FerrAus Pilbara Project

Rail Construction Environmental Management Plan

Prepared for
FerrAus Limited
by Strategen

August 2011

FerrAus LIMITED

STRATEGEN
environmental consultants

FerrAus Pilbara Project

Rail Construction Environmental Management Plan

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Client: FerrAus Limited

Report Version	Revision No.	Purpose	Strategen author/reviewer	Submitted to Client	
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1. Introduction

FerrAus Limited (FerrAus), as the Proponent, proposes to expand its FerrAus Pilbara Project (FPP) in the Pilbara Region of Western Australia. The FPP consists of the mining, processing and development of supporting infrastructure to produce iron ore from its Robertson Range Area (RRA) and Davidson Creek Area (DCA) deposits. FerrAus is the Proponent for the Proposal, within the meaning of the *Environmental Protection Act 1986* (EP Act).

1.1 Project description

1.1.1 Project location

The FPP is located approximately 475 km southeast of Port Hedland and lies within two Shire boundaries, the Shire of Meekatharra and the Shire of East Pilbara. The town of Newman is approximately 80 km west of the Project Area. The FPP is located approximately 35 km east of the BHP Billiton Iron Ore (BHPBIO) mining operations and rail infrastructure at Jimblebar. The location is presented on Figure 1-1 and in more detail in Figure 1-2.

1.1.2 Proposal overview

The FPP involves open pit mining of several iron ore deposits at an annual rate of approximately 15 mtpa.

To facilitate transportation of the iron ore product, the FPP would also involve establishment of a rail spur and loop enabling delivery of diesel fuel to site and transport of ore to Port Hedland via either the Brockman Resources Marillana rail line or the Hancock Prospecting Pty Ltd Roy Hill rail line. The two rail options to transport the ore to Port Hedland encompass:

1. **FerrAus East Pilbara Railway** (Option 1) line from the FPP mine site to the Brockman Resources Marillana project (approximately 170 km track length) and use of the Marillana project rail line from there to Port Hedland within a 3 km wide corridor (4 km wide at watercourse crossings).
2. **Option 2: Northern Rail Alignment** (Option 2) being an alternative rail line route from the FPP mine site to the Roy Hill project (approximately 150 km track length) and use of the Roy Hill project rail line from there to Port Hedland. The first 76 km of Option 2 from the rail load out at the mine site would be common with the alignment proposed under Option 1.

Approval is being sought for the two rail options as the outcome of negotiations with the owners of the railways will not be known for some time. Delaying the environmental approval process until these negotiations are finalised would unacceptably affect the project timing. The two alignment options are presented in Figure 1-3.

A schematic of the rail construction corridor and typical camp configurations is presented in Figure 1-4.

1.2 Scope

The scope of the FPP Rail Construction Environmental Management Plan (CEMP) is limited to activities associated with construction of the rail infrastructure component of the project.

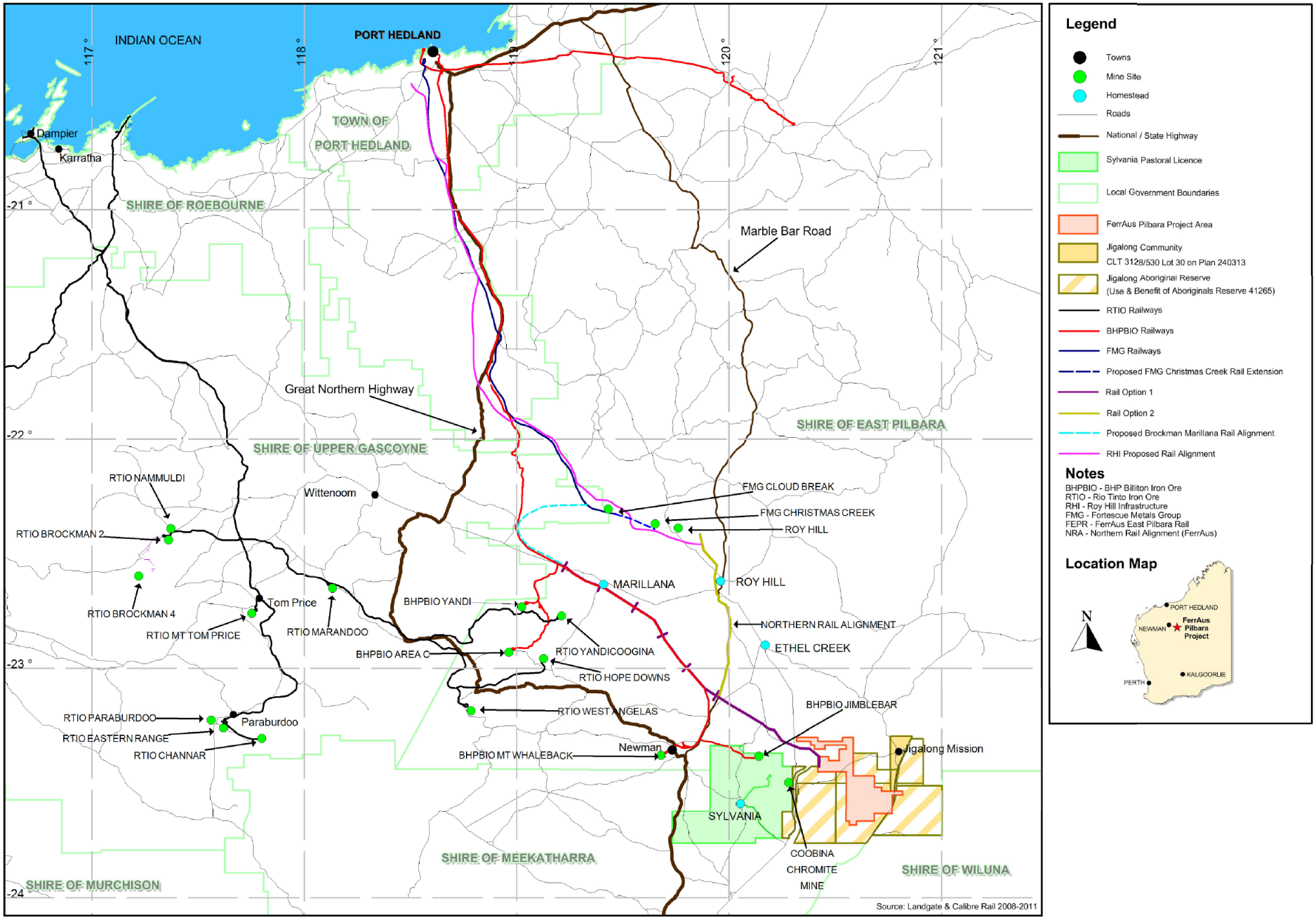

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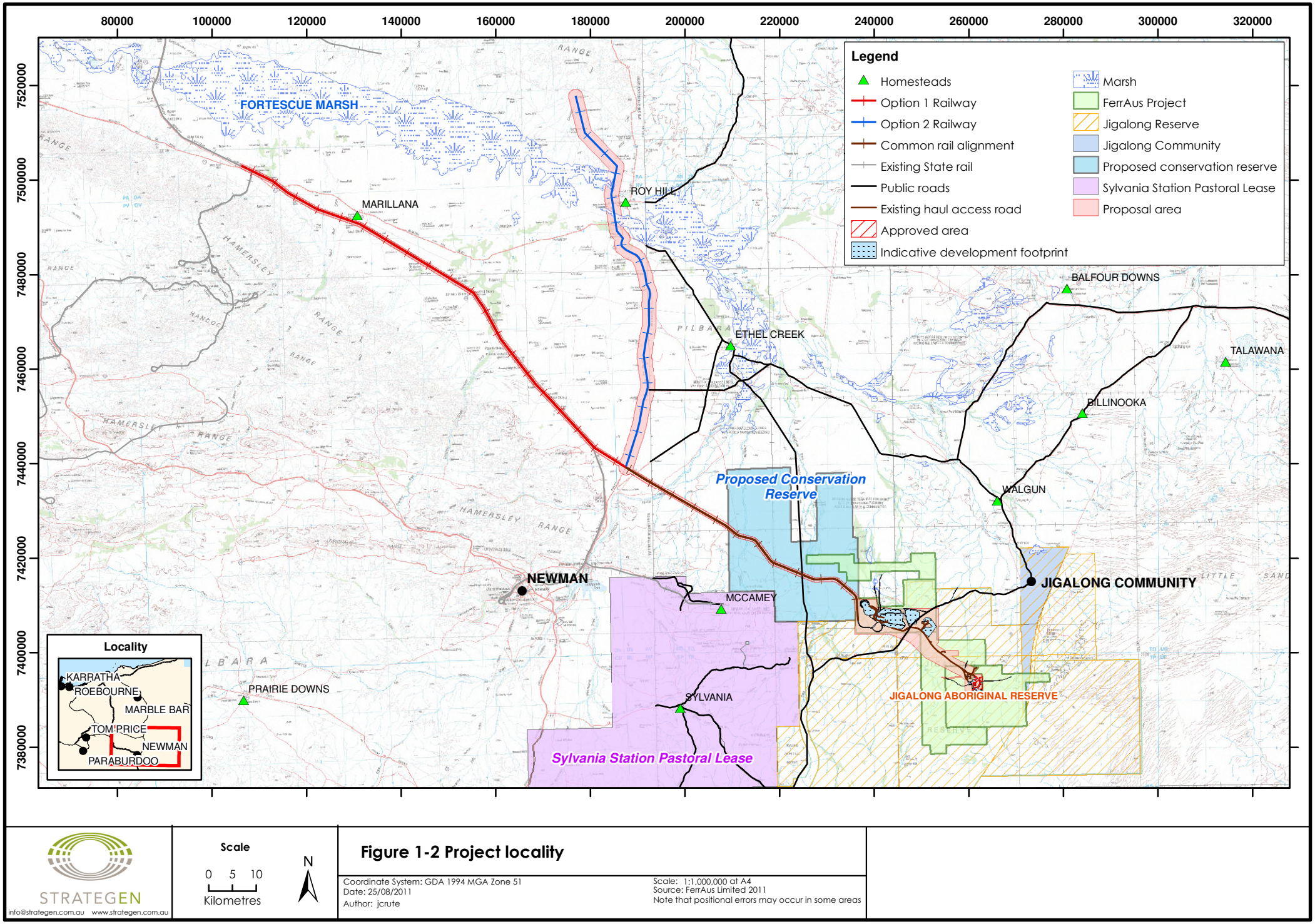
Figure 1-1 Project location and regional context

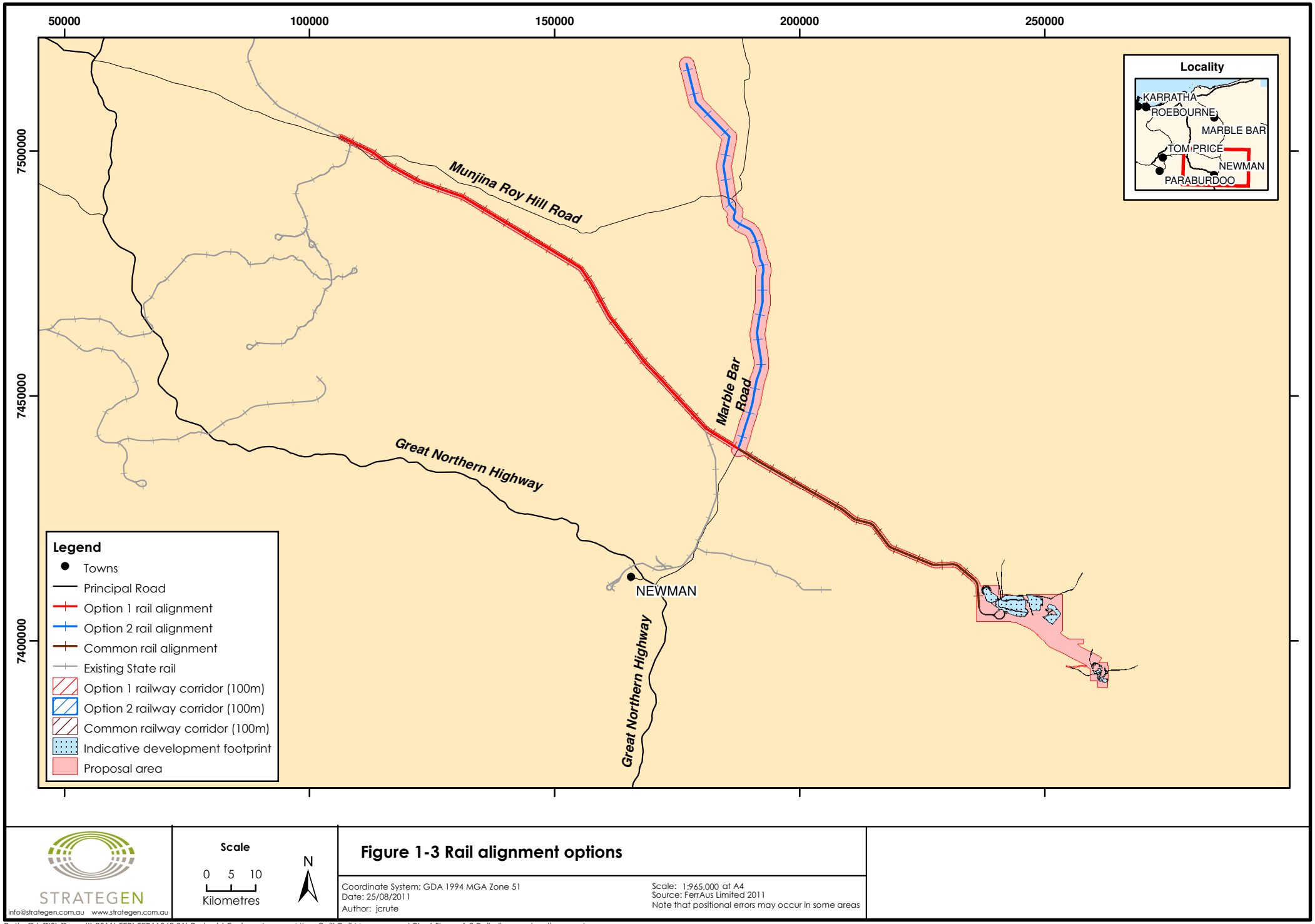
Source: JPEG from FerrAus Limited 2011

Date: 25/08/2011

Path: Q:\GIS\Consult\2011\FER\FER11068.01\Projects\Environ_Approv_Mine_Rail\Rail Management Plan\Figure 1-1 Project location and regional context.mxd



Path: Q:\GIS\Consult\2011\FER\FER11068.01\Projects\Environ_Approv_Mine_Rail\Rail Management Plan\Figure 1-2 Project locality.mxd



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Scale
0 5 10
Kilometres

N

Figure 1-3 Rail alignment options

Coordinate System: GDA 1994 MGA Zone 51
Date: 25/08/2011
Author: jcrute

Scale: 1:965,000 at A4
Source: FerrAus Limited 2011
Note that positional errors may occur in some areas

Path: Q:\GIS\Consult\2011\FER\FER11068.01\Projects\Environ_Approv_Mine_Rail\Rail Management Plan\Figure 1-3 Rail alignment options.mxd

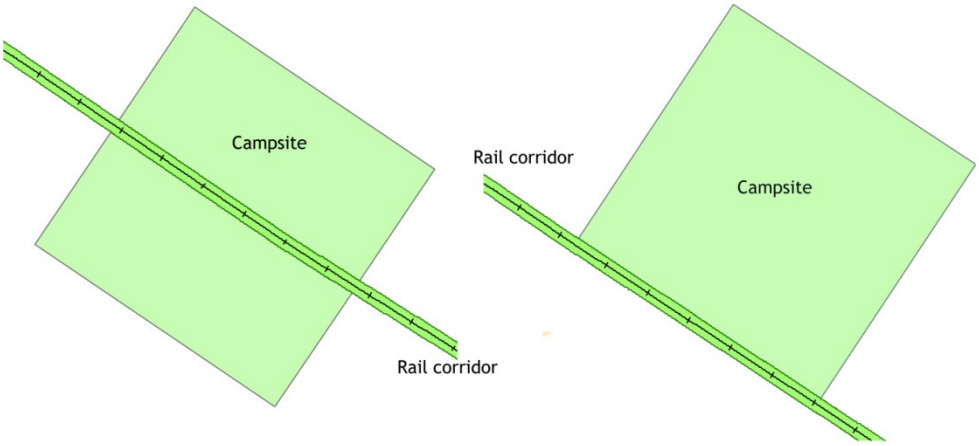


Figure 1-4: Rail construction corridor and typical camp configurations (schematic)

1.3 Legislative requirements

Construction of the rail infrastructure is subject to both Commonwealth and State legislation and Proponent environmental management system (EMS) requirements. Legislation and standards relevant to each aspect within the scope of this CEMP are listed in the relevant chapters below.

Copies of relevant licences, approvals and permits will be held on site and in relevant Project offices.

A Legal and Other Requirements Register relevant to the construction of the works will be developed for the Project and maintained by the Environment Manager. The Register will consolidate the legal and other requirements relevant to the Project and the actions taken to comply with these requirements as they apply to construction activities. The Register and its requirements will be communicated to all contractors.

1.4 Existing environment

A detailed description of the existing physical and biological environment in the vicinity of the proposed development is presented in the FerrAus Pilbara Project Mining and Rail Infrastructure Environmental Impact Assessment (Strategen 2011).

2. Management plan framework

2.1 Methodology

This CEMP was developed on the basis of obligations expected to be applied through the Ministerial Statement and management measures proposed in the Environmental Impact Assessment (EIA) (Strategen 2011). Risk assessment workshops defined the key risks associated with the construction and operation of the rail infrastructure. Inherent risks of key activities and impacts were assessed according to a likelihood and consequence matrix as captured within the project Environmental Management System (EMS). All relevant activities were reduced to a low residual risk based on management actions being enacted through this CEMP.

2.2 Environmental factors

Key environmental factors are those that are considered likely to be materially impacted by the construction of the rail infrastructure, such that measures will need to be applied to construction processes and procedures.

The following environmental factors are considered the key factors relevant to the scope of this CEMP, and are largely based on the factors identified through the EIA process. The section containing the relevant environmental management plan (EMP) for each factor is included in this listing:

- terrestrial flora and vegetation (Section 4)
- weeds and pathogens (Section 5)
- fauna and habitat (Section 6)
- surface water (Section 7)
- groundwater (Section 8)
- hazardous materials (Section 9)
- waste (Section 10)
- dust (Section 11)
- noise and vibration (Section 12)
- acid sulfate soils (Section 13)
- Aboriginal heritage (Section 14)
- rehabilitation (Section 15).

For each factor, Environmental Protection Authority (EPA) objectives, applicable standards/guidelines, potential impacts, proposed management and mitigation measures (control measures), monitoring and reporting, and contingency plans are identified and discussed in detail within the relevant management plans.

Any environmental incident or public complaint related to environmental matters will be managed through a specific Environmental Incident Response Management Plan (Section 16). This plan integrates with the FerrAus Limited EMS incident reporting and investigation protocols.

Implementation of the EMPs within this CEMP will be a condition of any construction contracts.

2.3 Performance management

Environmental objectives and performance indicators have been developed to guide performance management throughout construction of the rail infrastructure. Objectives for each factor have been developed in accordance with EPA objectives and project-specific environmental objectives identified during the EIA process. Performance indicators have been developed as the basis for determining achievement of the factor-specific objectives.

2.4 Control measures

For each factor addressed within this CEMP, a series of control measures have been established to manage the expected potential impacts that could arise during construction of the rail infrastructure. Implementation of the control measures is intended to achieve the identified factor-specific environmental objectives, and compliance with the conditions of environmental approval.

Impacts on the environment within and adjacent to the rail infrastructure corridor will be minimised by appropriate design and avoidance where possible. To prevent or minimise any residual impacts, controls measures have been determined in accordance with the mitigation hierarchy (EPA 2006a):

- avoid
- minimise (limit magnitude)
- rectify (restore, repair)
- reduce (over time)
- offset.

For each factor, the responsibility for implementation of each control measure and its timing are defined within the sections.

2.4.1 Timing nomenclature

The terminology used to define the timing of required control measures has meanings in each of the EMPs as set out in Table 2-1. Other self-explanatory terms are also used where relevant.

Table 2-1: Timing nomenclature

Timing	Meaning
Design	During the project design phase.
Pre-construction	Following the project design phase, but prior to any on-site ground disturbance.
Construction	From initial ground disturbance and during construction activities until commissioning.
Post-construction	After commissioning.

2.5 Monitoring, reporting and contingencies

2.5.1 Monitoring

Monitoring will be continuous throughout construction of the rail infrastructure, with the relevant registers and systems developed and implemented prior to the start of construction. Prior to mobilisation, all new contractor packages will address the registers and systems detailed within this plan with monitoring undertaken in coordination with Site Supervisors and the Construction Manager.

The four purposes of monitoring as required by this CEMP are:

1. To confirm the effectiveness of the control measures with respect to achieving the objectives for management of the factor, by comparison with the relevant stated performance indicators.

2. To provide warning or alerts regarding unexpected impacts.
3. To confirm that control measures are being implemented.
4. To provide records to support annual environmental compliance auditing and reporting.

Monitoring will generally comprise either visual inspections or data gathering and review, at frequencies as specified in the relevant EMPs. All monitoring results will be recorded on the appropriate EMS form.

The monitoring requirements associated with each factor are addressed in the EMP specific to that factor.

2.5.2 Reporting

The results of monitoring will be reported internally and as required by the EPA. Relevant monitoring data and information will be used in all reporting associated with management of environmental incidents, as required under the factor-specific EMP, or the Environmental Incident Response Management Plan.

All external reporting will be the responsibility of FerrAus Limited. Internal reporting may be the responsibility of FerrAus Limited or the Construction Contractor, as specifically defined in each of the EMPs (Sections 4 to 15).

The monitoring results will also support any internal and external environmental compliance auditing and reporting.

Where the reporting is outside the annual environmental compliance reporting required as conditions of the environmental approvals, this additional specific reporting requirement associated with any factor is addressed in the EMP specific to that factor.

2.5.3 Contingencies

Contingency actions will be initiated where monitoring indicates that performance indicators have not been met or that these indicators may not be met in the future. For each environmental factor, a set of triggers has been defined to indicate a potential non-conformance and prompt contingency actions. These are primarily based on responding to monitoring information, but may also include responding to untoward or unexpected actions that have the potential to compromise the achievement of environmental objectives. The contingences specifically associated with each factor are addressed in the EMP specific to that factor.

All contingency actions will be considered environmental incidents and will be managed in accordance with the Environmental Incident Response Management Plan (Section 16).

2.6 Supporting systems

2.6.1 Procedures and systems

As part of the implementation of control measures as detailed in this plan, a number of procedures and systems will be employed in order to govern and manage the requirements during construction. The system requirements specific to management of the various environmental factors are outlined in the related EMP (Sections 4 to 15). Generic systems that will commonly apply to several factors are:

1. **Ground Disturbance System:** Will be based on a requirement for a Ground Disturbance Permit to be issued for ground disturbing work within the rail corridor during the Construction Phase in accordance with the procedure. Amongst other things, this will contribute to achievement of the environmental objectives related to:
   (a) native vegetation clearing
   (b) abstraction of groundwater
   (c) disturbance of acid sulfate soils
   (d) Aboriginal heritage.

2. **Incident Reporting System:** The registers implemented on the Project will interface with the Project GIS database to provide a comprehensive database of the key environmental assets and across the Project site. This system will contribute to tracking achievement of the objectives related to all environmental factors.
3. **Emergency Response Procedure:** This procedure will set out the specific requirements for responding to emergencies, including safety, health and environment. Amongst other things, this will contribute to achievement of the environmental objectives related to:
   (a) spills of hazardous or polluting materialnative vegetation affected by fire outbreaks.

2.6.2 Control of records

The following generic records in relation to this CEMP will be developed and maintained via electronically based forms:

- induction records
- training records
- incident report forms
- audit/inspection forms
- corrective actions register
- monitoring results.

Contractors are required to forward all records generated as a result of implementation of the CEMP to the Construction Manager and records shall be maintained on site by the Site Environmental Coordinator.

3. Environmental Management System

The CEMP will be managed via the Environmental Management System (EMS) ensuring all commitments are effectively disseminated across the project team and construction supervisors. The policies, monitoring, review and auditing of the CEMP are elements of the broader EMS framework under which the construction of the Project will be managed. The EMS enables the CEMP to be cross-referenced with other management plans and regulatory approval documents via a series of databases and registers.

3.1 Roles and responsibilities

This section outlines the overarching roles and responsibilities relating to this CEMP. Overall responsibility for implementation of this CEMP rests with the Construction Manager and Environment Manager. All employees and Contractors shall meet the requirements of this CEMP and associated procedures. Where appropriate, responsibility for some management actions stated in this CEMP may be delegated to specific contractors.

Key Project personnel (including Construction Managers, Superintendents and Supervisors) shall ensure that all management actions are undertaken to satisfactory standards and that all personnel are aware of their responsibilities.

During construction, there shall be dedicated staff to manage health, safety and environment. The responsibilities for implementation of the various individual control measures within each EMP are presented in those EMPs (Sections 4 to 16). The generic responsibilities of the various individual and staffing groups are listed in the following sections.

3.1.1 Project Manager

Responsibilities of the Project Manager include:

- ensuring environmental management requirements of the FPP are incorporated into the design of the mine and processing infrastructure.

3.1.2 Construction Manager

Responsibilities of the Construction Manager include the following:

- overall accountability to ensure this CEMP is implemented with respect to identified Construction Contractor responsibilities, reported and maintained on site
- ensure appropriate resources and personnel are made available to meet identified Construction Contractor requirements of this CEMP
- ensure all personnel attend inductions and any required training programs, and are aware of the requirements of this CEMP and related procedures specific to their work area
- ensure all contracts contain relevant construction environmental management provisions
- review monthly reports provided by the Site Environmental Coordinator
- provide support to contractors and on-site Project personnel as required during the construction phase
- ensure equipment is installed and operating in compliance with Australian Standards and licence requirements, and is well maintained.

3.1.3 Environment Manager

Responsibilities of the Environment Manager include the following:

- overall accountability for internal auditing and assessment of conformance with this CEMP and ensure it is maintained on site
- provide support (as required) to all Project personnel to ensure this CEMP is implemented and complied with
- provide advice to all key parties to ensure compliance with legal requirements, achievement of environmental objectives and improving environmental performance
- obtain relevant environmental approvals, if and as required
- review the effectiveness of this CEMP in achieving the stated environmental objectives
- review and ensure closing out of any corrective actions listed in the Incident Register
- participate in hazard studies, risk workshops and design reviews to ensure risks and opportunities are identified and managed
- authorise personnel to approve hazardous materials for use on the project
- ensure contracts contain relevant construction environmental management provisions
- promote a strong environmental management culture with staff and subcontractors
- report to regulating authorities as required.

3.1.4 Site Supervisor

Responsibilities of the Site Supervisor include the following:

- ensure the requirements of this CEMP are implemented within their area of responsibility as delegated by the Construction Manager
- have a working knowledge of the environmental management systems applicable to their area of responsibility
- include construction environmental issues in prestart (toolbox) meetings
- conduct internal audits, inspections and raising corrective actions as required
- provide leadership, training and recognition in managing the environment within their area of responsibility.

3.1.5 Site Environmental Coordinator

Responsibilities of the Site Environmental Coordinator include the following:

- provide training and induction on environmental management as outlined in this CEMP
- liaise with supervisors to identify and address environmental issues associated with day-to-day construction and pre-commissioning activities
- undertake inspections in liaison with Site Supervisors
- prepare reports on construction environmental management performance and identify areas for improvement and implementation of corrective action
- assist with investigating incidents and coordinating corrective actions, if required
- provide accurate and timely advice to the Construction Manager on environmental management and corrective actions in relation to construction incidents
- report any non-conformance in the Incident and Non-conformance Report Form (contained within the EMS)
- collate statistics for monthly construction management performance
- maintain all documents (hard copy files, electronic files and emails) for inspection during internal and external audits
- ensure familiarity with environmental standards and legal requirements applicable to this CEMP

- maintain an Incident Register and report incidents to the Environment Manager
- maintain the risk register that informs this CEMP.

3.1.6 Fauna handlers

Responsibilities of fauna handlers include the following:

- hold a s 15 *Licence to take fauna for public purposes*, under the Wildlife Conservation Regulations 1950, issued specifically for the purposes of fauna capture and release associated with the rail infrastructure construction project
- carry out all handling of native fauna as required under the Fauna Management Plan (Section 6).

3.1.7 Contractors

Responsibilities of contractors include the following:

- support Proponent management initiatives and culture
- implement the CEMP as relevant to the contractor's work area
- comply with all legal requirements and the requirements specified in this CEMP
- ensure all personnel are adequately trained in the requirements of this CEMP
- seek advice from the Proponent when in doubt of their requirements.

3.1.8 All personnel

Responsibilities of all personnel include the following:

- comply with all legal requirements and the requirements of this CEMP
- report all environmental incidents to their Supervisor or Site Environmental Coordinator
- attend environmental inductions or any other training as required by this CEMP
- participate in environmental meetings and suggest improvements to construction management

Refer to the EMS for further details on general personnel responsibilities.

3.2 Induction

Inductions will be provided to all personnel and contractors before they can commence work on the project, outlining the environmental context and management covered in this CEMP to all personnel and Contractors before they can commence work on the Project. This basic training will cover their responsibilities for supporting Project environmental management performance. The induction material shall be reviewed at least annually or more frequently if there are significant changes in environmental conditions or requirements.

Induction records to be maintained on site will include, as a minimum, records of attendance.

3.3 Training

Further training will be provided to selected personnel as appropriate and according to their role and responsibilities. The training will include further explanation of specific environmental aspects and management practices, as covered in this CEMP.

Training records to be maintained on site shall include as a minimum:

- records of attendance
- competency assessments (where relevant to the training provided).

3.4 Communication

Ongoing communication will occur during construction to ensure effective implementation of this CEMP. The 'toolbox' and prestart meetings held regularly by each construction crew will include appropriate environmental issues when applicable. For example, the communications may include:

- new environmental management procedures or information
- addressing questions and concerns raised by personnel
- briefing on environmental incidents that have occurred, including actions taken
- reiteration of environmental management information, if requested by the Construction Manager, Environment Manager, Site Supervisor or Site Environmental Coordinator.

Environment specific notice boards will be established to inform personnel of relevant environmental information such as results of monitoring, performance standards, environmental incident alerts and company environmental notices.

Part of the core role and responsibilities of the construction personnel (as outlined in Sections 4 to 16) is to liaise regularly with other personnel to ensure the CEMP is implemented successfully.

3.5 Environmental Line List

All site-specific environmental information along the rail alignment will be captured in an Environmental Line List (ELL). This list will be sorted by chainage along the alignment from a datum and will include the location (start and end chainage), a brief description of the issue and reference to the required management practices required for site-specific environmental issues as set out in the relevant EMPs. Results of the specialist surveys and consultation will be captured here. The ELL will be consolidated with other critical construction information in a Construction Line List, which will be issued to all crews.

3.6 Environmental incidents and corrective actions

Environmental incidents include events that cause environmental impacts or harm as well as events involving non-conformance with internal procedures and "near-miss" events, which may or may not have resulted in an environmental impact. An Environmental Incident Response Management Plan detailing the requirements for management of environmental incidents is presented in Section 16.

4. Vegetation and Flora Management Plan

4.1 Introduction

This management plan details requirements to minimise impacts on vegetation and flora during the construction of the rail infrastructure.

The rail construction area predominantly comprises disturbed pastoral land and areas of intact native vegetation. Up to 1640 ha of native vegetation would be cleared for construction of Rail Option 1, of which no more than 660 ha would be permanently disturbed. Up to 1460 ha of native vegetation would be cleared for construction of Rail Option 2, of which no more than 580 ha would be permanently disturbed.

No Threatened Ecological Communities (TECs) occur within the rail infrastructure construction area; however, one Protected Ecological Community (PEC) occurs within the Option 2 rail infrastructure construction area (Fortescue Marsh).

No Declared Rare Flora (DRF) species occur, however, Priority flora has been recorded as potentially occurring within the rail infrastructure construction area.

4.2 Relevant legislation and standards

Relevant legislation, policies and guidances include, but are not necessarily limited to:

- *Environment Protection & Biodiversity Conservation Act 1999* (EPBC Act)
- *Bush Fires Act 1954*
- *Environmental Protection Act 1986* (EP Act)
- *Conservation and Land Management Act 1984*
- *Soil and Land Conservation Act 1945*
- *Wildlife Conservation Act 1950* (Wildlife Act)
- *Agriculture and Related Resources Protection Act 1976* (ARRP Act)
- EPA Position Statement No. 2: Environmental Protection of Native Vegetation in Western Australia (EPA 2000c)
- EPA Position Statement No. 3: Terrestrial Biological Surveys as an Element of Biodiversity Protection (EPA 2002)
- EPA Guidance Statement No. 6: Rehabilitation of Terrestrial Ecosystems (EPA 2006b)
- EPA Guidance Statement No. 56: Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessment in Western Australia (EPA 2004b)
- EPA Environmental Protection Bulletin No. 10: Geraldton Regional Flora and Vegetation Survey (EPA 2010).

4.3 Potential impacts

4.3.1 Activities

The key activities during construction that have the potential to affect vegetation are:

- vegetation clearing
- earthworks
- vehicle/machinery activity
- hydrocarbon and other hazardous material use, storage and transport

- design and construction of landforms.

4.3.2 Impacts

Potential impacts to vegetation and flora due to construction of the rail infrastructure include:

- loss of DRF or Priority flora
- loss of biodiversity
- vegetation and habitat fragmentation
- weed infestations
- soil erosion from disturbed areas
- smothering of vegetation by dust
- changes to surface water flows
- changes in surface water quality
- fire outbreaks.

Construction sites no longer required for the operation phase (such as laydown areas, and the temporary construction campsite will be rehabilitated in accordance with the Rehabilitation Management Plan (Section 15).

4.4 Performance management

Management strategies have been developed to meet the EPA vegetation and flora objective:

- *To maintain the abundance, diversity, geographic distribution and productivity of flora at ecosystem levels through the avoidance or management of adverse impacts and improvement in knowledge.*

The intended environmental objectives and performance indicators for vegetation and flora are outlined in Table 4-1.

A vegetation health and condition monitoring program is to be developed in consultation with the Department of Environment and Conservation (DEC), which will include definition of contingency action trigger levels for changes in vegetation outside the indirect impact buffer.

Table 4-1: Performance management targets and indicators for vegetation and flora

Issue	Objective	Performance Indicator
Vegetation disturbance	To ensure that the area of cleared native vegetation is no greater than approved under the provisions of the Ministerial Statement.	Not more than 1640 ha of native vegetation is cleared for construction of Rail Option 1, of which no more than 660 ha is to be permanently disturbed. Not more than 1460 ha of native vegetation is cleared for construction of Rail Option 2, of which no more than 580 ha is to be permanently disturbed. Vegetation clearance for implementation of works is in accordance with approval applications.
	To ensure that clearing of native vegetation does not extend to areas prohibited under the provisions of the Ministerial Statement.	No clearing outside approved boundaries.
	To ensure that no Priority 1 and 2 flora species or the PEC are disturbed during the construction of the rail infrastructure, unless approved under the provisions of the Ministerial Statement.	No clearing within 10 m of Priority flora and the PEC unless authorised under the provisions of the Ministerial Statement. No clearing within 10 m of Priority 1 and 2 flora species unless authorised under the provisions of the Ministerial Statement.

Issue	Objective	Performance Indicator
Vegetation health and condition	To ensure that health and condition of significant vegetation* located >50 m either side of the rail centreline (other than areas required for ancillary infrastructure or works such as laydown areas, campsites, borrow pits, etc.) are not affected by construction activities	No decline in vegetation health below the DEC approved trigger attributable to construction activities at monitoring locations beyond the area described in the objective.

* Significant vegetation: as per definition described in Environmental Protection Authority Guidance Statement No. 56 Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessment in Western Australia (EPA 2004b) and includes:

- Mulga communities
- Priority 1 PEC
- Vegetation associations with less than 30% pre-European extent remaining.

4.5 Key control measures

The control measures for mitigation of impacts to vegetation and flora are detailed in Table 4-2. The control measures directly address the management objectives outlined in Table 4-1.

Management of potential impacts as a consequence of weeds and pathogens, changes to the surface water regime, exposure to hydrocarbons, hazardous materials and dust smothering are discussed in the following management plans:

- Weed and Pathogen Management Plan (Section 5)
- Surface Water Management Plan (Section 7)
- Hydrocarbons and Hazardous Materials Management Plan (Section 9)
- Dust Management Plan (Section 11).

Table 4-2: Control measures for mitigation of impacts to vegetation and flora

Aspect	Control Measures	Responsibility	Timing
Baseline information	A botanical survey within the rail construction area will be conducted prior to the commencement of construction activities to identify and map the baseline occurrence of vegetation and flora (including conservation-significant species). The survey is to be undertaken by a botanist with five years relevant field survey experience to the satisfaction of the EPA on advice from DEC.	Environment Manager	Design
	Data from the botanical survey will be stored in a Conservation Significant Flora Register with the following attributes: • names of all species identified • distribution • abundance • other relevant biological information.	Environment Manager	Design, Pre-construction, Construction
	Rail alignments will be designed to ensure no unauthorised clearing, ground disturbance or access occurs within 10 m of the PEC, or all Priority 1 and 2 flora.	Project Manager, Environment Manager	Design
	Where the required separation distance is unable to be achieved, a site-specific waiver of the requirements will be sought.	Project Manager, Environment Manager	Design
Field demarcation	The conservation-significant or listed species and communities identified in the botanical survey are to be listed, their locations entered into the ELL and demarcated in the field with signage and flagging as Restricted Access Areas. No personnel may enter the Restricted Access Areas unless authorised by the Environment Manager.	Environment Manager	Pre-construction
	Locations of the PEC will be clearly demarcated with a 10 m buffer zone where clearing will be prohibited.	Construction Manager	Pre-construction, Construction

Aspect	Control Measures	Responsibility	Timing
	Locations of Priority 1 and 2 flora will be clearly demarcated with a 10 m buffer zone where clearing will be prohibited.	Construction Manager	Pre-construction, Construction
Clearing	No clearing is to be undertaken unless managed through the procedures of the Ground Disturbance System (see Section 2.6.1).	Site Environmental Coordinator Construction Manager	Pre-construction, Construction
	All areas approved for vegetation clearing (via issue of a Ground Disturbance Permit [GDP]) will be demarcated in the field prior to commencement of clearing to prevent accidental clearing of non-approved areas.	Construction Manager	Pre-construction, Construction
	Vegetation clearing will be prohibited unless approved by the Environment Manager (through implementation of the Ground Disturbance System).	Site Environmental Coordinator	Pre-construction, Construction
	Vegetation clearing will be restricted to within the demarcated areas.	Construction Manager	Construction
	The construction corridor will be restricted to a maximum disturbance width of 100 m where it passes through areas of native vegetation, with the exception of campsite locations and watercourse crossings.	Construction Manager	Construction
Topsoil	All topsoil to a depth of 150 mm from areas of cleared vegetation will be salvaged after clearing and stockpiled separately from any other material stockpiles.	Construction Manager	Construction
	Topsoil stockpiles will be limited to a maximum height of 2 m.	Construction Manager	Construction
	Topsoil stockpiles will be clearly signposted.	Construction Manager	Construction
	Topsoil stockpiles will be located away from watercourses.	Construction Manager	Construction
Access	Off-road access by any vehicles will be prohibited unless authorised by the Site Environmental Coordinator.	Construction Manager	Design, Pre-construction, Construction
Fire	A fire management plan will be prepared and implemented that includes consideration of fire and fire effects on vegetation and flora.	Construction Manager	Construction
Records	Any identified impacts on conservation-significant flora will be recorded in the Conservation Significant Flora Register.	Environment Manager	Design, Pre-construction, Construction
	Survey records of the areas demarcated for clearing will be maintained as part of the Ground Disturbance System.	Construction Manager	Pre-construction, Construction
	Survey records of areas actually cleared will be maintained as part of the Ground Disturbance System.	Construction Manager	Pre-construction, Construction

4.6 Monitoring and reporting

The Site Supervisor shall be responsible for conducting regular inspections to ensure compliance with the control measures stipulated in Table 4-2.

Monitoring will be undertaken for the purposes outlined in Section 2.5.1. Monitoring requirements are summarised in Table 4-3.

Table 4-3: Summary of monitoring requirements for impacts to vegetation and flora

Monitoring	Frequency/Timing	Location	Responsibility
Direct Impacts: Reconcile actual clearing (area and location) against design clearing via interrogation of the GDP and GIS system to ensure clearing is within approved areas.	Monthly	Entire rail infrastructure footprint	Site Environmental Coordinator
Indirect Impacts: Prepare and implement a vegetation health and condition monitoring program in consultation with DEC to determine if construction activities cause indirect impacts to significant vegetation (including mulga vegetation communities), beyond 50 m either side of the railway formation.	As required by monitoring program	Impact monitoring sites Reference monitoring sites	Site Environmental Coordinator
Reconcile total indirect and direct impacts to vegetation and conservation-significant flora against approved footprint.	Annually	Entire rail infrastructure footprint	Site Environmental Coordinator

No specific internal reporting is required under the provisions of this plan, provided the record keeping as set out in Table 4-2 is maintained and available.

The reporting required to document compliance with the objectives of this management plan is summarised in Table 4-4.

Table 4-4: Reporting requirements for vegetation and flora management

Report	Details	Reporting Frequency	Responsibility
Pre-construction botanical survey records	All records of the pre-construction botanical survey work required to be submitted to the OEPA and DEC.	Prior to commencement of ground disturbing activities (other than works approved as pre-construction works).	Site Environmental Coordinator Environment Manager
Vegetation Health and Condition Monitoring Report	Details the scope, methodology and results of the vegetation health and condition monitoring program. To be submitted to the OEPA.	Annually and within 1 year of completion of construction and further reports after 3 years and 5 years.	Site Environmental Coordinator Environment Manager
Trigger level exceedance	Report exceedance of trigger levels as defined in the vegetation health and condition monitoring program to be developed in consultation with DEC. Report to CEO of OEPA.	Within 21 days of exceedance being identified.	Site Environmental Coordinator Environment Manager
Ground Disturbance Report	Details the vegetation areas cleared over the previous month (areas and location), and a running total of clearing undertaken to date (internal report).	Monthly.	Construction Manager Site Environmental Coordinator

4.7 Contingency actions

Contingency actions will be initiated where monitoring indicates the environmental objectives for management of vegetation and flora are not being achieved and/or that trigger levels have been exceeded (Table 4-5).

Table 4-5: Contingency actions for impacts to vegetation and flora

Trigger	Contingency Action	Responsibility
Clearing outside areas approved for vegetation clearance through the GDP system.	Investigate cause. Implement corrective and preventative actions. Identify opportunities to reallocate clearing budget if required to ensure compliance with approved footprint. Redefine boundaries if due to inadequate boundary marking. If disturbance to vegetation requires mitigation, then the area disturbed will be rehabilitated. Communicate incident investigation outcomes to personnel.	Site Environmental Coordinator
Clearing in excess of approved area or outside development envelope.	Notify CEO of OEPA. Investigate cause. Implement corrective and preventative actions. Redefine boundaries if due to inadequate boundary marking. If disturbance to vegetation requires mitigation, then the area disturbed will be rehabilitated. Communicate incident investigation outcomes to personnel.	Site Environmental Coordinator Environment Manager
Unapproved disturbance to the PEC or its 10 m buffer. Loss of Priority 1 and 2 Flora or disturbance to their buffers.	Notify CEO of OEPA. Investigate cause. Redefine boundaries if due to inadequate boundary marking. Investigate potential remedial measures in consultation with DEC and implement where practicable. Communicate incident investigation outcomes to personnel.	Site Environmental Coordinator Environment Manager
Decline in vegetation health or condition beyond the approved footprint below the trigger level developed in consultation with DEC.	Investigate cause of exceedance. Develop action plan to address exceedance. Report findings to CEO of OEPA as required in Table 4-4. Implement action plan on approval of CEO of OEPA. Communicate incident investigation outcomes to personnel. Continue targeted monitoring in the affected area to confirm the success of implemented actions as agreed with DEC.	Site Environmental Coordinator Environment Manager

5. Weed and Pathogen Management Plan

5.1 Introduction

The following sections detail the management actions to be implemented in order to help ensure weeds are managed in an effective manner during construction and operation of the Rail infrastructure.

A total of 12 weeds were recorded during surveys of the rail alignment, including one Declared Plant (**Parkinsonia aculeata*) under the *Agriculture and Related Resources Protection Act 1976* (Table 5-1).

Table 5-1: Weeds recorded in the Project area

Species	Common name	Location
**Aerva javanica*	Kapok Bush	Rail Option 2
**Bidens bipinnata*	Bipinnate Beggartick	Rail Option 1
**Cenchrus ciliaris*	Buffel Grass	Rail Option 1, Rail Option 2
**Cenchrus setiger*	Birdwood Grass	Rail Option 2
**Citrullus colocynthis*	-	Rail Option 2
Cucumis melo* ***subsp.* *agrestis*	Ulcardo Melon	Rail Option 2
**Echinochloa colona*	Awnless Barnyard Grass	Rail Option 2
**Malvastrum americanum*	Spiked Malvastrum	Rail Option 1, Rail Option 2
**Parkinsonia aculeata*	Parkinsonia	Rail Option 2
**Portulaca oleracea*	Purslane	Rail Option 1, Rail Option 2
**Sonchus oleraceus*	Common Sowthistle	Rail Option 1
**Vachellia farnesiana*	Mimosa Bush	Rail Option 2

**Parkinsonia aculeata* is classed as P1 for the entire state and P2 for the Shire of East Pilbara, which includes the survey area.

5.2 Relevant legislation

Relevant legislation includes but is not necessarily limited to:

- *Environmental Protection Act 1986*
- *Agriculture and Related Resources Protection Act 1976* (ARRP Act).

5.3 Potential impacts

5.3.1 Activities

Key construction activities identified as having the potential to cause weed related environmental impacts include:

- vegetation clearing/ground disturbance
- movement of vehicles/machinery
- movement of soils.

5.3.2 Potential impacts

Potential impacts include:

- introduction of new environmental weeds
- increased distribution and/or cover of existing environmental weeds.

5.4 Performance management

Objectives, targets and indicators for the Proposal are outlined in Table 5-2.

Table 5-2: Performance management objectives, targets and indicators

Impact/Aspect	Objective	Performance Indicator
Introduction of new environmental weeds. Increased distribution and/or cover of existing environmental weeds.	Prevent the introduction and spread of weeds and protect unaffected areas from invasion of exotic noxious weeds.	No new weed species introduced as a result of Proposal construction. No increase in weed distribution throughout the Proposal area.

5.5 Control measures

Control measures for mitigation of weed related impacts are detailed in Table 5-3.

Table 5-3: Control measures for management of weeds

Aspect	Control Measure	Responsibility	Timing
Induction	The induction program will involve hygiene training to ensure all personnel are aware of the requirements to prevent the spread of weeds.	Construction Contractor	Construction
General requirements	The location of all weed infested areas as surveyed will be marked as 'high risk' weed areas on the ELL with requirements for installation of hygiene stations at exit locations.	Environment Manager	Pre-construction
	Construction areas containing native vegetation and displaying weed covers in excess of 50% will be selectively sprayed with Glyphosate to reduce weed seed loads in the topsoil in order to improve establishment of native species in the rehabilitation. Where such weeds are of a variety not conducive to eradication with Glyphosate, they will be cleared and the weeds disposed to an appropriate landfill. Construction areas that are heavily infested with weeds but not containing native vegetation will also be cleared and the weeds disposed to an appropriate landfill as required.	Construction Contractor	Construction
Surveying	Distinctive flagging and signage will be used to identify those areas of high risk for weeds.	Construction Contractor	Pre-construction, Construction
	Corridor access hygiene points will be identified on construction alignment sheets.	Construction Contractor	Pre-construction, Construction
	Corridor access hygiene points will be marked in the field with signage.	Construction Contractor	Pre-construction, Construction
Hygiene	Exit from 'high risk' weed areas identified on the ELL will only be through hygiene stations.	Construction Contractor	Construction
	Signage will be erected outlining the hygiene management procedure at each station.	Construction Contractor	Construction
	All construction machinery (including handheld tools) and vehicles will be cleaned down at the hygiene management stations.	Construction Contractor	Construction
	Personnel will clean footwear each time they exit a high risk area.	Construction Contractor	Construction

Aspect	Control Measure	Responsibility	Timing
	If weed seeds and/or soil are found attached to vehicles, footwear, clothing and/or equipment, they will be collected in a sealed container and disposed in accordance with the Waste Management Plan (Section 10).	Construction Contractor	Construction
Access and vehicular /machinery movement	All vehicles and machinery that access the construction corridor will be checked to ensure they are free from soil/organic matter prior to arrival on site (recorded as part of the mobilisation procedure) and marked accordingly.	Construction Contractor	Construction
	Personnel will remain on designated roads and access tracks and will not go outside approved access areas.	Construction Contractor	Construction
	Vehicles that move off the construction right-of-way but remain on bitumen or hard surfaces do not require clean down prior to entering areas of the corridor with the same risk rating.	Construction Contractor	Construction
Construction materials	Construction materials brought on site will be demonstrated to be disease, pest and weed free.	Construction Contractor	Construction
Clear and grade	All topsoil within identified 'high risk' areas will be stockpiled within the high risk area and not with topsoil from lower risk areas.	Construction Contractor	Construction
Trenching	Stockpiles of weed and weed-free material will be kept separate.	Construction Contractor	Construction
	Infested soil will be stockpiled in a manner that minimises the risk of being washed into the trench or out of the construction corridor.	Construction Contractor	Construction
	Drainage for weed infested areas will be designed so that it prevents water draining into weed free areas.	Construction Contractor	Construction
Rehabilitation	Stockpiles of weed and weed-free material will only be re-spread back to their point of origin.	Construction Contractor	Construction

5.5.1 Weed control methodology

Weed control methods employed for the Proposal will vary based on the weed, or assemblage of weeds, requiring treatment. Herbicides and application rates used will be consistent with recommended guidelines (i.e. as labelled) and personnel employed to complete the works will be adequately trained and licensed. The following factors will also be considered when planning weed control activities:

- weather – herbicide application should not be carried out during wet or windy conditions nor should it be carried out at times immediately preceding forecasted rain
- presence of sensitive native species – herbicide use should be sensitive to the types and proximity of native vegetation at the site (e.g. grass selective herbicides)
- timing – herbicide application should be carried out at times considered optimal for weed kill/prevention of seed set (e.g. earlier in the east than in the west due to shorter growing seasons inland)
- compliance with Circular No: PSC 88 (use of herbicides in water catchment areas) (Department of Health 2007) – herbicide use in water catchment areas will need to comply with Premier's Circular 88 in order to maintain the integrity of water resources.

Recommended herbicides for the treatment of Declared Plants identified for the Proposal are detailed in Department of Agriculture and Food (2011), *Declared Plants Database,* [Online], Available from: *http://agspsrv95.agric.wa.gov.au/dps/version02/01_plantsearch.asp* (28/06/11).

5.5.2 Hygiene management methodology

Methods for vehicle/machinery clean-down in the field include blow-down, brush-down, wash-down and rumble grids. Vehicle wash-down is not preferred (unless adequate drying time is available), as it provides wet surfaces for adhesion of soils and organic materials. Methods employed will need to be flexible to take into account site conditions (e.g. mud caused by heavy rainfall, access to water and energy, etc.).

5.6 Monitoring and reporting

The Environment Manager shall be responsible for monitoring and reporting to ensure compliance with the control measures stipulated in Table 5-3.

Monitoring will be undertaken for the purposes outlined in Section 2.5.1. Monitoring requirements are summarised in Table 5-4.

Table 5-4: Summary of monitoring requirements for weed management

Monitoring	Frequency/Timing	Location	Responsibility
Conduct weed surveys to monitor the distribution and cover of environmental weeds.	Proposal area: annually for at least two years following completion of construction. Reference sites: at least once every two years.	Proposal area: reference site adjacent to the Proposal area. Reference sites: within the Proposal area but outside the impact area – to be developed in consultation with the DEC.	Environment Manager
Conduct random inspections/audits of hygiene measures to ensure compliance with related controls.	Weekly during clearing and topsoil stripping. Monthly during all other construction or maintenance works.	Vehicles/machinery, hygiene stations and hygiene forms.	Site Environmental Coordinator
Inspect locations of topsoil and vegetation stockpiles to ensure compliance with related controls.	Weekly during clearing and topsoil stripping.	All topsoil and vegetation stockpile areas.	Site Environmental Coordinator

Monitoring methodology for reference sites and impact areas will meet the following requirements as a minimum:

- monitoring to be undertaken by a suitably qualified botanist
- quadrats to be randomly distributed and marked out in the field (or as agreed with the DEC)
- quadrats to be spatially (GPS) and visually (photographically) recorded
- all species present to be identified to species level (where possible) and distinguished as either native or introduced
- weed cover to be recorded (as a percentage)
- vegetation condition to be recorded using the Keighery scale
- signs of native and feral animal activity to be recorded.

Weed monitoring reporting will note recent climatic conditions, land use activities and any other potentially relevant factors observed during monitoring activities.

The reporting required to document compliance with the objectives of this management plan is summarised in Table 5-5.

Table 5-5: Reporting requirements for weed management

Report	Details	Reporting Frequency	Responsibility
Weed Monitoring Report	Documents results of weed distribution and weed cover monitoring including monitoring of reference sites.	Annually (biennially for reference sites).	Environment Manager
Hygiene Compliance Report	Documents the occurrence and outcomes of hygiene inspections.	Monthly during clearing and topsoil stripping. Quarterly during all other construction or maintenance works.	Environment Manager

5.7 Contingencies

Contingency actions will be initiated where monitoring indicates the environmental objectives for management of weeds are not being achieved and/or that trigger levels have been exceeded (Table 5-6).

Table 5-6: Contingency actions for weed impacts

Trigger Level	Contingency Action	Responsibility
Weed cover within an impact area exceeds that of reference sites.	Investigate cause. Undertake weed control in consultation with Department of Agriculture and Food (DAF) and DEC (or as appropriate). Review and amend (if necessary) existing hygiene procedures in consultation with DAF and DEC (or as appropriate). If relevant, reinforce hygiene requirements to relevant personnel and inform them of any changes to control procedures. Continue targeted monitoring in affected area to confirm the success of implemented actions.	Environment Manager
New species of weeds introduced into the Proposal area. Increase in declared weed distribution identified.	Identify source. Undertake weed control in consultation with DAF and DEC (or as appropriate). Review and amend (if necessary) existing hygiene procedures in consultation with DAF and DEC (or as appropriate). Reinforce hygiene requirements to relevant personnel and inform them of any changes to control procedures. Continue targeted monitoring in affected area to confirm the success of implemented actions.	Environment Manager
Soil and/or organic material is identified on vehicles/machinery moving from higher to lower risk areas. Weed infested/non-infested topsoil is not stockpiled correctly.	Investigate cause. Assess potential for significant impact. Target any potentially affected areas for weed survey and perform eradication methods if new infestations are found. Review and amend (if necessary) existing hygiene procedures in consultation with DAF and DEC (or as appropriate). Reinforce hygiene requirements to relevant personnel and inform them of any changes to control procedures. Continue inspections to confirm the success of implemented actions.	Environment Manager

6. Fauna Management Plan

6.1 Introduction

This management plan details requirements to minimise impacts on all terrestrial fauna and associated habitat during the construction of the rail infrastructure.

Conservation-significant species (Mulgara, Greater Bilby and the Northern Marsupial Mole) have been recorded in the rail infrastructure area or identified as likely to occur. The area is at the southern extent of the range of the Northern Quoll. The rail infrastructure has consequently been designed to minimise impacts on significant fauna and associated habitats.

6.2 Relevant legislation and standards

Relevant legislation, policies and guidances include, but are not necessarily limited to:

- *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)
- *Bush Fires Act 1954*
- *Environment Protection Act 1986* (EP Act)
- *Wildlife Conservation Act 1950* (WC Act)
- *Soil and Land Conservation Act 1945*
- *Conservation and Land Management Act 1984*
- Ministerial Statement of approval to implement Proposal
- Health (Pesticide) Regulations 1956
- EPA Position Statement No. 3: Terrestrial Biological Surveys as an Element of Biodiversity Protection (EPA 2002)
- EPA Guidance Statement No. 20: Sampling of Short Range Endemic Invertebrate Fauna for Environmental Impact Assessment in Western Australia (EPA 2005a)
- EPA Guidance Statement No. 33: Environmental Guidance for Planning and Development (EPA 2008)
- EPA Guidance Statement No. 54: Consideration of Subterranean Fauna in Groundwater and Caves during Environmental Impact Assessment in Western Australia (EPA 2004a)
- EPA Draft Guidance Statement No. 54a: Sampling Methods and Survey Considerations for Subterranean Fauna in Western Australia (EPA 2007)
- EPA Guidance Statement No. 56: Terrestrial Fauna Surveys for Environmental Impact Assessment in Western Australia (EPA 2004b)
- CALM Policy Statement No 33: Conservation of threatened and specially protected fauna in the wild (CALM 1991).

6.3 Potential impacts

6.3.1 Activities

The key activities identified as having potential to impact on terrestrial fauna during construction of the rail infrastructure are:

- vehicle activity
- vegetation (habitat) clearance
- fire

- direct human contact
- waste storage
- water use
- groundwater abstraction
- changes in hydrology
- trenching and other earthworks
- operation of heavy machinery (generation of dust, noise and vibration)
- night works (generation of light)
- excavation for ballast (potential troglofauna habitat)
- chemical/hydrocarbon use, storage and transport
- inadequate rehabilitation activities.

6.3.2 Impacts

Potential impacts to fauna due to the construction of the rail infrastructure include:

- fauna injury or death
- fauna entrapment (i.e. in trenches or turkey nest dams)
- increase in abundance or distribution of feral fauna
- native fauna reliance on construction personnel food wastes
- destruction and reduction of fauna habitats
- disturbance of fauna habitats (e.g. dust, light, vibration)
- disruption to parenting, reproductive and natural feeding habits
- habitat contraction/fragmentation due to vegetation clearance, the introduction of weeds or fire and presence of the rail corridor
- loss of biodiversity for vertebrate or invertebrate fauna species
- changes in groundwater levels and groundwater chemistry.

6.4 Performance management

Management strategies have been developed to meet the following EPA objective:

- *To maintain the abundance, diversity, geographic distribution and productivity of fauna at species and ecosystem levels through the avoidance or management of adverse impacts and improvement in knowledge.*

The intended performance management targets and indicators for terrestrial fauna are outlined in Table 6-1.

Table 6-1: Performance management targets and indicators for terrestrial fauna

Issue	Objective	Performance Indicator
Fauna habitat	To ensure that any clearing of habitat is confined to locations approved under the Ministerial Statement.	No clearing outside approved boundaries.
Conservation-significant fauna	To minimise the impacts of Project design on conservation-significant fauna or their habitats.	No disturbance to conservation-significant fauna and their habitats beyond the approved disturbance areas.

Issue	Objective	Performance Indicator
Welfare of native fauna	To prevent native fauna stress, injuries or deaths as a result of construction of the rail infrastructure.	No deliberate loss of native fauna from actions of site personnel. Mortality rate for fauna trapped in trenches is not to exceed 5% for two consecutive weeks where the weekly fauna encounter rate exceeds 25/week.

6.5 Key control measures

The control measures for mitigation of impacts to terrestrial fauna are detailed in Table 6-2. The control measures directly address the management objectives outlined in Table 6-1.

The following also relate to managing on-site compliance and monitoring:

- Ground Disturbance System
- Clearing Control System
- Conservation Significant Fauna Database
- Vegetation and Flora Management Plan (Section 4)
- A *Mulgara and Bilby Translocation Program (*to be developed in consultation with DEC and Department of Sustainability, Environment, Water, Population and Communities and on advice of recognised specialists).

The Conservation Significant Fauna Database will interface with the Project GIS database to provide a comprehensive database of the key fauna values across the Project site. The Ground Disturbance and Clearing Control Systems will work in conjunction to ensure all Project construction activities only occur within designated areas.

Table 6-2: Control measures for mitigation of impacts to terrestrial fauna

Aspect	Control Measures	Responsibility	Timing
Baseline information	All conservation-significant fauna and fauna habitat will be surveyed and mapped within the rail infrastructure footprint.	Environment Manager	Pre-construction
Planning	The Final Rail Alignment Plan will avoid disturbing known populations of conservation-significant fauna and minimise impact to areas of likely habitat,	Project Manager	Design
	All conservation-significant fauna habitat will be entered on the ELL with direction on relevant management measures to be applied.	Environment Manager	Pre-construction
Inductions	Appropriate induction and training will be provided to educate all staff in relation to fauna protection requirements including: • identification of all conservation-significant species identified on site • identification of habitat specific to conservation-significant fauna • awareness of environmental obligations and expectations, including stewardship of fauna and fauna habitats • provision of maps identifying “no access” areas • fauna protection measures and encounter procedures.	Environment Manager	Construction
	Protected fauna and fauna habitat identification sheets will be developed and displayed in the site office(s).	Site Environmental Coordinator	Construction
Vehicle movement	Vehicle speeds will be restricted to minimise potential for interaction with fauna, with additional restrictions to apply in conservation-significant habitat zones as marked on the ELL.	Construction Manager	Construction
Fauna handling	No native fauna are to be handled by personnel other than those licensed as fauna handlers under the Wildlife Conservation Regulations 1950, as outlined in Section 3.1.6.	All personnel	Pre-construction, Construction

Aspect	Control Measures	Responsibility	Timing
Fauna translocation	The *Mulgara and Bilby Translocation Program* will be implemented prior to clearing activities and during construction if Mulgara or Greater Bilby encountered.	Fauna handlers	Pre-construction, Construction
Clearing	The construction corridor will be restricted to a maximum disturbance width of 100 m where it passes through areas of conservation-significant fauna habitat.	Construction Manager	Construction
	Important habitat areas, such as rocky outcrops will be demarcated and fenced as "no access" areas unless they materially affect construction activities.	Site Environmental Coordinator	Pre-construction
Access	A policy of unauthorised access to restricted areas, including areas of conservation-significant fauna habitat will be prepared and implemented.	Environment Manager	Design, Pre-construction, Construction
Turkey nest dams	Turkey nest dams will be fenced to restrict fauna access.	Construction Manager	Construction
	Fauna egress mechanisms (such as wire mesh) will be installed in all turkey nest dams.	Construction Manager	Construction
Trenches and other excavations	Open trench lengths will not at any time, exceed lengths capable of being practically inspected and cleared by the available fauna handling staff in accordance with this plan.	Construction Manager	Construction
	Trench plugs for fauna crossing with fauna exit ramps will be installed in trenches at intervals not exceeding 1200 m and ramp slopes are not to exceed 1:1.	Construction Manager	Construction
	Ramps providing egress points and/or fauna refuges providing suitable shelter for trapped fauna from the sun and predators for trapped fauna are to be placed in the open trench at intervals not exceeding 50 m.	Site Environmental Coordinator Fauna handlers	Construction
	Fauna handlers will conduct daily inspections of the full length of all trenches by no later than 3 hours after sunrise to identify and remove trapped fauna. The inspections and fauna clearing will be repeated between the hours of 3:00 pm and 6:00 pm. Records will be kept as outlined below.	Fauna handlers	Construction
	All open trenches will be cleared, and fauna encounter details recorded on trench inspection records, no more than one hour prior to backfilling of trenches. All details will be documented on trench inspection records as per the daily trench inspection requirements.	Fauna handlers	Construction
	Entrapped uninjured fauna will be translocated to an area at least 50 m from the boundary of the construction corridor.	Fauna handlers	Construction
	Borrow pits and quarries will be designed so that small terrestrial fauna can egress the excavation. Where possible, borrow pits will be free draining to minimise standing water.	Construction Manager	Construction
Vehicle impact	Vehicle speed restrictions will be established and enforced.	Construction Manager	Construction
Lighting	All night work lights will be directed towards construction areas to minimise light spill towards fauna habitat.	Construction Manager	Construction
Injured fauna	All injured fauna found will be assessed with the advice of an experienced zoologist/veterinarian to determine suitability for relocation, transfer to a wildlife carer or need for euthanasia.	Site Environmental Coordinator	Construction
	Euthanasia will only be carried out by a fauna handler or other suitably qualified person and will be consistent with animal welfare legislation and DEC guidelines (e.g. Chapman *et al.* 2005). All fauna handlers will have access to this document.	Site Environmental Coordinator	Construction
Feral animals	Feral animal controls (such as baiting, shooting or fencing) will be regularly implemented throughout the mine tenements, in consultation with DEC and the Jigalong community.	Site Environmental Coordinator	Construction
Other	Domestic animals and pets will be prohibited on site.	All personnel	Construction
	Livestock will be excluded from the construction area.	All personnel	Construction

Aspect	Control Measures	Responsibility	Timing
	Firearms are not permitted on site.	All personnel	Construction
	Feeding of native fauna will be prohibited.	All personnel	Construction
	Waste will be managed to ensure food scraps are not accessible to attract native fauna or feral animals.	All personnel	Construction
	Department of Agriculture and Food will be consulted with regard to the rail crossing of the State Barrier Fence.	Project Manager, Construction Manager	Design, Pre-construction, Construction
Records	Daily and pre-backfilling trench inspections will be recorded in a trench inspection log. All details of trench-related fauna encounters will be documented and maintained and will include: • identity of fauna handlers • date and time of inspections • fauna entrapped, including identity of species and numbers • actions taken with entrapped, injured or deceased fauna • fauna mortalities and causes • trench lengths and locations of individual fauna interactions.	Fauna handlers	Construction
	All fauna injuries and deaths associated with construction activities, other than those resulting from or in association with entrapment in trenches, will be recorded in a fauna encounter log. The log will record: • date and time of encounter • location of encounter • identity of species • actions taken • cause of death or mortality.	Fauna handlers	Construction
	All observations of protected fauna will be reported to a fauna handler who will record the details in a fauna encounter log.	All personnel Fauna handlers	Construction

6.6 Monitoring and reporting

The Site Supervisor shall be responsible for conducting regular inspections to ensure compliance with the control measures stipulated in Table 6-2.

Monitoring will be undertaken for the purposes outlined in Section 2.5.1. The general monitoring requirements are summarised in Table 6-3.

Table 6-3: Summary of general monitoring requirements for impacts to terrestrial fauna

Monitoring	Frequency/Timing	Location	Responsibility
Reconcile actual clearing (area and location) against design clearing via interrogation of the GDP system to ensure clearing is within approved areas with respect to fauna habitat.	As specified under clearing area monitoring in the Vegetation and Flora Management Plan (Table 4-3).		
Review frequency of fauna injuries or deaths to determine adequacy of fauna management measures.	Opportunistically (minimum quarterly)	Construction areas	Environment Manager

Monitoring requirements for conservation-significant fauna are set out in Table 6-4

Table 6-4: Monitoring requirements for conservation-significant fauna

Aspect	Monitoring Objective	Method
Pre-clearing and translocation	To determine if areas are utilised by threatened fauna for the purposes of directing translocation activities, prior to extensive ground disturbance.	Field assessment of secondary evidence of presence and abundance of threatened fauna (specif. Mulgara), in accordance with *Threatened Fauna Translocation Plan*.
Translocation	To maintain an observational record of threatened species captured during translocation.	Body morphometrics and other measurements, in accordance with *Threatened Fauna Translocation Plan*.
Borrow pits	To assess the effectiveness of fauna escape measures in closure design.	Visual inspection over the first 12 months of decommissioned borrow pits.
Trenches	To check if fauna has become trapped and will require assisted removal from the trench.	Daily: morning and evening.
Irrigation - vegetation	To demonstrate the effectiveness of irrigation management is not adversely affecting the receiving vegetation.	Vegetation condition, weeds, recruitment, assessed monthly for first two years, then 6-monthly, in accordance with Irrigation Management Plan.
Irrigation – soil	To demonstrate the effectiveness of irrigation management in not adversely affecting the soil function and structure.	Soil salinity, pH, sodicity, moisture and nutrient status over a suitable depth profile, assessed monthly for the first two years, then 6-monthly, in accordance with *Irrigation Management Plan*.
Irrigation - fauna	To demonstrate the effectiveness of irrigation management in minimising impacts to threatened fauna utilising irrigation areas.	Field assessment of secondary evidence of presence and abundance of threatened fauna (specif. Mulgara), in accordance with *Irrigation Management Plan*.
Environmental incidents - road kill	To monitor the effectiveness of traffic controls in minimising the number of physical encounters between wildlife and work vehicles.	Record of encounters, maintained as part of site EMS.
Closure and decommissioning	To determine if areas are utilised by threatened fauna for the purposes of directing translocation activities, prior to demolition of structures.	Field assessment of secondary evidence of presence and abundance of threatened fauna (specif. Mulgara), in accordance with *Threatened Fauna Translocation Plan*.
Rehabilitation	To determine if the recolonisation by fauna of rehabilitated areas is being satisfactorily achieved.	Field assessment of secondary evidence of presence and abundance of threatened fauna, on a 6-monthly basis.
Feral animals	To identify if local populations of feral and nuisance native animals require additional control.	Field assessment of secondary evidence of presence and abundance of feral animals, on a 6-monthly basis.

The reporting required to document compliance with the objectives of this management plan is summarised in Table 6-5.

Table 6-5: Reporting requirements for terrestrial fauna management

Report	Details	Reporting Frequency	Responsibility
Ground Disturbance Report	As specified under Ground Disturbance reporting in the Vegetation and Flora Management Plan (Table 4-4).		
Protected fauna	All mortalities of fauna listed in Schedule 1 and Schedule 2 of the *Wildlife Conservation Act 1950* including the cause, location, number, species and any actions taken will be reported to the CEO of the OEPA and the DEC.	Within 21 days of the mortality being identified.	Environment Manager
Trench encounters	In the event open trenches are used for construction, a report will be provided to the CEO of the OEPA and the DEC, based on the trench inspection logs, that will include: • details of fauna inspections • number of each species of fauna cleared from trenches • all fauna mortalities • actions taken regarding fauna encountered during fauna inspections.	No later than 90 days after completion of communication link installation.	Environment Manager

6.7 Contingency actions

Contingency actions will be initiated where monitoring indicates the environmental objectives for management of terrestrial fauna are not being achieved and/or that trigger levels have been exceeded (Table 6-6).

Table 6-6: Contingency actions for impacts to terrestrial fauna

Trigger Level	Contingency Action	Responsibility
Clearing in excess of approved area, or outside approved locations.	As specified under excessive clearing contingency in the Vegetation and Flora Management Plan (Table 4-5).	
Multiple occurrences of fauna injury or death from vehicle impacts at single location(s).	Investigate whether location(s) is a fauna corridor. If identified as a fauna corridor, erect new or improve any existing warning signs and set lower speed limit for that location. Review induction material and re-inform personnel of speed restrictions and high-risk areas.	Site Environmental Coordinator
Weekly fauna mortality rate in trenches exceeds 5% for two consecutive weeks where the weekly fauna encounter rate exceeds 25/week.	Investigate potential causes and develop and implement appropriate response plan (e.g. provision of additional in-trench fauna shelters, increase frequency of inspections). Advise DEC of issue and proposed response plan.	Site Environmental Coordinator

7. Surface Water Management Plan

7.1 Introduction

This management plan details requirements to minimise impacts on surface water during the construction of the rail infrastructure.

Construction of the rail line and associated infrastructure has the potential to affect watercourses through flow constriction or alteration, loss of riparian vegetation, sedimentation and effects of backwaters and scouring due to poorly designed bridges and culverts. The rail infrastructure also has the potential to interrupt sheetflow and impact Mulga communities and other sheetflow-dependent vegetation downstream of the rail alignment.

For the purposes of this management plan, a watercourse refers to any naturally occurring river, creek, stream or brook with a distinguishable bed and banks in which water flows either permanently or intermittently and includes the bed and banks.

7.2 Relevant legislation and standards

Relevant legislation, policies and guidances include, but are not necessarily limited to:

- *Environment Protection and Biodiversity Conservation Act 1999*
- *National Water Commission Act 2004*
- *Environmental Protection Act 1986*
- *Conservation and Land Management Act 1984*
- *Rights in Water and Irrigation Act 1914*
- *Soil and Land Conservation Act 1945*
- *Country Areas Water Supply Act 1947*
- Contaminated Sites Management Series 2001–2007
- Dangerous Goods Safety Act 2004
- Dangerous Goods Regulations 1992
- Environmental Protection (Controlled Waste) Regulations 2004
- Environmental Protection (Unauthorised Discharges) Regulations 2004
- EPA Guidance No. 33: Environmental Guidance for Planning and Development (EPA 2005b)
- Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC/ARMCANZ 2000a)
- Australian Guidelines for Water Quality Monitoring and reporting (ANZECC/ARMCANZ 2000b).

7.3 Potential impacts

7.3.1 Activities

The key activities identified as having potential to impact on surface water during construction of the rail infrastructure are:

- vegetation clearance
- earthworks and alteration of existing landform (and changes to natural sheetflow and watercourse flow regimes)
- chemicals and hydrocarbon handling and storage

- solid and liquid waste collection, treatment and disposal
- wastewater collection and disposal
- wastewater treatment plant effluent disposal
- dewatering effluent disposal.

The improper handling, storage, transport or disposal of chemicals, hydrocarbons, wastewater and stormwater may contribute to contamination of surface water resources. Management of these risks is addressed in the Hydrocarbons and Hazardous Materials Management Plan (Section 9). The management of risks associated with handling, storage, transport or disposal of waste materials is addressed in the Waste Management Plan (Section 10).

7.3.2 Impacts

Construction of the rail line and associated infrastructure has the potential to affect watercourses through flow constriction or alteration, loss of riparian vegetation, sedimentation and effects of backwaters and scouring due to poorly designed bridges and culverts. Bridges will be required, which have the potential to affect the hydrology of watercourse ecosystems and riparian vegetation, some of which have been identified as important ecological corridors for localised fauna movements. The rail infrastructure also has the potential to interrupt sheetflow and impact Mulga communities and other sheetflow-dependent vegetation downstream of the rail alignment. The most significant threats of the Proposal on surface water and water dependent ecological values are considered to be:

- water ponding upslope of the rail embankment infrastructure
- reduced sheetflow (water starving) down slope of the infrastructure with impact on dependent ecological values
- concentrated sheetflow through diversion infrastructure, with potential to cause erosion and subsequent deposition and exacerbation of upstream flooding
- changes to watercourse flow regimes through bridge infrastructure with potential to cause erosion and subsequent deposition and exacerbation of upstream flooding with impact on flow dependent ecological values
- changes to channel form due to changes in the flow regime with impact on dependent ecological values.

7.4 Performance management

Management strategies have been developed to meet the following EPA objectives:

- *To maintain the integrity, functions and environmental values of watercourses*
- *To maintain the quality and quantity of surface flow so that existing and potential uses, including ecosystem maintenance, are protected.*

The intended performance management targets and indicators for surface water are outlined in Table 7-1.

Table 7-1: Performance management targets and indicators for surface water

Issue	Objective	Performance Indicator
Changes to surface water flow and/or quality regimes in watercourses	To avoid any significant disturbance to the flow and water quality regimes in watercourses.	No significant change to the flow and/or quality regimes in watercourses. No significant scouring or erosion of watercourses downstream of watercourse crossings. No increased flooding upstream of watercourse crossings.
Changes to sheetflow regimes	Ensure the protection of sheetflow-dependent vegetation.	No visible pooling upstream of rail embankment. No loss or degradation of sheetflow-dependent Mulga vegetation.

Issue	Objective	Performance Indicator
Impact on riparian vegetation	Ensure the protection of riparian vegetation.	No loss or degradation of riparian vegetation outside approved disturbance footprint.

7.5 Key control measures

The control measures for surface water are detailed in Table 7-2. The control measures directly address the management objectives outlined in Table 7-1.

The following management plans also relate to managing on-site compliance and monitoring:

- Hydrocarbons and Hazardous Materials Management Plan (Section 9)
- Waste Management Plan (Section 10)
- Environmental Incident Response Management Plan (Section 16).

Table 7-2: Control measures for mitigation of impacts to surface water

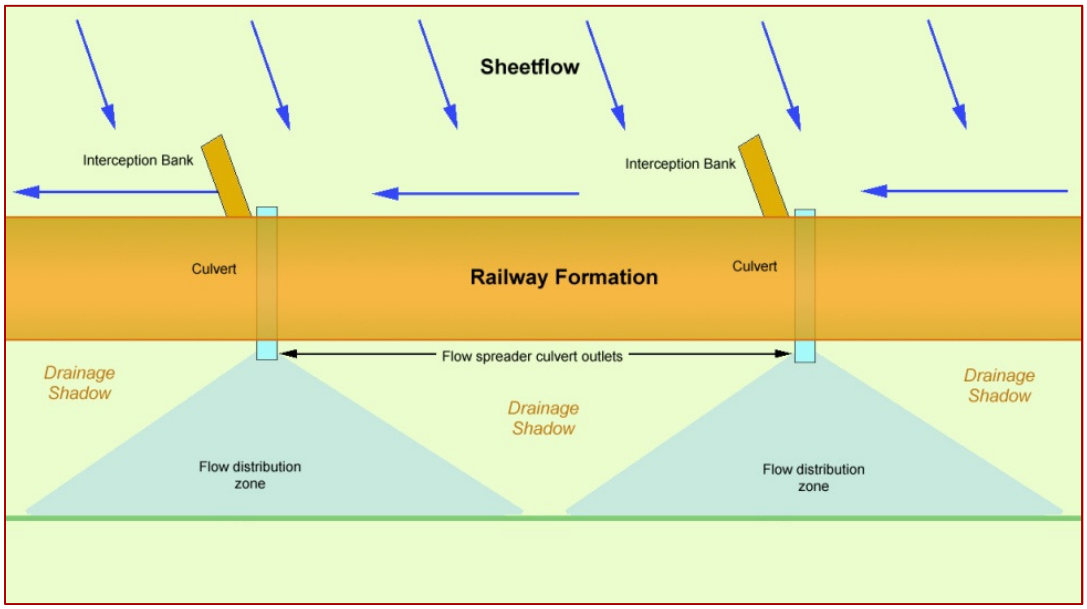
Aspect	Control Measures	Responsibility	Timing
Regulation	All watercourse crossings will be listed in the ELL. All crossings requiring bed and banks permits will be noted accordingly in the ELL.	Environment Manager	Pre-construction
	Areas of sheetflow-dependent vegetation that may be impacted by the rail formation shall be listed in the ELL.	Environment Manager	Pre-construction
Inductions	Staff inductions will include information on surface water management requirements.	Environment Manager	Construction
General	Relevant surface water monitoring points and schedules will be identified and facilities installed as necessary to undertake the monitoring required for impacts on: • watercourse flows and quality • sheetflow.	Environment Manager	Pre-construction
	Watercourse crossings shall be scheduled during dry conditions or low flow periods wherever practicable.	Construction Manager	Construction
Flow and quality regimes in watercourses	Watercourse crossings including bridges will be designed to minimise impacts on the natural flow regime. Unless impracticable to do so, watercourse crossings will be perpendicular to the direction of flow.	Project Manager	Design
	Watercourse crossings including bridges will be constructed using methods to minimise impacts on the flow regime.	Construction Manager	Construction
	Where significant disturbance of a watercourse bed is required for construction purposes, sediment traps will be placed in the watercourse, immediately downstream.	Construction Manager	Construction
	Construction of watercourse crossings will include appropriate erosion protection (e.g. rock rip rap, reno mattresses).	Construction Manager	Construction
	Camps and other supporting rail infrastructure will be located away from watercourses at least 0.5 m above the 100-yr ARI flood level for the area.	Project Manager, Construction Manager	Design, Construction
	Sediment-laden surface water runoff from any disturbed areas is to be directed through sediment traps, prior to discharge to the environment.	Construction Manager	Construction
	All stormwater runoff from camp sites and other supporting rail infrastructure sites will report to gross pollutant (sediment and hydrocarbon) traps prior to discharge to the environment.	Construction Manager	Construction
	Any water that is visibly contaminated or suspected to be contaminated will report into an internal collection sump for appropriate treatment, recovery or off-site disposal.	Construction Manager	Construction

Aspect	Control Measures	Responsibility	Timing
	Any water that is visibly contaminated or suspected to be contaminated shall not be discharged to the environment without treatment. Where on-site treatment facilities are inadequate, the water will be disposed to a licensed facility.	Construction Manager	Construction
	Accumulated water from containment facilities shall be drained as required to prevent overtopping.	Construction Manager	Construction
	Vehicles and equipment shall only be washed within approved designated wash-down areas.	Construction Manager	Construction
	Water from wash-down bays will be collected, treated and released or recycled where practicable.	Construction Manager	Construction
Sheetflow regimes	Investigations will be undertaken to determine areas of sheetflow-dependent vegetation that may be impacted by the Proposal. In consultation with DEC, a hydrology assessment will be performed for these areas to determine the suitable drainage measures required to maintain sheetflow and restrict drainage shadows to an area within the construction footprint approved for disturbance.	Environment Manager	Pre-construction
	Suitable drainage mechanisms (such as culverts) will be installed in areas of sheetflow-dependent vegetation at intervals that will ensure the drainage shadow does not extend beyond the approved disturbance area (see Figure 7-1).	Project Manager, Construction Manager	Design, Construction
	Drainage infrastructure will be designed to eliminate pooling alongside the rail formation following cessation of natural sheetflow.	Project Manager, Construction Manager	Design
	Where infrastructure may cause drainage to flow parallel to the rail formation, culverts will be placed at regular intervals together with interceptor banks to direct runoff across the rail alignment.	Project Manager, Construction Manager	Design, Construction
	Borrow pits will be constructed such that they are not an impediment to sheetflow. Borrow pits will not be located within 200 m of a watercourse and are to be self-draining, where possible. They will contain erosion protection as required.	Construction Manager	Construction
Riparian vegetation	Areas containing riparian vegetation along watercourses that may be removed for construction purposes under the relevant approvals will be marked accordingly. Adjacent areas containing riparian vegetation will be marked as “no-go” zones with pegs and flagging. The “no go” zone markings will be retained until rehabilitation activities are complete.	Site Environmental Coordinator	Pre-Construction, Construction
	No riparian vegetation other than vegetation marked for removal, may be removed.	Construction Manager	Construction
	Cleared and pruned vegetation shall be stockpiled on site for later use in bank stabilisation and rehabilitation.	Construction Manager	Construction
	No clearing of riparian vegetation is to be undertaken unless managed through the procedures of the Ground Disturbance System (see Section 2.6.1).	Site Environmental Coordinator Construction Manager	Pre-construction, Construction
	Cleared and pruned vegetation shall be placed and secured over the disturbed areas of the mid-stream banks to stabilise and minimise erosion when the river is in flood and to encourage re-establishment of mid-stream vegetation.	Construction Manager	Construction
Erosion	High erosion risk zones in construction areas shall be stabilised to prevent water erosion.	Construction Manager	Construction
Hazardous materials	All activities involving hazardous materials will be managed to the requirements of the Hydrocarbons and Hazardous Materials Management Plan (Section 9).	Construction Manager	Construction

Aspect	Control Measures	Responsibility	Timing
Maintenance	Following heavy rainfall, work areas shall be inspected and assessed for water pooling as soon as possible. In the event that water pooling occurs, design should be modified to prevent reoccurrence. Any inspections requiring follow-up action will be treated as environmental incidents.	Construction Manager	Construction
Rehabilitation	Pre-construction equivalent stability, channel profile and bed composition shall be achieved wherever practicable.	Construction Manager	Construction
Records	All inspections shall be recorded, including time and date, locations and observations.	Site Supervisor	Construction
	Records shall be kept of all maintenance associated with surface water management.	Site Supervisor	Construction

Figure 7-1 demonstrates the indicative design for sheetflow drainage mechanisms and the expected drainage shadow.

Figure 7-1: Indicative design for sheetflow drainage mechanisms



7.6 Monitoring and reporting

The Site Supervisor shall be responsible for conducting regular inspections to ensure compliance with the control measures stipulated in Table 7-2.

Monitoring will be undertaken for the purposes outlined in Section 2.5.1. Monitoring requirements are summarised in Table 7-3.

All water quality monitoring results will be recorded in an on-site database.

Table 7-3: Summary of monitoring requirements for impacts to surface water

Monitoring	Frequency/Timing	Location	Responsibility
Watercourses traversing the construction site will be inspected to establish whether flow is being affected by the rail infrastructure in terms of flow rates or quality.	During flow events during construction.	At watercourse crossings, immediately upstream and downstream of the construction site.	Site Supervisor
	During post-construction flow events.		Site Environmental Coordinator

Monitoring	Frequency/Timing	Location	Responsibility
Visual observations of the rail alignment to detect pooling or diversion of sheetflow away from sheetflow-dependent vegetation.	During flow events during construction.	Along the rail alignment immediately upstream and downstream of the construction site.	Site Supervisor
	During post-construction flow events.		Site Environmental Coordinator
Sheetflow-dependent vegetation health in accordance with the Vegetation and Flora Management Plan (Section 4)			
Surface water quality monitoring in watercourses to be conducted to characterise water quality. Monitoring will include field measurement of physical parameters (pH, conductivity, turbidity and dissolved oxygen) and visual monitoring for hydrocarbons and other hazardous substances used in construction.	Monthly during each flow event.	Along the rail alignment immediately upstream and downstream of the construction site.	Site Environmental Coordinator

No specific internal reporting is required under the provisions of this plan, provided the record keeping as set out in Table 7-2 is maintained and available.

7.7 Contingency actions

Contingency actions will be initiated where monitoring indicates the environmental objectives for surface water management are not being achieved and/or that trigger levels have been exceeded (Table 7-4).

Table 7-4: Contingency actions for impacts to surface water

Trigger	Contingency Action	Responsibility
Significant change to the flow regime in a watercourse(s).	Investigate cause. Repair, unblock, redesign or replace facilities causing impact as appropriate. Review success of action taken.	Environment Manager, Construction Manager
Significant change to the water quality regimes in a watercourse(s).	Investigate and identify source. If change in chemical quality, repair, redesign and/or replace contributing drainage containment facilities as appropriate. If change in sediment load, review design and modify in-stream structures to reduce erosional velocities as appropriate. Review success of management action.	Environment Manager, Construction Manager
Scouring or erosion of a watercourse(s) downstream of watercourse crossing(s).	Review design and modify in-stream structures to reduce erosional velocities as appropriate. Rehabilitate impacted area. Review success of management action.	Environment Manager, Construction Manager
Increased flooding upstream of a watercourse crossing(s).	Review design and modify in-stream structures to reduce impediments to flow as appropriate. Review success of management action.	Environment Manager, Construction Manager
Visible pooling upstream of rail embankment.	Review drainage design and modify structures to enable flow through the rail alignment as appropriate. Review success of management action.	Environment Manager, Construction Manager
Loss or degradation of sheetflow-dependent Mulga vegetation.	Investigate cause. If due to water stress, review drainage design in consultation with DEC and modify structures to redistribute available sheetflow to stressed area as appropriate. Rehabilitate impacted area. Review success of management action.	Environment Manager, Construction Manager

Trigger	Contingency Action	Responsibility
Loss or degradation of riparian vegetation outside approved disturbance footprint.	Investigate cause. Implement corrective and preventative actions. Redefine boundaries if due to inadequate boundary marking. If disturbance to vegetation requires mitigation, then the area disturbed shall be rehabilitated. Communicate incident investigation outcomes to personnel.	Site Environmental Coordinator

8. Groundwater Management Plan

8.1 Introduction

This management plan details requirements to minimise impacts on groundwater during the construction of the rail infrastructure.

The Project is expected to require a total of 2.2 GL/yr of groundwater over the 12 to 18 month construction period. The water is required during construction to consolidate fill, suppress dust and provide water supply for construction camps, a sleeper factory and several workshops and depots. Dewatering of ballast quarries may also be required.

8.2 Relevant legislation and standards

Relevant legislation, policies and guidances include, but are not necessarily limited to:

- *Environment Protection and Biodiversity Conservation Act 1999*
- *National Water Commission Act 2004*
- *Environmental Protection Act 1986*
- *Conservation and Land Management Act 1984*
- *Contaminated Sites Act 2003*
- *Rights in Water and Irrigation Act 1914*
- *Soil and Land Conservation Act 1945*
- Contaminated Sites Management Series 2001–2007
- Dangerous Goods Safety Act 2004
- Dangerous Goods Regulations 1992
- Dangerous Goods Safety (Goods in Ports) Regulations 2007
- Environmental Protection (Controlled Waste) Regulations 2004
- Environmental Protection (Unauthorised Discharges) Regulations 2004
- Environmental Water Provisions for WA: Statewide Policy No. 5 (WRC 2000)
- Minimum construction requirements for groundwater bores (Land and Water Biodiversity Committee 2003)
- EPA Guidance No. 33: Environmental Guidance for Planning and Development (EPA 2008)
- Water Quality Protection Note 13: Dewatering of soils at construction sites (DoW 2006)
- Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC/ARMCANZ 2000a)
- Australian Guidelines for Water Quality Monitoring and reporting (ANZECC/ARMCANZ 2000b).

8.3 Potential impacts

8.3.1 Activities

The key activities identified as having potential to impact on groundwater during construction of the rail infrastructure are:

- groundwater abstraction for construction water supplies and dewatering of ballast quarries
- chemicals and hydrocarbon handling and storage
- solid and liquid waste collection, treatment and disposal

- wastewater collection and disposal
- wastewater treatment plant effluent disposal
- excavation of potential acid sulfate soil from below the watertable.

During construction, the improper handling, storage, transport or disposal of chemicals, hydrocarbons, wastewater and stormwater may contribute to the contamination of groundwater resources. Management of these risks is addressed in the Hydrocarbons and Hazardous Materials Management Plan (Section 9). The management of risks associated with handling, storage, transport or disposal of waste materials is addressed in the Waste Management Plan (Section 10). The management of risks associated with acid sulfate soils is addressed in the Acid Sulfate Soils Management Plan (Section 13).

8.3.2 Impacts

Potential impacts to groundwater as a result of the construction of the rail infrastructure include:

- changes in groundwater levels as a consequence of abstractions
- reduction in groundwater quality due to hazardous material contamination particularly from hydrocarbons and/or dust and other contaminants
- changes in water quality as a consequence of exposure of potential acid sulfate soils to the atmosphere.

Only the changes to groundwater levels are relevant to this management plan, as management of risks to groundwater quality are addressed in the Hydrocarbons and Hazardous Materials Management Plan (Section 9), Waste Management Plan (Section 10) and the Acid Sulfate Soils Management Plan (Section 13).

8.4 Performance management

Management strategies have been developed to meet the following EPA objectives:

- *to maintain the quantity and quality of water so that existing and potential environmental values, including ecosystem maintenance, are protected.*

The intended performance management targets and indicators for groundwater are outlined below in Table 8-1.

Table 8-1: Performance management targets and indicators for groundwater

Issue	Objective	Performance Indicator
Changes to groundwater levels	Maintain the natural groundwater level regime.	No measurable difference between the pre and post-construction water level regime.

8.5 Key control measures

The control measures for groundwater are detailed in Table 8-2. The control measures directly address the management objectives outlined in Table 8-1.

The following management plans also relate to managing on-site compliance and monitoring:

- Hydrocarbons and Hazardous Materials Management Plan (Section 9)
- Waste Management Plan (Section 10)
- Acid Sulfate Soils Management Plan (Section 13)
- Environmental Incident Response Management Plan (Section 16).

The rail infrastructure construction site is located within the Pilbara Groundwater Area as proclaimed under the *Rights in Water and Irrigation Act 1914.* This requires all groundwater wells and abstractions (other than for domestic, stock or fire fighting purposes) to be licensed by the Department of Water (DoW).

Conditions may be attached to any licences issued[1]. The control measures listed in Table 8-2 assume that the licence conditions will specify the required control measures, including limits on abstractions, monitoring and reporting requirements, requirements for use of licensed drillers, and rehabilitation of wells[2] that are no longer required. Compliance with the conditions will be a legal requirement and the requirements of potential conditions are consequently not dealt with in this plan.

Table 8-2: Control measures for mitigation of impacts to groundwater

Aspect	Control Measures	Responsibility	Timing
Investigations	Groundwater sources to be utilised for water supply for the rail infrastructure will be investigated to ensure that the sources chosen contain suitable quality and sustainable yields such that GDEs, subterranean invertebrate fauna and seasonal pools will not be significantly affected. Investigations will be conducted in consultation with the DoW.	Environment Manager	Pre-construction
Licensing	Licences for well construction and groundwater abstraction required under the *Rights in Water and Irrigation Act 1914* will be obtained for all wells to be used for construction of the rail infrastructure.	Environment Manager	Pre-construction
Ground disturbance	Ground Disturbance Permits will be in place for all proposed clearing and ground disturbance for the purposes of well construction.	Construction Manager	Construction
Records	A groundwater monitoring database shall be developed to enable centralised storage of all groundwater monitoring data required under the conditions of *Rights in Water and Irrigation Act 1914* licences.	Environment Manager	Pre-construction, Construction

8.6 Monitoring and reporting

The Site Supervisor shall be responsible for conducting regular inspections to ensure compliance with the control measures stipulated in Table 8-2.

Monitoring will be undertaken for the purposes outlined in Section 2.5.1. Monitoring requirements are summarised in Table 8-3.

Table 8-3: Summary of monitoring requirements for impacts to groundwater

Monitoring	Frequency/Timing	Location	Responsibility
Monitoring of abstractions and impacts on the groundwater resource.	As required by the licence conditions.	As required by the licence conditions.	Construction Manager

The reporting to meet DoW requirements are summarised in Table 8-4. No specific internal reporting is required under the provisions of this plan, provided the record keeping as set out in Table 7-2 is maintained and available.

[1] For details on groundwater licensing under the *Rights in Water and Irrigation Act 1914*, see the DoW website: http://www.water.wa.gov.au/Doing+business+with+us/Water+licensing.

[2] The term "well" has the meaning as defined in the *Rights in Water and Irrigation Act 1914: "means an opening in the ground made or used to obtain access to underground water".*

Table 8-4: Reporting requirements for groundwater management

Report	Details	Reporting Frequency	Responsibility
Reporting to the DoW will be carried out as prescribed by the licence conditions.	As required by the licence conditions.	As required by the licence conditions.	Construction Manager

8.7 Contingency actions

Contingency actions will be initiated where monitoring indicates the environmental objectives for groundwater management are not being achieved and/or that trigger levels have been exceeded (Table 8-5).

Table 8-5: Contingency actions for impacts to groundwater

Trigger	Contingency Action	Responsibility
Rights in Water and Irrigation Act 1914 licence conditions are not complied with.	Take all immediately practical steps to re-establish compliance. Immediately advise DoW (Karratha Regional Office) and negotiate a solution if issue has potential to be ongoing.	Construction Manager
Drawdown is greater than expected.	Immediately advise DoW (Karratha Regional Office) and negotiate a solution. This may involve a reduction in pumping rate(s) and development of a supplementary or replacement source of water. If GDEs are in proximity to the drawdown zone, monitoring of ecological condition should be undertaken to establish potential effects. Monitoring of water levels (and GDEs if relevant) should be continued after implementation of the contingency action to confirm that the contingency action is effective in mitigating drawdown impacts.	Environment Manager

9. Hydrocarbons and Hazardous Materials Management Plan

9.1 Introduction

During the construction of the rail infrastructure there will be hazardous materials (such as diesel, grease oils etc.) required for vehicles, earthmoving equipment, generators and other heavy equipment.

For the purpose of this management plan, hazardous material refers to any solid or liquid material (other than wastes), which if released into the environment, has the potential to cause direct or indirect alteration of the environment, to its detriment or degradation or the detriment or degradation of an environmental value. This may include some classes of dangerous goods as defined by the *Dangerous Goods Safety Act 2004.* The management of solid and liquid waste is prescribed in the Waste Management Plan (Section 10).

9.2 Relevant legislation and standards

Relevant legislation, policies and guidances include, but are not necessarily limited to:

- *Environment Protection and Biodiversity Conservation Act 1999*
- *Environmental Protection Act 1986*
- *Contaminated Sites Act 2003*
- *Dangerous Goods Safety Act 2004*
- *Waste Avoidance and Resource Recovery Act 2007*
- Dangerous Goods Safety (Road and Rail Transport of Non-explosives) Regulations 2007
- Environmental Protection (Clinical Waste) Regulations (WA) 2002
- Environmental Protection (Controlled Wastes) Regulations 2004
- Environmental Protection (Unauthorised Discharge) Regulations 2004
- AS1940: 2004: The Storage and Handling of Flammable and Combustible Liquids
- AS 1692: 2006: Steel Tanks for Flammable and Combustible Liquids
- AS 3780: 1994: The Storage and Handling of Corrosive Substances
- AS/NZS 4452: 1997: The Storage and Handling of Toxic Substances
- AS 1692: Tanks for Flammable and Combustible Liquids
- AS 3833: The Storage and Handling of Mixed Classes of Dangerous Goods in Packages and Intermediate Bulk Containers
- Water Quality Protection Guidelines No. 10: Mining and Mineral Processing Above-Ground Fuel and Chemical Storage (DoW 2000)
- Dangerous Goods Safety Guidance Note S01/11: Storage of Dangerous Goods Licensing and Exemptions (DMP 2011)
- Australian Code for the Transport of Dangerous Goods by Road and Rail (NRTC/FORS 1998).

Dangerous Goods may require licensing by the Department of Mines and Petroleum and demonstration that the proposed storage and/or handling will meet Australian Standards and regulatory requirements.

9.3 Potential impacts

9.3.1 Activities

The key activities that involve hazardous materials during construction of the rail infrastructure are:

- storage and handling of hazardous materials used in the construction process
- transportation of hazardous material including delivery, receipt and off-site transfer
- refuelling of vehicles and earthmoving equipment.

Hazardous materials may have an impact on the surrounding environment if not used or stored correctly, for example:

- burst hydraulic, fuel, oil or lubricant vehicle hoses
- overflow of tanks due to overfilling
- spills due to collisions or tipping
- faulty or inadequate containers
- faulty or inadequate secondary containment facilities
- poor vehicle maintenance
- train derailment
- inadequate storage of explosive materials.

9.3.2 Impacts

The following potential impacts to the surrounding environment may occur as a result of hazardous materials storage and handling during construction of the rail infrastructure:

- contamination of food sources, soils, surface water or groundwater
- decline in vegetation health
- illness/death of fauna
- impact to aesthetic values and recreational activities.

The environmental impacts of a hazardous material spill will depend on factors such as nature of the material, location (and potential receiving environment), volume, and response measure. A small spill will generally have minimal impact on the environment and will have minor or no consequences to flora and fauna. Larger spills can have detrimental long-term impacts on the environment, particularly if a spill is uncontained and seeps into groundwater or a watercourse.

Spills that only affect soil are generally of minor concern, but do affect the environmental amenity of the soils and will be cleaned up.

9.4 Performance management

Management strategies have been developed to meet the following EPA objective:

- *To ensure that emissions do not adversely affect environment values or the health, welfare and amenity of people and land uses by meeting statutory requirements and acceptable standards.*

The intended performance management targets and indicators for hazardous materials management are outlined below in Table 9-1.

Table 9-1: Performance management targets and indicators for hazardous materials management

Issue	Objective	Performance Indicator
Contamination	To prevent contamination of the surrounding environment from release of hazardous materials.	No significant spillage of hazardous materials to the environment during construction.

9.5 Key control measures

The control measures for mitigation of hazardous materials are detailed in Table 9-2. The control measures directly address the management objectives outlined in Table 9-1.

The following key systems will be also utilised for managing on-site compliance and monitoring:

- Surface Water Management Plan (Section 7)
- Groundwater Management Plan (Section 8)
- Waste Management Plan (Section 10)
- Environmental Incident Response Management Plan (Section 16)
- Hazardous Materials Register.

Table 9-2: Control measures for hazardous materials management

Aspect	Control Measures	Responsibility	Timing
Inductions	Inductions for all site construction personnel will include information on: • procedures for handling and storage of hazardous materials • transferring of fuel and the refuelling of vehicles and machinery • vehicle maintenance • spill response procedures • individual responsibilities when handling and storing hazardous materials • use and location of the Hazardous Materials Register.	Construction Contractor	Pre-construction Construction
Hazardous material identification	A procedure shall be developed and implemented to ensure that no hazardous materials are brought to site unless subject to risk assessment and approval by an authorised person. Documentation of this authorisation process shall be maintained for auditing purposes.	Environment Manager	Pre-construction, Construction
	Personnel authorised to approve hazardous materials to be used on the project must undergo relevant project training.	Environment Manager	Pre-construction, Construction
Storage and containment	All hazardous materials shall be stored in areas where there is no potential for runoff to reach watercourses or undisturbed areas.	Construction Manager	Construction
	Hazardous material storage shall be designed/constructed to protect storage and containment areas from stormwater ingress.	Project Manager, Construction Manager	Design, Construction
	All hazardous material storage areas shall display relevant signage (e.g. dangerous classification) and basic hazard information (e.g. flammability, corrosivity).	Construction Contractor	Construction
	All storage vessels will be tested and labelled as required by legislation.	Construction Contractor	Construction
	Incompatible materials shall be physically isolated when stored.	Construction Manager	Construction

Aspect	Control Measures	Responsibility	Timing
	Large quantities of chemicals and hydrocarbons will be stored to meet the requirements of AS 1940, which will include the following; • chemicals and hydrocarbons will be located in bunded compounds so at least 100% of the capacity of the largest tank plus at least 10% of the second largest tank is contained • chemicals stored in drums will be bunded to contain at least 25% of the maximum stored quantity of chemicals • areas will be designated to store hazardous materials, and any runoff will be designed to control flow away from those areas • waste chemicals and hydrocarbons will be stored in appropriate compounds prior to removal from site for recycling by approved contractors.	Construction Contractor	Construction
	All minor storage (<500 litres) shall be secondarily contained in bunded areas or chemical storage cabinets.	Construction Manager	Construction
	Bulk liquid transfer points shall be fully bunded.	Construction Manager	Construction
	Unless authorised by FerrAus Limited, all storage tanks and any associated pipelines shall be located above ground.	Construction Manager	Construction
	All hazardous materials storage/transfer infrastructure (including pipelines) shall be labelled, signposted or otherwise indicate the contents and will be fitted with protection from accidental damage or dislodgement by mobile plant or vehicles (e.g. earthen windrows, bollards).	Construction Manager	Construction
	Prior to construction, the location and engineering details of hazardous material storage areas must be approved by FerrAus Limited HSE personnel. Details shall include: • proposed location(s) in site drawings • proposed material(s) to be used • volume of the contained area • overflow protection area • type and volume of materials to be stored within the storage area.	Construction Manager	Design, Pre-construction, Construction
Refuelling	All areas within the construction site and within 200 m of any watercourse, remnant vegetation or rehabilitated native vegetation are to be designated as restricted refuelling areas, and identified on the ELL. The restricted refuelling areas are to be demarcated on the ground and signposted accordingly.	Construction Manager	Construction

Aspect	Control Measures	Responsibility	Timing
	Refuelling of any self-propelled plant within a restricted refuelling area is prohibited unless this results in a requirement to move the plant more than 400 m to enable refuelling. In this situation, the plant may be refuelled at a location no closer than 50 m from the edge of the watercourse, remnant vegetation or rehabilitated native vegetation, with the following additional safeguards being applied: 1. Refuelling of self-propelled plant is to be carried out from a mobile tank no larger than 1000 L in capacity, towed to a refuelling location no closer than 50 m from the edge of the watercourse, remnant vegetation or rehabilitated native vegetation. 2. The refuelling crew will be one experienced fuel truck operator and one experienced offsider as well as the operator of the individual machine if required. 3. The mobile tank unit may only be refilled in the field from a bulk tanker located outside the restricted refuelling area. 4. Refuelling procedures and safeguards otherwise apply as for unrestricted refuelling.	Construction Manager	Construction
	Refuelling of non self-propelled plant in a restricted refuelling area shall be carried out as follows: 1. Refuelling of non self-propelled plant proximate to or within watercourse, remnant vegetation or rehabilitated native vegetations is to be carried out from a mobile tank no larger than 1000 L in capacity, towed to the location of the non self-propelled plant. 2. The refuelling crew will be one experienced fuel truck operator and one experienced offsider as well as the operator of the individual machine if required. 3. The mobile tank unit may only be refilled in the field from a bulk tanker located outside the restricted refuelling area. 4. The 1000 L mobile tank will travel between the designated refuelling locations and the non self-propelled plant. 5. Refuelling procedures and safeguards otherwise apply as for unrestricted refuelling.	Construction Manager	Construction
	Refuelling vehicles shall be equipped with the following to enable quick response to spillages: • 250 L spill kits • spill tray(s) or absorbent material • shovel • containers for temporary storage and transport of contaminated soil.	Construction Manager	Construction
	Spill trays or absorbent material are to be placed on the ground below the filling point for the duration of refuelling.	Construction Manager	Construction
	Spill kits are to be provided as follows: • all bulk fuel storages to have 250 L spill kit immediately available • all refuelling vehicles carry 250 L spill kits • all vehicles fitted with hydraulic hoses have immediate access to 20 L spill kits • all crews handling hazardous chemicals have immediate access to 20 L spill kits • all supervisors' vehicles will carry 20 L spill kits.	Construction Manager	Construction
	High-pressure hose shall be used for low pressure pumping of fuel to reduce the risk of hose rupture.	Construction Manager	Construction

Aspect	Control Measures	Responsibility	Timing
	All plant, vehicles and equipment shall be adequately maintained to minimise drips/leaks of oil and fuel.	Construction Manager	Construction
	All bulk and fuel tanks and mobile refuelling vehicles are to be fitted with auto-shut-off valves or other appropriate device to prevent overfilling.	Construction Manager	Construction
Plant maintenance	Plant, vehicle and equipment maintenance and servicing will occur within designated areas located at least 200 m from any watercourse, remnant vegetation or rehabilitated native vegetation.	Construction Manager	Construction
	All plant, vehicles and equipment shall undergo regular preventative maintenance and testing (at a minimum in accordance with manufacturer's recommendations) to reduce likelihood of equipment failure, spills or leaks.	Construction Manager	Construction
MSDS and records	Material Safety Data Sheets (MSDS) will be kept in a register at the site office along with a copy located near the chemical storage facility. Records will be kept on existing inventory, storage location, personnel training and disposal of waste for any hazardous materials used on site.	Construction Manager	Construction
	A Hazardous Materials Register to record each material received and stored on-site will be prepared and maintained with details including: • name of material • description • standards and procedures for storage and use • regulations and standards, MSDSs • volumes received • volumes dispensed. The Register will be located on-site and made accessible to all personnel.	Construction Manager, All personnel	Construction
	The Hazardous Materials Register shall be reconciled weekly and where any discrepancy indicates that leakage or loss may be occurring, it shall be reported immediately.	Construction Manager	Construction
	Maintenance (including testing) logs and inspection records shall be kept with all relevant vehicles, plant or equipment and made available on request.	Construction Manager	Construction
Spill preparedness and response	All relevant construction personnel will be trained in appropriate handling and spill cleanup requirements.	Construction Manager	Construction
	Containment of any spillages or leakage will be a priority, and spills will be cleaned up immediately by the Contractor.	Construction Manager	Construction
	An emergency response plan will be prepared and implemented to enable a rapid response in the event of a significant spill or loss of potentially contaminating material.	Construction Manager	Construction

Aspect	Control Measures	Responsibility	Timing
	Should an incident occur that results in the uncontrolled release of potentially contaminating substances, or breach of regulatory standards and/or industry standards in relation to chemical and oil management, the following corrective actions will be undertaken as appropriate: 1. Contain and clean up spill material immediately and remediate. Contaminated material will be appropriately disposed of in accordance with regulatory and local Shire requirements. 2. All incidents and near misses involving dangerous goods will be reported to FerrAus Limited within 12 hours, who will notify the regulatory authorities as required. 3. Bunds will be inspected and necessary repairs carried out to ensure they are maintained in good working condition, and bund plugs are secure. Inspections will be routinely undertaken on a regular (daily) basis. 4. Regular Inspections will be carried out to ensure all chemicals and hazardous materials are located in appropriately bunded or approved storage areas. Any non compliance will be reported to FerrAus Limited within 12 hours, who will notify regulatory authorities if required.	Construction Manager	Construction
	All spills over 2 L shall be considered an environmental incident and managed in accordance with the Environmental Incident Response Management Plan (Section 16).	Construction Manager	Construction
Accumulated contaminated water	Any accumulated water within containment facilities will be removed. Water that is visibly contaminated or suspected to be contaminated will be removed by a licensed contractor for treatment or disposal at a licensed facility.	Construction Manager	Construction

9.6 Monitoring and reporting

The Site Supervisor shall be responsible for conducting regular inspections to ensure compliance with the control measures stipulated in Table 9-2.

Monitoring will be undertaken for the purposes outlined in Section 2.5.1. Monitoring requirements are summarised in Table 9-3.

Table 9-3: Summary of monitoring requirements for management of hazardous materials

Monitoring	Frequency/Timing	Location	Responsibility
Inspections of hazardous materials storage areas, service areas and refuelling facilities to ensure compliance with required control measures.	Weekly	Construction site	Site Supervisor
Reviews of Hazardous Material Register and assess adequacy of information it contains.	Fortnightly	On-site Hazardous Material Register	Environment Manager
Review of Hazardous Material Register with respect to hazardous materials received, stored and dispensed to detect unaccounted loss.	Weekly	On-site Hazardous Material Register	Environment Manager

The reporting requirements are summarised in Table 9-4. No specific internal reporting other than incident reporting is required under the provisions of this plan, provided the record keeping as set out in Table 9-2 is maintained and available.

Table 9-4: Reporting requirements for management of hazardous materials

Report	Details	Reporting Frequency	Responsibility
Incident Report	Spills shall be reported as required under the Environmental Incident Response Management Plan (Section 16).	As required under the Environmental Incident Response Management Plan (Section 16).	As specified under the Environmental Incident Response Management Plan (Section 16).
	Where an incident may be non-compliant with a Part V licence condition, the incident will be considered a Level 3 incident and the DEC will be notified.	Within 7 days.	As specified under the Environmental Incident Response Management Plan (Section 16).
	Where an incident can be considered a breach of the Environmental Protection (Unauthorised Discharges) Regulations 2004, the incident will be considered a Level 3 or 4 incident and the DEC will be notified.	Within 24 hours.	As specified under the Environmental Incident Response Management Plan (Section 16).

9.7 Contingency actions

Contingency actions will be initiated where monitoring indicates the environmental objectives for management of hazardous materials are not being achieved and/or that trigger levels have been exceeded (Table 9-5).

Table 9-5: Contingency actions for management of hazardous materials

Trigger	Contingency Action	Responsibility
Hazardous material spill	Identify type and characteristics of hazardous material (hydrocarbon, chemical etc). Comply with safety and environmental recommendations within the relevant Materials Safety Data Sheet (MSDS). Identify potential sources of spill. Respond to spills using the following response priorities: 1. Control – find the source of the discharge and prevent further discharges. 2. Contain – Use spill kits and other response capabilities to contain the spill and prevent further spread. Priority should be given to preventing spill from entering sensitive areas such as surface waters. 3. Cleanup - Use spill kits and other response capabilities to remove the spilt material from the affected area and clean up the site. Priority should be given to sensitive areas such as surface waters. Inspect on-site containment measures. Repair, redesign or replace on-site containment facilities if required. Perform visual inspection to confirm success of contingency measures. Review and revise procedures as appropriate. Advise all staff of procedure revision and requirements. Report as required (refer to Section 16.3)	Environment Manager and Construction Manager
Review of Incident Register identifies adverse frequencies or trends associated with spills of hazardous materials	Investigate issue to determine potential causes. Review and revise procedures as appropriate. Advise all staff of procedure revision and requirements.	Site Environmental Coordinator Environment Manager

10. Waste Management Plan

10.1 Introduction

Waste streams will be generated during construction and operation, including general waste and sewage. There are no pre-existing waste facilities present at the rail infrastructure site. This management plan covers all waste, including waste that would be considered a hazardous material as defined in the Hydrocarbons and Hazardous Materials Management Plan (Section 9).

10.2 Relevant legislation and standards

Relevant legislation, policies and guidances include, but are not necessarily limited to:

- *Environmental Protection and Biodiversity Conservation Act 1999*
- *Environmental Protection Act 1986*
- *Contaminated Sites Act 2003*
- *Waste Avoidance and Resource Recovery Act 2007*
- *Health Act 1911*
- *Waste Avoidance and Resource Recovery Act 2007*
- Environmental Protection (Rural Landfill) Regulations 2002
- Environmental Protection (Clinical Waste) Regulations 2002
- Environmental Protection (Controlled Wastes) Regulation 2004
- Environmental Protection (Unauthorised Discharge) Regulations 2004
- Dangerous Goods Safety (Road and Rail Transport of Non-explosives) Regulations 2007
- Health (Treatment of Sewage and Disposal of Effluent and Liquid Waste) Regulations 1974
- Landfill Waste Classification and Waste Definitions (As Amended) 1996 (DoE 1996)
- Water Quality Protection Guidelines No. 10: Mining and Mineral Processing - Above-Ground Fuel and Chemical Storage (DoW 2000)
- Dangerous Goods Safety Guidance Note S01/11: Storage of Dangerous Goods Licensing and Exemptions (DMP 2011)
- Australian Code for the Transport of Dangerous Goods by Road and Rail (NRTC/FORS 1998)
- Used Tyre Strategy for Western Australia (Waste Management Board 2005).

10.3 Potential impacts

10.3.1 Activities

The main waste streams are listed below:

- general waste including packaging, wiring, fencing, piping, etc
- contaminated soil or other spill cleanup products
- blasting refuse (e.g. cartridges, detonators, wire)
- office/accommodation wastes including sewage, food wastes, paper, plastic, cans, glass, etc.
- clinical wastes
- industrial wastes (e.g. service/maintenance waste including waste oils, filters, used tyres, used drilling equipment, tyres, infrastructure and machinery components)
- residual hazardous materials (e.g. used hazardous material storage containers).

Wastewater treatment plants will be constructed at each of the construction camps and approved by the local government and under the *Environmental Protection Act 1986* and the *Health Act 1911*, as required. Putrescible waste will be removed from site by licensed contractors and disposed of to existing approved facilities. Should transport distances be prohibitive, landfills proximate to the construction site may be required. In this case, these will be licensed or registered as required under legislation.

There are no known registered contaminated sites or hazardous materials stores within the construction area of the rail infrastructure.

10.3.2 Impacts

Potential impacts are associated with the inappropriate storage, transport or disposal of waste products, which may lead to adverse environmental impacts. Examples of inappropriate waste management with the potential to cause environmental harm include:

- containers being faulty, inadequate or inappropriately used causing spills, leaks or vermin ingress
- secondary containment facilities being faulty, inadequate or inappropriately used.

Solid and liquid wastes can have significant impacts on human health and on the marine and terrestrial environment including:

- loss of biodiversity and/or destruction of marine or terrestrial habitats
- contamination of soil, surface water or groundwater
- create fire hazard
- attract fauna and potentially create fauna trap hazards
- generate odour.

10.4 Performance management

The management strategy structure and content follows EPA and DEC guidance. Management strategies have been developed to meet the following EPA objective:

- *To ensure that emissions do not adversely affect environment values or the health, welfare and amenity of people and land uses by meeting statutory requirements and acceptable standards.*

FerrAus Limited supports the following priorities of waste management (from the most preferred to the least preferred method):

1. Waste avoidance (elimination or substitution).
2. Waste reduction.
3. Waste reuse.
4. Waste recycling.
5. Waste treatment.
6. Waste disposal.

The intended mitigation of impacts, determined in accordance with the above mitigation hierarchy, is outlined in Table 10-1.

Table 10-1: Performance management targets and indicators for waste management

Issue	Objective	Performance Indicator
Avoidance of impacts	To avoid significant environmental impacts from waste.	No reported waste impacts on the surrounding environment.

10.5 Key control measures

The control measures for mitigation of waste impacts are detailed in Table 10-2. The control measures directly address the management objectives outlined in Table 10-1 above.

Waste spills of materials likely to cause health or environmental impact are to be managed in accordance with the hazardous materials contingency requirements as set out in the Hydrocarbons and Hazardous Materials Management Plan (Section 9.7).

Table 10-2: Control measures for waste management

Aspect	Control Measures	Responsibility	Timing
Inductions and Pre-starts	All personnel will be instructed in the requirements for waste management, including storage, recycling and disposal, and the location of facilities. As the location of these facilities changes during construction, personnel shall be promptly informed.	Construction Contractor	Construction
Procedure	A waste management procedure shall be prepared that specifies how each waste stream is to be managed. The procedure shall: • demonstrate compliance with legislation, standards, local government requirements, etc. • ensure waste management is in accordance with waste management principles • identify and categorise the waste that will be generated and estimate volumes • communicate waste handling segregation, storage and spill response requirements • ensure that waste storage sites and procedures take into account fire, safety, work health, pests, native animals and odour control • specify requirements to process and maintain waste records (including waste type and quantity disposed).	Construction Contractor	Construction
Waste collection	Appropriate waste collection and disposal facilities (e.g. bins, segregation facility) shall be placed in locations within the construction site appropriate to the types of wasted generated at those locations.	Construction Contractor	Construction
	Litter bins shall be provided in all work, accommodation and recreation areas within the construction site.	Construction Contractor	Construction
	No waste storage facilities will be located within 200 m of any watercourse.	Project Manager, Construction Contractor	Design, Construction
	All waste containers located in the open, including litter bins, shall be covered as necessary to prevent: • access by fauna • waste falling out of the container as a result of overfilling • waste material being blown out of the container by wind.	Construction Contractor	Construction
	Waste shall not be burned on site.	Construction Contractor	Construction
	Littering (including cigarette butts) shall be strictly prohibited and housekeeping maintained in all areas.	Construction Contractor	Construction
	Waste management strategies shall be developed for each waste stream based on the principles of reduce, reuse, recycle and appropriate disposal.	Construction Contractor	Construction
	Portable toilets and other temporary facilities (e.g. crib rooms) should be self-contained with no waste disposal direct to the environment.	Construction Contractor	Construction
	Portable toilets and other temporary facilities shall be inspected and emptied regularly to avoid overflows.	Construction Contractor	Construction
	Maintenance/inspection logs of self-contained facilities shall be maintained and made available on request.	Construction Contractor	Construction

Aspect	Control Measures	Responsibility	Timing
Waste storage	Chemical wastes, waste oils, solvents and other toxic material shall be stored in appropriately labelled drums in bunded areas prior to off-site disposal. Handling shall be in accordance with the requirements of the Hydrocarbons and Hazardous Materials Management Plan (Section 9).	Construction Contractor	Construction
	All waste storage containers shall be regularly emptied to ensure no over-filling.	Construction Contractor	Construction
	All waste storage areas/facilities will be appropriately signposted with identification of the waste type, and appropriate warnings.	Construction Contractor	Construction
Waste disposal	Licensed carriers shall be used for off-site transport and disposal of all controlled wastes.	Construction Contractor	Construction
	Domestic wastes (e.g. kitchen/putrescible, grey water, packaging etc) shall be disposed of in accordance with local government requirements.	Construction Contractor	Construction
	Where distance to existing approved local government landfills is prohibitive, inert and putrescible waste will be disposed of at licensed or registered landfills created proximate to the construction site.	Construction Contractor	Construction
	Hydrocarbon wastes (including lube oils) shall be collected for safe transport off-site for reuse, recycling, treatment or disposal at approved locations.	Construction Contractor	Construction
	All liquid waste other than wastewater shall be collected and transported to appropriately licensed disposal sites.	Construction Contractor	Construction
	Sewage shall be disposed of through on-site treatment and disposal in accordance with local government requirements or transport to a licensed disposal site.	Construction Contractor	Construction
Ablutions	Sanitary or ablution facilities shall be provided on-site, conveniently located for access from all work areas and accommodation.	Construction Contractor	Construction
	Ablution facilities shall be regularly cleaned and maintained.	Construction Contractor	Construction
Hygiene stations	Seed, soil and organic matter removed during hygiene clean-down activities shall be collected in a sealed container for disposal at approved landfill facilities or within areas that have been determined to be weed infested.	Construction Contractor	Construction
Waste spills	Waste spills of materials likely to cause health or environmental impact are to be managed in accordance with the hazardous materials contingency requirements (see the Hydrocarbons and Hazardous Materials Management Plan Section 9.7).	Construction Contractor	Construction
Records	Records shall be kept of all waste removed from site, with documentation to include the following: • waste type • approximate volume • date and time of disposal • details on means of disposal, including any relevant licensing or approval requirements.	Construction Contractor	Construction

10.6 Monitoring and reporting

The Site Supervisor shall be responsible for conducting regular inspections to ensure compliance with the control measures stipulated in Table 10-2.

Monitoring will be undertaken for the purposes outlined in Section 2.5.1. Monitoring requirements are summarised in Table 10-3.

Table 10-3: Summary of monitoring requirements for management of waste

Monitoring	Frequency/Timing	Location	Responsibility
Conduct inspections to observe presence of litter.	Fortnightly	Construction site and accommodation areas	Environment Manager

The reporting requirements are summarised in Table 10-4.

Table 10-4: Reporting requirements for management of waste

Report	Details	Reporting Frequency	Responsibility
Contractor waste records	Contractor is to report to FerrAus Limited on amounts of waste disposed as detailed in the monthly environmental report.	Monthly	Construction Contractor
Waste record summary	Summarised waste records, including monitoring results.	Annual report	Environmental Site Coordinator
Controlled waste	Contractors shall report to DEC on controlled waste type, sources, storage and disposal.	As required	Construction Contractor

10.7 Contingency actions

Contingency actions will be initiated where monitoring indicates the environmental objectives for waste management are not being achieved and/or that trigger levels have been exceeded (Table 10-5).

Table 10-5: Contingency actions for management of waste

Trigger	Contingency Action	Responsibility
Waste spills likely to cause health or environmental impact.	Implement the hazardous materials spill contingency requirements (Hydrocarbons and Hazardous Materials Management Plan – Section 9.7)	Construction Contractor
Minor waste spills.	Clean up and take preventative action against potential for future spills as appropriate.	Construction Contractor

11. Dust Management Plan

11.1 Introduction

This management plan details requirements to minimise impacts from dust during the construction of the rail infrastructure.

Dust is a common feature through much of the region. Dust events tend to be episodic, associated with movement of stock and vehicles, together with windy conditions causing events of varying magnitudes, including large-scale events that may exceed NEPM levels.

Construction activities, such as clearing and grading, formation construction, backfill and rehabilitation, and general vehicle movement within the construction areas and along access roads are likely to increase the risk of atmospheric dust emissions. These emissions are expected to be minor, intermittent and unlikely to significantly contribute to dust levels in the area. The overall occurrence of dust emissions in any given area will be limited to the short period of time that construction is occurring in that area.

11.2 Relevant legislation and standards

Relevant legislation, policies and guidances include, but are not necessarily limited to:

- *Environmental Protection Act 1986*
- *Soil and Land Conservation Act 1945*
- *National Environment Protection Measures (Implementation) Act 1998*
- Environmental Protection (Unauthorised Discharge) Regulations 2004
- Ministerial Statement of approval to implement Proposal
- National Environmental Protection Council (2003 and 2007) Standards – $PM_{2.5}$ and PM_{10}
- NSW EPA (2005) Standard – dust deposition
- Guidance for the Assessment of Environmental Factors No 18: Prevention of air quality impacts from land development sites (EPA 2000a)
- Land Development Sites and Impacts on Air Quality: A guideline for the prevention of dust and smoke pollution from land development sites in Western Australia (DEP 1996)
- EPA Guidance Statement No. 3: Separation Distances Between Industrial and Sensitive Land Uses (EPA 2002)
- EPA Guidance Statement No. 15: Emissions of Oxides of Nitrogen from Gas Turbines (EPA 2000b)
- EPA Guidance Statement No. 33: Environmental Guidance for Planning and Development (EPA 2008)
- Dust Control; Best Practice in Environmental Management Series (Environment Australia 1998)
- Air Quality and Air Pollution Modelling Guidance Notes (DEC 2000)
- A guideline for the development and implementation of a dust management plan (Draft, DEC 2008)
- National Environmental Protection (Ambient Air Quality) Measure (NEPC 2003).

11.3 Potential impacts

11.3.1 Activities

The key activities during construction of the rail infrastructure identified as having potential to cause dust impacts are:

- vegetation clearance (generating exposed surfaces)
- construction earthworks, haulage, topsoil stripping and stockpiling, grading of soil and fill, and excavation activities including blasting for site levelling and trenching
- stockpiling, loading and movement of construction waste
- blasting and crushing of rock (if required)
- construction of temporary lay-down and construction parking areas
- vehicle movements on unsealed roads
- concrete batch plant operations
- uncovered or exposed surfaces and bulk materials stockpiles
- vehicle movements (construction machinery and traffic) on site and on nearby roads.

11.3.2 Impacts

Potential impacts of dust generated through the construction of the rail infrastructure include:

- reduced visual amenity – preventing the community from undertaking outdoor activities in proximity to the construction site
- risk to human health – exposure to small dust particles may lead to respiratory conditions such as asthma.

As outlined in Section 11.1, the potential for dust generation is limited and will minor episodic events over the short period of time construction is occurring in any given location. As a result, the effects of dust on vegetation and other environmental values are not expected to be significant.

11.4 Performance management

Management strategies have been developed to meet the following EPA objective(s):

- *To ensure that emissions do not adversely affect environment values or the health, welfare and amenity of people and land uses by meeting statutory requirements and acceptable standards.*

The intended performance management targets and indicators for dust management are outlined in Table 11-1. These are focussed on anthropogenic effects, as the environmental effects are considered minor.

Table 11-1: Performance management targets and indicators for dust management

Issue	Objective	Performance Indicator
Human health	To ensure that dust emissions do not adversely impact upon the health and welfare of construction personnel or adjacent land users.	No public or personnel dust complaints attributable to rail construction.
Amenity	To ensure that dust emissions do not adversely impact upon the amenity of adjacent land users.	No sustained visual dust attributable to rail construction observed beyond the immediate boundaries of construction sites. No public or personnel dust complaints.

11.5 Key control measures

The control measures for dust management are detailed in Table 11-2. The control measures directly address the management objectives outlined in Table 11-1.

Table 11-2: Control measures for mitigation of dust impacts

Aspect	Control Measures	Responsibility	Timing
Inductions	Inductions will be provided to all site personnel will include information on: • potential for construction activities to cause dust • potential effects of dust on human health, amenity and the environment • dust suppression procedures.	Construction Manager	Construction
Clearing	Vegetation clearing will be scheduled to occur to immediately before planned earthworks to minimise opportunity for dust liftoff.	Construction Manager	Construction
Dust suppression	Cleared areas and any dry, dust-prone areas or stockpiles will be stabilised to prevent dust lift off. Stabilisation methods may include wetting (through use of water trucks), application of hydromulch, use of chemical polymers (if required) or other sealing material.	Construction Manager	Construction
	Water spray will be applied to exposed soil during open activities such as loading and unloading of material.	Construction Manager	Construction
Vehicle movement	Vehicles will not operate on areas other than designated roads, access tracks and construction areas.	Construction Manager	Construction
	Vehicle speed limits for unsealed areas will be established and enforced with an objective to minimise dust generation.	Construction Manager	Construction

11.6 Monitoring and reporting

The Site Supervisor shall be responsible for conducting regular inspections to ensure compliance with the control measures stipulated in Table 11-2.

Monitoring will be undertaken for the purposes outlined in Section 2.5.1. Monitoring requirements are summarised in Table 11-3.

Table 11-3: Summary of monitoring requirements for dust impacts

Monitoring	Frequency/Timing	Location	Responsibility
Conduct visual observations of dust clouds during high risk dust generating activities (e.g. clearing and blasting) at the rail infrastructure corridor boundary and at all construction areas to confirm containment within the boundary.	Opportunistically	Along the rail infrastructure construction site	Construction Manager Site Supervisor

No specific reporting is required with respect to dust management, other than recoding of dust related incidents in accordance with the Environmental Incident Response Management Plan (Section 16).

11.7 Contingency actions

Contingency actions will be initiated where monitoring indicates the environmental objectives for management of dust are not being achieved and/or that trigger levels have been exceeded (Table 11-4).

Table 11-4: Contingency actions for dust impacts

Trigger	Contingency Action	Responsibility
Excessive dust emissions noted during visual monitoring of construction areas. Receipt of complaint.	Investigate cause. Implement additional dust control measures within 48 hrs, including as appropriate: • increase watering frequency • cover vehicles with dust emitting loads (except when loading/unloading). • use of dust stabilisers, tarps or geo-textile materials to suppress dust generation. These measures will remain in effect until construction is completed and rehabilitation has taken place. Should dust suppression techniques be inadequate, construction activities that generate dust will be temporarily ceased until a remedy is sought (consultation with relevant agencies may be required). If exceedance is attributable to high winds, cease work until suitable conditions exist.	Site Environmental Coordinator Site Supervisor

12. Noise and Vibration Management Plan

12.1 Introduction

This management plan details requirements to minimise noise and vibration impacts during construction of the rail infrastructure.

12.2 Relevant legislation and standards

Relevant legislation, policies and guidances include, but are not necessarily limited to:

- *Environmental Protection Act 1986*
- Environmental Protection (Noise) Regulations 1997
- AS 2436 1981 Guide to Noise Control on Construction, Maintenance and Demolition Sites
- Australian Design Rules for Vehicles
- EPA Draft Guidance Statement Number 8: Environmental Noise
- EPA Guidance Statement No. 3: Separation Distances Between Industrial and Sensitive Land Uses (EPA 2002)
- EPA Guidance Statement No. 33: Environmental Guidance for Planning and Development (EPA 2008.

The assigned noise levels in the Environmental Protection (Noise) Regulations 1997 (Noise Regulations) do not apply to construction activities carried out between 0700 and 1900 hours on any day except Sunday and public holidays (i.e. normal working hours) provided:

- construction work is carried out in accordance with Section 6 of the Australian Standard 2436: 1981 Guide to Noise Control on Construction, Maintenance and Demolition Sites
- the equipment used is the quietest reasonably available
- where work is to be undertaken outside these times, a noise management plan is to be prepared to the requirements of the Local Government Authority, which will include a requirement to notify residents likely to be affected, at least 24 hours prior to commencement of the relevant activity.

Activities outside normal working hours (0700 hours to 1800 hours Monday to Saturday) will be undertaken to ensure emissions comply with the assigned levels provided in the Noise Regulations, unless undertaken in compliance with an approved Noise Management Plan.

12.3 Potential impacts

12.3.1 Activities

The key activities during construction of the rail infrastructure identified as having potential to cause noise impacts are:

- earthmoving
- power generation
- rock dumping
- vehicle movements (including reversing beepers)
- blasting
- compacting.

12.3.2 Impacts

Noise emissions from the construction process will vary depending on the specific activity being undertaken (e.g. blasting, earthmoving, ballast bedding), with the duration that noise and vibration impact at any one location being limited by progressive movement of the active construction areas.

Construction activities may result in minor increases in traffic noise on access roads, and may cause localised temporary disruption to fauna in areas adjacent to the construction corridor. However, increased noise emissions will be temporary and as such, it is unlikely that the behaviour of fauna will be disrupted in the long-term.

Construction activities may also result in noise impacts on neighbouring residences, although the risk of these impacts is limited. The nearest homestead to the rail operations is McCamey Homestead, approximately 14.5 km from Rail Option 1 (Marillana Homestead is closer; however this is abandoned). Roy Hill Homestead is approximately 37 km from Rail Option 2 at its closest point.

Noise from campsites (e.g., music, workshops, etc.) is not expected to be a factor as no campsites will be located proximate to sensitive premises.

12.4 Performance management

Management strategies have been developed to meet the following EPA objective:

- *To protect the amenity of nearby residents from noise impacts resulting from activities associated with the proposal by ensuring the noise levels meet statutory requirements and acceptable standards.*

The intended performance management targets and indicators for noise and vibration are outlined in Table 12-1.

Table 12-1: Performance management targets and indicators for noise and vibration

Issue	Objective	Performance Indicator
Public/residents	To ensure the amenity of nearby residents or local recreation users is not affected by noise and vibration emissions from construction.	Compliance with relevant noise and vibration criteria. No noise and vibration complaints attributable to construction from nearby residents or local recreation areas.

12.5 Key control measures

The control measures for noise and vibration are detailed in Table 12-2. The control measures directly address the management objectives outlined in Table 12-1.

Table 12-2: Control measures for mitigation of noise and vibration impacts

Activity	Control Measures	Responsibility	Timing
Planning	Schedule activities to avoid construction activities near residences being carried out: • on Sundays and public holidays • after 1900 and before 0700 hours on any other day unless the construction activities can comply with the assigned levels in the Environmental Protection (Noise) Regulations 1997 (Noise Regulations) or are managed in accordance with an approved Noise Management Plan.	Construction Manager	Pre-construction Construction
	The accommodation camps shall be located greater than 2 km from neighbouring residences.	Construction Manager	Pre-construction Construction
	Residents in proximity to the pipeline shall be advised of the proposed working schedule.	Construction Manager	Pre-construction Construction

Activity	Control Measures	Responsibility	Timing
General	Contractors will provide verification that all plant, equipment or machinery, whether mobile or stationary, is: • fitted with sound insulation and/or silencers/mufflers, smart reversing alarms, noise barriers etc to reduce noise • located and directed such that noise is minimised e.g. ventilation openings face away from sensitive receptors • located a suitable distance from sensitive receptors • regularly and efficiently maintained to ensure that noise attenuating measures are operating efficiently.	Construction Manager	Construction
	Construction work shall be carried out in accordance with Section 6 of the Australian Standard 2436: 1981: Guide to Noise Control on Construction, Maintenance and Demolition Sites.	Construction Manager	Construction
Training and inductions	Adequate training and induction will be provided to all personnel to ensure they understand: • their responsibilities with relation to noise management • the importance of managing noise levels through site induction programs.	Site Supervisor	Construction
Equipment usage	Equipment used within the construction areas will be the quietest reasonably practicable.	Construction Manager	Construction
	All equipment and plant will conform to appropriate noise control standards.	Construction Manager	Construction
	Equipment maintenance will be conducted regularly to ensure that noise attenuating measures are operating efficiently. All maintenance works will be recorded.	Construction Manager	Construction
	Between work periods, machines such as cranes, loaders and generators will be shut down or use minimum throttle.	Construction Manager	Construction
Blasting	If required, blasting will initially be undertaken once only until noise impacts at sensitive receptors are understood (as measured through monitoring specified in Table 12-3).	Construction Manager	Construction
	Blasting activities will only be undertaken during daylight hours.	Construction Manager	Construction
	A Blast Management Plan will be prepared and implemented prior to commencement of blasting. The Blast Management Plan will include (as a minimum): • a risk assessment • strategies to manage the identified risks • a description of additional strategies employed to avoid impacts to identified sensitive receptors.	Construction Manager	Construction
Records	All noise monitoring data will be retained on site.	Environment Manager	Construction

12.6 Monitoring and reporting

The Site Supervisor shall be responsible for conducting regular inspections to ensure compliance with the control measures stipulated in Table 12-2.

Monitoring will be undertaken for the purposes outlined in Section 2.5.1. Monitoring requirements are summarised in Table 12-3.

Table 12-3: Summary of monitoring requirements for noise and vibration impacts

Monitoring	Frequency/Timing	Location	Responsibility
Conduct real time noise/vibration monitoring during construction in accordance with Schedule 4 of the Environmental Protection (Noise) Regulations 1999.	Continuously when activities occur within the locations specified in this table	All residences within 2 km of construction activities on the rail alignment, and within 10 km of any blasting operations	Site Environmental Coordinator

No specific internal reporting is required under the provisions of this plan, provided the record keeping as set out in Table 12-2 is maintained and available.

12.7 Contingency actions

Contingency actions will be initiated where monitoring indicates the environmental objectives for management of noise and vibration are not being achieved and/or that trigger levels have been exceeded (Table 12-4).

Table 12-4: Contingency actions for noise and vibration impacts

Trigger	Contingency Action	Responsibility
Non-compliance with the Environmental Protection (Noise) Regulations 1999.	Investigate source of the high noise or vibration levels. Take appropriate action to reduce the noise or vibration levels. Confirm success of actions taken through further monitoring.	Site Environmental Coordinator Construction Manager
Receipt of complaint.	Any complaints will be considered incidents and will be managed in accordance with the Environmental Incident Response Management Plan (Section 16). Investigate source of the high noise or vibration levels. Take appropriate action to reduce the noise or vibration levels. Confirm success of actions taken through further monitoring.	Site Environmental Coordinator Construction Manager

13. Acid Sulfate Soils Management Plan

13.1 Introduction

This section of the rail infrastructure CEMP details the management strategies to be implemented to ensure Acid Sulfate Soils (ASS) and Potential Acid Sulfate Soils (PASS) are managed in an appropriate manner during construction of the rail infrastructure.

There is potential risk of ASS occurring in areas of shallow watertable. It can be expected that only a small portion of the alignment has potential to involve excavation below the watertable as depths to groundwater over the region vary significantly over its length.

Nonetheless, as there is some potential risk, this management plan is intended to eliminate any potential impacts in the event that oxidation of ASS occurs as a consequence of the construction work.

13.2 Relevant legislation and standards

Relevant legislation, policies and guidances include, but are not necessarily limited to:

- *Environmental Protection Act 1986*
- *Rights in Water and Irrigation Act 1914*
- EPA Guidance Statement No. 33: Environmental Guidance for Planning and Development (EPA 2005b)
- DEC: Identification and Investigation of Acid Sulfate Soils and Acidic Landscapes
- DEC: Treatment and management of soils and water in acid sulfate soil landscapes (Draft)
- DoW Water Quality Protection Note 13: Dewatering of soils at construction sites (WQPN 13).

13.3 Potential impacts

13.3.1 Activities

The key construction activities identified as having potential to cause oxidation of PASS at the rail infrastructure are:

- excavation of soils from below the water table
- disposal of dewatering effluent from PASS aquifers.

It should be noted that ASS impacts would only occur when PASS from below the naturally occurring watertable is exposed to the atmosphere. PASS occurring above the watertable is normally exposed to replenishing atmospheric oxygen in the pore spaces and further exposure through excavation would not be expected to cause further oxidation and ASS impacts.

13.3.2 Impacts

Potential impacts in relation to ASS due to construction of the rail infrastructure include:

- oxidation of sulfides producing sulphuric acid and iron precipitates
- elevated concentrations of dissolved metals such as aluminium, iron and arsenic in groundwater.

13.4 Performance management

Management strategies have been developed to meet the following EPA objectives:

- *To ensure that emissions do not adversely affect environment values or the health, welfare and amenity of people and land uses by meeting statutory requirements and acceptable standards*
- *To maintain the integrity, ecological functions and environmental values of the soil and landform.*

The intended performance management targets and indicators for management of ASS are outlined below in Table 13-1.

Table 13-1: Performance management targets and indicators for acid sulfate soils

Issue	Objective	Performance Indicator
Oxidation of acid sulfate soils	To manage the disturbance of potential acid sulphate soils and/or actual acid sulphate soils to avoid consequent oxidation of those soils.	Implementation of neutralising agent to soils with potential to oxidise and acidify on exposure to atmosphere.
Discharge of acidic dewatering effluent	To prevent discharge of acidic dewatering effluent into the receiving environment.	Quality of water discharged to receiving environment (pH and TDS) meets requirements of DoW dewatering licence or of DoW WQPN 13.

13.5 Key control measures

The control measures for mitigation of impacts from ASS are detailed in Table 13-2.

Table 13-2: Control measures for management of acid sulfate soils

Activity	Control Measure	Responsibility	Timing
Investigations	A desktop assessment of acid sulfate soil risk potential will be carried out by competent experts in the field. The desktop assessment should consider: • topography • geology • groundwater level data (where available) to establish watertable depths • likelihood of excavation below watertable.	Construction Manager	Pre-Construction
	In areas of Moderate to High or High ASS risk as identified by the desktop assessment where excavation below watertable or dewatering is to be carried out, soil investigations will be carried out in accordance with DEC guideline *Identification and Investigation of Acid Sulfate Soils and Acidic Landscapes* in order to determine treatment rates for excavated soil or discharged dewatering effluent.	Construction Manager	Pre-Construction
Excavation below watertable	Excavated soils from below the watertable in Low and Low to Moderate ASS risk areas shall be field tested at the time of excavation for field pH (pH_F) and field pH after oxidation with hydrogen peroxide (pH_{FOX}) at a rate of 1 sample per 200 m^3 of soil excavated.	Construction Manager	Construction

Activity	Control Measure	Responsibility	Timing
	Excavated soils from below the watertable in Moderate to High or High ASS risk areas confirmed to be potentially acid generating as evidenced by a sulphide content: for coarse sandy soils (clay content <5%) of 0.03%S, for sandy loam to light clay (clay content <40%) of 0.06%S and for clayey soils with clay content >40% of 0.1%S shall be uniformly treated with sufficient neutralising agent using a method approved by the DEC. The amount of neutralising agent at any location shall be based on the laboratory defined %S concentration with a 1.5 safety factor. Approved treatment methods include either of the following: 1. Prior to excavation, a layer of neutralising agent (aglime or lime sands) shall be laid over the area of the expected excavation. The thickness of the neutralising layer shall be based on the laboratory defined %S concentration with a 1.5 safety factor. Excavation will result in a blended stockpile. The blended stockpile should then all be placed into the excavation during backfilling. 2. The excavated soil stockpile shall be uniformly covered with the neutralising agent (aglime or lime sands) immediately upon excavation. The thickness of the neutralising layer shall be based on the laboratory defined %S concentration with a 1.5 safety factor. The stockpile and covering layer should then all be placed into the excavation during backfilling in a manner that will result in a blended backfill.	Construction Manager	Construction
	Excavated soils from below the watertable in Low and Low to Moderate ASS risk areas do not require active treatment or management unless field testing indicates that pH_F <4 and pH_{FOX} <3. If pH_F <4 and pH_{FOX} <3 then the soils shall be: • underlain by a 0.1 m guard layer of aglime or equivalent neutralising agent, or • uniformly treated with sufficient neutralising agent using an alternative method approved by the DEC.	Construction Manager	Construction
Dewatering	If dewatering abstractions are subject to a licence(s) under the *Rights in Water and Irrigation Act 1914*, disposal of dewatering effluent shall comply with any relevant conditions attached to licence(s).	Construction Manager	Construction
	If dewatering abstractions are not subject to a licence(s) under the *Rights in Water and Irrigation Act 1914*, and disposal of dewatering effluent has potential to enter the local groundwater or a flowing watercourse, disposal shall conform to the requirements of DoW WQPN 13 (Dewatering of soils at construction sites) with respect to pH and TDS.	Construction Manager	Construction
Records	All soil and water testing results shall be recorded, including the sample location, sample depth, time/date and pH_F/pH_{FOX} testing results.	Construction Manager	Construction
	All soil treatments shall be recorded, including the location and form of treatment. Photographic records should also be included.	Construction Manager	Construction

13.6 Monitoring and reporting

The Site Supervisor shall be responsible for conducting regular inspections to ensure compliance with the control measures stipulated in Table 13-2 above.

Monitoring will be undertaken for the purposes outlined in Section 2.5.1. Monitoring requirements are summarised in Table 13-3.

Table 13-3: Summary of monitoring requirements for acid sulfate soil management

Monitoring	Frequency/Timing	Location	Responsibility
Analysis of soil samples for pH_F and pH_{FOX} to determine requirements for neutralisation of acid forming potential of excavated soils from Low or Low to Moderate ASS risk areas.	1 sample per 200 m^3 of soil excavated	Stockpiles of soil excavated from below the natural watertable	Construction Manager
Analysis of water quality of dewatering effluent discharge as required by any *Rights in Water and Irrigation Act 1914* licence to satisfy licence requirements.	As required by licence conditions	As required by licence conditions	Construction Manager
TDS (via EC) and pH where dewatering effluent discharge is not subject to a *Rights in Water and Irrigation Act 1914* licence to demonstrate conformance with DoW WQPN 13 requirements with respect to primary water quality parameters.	On commencement of discharge and 12 hours after discharge commences	Point of discharge to the receiving environment	Construction Manager

The internal reporting required to document compliance with the objectives of this Section is summarised in Table 13-4.

Table 13-4: Reporting requirements for acid sulfate soil management

Report	Details	Reporting Frequency	Responsibility
Soil testing and treatment	Presents the records of ASS testing and treatment.	Monthly during construction.	Construction Manager
Dewatering effluent water quality	Presents the records of dewatering effluent water quality testing and treatment.	Monthly during construction.	Construction Manager

13.7 Contingency actions

Contingency actions will be initiated where monitoring indicates the environmental objectives for ASS are not being achieved and/or that trigger levels have been exceeded (Table 13-5).

Table 13-5: Contingency actions for acid sulfate soil impacts

Trigger Level	Contingency Action	Responsibility
Evidence of acidification of excavated soil	Investigate cause. Remediate by application of additional neutralising agent and monitor results. Review treatment process and amend management procedures accordingly. Inform all relevant personnel of changes.	Construction Manager
Discharge water quality not meeting discharge criteria	Review treatment process and amend management procedures accordingly. Inform all relevant personnel of changes.	Construction Manager

14. Aboriginal Heritage Management Plan

14.1 Introduction

This management plan details requirements to be implemented to ensure protection of Aboriginal heritage sites during construction.

Along Rail Option 1, 56 heritage sites have been identified. The surveys identified numerous archaeological sites and artefacts in the Proposal area, including artefact scatters, quarries, occupied rock shelters, reduction areas, grinding patches and modified (scarred) trees (Eureka 2010).

No heritage surveys have been conducted along Rail Option 2.

14.2 Relevant legislation and standards

Relevant legislation, policies and guidances include, but are not necessarily limited to:

- *Aboriginal and Torres Strait Islander Heritage Protection Act 1984*
- *Aboriginal Heritage Act 1972*
- *Environmental Protection Act 1986*
- EPA Guidance Statement No. 41: Assessment of Aboriginal Heritage (EPA 2004c)
- EPA Guidance No. 33: Environmental Guidance for Planning and Development (EPA 2008).

14.3 Potential impacts

14.3.1 Activities

Sites of Aboriginal heritage may be impacted by the following aspects of the rail construction:

- vegetation clearing
- topsoil relocation
- construction of infrastructure
- earthmoving
- vehicle and train movements
- dust.

14.3.2 Impacts

Potential impacts to Aboriginal heritage sites relate primarily to direct disturbance and include:

- disturbance of sites during the construction of rail infrastructure
- landscape level changes through the development of a visible linear feature through the landscape
- accidental damage of artefacts by off-road vehicle use
- indirect disturbance to sites from changes in water flows, spillages, dust, or other indirect impacts.

14.4 Performance management

Management strategies have been developed to meet the following EPA objective:

- *To ensure that changes to the biophysical environment do not adversely affect historical and cultural associations and comply with relevant heritage legislation.*

The intended performance management objectives and indicators for Aboriginal heritage are outlined below in Table 14-1.

Table 14-1: Performance management objectives and indicators for Aboriginal Heritage

Issue	Objective	Performance Indicator
Known (recorded) Aboriginal heritage sites	To avoid disturbance to Aboriginal heritage sites identified for protection near the construction site unless consent has been granted under s 18 of the AH Act.	No disturbance to Aboriginal heritage sites identified for protection without consent being granted under s 18 of the AH Act.
New (unrecorded) Aboriginal heritage sites	To manage new Aboriginal heritage sites/artefacts uncovered or identified during construction in accordance with the requirements of the AH Act.	All new Aboriginal heritage sites managed in accordance with the AH Act.

14.5 Key control measures

The control measures for mitigation of impacts to Aboriginal heritage are detailed in Table 14-2 below. The control measures directly address the EPA objectives detailed in Section 14.4 of this plan.

Table 14-2: Control measures for mitigation of impacts to Aboriginal Heritage

Aspect	Control Measures	Responsibility	Timing
Consultation	Traditional Owners will be informed of relevant proposed works, work schedules, and potential impacts on sites throughout construction.	Principal Heritage Advisor	Pre-construction, Construction
General	No ground disturbing activity will be undertaken until a signed Ground Disturbance Permit is signed by the Principal Heritage Advisor.	Construction Manager	Construction
Inductions	The induction program will involve an Aboriginal Heritage component to ensure all personnel are aware of obligations under the AH Act, and the requirements to protect known Aboriginal heritage sites and that they avoid any disturbance to the sites.	Principal Heritage Advisor	Construction
	The induction program will ensure personnel are informed of the possibility of encountering new sites and what may constitute a site/artefact.	Principal Heritage Advisor	Construction
Known Aboriginal heritage sites	Approval to disturb known sites under s 18 of the AH Act will be sought where a known Aboriginal site impact is unavoidable.	Principal Heritage Advisor	Pre-construction
	Aboriginal heritage sites within 100 m of construction activities will be identified on the ELL together with reference to any specific s 18 requirements relevant to that site.	Principal Heritage Advisor	Pre-construction
	Aboriginal heritage sites within 100 m of construction activities identified for protection will be clearly flagged and/or fenced with a 50 m buffer unless the buffer causes material interference with construction activities, in which case a minimum buffer of 10 m is required.	Principal Heritage Advisor	Pre-construction, Construction
	A Cultural Heritage Management Plan to manage heritage sites will be developed and implemented in consultation with the Traditional Owners.	Principal Heritage Advisor	Pre-construction, Construction
	Erosion control measures will be installed as required to protect Aboriginal heritage sites near construction areas.	Principal Heritage Advisor	Construction
	A Cultural Heritage Database will be established with GIS records of indigenous heritage site locations within the Proposal Area. This database will be updated with any potential new sites identified during the construction phase of the Proposal.	Principal Heritage Advisor	Pre-construction

Aspect	Control Measures	Responsibility	Timing
	The location of protected ABORIGINAL heritage areas will be documented and made available (acknowledging confidentiality issues) to relevant employees. Where appropriate, flag and fence sites and signpost the areas to avoid disturbance.	Principal Heritage Advisor	Pre-construction
Potential new sites	Aboriginal heritage surveys will be conducted within proposed disturbance envelopes using suitably qualified archaeologists and anthropologists as agreed with Traditional Owners.	Principal Heritage Advisor	Pre-construction
	Qualified site heritage monitors and archaeologists (issued with a s 16 permit) will be on site to monitor clearing and earthworks for areas considered to have a high potential to contain additional surface or sub-surface archaeological material.	Principal Heritage Advisor	Construction
	Any newly identified Aboriginal heritage sites will be managed in accordance with the Cultural Heritage Management Plan to be developed and implemented in consultation with the Traditional Owners.	Principal Heritage Advisor	Construction

14.6 Monitoring and reporting

The Site Supervisor will be responsible for conducting regular inspections to ensure compliance with the control measures stipulated in Table 14-2.

Monitoring will be undertaken for the purposes outlined in Section 2.5.1. Monitoring requirements are summarised below in Table 14-3.

Table 14-3: Summary of monitoring requirements for impacts to Aboriginal Heritage

Monitoring	Frequency/Timing	Location	Responsibility
Visual inspection of known Aboriginal heritage sites identified for protection to monitor for disturbance and/or removal of flagging/fencing.	Weekly	All known Aboriginal heritage sites identified for protection	Site Environmental Coordinator

All new Aboriginal heritage sites or disturbances to sites identified for protection will be recorded in the Cultural Heritage Database, in accordance with the Incident Reporting procedures and a report prepared and submitted to the Department of Indigenous Affairs (DIA) within seven days of the discovery/disturbance incident. The report will outline the nature of the discovery, the extent and significance of any disturbance, and any mitigation/management measures implemented.

14.7 Contingency actions

Contingency actions will be initiated where monitoring indicates the environmental objectives for Aboriginal heritage management are not being achieved and/or that trigger levels have been reached (Table 14-4).

Table 14-4: Contingency actions for impacts to Aboriginal Heritage

Trigger	Contingency Action	Responsibility
Disturbance of an existing Aboriginal heritage site identified for protection.	Immediately cease all work in the area of the Aboriginal heritage site. Investigate the cause of disturbance. Implement actions to prevent disturbance from reoccurring (e.g. fencing site or re-informing workforce). If necessary, consult with relevant stakeholders (e.g. Department of Indigenous Affairs [DIA]) to determine actions required to restore the site to its original condition. Report as required under the Environmental Incident Response Management Plan (Section 16.3). Comply with the requirements of the Cultural Heritage Management Plan.	Construction Manager

Trigger	Contingency Action	Responsibility
Previously unrecorded Aboriginal heritage site/artefact is uncovered or identified.	Immediately cease construction operations within 30 m of the potential Aboriginal heritage site. Establish a 30 m buffer around the potential Aboriginal heritage site, outside which work may continue. Notify FerrAus Limited appointed archaeologist. The Police and State Coroner will be contacted in the instance of the discovery of skeletal remains. If it is determined the remains are Aboriginal, the Commonwealth Minister for Aboriginal Affairs will be notified (legal requirement under the *Aboriginal and Torres Strait Islander Heritage Protection Act 1984* – s 20(1)). The authenticity of the site or material will be determined using appropriate methods, in consultation with all relevant stakeholders, and suitable mitigative/management measures, once agreed upon by all stakeholders, will be implemented as soon as practicable. Where disturbance to the site cannot be avoided, consent to disturb the site will be obtained under s 18 of the AH Act. Where disturbance to the site can be avoided, actions may include compiling a detailed site record, collection of the cultural material or protection of the site (e.g. fencing). Complete and forward an Incident Report to the appropriate person(s). Comply with the requirements of the Cultural Heritage Management Plan.	Construction Manager

15. Rehabilitation Management Plan

15.1 Introduction

This management plan details the management strategies to be implemented to ensure rehabilitation is undertaken in an appropriate manner during the construction of the rail infrastructure. Up to 1640 ha of native vegetation would be cleared for construction of Rail Option 1, of which no more than 660 ha would be permanently disturbed. Up to 1460 ha of native vegetation would be cleared for construction of Rail Option 1, of which no more than 580 ha would be permanently disturbed. Construction sites no longer required for the operation phase (such as laydown areas, and the temporary construction camp site) will be rehabilitated.

The rail infrastructure construction area predominantly comprises pastoral land with large areas of intact native vegetation.

The Vegetation and Flora Management Plan (Section 4) outlines control measures to minimise impacts to flora and vegetation during clearing and construction.

15.2 Performance management

Rehabilitation strategies have been developed to meet the EPA vegetation and flora objective:

- *To maintain the abundance, diversity, geographic distribution and productivity of flora at ecosystem levels through the avoidance or management of adverse impacts and improvement in knowledge.*

The intended environmental objectives and performance indicators for rehabilitation are outlined in Table 15-1.

Table 15-1: Environmental objectives and performance indicators for rehabilitation

Issue	Objective	Performance Indicator
Vegetation and flora	To reinstate an acceptable abundance, species diversity, and productivity of flora and vegetation communities in areas not needed for operations.	No more than 660 ha is to remain as permanently disturbed for Rail Option 1 or 580 ha for Rail Option 2. Achievement of completion criteria to be developed in consultation with DEC.
Soil	To reinstate landforms to the pre-construction condition in terms of form and erosion resistance.	Achievement of landform similar to the pre-existing condition.

15.3 Key rehabilitation measures

The measures to be implemented to ensure successful rehabilitation are detailed in Table 15-2.

Table 15-2: Control measures for rehabilitation

Aspect	Control Measures	Responsibility	Timing
Planning	A rehabilitation program will developed for each rehabilitation area in consultation with DEC. The program will include the following: • final land use • area to be rehabilitated • timing of rehabilitation activities • detailed methodology • completion criteria.	Site Environment Manager	Pre-construction, construction

Aspect	Control Measures	Responsibility	Timing
General	Areas disturbed for construction but not required for permanent infrastructure will be rehabilitated as soon as practicable after use.	Construction Manager	Construction Post-construction
Decommissioning of work areas	Work areas will be inspected prior to decommissioning and specific decommissioning requirements will be identified. Requirements may include, but are not limited to: • removal of hardstand areas • removal of unused chemicals • removal of contaminated wastes • soil testing (testing to be completed by NATA accredited laboratories) for contamination if necessary • cleanup of any residual spilled material.	Construction Manager	Construction Post-construction
	For all drill pads: • drill cuttings will be assessed, and if considered hostile for plant growth, will be removed • all drilling fluid will be removed and disposed of appropriately off site.	Construction Manager	Construction Post-construction
Ecological linkages	Rehabilitation areas with boundaries contiguous with areas of remnant vegetation will be connected to those areas to allow access for recolonising fauna and provide ecological linkages, particularly for conservation-significant fauna.	Site Environmental Coordinator Construction Manager	Construction
Re-contouring	Rehabilitation areas will be re-contoured to reflect pre-disturbance conditions.	Construction Manager	Post-construction
Ripping	Rehabilitation areas subject to high traffic movements during construction will be ripped to a depth of 30 cm prior to respreading of topsoil.	Construction Manager	Post-construction
Topsoil	Topsoil will be respread across rehabilitation areas to a depth of no less than 100 mm. The topsoil will be from stockpiles sourced from the area being rehabilitated.	Construction Manager	Post-construction
Revegetation	Only local native species will be utilised in rehabilitation.	Site Environmental Coordinator	Post-construction
	Seed will be collected from within the construction areas and surrounds (if agreed by DEC) prior to clearing of the site in accordance with a methodology to be developed in consultation with DEC.	Site Environmental Coordinator	Pre-construction
	A NIASA-accredited nursery or nurseries will be engaged to propagate sufficient amount and species of tubestock if required to achieve completion criteria.	Site Environmental Coordinator	Construction
	An appropriately qualified contractor will be engaged to plant seedlings and undertake direct seeding if required to achieve the completion criteria.	Site Environmental Coordinator	Post-construction
	Infill planting will be undertaken for three years following initial planting if required to achieve completion criteria.	Site Environmental Coordinator	Post-construction
Weed control	Weed control will be undertaken post-planting as required to achieve the completion criteria established.	Site Environmental Coordinator	Post-construction
Access	Vehicular access to rehabilitated areas will be prohibited and prevented by signage.	Site Environmental Coordinator	Post-construction

Aspect	Control Measures	Responsibility	Timing
Records	A register will be maintained to record: • total areas (ha) and GPS locations of rehabilitation • prescriptions used for clearing and rehabilitation • identification of new areas available for rehabilitation to commence • outcomes of inspections of rehabilitation success at completed rehabilitation areas • location and size of topsoil storage areas.	Site Environmental Coordinator Construction Manager	Post-construction

15.4 Monitoring and reporting

Monitoring will be undertaken to ensure rehabilitation will achieve the completion criteria. Monitoring and maintenance will continue until completion criteria are met as agreed with DEC. Monitoring requirements are summarised in Table 15-3.

Table 15-3: Summary of monitoring requirements for rehabilitation

Monitoring	Frequency/Timing	Location	Responsibility
Revegetation. Monitoring of the parameters set out in the completion criteria to be developed in consultation with DEC will be undertaken to assess conformance and need for supplementary rehabilitation work. This is expected to include: • projected native foliage cover (%) • native species diversity (number of species) • native species density (average number of plants per m^2) • weed density (percentage cover) • weed species diversity (number of species)	At timings to coincide with completion criteria specifications (e.g. 12 and 24 months after completion of construction).	All rehabilitated areas.	Site Environmental Coordinator
Soils. Inspection of rehabilitation areas for evidence of erosion or sedimentation.	Six months, 12 months and 24 months after completion of construction.	All rehabilitated areas.	Site Environmental Coordinator

The internal reporting required to document the progress of rehabilitation is summarised in Table 15-4.

Table 15-4: Reporting requirements for vegetation and flora management

Report	Details	Reporting Frequency	Responsibility
Rehabilitation Register Summary Report	Details the areas rehabilitated over the previous month, and an update on the total rehabilitation undertaken to date.	Monthly	Site Environmental Coordinator
Rehabilitation Monitoring Report	Details the scope, methodology and results of the rehabilitation monitoring program.	Annually	Site Environmental Coordinator

15.5 Contingency actions

Contingency actions will be initiated where monitoring indicates the completion criteria for rehabilitation will not/has not been achieved (Table 15-5).

Table 15-5: Contingency actions for rehabilitation

Trigger	Action
Insufficient provenance seed volumes or plants collected and propagated from current seed collection areas.	Discuss with DEC the potential to extend the seed collection areas or obtain additional seed and plants from other seed collectors and native nurseries. Prioritise areas for planting and/or direct seeding, potentially postponing some of the planned works.
Inadequate native flora species diversity and/or density to achieve completion criteria.	Identify cause. Implement approach to remedy cause, which could include: • collecting additional provenance seed for direct seeding or plant propagation to compensate for the insufficient native plant species richness and/or cover • undertaking of infill seedling planting and direct seeding • application of fertilisers or wetting agents etc, as approved by DEC. Monitor success of remedy.
Significant changes to native flora species diversity, richness and/or cover between monitoring years.	Identify cause, which could include: • favoured species is potentially invasive or a pioneer species • spatial and seasonal variation is attributing to succession within plant communities • limiting factors restricting the development of species (e.g. infiltration rates, groundwater level, soil surface features, diseases). Implement approach to remedy cause, which could include: • application of fertilisers and wetting agents • removing potentially invasive species • dieback treatment. Monitor success of remedy.
Unacceptable weed infestations as per completion criteria.	Identify cause. Identify the weeds, their location and coverage and employ a contractor to control the weeds. Monitor success of control.
Erosion or sedimentation occurring.	Identify cause. Implement remedy (may involve consulting an expert to determine the appropriate remedy). Monitor success of remedy.

16. Environmental Incident Response Management Plan

Environmental issues associated with the rail infrastructure shall be managed such that there are no significant environmental impacts. Should an environmental incident occur, or a complaint about an environmental issue be received, the issue shall be appropriately and efficiently managed to identify the cause, implement preventative measures and minimise potential re-occurrence.

16.1 Environmental incident identification

For all construction activities, an incident shall be defined as any:

- unexpected environmental impact resulting from planned construction activities (e.g. decline in vegetation health)
- unplanned construction activity or accident with a potential to cause an environmental impact (e.g. spills, fire outbreak in native vegetation)
- exceedance of a trigger level defined in this CEMP (or other approval document)
- non compliance with relevant legislation, approval condition or requirement of this CEMP (e.g. control measure not being implemented)
- complaint received regarding an environmental issue (e.g. dust or noise).

Once an incident has been identified, the level of associated environmental, reputation and compliance risk shall be classified in accordance with Table 16-1 below in order to determine the appropriate rigour, timeframe and reporting of remedial actions. Where more than one level is identified, the level of investigation will be determined by the highest risk rating.

Table 16-1: Environmental incident classification

Level	Severity	Environment	Compliance	Reputation
1	Insignificant	Limited damage to localised area of low significance.	Non-conformance with provisions of CEMP with no adverse environmental effect.	Public concern limited to local complaints.
2	Minor	Localised on-site damage with minor effect on physical environment.	Multiple non-conformances with provisions of CEMP with minor or no adverse environmental effect.	Local adverse media attention, with heightened local public/regulator concern.
3	Severe	Short-term impairment/harm to ecosystem or non threatened species.	Non-compliance with condition(s) of Ministerial Statement with no adverse environmental effect.	Adverse attention from national media, with criticism from public/regulator/NGOs.
4	Major	Significant harm with long-term impact on ecosystem function or valued species.	Non-compliance with condition(s) of Ministerial Statement or breach of law, resulting in prosecution.	International media/NGO condemnation.
5	Catastrophic	Unplanned permanent impact on ecosystem function or valued species.	Major breach of laws resulting in loss of certification/prosecution/ imprisonment of executives.	Prolonged international media/NGO condemnation tarnishing reputation.

16.2 Incident response

All incident response actions should be undertaken in conjunction with any relevant emergency response procedures. A detailed procedure shall be prepared to document the environmental incident response, investigation and reporting requirements. The generalised response requirements for all environmental incidents is summarised below:

- act to stop or limit the extent of the incident
- report the incident to Construction Manager, Environment Manager and relevant regulatory authorities
- classify the incident and stop work if required
- conduct an investigation to identify the cause and effects of the incident
- develop corrective and preventative actions including accountabilities and timeframes for completion
- implement corrective and preventative actions in line with the established time frame
- report on and communicate the cause, effect, correction and prevention of the incident to all staff
- record all relevant details within the Incident Register.

Where the incident relates to a public complaint, the response above shall be adhered to. The complainant will be formally advised of the outcome of the investigation and of the proposed or completed rectification action if applicable.

A complaints register shall be developed and maintained to document the following:

- name, address and contact details of the complainant
- details of the incident, including:
  - type of concern (dust/noise etc)
  - time and date of concern
  - duration of concern
  - possible source of concern.

16.3 Monitoring and reporting

The Environment Manager shall be responsible for conducting a review of monthly environment incident summaries to establish whether there are adverse frequencies or trends in the nature, frequency and/or severity of incidents and whether close-out actions have been sufficient to limit the potential for reoccurrences.

In addition, contingency or other response actions may involve supplementary monitoring to determine the effectiveness of those actions or to identify the source of the non-compliance, and may involve revising existing construction practices to prevent future occurrences.

The reporting required to document compliance with the objectives of this management plan is summarised in Table 16-2. The Environment Manager shall be responsible for reporting on incidents to regulatory authorities where applicable and as determined on a case-by-case basis and in consultation with the relevant legislation.

Table 16-2: Reporting requirements for environmental incident management

Report	Details	Reporting Timing	Responsibility
Environmental Incident Summary Report	A summary report to provide a brief description of all environmental incidents that have occurred.	Monthly	Construction Manager
Environmental Incident Detailed Report	A detailed report of all environmental incidents to document the: • cause and effect • corrective and preventative actions • any ongoing monitoring required.	Monthly	Construction Manager
Advice of Level 2 incident	Advice of the incident will be formally reported to the Environment Manager.	Within 72 hours after incident identified.	Construction Manager
Advice of Level 3 incident	Advice of the incident will be formally reported to the Environment Manager.	Within 24 hours after incident identified.	Construction Manager

Report	Details	Reporting Timing	Responsibility
Advice of Level 4 or 5 incident	Advice of the incident will be formally reported to the Environment Manager.	As soon as practical within 4 hours after incident identified.	Construction Manager

17. Auditing and review

17.1 Auditing

Assessment of the conformance with the requirements of this CEMP will be undertaken through a number of methods and at different timeframes throughout the construction program.

Construction areas shall be subject to inspections by the Construction Contractor as set out in the various management plans.

Monitoring will be undertaken as set out in the various management plans.

Audits (internal and external) will be conducted in accordance with the FerrAus Limited overall EMS auditing regime. The auditing program will involve:

- internal monthly audits to assess conformance with the provisions of the various management plans and may involve specialist auditors
- environmental compliance audits to assess compliance as required under the conditions of the Ministerial Statement.

The internal monthly audits will be undertaken by suitably qualified environmental personnel employed by the Proponent to ensure the Contactor(s) are fulfilling environmental obligations. The internal audit reports will detail the outcomes of the audits including:

- completeness of implementation of systems, databases and registers
- integration of approvals systems with Procurement, Contracting and Construction
- compliance with commitments and control measures
- recommendations for follow up actions
- recommendations for changes to management plans, where considered necessary to either improve auditability, or address impracticalities of implementation.

The annual audit will be undertaken by an external auditor, conducted in accordance with an agreed Audit Protocol, with the outcomes to form the basis of the statement of compliance submitted to DEC.

The findings of all environmental audits will be submitted to the Site Environmental Coordinator, and used to develop and implement rectification plans as required.

17.2 Review and revision

Any non-conformances identified through the monitoring or auditing procedures will be assessed to determine if changes to the CEMP will be required. The review will follow on from an audit and audit report to determine if any non-conformances are the result of inadequacy of the management plans and EMS systems and processes. Details of the review program for all EMPs are detailed in the FerrAus Limited EMS with regular six-monthly reviews scheduled to align to the audit schedule.

Where revision of the CEMP and associated management plans is required, a “change management” process is required to ensure that regulatory bodies can be involved in any revision where necessary. The “change management” process must be capable of ensuring that all versions of the document, held by the various parties, are updated with recent amendments.

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