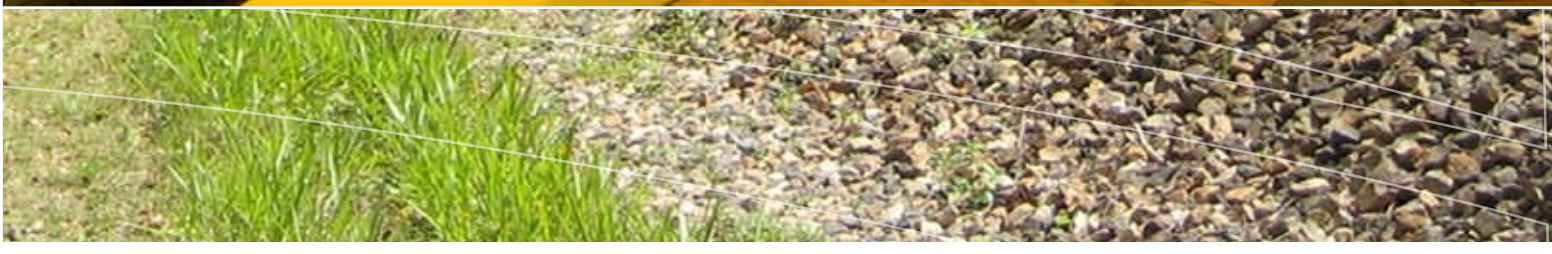
22 Environmental Management Plans



22.1 Introduction and purpose

The project will involve the construction of approximately 22 km of rail between the existing train stations of Landsborough and Nambour. The project will result in a new two track rail with much higher efficiency than the existing single track rail.

This Environmental Management Plan (EMP) sets out the environmental issues that will be encountered by the project and contains clear commitments to manage these issues. It is a written description of proposed measures to be implemented to help achieve and maintain acceptable levels of the environmental impacts identified in the EIS and a tool to help meet the requirements of relevant legislation and best practice environmental management.

The purpose of this EMP is to identify all potential environmental impacts and mitigation measures together with corrective action if an undesirable impact or unforeseen level of impact occurs. The aims of the EMP are to:

- provide auditable proponent commitments to practical and achievable plans for the management of the project such that environmental requirements are complied with
- produce an integrated planning framework, which provides for comprehensive monitoring and control of construction and operational impacts
- provide local, State and Commonwealth authorities and the scheme proponent with a framework to confirm compliance with their policies and requirements
- provide the community with evidence of the management of the project in an environmentally acceptable manner.

It is anticipated that the primary users of this EMP will be the Principal (or proponent), the design consultant, the construction contractors and maintenance contractors. All the requirements for the construction and maintenance contractors stemming from the EIS, the EMP and the detailed design process will be incorporated within the drawings and contract specifications produced by the Principal and the design consultant.

Both the Construction and Maintenance EMPs would be prepared by the appropriate contractor and submitted to the Principal who may in turn distribute them to the relevant government bodies i.e the Department of Environment and Resource Management etc for comment if deemed appropriate. The contractors would not be permitted to begin works until the comments from the government bodies have been incorporated into the EMPs to the satisfaction of the Principal.

22.1.1 Structure of the EMP

This project is scheduled to be operational by 2026. Hence, there will be some lapse in time between the completion of the EIS and the commencement of works. The relevant planning approvals required by the project are associated with a time frame of four years, after which they lapse. It is anticipated that some construction works will commence approximately four years after approval is received and that construction will be staged so that the rail upgrade is completed and operational by 2026. A staging plan has been described in **Chapter 2, Description of the project**. The EMP is structured to address the environmental management on the site and in proximity to the site for the life of the activity being controlled.

The structure of the individual management plans in this EMP (Planning) has been prepared in accordance with the former EPA (now Department of Environment and Resource Management) guidelines as follows:

- element - aspect of environmental issue
- policy - the operational policy that applies to the element
- performance criteria - a performance requirement for each element of the operation
- implementation strategy - the things that would be implemented to achieve the performance requirement
- monitoring - the monitoring requirements which would measure actual performance
- reporting - format, timing and responsibility for reporting and auditing of monitoring results
- corrective action - the action to be implemented in case a performance requirement is not reached
- responsibility - the person(s) responsible for action
- timing - when certain actions should been undertaken.

A discussion of the potential impacts and relevant legislation and / or policies is also included within the introduction to each of the EMP elements.

22.1.2 Relevant legislation

The Principal is required to give due consideration to the likely environmental impacts of new projects under various Commonwealth, State and local government legislation, guidelines and policies. The legislative framework to this project includes but is not limited to:

- *Aboriginal Cultural Heritage Act 2003*
- *Aboriginal and Torres Strait Islander Heritage Protection Act 1984*

- *Australian Heritage Council Act 2003*
- *Coastal Protection and Management Act 1995*
- *Environmental Protection and Biodiversity Conservation Act 1999*
- *Environmental Protection Act 1994*
- Environmental Protection Regulation 2008
- Environmental Protection Policy (Water) 1997
- Environmental Protection Policy (Air) 2008
- Environmental Protection Policy (Noise) 2008
- Environmental Protection (Waste Management) Regulation 2000
- *Fisheries Act 1994*
- Fisheries Regulation 1995
- *Integrated Planning Act 1997*
- Integrated Planning Regulation 1998
- *Land Protection (Pest and Stock Route Management) Act 2002*
- *Land Act 1994*
- *Marine Parks Act 1982*
- *Native Title Act 1993*
- *Native Title (Queensland) Act 1993*
- Native Title (Queensland) Regulation 1996
- *Nature Conservation Act 1992*
- Nature Conservation Regulation 1994
- Nature Conservation (Wildlife) Regulations 2006
- *Queensland Buildings Services Authority Act 1991*
- Queensland Buildings Services Authority Regulation 1992
- *Queensland Heritage Act 1992*
- Queensland Heritage Regulation 1992
- *Sewerage and Water Supply Act 1949*
- Sewerage and Water Supply Regulation 1949
- *State Development and Public Works Organisation Act 1971*
- *Transport Infrastructure Act 1994*.
- *Vegetation Management Act 1999*
- *Water Resources Act 2000*

Permits or approvals that may need to be obtained from various government and regulatory authorities prior to commencement of construction activities include:

- development permit for Operational Works (that is the clearing of native vegetation) under the *Vegetation Management Act 1999*
- development permit for Material Change of use for an Environmentally Relevant Activity (ERA) under the *Environmental Protection Act 1994* and Environmental Protection Regulation 2008
- riverine protection permit under the *Water Act 2000*
- development permit for Operational Work (that is the construction or raising of a waterway barrier) under the *Fisheries Act 1994*
- permit to occupy under the *Land Act 1994*.

22.2 Environmental management processes and responsibilities

22.2.1 Implementation

All personnel involved in the project have an obligation to observe due diligence with respect to all aspects of environmental management. The parties responsible for the environmental management of the project are defined as follows:

- the Principal - the Department of Transport and Main Roads or its agents in delivering the project
- the design consultant - anyone engaged by the Principal to undertake any aspects of the design of the transport system and includes sub-consultants and the Department of Transport and Main Roads staff
- the construction contractor - anyone engaged by the Principal to undertake any aspects of construction of the transport system and includes private contractors and public workforce
- the maintenance contractor - anyone engaged by the Principal to undertake any aspect of maintenance of the transport system and includes private contractors and public workforce

All parties involved in the project are required to undertake their work in accordance with all relevant Acts, Policies and Regulations. In particular, all parties are referred to the *Environmental Protection Act 1994* which states that individuals and organisations must take all reasonable and practicable measures to prevent or minimise environmental harm'. In addition to legislative compliance the appointed design consultant, construction and maintenance contractors will be aware of the content and intent of relevant environmental guidelines and Australian Standards.

The particular responsibilities of the various parties are shown below in **Table 22.2.1**.

Table 22.2.1: Responsibilities of parties with regards to implementation of EMP

Parties	Responsibilities
The Principal (or proponent)	The primary responsibility for environmental performance and for implementing the EMP for the rail upgrade rests with the Principal. Specific responsibilities with regard to environmental management include: ▪ review of the relevance of the EMP and its effectiveness in helping meeting the project's environmental responsibilities ▪ minimisation of the potential environmental impacts associated with the project ▪ addressing issues raised by the community ▪ coordinating acquisition requirements and processes, compensation arrangements, likely timetable and notification to affected property owners ▪ management of the tender documents for design, construction and maintenance and incorporating the requirements for complying with the EMP ▪ obtaining various permits and licenses required by any relevant legislation as described in Section 23.1.3.
The design consultant	The design consultant has the responsibility of ensuring that the requirements of the EMP are reflected in their designs and in the contract documentation including specifications and drawings.
The construction contractor	Notwithstanding any other conditions that may be required by the Principal or a government authority, the construction contractor will be responsible for: ▪ developing, implementing and complying with a Construction EMP, which is consistent with the content of this EMP ▪ complying with all the environmental provisions of the Construction Contract ▪ obtaining any and all licences and approvals under the *Environmental Protection Act 1994* ▪ complying with all licences and approvals under the *Environmental Protection Act 1994* and any other relevant legislation as described in Section 23.1.3.
The maintenance contractor	Notwithstanding any other conditions that may be required by the Principal or a government authority, the maintenance contractor will be responsible for: ▪ developing, implementing and complying with a Maintenance EMP, which is consistent with the content of this EMP ▪ complying with all the environmental provisions of the Maintenance Contract ▪ obtaining any and all licences and approvals under the *Environmental Protection Act 1994* ▪ complying with all licences and approvals under the *Environmental Protection Act 1994* and any other relevant legislation as described in Section 23.1.3 ▪ documentation of all monitoring and maintenance procedures undertaken.

22.2.2 Reporting

This EMP will be controlled by the Principal and provided to the design consultant, the construction contractor and the maintenance contractor at the relevant stages of the project.

A copy of the EMP will be kept on-site and be easily obtainable at all times during construction and operation. During the construction works, the project manager would hold an additional copy. A copy of this EMP should be kept by the Principal and issued as standard information to any consultants or contractors employed on the project.

22.2.3 Review and update

The EMP is reviewed and periodically updated to reflect knowledge gained during the course of operations and to reflect new knowledge and changed community standards (values). Changes to the EMP may be developed and implemented in consultation with relevant authorities and stakeholders.

Due to the expected time delay before the construction phase, it is recommended that this EMP be reviewed and updated before the commencement of works. The Principal will be responsible for undertaking this review and update and any changes to the EMP should be agreed with the relevant authorities.

22.2.4 Training

The EMP outlines the required measures to be undertaken to prevent harm to the environment during project works. In order for these measures to be implemented effectively, staff, contractors and subcontractors will need to be made aware of the existence of the EMP and its requirements. This applies to personnel involved in the design, construction and maintenance / operation phases of the project.

Prior to the commencement of works on the site, staff will be required to undergo induction training outlining all aspects of:

- safety and security
- responsibilities on-site
- housekeeping in relation to the construction compound
- equipment operation
- first aid
- work procedures
- awareness of the EMP and its importance
- content of the EMP and the benefits of compliance
- the role of personnel in the implementation of the EMP and consequences for non-compliance
- emergency responses for environmental management issues.

22.3 Environmental management plan (EMP)

There are three phases associated with the life of the project. These are construction, operation and decommissioning and they are now described in detail.

Construction of the project is scheduled to start approximately four years after the final approval of the project is received. The construction phase is generally regarded as the most disruptive and destructive stage of the project, hence the EMP plays an important role in keeping the disruption and impacts at an acceptable level. The construction process is described below. It should be noted that the order of these activities might change in some locations, due to the logistics of keeping the road and rail network functional.

1. survey of rail alignment
2. construction barriers and exclusion fencing to be erected
3. installation of new public service utilities / services diversions
4. sediment and erosion control
5. construction of temporary access roads
6. clearing and removal of vegetation on rail alignment
7. earthworks (including tunnels and drainage for road and rail works)
8. building of bridges and structures for road and rail works
9. road works (for roads being realigned)
10. railway formation construction (embankment and cut)
11. overhead mast foundation construction
12. ballast and sleeper construction
13. building of station facilities
14. laying of two tracks, overhead wiring, signal and communications systems
15. finalisation of remaining areas of road works and asphalt
16. commissioning of railway.

Operation of the railway will essentially involve the running of passenger and freight services between Landsborough and Nambour (and beyond). The operation of the railway is associated with maintenance of the tracks and railway stations, which may include activities such as:

- sleeper or rail replacement
- maintenance of drainage structures
- maintenance of retaining walls, bridges and tunnels
- maintenance of overhead wiring
- fence maintenance
- weed and grass management
- maintenance of signalling equipment
- repair, maintenance and cleaning of platform areas (including lifts, staircase, waste facilities)
- repair, maintenance and cleaning of station building (ticketing office and bathrooms)
- maintenance of landscaping
- management of security.

Decommissioning of the existing railway will occur once the new rail has been constructed and is operational. It will basically involve the removal of the existing railway and dedication of land to alternative uses. The alternative land uses will largely depend on the location of the existing rail and will be decided by the local government authority, which is responsible for the planning of the area. For example, in areas of conservation significance (e.g. national parks) the existing rail will be removed and the land rehabilitated. Allowance may be made in some areas for the provision of a 'rail trail'. Pedestrians, bikes and horse riders typically use these trails for recreational purposes. Alternatively, in railway towns the land may be redeveloped. In most cases, the subsequent land use will require treatment of rail land for contamination and removal of formation prior to redevelopment.

Each of the phases of the project is associated with activities that may impact on the environment. Management plans have been prepared for the following key environmental issues. These include:

- Greenhouse gas and climate change (see **Table 22.3.1**)
- landscape and visual management (see **Table 22.3.2**)
- erosion and sediment control (see **Table 22.3.3**)
- acid sulphate soils and contaminated land (see **Table 22.3.4**)
- vegetation management (see **Table 22.3.5**)
- weed management (see **Table 22.3.6**)
- fauna management (see **Table 22.3.7**)
- hydrology and water quality (see **Table 22.3.8**)

- air quality and dust (see **Table 22.3.9**)
- noise and vibration (see **Table 22.3.10**)
- waste management (see **Table 22.3.11**)
- traffic and transport (see **Table 22.3.12**)
- cultural heritage and archaeology (see **Table 22.3.13**)
- hazard and risk. (see **Table 22.3.14, Table 22.3.15 and Table 22.3.16**).

22.3.1 Greenhouse gas and climate change

The project area is located within the coastal lowlands of the South East Queensland region and is classified as having a subtropical climate with no dry season. This is characterised by warm summers and relatively dry winters. Mean annual rainfall is around 1578 mm with the majority received in the summer months (December-April). Mean daily temperatures range between 25-27 °C in summer and 10-14 °C in winter. Surface winds generally reflect the diurnal pattern of land and sea breezes. The Climate Change in Queensland 2008 Report (CCQ 2008) issued by the Queensland Office of Climate Change notes a rise in average temperature since 1910 across Queensland and an even faster rate of temperature rise since 1950, with the rate of temperature increase ranging from 0.07 °C / decade in the far north to 0.32 °C / decade in the south west of the State. By 2030 annual average temperatures in Queensland's coastal areas are projected to increase by about 0.9 °C (range of 0.7–1.2 °C) relative to the climate of recent decades (CCQ 2008).

Relevant policy: Climate Change Impact Statements (CCIS) (2008), Climate Smart 2050 (2007), ClimateSmart Adaptation 2007-2012 (2007).

Table 22.3.1: Greenhouse gas and climate change plan

	Greenhouse gas and climate change
Policy	To ensure that the project is managed in a way that it is adaptable to conditions that may arise as a result of climate change.
Performance Criteria	1. to recognise the exacerbated risk of extreme weather conditions, for example heat waves, storms, floods, bushfire and windstorms 2. to integrate mitigation measures into the project that reduce the risk of damage to construction from the extreme weather events 3. to integrate mitigation measures into the project that reduce the risk of harm to people or property caused by extreme weather events during construction and operation 4. to recognise the association between the project and its potential contribution to climate change and comply with the Air Quality EMP to reduce the impact of the project on climate change.
Implementation Strategy	**Construction:** ▪ siting of key infrastructure above flood levels and on structure ▪ construction at flood sensitive sites during dry periods wherever possible ▪ control of dust at all times, but particularly during windy periods ▪ the use of erosion and sediment control measures during construction to prevent increased erosion and sedimentation during rainfall events ▪ implementation of health and safety procedures to reduce the risk of dehydration, heat stroke or sunburn that may affect project personnel during construction, particularly during heatwaves ▪ change work hours to start earlier and finish earlier to avoid the afternoon heat.

Table 22.3.1: continued

	Greenhouse gas and climate change
	▪ modify work hours during heatwaves so as to limit number of hours construction personnel are exposed to high temperatures ▪ postpone construction work during periods of cyclones, severe storms and other extreme climatic events ▪ Health and Safety Management Systems to ensure appropriate procedures are in place to prevent health and safety incidents arising as a result of extreme climatic events ▪ a disaster / emergency management plan for the project during construction incorporating an early warning system, response strategy to protect the construction works from flooding, storm and heatwave, protective measures for personnel and an evacuation plan. **Operation:** ▪ rainfall and temperature monitoring ▪ Health and Safety Management Systems to ensure appropriate procedures are in place to prevent health and safety incidents arising as a result of extreme climatic events ▪ a disaster / emergency management plan for the project during operation incorporating an early warning system, response strategy to reduce / cease / modify operations during extreme events and evacuation plans ▪ the condition of the rail to be monitored regularly, in particular during heat waves, to prevent any damage to the tracks ▪ repair and maintenance of the rail to keep it in good working order and reduce the risk of incident during extreme weather events ▪ appropriate rail speed restrictions when air temperature rises over 38 °C. **Decommissioning:** The decommissioning stage will involve removal of the redundant railway line, rehabilitation and construction of a rail trail (in some areas). The mitigation measures for the decommissioning stage will be the same as those for the construction stage of the project.
Monitoring	Monitoring both long and short term weather forecasts during the construction period to enable prediction of extreme weather events and appropriate actions to prevent damage to the project and/or harm to personnel. The condition of the rail will be monitored regularly, especially during heat waves and flood, to prevent damage to the tracks.
Auditing	**Construction / Decommissioning**: Visual inspection of construction zones several times during construction to ensure performance criteria are being met. **Operation**: Visual inspection of rail to ensure that it is in good working order and any requirements for repair or maintenance reported appropriately.
Reporting	Monthly reports to indicate monitoring results, audits, training and incidents. Reporting any environmental incident that results in damage to construction works or operational rail and / or harm to personnel. Report any non-compliance with EMP or significant harm to the environment to the on-site construction manager, the Department of Transport and Main Roads and the regulatory body, such as the Department of Environment and Resource Management, as required.
Corrective Action	Following a reportable incident, the restoration and repair of the environment to its natural state or as directed by the regulatory authority. Construction project manager can request cessation of works if there is a breach in performance criteria of EMP or a risk of it occurring.
Responsibility	The environmental officer is to conduct monitoring of long and short term weather forecasts and liaise with the on-site construction manager and / or the Department of Transport and Main Roads as appropriate. The on-site construction manager is responsible for compliance with the EMP and implementing the disaster / emergency management plan during construction. The maintenance contractor is responsible for monitoring the condition of the rail.

22.3.2 Landscape and visual management

The project area lies within the Sunshine Coast Regional Council Local Government Area. Large sections within the project area are considered to have a high scenic amenity profile. These areas are generally located in the areas between the railway townships along the existing rail corridor. Key characteristics that describe the existing landscape and visual context include:

- a distinctive topographic mix of high, steep undulating land and lower floodplain areas
- the Blackall Range running parallel to the project area to the west
- east-west running ridges bisecting the project area at a number of points, most noticeably between Landsborough and Mooloolah, and between Mooloolah and Eudlo. Numerous smaller ridges and steep slopes also traverse the project area
- settlement areas of Landsborough, Mooloolah, Eudlo, Palmwoods, Woombye and Nambour around the existing railway corridor stations
- National parks, forested and other vegetated areas
- floodplains linked to Addlington Creek, South Mooloolah River, Mooloolah River, Eudlo Creek, Acrobat Creek, Paynter Creek and Petrie Creek bisecting the landscape with dense riparian vegetation
- agricultural small holdings comprising cropping and grazing activities generally clear of vegetation with perimeter fences that pattern the landscape and are lined with rows of established trees
- scattered individual rural dwellings and rural residential subdivisions.

Relevant policy: *South East Queensland Regional Scenic Amenity Study* 2004.

Table 22.3.2: Landscape and visual management plan

	Landscape and visual
Policy	To recognise the visual impact that the rail corridor will have on the existing environment and reduce this impact through sensitive design and landscape screening.
Performance Criteria	1. minimise impact of the project on the landscape character and visual environment of the area through which it passes 2. minimise the earthwork footprint to reduce visual, landscape and ecological impacts 3. retain existing vegetation where possible and provide buffer zones and planting that contribute to ecological and landscape value 4. minimise the requirement for lighting in areas outside of townships
Implementation Strategy	**Construction:** ▪ staged construction to limit visual impact to several small areas at any one time ▪ ensure appropriate screening of construction activities with sensitive receptors, such as nearby residences and businesses ▪ ensure site is kept tidy and clean at all times ▪ avoid construction outside of daylight hours in areas that are environmentally sensitive, i.e. national parks and vegetated ridgelines to prevent the requirement for lighting. ▪ Rail lighting during night time works to be placed to minimise light intrusion to nearby sensitive receptors, i.e. residences and operating businesses. ▪ minimise the construction footprint as far as possible and implement the Vegetation Management Plan (Section 22.3.5) to rehabilitate areas no longer required for construction **Operation:** ▪ consider visual impacts in the choice of electrification mast structures, generally favouring pole structures over gantry structures ▪ consider colour scheme and architectural relationship to existing town centres in the design of the rail stations ▪ undertake landscape planting within the railway reserve to screen the project from external views ▪ undertake landscape planting in strategic locations outside the railway reserve to provide additional screening. ▪ design lighting to minimise light intrusion to nearby residences

Table 22.3.2: continued

	Landscape and visual
	▪ limit operating hours of lighting to minimise light intrusion to nearby residences and use timers and motion sensors as appropriate ▪ maintain station buildings and other structures (such as fences) in good condition ▪ keep stations clean and tidy ▪ maintain landscape in the railway reserve including regular weed and litter removal. **Decommissioning:** Careful urban design and landscape treatment of modified spaces in town centres created by the relocation of the railway and the decommissioning of existing rail infrastructure. Implementation of Vegetation Management Plan (Section 23.3.5) to rehabilitate areas no longer required for the rail service.
Monitoring	Regular monitoring of construction works to ensure only prescribed clearing is occurring (including before and after photographs). Inspections to be undertaken post construction to ensure appropriate maintenance of revegetated and landscaped areas, successful stabilisation of plants and minimal weed invasion. Periodic monitoring of rehabilitation zones to assess threatening processes (e.g. flood, erosion etc) that may affect the success of rehabilitation.
Auditing	Two years after works, site management to determine if objectives of this management plan have been achieved. A report is to be prepared and if not achieved management requirements be defined to ensure that a self sustaining population is established within regeneration areas.
Reporting	Monthly reports to indicate monitoring results, audits, training and incidents. Report any non-compliance with EMP to the on-site construction manager, the Department of Transport and Main Roads and the regulatory body, such as the Department of Environment and Resource Management, as required.
Corrective Action	Following a reportable incident, the restoration and repair of the environment to its natural state or as directed by the regulatory authority. The on-site construction manager can request cessation of works if there is a breach in performance criteria of EMP or a risk of it occurring.
Responsibility	The on-site construction manager is responsible for compliance with the EMP and implementing the disaster / emergency management plan during construction. The maintenance contractor is responsible for monitoring the condition of the landscaping and rehabilitation.

22.3.3 Erosion and sediment control

Much of the area between Landsborough and Mooloolah and Mooloolah and Eudlo is steep. North of Eudlo the terrain flattens as it is affected by floodplains. The predominant geological formations encountered in the project area are: Landsborough Sandstone, Tertiary / Quaternary Alluvium, Tertiary / Quaternary Residual Deposits and Nambour Formation. The published geological map identifies an area of residual deposits and possible hill wash soils. Although no clear indications of ongoing slope movement were observed from the aerial photographs, zones of ongoing instability and the potential presence of low strength materials is likely in areas affected by residual deposits and alluvium. It is in these areas where the biggest risk of erosion and sedimentation occurs.

Relevant legislation/policy: *Environmental Protection Act 1994*; *Water Act 2000*, Environmental Protection (Water) Policy 1997; Soil Erosion and Sediment Control – Engineering Guidelines for Queensland Construction Sites (Queensland Division of the Institute Engineers 1996); Erosion and Sediment Control Guidelines for Queensland Construction Sites (Witheridge and Walker, 1996).

Table 22.3.3: Erosion and sediment control plan

	Erosion and sediment
Policy	To minimise the likelihood and extent of erosion occurring during the project life and manage sedimentation issues arising from erosion that does occur, such that environmental impacts are reduced.
Performance Criteria	1. to minimise impact to surface water, groundwater quality, vegetation and fauna species 2. maintain existing water quality conditions within waterways and adjoining tributaries 3. erosion to be controlled at all sites disturbed by construction activities 4. sediment control devices used to treat all site discharges with the potential for particle export.
Implementation Strategy	**Construction:** ▪ clearing to be undertaken in stages and occur only as necessary to reduce potential sediment loads at any one time during the construction period ▪ undertake extension of existing major culverts or new culverts during dry conditions, where possible, to minimise erosion and sediment transport ▪ contractor to submit design for erosion control measures for sections prior to disturbance of natural surface ▪ construct temporary treatment measures (silt fences, rock checks, diversion drains, silt socks, coir logs etc) at specified locations prior to commencement of works ▪ ensure temporary erosion and sediment controls are in place and operational at the beginning of each work day ▪ soil erosion from areas with diffuse drainage to be controlled using silt fencing to control transport of coarse sediments; fencing to be placed at toe of batters; Check Dams to be used along tow of batters to control flow velocities along steeper sections of rail ▪ temporary drainage from all batter slopes to be conveyed in a controlled manner down slope by use of protective plastic or geo-fabric liners ▪ drainage structures to be inspected and maintained to ensure they are effective and remain stable. Sedimentary build up to be removed from control structures to ensure maximum capacity at all times ▪ remove loose surplus excavated sand, gravel or clay (where possible), to minimise excessive erosion ▪ roughen disturbed areas to reduce velocity flowing into nearby drains and watercourses; minimise timeframes areas are left exposed ▪ topsoil to be keyed into batter slopes (e.g. through roughened lines) ▪ during the construction phase, scour protection to be provided for all drainage outlets to reduce the water discharge velocity and the potential for bed and bank scour ▪ vehicle routes within works sites to be maintained to minimise loss of sediments by construction traffic ▪ minimise sediment taken off site by vehicles by using designated wash down bays, where appropriate ▪ stormwater to be collected where possible from construction areas and diverted into settlement ponds for treatment and reuse ▪ use sedimentation basins (where required) to enable settlement of sediments prior to discharge; maintain regularly; sediment removed from basins to be dewatered on site when possible and used as construction fill material. ▪ stockpiles to be no less than 50 m from a watercourse (where possible) ▪ consideration to be given to covering of stockpiles where they are in place for greater than a month, such as using plastic sheeting ▪ sediment fences to be installed down slope of stockpiles and maintained ▪ in regards to the timing of construction activities, the contractor to consider seasonal conditions and also obtain Bureau of Meteorology weather forecasts for the site and to take appropriate action based on such forecasts ▪ progressive installation of drainage structures (i.e. bioretention systems) depending on stage of works; consideration given to using erosion control matting and blankets, pending soil condition and topography ▪ immediate revegetation / landscaping of areas once construction has been finalised.

Table 22.3.3: continued

	Erosion and sediment
	Post-construction: ▪ Areas required for construction, but not needed for operation of the railway should be stabilised immediately after construction has ceased. Stabilisation will be in the form of vegetative rehabilitation, landscaping or constructed stabilisation depending on the location. ▪ In the event that permanent stabilisation cannot be implemented immediately, temporary stabilisation is required in the form of geo-fabrics or similar. **Operation:** ▪ restricting access to rehabilitated or landscaped areas ▪ regular monitoring of the stormwater control devices (e.g. bioretention basins, culverts, drains etc) ▪ removal of control measures when on-site erosion is controlled and significant permanent vegetation coverage is obtained ▪ a sediment and erosion control plan (for the operational phase) to be kept on site at all times for review and update ▪ regular maintenance of sediment and erosion controls on the site. **Decommissioning:** The decommissioning stage will involve removal of the redundant railway line, rehabilitation and construction of a rail trail (in some areas). The mitigation measures for the decommissioning stage will there be the same as those for the construction stage of the project.
Monitoring	Monitoring of the erosion and sediment control devices at the beginning of each work day during construction. Monitoring after major rainfall events where there is more than 25 mm within a 24 hour period. Regular monitoring of drainage and erosion control measures in place during the operational phase of the project. Monitoring of water quality in line with Section 23.3.8.
Auditing	The contractor will periodically submit an inspection inventory of erosion and sediment control devices established at each of the separate stages of the construction contract. For each device, the contractor will include the following information in the inventory : inspection date, condition report, restoration actions required and date of restoration.
Reporting	Monthly reports to indicate monitoring results, audits, training and incidents. Report any non compliance with EMP to the on-site construction manager, the Department of Transport and Main Roads and the regulatory body, such as the Department of Environment and Resource Management, as required.
Corrective Action	Immediate replacement or repair of stormwater control device or sediment / erosion control device upon first notification of failure. Following a reportable incident, the restoration and repair of the environment to its natural state or as directed by the regulatory authority. The on-site construction manager can request cessation of works if there is a breach in performance criteria of EMP or a risk of it occurring.
Responsibility	Monitoring of the erosion and sediment control devices during construction will be the responsibility of the on-site construction manager. The maintenance contractor will be responsible for monitoring the condition of erosion and sediment devices during the operational phase.

22.3.4 Acid sulfate soils and contaminated land

Although not all rail land is listed on the Environmental Management Register or the Contaminated Land Register, it is considered potentially contaminated. The potential contamination is a result of the majority of the rail corridor being historically (1940s and 1950s) treated with the herbicide sodium arsenite, which was sprayed via boom arrangement onto the track. The resulting sodium arsenite has a low mobility and thus has a continued presence in the substrate. Consequently, QR Limited has adopted a policy whereby all soils excavated for track work are treated as contaminated. Due to the mechanics of the spraying method used, most of the contamination occurs within 5 m of the track formation, and to a depth of 0.5 m. Beyond this, the levels are expected to be much lower.

The majority of the project is elevated above 20 m AHD and therefore not identified as Potential Acid Sulfate Soils (PASS) areas. However, there are some lower lying areas in the north of the project between Palmwoods and Nambour. These areas are on the floodplains of Paynter Creek and Petrie Creek.

Relevant legislation policy: *Environmental Protection Act 1994;* Environmental Protection (Waste Management) Regulation 2000; State Planning Policy 2/02: Planning and Managing Development Involving Acid Sulfate Soils; Environmental Protection (Waste Management) Policy 2000; Guidelines for Sampling and Analysis of Lowland Acid Sulphate Soils (ASS) in Queensland 1998 (QASSIT); AS4482 .1, 1997, Guide to the sampling and investigation of potentially contaminated soil; Draft Guidelines for assessment and management of Contaminated Land in Queensland (1998).

Table 22.3.4: Acid sulfate soils and contaminated land plan

	Acid sulfate soils and contaminated land
Policy	To identify and treat areas of contaminated / acid sulphate soils within the project area, in order to prevent adverse environmental impacts as a result of toxic leachate.
Performance Criteria	1. all fill brought to site or exported from site to be inert and free of contaminants and waste 2. all spills or materials capable of causing environmental harm to be contained 3. no residual land contamination to remain following the completion of construction.
Implementation Strategy	**Construction:** ▪ Any excavated material can be kept in the corridor either in the location of origin or within the near vicinity. ▪ Details of fill providers will include date of arrival, quantity, source of fill and all documentation. ▪ The Department of Environment and Resource Management permit QR Limited to move excavated material by road, provided it is returned to the rail corridor (near the place of origin). Excavated material is to be kept away from watercourses and boundary fences, due to the potential for erosion to mobilise the contaminants in the soils. ▪ Ground waters and surface waters that leach or flow into any excavation of a disturbed ASS or contamination site will be contained (where possible) and monitored for water quality parameters. Detained water must satisfy ANZECC water quality parameters before being released off-site. ▪ On-site storage of fuel and other contaminants will be limited. ▪ Spills will be cleaned up and treated as appropriate.

Table 22.3.4: continued

	Acid sulfate soils and contaminated land
	Contaminated land: ▪ If contaminated land is located during works, it is to be managed through one or more of the following options: Option 1 – do nothing – site left as is with no management put in place Option 2 – decommissioning underground storage tanks Option 3 – removal of underground storage tanks Option 4 – capping of contaminated sites Option 5 – excavation of off-site entombment to a suitable location, management of project area Option 6 – excavation and on-site entombment to suitable location and management of project area. ▪ Approval and disposal permit from the Department of Environment and Resource Management will be sought for any removal of contaminated soil. ▪ Soil will be removed in accordance with a Remediation Action Plan approved by the Department of Environment and Resource Management. ▪ Procedures for handling (loading and unloading), storage, disposal and emergency response for hazardous waste will be described within an Emergency Management Plan. ▪ For large spills, management and remediation will be undertaken in accordance with the *Environment Protection Act 1994* and Draft Guidelines for the Assessment and Management of Contaminated Land (former EPA now Department of Environment and Resource Management). **Acid Sulfate Soils:** ▪ Further ground investigations will be required to identify the extent of acid sulfate soils. Should it be discovered during works, mitigation may include: – blending neutralising agents with acid sulphate soil (ASS) to neutralise the Total Potential Acidity (TPA) present – disposing of untreated ASS to site or a registered landfill licensed to accept it and approved by the Department of Environment and Resource Management – disposal of untreated ASS under water to prevent possible oxidation and production of acids. ▪ The treatment of ASS will depend on the method chosen and the results of the TPA testing. If the soil is nominated to be neutralised, then the neutralising agent rate will be 1.5 times the theoretical amount to neutralise the acid generating potential. Excavated ASS material should be treated on-site within designated neutralising pad areas. ▪ The Department of Environment and Resource Management have no restrictions on the transportation of ASS, as it is not considered a contaminated soil unless heavy metals or other contaminants are present. ASS exposure to air should be limited.
	Operation: The disturbance of contaminated or acid sulphate soils during operational phases is highly unlikely. However, if maintenance or repair works requires excavation in previously identified risk areas, then the management plan as described for 'Construction' will be applicable. **Decommissioning:** The decommissioning stage will involve removal of the redundant railway line, rehabilitation and construction of a rail trail (in some areas). The mitigation measures for the decommissioning stage will there be the same as those for the construction stage of the project.
Monitoring	Monitoring of a contaminated site as required by the Department of Environment and Resource Management under a Remediation Action Plan. Any ponded waters on disturbed ASS or contaminated sites will be monitored on a daily basis. All treated ASS will be tested at the rate of one sample per 500 m^3 of treated material to validate the effectiveness of treatment.

Table 22.3.4: continued

	Acid sulfate soils and contaminated land
Auditing	At the completion of the construction phase, a final ASS and contaminated site status report will be prepared and submitted to the Principal and any relevant agencies.
Reporting	A register of each ASS and contaminated site will be maintained on site to record all of the strategy actions, including inspection dates, sampling dates, results of testing, treatment and any corrective actions.
Corrective Action	If an area of ASS or contamination is encountered, additional to the sites identified and tested prior to construction, works will cease while an investigation as to the extent and type of contamination / ASS will be undertaken. The ASS or contamination will be treated appropriately prior to the resumption of works. Following a reportable incident, the restoration and repair of the environment to its natural state or as directed by the regulatory authority.
Responsibility	All routine test results will be forwarded to the environmental officer and the on-site construction manager. The environmental officer will investigate all valid complaints and implement remedial action.

22.3.5 Vegetation management

Whilst the project has endeavoured to avoid significant areas of mapped remnant vegetation, there are several sections where such values could not be avoided due to existing development, topography and the nature of the rail as linear transport infrastructure. The project will result in the removal of approximately 30 ha of mapped remnant vegetation representing a variety of regional ecosystems. Whilst there were no significant species located during the field investigations conducted for the project, precautionary measures need to be put in place in case they are encountered in pre-construction investigations.

Relevant legislation/policy: *Environment Protection and Biodiversity Conservation Act 1999*; *Nature Conservation Act 1992; Vegetation Management Act 1999; Environmental Protection Act 1994; Water Act 2000;* Nature Conservation (Wildlife) Regulation 2006; Queensland Policy for Vegetation Management Offsets 2006; Australian Standard AS 4373-2007 – *Pruning of Amenity Trees*.

Table 22.3.5: Vegetation management plan

	Vegetation management
Policy	To minimise remnant vegetation clearing and achieve vegetation offsets in compliance with Policy for Vegetation Management Offsets 2006.
Performance Criteria	1. no unnecessary removal of remnant vegetation 2. no clearing of threatened species and old growth trees, where possible 3. clearing within designated areas only 4. ensure compliance with licenses and approvals 5. rehabilitation of areas required only for construction 6. management of rehabilitation areas to a point where limited maintenance is required 7. offset remnant vegetation clearance in accordance with the Policy for Vegetation Management Offsets 2006.

Table 22.3.5: continued

	Vegetation management
Implementation Strategy	**Construction:** ▪ A Vegetation Clearing Permit/s will be obtained from the Department of Environment and Resource Management as required under the *Vegetation Management Act 1999*. ▪ Surveyors will be instructed to notify the environmental officer if remnant vegetation requires clearing for line-of-site, location of pegs etc. The environmental officer will conduct an inspection to ensure that the vegetation to be removed does not consist of threatened species. ▪ Clearing along the proposed rail corridor should be limited to the amount necessary to undertake earthworks and should aim to minimise the construction corridor where possible. ▪ In remnant areas, an environmental officer should traverse the area by foot immediately prior to clearing (in conjunction with a fauna spotter-catcher) to check for any threatened plant species or old-growth trees on or directly adjacent to the corridor. ▪ Areas of vegetation containing threatened species or old-growth trees that could be affected by the construction of the rail corridor will be flagged. ▪ Areas of vegetation that have the lowest diversity of native species and / or are weed infested should be selected for clearing where options exist, i.e. for construction zones. ▪ Installation of vegetation clearance markers (e.g. flagging tape, marker paint, high visibility poly-web fencing) prior to the commencement of vegetation clearance. Vegetation clearing will be limited to the construction footprint. Construction equipment and personnel will not be permitted outside the construction footprint. ▪ An exclusion fence will be placed around culturally significant trees being retained (e.g. adjacent to Eudlo station) to prevent damage to trees and root systems. The exclusion fencing shall be placed at a distance of 10 x DBH (Diameter at Breast Height) from the tree. ▪ Areas of vegetation containing threatened species or old-growth trees directly adjacent to the construction zone will be defined with exclusion fencing prior to construction works. Access will not be permitted to these areas. ▪ Where rare or threatened species are encountered within the construction footprint, work in that immediate area must stop and arrangements be made for the translocation of that (or those) plant(s) using recognised landscaping techniques, and undertaken by appropriately skilled staff. Plants should be removed keeping the root ball intact, and stored ready for replanting using accepted nursery practices. When works in that area have finished, they should then be planted as near as practicable to the original location, where they will not be disturbed in future (e.g. by future activity on the corridor). Watering in should occur immediately after planting. The ground around the plant in its new location should be mulched during watering. ▪ Where possible, lopping or pruning of trees within the clearing zone is preferable to completely removing them. Pruning should be undertaken in accordance with Australian Standard AS 4373-2007 – Pruning of Amenity Trees. ▪ Within areas where clearing must occur for construction purposes (but is outside of the actual footprint of the track and safety zones), clearing to ground level will be minimised. If possible, slashing of existing vegetation layers or clearing with minimal ground disturbance (e.g. chain saw) should be undertaken so that the soil seed bank is retained. ▪ Felled vegetation should be economically salvaged as appropriate, such as mulching of smaller stems and branches, and sale of larger timber to contractors. ▪ Hollow logs, rocks and large debris can be salvaged for use for habitat enhancement within areas for rehabilitation.

Table 22.3.5: continued

	Vegetation management
	▪ Limiting any necessary slashing to a minimum height of 200 mm, to allow for the retention of ground layer and understorey vegetation in all areas not directly utilised for infrastructure construction or access track purposes. ▪ Access tracks should be located in consultation with the environmental officer to avoid mature, remnant trees as much as possible. ▪ Intended vehicle access tracks to and along the infrastructure route should be identified and marked at the commencement of the construction phase, to prevent the development of multiple access tracks. ▪ Restriction of access to rail corridor, construction zones and access tracks to prevent trampling and minimise the chances of weed infestation. ▪ Locating features such as fill stockpiles, access tracks, site facilities etc. within the construction zone or in areas of existing disturbance. ▪ Storage of all materials and waste (including general human waste) should be restricted to designated areas that are at least 50 m away from waterway corridors. These should be designed to ensure no off-site impacts occur (e.g. bunding should be placed around fuel and chemical storage areas). ▪ Soil stability should be maintained in all disturbed areas, by means of erosion control mechanisms, including sediment barriers, berms, batters, fabric covers and / or mulching, temporary and permanent drains, etc. ▪ Penalties should be imposed for unauthorised clearing of defined protected vegetation. ▪ Location and securing of areas required for offsetting remnant vegetation as per VM Act.
	Post-construction: ▪ Areas required for construction, but not needed for operation of the railway should be stabilised immediately after construction has ceased. Stabilisation will be in the form of vegetative rehabilitation, landscaping or constructed stabilisation depending on the location. ▪ In the event that permanent stabilisation cannot be implemented immediately, temporary stabilisation is required in the form of geo-fabrics or similar. **Operation:** ▪ Vegetation offsets will be established to replace areas of remnant regional ecosystems removed by the proposed railway development. Offsets will be in line with the policy of the Department of Environment and Resource Management for Vegetation Management Offsets, which is triggered under the *Vegetation Management Act* 1999. ▪ Control and/or removal of any weeds in the corridor that have been introduced or exacerbated as a result of the works will aim to leave the site in equivalent condition (or better, in terms of weeds) to prior to construction. ▪ Weed establishment on bare ground and in areas of revegetation will be prevented. ▪ Areas necessary for construction, but not required for the operational phase of the railway, will be rehabilitated, such as areas disturbed by construction of the bridges. Rehabilitation will aim to re-establish the original regional ecosystems present prior to disturbance and will be staged where necessary. ▪ The rehabilitation program should incorporate a wide variety of species endemic to the area and typical of the regional ecosystem being rehabilitated. ▪ The rehabilitation program should incorporate threatened species endemic to the area and typical of the regional ecosystem being rehabilitated, where possible. ▪ Plant stock should be locally sourced, where possible, to maintain genetic identity of local communities. ▪ Due to the large number of plants likely to be required for the revegetation program, it is recommended that a native plant nursery be established to supply the project.

Table 22.3.5: continued

	Vegetation management
	Decommissioning: ▪ identification of areas to be rehabilitated for conservation purposes ▪ removal of decommissioned rail infrastructure and associated facilities ▪ treatment of contaminated land ▪ restoration of terrain and site preparation (top soil and mulching) ▪ planting (tubestock, seeding and / or hydro-mulching as appropriate). **Aquatic Habitat Management:** ▪ vegetation clearing and bank / bed disturbance to be minimised where possible ▪ appropriate management to contain disturbed sediments ▪ not removing sediment or other substrate material from a stream or stream channel ▪ not adding or releasing sediment, debris or material into the stream or stream channel ▪ monitoring and controlling the encroachment of weeds in areas where vegetation has been removed ▪ undertaking any in-channel works during winter and early spring, when rainfall is lowest, and avoiding the late spring to late summer period, which is a critical spawning and migration period for most native fish species. ▪ where possible (e.g. riparian areas cleared for construction of temporary access tracks), replanting vegetation after construction completion, which would be a beneficial impact to the long-term stability of stream banks ▪ restoration of the worksite after the completion of works ▪ reporting any environmental incident that results in physio-chemical changes to water quality of physical habitat structure of riparian, littoral and in-stream environment ▪ following a reportable incident, the restoration and repair of the habitat to its natural state or as directed by the regulatory authority.
Monitoring	▪ regular monitoring of construction works to ensure only prescribed clearing is occurring (including before and after photographs) ▪ periodic monitoring of weed density within rehabilitation and offset zones ▪ periodic monitoring of native plant stock to ensure survival and growth ▪ periodic monitoring of rehabilitation zones to assess threatening processes (e.g. flood, erosion etc) that may affect the success of rehabilitation ▪ any translocated specimens to become an integral part of the monitoring element of the rehabilitation program ▪ monitoring of water quality as per Section 23.3.8.
Auditing	**Construction:** Visual inspection of construction zones pre-clearing, several times during construction and post-construction to ensure performance criteria are being met. **Operation / Decommissioning:** Visual inspection of rehabilitation zones monthly for 12 months and then quarterly until the vegetation is self-managing (i.e. maintaining low weed density and continued growth of native vegetation).
Reporting	Monthly reports to indicate monitoring results, audits, training and incidents. Reporting any environmental incident that results in physio-chemical changes to water quality of physical habitat structure of riparian, littoral and in-stream environment. Report any non-compliance with EMP to the on-site construction manager, the Department of Transport and Main Roads and the regulatory body, such as the Department of Environment and Resource Management, as required. Report any incidents of significant environmental harm to the on-site construction manager, the Department of Transport and Main Roads and the regulatory body, such as the Department of Environment and Resource Management, as required.

Table 22.3.5: continued

	Vegetation management
Corrective Action	Following a reportable incident, the restoration and repair of the environment to its natural state or as directed by the regulatory authority. Construction project manager can request cessation of works if there is a breach in performance criteria of EMP or a risk of it occurring. Any excessive clearing will be offset with rehabilitation.
Responsibility	Environmental officer is to oversee clearing activities and liaise with the on-site construction manager. Environmental officer should periodically monitor weed cover, replanting success, and report necessary maintenance to the maintenance contractor.

22.3.6 Weed management

Weed management will be essential to prevent the incursion of highly competitive weed species into establishing areas of rehabilitation and to prevent weed establishment under areas after construction. A targeted approach to individual weed species is possible given the limited number of weed species, and this should prove to be more effective than a broad-based approach (e.g. for herbicide selection). Lantana (*Lantana camara*) is the most significant weed along the preferred corridor, and a focus on this species by weed control contractors should control the majority of weed biomass. The other weed species encountered (particularly silver-leaf desmodium – *Desmodium uncinatum* and mother of millions – *Bryophyllum spp.*) on the corridor will need to be controlled, but they are not considered as destructive as lantana.

Relevant legislation: *Land Protection (Pest and Stock Route Management) Act 2002*, Land Protection (Pest and Stock Route Management) Regulation 2003

Table 22.3.6: Weed management plan

	Weed management
Policy	To prevent the spread of weeds into areas affected by the project during construction and to minimise weed invasion during the operational phase.
Performance Criteria	1. no increase in weed invasion (terrestrial and aquatic) within the project area 2. removal of major weed infestations within the project area 3. minimise use of herbicides 4. to adhere to the Vegetation Management Plan in Section 22.3.5, which will ensure weed invasion is reduced and rehabilitated areas achieve self-managing status.
Implementation Strategy	**Construction:** ▪ Prior to construction, specific site surveys should be done by the environmental officer in areas before construction teams enter the site. A weed report should be provided to the site manager and access prohibited to infested areas not essential for access. If infested areas need to be cleared, then appropriate weed control or containment measures should be implemented by the environmental officer. Depending on the type of weeds, this could entail slashing, burning, poisoning, landfill etc. ▪ The risk of in-stream and riparian weeds should be minimised through the implementation of vegetation clearing and revegetation management strategies as outlined in Section 22.3.5. ▪ Any weeds in the corridor that have been introduced or exacerbated as a result of the works should be controlled and/or removed, with the aim being to leave the site in equivalent condition (or better, in terms of weeds) to prior to construction. ▪ Staff/operator education programs run by the environmental officer should be implemented as part of the general site induction process, including distribution of fact-sheets to staff (e.g. colour photos, precautions, procedures). ▪ During construction, certification should be required to identify of the origin of construction materials, machinery and equipment. Vehicles and machinery should be subject to inspection, and if necessary, wash-down before entering sites. Vehicles and machinery must also be subject to wash-down immediately off-site when departing from areas known to be infested with weed species. Wash-down facilities should be situated so as not to allow mud to adhere to vehicles and machinery on exit from key weed-affected sites. ▪ Weeds should not mulched for use on site, but disposed of in the appropriate facility off-site.

Table 22.3.6: continued

	Weed management
	Operation: ▪ On-going weed management will be essential around and under bridge crossings, especially in *M. iteratus* habitat. ▪ On-going weed management will be undertaken within areas of rehabilitation and offsets. ▪ Chemical control of weeds should only be done where the site is at least 50 m from a waterway and it is carried out by trained and/or qualified operators, approved by the environmental officer and is preferable prior to mechanical clearing to reduce seed set. ▪ Herbicide will be applied according to the recommended rate. ▪ If possible, spraying should occur when surface water levels are low, generally in early winter after germination has occurred, but stream levels have not risen appreciably. ▪ Weeds should be sprayed at the correct time, usually when they are growing strongly, and before seed set. ▪ Damage to frogs should be minimised by determining the species present, and ensuring that as far as possible herbicide is not applied during egg laying, tadpole development or at the point where the juvenile frogs emerge from the water. ▪ Herbicide should be mixed in a coloured dye to accurately see which areas have been sprayed, and whether areas have been missed. ▪ Adequate follow-up of weed treatment will ensure that repeat treatment is minimised. ▪ Where possible, weeds will be wiped or injected with herbicide instead of spraying, to avoid spray drift. ▪ Do not spray if plants are under stress, such as on very hot days or in very dry or dusty conditions, as uptake of herbicide through leaves will be minimal. ▪ No spraying should be undertaken on windy days, or if it is likely to rain soon after application; before the herbicide has been adequately absorbed through the leaf surface. ▪ Surfactants will be avoided, as many of these are more toxic to wetland fauna than the actual herbicide. ▪ If contractors are to be used for herbicide application, ensure they are familiar with the above principles. ▪ It is also extremely important for the safety of the operator that all proper precautions are followed when using herbicides, including the use of correct clothing and disposal procedures. ▪ Buffer plantings will be implemented along the newly exposed forest edges. These plantings will be of appropriate native understorey species such as those present within the remaining forest itself, and will be planted at the forest edges at a level of density that will provide adequate protection to the forest in terms of shading, weed inhibition and microclimate control in general.
	Decommissioning: ▪ removing weed invasions along the existing alignment and preventing further spread ▪ preventing weed establishment on bare ground and in areas of revegetation ▪ rehabilitation and management of vegetation to a stage where it is resilient to weed invasion ▪ implementing buffer plantings along the newly exposed forest edges. These plantings to be of appropriate native understorey species such as those present within the remaining forest itself, and to be planted at the forest edges at a level of density that will provide adequate protection to the forest in terms of shading, weed inhibition and microclimate control in general.

Table 22.3.6: continued

	Weed management
Monitoring	Periodic monitoring of weed density within rehabilitation and offset areas. Monitoring of 'edge plantings' to ensure they achieve appropriate densities and are not penetrated by weed species.
Auditing	**Construction**: Visual inspection of construction zones pre-clearing, several times during construction and post-construction to ensure performance criteria are being met. **Operation / Decommissioning**: Visual inspection of rehabilitation zones monthly for 12 months and then quarterly until the vegetation is self-managing (i.e. maintaining low weed density and continued growth of native vegetation).
Reporting	Monthly reports to indicate monitoring results, audits, training and incidents. Report any non-compliance with EMP to the on-site construction manager, the Department of Transport and Main Roads and regulatory body, such as the Department of Environment and Resource Management, as required. Report any incidents of significant environmental harm to the on-site construction manager, the Department of Transport and Main Roads and the regulatory body, such as the Department of Environment and Resource Management, as required.
Corrective Action	Following a reportable incident, the restoration and repair of the environment to its natural state or as directed by the regulatory authority. Construction project manager can request cessation of works if there is a breach in performance criteria of EMP or a risk of it occurring.
Responsibility	Environmental officer is to liaise with the maintenance contractor with respect to the status of weeds within the project area. Environmental officer should periodically monitor weed cover, replanting success, and report necessary maintenance to the maintenance contractor. The maintenance contractor is responsible for complying with the Weed Management Plan.

22.3.7 Fauna management

The area affected by the alignment is relatively large and supports a diversity of habitats, including eucalypt open forest, eucalypt woodlands, wet sclerophyll forest, riparian rainforest, *Melaleuca sp*. wetlands, swamps and notophyll vine forest (as described in **Chapter 7, Terrestrial Flora**). With such a diversity of habitats and a large area of remnant vegetation, the project area supports a high diversity of terrestrial fauna, including some species of conservation significance. Fauna habitat is concentrated around the southern portion of the project area where there are several valuable areas, including: Dularcha National Park, Eudlo Creek National Park and two Bioregional Wildlife Corridors (Rose Road and The Pinch Lane). There are also several major waterways that support remnant riparian rainforest, namely: Addlington Creek, South Mooloolah River, Mooloolah River and Eudlo Creek. The areas of valuable habitat in the northern portion of the project area are limited to Paynter Creek and Petrie Creek.

Relevant legislation/policy: *Environment Protection and Biodiversity Conservation Act 1999; Vegetation Management Act 1999* (with reference to Essential Habitat); *Environmental Protection Act 1994; Nature Conservation Act 1992;* Nature Conservation (Wildlife) Regulation 2006, Queensland Policy for Vegetation Management Offsets 2006 (with reference to Essential Habitat).

Table 22.3.7: Fauna management plan

	Fauna management
Policy	To minimise destruction of valuable fauna habitat, particularly with reference to the EPBC Act listed Giant Barred Frog (*Mixophyes iteratus*) and achieve essential habitat offsets in compliance with Policy for Vegetation Management Offsets 2006.
Performance Criteria	1. no unnecessary clearing of threatened species habitat 2. to adhere to the Vegetation Management Plan in Section 22.3.5, this will ensure protection of fauna habitat and rehabilitation of disturbed areas 3. ensure compliance with licenses and approvals, particularly the referral to DEWHA under EPBC Act 4. no death or serious injury to native fauna during clearing.
Implementation Strategy	**Construction:** ▪ clearing along the alignment to be limited to 60 m (or less); in areas identified as containing features of ecological significance, the construction corridor to be minimised further if possible ▪ removal and/or damage to existing native vegetation, particularly large trees, to be minimised wherever possible ▪ minimise clearing of large trees in riparian areas to protect potential nesting trees of raptors ▪ logs and large rocks to be placed in nearby vegetation or adjacent to such vegetation to create shelter habitat for terrestrial fauna species ▪ an experienced spotter catcher to be engaged to check vegetation for the presence of fauna immediately prior to its clearing ▪ any injured or abandoned offspring of native wildlife to be taken to the nearest vet or wildlife carer (which ever is appropriate) for treatment at the expense of the Principal ▪ the location of nests / dens or fauna to be clearly marked with flagging tape and these areas will be buffered by 10m and retained until the fauna has moved on of its own volition ▪ penalties to be imposed for unauthorised clearing of defined protected vegetation or clearing of remnant vegetation without the direction of a fauna spotter-catcher ▪ development and implementation of protocols for any displaced fauna to be relocated to more suitable similar habitat within the surrounding area ▪ fauna exclusion fences to prevent fauna re-entering the construction site ▪ where possible, the timing of vegetation clearance (particularly remnant vegetation associated with waterways) to be selected in order to minimise impacts (direct and indirect disturbances) to affected fauna habitats during optimum breeding periods ▪ strict litter control throughout the construction site to be supported by: site-wide signage; an adequate number of litter bins (which by design exclude birds and vermin); bin clearance on a regular basis; daily maintenance of crib rooms to ensure cleanliness; educational signage within crib rooms on the linkage between poor waste management practices, increases in pest animal populations and subsequent impacts to native fauna. ▪ establishment of habitat enhancements to retained remnant habitat within the preferred alignment corridor (e.g. artificial roost boxes for microbats).
	Operation: ▪ Revegetation will prioritise plant species used by locally known EVR species such as *Allocasuarina*, fruiting trees, Koala feed trees, *P.praevenosa* and *E.tereticornis*. ▪ The incorporation of native grasses, herbs and shrubs for those areas where canopy species should not be planted (e.g. around bridges). ▪ Fauna underpasses, guide fencing and verge treatments require regular monitoring and maintenance to ensure their effectiveness and to allow remedial actions to be taken if trouble spots are recorded.

Table 22.3.7: continued

	Fauna management
	▪ At underpass locations, regular weed control, slashing of grasses and removal of silt that may cause water to pond, is necessary. All *A.elegans* identified during revegetation and construction should be removed to assist in the conservation of Richmond Birdwing Butterfly (*Ornithoptera richmondia*). ▪ Where appropriate vegetation is not already in place, a rehabilitation program should ensure that the preferred conditions are provided and maintained. ▪ An ongoing trapping and eradication program that targets pest animals will be designed and implemented. Trapping procedures will be undertaken by suitably trained personnel. ▪ An ongoing systematic monitoring program will be designed and implemented to detect the occurrence of feral animals and to assess the success of the trapping and eradication program. ▪ Fauna exclusion fences and guide fences will be repaired as required. ▪ Overhead wires are to be fauna-proofed to reduce the risk of electrocution. **Decommissioning:** ▪ Areas recommended for rehabilitation are: Addlington Creek (north), Dularcha NP, North of Dularcha NP – Rose Road and surrounds, Mooloolah River, The Pinch Lane and surrounds (bioregional corridor) and Eudlo Creek NP. EPBC Act specific: ▪ Bridge footings should be set back at least 20 m from the low bank with a bridge height that will allow retention of rainforest understorey at the site or treatment of the area under the bridge to convey frog movement. It will be advantageous to separate tracks in some locations to maximise light penetration under the bridge. This will reduce habitat disturbance and allow native vegetation and flood debris to accumulate in which the species may shelter. ▪ Placement of footings / abutments / piers within the water channel should be avoided where possible. If this is not possible due to structural constraints, then footings / abutments / piers within the waterway should be designed to minimise impacts on the natural flow. ▪ Construction should avoid peak breeding times around November to February. ▪ Soft-construction methods are recommended for bridges, where footings are put in place with minimal clearing and pre-fabricated spans are then installed. ▪ Spotter-catchers should conduct pre-clearing surveys for *M. iteratus* and relocate individuals where possible. If relocation is not possible, areas of high frog activity should be flagged and avoided until activity has decreased. ▪ Hydrocarbons should not be stored within 100 m of creeklines and waterways. ▪ All areas where soil, chemicals and hydrocarbons are stored should be bunded to avoid surface flow into creek lines. ▪ Sediment control structures should be established during construction to reduce sediment loads entering waterways. ▪ Soil disturbance should be minimised to avoid excess surface flow carrying sediments into waterways. ▪ Areas under bridges within known *M. iteratus* habitat will be mulched with leaf litter prior to rehabilitation. Disturbed banks should be stabilised and revegetated as soon as possible and habitat enrichment with logs and other large debris undertaken. ▪ On-going weed management will be essential around and under bridge crossings, especially in *M. iteratus* habitat.
Monitoring	Regular monitoring of constructed fauna underpasses to ensure appropriate water levels and maintenance of vegetation at entrances. Monitoring of the condition of fence lines will be required to ensure that there has been no damage to the fence and that guide fences and exclusion fences are operational. Monitoring of fauna strike incidents, so that any 'hot spot' areas can be identified and measures put in place to ameliorate the problem. Monitoring of rehabilitation areas as per Vegetation Management Plan Section 22.3.5.

Table 22.3.7: continued

	Fauna management
Auditing	**Construction:** Visual inspection of construction zones pre-clearing, several times during construction and post-construction to ensure performance criteria are being met. **Operation / Decommissioning**: Visual inspection of fauna underpasses and fence lines (exclusion and guide fencing) to ensure they are functional.
Reporting	Monthly reports to indicate monitoring results, audits, training and incidents. Report any non-compliance with EMP to the on-site construction manager, Department of Transport and Main Roads and the regulatory body, such as the Department of Environment and Resource Management, as required. Report any incidents of significant environmental harm to the on-site construction manager, Department of Transport and Main Roads and the regulatory body, such as the Department of Environment and Resource Management, as required.
Corrective Action	Following a reportable incident, the restoration and repair of the environment to its natural state or as directed by the regulatory authority. Construction project manager can request cessation of works if there is a breach in performance criteria of EMP or a risk of it occurring. Any excessive clearing will be offset with rehabilitation.
Responsibility	The on-site construction manager is responsible for ensuring presence of a spotter-catcher during clearing works and reporting any incidents involving native fauna to the appropriate regulatory body. The maintenance contractor is responsible for the monitoring and maintenance of fauna underpasses.

22.3.8 Hydrology and water quality

The project area traverses the mid and upper reaches of three SEQ catchments, namely, the Pumicestone, Mooloolah and Maroochy catchments. The total area of each catchment within the project area was 2.88, 22.09 and 41.37 km^2 , respectively. Based on the SEQ catchment digital terrain model and stream order mapping (WBM 2005), a total of 163.4 km of stream length has been mapped within the project area, most of which are minor drainages (stream orders one and two). Five main drainage systems traverse the project area, including Petrie Creek, Paynter Creek, Eudlo Creek, Mooloolah River and minor drainages of Ewen Maddock Dam. The project also traverses a number of aquifers, some of which are associated with groundwater bores.

Relevant legislation/policy: *Environment Protection and Biodiversity Conservation Act 1999*; *Nature Conservation Act 1992; Vegetation Management Act 1999; Environmental Protection Act 1994; Water Act 2000;* Nature Conservation (Wildlife) Regulation 2006; Queensland Policy for Vegetation Management Offsets 2006.

Table 22.3.8: Hydrology and water quality plan

	Hydrology and water quality
Policy	To minimise destruction of aquatic habitat, avoid impacts on flood hydrology and achieve no worsening of water quality within the riparian and groundwater systems and no significant lessening of yield from groundwater resources affected by the project.
Performance Criteria	1. no decrease in water quality (surface or groundwater) as a result of the project 2. no worsening of flooding scenarios as a result of the project 3. no significant lessening of yield from groundwater resources 4. to adhere to the Vegetation Management Plan in Section 22.3.5, which will ensure protection of aquatic habitat and rehabilitation of disturbed areas 5. ensure compliance with licenses and approvals, particularly the under *Water Act 2000* and *Fisheries Act 1994* 6. to ensure continued movement of aquatic fauna during construction.

Table 22.3.8: continued

	Hydrology and water quality
Implementation Strategy	**Construction:** ▪ relocation of extraction points associated with groundwater bores where applicable ▪ minimisation of removal of riparian vegetation ▪ prior to the commencement of works, establishment of appropriate sediment and erosion mitigation measures for the impact zone ▪ site access to follow the natural contour of the terrain, where possible; avoid steep slopes, wet or rocky areas and highly erosive soils ▪ access ways to be delineated with sediment and erosion control fencing and incorporate earthen bunds every 5 – 10 m where slope is an issue. ▪ silt fences to be placed on the down-slope boundary of the construction zone; silt fences to be placed along the contour and not across it to avoid heavy sediment loading ▪ bank stabilisation (i.e. hydro-mulching, planting or structural stabilisation where required) to be undertaken immediately after construction activities for areas no longer required for construction works ▪ a mobile spill kit to be available on site ▪ topsoil stripped from the site to be stockpiled and protected from erosion until re-use during site remediation ▪ stockpiles to be located on the up-slope side of any excavation and as far as possible from the waterway ▪ any sediment material that is spilled to be cleaned up ▪ earthen bunds or sediment fences to delineate the toe of any stockpiles ▪ catch-drains to be used to intercept and divert run-off around the area of impact ▪ avoid earthworks during wet weather ▪ construction activities to be conducted in a manner, to minimise disturbance to stream banks and beds ▪ no operation outside of construction zone ▪ no clearing, operation of machinery or personnel access within 3 m of the high bank ▪ re-fuelling of machinery not be undertaken less than 30 m from the waterway and fuel be stored at least 50 m from the waterway ▪ implementation and maintenance of control measures for the storage and handling of chemicals (e.g. fuels, oils etc.) to ensure potential contaminants are prevented from surface or subsurface leakage from the construction site ▪ storage of chemicals to be at least 50 m from the waterway and within a bunded area ▪ water leaving the work sites to be monitored and to be of similar quality to that of the receiving waters and efforts will be made to ensure contaminants do not leave the site ▪ minimising the risk of in-stream and riparian weeds through the implementation of vegetation clearing and revegetation management strategies as outlined in **Section 22.3.5** ▪ minimising in-stream habitat disturbance, including in-stream barriers and the creation of shallow ponded waters ▪ implementation of management strategies for in-stream barriers.
	Operation: ▪ drainage provided along the railway to collect run-off which may contain leached chemicals and metals ▪ implementation of sedimentation management practices (QR Limited actively seeks to identify sites where sedimentation problems may occur as a result their activities and implement appropriate management activities to minimise these impacts) ▪ emergency response (QR Limited has emergency response plans and training that are to be utilised when required) ▪ the surface level of a causeway to be the same, or lower than the natural level of the stream bed to reduce interference with flow ▪ habitat within a culvert to be as natural as possible (e.g. allow rocks and bed materials to infill the culvert base) ▪ light penetration to be as great as possible ▪ maintain the natural stream flow and velocity to be maintained or mimicked as closely as possible. **Decommissioning:** The most effective mitigation measure regarding conservation of aquatic ecosystems will be the protection and rehabilitation of native vegetation cover associated with waterways.

Table 22.3.8: continued

	Hydrology and water quality
Monitoring	Regular water quality monitoring during construction and operation.
	Regular monitoring to ensure that the natural stream flow and velocity will be maintained or mimicked as closely as possible.
	Monitoring to identify potential breeding habitat of mosquitos and biting midges before it becomes an issue.
	Monitoring of water extraction locations, i.e. water levels and quality.
	Monitoring of the condition of the railway so as to avoid leaching of contaminants.
Auditing	**Construction:** Visual inspection and water quality sampling of construction zones pre-clearing, several times during construction and post-construction to ensure performance criteria are being met.
	Operation / Decommissioning: Visual inspection and water quality sampling of waterways affected by the project, i.e. at crossing points.
Reporting	Monthly reports to indicate monitoring results, audits, training and incidents.
	Report any non compliance with EMP to the on-site construction manager, Department of Transport and Main Roads and the regulatory body, such as the Department of Environment and Resource Management, as required.
	Report any incidents of significant environmental harm to the on-site construction manager, Department of Transport and Main Roads and the regulatory body, such as the Department of Environment and Resource Management, as required.
Corrective Action	Following a reportable incident, the restoration and repair of the environment to its natural state or as directed by the regulatory authority.
	Construction project manager can request cessation of works if there is a breach in performance criteria of EMP or a risk of it occurring.
	Any excessive clearing of aquatic habitats will be offset with rehabilitation.
Responsibility	The on-site construction manager is responsible for ensuring adherence to the Hydrology and Water Quality Plan.
	The maintenance contractor is responsible for the monitoring and maintenance of aquatic environments affected by the project.

22.3.9 Air quality and dust

The closest air quality monitoring station is located approximately 13 km to the north of the project area at Mountain Creek (Mountain Creek Primary School, Maroochy Shire) which records ozone, PM_{10} (Particulates), nitrogen oxides and meteorological conditions. A review of the air quality monitoring data on 6 October 2008 showed that all indicators were classified as 'good to very good'.

Data from industrial facilities and diffuse sources for the 2005-2006 NPI reporting year identified motor vehicles as the top source of emissions followed by solid fuel burning (domestic), architectural surface coatings, domestic/commercial solvents/ aerosols, lawn mowing and others.

The most significant potential impacts during construction will be dust from wind erosion of exposed areas, earthworks and road haulage. Impacts during the operational phase will largely relate to emissions and are likely to be beneficial as the rail is intended to reduce road traffic.

Relevant legislation policy: *Environmental Protection Act 1994*; Environmental Protection Regulation 2008; Environmental Protection (Air) Policy (EPP Air) and National Environment Protection Measures (NEPMs) which are a broad framework-setting statutory instruments defined in the *National Environment Protection Council (NEPC) Act 1994*.

Table 22.3.9: Air quality and dust plan

	Air quality and dust
Policy	To manage and control the effects of construction activities and operational activities on air quality by reducing the effects of dust generation, exhaust emissions and any other functions causing an impact on the existing air quality.
Performance Criteria	1. minimise air pollution caused by dust and vehicle emissions 2. maintain air quality within acceptable and legal limits 3. aim to achieve PM_{10} = 50 (ug/m3), not exceed PM_{10} (24hr average) – 150 (ug/m3), PM_{10} (annual average) – 50 (ug/m3), Dust Deposition – 120 (ug/m2/day) 4. no complaints received from nearby sensitive receptors regarding air quality issues.
Implementation Strategy	**Construction:** <u>Dust</u> ▪ community/sensitive receptors to be informed of construction activities and hours of work ▪ review of construction activities and modification during periods of high-winds ▪ potential use of timber hoardings around work areas near sensitive receptors ▪ contractor to implement Erosion and Sedimentary Control Management Plan measures (**Section 22.3.3**) ▪ minimised vegetation removal as per the Vegetation Management Plan (**Section 22.3.5**); cleared areas to be reshaped and rehabilitated as soon as practical after the completion of works ▪ mulching of timber and cleared vegetation on site to avoid transportation ▪ compact unsurfaced roads and verges ▪ speed limits on unsealed roads to be minimised (20- 40 km/hr); rumble strips or gravel pads to be provided at site entry/exit points to assist in removal of debris; roads to be swept if soil is tracked onto them ▪ any dust, soil or mud deposited on public roads caused by construction vehicles to be removed immediately and disposed of appropriately ▪ equipment to be fitted with dust collection/suppression devices ▪ excavation and stripping works to be undertaken outside of dusty/windy conditions, where possible ▪ use of water as a dust suppressant, the water used to be rainwater harvested on site or recycled water from another source; potable town water not to be used for this purpose ▪ if conditions allow, water to be used as a dust suppressant on material stockpiles and unsealed access tracks to reduce the risk of airborne dust; consideration to be given to establishing rain water storage on site. ▪ inclusion and retention of vegetated buffers or windscreens at the nearest surrounding sensitive receptors ▪ minimised soil and fill stockpile heights ▪ locate stockpiles away from sensitive receptors ▪ for material stockpiles that are not to be used in less than six months, a cover crop or other suitable capping to be established to minimise aeolian dust generation ▪ haul truck loads to be covered ▪ installation of temporary wheel washers at construction exists for haul trucks leaving the site (as per Institutions of Engineers of Australia (IEA) Soil Erosion and Sediment Control Guidelines). <u>Emissions</u> ▪ There is to be no burning of material on site. ▪ The maintenance of machinery will be carried out on site to reduce emissions caused by transporting machinery for maintenance off site. ▪ Emissions from all construction vehicles will comply with the appropriate standards and regulations. ▪ Machinery should be switched off during prolonged periods of inactivity. ▪ Vehicle kilometres during construction will be reduced where possible by encouraging car sharing etc. ▪ Queuing of construction vehicles will be avoided. ▪ On-site power usage will be limited where possible.

Table 22.3.9: continued

	Air quality and dust
	Operation: A negative impact on local air quality during the operational phases is highly unlikely. However, if maintenance or repair works requires excavation or additional construction, then the management plan as described for 'Construction' will be applicable. **Decommissioning:** The decommissioning stage will involve removal of the redundant railway line, rehabilitation and construction of a rail trail (in some areas). The mitigation measures for the decommissioning stage will there be the same as those for the construction stage of the project.
Monitoring	Ongoing surveillance by site workers, particularly the environmental officer and on-site construction manager. Regular monitoring with 'real time' dust monitors at sensitive receptors or problem areas.
Auditing	Monthly reports to be provided to the Department of Transport and Main Roads detailing air quality results, audits, training and complaints.
Reporting	Complaints and environmental incidents of significant environmental harm to be reported to the construction project manager and the regulatory bodies, such as the Department of Environment and Resource Management.
Corrective Action	Modify work practices as required. Following a reportable incident, the restoration and repair of the environment to its natural state or as directed by the regulatory authority. The on-site construction manager can request cessation of works if there is a breach in performance criteria of EMP or a risk of it occurring.
Responsibility	The environmental officer reporting to the on-site construction manager will have the primary responsibility for identifying problems with dust and significant emissions that are able to be detected via sight or smell.

22.3.10 Noise and vibration

Noise and vibration arise during construction and operation of a railway. Operating railways generate airborne noise due to the rolling associated with the railway car wheels on the track, engine and exhaust noise of locomotives and impacts between cars during shunting. Airborne noise may also be generated by fixed railway equipment such as substations, tunnel ventilation plant and station PA systems.

The majority of the project area is an open rural environment. Main towns along the train line have more densely populated residential areas, generally localised to small regions around the train stations. As well as noise from the existing rail alignment, road traffic is a significant noise source in the area. Bruce Highway is approximately 5 km to the east and provides access to main towns within the project area. A sub-arterial road, ending as Nambour Connection Road in Nambour, follows the length of the existing rail alignment.

There are a large number of noise sensitive locations in the project area; these are listed in **Table 15.3.3, Chapter 15, Noise and vibration.**

Relevant legislation: *Environmental Protection Act 1994*, Environmental Protection (Noise) Policy 2008, Environmental Protection Regulation 2008

Relevant guidelines: QR Limited Code of Practice, Railway Noise Management November 2007, Noise and Vibration from Blasting Guideline former EPA (now Department of Environment and Resource Management) 2006, Department of Transport and Main Roads Interest in Planning Schemes 3 – Planning for Rail Noise, *Workplace Health and Safety Act 1995*, Noise Management Manual, former Environment Protection Agency (now Department of Environment and Resource Management) 2000

Relevant Standards: AS2436-1981: Guide to Noise Control on Construction, Maintenance and Demolition sites, AS2012 – 1990: Acoustics – Measurement of airborne noise emitted by earth-moving machinery and agricultural tractors – Stationary test condition. Part 1: Determination of compliance with limits for exterior noise, AS2670-1990: Evaluation of Human Exposure to Whole Body Vibration, BS6472-1992: Evaluation of Human Exposure to Vibration in Buildings and AS1055.1 – 1997: Acoustics – Description and measurement of environmental noise

Table 22.3.10: Noise and vibration plan

	Noise and vibration
Policy	To ensure that noise and vibration is maintained within acceptable and legal limits during construction and operation.
Performance Criteria	1. to ensure there is minimal impact to sensitive receptors 2. operational noise from the railway not to exceed acceptable levels (as per established Queensland Rail planning noise guidelines) of 65 dBLAeq, 24 hr or 87 dBLAmax by more than 5 dB(A) during the day 3. construction noise to have minimum impact on local community, outside working hours noise limits to be met where practical, not to exceed background noise levels by more than 10 dB(A) in the evening, and night time internal noise criteria of 40 $L_{A1,adj,1hr}$ 4. vibration to not exceed 5 mm/sec or 2 mm per second for any sensitive receptors (e.g. historical buildings, monuments etc) during construction and operation 5. to respond proactively to noise issues.
Implementation Strategy	**Pre-construction:** ▪ A Building Condition (Dilapidation) Survey of buildings located close to activities producing potentially high levels of vibration will be undertaken prior to works commencing. ▪ The noise levels of all items of plant will be measured prior to commencing works on site to assess the impact on the community. ▪ Predictive modelling of the proposed construction techniques and monitoring of existing noise levels will be undertaken. Construction techniques are to be designed having regard to the goals for noise and vibration performance criteria outlined above. ▪ Community/sensitive noise receptors, including critical premises such as hospitals, nursing homes and schools will be informed of haulage routes on local roads through residential areas, construction activities and hours of work. ▪ When works need to occur outside of the 'standard hours' and when noise levels are likely to exceed acceptable levels, the affected noise receptors will be consulted.
	Construction: ▪ Noise generating activities should be restricted to work hours as agreed with the Department of Transport and Main Roads. Work hours will usually be between 7.00 am – 6:00 pm Monday to Friday and between 7.00 am and 1.00 pm on Saturday, unless advised otherwise. No activities to occur that generate noise impacts on Sunday or public holidays. Any changes in work hours to be communicated with the community and agreed with the Department of Transport and Main Roads. ▪ Machinery will be fitted with high efficiency mufflers to conform to National Standard for Occupational Noise (NOHSC: 1007 (2000)). ▪ Site compounds and equipment storage sites will be 100 metres or greater from noise sensitive receptors. ▪ Consideration will be given to the use of silencers / dampening, servicing or replacement of plant or machinery, bunding, enclosures or screening and staging of works. ▪ Where possible and practical, mobile equipment will be fitted with warning lights rather than audible sirens or beepers. Other alternatives may include 'smart alarms' (which adjust volume depending on ambient noise level), 'quaker' low frequency alarms, spotters, CCTV. ▪ Vehicle fleet will be maintained to control engine noise emissions in compliance with Australian Design Rule 28/01 (External Noise and Motor Vehicles) and tested with National Road Transport Commission document Station Exhaust Noise Test Procedures. ▪ Use of vehicle horns will be reduced. ▪ Tailgates should be secured to minimise 'clanging' noise on empty trucks. ▪ Minimise speed limits on unsealed roads (20-40 km/hr). ▪ Appropriate traffic management of trucks entering and exiting site shall minimise congestion and delays and additional noise near sensitive receptors. ▪ Access tracks will be maintained to minimise additional noise of trucks travelling on these roads. ▪ When using bored piles for bridges, those cast in-situ or screen drop hammers will be used to minimise noise disturbance.

Table 22.3.10: continued

	Noise and vibration
	▪ The construction contractor is to calculate the number of properties within the risk radius from the works. Any structure within a radius of three times the calculated safe distance from the expected activity (zone of influence), should be nominated for condition surveys. ▪ When noise levels are predicted to exceed acceptable levels, affected noise receptors will be consulted and appropriate mitigation measures will be proposed. Measures could include temporary noise barriers where required. To maximise the effectiveness of the barriers, they should be positioned as close to the noise source as possible. Other measures could include careful scheduling of work, treatments to building facades and, as a last resort, temporary relocation of affected receptors. ▪ If specific construction activities are predicted to result in a significant noise impact and are to occur often during the construction phase, scheduled regular occurrence may be implemented in consultation with affected receptors.
	Operation: ▪ design all new bridges near residential areas with ballasted or vibration isolated track ▪ construct new corridor track with continuously welded rail wherever feasible ▪ track lubrication / greasing on tight radius curves ▪ employ new or retrofitted rolling stock that is quieter than existing rolling stock ▪ implement noise barriers in areas exceeding acceptable noise levels ▪ maintenance of noise barriers. **Decommissioning:** The decommissioning stage will involve removal of the redundant railway line, rehabilitation and construction of a rail trail (in some areas). The mitigation measures for the decommissioning stage will there be the same as those for the construction stage of the project.
Monitoring	Noise monitoring shall be undertaken during construction and operation in accordance with Noise Management Manual of the former Environmental Protection Agency (now Department of Environment and Resource Management) 2000 and the former Department of Main Roads (now Department of Transport and Main Roads) Code of Practice for noise. Vibration monitoring at sensitive receptors will be carried out within calculated zones of influence associated with construction and operational phases.
Auditing	Monthly monitoring reports will be submitted to the project manager and will be made available to a complainant and / or regulatory body upon request.
Reporting	Reporting to generally provide information, such as time, location, construction activity, other extraneous noise sources, weather conditions. LAmax, LA10, LA1, LA90, LAeq and construction noise levels compared with criteria of project noise levels. A noise complaint register to be maintained during construction. Where possible, a site activity log book to record the construction activity and times to assist with investigation of community complaints.
Corrective Action	In the event of complaint, an investigation will be conducted within 48 hours to identify likely source of impact and identify need for further controls and management practices. Use project noise levels to determine if additional corrective actions required. Validated complaints are incidents that have been investigated and found to exceed defined acceptable noise levels. Revise noise and vibration mitigation measures and construction activities, if required. Where source noise and vibration controls are not possible or ineffective, further controls will be investigated at the receptor end. Complaints will be responded to promptly with the information and action required. When necessary, the complaint process will allow for special procedures such as face-to-face meetings and on-going communications with affected parties to respond to validated complaints.
Responsibility	The Noise monitoring contractor will be responsible for carrying out the noise investigations and monitoring program during construction and operational phases of the project. The community relation representative will be responsible for investigating noise complaints. The on-site construction manager will be responsible for implementing this EMP.

22.3.11 Waste management

Waste has the potential to impact biodiversity, water quality, social value and human health. Environmental conditions such as climate and topography can enhance or reduce the impact of waste. Waste can also be considered a resource if re-use options are available. All of the construction sites along the project area will have similar construction waste characteristics due to materials used and the construction method. Types of waste generated by the project will include debris from vegetation clearance, spoil, building waste, waste from operation and maintenance, wastewater, sewage, general waste and hazardous waste.

Waste management for this project follows the waste management hierarchy as a guiding principle. The waste management hierarchy is a framework for prioritising waste management practices to achieve the best environmental outcome. The preferred order of adoption is as follows:

1. avoid waste by optimising construction, operation and decommissioning methods
2. re-use waste by identifying sources that can utilise the waste
3. recycle waste by identifying facilities that are able to recycle waste
4. energy recovery from waste
5. disposal of waste at an appropriate facility

Relevant legislation/policy: *Environmental Protection Act 1994;* Environmental Protection (Waste Management) Regulation 2000; Environmental Protection (Waste) Management Policy 2000; AS 1940 the Storage and Handling of Flammable and Combustible Liquids

Table 22.3.11: Waste management plan

	Waste management
Policy	To prevent any adverse impacts to the local social and environmental conditions from any construction and operation activities that generate waste by the implementation of waste management principles and best practice disposal strategies.
Performance Criteria	1. to minimise waste generation in line with the principles of the waste hierarchy described above 2. to minimise the volumes, as far as possible, of hazardous and non-hazardous waste generated 3. to minimise the use of hazardous substances 4. to reuse or recycle a significant proportion of waste 5. to comply with relevant regulations and / or policies.
Implementation Strategy	**Construction:** ▪ construction material quantities accurately estimated to reduce over-ordering and on-site stockpiling of materials ▪ choice of suppliers that have a working waste minimisation policy in place ▪ where possible, position construction sites and or buildings on previously cleared land ▪ re-use of mulch from cleared vegetation on site; the leafy branches of weed species not to be mulched ▪ building materials, timber, metals and plastics from construction and demolition to be reused where possible ▪ where appropriate, leftover concrete formed into materials suitable for alternative projects or crushed for road base and bedding material ▪ the environmental officer to investigate the recycling of any particular waste stream generated by the project, and to contact the respective organisation to arrange for containers for waste collection and removal ▪ bins or skips to be provided for temporary storage of all waste (other than natural earth, rocks or vegetation) and the frequent collection of these bins or skips ▪ all waste to be appropriately segregated and stored in suitable on-site storage facilities ▪ all regulated waste sealed, correctly labelled and contained within bunded areas prior to collection / removal; movement of regulated waste tracked ▪ all hazardous materials and dangerous goods waste to be stored appropriately and containers appropriately labelled and collected by licensed contractors ▪ movement of vehicles containing hazardous material to occur during off-peak traffic times to minimise risks ▪ all collectable recyclable materials taken to recycling centres

Table 22.3.11: continued

	Waste management
	▪ all putrescible waste to be stored in a manner not to attract vermin ▪ fill generated from earthworks activities reused as backfill, bunds or embankment on the site ▪ any solid waste that cannot be reused or recycled in a practicable and feasible manner to be disposed of in off-site licensed landfill sites ▪ no waste materials left on site post construction ▪ spill and emergency response plans for hazardous materials or dangerous goods. <u>Site office</u> ▪ the site office to implement a paper reduction office system and recycle used goods as far as possible ▪ separate and recycle paper, cardboard, wood, timber, glass plastic, aluminium and steel on site ▪ buy goods made of recycled materials or buy goods that are of a quality that will last ▪ choose products with minimal packaging and bulk buy, where possible ▪ maximise thermal performance to minimise use of heating and air conditioners for site office ▪ reduce energy and water use ▪ implement staff training regarding waste management ▪ use of a mobile composting facility (e.g. Bokashi Bin) for food scraps ▪ collection and transportation of waste by a licensed contractor with disposal at a suitable landfill facility ▪ all sewage and waste-water to be treated before release.
	Operation: ▪ spill and emergency response plans for hazardous materials or dangerous goods ▪ appropriately placed litterbins to avoid the dispersal of litter and regular site maintenance duties at stations ▪ sealable litter bins at stations to minimise the attraction of vermin, insect and pests ▪ waste sorting, composting and recycling. **Decommissioning:** The decommissioning stage will involve removal of the redundant railway line, rehabilitation and construction of a rail trail (in some areas). The mitigation measures for the decommissioning stage will there be the same as those for the construction stage of the project. In addition: ▪ Materials from demolished structures should be retained and reused on site, i.e. aggregate, sleepers and rail. ▪ Materials that cannot be reused on site should be transported to sites where they can be reused.
Monitoring	A regular site inspection by the environmental officer to ensure that reuse and recycling of materials is occurring on site as per the EMP and hazardous waste is being disposed of appropriately. A register of waste to be prepared that details type and quantity of waste, when and where waste was reused, disposed, recycled and waste transportation details (company, licensed operation name and license number).
Auditing	A monthly waste disposal report shall contain the following: ▪ copies of all waste dockets and manifests ▪ the location of waste storage areas ▪ dates and times of inspections ▪ details of procedures ▪ results of any monitoring ▪ assessment and evaluation of results ▪ summary of complaints and corrective actions.
Reporting	The Department of Environment and Resource Management and the client will be notified if any regulated waste, as defined in Environmental Protection (Waste) Regulation 2000, or any other materials causing land contamination have been disposed of or accidently spilt or leaked on-site.

Table 22.3.11: continued

	Waste management
Corrective Action	In the event that monitoring identifies practices inconsistent with the Waste Management Plan, action will be undertaken to remedy the situation. Non-conformance notices and corrective action notices will be prepared and actioned. Construction project manager can request cessation of works if there is a breach in performance criteria of EMP or a risk of it occurring.
Responsibility	The environment officer will be responsible for producing the monthly waste disposal report. The on-site construction manager is responsible for ensuring adherence to the Waste Management Plan

22.3.12 Traffic and transport

Relevant legislation/policy: *Transport Infrastructure Act 1994; Transport Planning and Coordination Act 1994; Transport Operations (Road Use Management) Act 1995;* Transport Infrastructure (Rail) Regulation 2006; Guidelines for Assessment of Road Impacts of Development (2006).

Table 22.3.12: Traffic and transport management plan

	Traffic and transport management
Policy	To minimise the duration and extent of delays and disruption to users of the road network (drivers, bus services, pedestrians, cyclists and others). To manage the impacts of planned station closures or access alterations to rail passengers. To provide safe working and travelling environment for the duration of construction and operation of the project.
Performance Criteria	1. minimise delay to traffic during construction 2. minimise delay to passenger and freight rail services 3. preparation of a Road Use Management Plan for construction vehicles.
Implementation Strategy	**Construction:** ▪ Site traffic will use site haul roads within the project area, or as close to the site as possible. ▪ Working hours for construction on the existing operational rail line will be restricted as much as possible, to minimise disruption to rail services. ▪ Replacement bus services may be required for passengers for connection between stations. ▪ Alternate station access will be required for some stations during construction. ▪ Temporary roads or alternative routes will be provided. ▪ Lane closures will allow one lane to open. ▪ Temporary access will be allowed on the side of the road with wide road reserves. ▪ Safety barriers, appropriate signage and traffic control will be used during construction.
	Operation: A negative impact on local traffic and transport during the operational phases is highly unlikely. However, if maintenance or repair works requires excavation or additional construction, then the management plan as described for 'Construction' will be applicable. **Decommissioning:** The decommissioning stage will involve removal of the redundant railway line, rehabilitation and construction of a rail trail (in some areas). The mitigation measures for the decommissioning stage will there be the same as those for the construction stage of the project.
Monitoring	Ongoing surveillance by site workers, particularly the on-site construction manager.
Auditing	Visual inspection of areas used by construction traffic, several times during construction and post-construction to ensure performance criteria are being met.
Reporting	Report any non compliance with EMP to the on-site construction manager and the Department of Transport and Main Roads, as required.

Table 22.3.12: continued

	Traffic and transport management
Corrective Action	In the event that monitoring identifies practices inconsistent with this plan, action will be undertaken to remedy the situation. Non-conformance notices and corrective action notices will be prepared and actioned. Construction project manager can request cessation of works if there is a breach in performance criteria of EMP or a risk of it occurring.
Responsibility	The on-site construction manager will have the primary responsibility for identifying problems with site traffic on local roads.

22.3.13 Cultural heritage

The Register of National Estate (RNE) identified one known place of Indigenous significance within the project area. The Aboriginal and Torres Strait Islander Cultural Heritage Register identified several sites and places of Indigenous significance within the study focus area. Previous studies identified known sites and places of indigenous significance within the project area including a potential Aboriginal burial site and remnant vegetation in the study focus area. As part of the cultural heritage management plan (CHMP) process, mitigation and management measures will be included in an agreement with the Aboriginal Parties. This agreement would be legally binding on the parties, and ultimately registered by the Chief Executive of the Department of Environment and Resource Management. The CHMP will be uniformed by the cultural heritage assessment process and consultation with the Aboriginal Parties.

The management plan framework below does not constitute the CHMP for this project. The CHMP for the project will be finalised at a later date. The process under the *Aboriginal Cultural Heritage Act 2003* has begun.

From the perspective of historical heritage, the Register of National Estate and the Queensland Heritage Register both identified several sites that fall within the project area. The Mooloolah Pedestrian Rail Crossing Bridge and waiting shed, the Palmwoods to Buderim and the Moreton Central Sugar Mill Cane Tramway Route, and the North Coast Railway National Parks signify remnants of twentieth century railway infrastructure, rural history and the conservation of remnant natural vegetation in the region.

Relevant legislation includes the *Aboriginal Cultural Heritage Act 2003* and the *Queensland Heritage Act 1992*.

The project area currently is within an area over which no registered or unregistered native title claims exist.

The following framework detailed in **Table 22.3.13**, where appropriate, provide the basis on which the cultural heritage management plans will be developed.

Table 22.3.13: Cultural heritage management plan framework

	Cultural heritage
Policy	To avoid where reasonably possible all cultural heritage, or where this is not possible, to minimize and manage the potential for harm to cultural heritage.
Performance Criteria	ensure management (including protection and preservation) of Aboriginal and non-indigenous cultural heritage values comply with Cultural Heritage Duty of Care to Aboriginal cultural heritage comply with the projects' Cultural Heritage Management Plan (CHMP) and agreement.
Implementation Strategy	**Pre-construction:** A site specific Conservation Management Plan will need to be prepared for the potentially impacted historic sites of national or State importance and the relevant approvals under the *Queensland Heritage Act 1992* will be sought. A Cultural Heritage Management plan and agreement will be prepared. This will encompass all management measures and requirements for Aboriginal cultural heritage. Cultural heritage training will be conducted for all on-site personnel prior to construction.
	Construction: All works are to be undertaking in accordance with the Cultural Heritage Management Plan (CHMP). The CHMP is likely to require monitoring by representatives of the Aboriginal Parties, will occur in those parts of the corridor that were defined by the cultural heritage survey as having potential for sub-surface cultural heritage.

Table 22.3.13: continued

	Cultural heritage
	Operation: The disturbance of cultural heritage during operational phases is highly unlikely. However, if maintenance or repair works require excavation in previously identified risk areas, then the cultural heritage management plan as described for 'Construction' will be applicable.
	Decommissioning: The decommissioning stage will involve removal of the redundant railway line, rehabilitation and construction of a rail trail (in some areas). The mitigation measures for the decommissioning stage will there be the same as those for the construction stage of the project.
Monitoring	Monitoring will be ongoing throughout the pre-construction and construction phase pursuant to the CHMP, i.e. an Aboriginal representative is required to be present during pre-construction surveys and excavation of potentially significant areas during construction.
Auditing	The treatment of all culturally significant areas (known and discovered) will be managed through the CHMP.
Reporting	Report any findings of archaeological items to on-site construction manager, cultural heritage representative, the cultural heritage project officer of the Department of Transport and Main Roads and the Department of Environment and Resource Management.
Corrective Action	In the event that any heritage items are uncovered during works, work in that area must cease immediately and finds be reported to the Department of Transport and Main Roads cultural heritage project officer. Appropriate barriers would be placed around exclusion zones and all site personnel notified. Works can recommence once the item has been removed or an agreement for treatment of the site made.
Responsibility	All personnel are responsible for reporting potential finds to the appropriate people, i.e. cultural heritage representative or on-site construction manager. The on-site construction manager will be responsible for compliance with the CHMP. The cultural heritage representative will be responsible for documentation of culturally significant areas their treatment for auditing.

22.3.14 Hazard and risk

This section of the Planning EMP provides control plans for the following elements relevant to hazard and risk:

- handling and storage of hazardous (including dangerous) goods
- health and safety
- emergency response procedures.

The Management Plans are outlined below in **Tables 22.3.14** to **22.3.16.**

During construction, the responsible construction authority will integrate pre-existing systems to manage occupational health and safety, hazardous goods storage and handling and emergencies.

Likewise, as QR Limited is anticipated to be the operator of the project upon commissioning, their operational systems (including their occupational health and safety, hazardous good management and emergency management processes and systems) will be implemented across the project during operations.

QR Limited has a suite of Emergency Management Plans for the operations of railways; the following general requirements have been identified through a review of other rail studies[1] :

- emergency management – general requirements
- a signal passed at danger
- collision
- dangerous goods emergency
- defective rolling stock and unsafe loads
- derailment
- emergency management – requirements for train crew
- environmental emergency
- evacuation of trains
- fires
- level crossing emergency
- onsite management procedures

1 *Source: http://www.networkaccess.qr.com.au/Images/Ch_4.11_Risk_Hazard_tcm10-11314.pdf*

- overhead line equipment emergency
- passenger door emergency
- person hit by train
- serious injury or illness on trains
- threats
- track obstructions
- wrong side signal failure.

Relevant legislation/policy: *Environmental Protection Act 1994 (Qld),* AS 1940 The Storage and Handling of Flammable and Combustible Liquids, *Workplace Health and Safety Act 1995 (Qld)* and Workplace Health and Safety Regulation 1995 (Qld), *Transport Infrastructure Act 1994 (Qld),* Transport Infrastructure Dangerous Goods by Rail Regulation 2002 (Qld), *Dangerous Goods Safety Management Act 2001 (Qld)* and Dangerous Goods Safety Management Regulation 2001 (Qld), *Explosives Act 1999 (Qld)* and Explosives Regulation 2003 (Qld), *Fire and Rescue Services Act 1990 (Qld)* and Fire and Rescue Service Regulation 2001 (Qld), *Disaster Management Act 2003 (Qld)*

Table 22.3.14: Hazardous goods handling and storage management plan

	Handling and storage of hazardous goods
Policy	To manage the purchase, handling, storage and disposal of hazardous (including dangerous) goods on site in a manner that does not cause harm to the environment, project personnel or the public.
Performance Criteria	1. target of no contamination of the environment and no injuries to personnel or the public from the storage or handling of hazardous goods 2. compliance with relevant legislation and Australian standards listed in **Table 19.1.2** 3. preparation of a Hazardous Goods Handling and Storage Management Plan.

Implementation Strategy	**Construction**
	▪ All site personnel will receive an induction prior to commencing work on the site in the handling and storage of hazardous goods and in spill containment procedures.
	▪ A hazard identification and risk assessment process will be undertaken for the storage of hazardous goods in the construction corridor.
	▪ The Material Safety Data Sheets (MSDS) for all dangerous goods will be kept on site.
	▪ Licenses or permits will be obtained from the relevant local governments if required for flammable and combustible liquids.
	▪ Risks posed by hazardous goods stored or handled during construction will be minimised where reasonably practicable through:
	  ▪ minimisation of the quantities kept on site
	  ▪ compliance with MSDS instructions
	  ▪ segregation of incompatible hazardous goods
	  ▪ appropriate separation of hazardous goods storage areas from people and property
	  ▪ storage of flammable or combustible dangerous goods away from ignition sources
	  ▪ liquid dangerous goods stored in bunded containers with sufficient capacity to contain the potential spillage
	  ▪ personal protective equipment provided to personnel required to work with hazardous goods
	  ▪ spill kits available at all construction sites along the project area and any spills will be cleaned up immediately
	  ▪ where practicable, any refuelling undertaken at site in a designated refuelling area to reduce the risk of contamination to the environment
	  ▪ portable fire extinguishers available if required at the site
	  ▪ hazardous goods waste transported by a licensed contractor to a designated site approved by the local authority
	  ▪ explosives stored in accordance with AS:2187 for the storage, transport and use of explosives and will be handled by a licensed explosives expert.

Table 22.3.14: continued

	Handling and storage of hazardous goods
	Operation Handling, storage, signage and transport of hazardous/dangerous goods to be consistent with QR Limited management systems and as per AS1940 and relevant legislation.
Monitoring	▪ Routine daily visual observance by all personnel during construction and operations for possible incidents related to dangerous goods. ▪ Environmental site checks undertaken by the environmental officer to include the following: – an inspection of the hazardous goods storage area(s) – a record of any spills occurring at the project site and corrective actions
Auditing	Monthly monitoring reports will be submitted to the project manager and will be made available to a complainant and / or regulatory body upon request.
Reporting	▪ inventory of hazardous goods at the site during construction and operation including their storage requirements, locations and Material Safety Data Sheets (MSDS) ▪ environmental checklists during construction ▪ external audit reports ▪ non- conformance reporting if required.
Corrective Action	In the event that monitoring identifies practices inconsistent with this plan, action will be undertaken to remedy the situation. Non-conformance notices and corrective action notices will be prepared and actioned. Construction project manager can request cessation of works if there is a breach in performance criteria of EMP or a risk of it occurring.
Responsibility	The on-site construction manager is responsible for ensuring adherence to the Hazardous Goods Handling and Storage Management Plan. The maintenance contractor is responsible for the handling, storage, monitoring and maintenance of hazardous goods. QR Limited is responsible for ensuring any dangerous goods that are transported via the railway conform to the Transport Infrastructure Dangerous Goods by Rail Regulation 2002 (Qld).

Table 22.3.15: Health and safety management plan

	Health and safety management
Policy	To manage the construction and operation of the project in a manner that prevents adverse effects to the health and safety of project personnel and the general public.
Performance Criteria	1. compliance with relevant legislation and regulations 2. integration into the construction contractor's and QR Limited respective Health and Safety Management Systems for construction and operation 3. creation and implementation of a Construction Safety Plan, Work Method Statements and a Job Hazard Analysis (JHA) for the project.
Implementation Strategy	**Design** ▪ Safety in Design has been a key consideration during the development of the project and preparation of the Preliminary Design documentation. ▪ A Safety in Design assessment will need to be undertaken as part of the detailed design of the project to provide information regarding existing and future health and safety risks to designers, constructors and operators.

Table 22.3.15: continued

	Health and safety management
	Construction ▪ The Construction Safety Plan that will be developed and implemented for the project will be compliant with overarching health and safety management systems and will include the following: – the workplace address – name and address of the principal contractor – principal contractor's ABN – WHS committee – WHS officer appointed – expected start date and duration of the work – induction training and consultation procedures for all personnel with regard to their health and safety obligations on the project – type of construction – plant provided for common use – site rules – site hazards and risks and proposed control measures – how the controls will be implemented – identification of major hazards and corresponding Work Method Statements – personal protective equipment – first aid – contractor management – monitor and review procedures – emergency procedures – public safety strategies – site housekeeping – site security and access – responsibilities for health and safety management on the project including a nominated health and safety representative(s). **Operation** Health and Safety plans will be developed for the project and will be consistent with QR Limited Occupational Health and Safety Management System, Zero Harm Strategy and relevant legislation. The minimum contents of the Health and Safety Plan are detailed above under Construction.
Monitoring	▪ The health and safety representative will carry out regular workplace health and safety inspections during construction.
Auditing	▪ The health and safety representative will report to the construction and operation managers and these reports will be made available to a complainant and / or regulatory body upon request. ▪ Audits will be undertaken against the health and safety management plans and systems that apply to construction and operation.

Table 22.3.15: continued

	Health and safety management
Reporting	▪ An incident register will be in place prior to the commencement of construction and will be used to record the following information: – date and time incident occurred – date and time incident reported – type of the incident, level of incident – type of injury (if applicable) – injury classification (if applicable) – name of any person involved or person reporting incident – details of any equipment involved (if applicable) – brief description of incident – the person responsible for investigating/addressing the incident – records of all incidents, audits and inspections will be kept and reviewed.
Corrective Action	If an incident occurs during construction, the Department of Transport and Main Roads and QR Limited will be notified and the following corrective actions should be carried out subject to approval by the Department of Transport and Main Roads and QR Limited: ▪ An investigation as to why the incident occurred should be undertaken and corrective actions implemented to reduce the risk of a recurrence. ▪ The health and safety information that is being provided to employees will be reviewed for relevance. ▪ All personnel working or entering the site should be informed of the health and safety policies and procedures in place and improvements to training should be made where deficiencies are identified. ▪ Non-conformances with the relevant health and safety management system or safety plan will be rectified immediately.
Responsibility	▪ Reporting on health and safety issues will be the responsibility of the nominated health and safety representative for the construction and operational phases of the project.

Table 22.3.16: Emergency management plan

	Emergency management
Policy	▪ to ensure that emergencies during construction or operation of the project are managed efficiently ▪ to minimise the risk to personnel, property or the public that may arise from emergencies
Performance Criteria	1. development of an emergency management plan for the construction of the project 2. development of a bush fire management plan for the operation of the project 3. adequate training for project personnel with respect to emergency management planning and procedures.

Table 22.3.16: continued

	Emergency management
Implementation Strategy	**Construction** The emergency management plan will be developed prior to as part of the construction planning. The emergency management plan will be implemented during pre-construction and construction and will include the following: ▪ emergency response procedures to be followed in an accident situation - including chain of command and evacuation routes ▪ emergency contact details of local SES branches, Fire and Rescue Service and Police ▪ allocation of tasks and responsibilities including an emergency management team ▪ training requirements ▪ the role of the first aid provider ▪ emergency transportation arrangements ▪ location of first aid equipment and facilities at the workplace ▪ site emergency response equipment locations ▪ monitoring and review procedures. The emergency management plan for the construction phase will include an emergency response procedure, example contents of which are outlined below: ▪ emergency contacts and chain of command ▪ responsibilities ▪ alert systems ▪ identification and control of emergency sources ▪ access routes and transport methods ▪ reporting and review requirements ▪ involvement of State agencies. **Operation** A bushfire management plan will be developed for the project, specifying appropriate clearance distances, and emergency service access requirements during construction. Emergency management planning will be undertaken for the project prior to operations and the results will be integrated into QR Limited emergency management plans. The emergency management planning for the operations phase will include a site-specific emergency response procedure, example contents of which are outlined below: ▪ emergency contacts and chain of command ▪ responsibilities ▪ alert systems ▪ identification and control of emergency sources ▪ access routes ▪ reporting and review requirements ▪ involvement of State agencies.
Monitoring	A record of all emergency incidents will be maintained and reviewed for possible procedural improvements.
Auditing	The emergency incident and response process will be audited and tested on a regular basis.
Reporting	All emergency incidents will be reported to the construction or operations manager.

Table 22.3.16: continued

	Emergency management
Corrective Action	▪ In the event that monitoring identifies practices inconsistent with this plan, action will be undertaken to remedy the situation. ▪ Non-conformance notices and corrective action notices will be prepared and actioned. ▪ Construction project manager can request cessation of works if there is a breach in performance criteria of EMP or a risk of it occurring. ▪ Following an emergency incident an investigation will be undertaken as to the cause of the incident and corrective action undertaken to minimise the risk of a recurrence. ▪ Non-conformances with the emergency response procedure or emergency management plans or emergency action plans will be identified and rectified.
Responsibility	QR Limited, corridor manager and the construction contractor.

22.4 Complaints and incidents

It is important to the construction and operational phases of the project that complaints be addressed as a matter of urgency and that measures be undertaken to rectifying the offending issue. Adhering to the objectives and implementation strategies outlined in previous sections will help minimise the potential for complaints. Specific details of the responding and reporting requirements should complaints be received are outlined below:

- respond quickly and effectively to public complaints / enquiries
- site manager to be made aware of any complaints received
- information regarding construction activities to be regularly provided in an accessible manner to maximise awareness in the community of construction activities
- during business hours, any complaints to be referred to the on-site construction manager
- investigate nature and extent of problem by site inspection and contacting complainant
- all complaints are investigated and replied to within acceptable timeframes
- implement corrective actions if appropriate otherwise instigate more detailed investigation
- works site manager to allocate necessary resources or assistance if required
- special procedures when necessary, such as face-to-face meetings and on-going communications with affected parties to respond to validated complaints
- maintain a complaints register, which can record name and address of the stakeholder, date of feedback, reason for feedback, action required, responsibility, action undertaken and outcome.