses, delays in coal haulage activities.	**Moderate** Localised damage to environment, injuries	Possible	High	Administration: Ensure that an Emergency Response Plan (refer to NACOP Rail Safety Accreditation and Regulation) is in place and that communications with the relevant emergency authorities are continuous during the event. Note: It is assumed all staff will have been trained to follow emergency procedures. Engineering: Provide suitable access points for emergency vehicles along the multi-user corridor in accordance with relevant emergency services legislation.	Minor	Possible	Medium
12	Track Obstructions.	Injury, possible fatalities, derailment, damage to rail tracks, financial losses, delays in coal haulage activities.	**Moderate** Localised damage to environment, injuries	Possible	High	Administration: Regular audits of the tracks to be done by maintenance staff. Reporting of obstructions on rail tracks to be reported immediately to the central rail controller. Obstructions to be rectified as soon as possible by the appropriate staff member.	Minor	Possible	Medium

Identifier	Impact/Event	Consequences	Consequence Rating	Likelihood Rating	Risk Assessment Ranking	Mitigation Measures	Risk Assessment Ranking After Mitigation		
							Consequence Rating	Likelihood Rating	Risk Assessment Ranking
13	Increase in traffic delays to local residents where preferred alignment crosses roadways.	Injury, traffic delay, increased localised traffic congestion, short term loss of public access, possibility of increased vehicle accidents, disgruntled local residents, and negative publicity.	**Minor** Localised to sections of road and rail interaction.	Probable	High	Engineering: Refer to Section 10 for further mitigation measures.	Minor	Probable	High
14	Noise during the operational phase.	Nuisance noise, localised complaints to the Environmental Protection Agency and Local Council, negative publicity.	**Minor** Localised events	Probable	High	Administration: Develop and implement a Management Plan to monitor and control the effects of noise and vibration. Engineering: Refer to Section 8 for mitigation measures.	Minor	Possible	Medium

15.8 Emergency Management Plan Outline

The following table outlines the proposed content and general principals that should be included in the Emergency Management Plans for the Project for the construction phase. More detailed management plans will be developed during detailed design.

Table 15-6: Emergency Management Plan Outline

Threat Scenario	Hazard	Risk	Action/Mitigation	Actionee(s)
Major spillage of dangerous goods or hazardous substances.	Contamination of local creeks, land, fauna and flora, exposure of dangerous goods to humans.	Rail personnel Environment Local community	Where possible contain the spill to the affected area. Follow the initial emergency response plan as outlined by the *Australian Dangerous Codes Code Appendix 4 HAZCHEM code* requirements. Contact the central rail operations command post immediately to report the spill. Evacuate nearby residents if the spill causes a threat to human life. If the event exceeds the capacity of the Local Disaster Management Team the Department of Emergency Services (DES) will be called in followed by the State and Federal Government Disaster Management team.	Rail personnel Emergency Response Team Local Disaster Management Team The Scientific Unit of the Queensland Fire and Rescue Service (QFRS) DES State and Federal Government Disaster Management Team
Minor spillage of dangerous goods or hazardous substances.	Contamination of local creeks, land, fauna and flora, exposure of dangerous goods to humans.	Rail personnel Environment Local community	Follow the initial emergency response plan as outlined by the *Australian Dangerous Codes Code Appendix 4 HAZCHEM code* requirements. Where possible contain the spillage to the affected area using a Dangerous Goods spill kit. Contact the central rail operations command post immediately to report the spill. If the event exceeds the capacity of the Local Disaster Management Team the DES will be called in.	Rail personnel Emergency Response Team Local Disaster Management Team The Scientific Unit of the QFRS DES
Bushfire.	Smoke, fire across rail line, poor visibility, breathing difficulties.	Rail personnel Environment Local community	Notify the central rails operation command post immediately as to the location of the fire. Central control to divert or delay train departures or movements in the threat zone. Contact the local fire authority immediately. If an injury has occurred contact the local ambulance service to assist the injured. Evacuate nearby residents if the fire causes a threat to human life. If the fire exceeds the capacity of the local fire authority the DES will be called in.	Rail personnel Emergency Response Team Local Fire Authority Local Ambulance Services DES

Threat Scenario	Hazard	Risk	Action/Mitigation	Actionee(s)
Natural Disasters such as, storms, flooding, server weather events and cyclones.	Debris on rail tracks, poor visibility, stranding of trains on tracks, damage to rail tracks.	Rail personnel	Notify the central rails operation command post immediately as to the location of the event. Central control to divert or delay train departures or movements in the threat zone. If the event exceeds the capacity of the Surat Rail Emergency Response Team the DES will be called in.	Rail personnel Emergency Response Team
Hydrocarbon spills.	Contamination of local creeks, land, fauna and flora, exposure of hydrocarbons to humans.	Rail personnel Environment Local community	Follow the initial emergency response plan as outlined by the *Australian Dangerous Codes Code Appendix 4 HAZCHEM code* requirements. Where possible contain the spillage to the affected area using a Dangerous Goods spill kit. Contact the central rail operations command post immediately to report the spill. If the event exceeds the capacity of the Local Disaster Management Team the DES will be called in.	Rail personnel Emergency Response Team Local Disaster Management Team The Scientific Unit of the QFRS DES
Train Derailment.	Damage to rail track, injury, possible death, debris on track, spillages of coal to environment, environmental damage, fuel spillages and contamination to surrounding environment.	Rail personnel Environment Local community	Where possible contain the spillages to the affected area using a spill kit. Contact the central rail operations command post immediately to report the spill. If the event exceeds the capacity of the Local Disaster Management Team the DES will be called in.	Rail personnel Emergency Response Team Local Disaster Management Team The Scientific Unit of the QFRS DES
Train Collisions.	Damage to rail track, injury, debris on track, possible death, spillages of coal to environment, environmental damage, fuel spillages and contamination to surrounding environment.	Rail personnel Environment Local community	Where possible contain the spillages to the affected area using a spill kit. Contact the central rail operations command post immediately to report the spill. If the event exceeds the capacity of the Local Disaster Management Team the DES will be called in.	Rail personnel Emergency Response Team Local Disaster Management Team The Scientific Unit of the QFRS DES

Threat Scenario	Hazard	Risk	Action/Mitigation	Actionee(s)
Major rail accident (>1 fatality, vehicular involvement).	Rail closure, multiple injuries, fatalities, derailment, debris on railways, and destruction of the railway.	Rail personnel Local community	Contact the central rail operations command post immediately to report the event. If the event exceeds the capacity of the Local Disaster Management Team the DES will be called in.	Rail personnel Emergency Response Team Local Disaster Management Team DES
Minor rail accident (no fatalities, vehicular involvement, injury).	Rail closure, injury, delays in coal haulage activities, debris on rail tracks, possible derailment.	Rail personnel Local community	Contact the central rail operations command post immediately to report the event. If the event exceeds the capacity of the Local Disaster Management Team the DES will be called in.	Rail personnel Emergency Response Team Local Disaster Management Team DES
Level crossing emergencies.	Injury, fatalities, debris on track, environmental damage, chemical spills, evacuation, traffic congestion.	Rail personnel Environment Local community	Contact the central rail operations command post immediately to report the event. If the event exceeds the capacity of the Local Disaster Management Team the DES will be called in.	Rail personnel Emergency Response Team Local Disaster Management Team DES

15.9 Potential Impacts and Mitigation Measures

Table 15-7 and Table 15-8 set out the recommendations to mitigate the potential hazard and risks associated with the construction and operation of the Project.

15.9.1 Construction

Table 15-7: Potential Construction Impact and Mitigation Measures for Hazard and Risk

Potential Impact	Mitigation Measure
Rail accidents/incidents, injury, fatalities, fire, spillages of dangerous goods, severe weather events, noise, dust, vibrations from earthworks, complaints, negative publicity	• Ensure all management plans are developed, implemented, reviewed and complied with at the beginning of the Project as outlined in the EIS. • To ensure the health and safety of all personnel and community measure, it is imperative that the above plans are actioned and complied with at all times.
Fatalities, rail closure, delay in coal haulage activities, traffic congestion, disgruntled residents, complaints, negative publicity	• Ensure all management plans are in place and operational. Negative publicity should only be handled by a media spokesperson with the approval of the most senior member of the Project.
Damage, destruction, dust, financial losses	• Ensure all management plans are in place and operational. All property damage must be reported immediately and investigated within a responsible time frame.
Carnage, rail closure, accidents, animals accessing tracks, construction sites displacement of nests and habitat	• Where appropriate along the alignment, fences should be erected to minimise access to the alignment from animals. Sighting of animals on the alignment must be reported to the central rail controller as soon as possible. The central rail controller must inform all train operators of any animal issues immediately.
Minor to moderated/long term damage caused by minor/major dangerous goods or hazardous substance spill, remediation, bushfires and flooding, severe weather events or natural disasters	• Ensure an EMP(C) is in place and implemented. All environmental damage must be reported immediately and investigated within a responsible time frame. Communication with the local EPA is imperative if an incident occurs. Employ an Environmental Officer to ensure compliance and operation of the EMP.
Delays in construction due to incidents/accidents, delays due to serve weather events, spillages of dangerous goods or hazardous substances, lack of construction materials, poor management of procurement of construction materials	• Ensure all contractual obligations are established at the beginning of the project. Secure construction materials at the beginning of the project. Ensure all management plans are in place and operational.
Delays in construction, breakdown of management systems, lack of communication and organisation	• Establish a Projects Director and Manager to oversee all aspects of the project. Enforce all management plans as outlined in the EIS.

15.9.2 Operation

Table 15-8: Potential Operational Impact and Mitigation Measures for Hazard and Risk

Potential Impact	Mitigation Measure
Rail accidents/incidents, injury, fatalities, fire, spillages of dangerous goods, severe weather events, noise, dust, complaints, negative publicity	• Ensure all management plans developed for the EIS are updated to reflect conditions of the operational phase. Regular auditing of management plans must be conducted.
Fatalities, rail closure, delay in coal haulage activities, traffic congestion, disgruntled residents, complaints, negative publicity	• Ensure all management plans are in place and operational. Provide regular news updates of operational changes.
Complaints about perceived nuisance (e.g. noise, dust and vibration)	• Ensure an EMP Construction with detailed Air Quality sub-plans for Air Quality and Noise & Vibrations are in place. Investigate and where possible invest in duct control equipment. Keep in regular contact with the local EPA and act quickly to resolve any complaints.
Carnage, rail closure, accidents, animals accessing tracks	• Sighting of animals on the alignment must be reported to the central rail controller as soon as possible. The central rail controller must inform all train operators of any animal issues immediately.
Minor to moderated/long term damage caused by minor/major dangerous goods or hazardous substance spill, remediation, bushfires and flooding, severe weather events, derailment, natural disasters	• Ensure an EMP(O) is in place and implemented during construction and operation. All environmental damage must be reported immediately and investigated within a responsible time frame. Communication with the local EPA is imperative if an incident occurs.
Breakdown of management systems, lack of communication and organisation	• Regular auditing of management systems to ensure compliance.