China Stone Coal Project:

Terms of reference for an environmental impact statement

December 2014

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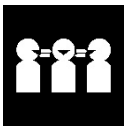

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Preamble

Macmines Austasia Pty Ltd proposes to develop the proposed China Stone Coal Project (the project), which has been declared a 'coordinated project' by the Coordinator-General.

The project involves the construction and operation of a large-scale greenfield coal mine in Central Queensland. The project site is located entirely within the southern block of an Exploration Permit for Coal (EPC) 987 and is approximately 270 kilometres south of Townsville and 300 kilometres west of Mackay at the northern end of the Galilee Basin.

The project is anticipated to have a peak production rate in the order of 55 million tonnes per annum (Mtpa) of run-of-mine (ROM) coal. This equates to a peak clean thermal coal production rate of approximately 38 Mtpa, for the export market. Mining will target coal seams within the Colinlea Sandstone and Bandanna Formation. Coal will be mined using both open-cut and underground mining methods. Coal will be washed and processed on site and product coal will be transported from site by rail. A portion of the coal washery rejects may also be used as fuel for an on-site power station. The project will have a mine life in in the order of 50 years.

The project components to be assessed include:

- open-cut and underground coal mines
- coal handling and preparation plant (CHPP) and associated equipment
- tailings storage facility, associated return water dam and conveyor to transport rejects from the CHPP to the tailings storage facility
- haul roads, surface conveyors, rail loop and train loading facilities
- power station and fly-ash storage facility
- power and water supply infrastructure
- various dams for sediment control, mine water storage and raw water storage
- workforce accommodation village
- private airstrip.

For further information on the project, refer to the project initial advice statement, which is available at: **www.dsdip.qld.gov.au/chinastone**

On 31 October 2012, the Coordinator-General declared the project to be a 'coordinated project' under section 26 of the *State Development and Public Works Organisation Act 1971* (Qld) (SDPWO Act). This declaration initiated the statutory environmental impact assessment procedure of Part 4 of the SDPWO Act, which requires the proponent to prepare an environmental impact statement (EIS) for the project.

The declaration of the project as a 'coordinated project' does not indicate support for or approval of the project by the Coordinator-General or the Queensland Government. Rather, it is a requirement for the project to undergo a rigorous and comprehensive EIS process.

The draft terms of reference (TOR) was released for public and advisory agency comment for 20 business days from 3 November to 3 December 2012. Twenty

submissions were lodged and changes were made to the TOR as a result of these submissions. The final TOR was provided to the proponent on 9 January 2013 and set out the matters to be addressed in an EIS.

The proponent referred the project to the Commonwealth Minister for the Environment in accordance with the provisions of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) on 1 October 2014. A delegate of the Commonwealth Minister decided, on 30 October 2014, that the project constituted a controlled action (EPBC 2014/7353) under Section 75 of the EPBC Act and decided on 12 November 2014 that the assessment would be undertaken through an accredited assessment under the SDPWO Act. Subsequently, these TOR were amended to incorporate matters of national environmental significance (MNES) and replace the previous TOR for the project.

This TOR sets out the matters to be addressed in an EIS for the project. The TOR must be read in conjunction with *Preparing an environmental impact statement: Guideline for proponents*, which explains the following:

- the target audience for the EIS
- stakeholder consultation requirements
- document format
- copy requirements.

The guideline is available from **www.dsdip.qld.gov.au** or from the EIS project manager.

In addition, subject-specific guidelines are referenced throughout this TOR; refer to Appendix 1 for a list of these policies and guidelines.

Content of the EIS

The EIS should follow the format and content outlined in this TOR. Discuss any proposed change to the overall structure of the EIS documents with the EIS project manager.

1. Executive summary

The executive summary should convey the most important and preferred aspects and options relating to the project in a concise and readable form. It should use plain English, avoid jargon, be written as a stand-alone document and be structured to follow the EIS. It should be easy to reproduce and distribute on request to those who may not wish to read or purchase the whole EIS.

The executive summary should include:

- project title
- proponent's name and contact details
- a discussion of any relevant projects previously undertaken by the proponent, if applicable, and the proponent's commitment to effective environmental management
- a concise statement of the aims and objectives of the project
- the legal framework for the project, decision-making authorities and advisory agencies
- an outline of the background and need for the project, including the consequences of not proceeding with the project
- an outline of the alternative options considered and reasons for selecting the proposed development option
- a brief description of the project (pre-construction, construction, operational activities and decommissioning) and the existing environment, using visual aids where appropriate
- an outline of the principal environmental impacts predicted and the proposed environmental management strategies, commitments and rehabilitation strategies to minimise the significance of these impacts
- a discussion of the cumulative impacts in relation to social, economic and environmental factors of associated infrastructure projects proposed within the region
- detailed maps of the proposed project location and any other critical figures.

2. Glossary of terms

Provide a glossary of technical terms, acronyms, abbreviations and references.

3. Introduction

Clearly explain the function of the EIS, why it has been prepared and what it sets out to achieve. Include an overview of the structure of the document.

3.1. Project proponent

Describe the proponent's experience, including:

- the nature and extent of business activities, including details of any joint venture partners
- experience and qualifications
- environmental record, including a list of any breach of relevant environmental laws (Queensland, Commonwealth of Australia, or International) during the previous ten years
- the proponent's environmental, health, safety and community policies.

3.2. Project description

Briefly describe the key elements of the project with illustrations or maps. Summarise any major associated infrastructure requirements. Provide detailed project descriptions in Section 4 (refer to page 10).

3.3. Project rationale

Describe the specific objectives and justification for the project, including its strategic, economic, environmental and social implications, technical feasibility and commercial drivers. Discuss the status of the project in a regional, state and national context. Explain the project's compatibility with relevant policy, planning and regulatory frameworks.

3.4. Relationship to other projects

Describe how the project relates to other major projects (of which the proponent should reasonably be aware) that have been, are being undertaken or that have been proposed or approved in the area potentially affected by the project. Include details of dependencies on and projected timing of other major projects identified.

As a result of this assessment, there may be opportunities to co-locate existing or proposed infrastructure, enabling efficiency gains and mitigating environmental and property impacts. Where co-location may be likely, outline opportunities to coordinate or enhance impact mitigation strategies. Discuss the opportunities in sufficient detail to enable the reader to understand the reasons for preferring certain options or courses of action and rejecting others.

3.5. Project alternatives

Describe feasible alternatives including conceptual, technological and locality alternatives to the proposed project and the consequences of not proceeding with the project (including any impacts that would be avoided). Detail the criteria used to determine the alternatives and provide sufficient detail to convey why certain options or courses of action are preferred and why others are rejected (including the 'no action' option). Discuss the interdependencies of project components, particularly in regard to how any infrastructure requirements relate to the viability of the project.

This information is required to assess why the scope of the project is as it is and to ensure that the environmentally sustainable design principles and sustainable development aspects were considered and incorporated during the project's scoping phase.

A comparative description of the relevant impacts of each alternative on the matters of state and national environmental significance must be provided, including alternate locations for project infrastructure. Sufficient detail must be provided to make clear why any alternative is preferred to another.

3.6. The environmental impact assessment process

3.6.1. Methodology of the EIS

Provide an outline of the environmental impact assessment process, including the role of the EIS in the Coordinator-General's decision making process. Include information on relevant stages of EIS development, statutory and public consultation requirements and any interdependencies that exist between approvals sought. The information in this section is required to ensure:

- relevant legislation is addressed
- readers are informed of the process to be followed
- stakeholders are aware of any opportunities for input and participation.

3.6.2. Objectives of the EIS

Provide a statement of the objectives of the environmental impact assessment process. The structure of the EIS can then be outlined and used to explain how the EIS will meet its objectives. The purpose of the EIS is to:

- provide public information on the need for the project, alternatives to it, assess options and make informed decisions for its implementation
- present the likely effects of the project on the natural, social and economic environment
- demonstrate how environmental impacts can be avoided, managed or mitigated and the offsets for any residual impacts
- provide information to formulate the project's environmental management plan (EMP).

3.6.3. Submissions

Inform the reader how and when properly made public submissions on the EIS will be addressed and taken into account in the decision-making process. Indicate points in subsequent approval processes for the project (for example, 'material change of use' (MCU) applications under the *Sustainable Planning Act 2009* (SPA)) where submitters may have appeal rights. The EIS project manager can assist with preparing information on the submissions process.

3.7. Public consultation process

3.7.1. Overview

The public consultation process should provide opportunities for community involvement and education. It may include interviews with individuals, public communication activities, interest group meetings, printed material and other mechanisms to encourage and facilitate active public consultation. The public consultation processes (community engagement) for all parts of the EIS should be integrated.

Consultation with advisory agencies should be the principal forum for identifying legislation, regulations, policies and guidelines relevant to the project and EIS process.

3.7.2. Consultation plan

Develop and implement a comprehensive and inclusive consultation plan with the stakeholder groups identified in section 3.2 of *Preparing an EIS: Guideline for proponents*.

The consultation plan should identify broad issues of concern to local and regional community and interest groups and address issues from project planning through commencement, project operations and decommissioning. The consultation plan should identify:

- the stakeholders to be targeted
- the topics to be consulted on with stakeholders
- the types of consultation and communication activities to be undertaken
- timing of activities
- how consultation activities will be integrated with other EIS activities and the project development process
- consultation responsibilities
- communication protocols
- reporting and feedback arrangements
- how results of consultation will be considered by the proponent and integrated into the EIS process.

3.7.3. Public consultation report

Include, as an appendix, a public consultation report detailing how the public consultation plan was implemented, and the results. It must include:

- a list of stakeholders identified, including the Australian and Queensland governments, local government agencies, and/or the affected parties (as defined by the *Environmental Protection Act 1994* (EP Act)
- criteria for identifying stakeholders and methods used to communicate with them
- details of the activities conducted to date and the future consultation strategies and programs, including those during the operational phase of the project (also outlined and included in the EMP)

- a matrix displaying the topics consulted against the list of stakeholders to show stakeholders with multiple issues of concern
- a summary of the issues raised by individual stakeholders and/or multiple groups of stakeholders and the means by which the issues have been addressed
- details of how consultation involvement and outcomes were integrated into the EIS process
- details of how consultation outcomes will be integrated into future site activities (including opportunities for engagement and provision for feedback and action if necessary).

3.8. Project approvals

3.8.1. Legislation and approvals

List and describe Australian, state and local legislation, approvals and plans relevant to the planning, approval, construction and operation of the project. Indicate any legislation or approval considered to be binding on key government agencies, following consultation with agency, and how the resultant impact is to be considered. (Note: It is the responsibility of the proponent (or its consultants) to address the requirements of new or amended legislation, policies, plans or guidelines that come into effect after these TOR have been finalised, regardless of whether or not the legislation or policies are covered in these TOR.)

Commonwealth legislation

Relevant Commonwealth legislation may include, but is not limited to:

- *Aboriginal and Torres Strait Islander Heritage Protection Act 1994*
- EPBC Act
- *Great Barrier Reef Marine Park Act 1975*
- *Native Title Act 1993.*

Queensland legislation

Relevant Queensland legislation may include, but is not limited to:

- *Aboriginal Cultural Heritage Act 2003* (ACH Act)
- *Environmental Offsets Act 2014* and Regulation
- EP Act and Regulation
- *Fire and Emergency Services Act 1990*
- *Fisheries Act 1994* (Fisheries Act)
- *Food Act 2006*
- *Forestry Act 1959*
- *Greenhouse Gas Storage Act 2009*
- *Land Act 1994*
- *Land Protection (Pest and Stock Route Management) Act 2002*
- *Mineral Resources Act 1989*
- *Nature Conservation Act 1992* (NC Act)

- *Queensland Heritage Act 1992*
- *Queensland Industry Participation Policy Act 2011*
- *Regional Planning Interests Act 2014*
- SPA
- SDPWO Act
- *Transport Infrastructure Act 1994* (TI Act)
- *Transport Operations (Road Use Management) Act 1995* (TORUM Act)
- *Transport Planning and Coordination Act 1994*
- *Vegetation Management Act 1999* (VM Act)
- *Waste Reduction and Recycling Act 2011*
- *Water Act 2000* (Water Act)
- *Water Supply (Safety and Reliability) Act 2008* (WSSR Act)
- *Work Health and Safety Act 2011* and Regulations

Queensland approvals

Key Queensland approvals required, and to be considered in the EIS process, include:

Construction

- development permit for operational work that is the clearing of native vegetation—VM Act
- approval to take native wildlife—NC Act
- approval to take protected plants—NC Act
- approval to close a road temporarily or permanently—TORUM Act
- approval and licence for camp kitchen
- allocation notice for quarry material—Water Act
- approval to take or interfere with the flow of surface or groundwater—Water Act
- riverine protection permit for excavating or placing of fill, or removing vegetation within a watercourse—Water Act
- an environmental authority for a Level 1 Mining Project including all Schedule 2 and Schedule 6 environmentally relevant activities (ERAs) (EP Regulation) proposed to be undertaken as part of the mining activity.
- development approval for a MCU of a premises for an ERA
- road impact assessment (including transport impact assessment) and road-use management plan for development on land not contiguous to a state-controlled road—TI Act.

Identify the relevant approval agency for each of the approvals required.

Operation

- environmental protection policies (EPPs subordinate to the EP Act) including but not limited to:
  - noise

- air
- water
- waste management

Identify the relevant approval agency for each of the approvals required.

3.8.2. Relevant plans

Outline the project's consistency with the existing national, state, regional and local planning framework that applies to the project location. Refer to all relevant statutory and non-statutory plans, planning policies, guidelines, strategies and agreements. The key plans and policies are listed under the relevant sections of this TOR. These include but are not limited to the following:

- State Planning Policy (Department of State Development, Infrastructure and Planning 2014)
- Queensland Environmental Offsets Policy (Department of Environment and Heritage Protection 2014)
- Queensland Vegetation Management State Code (Department of Environment and Heritage Protection 2013)
- *Queensland CoalPlan 2030* (Department of Infrastructure and Planning 2010)
- Charter for Local Content (Department of State Development, Infrastructure and Planning 2014)
- *Mackay, Isaac and Whitsunday Regional Plan* (Department of Local Government and Planning 2012)
- Water Resource (Burdekin Basin) Plan 2007
- Water Resource (Great Artesian Basin (GAB)) Plan 2006
- Water Resource (Cooper Creek) Plan 2011
- Water Regulation 2002 (see Schedule 11 for the GAB DSA)
- *Regional Pest Management Strategy – Isaac, Mackay, Whitsunday – 2011–2014* (Mackay Regional Pest Management Group 2011)
- Planning Scheme for Belyando Shire 2008
- Planning Scheme for Dalrymple Shire Council 2006
- Planning Scheme for Charters Towers City Council (Version 2) 2011.

3.8.3. Environmentally relevant activities

Briefly describe each ERA as defined under the EP Act and associated activities that are to be carried out in connection with the project, whether within or outside the mining tenure. Present a detailed description of each ERA in Section 5, Environmental values and management of impacts. Provide details of the impact on land, water, air, noise and any other identified environmental values, as well as a detailed description of the waste generated from each ERA and its quantity, characteristics, handling, storage, management and intended treatment and disposal.

In addition to an EMP for mining and associated ERAs to be located within the mining tenure, provide a site-based management plan for proposed ERAs located outside the mining tenure or ERAs not associated with the mining activity as defined in the EP Act.

The EIS must provide adequate information on potential impacts and the proposed mitigation, management and offset of impacts of the mining activity and associated ERAs for the purposes of assessment and the development of conditions of approval under the EP Act. The level of detail to be provided in the EIS should be confirmed with the Department of Environment and Heritage Protection (DEHP).

4. Project description

Describe the project through its lifetime of pre-construction, construction, operation and potentially decommissioning. The project description also allows further assessment of which approvals may be required and how they may be managed through the life of the project.

4.1. Overview of the project

Provide an overview of the project to put it into context. Include:

- a rationale explaining the selection of the preferred operating scenario, including details such as cost, environmental impacts, and the operational efficiencies of each option
- a description of the key components of the project including the use of text and design plans where applicable
- a summary of any environmental design features of the project
- the expected cost, timing, and overall duration of the project, including details of and justification for, any staging of the development.

4.2. Location

Describe, using maps, including digital format, at suitable scales, the regional and local context of the project and all associated infrastructure. Provide real property descriptions of the project's location. Maps should show the precise location of the project area, in particular the:

- location and boundaries of current or proposed land tenures that the project area is or will be subject to, and details of the ownership of that land
- location, boundaries, and area and size of the project footprint, including easement widths and access requirements
- location and size of any proposed buffers surrounding the project area (for construction and operation)
- location of infrastructure relevant to the project, including but not limited to, the state-controlled road network, local roads, stock routes, railways, marine and airport infrastructure
- location of natural features such as waterways (for example, rivers, streams, creeks, other water bodies and wetlands), shorelines, and significant or assessable vegetation
- location of any proposed site offices and accommodation sites.

4.3. Construction phase

Provide a detailed staging plan and approximate timeframes for the project's construction activities.

Provide an estimate of the number and roles of persons to be employed during the construction phase of the project.

Provide the following information on the pre-construction, construction and commissioning of the project, including detailed plans, drawings and maps.

4.3.1. Pre- construction

Describe all pre-construction activities, including nature, scale and timing of:

- land acquisitions required, be it in full or as easements or leases
- vegetation clearing
- site access
- earthworks
- interference with watercourses and floodplain areas, including wetlands
- site establishment requirements for construction facilities, including access measures, movement of materials and equipment, and expected size, source and control of the construction workforce accommodation, services (water, sewerage, communication, energy, medical, waste disposal, recreation) and safety requirements
- temporary works
- upgrade, relocation, realignment, deviation of or restricted access to roads and other infrastructure
- equipment to be used.

4.3.2. Program of works

Describe all the construction elements of the project, including:

- an indicative construction timetable, including start-up dates and hours of construction, and details of the timing and duration of major works programs involving a substantial increase in workforce and the movement of materials that may impact traffic movement on major arterial roads
- major work programs for the construction phase, including an outline of construction methodologies
- construction equipment to be used
- construction inputs, handling and storage including an outline of potential locations for source of construction materials
- major hazardous materials to be transported, stored and/or used on-site, including environmental toxicity data and biodegradability
- clean-up and restoration of areas used during construction, including camp site(s) and storage areas.

4.3.3. Commissioning

Describe the commissioning process including expected commissioning dates of the components of the project and the associated environmental impacts.

4.4. Operational phase

Provide full details of the operation for all elements of the project, including:

- a description of the project site, including concept and layout plans of buildings, structures, plant and equipment to be employed, roads, rail and helicopter/aircraft landing sites
- nature, timing and description of all key operational activities
- the capacity of the project equipment and operations
- estimated numbers and roles of persons to be employed during the operational phase of the project.

Provide details of any night-time surface work that may be undertaken. Specifically include:

- the reasons why night-time work may be undertaken (for example, to avoid peak traffic periods, or to undertake work in a rail corridor)
- the likely duration of work (if known)
- the proposed hours of the work
- the nature of the work to be undertaken
- the likely impact on residents and the associated mitigation measures to be undertaken by the proponent
- the methods that will be used to communicate with affected residents.

4.4.1. Tenements and tenures

Describe and illustrate any existing mining tenements, petroleum (including coal seam gas), geothermal and greenhouse gas tenures and licences overlying and adjacent to the project site, and any proposed applications required for this project.

Describe in detail any issues related to the overlap of tenements and tenures for different resources or purposes, including the sequential exploitation of the resources or uses to which the tenements and tenures may be put.

4.4.2. Resource base and mine life

Summarise the results of studies and surveys undertaken to identify the mineral and natural resources required to implement the proposal. Describe the required location, volume, tonnage and quality of natural resources (such as land, water, timber and energy). Provide specific details of the following:

- the proposed mine life and an outline of the coal/mineral resource base, including the total thickness of seams or extent of the ore body
- the planned recovery of resources
- locations of any resources that would be sterilised by the planned activities

- the quantity of coal/mineral to be mined annually, including any proposed ramping of production or staging of development.

4.4.3. Mining methods and equipment

Provide specific details of the following:

- the mining type and methods to be used, including the major equipment to be used in the various components of the operation
- the use of different techniques in areas of different topographic or geo-technical character
- chemicals to be used, including hydraulic fluids used and released in underground operations.

4.4.4. Mine sequencing

Provide specific details of the following:

- the proposed sequence and timing of mining of each seam/ore body within the mining lease
- the physical extent of excavations, location of stockpiles of overburden and/or coal/mineral reject to be handled during the project's operation or left after mining ceases, including the rate of throughput of stockpiles of product, reject and overburden
- typical cross sections of the mine workings showing voids, surface profiles and geological strata
- the proposed progressive backfilling of excavations
- the area disturbed at each major stage of the project.

4.5. Associated infrastructure

Detail, with the aid of concept and layout plans, requirements for new infrastructure or upgrading/relocating existing infrastructure to service the project. Consider infrastructure such as transportation (road/rail/air/ship), water supply and storage, energy supply, telecommunications (including broadband services and allocation of bandwidth for government services), stormwater, waste disposal and sewerage.

Describe:

- all infrastructure required to be constructed, upgraded, relocated or decommissioned for the construction and/or operation of the project, such as resource extraction areas, access roads, power supply, connection to sewerage or water supply
- the design and construction standards to be met (for example, waterway crossings should be designed to meet the requirements of the Fisheries Act and self-assessable codes for minor or temporary water barrier works)
- alternative approaches or the opportunity to obtain materials from alternative sources.

Identify if the associated infrastructure is being designed, built, upgraded or relocated by the proponent or a third party. If a third party, state who and if an environmental assessment has or will be done as part of the separate approval process.

4.5.1. Design of water resources infrastructure

Provide information on proposed water usage and storage by the project, including the quality and quantity of all water supplied to, or captured at, the site. In particular, describe the proposed and optional sources of water supply such as mine dewatering, capture of overland flow, taking from a watercourse, bores, coal seam gas water and associated pipelines, and any surface storages such as dams and weirs, municipal water supply pipelines.

Discuss likely temporal changes in specific water quality parameters in mine-affected water storages under different scenarios (extended dry periods, holding times and recycling scenarios) at different project stages. Estimate the average, maximum and minimum monthly rates of supply from each source for each phase of the project's life. Any proposed water conservation and management measures should be described.

Describe any approvals and water allocations the project may need under the Water Act for water supply and storage.

Estimate potable water demand for the project, including the temporary demands during the construction period. Provide details of any existing potable water supply, including town water, which would meet the requirements. If water storage and treatment is proposed on-site for use by the site workforce, describe the method of treatment and storage. Describe any waste streams from water treatment, and assess the potential impacts of disposal in the appropriate sections of the EIS.

4.5.2. Water distribution infrastructure

Describe the process and criteria used to select the preferred design and preferred construction techniques, including:

- the method of extracting and/or releasing water from a storage
- any treatment methods proposed
- if distribution is by pipe:
  - provision for route refinement and right of way
  - pipeline design parameters, including capacity and design life
  - above-ground facilities—physical dimensions and construction materials for surface facilities along the pipeline route, including information on pipeline markers
  - the location and/or frequency of (if applicable) cathodic protection points, off-take valves, pump stations, balance tanks, control valves (isolation points), pigging facilities and any other project facilities and linkages to existing water supply infrastructure along the pipeline route
  - design measures to prevent inter-basin transfer of aquatic flora and fauna.

4.5.3. Stormwater drainage

Provide a description of the proposed stormwater drainage system and the proposed disposal arrangements, including any off-site services. Illustrate the description with figures with contours at suitable intervals (one-metre contours in areas of low relief) showing drainage pathways, including the separate pathways for the natural and mine-affected surface run-off respectively, any stream diversions, and the locations and discharge points of sediment detention basins, and any other stormwater quality improvement devices. In particular, address how stormwater would be kept separate from mine-affected water.

4.6. Decommissioning and rehabilitation

This section should present general strategies and methods for decommissioning of the project and rehabilitation of the project site, including:

- a preferred rehabilitation strategy including measures aimed at minimising the amount of land disturbed at any one time and minimise the residual loss of land with ecological or productive value.
- the final topography of any excavations, waste areas and dam sites, including maps at a suitable scale
- options and proposed methods for disposing of wastes from the demolition of project infrastructure, with sufficient detail to allow the feasibility and suitability of the method to be considered
- future land tenure arrangements following decommissioning
- a strategy to ensure current and future surface and groundwater quality is maintained at levels that are acceptable for potentially affected users
- a strategy to rehabilitate affected watercourses, including removal of any redundant waterway barriers
- completion criteria for the project site in accordance with the DEHP guideline *Rehabilitation Requirements for Mining Resource Activities* (Department of Environment and Heritage Protection 2014)
- proposed rehabilitation objectives for the site linked to specific completion criteria, including rehabilitation indicators that will be measured to establish when rehabilitation is complete.

Describe the options, strategic approaches and methods for progressive and final rehabilitation of the environment disturbed by the project. Include measures to identify success, thresholds for intervention (including intervention measures) and timeframes for which activities will be undertaken.

Evaluate the compliance of the strategies and methods for progressive and final rehabilitation of disturbed areas with the objectives of the *Code of environmental compliance for exploration and mineral development projects* (Department of Environment and Heritage Protection 2013) and guideline *Rehabilitation Requirements for Mining Resource Activities* 2014. In particular, the strategies and methods are to have the following objectives:

- mining and rehabilitation should aim to create a landform with the same or similar land use capabilities and/or suitability it had prior to the disturbance, unless other beneficial land uses are pre-determined and agreed
- mine wastes and disturbed land should be rehabilitated so that it is self-sustaining or to a condition where the maintenance requirements are consistent with an agreed post-mining land use
- surface and ground waters that leave the lease should not be degraded compared to their condition prior to the commencement of mining operations. Current and future water quality should be maintained at levels that are acceptable for users downstream of the site
- describe the means of decommissioning the project by removing or reusing plant, equipment, structures, buildings, concrete footings and foundations, hardstand areas, storage tanks and wharfage. Describe the proposed methods for stabilising the affected sites. Discuss options and methods for the disposal of wastes from the demolition of plant and buildings in sufficient detail for their feasibility and suitability to be assessed
- describe any proposals to divert creeks during operations and, if applicable, the reinstatement of the creeks after operations have ceased. Rehabilitation would involve the re-establishment of vegetation communities along watercourses similar to the pre-cleared regional ecosystems in those areas.
- where dams are to be constructed, describe proposals for the management of these structures after the completion of the project. Describe the final drainage and seepage control systems and long-term monitoring plans
- describe and illustrate where final voids and uncompacted overburden and workings at the end of mining would lie in relation to flood levels up to and including the probable maximum flood level based on the Bureau of Meteorology's 'probable maximum precipitation' forecast for the locality
- describe topsoil management including addressing minimising topsoil storage times (to reduce fertility degradation) and the transportation, storage and replacement of topsoil to disturbed areas.

Discuss the preferred rehabilitation strategy in the appropriate subsections of Section 5, (refer to page 17) with particular regard to final landform stability, vegetation cover, rehabilitation of plants and the long-term quality of water in any final voids. Include appropriate post-mining surface and groundwater quality and quantity monitoring regimes. Address implications for the long-term safety, stability and environmental risk of the site, particularly with regard to the on-site disposal of waste and the site's inclusion on the Environmental Management Register (EMR) or the Contaminated Land Register (CLR).

Refer to infrastructure that is not intended to be decommissioned. In this situation describe the entity to which the infrastructure is intended to be transferred, and the proposed environmental management regimes.

5. Environmental values and management of impacts

Detail the environmental protection and mitigation measures incorporated in the planning, construction, rehabilitation, commissioning, operations and decommissioning of all facets of the project. Measures should prevent, or if not possible, minimise environmental harm and maximise environmental benefits of the project. Identify and describe preferred measures in more detail than other alternatives.

The objectives of the following subsections are to:

- describe the existing environmental values of the area that may be affected by the project. Environmental values are defined in section 9 of the EP Act, environmental protection policies and other documents such as *the Australian Water Quality Guidelines for Fresh and Marine Waters Quality* (Australian and New Zealand Environment and Conservation Council (ANZECC) & Agriculture and Resource Management Council of Australia and New Zealand (ARMCANZ) 2000), and include MNES under the EPBC Act. Environmental values may also be derived following recognised procedures, such as described in the ANZECC & ARMCANZ 2000 guidelines and relevant policies and plans. Environmental values should be described referring to background information and studies, which should be included as appendices to the EIS (include references to all definitions of environmental values)
- describe the potential adverse and beneficial impacts of the project on the identified environmental values and the measures taken to avoid, minimise and/or mitigate those impacts
- describe any cumulative impacts on environmental values caused by the project, either in isolation or in combination with other known existing or planned projects
- present objectives, standards and measurable indicators that protect the identified environmental values
- examine viable alternative strategies for managing impacts (present and compare these alternatives in view of the stated objectives and standards to be achieved)
- discuss the available techniques to control and manage impacts in relation to the nominated objectives.

Where negative impacts of the project cannot be avoided or adequately minimised or mitigated, present proposals to offset impacts in accordance with the Queensland Environmental Offsets Policy (Department of Environment and Heritage 2014) and the EPBC Act Environmental Offsets Policy (Department of Sustainability, Environment, Water, Population and Communities, 2012).

The mitigation measures and monitoring programs, identified in this section of the EIS, should be used to develop the EMP(s) for the project. For more information, refer to Section 11 (page 65).

5.1. Climate, natural hazards and climate change

Describe the climatic conditions that may affect management of the project. This includes a description of the vulnerability of the project area to seasonal conditions, extremes of climate (for example, cyclones) and natural or induced hazards (including bushfire and floods). Provide a risk assessment (as part of the requirements of Subsection 8.1 of this TOR) and management plan detailing these potential climatic threats to the construction, and operation of the project. Include the following:

- a risk assessment of changing climate patterns that may affect the viability and environmental management of the project
- the preferred and alternative adaptation strategies to be implemented
- commitments to working cooperatively, where practicable, with government, other industry and other sectors to address adaptation to climate change.

Address the most recent information on potential impacts of climatic factors in the appropriate sections of the EIS.

5.1.1. Flood management

Due to the location of the site, a comprehensive flood study should be included in the EIS that includes:

- quantification of flood impacts on properties surrounding and external to the project site from redirection or concentration of flows
- identification of likely increased flood levels, increased flow velocities or increased time of flood inundation as a result of the development
- identification of likely increased flood levels, increased flow velocities or increased time of flood inundation as a result of the modelled changes to climate conditions, including the frequency of severe weather events.

The flood study should address any requirements of local or regional planning schemes for flood affected areas. The study report should include details of all calculations along with descriptions of base data, any potential for loss of flood plain storage, and triangulated surface meshes produced in terrain modelling software. Reference must be made to any studies undertaken by the local council in relation to flooding.

5.2. Land

Detail the existing land environment values for all areas associated with the project. Describe the potential for the construction and operation of the project to change existing and potential land uses of the project sites and adjacent areas.

5.2.1. Land use and tenure

Description of environmental situation

Identify, with the aid of maps including digital format:

- land tenure, including reserves, tenure of special interest (such as protected areas and forest reserves), existing and proposed gas infrastructure, water pipelines,

powerlines and transport corridors, including local roads, state-controlled roads, stock routes and rail corridors
- existing land uses and facilities surrounding the project
- distance of the project from residential and recreational areas
- declared water storage catchments
- location of the project in relation to environmentally sensitive areas.

Potential impacts and mitigation measures

Describe the potential changes to existing and potential land uses due to the construction and operation of the project. In particular, describe the following:

- impacts on project site and adjacent land uses and human activities and strategies for mitigation, such as those required by:
  - State Planning Policy (Department of State Development, Infrastructure and Planning 2014)
  - local government planning schemes
- possible effect on town planning objectives and controls, including local government zoning and strategic plans
- constraints to potential developments and possibilities of rezoning adjacent to the development area
- management of the immediate environs of the project including construction buffer zones
- proposed land use changes in any areas of high conservation value and information on how easement widths and vegetation clearance in sensitive environmental areas will be minimised
- potential issues involved in proximity and/or co-location of other current or proposed infrastructure services
- any land units requiring specific management measures.

Where there are to be disruptions to the stock route network by any components of the project:

- describe realignment/replacement of corridors of similar width and suitable country type to allow for the uninterrupted flow of travelling stock to ensure the connectivity and usability of the network (note: current usage classifications of stock routes have no bearing need for their replacement/realignment)
- provide solutions to moving stock across infrastructure such as rail lines, haul roads and other mining operations in a timely and safe manner
- describe provision of necessary watering facilities and other infrastructure, particularly where existing infrastructure is to be made redundant
- outline safe options for diverting stock
- identify and assess direct, indirect and cumulative impacts of the project with respect to stock routes. Cumulative impacts include local and regional impacts accumulating over time and impacts exacerbated by intensity or scale or frequency or duration of impacts, either in isolation or by combination with other known existing or planned impacts, both at project sites and areas remote from these

- consult with the Department of Natural Resources and Mines (DNRM) Senior Lands Officer (Stock Routes) and local government stock route officers

5.2.2. Scenic amenity and lighting

Description of environmental values

Detail the scenic and landscape values of the area, focusing on the visual absorption capacity of the site, including any relevant World Heritage and National Heritage values of the area.

At a level of detail appropriate to the scale of the project, describe the relevant geomorphology, supported by illustrative mapping highlighting any significant features associated with environmental values.

Potential impacts and mitigation measures

Describe the potential beneficial and adverse impacts of the project on landscape character and visual qualities of the site and the surrounding area. Address the local and broader visual impacts of the project buildings and other structures during all stages of the project as it relates to the surrounding landscape. This should include views from:

- places of residence, work and recreation
- road, cycle and walkways
- the air
- other known vantage points day and night.

Use sketches, diagrams, computer imaging/simulation and photos where possible to portray the near views and far views of the completed structures and their surroundings from visually sensitive locations.

Detail the measures to be undertaken to mitigate or avoid identified adverse impacts.

Lighting

Provide an assessment of all potential impacts of lighting of the project, during all stages, with particular reference to objectives to be achieved and management methods and strategies to be implemented to mitigate or avoid:

- the visual impact at night
- night operations/maintenance and effects of lighting on residents and terrestrial fauna
- the potential impact of lighting from increased vehicular traffic on and off-site on residents and fauna
- changed habitat conditions for nocturnal fauna and associated impacts.

5.2.3. Topography, geology and soils

Description of environmental values

Topography

Provide maps locating the project in state, regional and local contexts. The topography should be detailed with contours at suitable increments, shown with respect to Australian Height Datum. Include significant features of the landscape and topography, and accompanying comments on the maps.

Geology

Provide a description, map and a series of cross-sections of the geology of the project area relevant to the project components. Describe the geological properties that may influence ground stability, occupational health and safety, or the quality of stormwater leaving any area disturbed by the project. In locations where the age and type of geology is such that significant fossil specimens may be uncovered during construction/operations, address the potential for significant finds.

Mineral resources

Summarise the results of studies and surveys undertaken to identify and delineate the mineral resources within the project area (including any areas underlying related infrastructure).

Describe in detail, as indicated in the dot points below, the location, tonnage and quality of the mineral resources within the project area. Where possible, present this information on a 'seam-by-seam' basis and include the modifying factors and assumptions made in arriving at the estimates. The mineral resources should be estimated and reported, as appropriate, in accordance with:

- the *Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves* (the JORC Code) (Joint Ore Reserves Committee of The Australasian Institute of Mining and Metallurgy, Australian Institute of Geoscientists & Minerals Council of Australia 2012)
- the principles outlined in the *Australian Guidelines for the Estimating and Classification of Coal Resources* (Coalfields Geology Council of New South Wales & Queensland Resources Council 2014).

In addition, provide maps (at appropriate scales) showing the general location of the project area, and in particular the:

- location and aerial extent of the mineral resources to be developed or mined
- location and boundaries of mining tenures, granted or proposed, to which the project area is, or will be subject
- location of the proposed mine excavation(s)
- location and boundaries of any project sites
- location and boundaries of any other features that will result from the proposed mining including waste/spoil dumps, water storage facilities and other infrastructure
- location of any proposed buffers, surrounding the working areas

- any part of the resource not intended to be mined and any part of the resource that may be sterilised by the proposed mining operations or infrastructure.

Soils

A soil survey of the project area should be conducted at 1:100,000 scale, following the standards in Table 1 of *Land Suitability Assessment Techniques* in the *Technical Guidelines for the Environmental Management of Exploration and Mining in Queensland* (Department of Minerals and Energy 1995).

Soil profiles should be described according to the *Australian soil and land survey field handbook* (National Committee on Soil and Terrain 2009), grouped according to their parent material and position in the landscape, and classified according to the *Australian soil classification* (Isbell 2002). Where possible, soils should be correlated to those described in soil survey maps and reports for the similar landscape in the region. Particular reference to the physical and chemical properties of the materials that will influence erosion potential, storm water run-off quality, rehabilitation and agricultural productivity of the land should be included. Representative soils must be sampled down the profile for laboratory analysis as outlined in *Land Suitability Assessment Techniques.*

An assessment of the depth and quality of useable topsoil and subsoil to be stripped and stockpiled for rehabilitation should be undertaken and documented.

Land suitability

Assess the suitability of the soils mapped in the project area for rainfed broadacre cropping and beef cattle grazing according to the limitations and land suitability classification system in Attachment 2 of *Land Suitability Assessment Techniques* in the *Technical Guidelines for the Environmental Management of Exploration and Mining in Queensland* (Department of Minerals and Energy 1995).

Provide land suitability maps of the mapped soil units and an Agricultural Land Class map according to the *Planning Guideline: The Identification of Good Quality Agricultural Land* (Department of Primary Industries and Department of Housing, Local Government and Planning 1993).

Discuss the good quality agricultural land status and comment on and justify any variation with the good quality agricultural land mapping shown in the Planning Scheme for Belyando Shire 2008.

Identify any areas of land within the project study area identified as ‘strategic cropping area’ (SCA) as identified by the strategic cropping land (SCL) trigger maps (available from **www.dnrm.qld.gov.au/land**).

Potential impacts and mitigation measures

Provide details of any potential impacts to the topography or geomorphology associated with the project and proposed mitigation measures, including:

- a discussion of the project in the context of major topographic features and any measures taken to avoid or minimise impact to such, if required

- the objectives to be used for the project in any re-contouring or consolidation, rehabilitation, landscaping, and fencing.

Identify the possible soil erosion rate for all permanent and temporary landforms and describe the techniques used to manage the impact. Identify all soil types and outline the erosion potential (both wind and water). Include an assessment of likely erosion effects, especially those resulting from removing vegetation, and constructing retaining walls both on-site and off site for all disturbed areas.

Identify erosion management techniques to be used. Provide details of an erosion monitoring program (including rehabilitation measures for erosion problems identified during construction), and detail acceptable mitigation strategies. Summarise methods proposed to prevent or control erosion with regard to:

- the *Guideline: EPA Best Practice Urban Stormwater Management—Erosion and Sediment Control* (Environmental Protection Agency 2008)
- preventing soil loss in order to maintain land capability/suitability
- preventing degradation of local waterways.

Consider the physical, geo-mechanical and chemical properties of waste rock in both fresh and weathered forms when determining their suitability for constructing stable slopes and developing measures to avoid acid generation from waste rock dumps and backfilling operations.

Provide a detailed description of tailings disposal facilities stability, capping and rehabilitation, including hydraulic performance of the tailings disposal facilities during operation and post-decommissioning.

Identify any areas within the project footprint likely to temporarily or permanently impact SCA. Where areas of identified SCA are likely to be permanently alienated by the project, address the requirements of the RPI Act as they apply to the components of the project, in consultation with the DNRM.

Resource utilisation

Analyse the effectiveness of the mining proposal in achieving the optimum utilisation of the coal/mineral resources within the project area and consider its impacts on other resources. Demonstrate that the mining proposal will ‘best develop’ the mineral resources within the project area, minimise resource wastage and avoid any unnecessary sterilisation of these or any other of the state’s coal, mineral, and petroleum (including gas and coal seam methane) resources that may be impacted upon or sterilised by the mining activities or related infrastructure.

Subsidence

Provide comprehensive surface subsidence predictions, taking into account factors such as topographic variations and geological complexities, with a full description of the methodology and an assessment of the reliability of the predictions. Show the results of the predictions on maps with one-metre contour increments and a scale appropriate for assessing surface subsidence impacts. Propose mitigation measures to deal with any significant impacts that would result from subsidence.

Provide a detailed subsidence management plan in accordance with the draft guideline *Watercourse Subsidence – Central Queensland Mining Industry* (latest version) (Department of Environment and Resource Management 2011) for remediation and monitoring of subsidence cracking and ponding. The subsidence management plan should seek to limit the impact of subsidence on remnant vegetation and other habitats, including impacts on fish movement within watercourses. Include in the plan a timeline for predicted subsidence, location, potential subsidence impacts in particular any impacts to any noted environmental values which may be impacted and any mitigation measures including triggers for managing surface cracking, and rehabilitation methods to a nominated post-mining land use.

This section should include, but is not limited to:

- a description of the long-wall mining and the physical process of subsidence
- an overview of the historical underground mining techniques used for coal mining in Australia (including width of long-wall panels used in Australia over time), and the level of subsidence that occur from different methods
- a description of the known or likely subsidence effects on surface and groundwater hydrology
- a description of subsidence effects on terrestrial ecosystems (including which vegetation communities and flora species are most likely to be affected by changes to surface hydrology)
- a summary of the impact of subsidence effects on freshwater effects on freshwater ecosystems from existing long-wall mining in Central Queensland, and other parts of Australia with similar underlying geology that have been undermined
- a description of the known impacts of subsidence on groundwater
- a description of any known incidents where subsidence effects have (or been implicated to have) caused damage to the environment in Queensland
- geological features, such as faults, that may affect the level of subsidence or subsidence effects, must be described and mapped
- a description and analysis of the likely level of subsidence from the proposed action, including maps showing expected subsidence level contours
- a description of potential impacts to aquatic and terrestrial ecosystems from subsidence affects as a result of the proposed mine.

The plan should also indicate timeframes under which these actions would be implemented. The plan must include maps that show the expected subsidence level contours and a clear description of the types and amounts of habitats associated with areas of high likely impacts, medium level and low level impacts.

Assess the potential impacts of subsidence on the sediment load within watercourses. Identify any existing Quarry Material Allocation Notice (QMAN) holders in, or downstream of, subsidence areas; and if there are any QMAN holders, assess whether there would be potential impacts on their resource or entitlement. Provide mitigation measures for any impacts on any QMAN holders.

Land disturbance

Develop a strategy that will minimise the amount of land disturbed at any one time. Describe the strategic approach to progressive rehabilitation of landforms and final decommissioning. Describe the methods to be used for the proposal, including backfilling, covering, re-contouring, topsoil handling and revegetation.

Refer to the description in Section 4.6 (Decommissioning and rehabilitation) of the location of final voids and uncompacted overburden and workings at the end of mining in relation to flood levels from nearby watercourses up to and including the 'probable maximum flood level', based on the Bureau of Meteorology's 'probable maximum precipitation' forecast for the locality.

Demonstrate that proposed protection from flooding is sustainable for the foreseeable future. Management and maintenance arrangements should be supported by appropriate erosion and stability monitoring to substantiate long-term rehabilitation sustainability.

Where waterways are proposed to be diverted, describe the impact on land use due to hydrology changes, both upstream and downstream. Also, detail the final drainage and seepage control systems and any long-term monitoring plans.

Where dams, roads, levee banks, waterway diversions and other infrastructure are to remain upon project decommissioning, provide proposals to manage and maintain these structures. Management and maintenance arrangements should be supported by appropriate erosion and stability monitoring to substantiate long-term rehabilitation sustainability.

Assess the mitigation measures for land disturbance to be used on decommissioning the site, providing sufficient detail to decide their feasibility. In particular, address the long-term stability of final voids and spoil dumps, safety of access to the site after surrender of the lease, and the residual risks that will be transferred to the subsequent landholder.

Describe the strategy that will be used to manage topsoil, considering transport, storage and replacement of topsoil to disturbed areas. Also outline how soil from good quality agricultural land will be best used. Address the minimisation of topsoil storage times (to reduce fertility degradation). Describe erosion and sediment control measures, particularly in relation to managing sodic and saline overburden material.

If geological conditions are conducive, the proponent should consider the possibility that significant fossil specimens (such as of dinosaurs or their tracks) may be uncovered during construction/operations and propose strategies for protecting the specimens and alerting the Queensland Museum to the find.

5.2.4. Land contamination

Description of environmental values

Include:

- mapping of any areas listed on the EMR or CLR under the EP Act

- identification of any potentially contaminated sites not on the registers whether or not remediation is required
- a description of the nature and extent of contamination at each site.

Assess the possible degradation or contamination of land that could result from any aspects of the project. The assessment should not be limited to activities that would result in the land being entered on the EMR or the CLR. Rather, it should include any activity that could have a detrimental impact on land. Matters to be considered include:

- the long-term use for dust-suppression of water with sufficient dissolved salts to affect soil condition
- contamination events on farmland and agriculture in the region
- de-watering and disposal to land of any waste water
- waste rock disposal
- tailings disposal
- fly-ash disposal
- disturbance of acid sulfate soils
- spills at chemical and fuel storage areas.

Potential impacts and mitigation measures

Discuss the management of any contaminated land and potential for contamination from construction, commissioning, operation and decommissioning, in accordance with the *Contaminated land assessment guideline* (Department of Environment and Heritage Protection 2014), *Guideline: Managing Contaminated land under the Sustainable Planning Act 2009* (Department of Environment and Heritage Protection 2014) and the *National Environment Protection (Assessment of Site Contamination) Measure 1999* (National Environment Protection Council 1999) or as amended.

Describe strategies and methods to be used to prevent and manage any land contamination resulting from the project, including the management of any acid generation or management of chemicals and fuels to prevent spills or leaks.

Propose measures that would prevent or remediate any degradation or contamination of land due to the proposed activities. Propose any measures required for the management and possible remediation of any existing contamination on the site.

Assess any activities or proposed contamination that would result in the land being newly entered on the EMR or the CLR. Also assess the consequences, particularly for the subsequent landholder, of any intention to leave the site on either register when mining ceases. Prepare a site management plan for any land remaining on the EMR or the CLR, and describe when, how and by whom it would be implemented.

5.3. Nature conservation

Detail the existing nature conservation values that may be affected by the proposal. Describe the environmental values in terms of:

- integrity of ecological processes, including habitat of endangered, vulnerable and near-threatened (EVNT) and special least-concern species

- migratory, critically endangered, endangered, and vulnerable species and ecological communities as defined under the EPBC Act
- conservation of resources
- biological diversity, including habitat of EVNT and special least-concern species
- integrity of landscapes and places including wilderness and similar natural places
- aquatic and terrestrial ecosystems.

Survey effort should be sufficient to identify, or adequately extrapolate, the floral and faunal values over the range of seasons, particularly during and following a wet season. Survey effort must also comply with all relevant Commonwealth and Queensland State Government survey guidelines for species and ecological communities which may be impacted by the proposed actions. Where surveys do not meet the minimum standards established by these guidelines justification must be provided to demonstrate the suitability of the surveys. Where results are extrapolated a detailed description of the methodology, including relevant details regarding field verification utilised, must be provided. The survey should account for the ephemeral nature of watercourses traversing the proposal area, and seasonal variation in fauna populations especially migratory species and transient users of the project area.

Existing information on plant and animal species may be used to supplement new survey work, provided that the information and data remains current and has been derived from previous surveys at the site that are consistent with current best practice methodologies. Methodologies used for flora and fauna surveys should be detailed in the appendices to the report.

Wherever possible, seek the involvement of the local Indigenous community in conducting field observations and survey activities, to identify the traditional and contemporary Indigenous uses of species.

Outline the proposed strategies to avoid, or minimise and mitigate, impacts on the identified values within the project's footprint.

Identify key flora and fauna indicators for ongoing monitoring.

5.3.1. Sensitive environmental areas

Description of environmental values

On a map of suitable scale, identify areas that are environmentally sensitive within the study area in proximity to the project. This should include areas classified as having national, state, regional or local biodiversity significance, or flagged as important for their integrated biodiversity values. Refer to Queensland legislation and policies on threatened species and ecological communities.

Areas regarded as sensitive with respect to flora and fauna have one or more of the following features, and should be identified and mapped:

- important habitat of species listed under the NC Act
- regional ecosystems (REs) listed as 'endangered' or 'of concern' under state legislation

- ecological communities listed as critically endangered or endangered under the EPBC Act
- good representative examples of remnant REs or REs that are described as having 'medium' or 'low' representation in the protected area estate as defined in the Regional Ecosystem Description Database (REDD) available at **www.qld.gov.au/environment**
- sites containing near-threatened or bio-regionally significant species or essential, viable habitat for near-threatened or bio-regionally significant species
- areas or features identified as State significant biodiversity values, pursuant to the Queensland Environmental Offsets Policy (Department of Environment and Heritage Protection 2014) and the EPBC Act Environmental Offsets Policy (Department of Sustainability, Environment, Water, Population and Communities 2012)
- sites containing common species that represent a distributional limit and are of scientific value or that contain feeding, breeding, resting areas for populations of echidna, koala, platypus and other species of special cultural significance
- sites of high biodiversity that are of a suitable size or with connectivity to corridors and protected areas to ensure survival in the longer term; such land may contain:
  - natural vegetation in good condition or other habitat in good condition (for example, wetlands)
  - degraded vegetation or other habitat that still support high levels of biodiversity or act as an important corridor for maintaining high levels of biodiversity in the area
- a site containing other special ecological values (for example, high habitat diversity and areas of high endemism)
- ecosystems that provide important ecological functions such as:
  - wetlands of national, state and regional significance
  - riparian vegetation
  - important buffer to a protected area or important habitat corridor between areas
- declared fish habitat areas and sites containing protected marine plants under the Fisheries Act
- sites of palaeontologic significance such as fossil sites
- sites of geomorphological significance
- protected areas that have been proclaimed under the NC Act and Marine Parks Act, or are under consideration for proclamation
- declared areas of major interest or critical habitat declared under the NC Act
- declared areas of high nature conservation value or areas vulnerable to land degradation under the VM Act
- remnant vegetation listed under the VM Act or the EPBC Act as containing critically endangered, endangered and of-concern regional ecosystems or ecological communities where clearing or other direct and indirect project related impacts are likely to result in land degradation and a loss of ecosystem function and biodiversity.

Areas of special sensitivity include the marine environment and wetlands, wildlife breeding or roosting areas, any significant habitat or relevant bird flight paths for

migratory species, bat roosting and breeding caves including existing structures such as adits and shafts, and habitat of threatened plants, animals and communities.

Potential impacts and mitigation measures

Discuss the impact of the project on species, ecological communities and habitat of local, regional, state or national significance in sensitive environmental areas as identified above. Include human impacts and the control of any domestic animals introduced to the area.

Demonstrate how the project would comply with the following hierarchy:

- avoiding or minimising impact on sensitive environmental areas and other values subject to relevant offsets polices
- mitigating impacts through rehabilitation and restoration including, where relevant, a discussion of any relevant previous experience or trials of the proposed rehabilitation
- replacing or offsetting the loss of conservation values, where impacts cannot be avoided or mitigated.

Explain why the measures above may not apply in areas where loss would occur.

Discuss the boundaries of the areas impacted by the project within or adjacent to an ecological community, including details of footprint width. If the project area will impact upon an endangered ecological community, include reasons for the preferred alignment and the viability of alternatives.

Describe strategies for protecting Ramsar wetlands and discuss any obligations imposed by state or Commonwealth legislation or policies, or international treaty obligations (that is, China–Australia Migratory Bird Agreement, Japan–Australia Migratory Bird Agreement, Republic of Korea–Australia Migratory Bird Agreement).

Provide details about the approvals that will be required under the NC Act and the VM Act for development made assessable under SPA. The EMP for the project should address the performance requirements of the relevant policies and regional vegetation management codes (refer to **www.qld.gov.au/environment/land/vegetation/management/**).

Where relevant, this section should discuss environmental offset requirements in accordance with the Queensland Environmental Offsets Policy (Department of Environment and Heritage 2014), Galilee Basin Offset Strategy (Department of Environment and Heritage Protection 2013) and the EPBC Act Environmental Offsets Policy (Department of Sustainability, Environment, Water, Population and Communities 2012).

The following information relating to offset requirements should be provided, preferably as part of an offset strategy:

- a description of the values required to be offset and the estimated extent of impact on each value (supported by mapping)

- if land-based offsets are proposed for terrestrial ecosystems, an assessment of ecological equivalence for each
- clearing/impact area (in accordance with the relevant guideline)
- the proposed timing of provision of offsets relative to issue of the environmental authority including clear definition of any staged approach to the provision of offsets
- other information specifically required by the relevant offset policy.

5.3.2. Terrestrial flora

Description of environmental values

Provide vegetation mapping for all relevant project sites, and for adjacent areas to illustrate interconnectivity. Mapping should also illustrate any larger scale interconnections between areas of remnant or regrowth vegetation where the project site includes a corridor connecting those other areas. Discuss any variances between site mapping and mapping produced by the Queensland Herbarium.

Describe the terrestrial vegetation communities within the affected areas at an appropriate scale (maximum 1:10 000), with mapping produced from aerial photographs and ground-truthing, showing the following:

- location and extent of vegetation types using the regional ecosystem type descriptions in accordance with the REDD
- location of vegetation types and ecological communities of state and national conservation significance based on RE types and occurrence of species listed as protected plants under the Nature Conservation (Wildlife) Regulation 2006 (Qld) and subsequent amendments, as well as areas subject to the VM Act
- the current extent (bioregional and catchment) of protected vegetation types of conservation significance within the protected area estate (national parks, conservation parks, resource reserves, nature refuges and conservation reserves under the NC Act)
- any plant communities of cultural, commercial or recreational significance
- location and presence of any state or nationally protected flora species and /or potential habitat for these species within the project area
- the location of any horticultural crops in the vicinity of the project area
- location and abundance of any known exotic or weed species including a description of the prevalence of introduced/exotic pasture grasses within the project site. (Biosecurity Queensland Annual Pest Distribution Survey (APDS) data and predictive pest maps should be used to supplement the proponent's survey and mapping).

Highlight sensitive or important vegetation types, including any riparian vegetation, and their value as habitat for fauna and conservation of specific rare floral and faunal assemblages or community types. The description should contain a review of published information regarding the assessment of the significance of the vegetation to conservation, recreation, scientific, educational and historical interests.

For each significant natural vegetation community likely to be impacted by the project, vegetation surveys should be undertaken at an appropriate number of sites, at least

once in the wet season (between March and May) and once in the dry season (between July and September), and satisfying the following:

- the relevant regional vegetation management codes
- site data should be recorded in a form compatible with the Queensland Herbarium CORVEG database and HERBRECS
- the minimum site size should be 10 × 50 metres
- a complete list of species present at each site should be recorded
- the surveys to include species structure, assemblage, diversity and abundance
- the relative abundance of plant species present to be recorded
- any plant species of conservation, cultural, commercial or recreational significance to be identified
- specimens of species listed as protected plants under the Nature Conservation (Wildlife) Regulation, other than common species, are to be submitted to the Queensland Herbarium for identification
- the methodology in *Biocondition: A Condition Assessment Framework for Terrestrial Biodiversity in Queensland: Assessment Manual* (version 2.1) (Eyre et al. 2011) and *Ecological Equivalence Methodology Guidelines* (version 1) (Department of Environment and Resource Management 2011) for sites possibly requiring offset considerations under the Queensland Environmental Offsets Policy (Department of Environment and Heritage Protection 2014).

Potential impacts and mitigation measures

Describe the potential environmental impacts to the ecological values of the area arising from the construction, operation and decommissioning of the project including clearing, salvaging or removing vegetation. Discuss the indirect effects on remaining vegetation. Consider short- and long-term effects and comment on whether the impacts are reversible or irreversible.

For all components of the project, discuss:

- the potential impacts that clearing vegetation will have on listed species and ecological communities in the extent of the proposed vegetation clearing
- any management actions to minimise vegetation disturbance and clearance
- the ability of identified vegetation to withstand any increased pressure resulting from the project, and any measures proposed to mitigate potential impacts
- the methods to ensure rapid and environmentally appropriate rehabilitation of disturbed areas following construction, including the species chosen for revegetation, which should be consistent with the surrounding associations
- any post-construction monitoring programs
- the potential environmental harm on flora due to any alterations to the local surface and groundwater environment, with specific reference to impacts on riparian vegetation or other sensitive vegetation communities
- a description of any foreseen impacts which increase the susceptibility of ecological communities and species to the impacts of climate change.

Outline how these mitigation measures and monitoring will be implemented in the EMP for the project.

Discuss weed management strategies for containing existing weed species (for example, parthenium and other declared plants) and ensuring no new declared plants are introduced to the area through project activities. Refer to the local government authority's pest management policies and plans and any strategies and plans recommended for the project area by Biosecurity Queensland. Discuss the strategies in accordance with provisions of the *Land Protection (Pest and Stock Route Management) Act 2002* in the main body of the EIS and in the pest management plan within the EMP for the project.

5.3.3. Terrestrial fauna

Description of environmental values

Describe the terrestrial and riparian fauna occurring in the areas affected by the proposal, noting the broad distribution patterns in relation to vegetation, topography and substrate. The description of the fauna present or likely to be present in the study area should include:

- species diversity (that is, a species list) and abundance of animals of recognised significance
- any species that are poorly known but suspected of being rare or threatened
- habitat requirements and sensitivity to changes, including movement corridors and barriers to movement
- the existence of feral or introduced animals including those of economic or conservation significance
- existence (actual or likely) of any species and communities of conservation significance in the study area, including discussion of range, habitat, breeding, recruitment feeding and movement requirements, and current level of protection (for example, any requirements of protected area management plans or threatened species recovery plans)
- habitat requirements and sensitivity to changes, including movement corridors and barriers to movement
- an estimate of commonness or rarity for the listed or otherwise significant species
- use of the area by migratory fauna
- records in a form compatible with the Wildlife Online database.

For each significant natural vegetation community, ecosystem, or habitat likely to be impacted by the project, fauna surveys should be undertaken at an appropriate number of sites consistent with habitat variation and size, and with existing knowledge of species potentially occurring in the project area and the survey effort required to confirm presence or absence of such species. Fauna surveys should be conducted during periods of the year consistent with seasonal variation in fauna presence or level of activity including the wet season (between March and May) and dry season (between July and September).

Present fauna data in columns titled: Number, collector, Start date, End date, Location, Latitude, Longitude, Zone, Easting, Northing, Datum, Precision (m), Altitude (m), Vegetation code, Slope, Aspect, Scientific name, Common name, Count, count type, Age code, Sex code, Breeding code, Identification method, Collector code, Specimen registration, Specimen location, Collection notes, vetting code.

DEHP has supporting documents available which explain the above fields and codes.

Identify any species listed by the NC Act and EPBC Act which are potentially occurring in the project area. Identify any species listed by the 'Back on Track' species prioritisation methodology (refer to:**www.ehp.qld.gov.au/wildlife/prioritisation-framework/index.html)**

Indicate how well any affected communities are represented and protected elsewhere in the bio-region where the project occurs. Specify the methodology used for fauna surveys and compliance with Queensland and Commonwealth survey guidelines. If methods do not comply provide justification of how surveys are suitable and representative. Provide relevant site data to DEHP in a format compatible with the Wildlife Online database for listed threatened species (refer to: **www.qld.gov.au/environment/plants-animals/species-list/**

Potential impacts and mitigation measures

Consider potential impacts on terrestrial fauna, relevant wildlife habitat and other fauna conservation values, including:

- impacts due to loss of range/habitat, food supply, nest sites, breeding/recruiting potential or movement corridors or as a result of hydrological change
- impacts on native species, particularly species of conservation significance
- cumulative effects of direct and indirect impacts
- threatening processes leading to progressive loss
- a description of any foreseen impacts that increase the susceptibility of ecological communities and species to the impacts of climate change
- indirect impacts through the decrease in vegetation quality in surrounding areas as a result of the project activities.

Address any actions of the project or likely impacts that require an authority under the NC Act. Provide the following information on mitigation strategies:

- measures to avoid and mitigate the identified impacts. Any provision for buffer zones and movement corridors, nature reserves or special provisions for migratory animals should be discussed and coordinated with the outputs of the flora assessment
- details of the methodologies that would be used to avoid injuring livestock and native fauna as a result of the project's construction and operational works, and if accidental injuries should occur, the methodologies to assess and handle injuries
- strategies for complying with the objectives and management practices of relevant recovery plans
- measures to rehabilitate disturbed areas, which incorporate provision of nest hollows and ground litter, where appropriate.

Outline how these measures will be implemented in the EMP for the project.

Discuss feral animal management strategies and practices. Develop strategies to ensure that the project does not contribute to increased encroachment of a feral animal species. Refer to the local government authority's pest management policies and plans and any strategies and plans recommended for the project area by Biosecurity Queensland. Discuss the strategies in accordance with the provisions of the *Land Protection (Pest and Stock Route Management) Act 2002* in the main body of the EIS and in the pest management plan within the EMP for the project.

5.3.4. Aquatic biology and ecology

Description of environmental values

Describe the aquatic flora and fauna present, or likely to be present, in the areas affected by the project. Include:

- fish species, mammals, reptiles, amphibians, crustaceans and aquatic invertebrates occurring in the waterways within the affected area and any associated wetlands (as defined under section 5 of the Fisheries Act)
- any rare or threatened aquatic and marine species
- exotic and pest marine organisms
- a description of the habitat requirements and the sensitivity of aquatic species to changes in flow regime, water levels and water quality in the project areas
- aquatic plants, including native, exotic and weed species
- aquatic matrices including benthic substrate
- habitat downstream of the project or potentially impacted due to currents in associated lacustrine and marine environments
- stream type, including extent of tidal influence and common levels such as highest astronomical tide and mean high water springs
- any other state significant biodiversity values identified in the Queensland Environmental Offsets Policy (Department of Environment and Heritage Protection 2014) that are not described elsewhere.

Describe the wetlands identified in Wetland*Maps* refer to: **http://wetlandinfo.ehp.qld.gov.au/wetlands/facts-maps/get-mapping-help/wetland-maps/**), with particular attention given to wetlands identified as being of high ecological significance, and detail their values and importance for aquatic flora and fauna species and hydrological functioning of the wetlands using appropriate methodologies.

Conduct a desktop assessment of the potential for stygofauna to occur within the zone of influence of the project, and a pilot study in accordance with the *Guidance for the Assessment of Environmental Factors No. 54a* (Western Australia Environmental Protection Agency 2007), or any more recent publication that supersedes that guideline. If the desktop assessment and pilot study identify potentially significant stygofauna values, provide a description to order or family taxonomic rank of the presence and nature of any stygofauna occurring in groundwater likely to be affected by the project. Sampling and survey methods should follow best practice, such as that

published by the *Guidance for the Assessment of Environmental Factors No. 54* (Western Australia Environmental Protection Agency 2003) and *No. 54a* (2007), *Environmental Assessment Guideline 12 Consideration of subterranean fauna in environmental impact assessment in Western Australia* (Western Australian Environmental Protection Authority 2013) or any more recent publication that supersedes that guideline.

Potential impacts and mitigation measures

Discuss the potential impacts of the project on the aquatic species and ecosystems and describe proposed mitigation actions, including:

- proposed location, type and design of waterway barrier works (temporary and permanent) that would impact on aquatic resources, particularly fish movement, with an appropriately scaled map
- proposed stream diversions, causeway construction and crossing facilities, stockpiled material and other impediments that would restrict free movement of aquatic fauna
- alternatives to waterway crossings where possible
- measures to avoid fish spawning periods, such as seasonal construction of waterway crossings and measures to facilitate fish movements through water crossings
- offsets proposed for unavoidable, permanent loss of fisheries habitat
- methods to minimise the potential for introducing or spreading weed species or plant disease
- monitoring aquatic biology health, productivity and biodiversity in areas subject to direct discharge
- potential impacts from climate change and the project's potential to increase the susceptibility of aquatic ecological communities and species.

Address any actions of the project or likely impacts that require an authority under the relevant legislation, including the NC Act and/or the Fisheries Act. Outline how these methods, measures and monitoring will be implemented in the overall EMP for the project.

5.4. Water resources

5.4.1. Description of environmental values

Describe the existing environmental values of water that may be affected by the project. Environmental values should be defined according to:

- the EP Act
- Environmental Protection (Water) Policy 2009 (EPP (Water))
- *State Planning Policy—state interest guideline Water quality* (Department of State Development, Infrastructure and Planning 2014)
- the *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* (ANZECC & ARMCANZ 2000)

- the *Queensland Water Quality Guidelines* (Department of Environment and Heritage Protection 2013)
- groundwater-dependent ecosystems as referred to in *Australian groundwater-dependent ecosystem toolbox part 1: assessment framework, Waterlines report* (Richardson et al. 2011)

Make reference to Wetland*Maps* and any available Aquatic Conservation Assessments produced by the Queensland Government or any bioregional assessments produced by the Independent Expert Scientific Committee on Coal Seam Gas and Large Coal Mining Development (IESC), which assess the potential risks to water resources in the area as a result of the direct and indirect impacts of coal seam gas development or large coal mining development. The definition of waters in the EPP (Water) includes the bed and banks of waters, so this section should address benthic sediments as well as the water column.

Surface water quantity

Describe and illustrate the existing surface drainage patterns, overland flows, and palustrine and lacustrine wetlands. The description must include suitably scaled maps of catchments, watercourses, drainage pathways, wetlands, or sources of water supply (such as farm dams) potentially affected by the project, whether on or off the project site.

Describe, with supporting photographs, the geomorphic condition of any watercourses likely to be affected by disturbance or stream diversion. The results of this description would form the basis for the planning and subsequent monitoring of rehabilitation of the watercourses during or after the operation of the project.

Describe the hydrology of watercourses and overland flow in the project area and any downstream locations potentially affected by the project.

Provide details of the likelihood of flooding (using information on the history of flooding) including extent, levels and frequency of floods in and around the project site. Flood studies must include a range of annual exceedence probabilities for potentially affected waterways, based on observed data if available or use appropriate modelling techniques and conservative assumptions if there are no suitable observations. The flood modelling assessment must include local flooding due to short duration events from contributing catchments on-site, as well as larger scale regional flooding including waterways downstream.

Describe present and potential users and uses of water in areas potentially affected by the project, including municipal, agricultural, industrial and recreational uses of water.

Describe the quality of surface waters in the area potentially affected by the project with an outline of the significance of these waters to the river catchment system in which they occur. The description should be based on a monitoring program, with sampling stations located upstream at background reference sites (sites that are currently not impacted and are likely not to be impacted by this or similar activities) and downstream of the project.

Identify and reference existing data obtained from other monitoring programs. Monitoring should include sites closest to the proposed release points and at

downstream locations that would be below any mixing zone. Sites should include permanent and semi-permanent water holes, known aquatic habitat, weirs or reservoirs. Available complementary stream-flow data should be obtained from historical records from the current stream gauging station network to assist interpretation. Where data exist, describe the flow regime for the receiving environment using plots of flow (cumecs) versus flow duration (per cent) to identify the flow duration of event high-flow, base-flow and no-flow periods to characterise the receiving environment.

Describe seasonal variations in water quality and variations with flow. Estimate the event flow trigger for environmentally significant analytes in each receiving waterway based on this observed variation (plot flow against environmentally significant analytes). The event flow trigger is the flow at which environmentally significant analytes increase and begin to exceed the applicable high flow water quality objective. The event flow trigger can also be any flow above this point. This data should be used to determine the appropriate conditions for the release of mine-affected water into the receiving environment.

Measure a range of physical, chemical and biological parameters relevant to the potential environmental harm on any affected creek or wetland system. This would include, but not necessarily be limited to, water quality indicators likely to be affected by the project such as electrical conductivity, total and dissolved metals, turbidity, suspended sediments and pH. Biological indicators should include macro-invertebrate surveys undertaken at appropriate locations according to best practice methods. All sampling should be performed in accordance with the *Monitoring and Sampling Manual 2009 Version 2* (Department of Environment and Heritage Protection 2013) or the most current edition.

All water quality data should be presented in a suitable format for assessment against relevant water quality objectives or guideline trigger values as described in Schedule 1 of the EPP (Water), the *Queensland Water Quality Guidelines* (Department of Environment and Resource Management 2009) and the *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* (ANZECC & ARMCANZ 2000).

Physico-chemical stressors and toxicants should at least be presented as 50th percentiles for comparison with guideline values, together with data ranges and the limit of reporting. 20th and/or 80th percentile (or 75th percentile for salinity) data may be required where water quality data is used to derive locally-relevant (sub-regional) water quality guidelines. Provide relevant metadata that would facilitate an assessment of the quality of this data set, including number of samples, timing and frequency of sampling and any quality assurance and quality control undertaken (for example, replicates, blanks and calibration).

Clearly and consistently distinguish between this monitoring program for the baseline condition assessment from any monitoring programs required for future compliance assessment or as a component of the receiving environment monitoring program (described in Section 5.4.2). Provide detailed mapping to illustrate the locations of each sampling site within these monitoring programs with respect to release points and gauging stations.

Groundwater

If the project is likely to use or affect local sources of groundwater, describe groundwater resources in the area in terms of:

- geology and stratigraphy
- aquifer type—such as confined, unconfined
- depth to and thickness of the aquifers
- depth to water level and seasonal changes in levels
- groundwater flow directions (defined from water level contours)
- groundwater quality
- interaction with surface water
- interaction with saline water
- possible sources of recharge
- potential exposure to pollution
- current access to groundwater resources in the form of bores, springs and ponds (including quantitative yield of water and locations of access)
- current estimated level of take from each aquifer and analysis of the current aquifer water level conditions (that is, under stress, or not under stress).

The groundwater assessment should also be consistent with relevant guidelines for the assessment of acid sulfate soils, including spatial and temporal monitoring, to accurately characterise baseline groundwater characteristics.

Review the quality, quantity and significance of groundwater in the project area, together with groundwater use in neighbouring areas. Refer to relevant legislation or water resource plans for the region. The review should also provide an assessment of the potential take of water from the aquifer and how current users and the aquifer itself and any connected aquifers will be affected by the take of water.

The review should include a survey of existing groundwater supply facilities (bores, wells, or excavations) to the extent of any environmental harm. The information to be gathered for analysis is to include:

- location
- pumping parameters
- draw down and recharge at normal pumping rates
- seasonal variations (if records exist) of groundwater levels.

Develop a network of observation points that would satisfactorily monitor groundwater resources both before and after commencement of operations. Describe the role and purpose of the monitoring program and provide justification for existing and proposed monitoring points.

The data obtained from the groundwater survey should be sufficient to enable specification of the major ionic species present in the groundwater, pH, electrical conductivity and total dissolved solids.

5.4.2. Potential impacts and mitigation measures

Assess the project's potential impacts on water resource environmental values identified in the previous section.

Assess how the proposed project will change both the site and regional water balances. The water balance analysis could include (but not necessarily be limited to) the following information:

- usage of the surface water and identified aquifer(s)
- an assessment of regional water assets
- critical dependencies of the identified aquifer(s) and extent of hydrological interconnectivity
- an understanding of the structural and dynamic ground and surface water systems (including recharge and discharge)
- an assessment of the quality of information and data for the identified systems.

Detail project elements which will induce changes to the pre-mining surface water/groundwater hydrology, for example, areas of long-wall mining and subsidence, rehabilitated areas, remaining spoil heaps, operational and post-mining voids/lakes, etc.

Map the areas of proposed long-wall mining in relation to streams and environmental assets and quantify total area of expected subsidence.

Assess and quantify impacts of subsidence and stratigraphic cracking from long-wall mining on groundwater recharge, run-off and streamflow, and potential problems induced by physicochemical changes such as groundwater and streamflow contamination, generation of acid drainage and the potential for induced salinity.

Quantify the post mine impacts of underground mining with associated subsidence and stratigraphic cracking on catchment run-off and quantify the sediment loss from rehabilitated areas including spoil heaps on stream hydrology and biota

Map the proposed areas of post-mining voids/lakes and define approximate lake dimensions.

Quantify evaporative losses (and define the methodology for doing so) from voids/lakes and the impact that this will have on the local and regional hydrology. Identify the aquifer(s) depleted by evaporative losses, expected salinity build-up in the lakes and the potential migration of the resultant saline plume into the regional groundwater flow regime.

Identify and map post-mine rehabilitated areas and asses the ongoing impact these will have on the regional surface water and groundwater hydrology.

For all phases of the project (including construction, operation and remediation phases):

- assess the project's potential impacts on water resource environmental values identified in the previous section
- define and describe the objectives and practical measures for protecting or enhancing water resource environmental values

- describe how nominated quantitative standards and indicators may be achieved, and how the achievement of objectives will be monitored, audited and managed
- quantify the impacts of mining on the local and regional hydrology
- assess the potential cumulative impacts of this project with the known developments in the Galilee Basin region, including potential impacts on:
  - surface and groundwater quality
  - surface and groundwater hydrology.

Assess the potential cumulative impacts of this project with the existing or planned known developments in the Galilee Basin region. Cumulative impacts to water resource quantity must be assessed in accordance with the practices and procedures set out in the *Water Accounting Framework for the Minerals Industry* (Minerals Council of Australia 2014)—refer to:
www.minerals.org.au/focus/sustainable_development/water_accounting

Describe and illustrate with maps, plans and cross-sections any proposal to divert creeks or undertake other in-stream works. Assess the potential impacts of in-stream works on hydrology and water quality, and propose measures for avoiding or mitigating the impacts and stabilising and rehabilitating any works.

Assess the hydrological impacts of the project on surface water and water courses including for consistency with the outcomes and objectives of the *Water Resource (Burdekin Basin) Plan 2007* and *Water Resource (Cooper Creek) Plan 2011*. The assessment will have particular regard to stream diversions, scouring and erosion, and changes to flooding levels and frequency of flooding, both upstream and downstream of the project. If flooding levels will be affected, modelling of afflux should be provided and illustrated with maps.

Describe and illustrate how an operating pit would be protected from flooding, and address the flood protection level of any final void without the need to maintain levees.

Describe the options for supplying water to the project, and assess the consequential impacts in relation to any water resource plan and resource operations plan that may apply. Water allocation and water sources, including impacts on existing water entitlements, including water harvesting, should be established in consultation with the relevant department. Where a licence or permit would be required under the Water Act to take water or interfere with the flow of water, provide sufficient information and assessment for the administering authority to consider the suitability of approving any necessary works under the Water Act. Similarly, provide sufficient assessment to consider any approval for waterway barrier works under the Fisheries Act.

Discuss the need or otherwise for licensing of any dams under the Water Act and referable dams under the WSSR Act. Detail the proposed capacities of water storages and indicate whether they would capture clean water (including overland flow) or would hold mine affected water to comply with an environmental authority.

Describe any approvals and water allocations the project may need under the Water Act for water supply, stream diversions and storage. Requirements relating to the Referable Dam provisions of the WSSR Act, and those associated with attaining approval under the Sustainable Planning Regulation 2009 need to be considered.

Describe in detail the proposed water management controls, addressing surface and ground water quality and quantity, drainage patterns (including the separation of natural and mine affected run-off) and sediment movements and quantity. Detail the water management infrastructure including, but not necessarily limited to, water storages, sedimentation dams, water treatment plants, levees, drains, diversions, containment channels, bunding, monitoring points, release points and any interconnections between these and the receiving environment using flow diagrams.

Model the proposed water retention and diversion measures for specific rain events.

Describe and illustrate any proposed diversions of watercourses, including any staging and whether the diversions are proposed to be temporary or permanent. Base the design of any diversions on the geomorphic condition of the original watercourses and demonstrate consideration of, and accordance with, best practice guidelines and reports, such as those produced by DEHP and the Australian Coal Association Research Program for mines in the Bowen Basin.

Describe and illustrate: the locations, catchments, footprints, cross-sections and method of construction of any dams on the site, their flood immunity, the quality of water or waste water they would contain, and indicate their hazard category. Provide the design storage allowances for sediment dams and process or waste water dams, and demonstrate that the design has been produced by a suitably qualified and experienced engineer using current best practice. Propose measures to manage sediment dams and process or waste water dams and their discharge, and to decommission and rehabilitate the dams when their use ends.

Assess the potential impacts on local and downstream water quality and environmental values due to any controlled and uncontrolled release of mine affected water from the site. Describe the proposed quality, quantities and locations of waste water discharges. Include tables with the latitude and longitude (GDA94) for all release points, sampling sites and gauging stations relevant to monitoring programs. Use stream flow data, receiving environment monitoring data (background water quality condition assessment), and proposed release limits and rates to estimate in-stream dilution and water quality at different points downstream of the proposed release.

If sensitive receptors such as, drinking water storages or aquatic ecosystems of high ecological value are located downstream, these should be identified and the assessment should extend at least to that point downstream. Consider periods of low-flow, medium-flow and high-flow in this assessment. Compare the predicted contaminant levels to the water quality objectives and provide an assessment of the assimilative capacity of the receiving waters.

Assess the acute and chronic potential impacts of the release of mine affected waters (or other discharges) including the cumulative impacts to water quality and environmental values of the receiving environment due to discharges from other projects or industry.

Describe any proposed no-release water systems, assess the management and fate of contaminants in the systems, the risk of environmental harm due to a temporal decline in water quality, and propose mitigation measures for any potential impacts.

Describe and assess proposed measures to manage any leachate or seepage from tailings and fly-ash storages, either during operations or following decommissioning of the mine and its rehabilitation. Describe monitoring programs that would assess the effectiveness of management strategies for protecting water quality during the construction, operation and decommissioning of the project.

Conduct a risk assessment, based on conservative water quality estimates and hydrology, for uncontrolled emissions to water due to system or catastrophic failure, assess the potential impacts of such emissions on human health and natural ecosystems, and provide detailed measures to avoid or minimise impacts.

Assess the potential impacts on local groundwater resources and quality, and define the extent of the area where groundwater resources are likely to be affected by the proposed operations. Assess the potential impacts of the operations on groundwater draw-down, depletion or recharge, and propose management options to monitor and mitigate these effects.

Describe the response of the groundwater resource to the progression and finally cessation of the proposal, including the impacts of groundwater inflow to any residual void.

Assess the impact of the project on the local groundwater regime caused by the altered porosity and permeability of any land disturbance (for example, subsidence).

Assess and describe any potential for the project to impact on groundwater-dependent ecosystems, including their flora and fauna. Describe avoidance and mitigation measures.

Propose measures to avoid, mitigate and remediate any impacts on groundwater resources or quality.

5.5. Forestry products and quarry materials

If any timber resources or quarry material are to be taken, disturbed or used for purposes other than mining within the boundaries of the mining lease, or outside of the mining lease area (MLA) as part of the project, provide information on the following:

- the location and quantity of all forest products and quarry material extractive resources, that are on State land administered under the *Forestry Act 1959,* that may be affected or sterilised from future use by the location and/or operation of the project
- the location and quantity of all forest products and quarry material extractive resources, that are on State land administered under the Forestry Act, the project may take, destroy, access, sample, quarry or remove during the life of the project
- the identification of the sources of quarry materials both on and off the mining lease for each component of the project
- details of any use of quarry material either outside the MLA or not consistent with the mining operation
- existing approval arrangements where forestry and quarry materials are in the project area.

5.6. Air quality

5.6.1. Description of environmental values

Describe the existing air quality that may be affected by the project in the context of environmental values as defined by the EP Act and Environmental Protection (Air) Policy 2008 (EPP (Air)).

Discuss the existing local and regional air shed environment, including:

- background levels and sources of particulates, gaseous and odorous compounds and any major constituent
- pollutants (including greenhouse gases)
- baseline monitoring results, sensitive receptors.

Data on local meteorology and ambient levels of pollutants should be gathered to provide a baseline for later studies or for the modelling of air quality environmental harms.

Parameters should include air temperature, wind speed and direction, atmospheric stability, mixing depth and other parameters necessary for input to the models.

5.6.2. Potential impacts and mitigation measures

For air quality issues and their mitigation:

- include an inventory of air emissions from the project expected during construction and operational activities (including source, nature and levels of emissions)
- accurately describe the activities carried out on the site, including a process flow diagram clearly showing all unit operations to be carried out on the premises, and a detailed discussion of all unit operations
- outline the chemical properties of the ‘coal washery rejects’ to be burnt in the on-site power station
- describe all pollution control equipment and pollution control techniques employed on the premises and the features of the project designed to suppress or minimise emissions, including dusts
- describe the back-up measures that will act in the event of primary measures failing, to minimise the likelihood of upsets and adverse air impacts
- provide an air emission inventory of the project site for all potential point, area and volume sources including fugitive emissions of dusts and a complete list of emissions to the atmosphere including SOx, NOx, CO2, particulates, PM_{10} and $PM_{2.5}$
- identify all expected emissions of hazardous air pollutants and their emissions from known and fugitive sources
- estimate emission rates, based on actual measurements of samples taken from similar facilities—either full-scale facilities operating elsewhere, or experimental or demonstration-scale facilities. Where this is not possible, use published emission factors and/or data supplied by manufacturers of process and control equipment
- using relevant inputs of emissions and local meteorology as input to an air dispersion model, estimate the likely impacts on the surrounding environment. (The

model inputs should be as detailed as possible, reflecting any variation of emissions with time and including at least a full year of representative hourly meteorological data.)

- estimate maximum ground level concentration and monthly average dust deposition values at the nearest sensitive receptor(s)
- present the results of the dispersion modelling as concentration contour plots and concentrations at the discrete sensitive receptors.
- predicted ground level concentration should be made for both normal and expected maximum emission conditions and the worst case meteorological conditions should be identified and modelled where necessary
- describe the background ambient air concentration from the existing sources in the airshed and evaluate the cumulative impact on the receiving environment (address both acute and cumulative impacts by considering the project in conjunction with existing and known future emission sources within the region)
- provide an averaging period for ground level concentrations of pollutants that are modelled, consistent with the relevant averaging periods for air quality indicators and goals in the EPP (Air) and the *National Environment Protection (Ambient Air Quality) Measure 2003* (National Environmental Protection Council 2003). For example, the modelling of PM_{10} must be conducted for 1 hour, 24 hours and annual averaging periods
- identify the worst case meteorological conditions based on the modelled ground level predictions and, using this information, develop dust mitigation measures for the mining activities and describe the dust management plan that will be employed to mitigate adverse air impacts under the worst meteorological conditions
- discuss the limitations and accuracy of the applied atmospheric dispersion models and the implications of this for the air quality modelling results
- where there is no single atmospheric dispersion model that can handle the different atmospheric dispersion characteristics exhibited in the proposal area (for example, strong convection, terrain features, temperature inversions and pollutant re-circulation), a combination of acceptable models should be applied
- identify ‘worst case’ emissions that may occur during operation. If these emissions are significantly higher than those for normal operations, it will be necessary to separately evaluate the worst-case impact as a separate exercise to determine whether the planned buffer distance between the facility and neighbouring sensitive receptors will be adequate
- ground level predictions should be made at any sensitive receptor including proposed accommodation camps and any residential, industrial, agricultural, commercial and community developments believed to be sensitive to the effects of predicted emissions
- discuss dust and odour generation from construction activities, especially in areas where construction activities are adjacent to existing road networks or are in close proximity to sensitive receivers
- discuss climatic patterns that could affect dust generation and movement

- discuss vehicle emissions and dust generation along major haulage routes both internal and external to the project site
- assess human health risk associated with emissions from project activities of all hazardous or toxic pollutants
- discuss impacts of air emissions on terrestrial flora and fauna.

Detail the best practice mitigation measures together with proactive and predictive operational and maintenance strategies that could be used to prevent and mitigate impacts.

Discuss potential air quality impacts from emissions, with reference to the *National Environmental Protection (Ambient Air Quality) Measure 2003* (Cwlth) and the EPP (Air). If an emission is not addressed in these legislative instruments, discuss the emission with reference to its risk to human health, including appropriate health-based guidelines/standards.

Discuss appropriate coal rail transport-related dust mitigation measures to be implemented at the project. Provide evidence of consultation with Aurizon Holdings Limited (ex QR National) Network Division to determine the likely requirements for new or upgraded coal-loading facilities, load controls and spray-on coal dust suppressant systems as a result of implementing the Aurizon Coal Dust Management Plan.

Outline how these dust mitigation measures and the Coal Dust Management Plan will be implemented in the EMP for the project.

5.7. Greenhouse gas emissions

5.7.1. Description of environmental situation

Provide an inventory of projected annual emissions for the life of the mine for each relevant greenhouse gas, with total emissions expressed in 'CO_2 equivalent' terms for the following categories:

- scope 1 emissions—means direct emissions of greenhouse gases from sources within the boundary of the facility and as a result of the facility's activities (including emission from vegetation clearing)
- scope 2 emissions—means emissions of greenhouse gases from the production of electricity, heat or steam that the facility will consume, but that are physically produced by another facility.

Briefly describe method(s) by which estimates were made.

Use the *National Greenhouse Accounts (NGA) Factors* (Commonwealth of Australia 2014) as a reference source for emission estimates, supplemented by other sources where practicable and appropriate. As a requirement of the NGA factors, estimates should include the loss of carbon sink capacity of vegetation due to clearing.

5.7.2. Potential impacts and mitigation measures

Discuss the potential for greenhouse gas abatement measures, including:

- the proposed measures (alternatives and preferred) to avoid and/or minimise direct greenhouse gas emissions, for example, using renewable technologies for project power generation
- how the preferred measures minimise emissions and achieve energy efficiency
- any opportunities to further offset greenhouse gas emissions through indirect means including sequestration and carbon trading.

5.8. Noise and vibration

5.8.1. Description of environmental values

Describe the existing noise and vibration environment that may be affected by the project in the context of the environmental values defined by the Environmental Protection (Noise) Policy 2008 (EPP (Noise)). Refer to the following documents:

- *Noise Measurement Manual, version 4* Department of Environment and Heritage Protection 2013)
- *Application requirements for activities with noise impacts* (Department of Environment and Heritage Protection 2014)
- *Australian Standard AS 2187.2-2006 Explosives – Storage, transport and use, Part 2 Use of Explosives* (Standards Australia 2006).

Identify sensitive noise receptors adjacent to all project components and estimate typical background noise and vibration levels based on surveys at representative sites. Discuss the potential sensitivity of such receptors and nominate performance indicators and standards.

If the proposed activity could adversely impact on the noise environment, undertake baseline monitoring at a selection of sensitive receptors potentially affected by the project. Sensitive receptors are defined in the EPP (Noise). Illustrate the locations of sensitive receptors on a suitably-scaled map.

Describe the results of any baseline monitoring of noise and vibration in the proposed vicinity of the project, including long-term measured background noise levels that take into account seasonal variations.

Report the daily variation of background noise levels at nearby sensitive receptors, with particular regard to detailing variations at different periods of the night. Monitoring methods should adhere to accepted best practice methodologies, relevant DEHP guidelines and Australian Standards, and any relevant requirements of the EP Regulation 2008 and the EPP (Noise).

Describe any current activities near the project area that may cause a background level of ground vibration (for example major roads, quarrying activities, etc.).

Develop and describe suitable indicators for measuring noise, and objectives that would protect the environmental values from significant noise and vibration impacts.

5.8.2. Potential impacts and mitigation measures

Describe the impacts of noise and vibration generated during the pre-construction, construction and operational phases of the project. Noise and vibration impact analysis should include:

- the levels of noise and vibration generated, including noise contours, assessed against current typical background levels, using modelling (such as Environmental Noise Model or SoundPLAN) where appropriate
- impact of noise, including low frequency noise (noise with components below 200 Hz) and vibration at all potentially sensitive receivers (for example, residences, social and public infrastructure, such as health, recreational and educational facilities, roads) compared with the performance indicators and standards nominated above in Section 5.8.1
- impact on terrestrial and avian fauna
- proposals to minimise or eliminate these effects, including details of any screening, lining, enclosing or bunding of facilities, or timing schedules for construction and operations that would minimise environmental harm and environmental nuisance from noise and vibration
- options for sensitive receptors that are otherwise unable to achieve a satisfactory internal noise level for the preservation of health and wellbeing as identified within the EPP (Noise).

Using a suitable acoustic model, predict the likely generation of noise for different times of day under a range of climatic conditions, including the expected worse case.

Describe the predictions using suitable indicators, and illustrate the predicted noise contours on suitably-scaled maps showing the locations of noise sensitive receptors. Assess the potential impacts of noise and vibration at all potentially sensitive receptors in comparison to the objectives and standards to be achieved.

The assessment of noise impacts should include matters raised in the document *The Health Effects of Environmental Noise – Other Than Hearing Loss* (enHealth Council, 2004 (or later editions)).

Assess the potential environmental impacts of noise and vibration on terrestrial and marine animals and birds, including migratory species. Also assess the potential impacts of noise and vibration on any relevant matters of national environmental significance. This information should be provided in the separate chapter or report for matters of national environmental significance.

Assess potential noise impacts on any nearby protected areas addressing amenity as well as impacts on animals. Provide information on blasting that might cause ground vibration or fly rock on, or adjacent to, the site with particular attention given to places of work, residence, recreation, worship and general amenity. Discuss the magnitude, duration and frequency of any vibration and assess the potential impacts on sensitive receptors.

Assess potential off-site noise and vibration impacts that could arise due to increased road or rail transportation directly resulting from the project.

Define and describe practical measures for protecting or enhancing environmental values from impacts by noise and vibration, including details and illustrations of any

screening, lining, enclosing or bunding. Provide a discussion of timing schedules for construction and operations with respect to minimising environmental nuisance and harm from noise and vibration.

5.9. Waste

5.9.1. Waste generation

Identify and describe all sources, likely volumes and quality (where applicable) of waste associated with pre-construction, construction, operation and decommissioning of all aspects of the project. Refer to regulated waste listed in Schedule 7 of the Environmental Protection Regulation 2008 (Qld). Describe:

- waste generated by delivery of material to site(s)
- all chemical and mechanical processes conducted on the construction sites that produce waste
- the amount and characteristics of solid and liquid waste produced on-site by the project
- hazardous materials to be stored and/or used on-site, including environmental toxicity data and biodegradability.

5.9.2. Waste management

Provide details of waste management strategies (including reduction, re-use, recycling, storage, transport and disposal of waste). Demonstrate that waste minimisation and cleaner production techniques and designs will be implemented to prevent or minimise environmental impacts when selecting processes, equipment and facilities.

Provide information on the variability, composition and generation rates of all waste produced at the site and processing plant.

Provide details of cleaner production waste management planning, especially how these concepts will be applied to prevent or minimise environmental impacts at each stage of the proposal. Discuss measures to improve natural resource use efficiency (for example, energy and water), integrated processing design, any co-generation of power and by-product re-use as shown in a material/energy flow analysis.

This information is required to enable the resource management agencies and other stakeholders to assess the efficiency of resource use, and allocation issues.

- Air emissions—provide information on air emissions, including particulates, fumes and odours, during the construction and operation stages of the project. Particulate emissions include those that would be produced by any industrial process, or disturbed by wind action on stockpiles and conveyors, or by transportation equipment (for example, trucks, either by entrainment from the load or by passage on unsealed roads). The methods to be employed to mitigate impacts from air emissions should be described in Subsection 5.6 (page 42).
- Excavated waste—describe and show the location, design and methods for constructing dumps for waste rock and subsoil. Show the location of the dumps on a map relative to topography and other natural features of the area.

- Tailings—describe the tailings waste produced by preparation and/or processing plants and the proposed methods for its disposal. Describe also the fly-ash waste produced during power generation and proposed methods available for its disposal. Describe alternative options for tailings and fly-ash disposal including the proposed location, site suitability and volume of any tailings and fly-ash storage and/or disposal site(s), including the method of construction. Discuss the options for in-pit disposal of tailings and fly-ash at various stages of mine development. For both tailings and fly-ash describe the:
  - approximate quantity of tailings and fly-ash to be produced by the project and its processing plant annually for the life of the mine; also present tailings and fly-ash characterisation information in this section
  - construction of the tailings storage facility and the fly-ash storage facility with regards to construction material and design; and how the tailings storage facility and fly-ash storage facility complies with relevant codes for the construction of such containment systems
  - strategies to monitor and manage seepage into ground and surface waters. Discuss the location of the storage and/or disposal site with regard to adjacent creeks and rivers.
- Solid waste disposal—describe the quantity and quality of solid wastes (other than waste rock, subsoil and tailings addressed in other sections) and the proposed methods of their disposal. Show the proposed location, site suitability, dimensions and volume of any landfill, including its method of construction.
- Liquid waste—present a description of the origin, quality and quantity of wastewater and any immiscible liquid waste originating from the project other than that addressed in other sections. Pay particular attention to the capacity of wastes to generate acid, and saline or sodic wastewater. A water balance for the proposal and processing plant is required to account for the estimated usage of water.

The EIS may need to consider the following effects:

- groundwater from excavations
- rainfall directly on to disturbed surface areas
- run-off from roads, plant and industrial areas, chemical storage areas
- drainage (that is, run-off plus any seepage or leakage)
- seepage from other waste storages
- water usage for:
  - process use
  - dust suppression
  - domestic purposes
- evaporation
- domestic sewage treatment—disposal of liquid effluent and sludge
- water supply treatment plant—disposal of wastes.

5.10. Transport

Present the transport assessment in separate reports for each project-affected mode (road, rail, air and sea) as appropriate for each phase of the project. These assessment reports should provide sufficient information to allow an independent assessment of how existing transport infrastructure will be affected by project transport at the local and regional level.

5.10.1. Existing infrastructure

Describe the extent, condition and capacity of the existing transport infrastructure on which the project will depend.

Include maps (at appropriate scales and level of detail) of the existing state-controlled road network identifying the state-controlled road network and other major inventory features (for example bridges along the state-controlled road network) to help establish the context of the site in relation to the network.

5.10.2. Transport activities and routes

Freight

Provide a summary of all the freight tasks (inputs and outputs, including wastes) associated with all phases of the project. The summary will be in tabular form (or other suitable format) and include for each freight task:

- tonnage/volume
- proposed transport methodologies (modes, vehicle types, payloads)
- estimates of the number of discrete trips required for each task
- origins of inputs and destinations of outputs (including wastes).

Cross-reference to the relevant section in the EIS where the task is fully described and/or assessed.

Traffic generation

For each mode of transport and each phase of the project, provide traffic generation information on:

- existing background traffic including volumes, composition, peak traffic and peak times along the transport routes to and from the project
- background traffic growth for the transport routes for all stages of the project life
- the construction of any project-related plant and utilities within or impacting on the jurisdiction of any transport authority
- the stages, timing and duration of each stage/phase and how these impact on the transport-related infrastructure
- comparison of the traffic situation and road conditions with and without the project
- expected volumes of project inputs and outputs of transported raw materials, plant, construction materials and operational equipment, waste, hazardous goods and finished products for all phases of the project

- how identified project inputs and outputs will be moved through the local and regional transport network (including number and type of vehicles, mode, volume, composition, trip timing and routes)
- traffic generated by construction and operational workforce personnel including visitors (volume, composition, timing and routes) and likely accommodation facilities
- likely heavy, oversize and indivisible loads (volume, composition, timing and routes) highlighting any vulnerable bridges and structures along proposed routes.

Provide traffic data in a format similar to ARMIS traffic data (refer Department of Transport and Main Roads) for identifying and comparing with current departmental traffic data to allow cumulative impacts of the project and nearby major development projects to be assessed. Data to be provided includes average annual daily traffic (AADT) total and (separately for each direction of traffic flow and percentage of vehicle by class) light vehicle, heavy vehicle, short vehicle, truck or bus, articulated vehicle and roadtrain in line with the Austroads Vehicle Classes.

Describe:

- access locations (existing and proposed) to state-controlled roads
- locations of proposed road-crossing points of existing and proposed rail infrastructure associated with the project.

5.10.3. Potential impacts and mitigation measures

Impact assessment reports should include details of the adopted assessment methodology (for impacts on roads: the road impact assessment report in accordance with the *Guidelines for Assessment of Road Impacts of Development* (Department of Main Roads 2006). Assessment of traffic impacts is to include the transport arrangements for permanent and temporary workforce associated with all phases of the project and the impacts on the road network from the construction phase of the project (for example haulage of construction inputs, etc.).

Assess project impacts on:

- local and state-controlled road networks, including key road and road/rail intersections, at project construction, operation and decommissioning stages. Any impact to level crossings should be assessed using the Australian Level Crossing Assessment Model (ALCAM)
- potential fatigue impacts associated with the movement of staff from major regional centres to the project site and accommodation centres
- capacity, safety, local amenity, efficiency and condition of transport operations, services and assets from either transport or project operations, including an assessment of pavement life of the road network as a result of the project. Refer, where relevant, to the *Queensland Road Safety Action Plan 2013-2015* (Department of Transport and Main Roads 2013)
- possible interruptions to transport operations
- the natural environment within the jurisdiction of an affected transport authority (for example, road and rail corridors)

- the nature and likelihood of product-spill to both land and marine environments during transport, if relevant
- driver fatigue for workers travelling to and from regional centres and key destinations
- any existing or proposed strategies for public passenger transport and active transport and address, where relevant, requirements of Part 2A of the *Transport Planning and Coordination Act 1994*
- access to transport for people with a disability
- transport and handling of hazardous substances and dangerous goods
- the cumulative impact of this project adding to the impact of other known proposed or current major projects impacting on the road network.

5.10.4. Infrastructure alterations

Detail:

- any proposed alterations or new transport-related infrastructure and services required by the project (as distinct from impact mitigation works)
- construction of any project-related plant and utilities, within or impacting on the jurisdiction of any transport authority.

Include maps (at appropriate scales and level of detail) of the existing state-controlled road network identifying:

- location of construction activities
- existing and proposed access locations to the state-controlled road network (if applicable)
- construction accommodation camps
- detail on the proposed location of project facilities in relation to the state-controlled road network, identifying any facilities which are proposed within and across state controlled road reserves.

5.10.5. Transport impact management strategies

Discuss and recommend how identified impacts will be mitigated so as to maintain safety, efficiency and condition of each mode. These mitigation strategies are to be prepared in close consultation with the Queensland Police Service, emergency services and relevant transport authorities (including local government), consider those authorities' works program and forward planning, and be in accordance with the relevant transport authorities' methodologies and design manuals.

Findings of studies and transport infrastructure impact assessments should be an input into preparing a transport management plan.

Road/rail management planning

Outline:

- procedures for assessing and agreeing on the scope of required mitigation works with road/rail corridor managers (for example, maintenance or upgrades), including any associated works, such as sourcing water and gravel

- strategies to minimise the effects of project transport on existing and future public road or rail corridors
- steps to be taken to prevent access from public roads/rail corridors to the project sites
- strategies to maintain safe access to public road/rail reserves to allow road/rail/pipeline maintenance activities
- process for decommissioning any temporary access to road/rail reserves, for example, stockpile sites.

Findings of studies and transport infrastructure impact assessments should be an input into preparing a draft road-use management plan. Conditions of approval for transport management impacts should also be detailed in the EMP.

Air service management planning

Describe the air services and their current capacity serving the region. Estimate the project's requirements for air transport to and from these regions, and the services required to supply these projections. Provide an assessment of the infrastructure needed to support the projected level of air services.

5.11. Indigenous cultural heritage

5.11.1. Cultural heritage management plan

Unless an exemption applies under section 86 of the ACH Act, a Cultural Heritage Management Plan (CHMP) must be prepared in accordance with the requirements of Part 7 of that Act. The gazetted Cultural Heritage Management Plan Guidelines may assist in the development of the CHMP.

During the EIS process, the proponent should initiate a CHMP under the ACH Act and make the EIS Coordinator aware of the progress of the CHMP approval process and of any related issues that should be addressed in the EIS assessment report. An approved CHMP in a form that complies with Part 7 of the ACH Act will ensure that the project meets the Aboriginal cultural heritage duty of care imposed by the ACH Act.

If a CHMP has not been approved when the EIS is submitted to the Coordinator-General details of the proposed steps and timeframes for finalising the CHMP must be provided.

5.11.2. Native title

Identify areas covered by applications for native title claims or native title determinations, providing boundary descriptions of native title representative body(ies), and whether it is necessary to notify the representative body(ies) or if there is evidence that native title does not exist.

Identify the potential for native title rights and interests likely to be impacted upon by the project and the potential for managing those impacts by an Indigenous land use agreement or other native title compliance outcomes.

5.12. Non-Indigenous cultural heritage

5.12.1. Description of existing non-Indigenous cultural heritage values

Include a cultural heritage study/survey that describes non-Indigenous cultural heritage sites and places, and their values.

Describe the significance of artefacts, items or places of conservation or non-Indigenous cultural heritage value likely to be affected by the project and their values at a local, regional, state and national level.

Any such study should be conducted by an appropriately qualified cultural heritage practitioner and should include the following:

- review of:
  - the Australian Heritage Places Inventory
  - the Queensland Heritage Register and other information regarding places of potential non-Indigenous cultural heritage significance
  - any local government heritage register
  - any existing literature relating to the heritage of the affected areas
- liaison with relevant community groups/organisations (for example, local historical societies) concerning places of non-Indigenous cultural heritage significance located or identified
- locations of culturally and historically significant sites, shown on maps, which could potentially be impacted by the project
- a constraints analysis of the proposed development area to identify and record non-Indigenous cultural heritage places.

5.12.2. Potential impacts and mitigation measures

Provide an assessment of any likely effects on sites of non-Indigenous cultural heritage values.

Provide strategies to mitigate and manage any negative impacts on non-Indigenous cultural heritage values and enhance any positive impacts.

As a minimum, investigation, consultation, impact assessment, management and protection strategies should satisfy statutory responsibilities and duties of care.

6. Social values and management of impacts

6.1. Description of existing social values

Conduct a social impact assessment (SIA) in consultation with the Coordinated Project Delivery Division in the office of the Coordinator-General. Matters to be considered in the SIA are detailed in the following subsections.

6.1.1. Social and cultural area

Define the project's social and cultural area of influence, including the local, district, regional and state level as relevant, taking into account the:

- potential for social and cultural impacts to occur
- location of other relevant proposals or projects
- location and types of physical and social infrastructure, settlement and land use patterns
- social values that might be affected by the project (for example, integrity of social conditions, visual amenity and liveability, social harmony, public health and wellbeing, and sense of community)
- Indigenous social and cultural characteristics such as native title rights and interests, and cultural heritage.

6.1.2. Community engagement

Consistent with national and international good practice, and with regard to local and regional strategies for community engagement, the proponent should undertake a community engagement strategy to engage at the earliest practicable stage with likely affected parties to discuss and explain the project, and to identify and respond to issues and concerns regarding social impacts. The strategy should detail all existing relevant community forums, groups and any proposal to establish additional community engagement.

Provide details of the community engagement processes used to conduct open and transparent dialogue with stakeholders. Such processes should include, but not be limited to, community reference group forums. Include any proposal to establish a common forum with other proponents and/or existing forums in the southern sector of the Galilee Basin.

Include the project's planning and design stages and future operations including affected local and state authorities. Engagement processes should consider social and cultural factors, customs and values, and, where relevant, linkages between environmental, economic, and social impact issues.

Discuss engagement strategies and processes, including how complaint resolution will be addressed, for all stages of the project.

6.1.3. Social baseline study

Undertake a targeted baseline study of the people residing in the project's social and cultural area, to identify the project's social issues, potential adverse and positive social impacts, and strategies and measures developed to address the impacts. The social baseline study should be based on qualitative, quantitative, and participatory methods. It should be supplemented by community engagement processes, and reference relevant data contained in local and state government publications, reports, plans, guidelines and documentation, including regional plans and, where available, community plans.

Describe and analyse a range of demographic and social statistics determined relevant to the project's social and cultural area including:

- major population trends and changes occurring irrespective of the project
- total population (the total enumerated population for the social and cultural area and the full-time equivalent transient population), 18 years and older

- estimates of population growth and population forecasts resulting from the proposal
- family structures
- age and gender distributions
- education, including schooling levels
- health and wellbeing measures
- cultural and ethnic characteristics
- the Indigenous population including age and gender
- income including personal and household
- labour force by occupation and industry
- housing costs—monthly housing repayments (per cent of dwellings in each category) and weekly rent (per cent of dwellings in each category), housing tenure type and landlord type, household and family type
- housing availability and affordability: the rental market (size, vacancy rate, seasonal variations, weekly rent by percentage dwellings in each category); the availability and typical costs of housing for purchase, monthly housing repayments by percentage dwellings in each category; and the availability of social housing
- disability prevalence
- the social and economic index for areas, index of disadvantage—score and relative ranking
- crime, including domestic violence
- any other indicators determined through the community engagement process as relevant.

The social baseline study should take account of current social issues such as:

- the social infrastructure, including community and civic facilities, services and networks—for definition see *South East Queensland Regional Plan 2009–2031* (Department of Infrastructure and Planning 2009)
- settlement patterns including the names, locations, size, history and cultural aspects of settlement in the social and cultural area
- the identity, values, lifestyles, vitality, characteristics and aspirations of communities in the social and cultural area, including Indigenous communities
- land use and land ownership patterns including:
  - rural properties, farms, croplands and grazing areas including on-farm activities near the proposed activities
  - the number of properties directly affected by the project
  - the number of families directly and indirectly affected by the project including Indigenous traditional owners and their families, property owners, and families of workers either living on the property or workers where the property is their primary employment.
- use of the social and cultural area for forestry, fishing, recreation, business and industry, tourism, aquaculture, and Indigenous cultural use of flora and fauna.

Cross-reference this section with Subsection 7.1 (refer to page 59).

6.1.4. Workforce profile

The SIA should include a profile of the workforce that describes the following:

Workforce demand

The estimated composition of workforce by occupation, project stage and duration (including any planned construction prior to final investment decision) using the template provided at **www.training.qld.gov.au**

Supply issues and strategies

- Analysis of relevant local, state and national workforce profiles and labour supply
- strategies and proposed programs for:
  - recruitment and attraction
  - population groups (including Indigenous people, women, secondary school students and unemployed and underemployed)
  - unskilled and semi-skilled labour requirements
  - structured training (apprenticeships, traineeships, graduates)
  - analysis of impact on local community workforce.

6.2. Potential impacts

Assess and describe the type, level and significance of the project's social impacts (both beneficial and adverse) on the local and cultural area, based on outcomes of community engagement processes and the social baseline study. Furthermore:

- describe and summarise outcomes of community engagement processes including the likely response of the affected communities, including Indigenous people
- include sufficient data to enable affected local and state authorities to make informed decisions about the project's effect on their business and plan for the provision of social infrastructure in the project's social and cultural area. If the project is likely to result in a significant increase in the population of the area, then the proponent should consult the relevant management units of the state authorities and summarise the results of the consultations
- address direct, indirect and secondary impacts from any existing projects and the proposed project including an assessment of the size, significance, and likelihood of these impacts at the local and regional level. Consider the following:
  - key population and demographic shifts; disruptions to existing lifestyles, the health and social wellbeing of families and communities; social dysfunction including alcohol and drugs, crime, violence, and social or cultural disruption due to population influx
  - the needs of vulnerable groups including unemployed, those with low social-economic status, women, children and young people, the aged and people with a disability
  - Indigenous peoples including cultural property issues
  - local, regional and state labour markets during the construction and operational phases, with regard to the source of the workforce. Present this information

according to occupational workforce groupings. Detail whether the proponent and/or contractors are likely to employ locally or through other means, including internationally, and whether there are initiatives for local employment business opportunities and how these workforce strategies relate and align to state and Commonwealth resource workforce planning, skill development and training strategies and policies

- proposed new skills and training related to the project including the occupational skill groups required and potential skill shortages anticipated
- how much service revenue and work from the project would be likely to flow to the project's social and cultural area
- impacts of construction and operational workforces, their families, and associated contractors on housing and accommodation availability and affordability, land use and land availability. Discuss the capability of existing housing and rental accommodation to meet any additional demands created by the project, including direct impacts on Indigenous people.

6.2.1. Cumulative impacts

Evaluate and discuss the potential cumulative social impacts resulting from the project including an estimation of the overall size, significance and likelihood of those impacts. Cumulative impacts, in this context, is defined as the additional impacts on population, workforce, accommodation, housing, and use of community infrastructure and services, from the project, and other proposals for development projects in the area, which are publicly known or communicated by the office of the Coordinator-General, if they overlap the proposed project in the same timeframe as its construction period.

Discuss the concept of longitudinal cumulative impacts, or 'project fatigue', where the community in the study area has been subject to a number of large-scale construction projects in recent years.

6.3. Impact mitigation measures and management strategies

For identified social impacts, social impact mitigation strategies and measures should be presented to address the:

- recruitment and training of the construction and operational workforces and the social and cultural implications this may have for the host community, including if any part of the workforce is sourced from outside the social and cultural area
- housing and accommodation issues
- demographic changes in the profile of the region and the associated sufficiency of current social infrastructure, particularly health and welfare, education, policing and emergency services
- adequate provision of education, training and employment for women, people with a disability, and Indigenous peoples.

Describe any consultation about acceptance of proposed mitigation strategies, and how practical management and monitoring regimes would be implemented.

Discuss special strategies that might be deployed by the proponent during all stages of the project to mitigate 'project fatigue' impacts.

6.3.1. Social impact management plan

Present a draft social impact management plan (SIMP) that promotes an active and ongoing role for impacted communities and local authorities through the project life cycle. The draft plan should cover:

- assignment of accountability and resources
- updates on activities and commitments
- mechanisms to respond to public enquiries and complaints
- mechanisms to resolve disputes with stakeholders
- periodic evaluation of the effectiveness of community engagement processes
- practical mechanisms to monitor and adjust mitigation strategies and action plans
- action plans to implement mitigation strategies and measures.

For further information refer to *Social impact assessment guideline* (Department of State Development, Infrastructure and Planning 2013).

7. Economies and management of impacts

7.1. Description of affected local and regional economies

Describe the existing economy in which the project is located and the economies materially impacted by the project. Include:

- a map illustrating the local and regional economies (local government areas—LGAs) that could be potentially affected by the project
- gross regional product or other appropriate measure of annual economic production
- demographic and employment profile of the study area as a whole and disaggregated by LGA. Include:
  - existing population (size, age, distribution)
  - existing community profiles of the LGAs directly affected by the project (household type, size, average income)
  - existing employment statistics (part-time/full-time, by occupation)
  - the regional economy's key industries and their contribution to regional economic income
- sufficient baseline economic data to underpin a comprehensive assessment of the direct, indirect, cumulative, costs and impacts of the project
- the key regional markets relevant to the project:
  - labour market
  - education and training markets
  - housing and land markets
  - construction services, building inputs and extractive resources market

– regional competitive advantage and expected future growth.

With regard to the region's key industries and factor prices, provide information on:

- current input costs (for example, wage rates, building costs, housing rent)
- land values in the region by type of use.

7.2. Potential impacts and mitigation measures

The potential impacts should consider local, regional, state and national perspectives as appropriate to the scale of the project.

The analysis should describe both the potential and direct economic impacts including estimated costs, if material, on industry and the community, assessing the following:

- property values
- industry output
- employment
- the indirect impacts likely to flow to other industries and economies from developing the project, and the implications of the project for future development
- the potential impact on extractive resource availability in the regions both during and after construction and any economic consequences for the regions
- the distributional effects of the proposal including proposals to mitigate any negative impact on disadvantaged groups.

7.2.1. Strategies for local participation

The assessment of economic impacts should outline strategies to encourage participation by local industry and the local workforce, including:

- strategies for assessing the capacity and cost-effectiveness of sourcing goods and services from the regional and wider state economy during the pre-construction, construction, operation and rehabilitation phases of the project
- strategies for ensuring local suppliers of goods and services receive full, fair and reasonable opportunity to tender for work throughout the life of the project. Government-funded projects must prepare a Statement of Intent (SOI) in accordance with the *Charter for Local Content* (Department of State Development, Infrastructure and Planning 2014). Private sector projects without government funding are recommended voluntarily to apply the policy's principles, for example, by preparing a SOI and working with the Queensland Office of the Industry Capability Network (**www.icnqld.org.au**) to promote tender opportunities and identify capable local suppliers. Also have regard to the *Queensland Resources and Energy Sector Code of practice for local content* (Queensland Resources Council 2013) and its associated guidelines
- employment strategies for local residents including members of Indigenous communities and people with a disability, including a skills assessment and recruitment and training programs to be offered
- strategies adopting relevant government policy, relating to the level of training provided for construction contracts on Queensland Government building and construction contracts, with regard to the *Queensland Government Building and*

Construction Training Policy (Department of Education, Training and Employment 2014)

7.2.2. Impact upon property management

Address the current and future management processes for adjacent properties that are likely to be impacted by the project during construction and/or operation and how these impacts will be managed. Mention the:

- impact of the project on existing agricultural land uses and management practices (for example, disruption to stockyards, fences, water points, sowing or harvesting of crops, increased risk of spread and establishment of weeds and pest animals, movement of livestock, agricultural machinery and any loss of agricultural land)
- impact of the project on residential, commercial and industrial land uses, property values and property management practices
- range of measures required to mitigate real and potential disruptions to rural, residential, commercial and industrial property uses and management practices.

8. Hazard and risk

8.1. Hazard and risk assessment

Describe the potential hazards and risks to people and property that may be associated with the project, which may include but are not restricted to:

- identifying potential hazards, accidents, spillages, fire and abnormal events that may occur during all stages of the project, including possible risk of occurrence
- identifying all hazardous substances to be used, stored, processed or produced and the rate of usage
- potential wildlife hazards, natural events (for example, cyclone, storm surge, flooding, bushfire) and implications related to climate change
- lack of baseline information to inform/measure:
  - direct impact on the water resources and vulnerable assets
  - indirect impacts on environment that is supported by the water resource
  - consequential impacts
  - cumulative impacts
- lack of adequate proposed monitoring and/or demonstrated capacity to manage environmental consequences
- likelihood of subsidence uncertain and/or not adequately monitored or managed
- likelihood of disruption to aquifer flow or creation of aquifer interconnectivity
- uncertain and/or not adequately monitored or managed drawdown of water table
- co-produced water or mine water not adequately monitored or managed
- groundwater dependent ecosystems significantly impacted
- likelihood of surface water adversely impacted
- possibility of drinking water and irrigation supply contamination.

Undertake a preliminary risk assessment for all components of the project, as part of the EIS process in accordance with *Australia/New Zealand AS/NZS ISO 31000:2009 Risk management—Principles and guidelines* (Standards Australia/Standards New Zealand 2009) and *Managing environment-related risk* (HB203:2012) (Standards Australia 2012). The National Emergency Risk Assessment Guidelines (NERAG) should also be considered. With respect to risk assessment, the EIS must:

- deal comprehensively with external and on-site risks including transport risks
- assess risks during the pre-construction, construction, operational and decommissioning phases of the project
- include an analysis of the consequences of each hazard on safety in the project area, examining the likelihood of both individual and collective consequences, involving injuries and fatalities to workers and to the public
- present quantitative levels of risks from the above analysis.

Provide details on the safeguards that would reduce the likelihood and severity of hazards, consequences and risks to persons, within and adjacent to the project area(s).

Present a comparison of assessed and mitigated risks with acceptable risk criteria for land uses in and adjacent to the project area(s).

Identify the residual risk following application of mitigation measures. Present an assessment of the overall acceptability of the impacts of the project in light of the residual uncertainties and risk profile.

Conduct a hazard identification study to identify the nature and scale of hazards that might occur during the construction and operation of the project. This would be expected to include hazards involving:

- construction accidents
- pipeline, processing unit or storage vessel rupture or loss of containment, and explosions and fires associated with such incidents
- release to the environment of liquid gaseous or particulate pollutants or any other hazardous material used, produced or stored on the site
- spills of materials during loading, unloading and transport
- the extent of heatflux and/or overpressure zones following hazard/ignition incidents (for example, in terms of 23 kW/m^2, 5 kW/m^2 heatflux and 35 kPa and 7 kPa overpressure end points)
- natural events such as cyclones, earthquakes, bushfires or local flooding.

A set of representative incident scenarios should be selected. This set should include credible event scenarios (for example, a catastrophic failure of a processing unit and the consequential explosion zone). This will require an evaluation of the likelihood of each scenario occurring in order to calculate the level of risk in surrounding areas due to the presence of the facility.

The risk analysis should include fatality and serious injury consequences, and present individual fatality risk contours at 0.5, 1, 5, 10, and 50 x 10^{-6} per year and injury risk

contours at 10 and 50 x 10^{-6} per year. Risk contours should be presented on a suitably scaled location map.

In addition, the proponent must undertake a detailed risk assessment of the plant and associated operational activities to identify risks and mitigation measures to ensure containment within the site boundaries, so as not to impact on future industrial development on adjacent industrial land. Any identified impact on the project should also be extended to determine the resultant impact on the surrounding areas and community.

Assess the acceptability of the risk on-site and to surrounding land uses by referring to nationally adopted risk criteria presented in the New South Wales Department of Urban Affairs and Planning's *Hazardous Industry Planning Advisory Paper No. 4: Risk Criteria for Land Use Safety Planning* (Department of Planning (NSW) 2008). Provide details of the methodology and results of each step described above.

8.2. Health and safety

8.2.1. Description of public health and safety community values

Describe the existing health and safety values of the community, workforce, suppliers and other stakeholders in terms of the environmental factors that can affect human health, public safety and quality of life, such as air pollutants, odour, lighting and amenity, dust, noise, water, disease vectors, pests and vermin.

Describe how potable water will be treated, stored and tested in accordance with the microbiological, physical and chemical standards stipulated in *Australian Drinking Water Guidelines Paper 6, National Water Quality Management Strategy* (Commonwealth of Australia 2011 as revised December 2013). Include the establishment and adoption of an appropriate risk framework to ensure a safe potable water supply.

Provide a description of existing health services in the neighbouring community/towns.

8.2.2. Potential impact and mitigation measures

Define and describe the objectives and practical measures for protecting or enhancing health and safety community values. Describe how nominated quantitative standards and indicators may be achieved for social impact management, and how the achievement of the objectives will be monitored, audited and managed. Develop a mosquito and pest management plan for the entire site and in particular areas where it is intending to pond significant volumes of water. Refer to *Guidelines to minimise mosquito and biting midge problems in new development areas* (Queensland Health 2002).

Assess the cumulative effects on public health values and occupational health and safety impacts on the community, workforce and regional health services from project operations and emissions. Recommend any practical monitoring regimes in this section.

Include relevant consultation with the appropriate regional health service providers.

Provide:

- information on the provision of health care facilities for project personnel at the mine site and personnel at the accommodation village. Where medical facilities are to be provided it must be noted that the requirements of the Health (Drugs and poisons) Regulations 1996 will be applicable
- a description of how the proponent will manage the delivery of health services and/or support/strengthen local health services. Specify how health services will be provided to the workforce and/or how the proponent intends to support local health services
- an outline of the proposed arrangements with local services and those provided by the relevant Health Services regarding emergency management protocols and procedures
- information on how utilities (water, electricity, gas) serving health facilities will be managed and distributed (if applicable)
- an assessment of the risk relating to the health and well-being of workers and residents in the surrounding area from the transmission of communicable diseases. This assessment should incorporate relevant programs such as incorporate/highlight any proposed vaccination, monitoring, and response program.

8.3. Emergency management plan

Present preliminary information on the design and operation of proposed safety/contingency/notification systems to address significant emergency issues delineated in the risk assessment, together with at least the following areas of emergency:

- fire prevention/protection
- leak detection/minimisation
- release of contaminants
- emergency shutdown systems and procedures
- natural disasters
- onsite drinking water incident.

In addition, undertake an assessment of businesses that may be affected in the event of an emergency, including strategies to mitigate the impact on these businesses.

In regard to fires, outline strategies to manage the provision of:

- fire management systems to ensure the retention on-site of fire water or other fire suppressants used to combat emergency incidents
- building fire safety measures for any construction or permanent accommodation
- details of any emergency response plans and bushfire mitigation plans
- on-site firefighting equipment provided and the level of training of staff who will be tasked with emergency management activities
- detailed maps showing the plant outline, potential hazardous material stores, incident control points, firefighting equipment and the like

- an outline of any dangerous goods stores associated with the plant operations, including fuel storage and emergency response plans.

Present outlines of emergency planning and response strategies, including a protocol to identify and notify relevant parties, to deal with relevant incidents above, which have been determined in consultation with state and regional emergency service providers, and which show integration of emergency services into the plans.

Present plans for emergency medical response and transport and first aid matters with involvement of the relevant state agencies (such as the Queensland Ambulance Service, Queensland Fire and Emergency Services, Emergency Management Queensland and Queensland Police Service).

9. Cumulative impacts

Summarise the project's cumulative impacts and describe these impacts in combination with those of existing or proposed project(s) publicly known or advised by the office of the Coordinator-General to be in the region, to the greatest extent practicable. Assess cumulative impacts with respect to both geographic location and environmental values. In particular, address cumulative impacts in sensitive environmental areas identified in Section 5.3.1 of this TOR (refer to page 27).

Explain the methodology used to determine the cumulative impacts of the project, detailing the range of variables considered (including relevant baseline or other criteria upon which the cumulative aspects of the project have been assessed, where applicable).

10. Sustainable development

Provide a comparative analysis of how the project conforms to the objectives for 'sustainable development'—see the *National Strategy for Ecologically Sustainable Development* (Commonwealth of Australia 1992).

Consider the cumulative impacts (both beneficial and adverse) of the project from a life-of-project perspective, taking into consideration the scale, intensity, duration and frequency of the impacts to demonstrate a balance between environmental integrity, social development and economic development.

This information is required to demonstrate that sustainable development aspects have been considered and incorporated during the scoping and planning of the project.

11. Environmental management plan

Detail the EMPs for the construction and operational phases of the project. The EMP should be developed from, and be consistent with, the information in the EIS. The EMP must meet the requirements of section 203 of the EP Act, address discrete project elements and provide life-of-proposal control strategies. It must be capable of being read as a stand-alone document without reference to parts of the EIS.

The EMP must comprise the following components for performance criteria and implementation strategies:

- the proponent's commitments to acceptable levels of environmental performance, including environmental objectives, performance standards and associated measurable indicators, performance monitoring and reporting
- impact prevention or mitigation actions to implement the commitments
- corrective actions to rectify any deviation from performance standards
- an action program to ensure the environmental protection commitments are achieved and implemented. This will include strategies in relation to:
  - continuous improvement
  - environmental auditing
  - monitoring
  - reporting
  - staff training
  - where relevant, a rehabilitation program for land proposed to be disturbed under each relevant aspect of the proposal.

The recommended structure of each element of the EMP is shown below.

Element/issue	**Aspect of construction or operation to be managed (as it affects environmental values).**
Operational policy	The operational policy or management objective that applies to the element.
Performance criteria	Measurable performance criteria (outcomes) for each element of the operation.
Implementation strategy	The strategies, tasks or action program (to nominated operational design standards) that would be implemented to achieve the performance criteria and also include the implementation agency for each element of the EMP.
Monitoring	The monitoring requirements to measure actual performance (for example, specified limits to pre-selected indicators of change).
Auditing	The auditing requirements to demonstrate implementation of agreed construction and operation environmental management strategies and compliance with agreed performance criteria.
Reporting	Format, timing and responsibility for reporting and auditing of monitoring results.
Corrective action	The action (options) to be implemented in case a performance requirement is not reached and the person(s) responsible for action (including staff authority and responsibility management structure).

The proponent's commitments to environmental performance, as described in the EMP, may be included in the Coordinator-General's evaluation report as conditions, to ensure the commitments are met. Therefore, the EMP is a relevant document for project approvals, environmental authorities and permits, and may be referenced by them.

12. Matters of National Environmental Significance

This section should provide a stand-alone description and detailed assessment of the impacts of the project on the controlling provisions for the project under the EPBC Act inclusive of any avoidance, mitigation and offset measures. This section should also cross-reference to the relevant section in the EIS that address each of the requirements under Division 5.2 of the Environment Protection and Biodiversity Conservation Regulations 2000 not covered below.

The controlling provisions under the EPBC Act relevant to this project are:

- listed threatened species and communities (sections 18 and 18A)
- listed migratory species (sections 20 and 20A)
- a water resource, in relation to coal seam gas development and large coal mining development (sections 24C and 24D).

Consider any relevant advice, policy statements and guidelines available at **www.environment.gov.au** including but not limited to:

- *Significant impact guidelines 1.1: Matters of National Environmental Significance*
- *Significant impact guidelines 1.3: Coal seam gas and large coal mining developments—impacts on water resources*
- *Information Guidelines for Independent Expert Scientific Committee advice on coal seam gas and large coal mining development proposals*
- EPBC Act*, Environmental Offsets Policy, 2012* (EPBC Act Offsets Policy)
- approved conservation advice, recovery plans and threat abatement plans.

Insofar as it relates to each matter of national environmental significance, this section must include:

- a description of the relevant direct, indirect and cumulative impacts of the project
- a detailed assessment of the nature and extent of the likely short-term and long-term relevant impacts
- a statement whether any relevant impacts are likely to be unknown, unpredictable or irreversible
- analysis of the significance of the relevant impacts
- any technical data and other information used or needed to make a detailed assessment of the relevant impacts, including:
  - the source of the information
  - how recent the information is
  - how the reliability of the information was tested
  - what uncertainties (if any) are in the information
- a description of the measures to avoid the relevant impacts of the project
- a description of, and an assessment of the expected or predicted effectiveness of, measures to mitigate the relevant impacts of the project
- any statutory or policy basis for the mitigation measures

- the likely residual impacts, including reasons why the avoidance or mitigation of impacts is not achieved
- identification and analysis of the significant residual impacts
- details of the proposed offsets package to compensate for residual significant impacts and an analysis of how the offset meets the requirements of the EPBC Act Offsets Policy
- an overall conclusion as to the environmental acceptability of the project on each matter of national environmental significance, including:
  - a discussion on the consideration with the requirements of the EPBC Act, including the objects of the EPBC Act, the principles of ecologically sustainable development and the precautionary principle
  - reasons justifying undertaking the project in the manner proposed, including the acceptability of the avoidance and mitigation measures
  - a discussion of residual significant impacts and any offsets and compensatory measures proposed or required for residual significant impacts, and the relative degree of compensation and acceptability.

12.1. Listed threatened species and communities

In relation to listed threatened species and communities the EIS must:

- provide details of the scope, timing, effort and methodology for studies or surveys used to provide information on the listed species or community or habitat that may be impacted as a result of the project
- include details of the application of best practice survey guidelines and how studies or surveys are consistent with (or a justification for divergence from) published Australian Government advice, policy statements and guidelines
- discuss how the project would be consistent with approved conservation advice for the species or community
- demonstrate that the project will not be inconsistent with:
  - Australia's obligations under:
    - the Biodiversity Convention
    - the Convention on Conservation of Nature in the South Pacific (Apia Convention)
    - Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)
  - a recovery plan or threat abatement plan.

12.2. Listed migratory species

In relation to listed migratory species the EIS must:

- provide details of the scope, timing, effort and methodology for studies or surveys used to provide information on the listed species or habitat that may be impacted as a result of the project

- include details of the application of best practice survey guidelines and how studies or surveys are consistent with (or a justification for divergence from) published Australian Government advice, policy statements and guidelines
- discuss how the project would be consistent with approved conservation advice for the species
- demonstrate that the project will not be inconsistent with:
  - the Bonn Convention
  - China–Australia Migratory Bird Agreement (CAMBA)
  - Japan–Australia Migratory Bird Agreement (JAMBA)
  - an international agreement approved under subsection 209(4) of the EPBC Act.

12.3. A water resource, in relation to coal seam gas development and large coal mining development

The EIS must:

- address the *Information Guidelines for Independent Expert Scientific Committee advice on coal seam gas and large coal mining development proposals* and provide a cross-reference table to identify where each component of the guidelines has been addressed
- provide maps and hydrographs to present standing groundwater water levels, potentiometric heads and groundwater flow for each individual hydrogeological unit potentially impacted. These should be presented to show pre-mining or existing conditions, conditions during mining and post-mining recovery conditions at the regional and smaller (project area) scale
- adequately characterise and assess faults within the project area and their potential influence on groundwater drawdown, changes to groundwater flow, and inter-aquifer connectivity
- provide technical data or other information used to model or assess the relevant impacts, or which is needed to make a detailed assessment of the relevant impacts, including:
  - hydrogeological parameters and boundary conditions used in the construction of any groundwater models
  - bore logs, baseline bore data and hydrographs
  - raw data such as records of seasonal and/or historic annual variations in water quality and quantity, bore logs and water quality parameters (such as relevant inorganic chemicals)
  - mapping and hydrographs to illustrate modelled drawdown (both at local and regional scales)
  - modelled head distribution
  - bore locations and geological structures to assist in the interpretation of model outcomes
  - data such as dates and locations of measurements, flow conditions, and elevations of the reference points from which water levels were measured.

- provide an uncertainty analysis of data, including seasonal and long-term climate variations as well as the development of the activity over time. All results of modelling should take account of the sensitivity and uncertainty of the model. If the potential impacts are significant and the predictions subject to significant uncertainty, then present results in a probabilistic way (as data ranges with probabilities stated).

12.4. Environmental record of person(s) proposing to take the action

This section must address the environmental record of the person proposing to take the action including details of any proceedings under a Commonwealth, State or Territory law for the protection of the environment or the conservation and sustainable use of natural resources against:

- the person proposing to take the action
- for an action for which a person has applied for a permit; the person making the application.

13. Conclusions and recommendations

Make conclusions and recommendations with respect to the project, based on the studies presented, the EMP, the SIMP and conformity of the project with legislative and policy requirements.

14. References

All references and sources of data consulted in the preparation of the EIS should be presented in this section of the EIS in a recognised format.

15. Appendices

Provide the following as appendices to the EIS:

- final TOR for this EIS
- TOR cross-reference table, which links the requirements of each section/subsection of the TOR with the corresponding section/subsection of the EIS, where those requirements have been addressed
- a list of the project approvals required by the project
- the consultation report, as described in Subsection 3.7 (page 6)
- a list of the relevant qualifications and experience of the key study team members and specialist sub-consultants
- a glossary of technical terms
- a list of abbreviations
- any reports of specialist studies undertaken as part of the EIS. Reports should contain a reference list for the source of data used in the preparation of the report

- a copy of the proponent's corporate environmental policy and planning framework document
- a list of all commitments made by the proponent in the EIS, with cross-references to the relevant section in the EIS
- a copy of the proponent's land acquisition protocols.

Acronyms and abbreviations

Acronym/abbreviation	Definition
AADT	Average Annual Daily Traffic
ACH Act	*Aboriginal Cultural Heritage Act 2003* (Qld)
ANZECC	Australian and New Zealand Environment and Conservation Council
APDS	Annual Pest Distribution Survey
ARMCANZ	Agriculture and Resource Management Council of Australia and New Zealand
AS/NZS	Australian standard/New Zealand standard
CHPP	Coal Handling and Preparation Plant
CHMP	cultural heritage management plan
CLR	Contaminated Land Register
DEHP	Department of Environment and Heritage Protection, Queensland
DNRM	Department of Natural Resources and Mines, Queensland
EIS	environmental impact statement
EMP	environmental management plan
EMR	Environmental Management Register
EP Act	*Environmental Protection Act 1994* (Qld)
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Cwlth)
EPC	Exploration Permit for Coal
EPP	environmental protection policy (water, air, waste, noise)
ERA	environmentally relevant activity
EVNT	Endangered, vulnerable and near-threatened
IESC	Independent Expert Scientific Committee on Coal Seam Gas and Large Coal Mining Development
LGA	Local Government Area
MCU	Material Change of Use
MLA	Mining lease area
MNES	Matters of National Environmental Significance
Mtpa	Million tonnes per annum
NC Act	*Nature Conservation Act 1992* (Qld)
NGA	National Greenhouse Accounts
QMAN	Quarry Material Allocation Notice
RE	regional ecosystem (for a definition, refer to the Glossary)
REDD	Regional Ecosystem Description Database
ROM	Run of Mine
RPI Act	*Regional Planning Interests Act 2014* (Qld)
SCA	Strategic Cropping Area
SCL	Strategic cropping land
SDPWO Act	*State Development and Public Works Organisation Act 1971* (Qld)

SIA	social impact assessment
SIMP	Social Impact Management Plan
SOI	Statement of intent
SPA	*Sustainable Planning Act 2009* (Qld)
SEWPaC	Department of Sustainability, Environment, Water, Population and Communities
The proponent	Macmines Austasia Pty Ltd
TI Act	*Transport Infrastructure Act 1994* (Qld)
TOR	terms of reference
TORUM Act	*Transport Operations (Road Use Management) Act 1995* (Qld)
VM Act	*Vegetation Management Act 1999* (Qld)
WSSR Act	*Water Supply (Safety and Reliability) Act 2008* (Qld)

Glossary

Term	Definition
afflux	A flow to or toward an area.
aquifer	A water bearing stratum.
assessable vegetation	Vegetation in which clearing is assessable development under Schedule 3, Part 1, Table 4, Item 1 of SPA.
Australian Height Datum	A mapping system applied to Australia, which uses a datum, or agreed level, from which the heights of naturally occurring features can be measured; this level, to which the value of zero is given, is equivalent to the mean sea level for 1966–68 at thirty tide gauges around the coast of the Australian continent.
benthic substrate	Pertaining to the bottom of a body of water.
biodiversity	Biodiversity is short for 'biological diversity'. It describes the natural diversity of native wildlife, together with the environmental conditions necessary for their survival and includes: a) regional diversity, that is, the diversity of the landscape components of a region, and the functional relationships that affect environmental conditions within ecosystems b) ecosystem diversity, that is, the diversity of the different types of communities formed by living organisms and the relations between them c) species diversity, that is, the diversity of species d) genetic diversity, that is, the diversity of genes within each species.
bunding	An artificial created boundary, usually in the form of an embankment used to prevent sediment and substances from entering a water steam or storage facility.
cathodic protection	Method of protection for iron and steel against electrochemical corrosion
community	An assemblage of interdependent populations of different species (plants and animals) interacting with one another, and living in a particular area.
controlled action	A proposed action that is likely to have a significant impact on a matter of national environmental significance; the environment of Commonwealth land (even if taken outside Commonwealth land); or the environment anywhere in the world (if the action is undertaken by the Commonwealth). Controlled actions must be approved under the controlling provisions of the EPBC Act.
controlling provision	The matters of national environmental significance, under the EPBC Act, that the proposed action may have a significant impact on.
Coordinator-General	The corporation sole constituted under section 8A of the *State Development and Public Works Organisation Act 1938* and preserved, continued in existence and constituted under section 8 of the SDPWO Act.
CORVEG	Queensland Herbarium's site based floristic dataset containing field survey data
ecosystem	A biophysical environment containing a community of organisms.
effluent	Outflow of treated wastewater.
ephemeral	Transitory, short-lived.

endangered	A species is endangered if: • there have not been thorough searches conducted for the wildlife and the wildlife has not been seen in the wild over a period that is appropriate for the life cycle or form of the wildlife, or • the habitat or distribution of the wildlife has been reduced to an extent that the wildlife may be in danger of extinction, or • the population size of the wildlife has declined, or is likely to decline, to an extent that the wildlife may be in danger of extinction, or • the survival of the wildlife in the wild is unlikely if a threatening process continues.
endemism	The ecological state of being unique to a defined geographic location, such as an island, nation or other defined zone, or habitat type.
erosion	The process by which rocks are loosened, worn away and removed from parts of the earth's surface.
forestry products	As defined under the *Forestry Act 1959*, Forest Products include, though are not limited to, all merchantable timber whether alive or dead standing or fallen; all quarry material, rock, stone, gravel, sand or earth.
geomorphology	The form or shape of the landscape and the processes that modify or change it.
groundwater	Water found underground in porous rock or soil strata.
habitat	The biophysical medium or media occupied (continuously, periodically or occasionally) by an organism or group of organisms.
Habitat corridor	A strip of habitat that facilitates fauna movement between otherwise isolated patches of habitat.
lacustrine environments	A lake or lake-like environment. Wetlands and deepwater habitats with all of the following characteristics: (1) situated in a topographic depression or dammed river channel; (2) lacking trees, shrubs, persistent emergent plants, mosses, or lichens with greater than 30% areal coverage; and (3) total area exceeds 8 ha (20 acres).
listed species	A plant or animal included in a schedule of vulnerable, rare or endangered biota, such as the schedules in the EPBC Act or the Nature Conservation (Wildlife) Regulation 2004 (Qld).
mitigation	The effort to eliminate or reduce impacts.
native species	A species that is indigenous to Australia or an external territory, or periodically or occasionally visits.
native wildlife	Any taxon or species of wildlife indigenous to Australia.
natural environment	The complex of atmospheric, geological, and biological characteristics found in an area in the absence of artefacts or influences of a well-developed technological human culture.
palaeontologic	The study of fossils to determine the structure and evolution of extinct animals and plants.
permeability	The capacity of a material (rock) to transmit fluids (groundwater).
porosity	That fraction of total rock volume which is filled with water, gas, or oil.
proponent	The entity or person who proposes a significant project. It includes a person who, under an agreement or other arrangement with the person who is the existing proponent of the project, later proposes the project.

regional ecosystems (REs)	Regional ecosystems were defined by Sattler and Williams (1999) as vegetation communities in a bioregion that are consistently associated with a particular combination of geology, landform and soil.
regrowth	A young, usually even-aged forest stand that has regenerated after disturbance.
rehabilitation	Making the land useful again after a disturbance. It involves the recovery of ecosystem functions and processes in a degraded habitat.
remnant vegetation	Vegetation, part of which forms the predominant canopy of the vegetation: • covering more than 50 per cent of the undisturbed predominant canopy • averaging more than 70 per cent of the vegetation's undisturbed height composed of species characteristic of the vegetation's undisturbed predominant canopy.
riparian	Pertaining to, or situated on the bank of, a body of water, especially a watercourse such as a river.
run-off	The amount of rainfall which actually ends up as stream flow, also known as rainfall excess.
sediment	Any usually finely divided organic and/or mineral matter deposited by air or water in non-turbulent areas.
sensitive receptor	Those locations or areas where dwelling units or other fixed, developed sites of frequent human use occur including publicly known proposed development sites and accommodation camps.
significant project	A project declared as a 'significant project' by the Coordinator-General, under section 26 of the SDPWO Act.
sodic soil	A sodic soil is defined as one in which more than 10–15 per cent of the clay's negative charge is balanced by sodium ions.
stratigraphy	Rock strata, especially the distribution, deposition, and age of sedimentary rocks.
terrestrial	Pertaining to land, the continents, and/or dry ground. Contrasts to aquatic.
under stress	Aquifer water level conditions as defined by DEHP
visual absorption capacity	The landscape's ability to absorb physical changes without transformation in its visual character and quality. The intrinsic capacity of a landscape unit to dissimulate the industrial structures of a specific project without compromising its unique character.
water asset	Water, or the rights or other claims to water, which the water report entity either holds, or for which the water report entity has management responsibilities, and from which an individual or organisation that is a water report entity, or a group of stakeholders of a physical water report entity, derives future benefits (as defined in Exposure Draft of Australian Water Accounting Standard 1 (2010)—Water Accounting Standards Board)

Appendix 1. Policies and guidelines

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