



The Coordinator-General



# South Galilee Coal Project

Terms of reference for an environmental  
impact statement

November 2010



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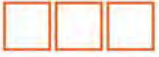
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# Synopsis

The South Galilee Coal project (SGCP), a joint venture between AMCI (Alpha) Pty Ltd and Alpha Coal Pty Ltd (the proponent), is a proposal to develop and operate a 15-20 million tonne per annum (Mtpa) coal mine in the Galilee Basin in central Queensland to service export markets for thermal coal.

The project would involve the development of a combined open-cut and underground mining operation and associated infrastructure including: a coal handling and preparation plant, a water pipeline, a rail spur to connect to common-user railway and port services, electricity transmission lines and accommodation facilities to support a fly-in-fly-out workforce.

The project is expected to require a total investment of approximately \$1.5 billion, with a workforce of 1500 people during construction and 750 employees to operate the mine. Subject to the outcome of the feasibility study and obtaining all the necessary approvals, the proponent is targeting initial coal exports in 2014-15.

The Coordinator-General has declared the project to be a 'significant project' requiring an environmental impact statement (EIS) under section 26(1)(a) of the *State Development and Public Works Organisation Act 1971*.

The Commonwealth Government has determined that the project constitutes a controlled action pursuant to the *Environment Protection and Biodiversity Conservation Act 1999*.

The declaration of the project as a 'significant 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 environmental impact statement process.

The EIS process is being coordinated by the Department of Infrastructure and Planning (DIP) on behalf of the Coordinator-General.

Terms of reference (TOR) set out the requirements, both general and specific, that the proponent should address in preparing the EIS. These TOR have been prepared having regard to comments and submission received on the draft TOR released for public comment over the period of 7 August 2010 to 13 September 2010.

The TOR are divided into two parts:

- Part A—general information and administrative procedures
- Part B—specific requirements and structure of the EIS.



# Abbreviations

The following abbreviations have been used in this document:

ACH Act	<i>Aboriginal Cultural Heritage Act 2003</i> (Qld)
AMCI	AMCI (Alpha) Pty Ltd
ANZECC	Australian and New Zealand Environment and Conservation Council
ARMCANZ	Agriculture and Resource Management Council of Australia and New Zealand
Bandanna	Bandanna Energy Pty Ltd, owners of Alpha Coal Pty Ltd
CAMBA	China-Australia Migratory Bird Agreement
CHMP	cultural heritage management plan
CHPP	Coal handling and preparation plant
CHRC	Central Highland Regional Council
CLR	Contaminated Land Register
DERM	Department of Environment and Resource Management
DIP	Department of Infrastructure and Planning
DME	former Department of Mines and Energy
EIS	environmental impact statement
EMP	environmental management plan
EP Act	<i>Environmental Protection Act 1994</i> (Queensland)
EPA	former Environmental Protection Agency
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i> (Commonwealth)
EPC	exploration permit for coal
EPP	<i>Environmental Protection Policy</i> (water, air, waste, noise)
EPP (Water)	<i>Environmental Protection (Water) Policy 2009</i>
FIFO	fly-in-fly-out
GOAL	good quality agricultural land
JAMBA	Japan-Australia Migratory Bird Agreement
JORC	Joint Ore Reserve Committee
kV	kilovolt
MDL	mineral development licence
ML	megalitres
MNES	Matters of national environmental significance (under the EPBC Act)
MRA	<i>Mineral Resources Act 1989</i> (Queensland)
Mt	million tonnes
Mtpa	million tonnes per annum
MVA	megavolt ampere
NEPM	National Environmental Protection Measures
NRW	former Department of Natural Resources and Water
NTA	Native Title Agreement
QASSMAC	Queensland Acid Sulfate Soils Management Advisory Committee
QASSIT	Queensland Acid Sulfate Soils Investigation Team
QMAN	Quarry Material Allocation Notice
QPS	Queensland Police Service
REDD	Regional Ecosystem Description Database



ROM	Run of mine facility
SDPWO Act	<i>State Development and Public Works Organisation Act 1971</i> (Queensland)
SEWPaC	Commonwealth Department of Sustainability, Environment, Water and Communities
SGCP	South Galilee Coal project
SIA	social impact assessment
SPA	<i>Sustainable Planning Act 2009</i> (Queensland)
SPP	State Planning Policy
TEC's	threatened ecological communities
The proponent	AMCI (Alpha) Pty Ltd
The project	South Galilee Coal project
TMR	Department of Transport and Main Roads
TOR	terms of reference
TSF	tailings storage facility
WRP	Water resource plan



# Part A: General information and administrative procedures

## 1. Project summary

Key elements of the AMCI (Alpha) Pty Ltd and Alpha Coal Pty Ltd proposed South Galilee Coal project (SCGP) include the following:

- **Project:** AMCI (Alpha) Pty Ltd and Alpha Coal Pty Ltd proposes to develop a run of mine combined open-cut and underground greenfield coal mine to service export markets for thermal coal.
- **Location:** the project site is located in the Galilee Basin, Central Queensland, immediately south-west of the township of Alpha, which is approximately 166 kilometres west of Emerald and 450 kilometres west of Rockhampton (Figure 1).
- **Tenure:** Alpha Coal Pty Ltd holds EPCs 1048, 1049, 1179 and 1180 over the area and intends to apply for a mining lease covering the proposed mining area of the project (Figure 2).
- **Coal resource:** current exploration has identified a Joint Ore Reserves Committee (JORC) compliant thermal coal resource of 982 million tonnes (Mt), with potential for significant additional resources as exploration continues.
- **Mine capacity and life:** the capacity of the mine is expected to be a maximum 20 million tonnes per annum (Mtpa) of run of mine (ROM) coal, although operational constraints may necessitate lower initial extraction rates. The mine life is expected to be in excess of 40 years.
- **Infrastructure requirements:** infrastructure to be constructed for the mine includes mine administration facilities, workshops, refuelling facilities, surface portals and mine exhaust fans for underground operations, a ROM facility, overland conveyors, a coal handling and preparation plant (CHPP), waste and product storage facilities, access and haul roads, powerlines, communication facilities, a water pipeline, raw water dams, a rail spur and an accommodation village.
- **Investment:** the expected capital expenditure for the project is \$1.5 billion, excluding the relevant portion of rail and port capital.
- **Development timetable:** subject to project approvals, the target commencement date for construction is 2012-2013, with initial coal exports expected in 2014-2015. However, development timeframes are very much dependent on the completion and access to off-site rail and port infrastructure, as well as the availability of secure long-term electricity and water supplies.
- **Employment, accommodation and travel:** during construction, the mine workforce is expected to be approximately 1500 employees and during operation, it is anticipated that a permanent workforce of 750 people will be employed. In addition to the mine personnel, support personnel would be required for operating an accommodation camp and there would be periodic increases of maintenance contractors for shutdown work on the major plant and infrastructure.

Due to the relatively remote location of the proposed mine and its distance from an available workforce, a fly-in-fly-out (FIFO) roster is the most likely scenario for the majority of employees, however, options for development of housing in Alpha or nearby townships for part of the workforce will also be assessed. The project proposes to utilise the existing Alpha airstrip for employee and/or contractor air transport requirements. The Alpha airstrip is a sealed airstrip located approximately five kilometres west of Alpha.

For a FIFO operation, an accommodation village would be required. The sizing and location of the accommodation village would be determined, in conjunction with relevant local planning requirements, once mine planning is agreed for the project





A separate, temporary construction camp may be built to accommodate the construction workforce.

- **Water requirements and supply:** the project's total annual water demand would be approximately 3000 megalitres (ML) per annum, although the final design and process systems could reduce this volume. It is currently proposed that the water requirements for the mine will be supplied from a combination of groundwater, collected internal site runoff, recycled and potentially treated process water and an external raw water supply. Initial construction works may be undertaken prior to finalisation of the external raw water supply pipeline, and would propose to utilise existing groundwater resources in conjunction with surface water storages, water importation and recycling/reuse of water resources.
- **Power requirements and supply:** the mine would require in the order of 60-70 megavolt ampere (MVA) per annum, based on similar mining operations. There are currently two options for the supply of electricity for the SGCP including:
  1. extending the existing 275 kilovolt (kV) power grid from Lilyvale through the Powerlink and Ergon supply system to the project site
  2. the successful approval and development of one of the currently proposed mine mouth power stations in the region, with suitable third-party supply conditions being provided.

Any viable options for utilising renewable energy sources will be incorporated into infrastructure planning and construction.

Diesel fuel and possibly petrol will need to be supplied to the site for the operation of mine equipment. Some form of onsite fuel storage facility will be required.

- **Coal extraction:** there are five principal coal seams from two metres to five metres in depth containing sub-bituminous highly volatile perhydrous coals. Open cut mining methods will be determined following further mine planning, but will involve truck and shovel, shovel and conveyor, and/or dragline options and is likely to involve a number of active pits. Underground mining is likely to be via punch longwall mining off the open-cut highwalls and may include multiple longwalls.
- **Coal processing and waste disposal:** the mined coal will be transported and stockpiled in a ROM area prior to processing via a CHPP facility. Processing involves separation of the coal and waste materials through screening, crushing, grinding, washing and dewatering. Coal reject materials (coarse and fine) would be transferred to appropriate containment facilities. Coarse rejects will be deposited to a stockpile adjacent to the CHPP, while tailings material would be pumped to a tailings dam for future rehabilitation. Overburden will be stockpiled in out-of-pit spoil dumps and will also be used to partially backfill the pits.
- **Coal product transportation requirements:** the SGCP will include the construction of a rail spur to connect to the proposed common user rail and port infrastructure that is currently under consideration for environmental approval by Hancock Coal Pty Ltd, Waratah Coal Pty Ltd and North Queensland Bulk Ports Corporation Limited.

For more information about the SGCP visit DIP's website at [www.dip.qld.gov.au/projects](http://www.dip.qld.gov.au/projects)



Figure 1: Project locality map

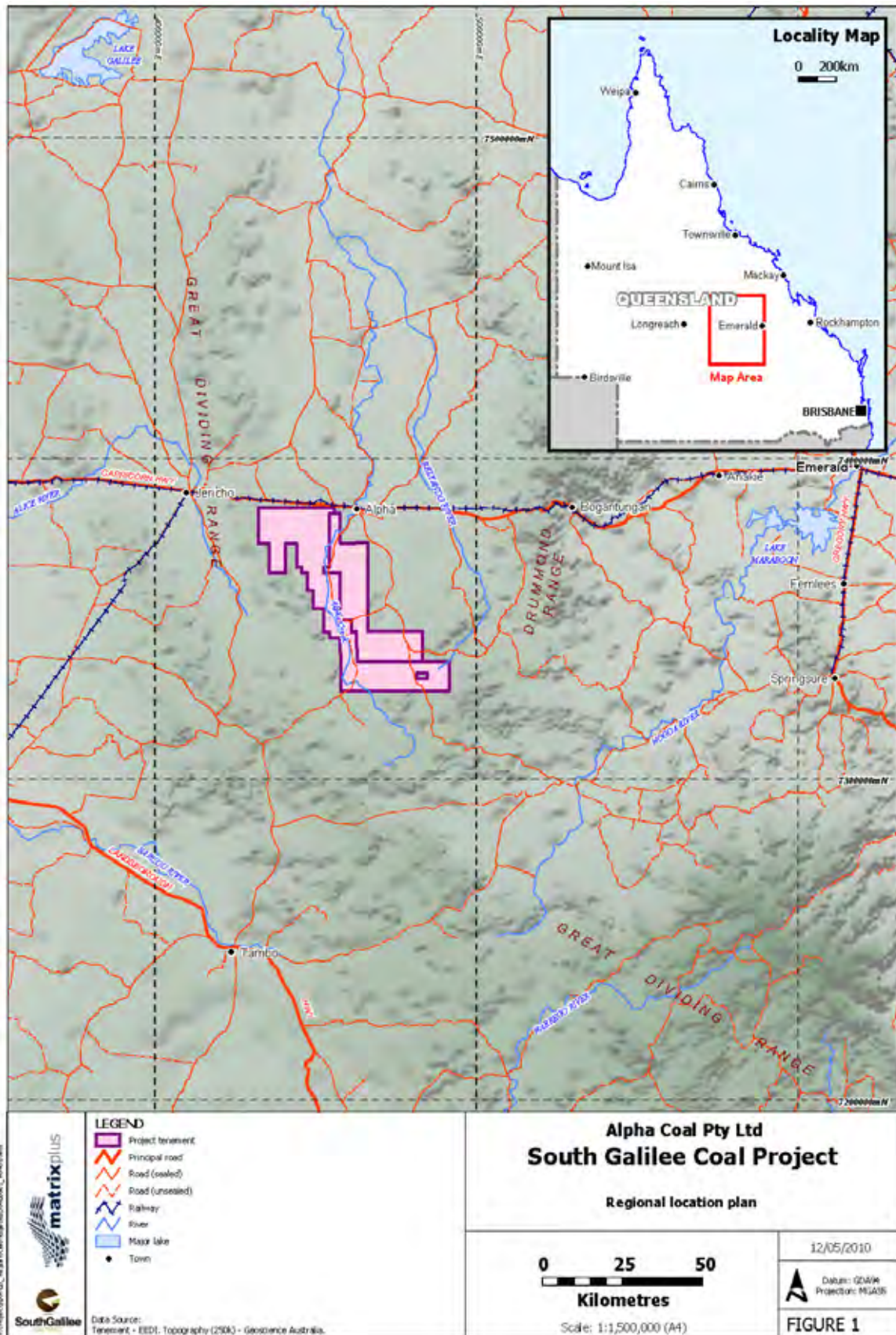
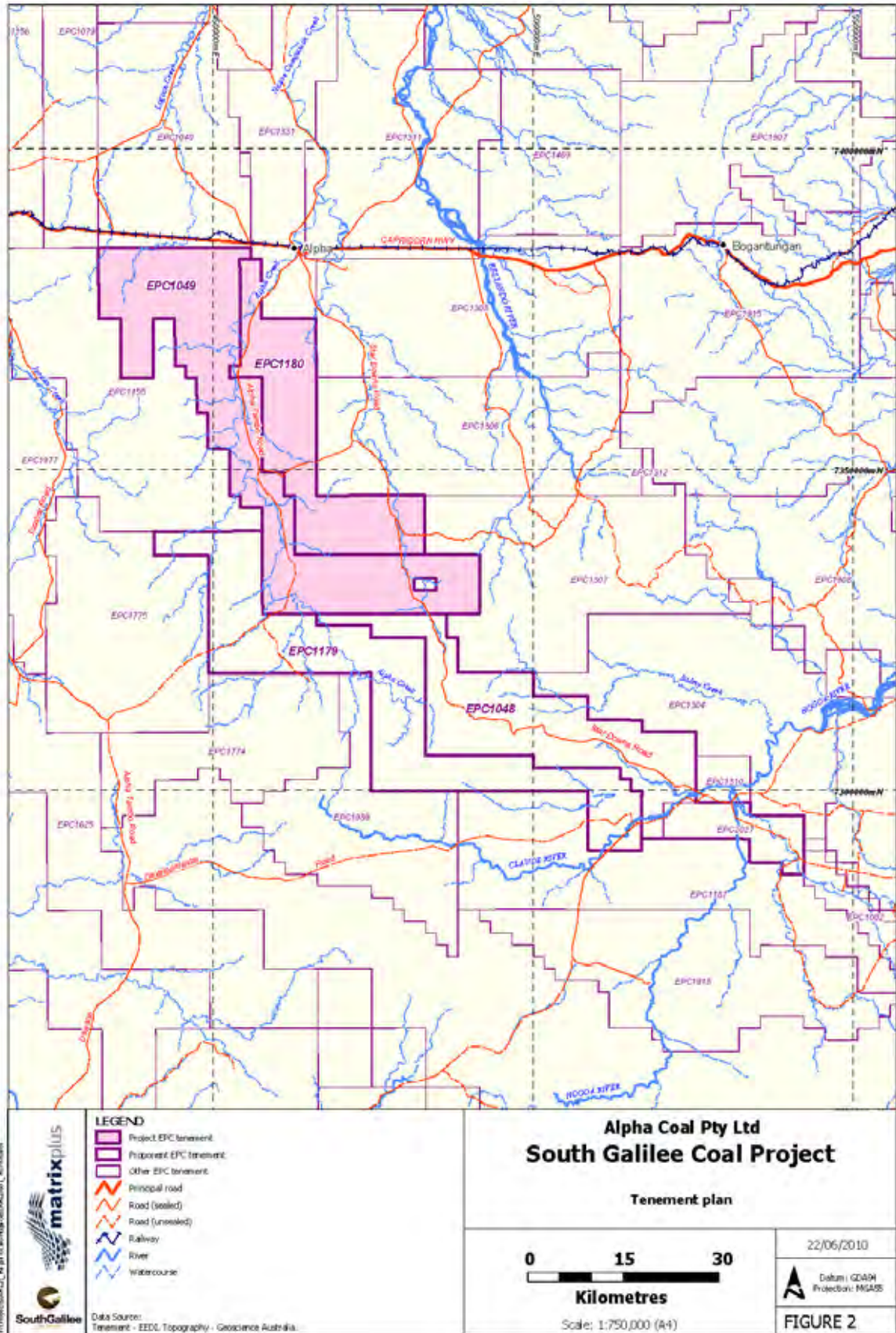






Figure 2: Project tenement map





## 2. Project proponent

The SGCP will be developed by joint venture partners AMCI (Alpha) Pty Ltd and Alpha Coal Pty Ltd.

AMCI (Alpha) Pty Ltd, will manage the joint venture and is the project's proponent. AMCI (Alpha) Pty Ltd is a subsidiary of the AMCI group—a privately owned global mining, investment and trading business operating in the resources industry.

Alpha Coal Pty Ltd is a wholly-owned subsidiary of Bandanna Energy Limited—an Australian Securities Exchange listed resources company with exploration and mining areas in the Bowen and Galilee Basins.

Contact details for AMCI (Alpha) Pty Ltd are as follows:

AMCI Investments Pty Ltd  
Level 12  
400 Queen Street  
Brisbane QLD 4000  
**Tel** +617 3006 1850  
info@southgalilee.com.au

[www.southgalilee.com.au](http://www.southgalilee.com.au)

## 3. Legislative framework

On 11 March 2010, AMCI lodged an initial advice statement (IAS) for its proposed SGCP with the Queensland Coordinator-General seeking 'significant project' declaration under the *State Development and Public Works Organisation Act 1971* (SDPWO Act). The IAS provides an outline of the proposed project, including the project rationale and its potential impacts.

On 26 May 2010, the Coordinator-General declared the South Galilee Coal Project to be a 'significant project' under section 26(1)(a) of SDPWO Act. This declaration initiates 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.

On 17 May 2010, the proponent referred the project to the Commonwealth Minister for the Environment, Heritage and the Arts for a decision as to whether the project constitutes a 'controlled action' under the *Environment Protection and Biodiversity Conservation Act 1999* (Cwlth) (EPBC Act) (referral No. 2010/5496).

On 16 June 2010, the delegate of the Commonwealth Minister for Environment, Heritage and the Arts determined that the project was a 'controlled action' under the EPBC Act due to the likely potential impacts on matters of national environmental significance (MNES). The controlling provisions under the EPBC Act are:

- sections 18 and 18A (listed threatened species and ecological communities)
- sections 20 and 20A (listed migratory species).

As a consequence, the project requires assessment and approval under the EPBC Act. In accordance with the Commonwealth Minister's decision on the assessment approach, determined on 16 June 2010, the project will be assessed under the bilateral agreement with the state government. The federal government has accredited the EIS process, to be conducted under the SDPWO Act, under a bilateral agreement between the federal and state government. This will enable the EIS to meet the impact assessment requirements under both federal and state legislation. The project will require



approval from the responsible Commonwealth Minister under Part 9 of the EPBC Act before it can proceed.

Consequently, the term EIS used in these terms of reference (TOR) should be interpreted as satisfying the impact assessment requirements of all relevant state and federal government legislation.

DIP is managing the EIS process on behalf of the Coordinator-General. DIP has invited relevant federal, state and local government representatives and other relevant authorities, to participate in the process as advisory agencies.

The first step in the impact assessment process is the development of TOR for an EIS for the project. The process involves the formulation of draft TOR that are made available for public and advisory agency comment. The Coordinator-General will have regard to all properly made submissions received on the draft TOR in finalising the TOR which will be presented to the proponent.

The proponent will prepare an EIS to address the TOR. Once the EIS has been prepared to the satisfaction of the Coordinator-General, a public notice will be advertised in relevant newspapers circulating in the region and nationally. The notice will state where copies of the EIS can be viewed or purchased, the submission period and where submissions should be sent. The proponent may also be required to prepare a supplementary report to the EIS to address specific matters raised during the EIS submission period.

At the completion of the EIS phase, the Coordinator-General will prepare a report (Coordinator-General's evaluation report) evaluating the EIS and other relevant material, pursuant to section 35 of the SDPWO Act. This evaluation report will include an assessment and conclusion about the environmental effects of the project and any associated mitigation measures. Material that will be assessed includes: the EIS, properly made submissions and other submissions accepted by the Coordinator-General and any other material the Coordinator-General considers relevant to the project, such as a supplementary EIS, comments and advice from advisory agencies and other entities, technical reports and legal advice.

The Coordinator-General's evaluation report will be publicly notified by placing it on DIP's website [www.dip.qld.gov.au](http://www.dip.qld.gov.au). The Coordinator-General's evaluation report will also be presented to the proponent, the *Sustainable Planning Act 2009* (SPA) assessment manager, the Queensland Minister administering the *Environmental Protection Act 1994* (EP Act) and the Queensland Minister administering the *Mineral Resources Act 1989* (MRA) if relevant. As the project was determined to be a 'controlled action' under the EPBC Act, the report will also be provided to the Commonwealth Minister responsible for administering Part 9 of the EPBC Act.

Similarly, the Coordinator-General's evaluation report may, under section 47C or 49 of the SDPWO Act, state conditions for any draft environmental authority under the EP Act for the proposed environmental authority (mining activities). If conditions are included in the report:

- the Coordinator-General must give the Minister responsible for the EP Act a copy of the report
- the environmental authority must include the conditions.

Similarly, under section 45 of the SDPWO Act, the Coordinator-General's evaluation report may state conditions for the proposed mining lease(s) under the MRA. If Coordinator-General conditions are included in the report:

- the Coordinator-General must give a copy of the report to the Minister responsible for the MRA
- the conditions of the proposed mining lease, subject to any inconsistency with native title conditions that have paramountcy under section 47 of the SDPWO Act, are taken to include the Coordinator-General conditions.

If the project involves development requiring an application for a development approval under SPA, the Coordinator-General's evaluation report may, under section 39 of the SDPWO Act, state for the assessment manager one or more of the following:



- the conditions that must attach to the development approval
- that the development approval must be for only part of the development
- that the approval must be a preliminary approval only.

Alternatively, the Coordinator-General's evaluation report must state for the assessment manager:

- that there are no conditions or requirements for the project or
- that the application for development approval be refused.

The Coordinator-General's evaluation report must state the reasons if the application for development is to be refused.

## 4. EIS objectives

The objective of the EIS is to ensure that all potential environmental, social and economic impacts of the project are identified and assessed and that adverse impacts are avoided or mitigated. Direct, indirect and cumulative impacts must be fully examined and addressed. The project should be based on sound environmental protection and management criteria.

The EIS document should provide information for the following project stakeholders:

- interested bodies and persons: a basis for understanding the project, prudent and feasible alternatives, affected environmental values, impacts that may occur and the measures to be taken to mitigate all adverse impacts
- affected groups or persons: that is, groups or persons with rights or interests in land, as defined under section 38 of the *Environmental Protection Act 1999* or water as defined under the *Water Act 2000*
- government agencies and referral bodies: a framework for decision-makers to assess the environmental aspects of the proposed project with respect to legislative and policy provisions, and based on that information, to make an informed decision on whether the project should proceed or not and if so, subject to what conditions, if any
- the proponent: a mechanism by which the potential environmental impacts of the project are identified and understood, including information to support the development of management measures, such as an environmental management plan, to mitigate the effects of adverse environmental impacts of the development.

The proponent is required to address the TOR to the satisfaction of the Coordinator-General before the EIS is made publicly available. It should be noted that the Coordinator-General does not evaluate the EIS until public notification is completed and the Coordinator-General has obtained any other material considered relevant to the project, including additional information or comment about the EIS and the project from the proponent.

## 5. EIS guidelines

The EIS should be a self-contained and comprehensive document that provides sufficient information for an informed decision on the potential impacts of the project and the management measures employed to mitigate adverse impacts. The main EIS report needs to be supported by appendices containing relevant data, technical reports and other sources of the EIS analysis. In preparing the EIS, the approach to be adopted requires that:

- scientific studies are used to predict environmental impacts and details of their methodology, reliability, and any relevant assumptions or scientific judgements are indicated
- the EIS is to present all technical data, sources or authority and other information used to assess impacts
- proposed measures to mitigate and manage identified issues are described and evaluated





- residual impacts that are not quantifiable are described qualitatively, in as much detail as reasonably practicable
- a discussion of the criteria adopted in assessing the proposed project and its impacts—for instance, compliance with relevant legislation, policies, standards, community acceptance is included
- the level of investigation of potential/uncertain impacts on the environment is proportionate to both the severity and the likelihood of those events occurring
- issues that may emerge during the investigations and preparation of the EIS are adequately addressed and the necessary studies are undertaken and reported
- all relevant matters concerning environmental values, impacts and proposed mitigation measures are addressed for the first time in the main text of the EIS and not in an appendix or the draft environmental management plan
- adverse and beneficial effects should be presented in quantitative and/or qualitative terms as appropriate.

Where possible, information provided in the EIS should be clear, logical, objective and concise, so that non-technical people may easily understand it. Where appropriate, text should be supported by maps and diagrams and factual information in the document should be referenced. Where applicable, aerial photography and/or digital information (e.g. of project site etc.) should be presented.

The terms 'describe,' 'detail' and 'discuss' should be taken to include both quantitative and qualitative matters as practical and meaningful. Should the proponent require any information in the EIS to remain confidential, this should be clearly indicated and separate information should be prepared on these matters.

## 6. Stakeholder consultation

The proponent should undertake a comprehensive and inclusive consultation plan with the stakeholders identified in Part A—section 4. Consultation with advisory agencies should be the principal forum for identifying legislation, regulations, policies and guidelines relevant to the project and EIS process.

The public 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 types of consultation and communication activities to be undertaken
- timing of activities
- how it will target the stakeholder/community representatives
- integration with other EIS activities and the project development process
- consultation responsibilities
- communication protocols
- reporting and feedback arrangements.

## 7. General EIS format

The EIS should be written in a format matching the TOR or include guidelines (preferably as an appendix) describing how the EIS responds to the TOR. There should be clear demarcation between material in the EIS that refers to any separate project components to allow assessment agencies and other readers to differentiate between the project components.



The EIS should contain (possibly as part of the executive summary) a one page, brief guide as to where a range of categories of information for various readers are located in the report. This should particularly cover subjects that are presented in a number of places in the EIS.

Maps, diagrams and other illustrative material should be included in the EIS to assist in the interpretation of the information.

Limited copies of the EIS should be produced on A4-size paper capable of being photocopied, with maps and diagrams of A4 or A3 size.

The EIS should be produced in a format suitable for publishing on the proponent's web site and an executive summary, no larger than 2MB in size, should be provided for placement on DIP's website. Both sites should include hyperlinks to each other.

Consideration should be given to publishing the EIS as a website in HTML for the main body of the report with supporting material as PDF files. If the EIS is published on a website in HTML, it must meet the *W3C web content accessibility guidelines (WCAG)* as outlined at [www.w3.org/WAI/intro/wcag.php](http://www.w3.org/WAI/intro/wcag.php).

Alternatively, the EIS may be produced completely as PDF documents which must be no larger than 2MB in size. Documents can be provided in sections to meet this size requirement. Text size and graphics files included in the PDF document should be of sufficient resolution to facilitate reading and enable legible printing. PDF documents must be accessible and it is recommended they are produced in accordance with Adobe's PDF accessibility best practice guides available at: [www.adobe.com/accessibility/products/acrobat/training.html](http://www.adobe.com/accessibility/products/acrobat/training.html).

PDF documents must, at a minimum, meet the following accessibility requirements:

- document structure tags and proper read order
- searchable text
- alternative text descriptions
- security that does not interfere with assistive technology.

The EIS should also be produced on CD-ROM or other electronic memory device in Adobe®PDF format. All compression must be down-sampled to 72 dpi (or ppi).

The final nature and number of EIS copies required to be submitted and made available, should be discussed and agreed with DIP in the early stages of the EIS process.

## 8. DIP contact details

For further inquiries about the EIS process for this project, please contact:

EIS project manager—South Galilee Coal project

Significant Projects Coordination

**Department of Infrastructure and Planning**

PO Box 15009

City East Qld 4002

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## Part B: Contents of the EIS

The EIS should follow the format and content outlined in these TOR, however, changes to the structure can be discussed with DIP. Detailed cross-references describing where the EIS responds to the TOR should be included in the appendices.

### Executive summary

The executive summary should convey the most important aspects and options relating to the project to the reader in a concise and readable form. It should use plain English and avoid using jargon. It should be written as a stand-alone document and be structured to follow the EIS. It should be able to be reproduced on request and distributed to interested parties who may not wish to read or purchase the EIS as a whole.

The executive summary should include:

- the title of the project
- name and contact details of the proponent and a discussion of previous projects undertaken by the proponent, if applicable, and their commitment to effective environmental management
- a concise statement of the aims and objectives of the project
- the legal framework, 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 the selection of the proposed development option
- a brief description of the project (pre-construction, construction, operational activities and decommissioning) and the existing environment, utilising visual aids where appropriate
- an outline of the principal environmental impacts predicted and the proposed environmental management strategies and commitments to minimise the significance of these impacts
- an outline of the principal social and economic impacts on the local and regional community and strategies to manage those impacts and deliver benefits from the development
- 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 should also be included.

### Glossary of terms

A glossary of technical terms, acronyms, abbreviations and references should be provided in the EIS.



# 1 Introduction

The introduction should clearly explain the function of the EIS, why it has been prepared and what it sets out to achieve. It should contain an overview of the structure of the document.

## 1.1 Project proponent

This section should describe the experience of the project proponent, including the nature and extent of business activities, experience and qualifications, and environmental record, including the proponent's environmental, health, safety and community policies.

## 1.2 Project description

A brief description of the key elements of the project should be provided with illustrations or maps. Any major associated infrastructure requirements should also be summarised. Detailed descriptions of the project should follow in section 2.

## 1.3 Project rationale

The specific objectives and justification for the project should be described, including its strategic, economic, environmental and social implications, technical feasibility and commercial drivers. The status of the project should be discussed in a regional, state and national context. The project's compatibility with relevant policy, planning and regulatory frameworks should also be mentioned.

## 1.4 Relationship to other projects

This section should also describe how the project relates to any other infrastructure projects of which the proponent should reasonably be aware, that have been, or are being undertaken or that have been approved in the area affected by the project.

As a result of this assessment, opportunities may exist for co-location of existing or proposed infrastructure enabling efficiency gains and the mitigation of environmental and property impacts. Where co-location may be likely, the EIS should outline opportunities to coordinate or enhance impact mitigation strategies. Opportunities should be discussed in sufficient detail to enable an understanding of the reasons for preferring certain options or courses of action and rejecting others.

## 1.5 Alternatives to the project

This section should describe feasible alternatives including conceptual, technological and locality alternatives to the proposed project, as well as discussion of the consequences of not proceeding with the project. Alternatives should be discussed in sufficient detail to enable an understanding of the reasons for preferring certain options or courses of action and rejecting others. This should include a discussion of the 'no action' option. A discussion of the methodology adopted to discern between the feasible options should be included.

The interdependencies of the project components should be explained, particularly in regard to how each of 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 have been considered and incorporated during the scoping of the project.

This section should also comply with the EPBC Act regulations listed in section 2.01(g) of Schedule 4.



## 1.6 Co-location opportunities

Opportunities may exist for co-location of existing or proposed infrastructure enabling efficiency gains and the mitigation of environmental, social and property impacts. The proponent should identify any proposals to develop infrastructure within the vicinity of the proposed project. Such proposals would be limited to those projects which are in the public arena during the period of preparation of this EIS and for which a proponent can be readily identified.

Whilst it may be inappropriate for this EIS to evaluate the environmental impacts of other infrastructure not directly required for this project, the EIS should describe the broad implications of locating other forms of linear infrastructure within or near the proposed project infrastructure. Where co-location may be likely, the EIS should consider opportunities to coordinate or enhance any of the impact mitigation strategies proposed through cooperation with other proponents in the locality.

## 1.7 The environmental impact assessment process

### 1.7.1 Methodology of the EIS

This section should provide an outline of the environmental impact assessment process including the role of the EIS in the Coordinator-General's decision making process. It should include information on relevant stages of the 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.

### 1.7.2 Objectives of the EIS

This section should provide a statement of the objectives of the environmental impact assessment process. The structure of the EIS can then be outlined as an explanation of 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 and options 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 offsets for any residual impacts.

The role of the EIS in providing information for the formulation of the environmental management plan (EMP) for the project should be discussed.

### 1.7.3 Submissions

The EIS should inform the reader how to properly make submissions and what form the submissions should take. The reader should be informed as to how and when properly made public submissions on the EIS will be addressed and taken into account in the decision-making process. The EIS should also indicate any implications for submissions in the event of any appeal processes.

## 1.8 Public consultation process

The public consultation process should provide opportunities for community involvement and education. It may include interviews with individuals, public communication activities, interest group meetings, production of regular summary information and updates (i.e. newsletters), and other



consultation mechanisms to encourage and facilitate active public consultation. Public consultation processes (community engagement) for all parts of the EIS should be integrated.

This section should outline the methodology that will be adopted to:

- identify the stakeholders and how their involvement was facilitated
- identify the processes conducted to date and the future consultation strategies and programs including those during the operational phase of the project
- indicate how consultation involvement and outcomes were integrated into the EIS process and future site activities, including opportunities for engagement and provision for feedback and action if necessary.

A list of the stakeholders consulted during the program should be provided as well as any meetings held, presentations made and any other consultation undertaken for the EIS process.

Information about the consultation process that has taken place and the results should be provided.

## 1.9 Project approvals

### 1.9.1 Relevant legislation and approvals

This section must describe and list Commonwealth, state and local legislation and policies relevant to the planning, approval, construction and operation of the project. The EIS should identify all approvals, permits, licences and authorities that will need to be obtained for the proposed project. Triggers for the application of each of these should be outlined and relevant approval requirements identified.

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

- *Aboriginal and Torres Strait Islander Heritage Protection Act 1994*
- *Environment Protection and Biodiversity Conservation Act 1999*
- *Native Title Act 1993*

Relevant Commonwealth obligations such as protection of World Heritage values, migratory animals (China-Australia Migratory Bird Agreement (CAMBA), Japan-Australia Migratory Bird Agreement (JAMBA) and Bonn Convention), biodiversity, climate and wetlands of international importance (Ramsar) should also be outlined and identified.

Reference must also be made, where relevant, to applicable state legislation but not limited to:

- *Aboriginal Cultural Heritage Act 2003*
- *Environmental Protection Act 1994*
- *Fisheries Act 1994*
- *Land Act 1994*
- *Land Protection (Pest and Stock Route Management) Act 2002*
- *Mineral Resources Act 1989*
- *Nature Conservation Act 1992*
- *Queensland Heritage Act 1992*
- *Sustainable Planning Act 2009*
- *Torres Strait Islander Cultural Heritage Act 2003*
- *Transport Infrastructure Act 1994*
- *Vegetation Management Act 1999*
- *Water Act 2000.*



### **1.9.2 Relevant plans**

This section should outline the project's consistency with the existing national, state, regional and local planning frameworks that apply to the project location. This should include reference to all relevant statutory and non-statutory plans, including Water Resources Plans under the *Water Act 2000*, planning policies, guidelines, strategies and agreements.

### **1.9.3 Environmentally relevant activities**

A brief description is required for each environmentally relevant activity (ERA) and associated activities which are to be carried out in connection with the project. A detailed description of each ERA should be presented in Section 3—Environmental values and management of impacts—and detail of the impact on land, water, air, noise and any other relevant environmental values identified.

The above information will allow for informed decisions to be made with respect to the project, consistent with the provisions of the EP Act.

### **1.9.4 Accredited process for controlled actions under Australian Government legislation**

The EIS will be developed pursuant to the bilateral agreement between the federal and state governments for the purposes of the Commonwealth Government's assessment under Part 8 of the EPBC Act. The EIS should address potential impacts on the MNES that were identified when the project was determined to be a controlled action.

Section 9—Matters of national environmental significance—outlines the requirements in relation to this matter.



## 2 Description of the project

The objective of this section is to describe the project through its lifetime of 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.

### 2.1 Overview of the project

The EIS should provide an overview of the project to put it into context. This section should 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
- the expected cost, timing, and overall duration of the project
- a summary of any environmental design features of the project.

### 2.2 Location

This section should describe, through maps at suitable scales, the regional and local context of the project and all associated infrastructure. Real property descriptions of the project should be provided. 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
- location and boundaries of the project footprint, including easement widths and access requirements
- location of any proposed buffers surrounding the working areas (for construction and operation)
- location of existing infrastructure such as roads, railways, weirs, powerlines and marine infrastructure as relevant
- location of geomorphic features such as waterways (e.g. rivers, streams, creeks and other bodies of water), shorelines and wetlands
- location of any proposed project infrastructure requirements (e.g. site offices and accommodation sites), with reference to size, type and use, during all project phases.

### 2.3 Construction

The following information should be provided on the pre-construction, construction and commissioning of the project including detailed plans where appropriate.

#### 2.3.1 Pre-construction activities

This section should set out a description of all the pre-construction activities, including:

- any land acquisitions required, be it in full or as easements, leases, etc.
- vegetation clearing
- site access
- earthworks
- interference with watercourses (e.g. rivers, streams, creeks other bodies of water and wetlands)
- site establishment requirements for construction facilities, including access restriction measures



- temporary works
- the upgrade, relocation, realignment or deviation of roads and other infrastructure.

### 2.3.2 Construction

This section should set out a description of all the construction elements of the project, including:

- an indicative construction timetable, including expected commissioning and start-up dates and hours of operation
- description of major work programs for the construction phase, including an outline of construction methodologies
- 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.

### 2.3.3 Commissioning

A description of the commissioning process including the associated environmental impacts should be provided.

## 2.4 Operation

This section should 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
- nature 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, proposed work schedules and accommodation arrangements.

## 2.5 Associated infrastructure

This section should detail, with concept and layout plans, requirements for new infrastructure or the upgrading/relocating of existing infrastructure to service the project. Matters to be considered include such infrastructure as transportation, water supply, energy supply, sewerage, stormwater, waste disposal, accommodation and telecommunications (including the type of communications to be provided to the mine and accommodation facilities, and the capacity of the communications service to allow for additional services, (e.g. broadband access for Radio over Internet Protocol that would facilitate other users' communications needs).

The associated rail infrastructure component of the project should contain the:

- location of the rail corridor, railway and associated rail infrastructure
- location and boundaries of land tenures, in place or proposed, to which the rail component is or will be subject
- point of interface between the main rail corridor, branch line and proposed balloon loop (including the Central Rail Line, the Capricorn Highway, other local government roads, any proposed rail infrastructure and other infrastructure such as pipelines).
- location and boundaries of the rail project footprint showing all key aspects including excavations, stockpiles, areas of fill, watercourses, bridges, culverts, hardstands, open level



crossings and occupational crossings etc..

- location of all proposed project rail transport and coal loading infrastructure.

As such, consideration should also be given to resource extraction areas, access roads, and connection to sewerage or water supply, should be described including the design and construction standards to be met (e.g. waterway crossings and barriers should be designed to meet the requirements of the *Fisheries Act 1994* and in consultation with the Department of Employment, Economic Development and Innovation (DEEDI)). Alternative approaches or the opportunity of obtaining materials from alternative sources should be discussed.

Any development within the Abbot Point State Development Area (APSDA) will need to address the Development Scheme for the APSDA. Furthermore, any development will need to demonstrate consistency with the more detailed planning work being undertaken by DIP and North Queensland Bulk Ports regarding coal stockpiling and the alignment of any rail line within the APSDA. It will need to be demonstrated there will be no net worsening to the natural environment within the APSDA.

### 2.5.1 Water distribution infrastructure

The process and criteria used for the selection of the preferred design and preferred construction techniques should be described, including:

- the method of extracting and/or releasing water from the 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.

## 2.6 Decommissioning and rehabilitation

This section should describe the options, strategies and methods for progressive and final rehabilitation of the environment disturbed by the project, including:

- a preferred rehabilitation strategy should be developed with a view to minimising the amount of land disturbed at any one time
- the final topography of any excavations, waste areas and dam sites and subsidence areas should be shown on maps at a suitable scale
- the means of decommissioning the project, in terms of the removal of equipment, structures and buildings, and the methods proposed for the stabilisation of the affected areas
- options and methods for the disposal of wastes from the demolition of the project infrastructure should be discussed in sufficient detail for their feasibility and suitability to be established
- a discussion of future land tenure arrangements post decommissioning of the project.

Detail of the impacts of the preferred decommissioning and rehabilitation strategy should be discussed in the appropriate subsections of section 3.





Reference should also be made to infrastructure that is not intended to be decommissioned. In this situation the entity, to which the infrastructure is intended to be transferred, should be described with the proposed environmental management regimes.

The description of topsoil management will address the transportation, storage and replacement of topsoil to disturbed areas. It will address the identification and management of topsoil (including stripping, handling, limitation of compaction, placement, stockpile heights, and optimal storage times) that would ensure the continued viability of the native seed bank. It will also address the identification and management of topsoil that may be contaminated with weed or exotic species and which would be unsuitable for use in rehabilitation without treatment.

### 3 Environmental values and management of impacts

This section should 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 where prevention is not possible, minimise environmental harm and maximise environmental benefits of the project. Preferred measures should be identified and described in more detail than other alternatives.

The objectives of subsequent sections are to:

- describe the existing environmental values of the area that may be affected by the project, using background information and/or new studies to support. This shall include reference to all definitions of environmental values set out in relevant legislation, policies and plans
- 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 by combination with other known existing or planned projects
- present environmental protection objectives, standards and measurable indicators to be achieved
- examine viable alternative strategies for managing impacts. These alternatives should be presented and compared 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.

Proposals to offset any impacts should be presented in accordance with the Queensland Government *Environmental Offset Policy (2008)*,

Offsets must be discussed with regard to impacts on EPBC Act matters, reference should be made to the eight principles set out in the DEWHA's *Draft Policy Statement: Use of Environmental Offsets* under the *Environment Protection and Biodiversity Conservation Act 1999* or the finalised policy if available when the EIS is produced and the accompanying Discussion Paper in August 2007.

The EIS should follow the format and content outlined in these TOR, however, changes to the structure can be discussed with DIP. The mitigation measures, monitoring programs etc., identified in this section of the EIS should be used to develop the EMP for the project (see Section 8 - Environmental management plan).



## 3.1 Climate, natural hazards and climate change

This section should 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 and natural or induced hazards. A risk assessment and management plan detailing these potential threats to the construction, and operation of the project should be provided.

The most recent information on potential impacts of climatic factors should be addressed in the appropriate sections of the EIS.

An assessment of climate change risks and possible adaptation strategies should be included, as well as 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 undertaking, where practicable, a cooperative approach with government, other industry and other sectors to address adaptation to climate change.

### 3.1.1 Flood plain management

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

- 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.

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.

#### 3.1.1.1 Potential impacts and mitigation measures

Details should be provided on the:

- potential impacts of floods at a range of flood intervals including the probable maximum flood event
- potential impacts of flooding on environmental values due to the identified likely increased flood levels, increased flow velocities or increased time of flood inundation as a result of the project
- impacts and mitigation measures for flooding. The construction of any flood protection levees should be described with regards to construction material, design and methods.

## 3.2 Land

This section should detail the existing land environment values for all areas associated with the project. It should also 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.

### 3.2.1 Scenic amenity and lighting

#### 3.2.1.1 Description of environmental values

This section should describe in general terms the existing character of the landscape and the general impression that would be obtained while travelling through and around it. It should outline existing landscape features, panoramas and views that have, or could be expected to have, value to the



community. Information in the form of maps and photographs should be used, particularly where addressing the following issues:

- major views, view sheds, outlooks, and features contributing to the amenity of the area, including assessment from private residences
- focal points, landmarks, waterways (e.g. rivers, streams, creeks other bodies of water and wetlands) and other features contributing to the visual quality of the area and the project site(s)
- character of the local and surrounding areas including vegetation and land use.

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

#### 3.2.1.2 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. Details should be provided of measures to be undertaken to mitigate or avoid the identified impacts.

#### 3.2.1.3 Lighting

An assessment of all potential impacts of the project's lighting, during all stages, is to be provided, with particular reference to objectives to be achieved and management methods to be implemented to mitigate or avoid, such as:

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

### 3.2.2 Topography, geology and soils

#### 3.2.2.1 Description of environmental values

Maps should be provided 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. Significant features of the landscape and topography should be included and commented on the maps.

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

Existing land system and land unit data of the Nogo-Belyando Area (CSIRO, 1967) for the project area should be reviewed and discussed. A soil survey of the project area should be conducted at 1:100,000 scale, following the standards in *Land Suitability Assessment Techniques in the Technical Guidelines for the Environmental Management of Exploration and Mining in Queensland (1995)*. The relationship of the soils, land system and land unit data sets should be reviewed and discussed.

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)*. 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 the Land Suitability Assessment Techniques.

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

### Mineral resources

The EIS should provide a summary of the results of studies and surveys undertaken to identify and delineate the mineral resources within the project area (including any areas underlying related infrastructure).

The location, tonnage and quality of the mineral resources within the project area should be described in detail as indicated below. For coal projects, where possible it should be presented 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 in accordance with the *Australasian code for reporting of mineral resources and ore reserves* (the JORC Code—available at [www.jorc.org/main.php](http://www.jorc.org/main.php)) and the principles outlined in the *Australian guidelines for the estimating and reporting of inventory coal, coal resources and coal reserves* (available at [www.jorc.org/pdf/coalguidelines.pdf](http://www.jorc.org/pdf/coalguidelines.pdf)).

In addition, maps (at appropriate scales) should be provided showing the general location of the project area, 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.

#### 3.2.2.2 Potential impacts and mitigation measures

This section should 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 for all permanent and temporary landforms the possible soil erosion rate and provide a description of the techniques used to manage the impact. Identify all soil types and outline the erosion potential (both wind and water) and erosion management techniques to be used.

An erosion-monitoring program, including rehabilitation measures for erosion problems identified during construction, must also be outlined and acceptable mitigation strategies provided.

The report must include an assessment of likely erosion effects, especially those resulting from the removal of vegetation, and construction of retaining walls both on-site and off-site for all disturbed areas.

It should summarise methods proposed to prevent or control erosion with regard to:

- (a) the *Soil Erosion and Sediment Control—Engineering Guidelines for Queensland Construction Sites* (Institute of Engineers Australia (Qld Division) 1996)



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

The potential for acid generation by disturbance of potentially acid forming materials during earthworks and construction should be discussed and measures for management of potentially acid forming materials and mitigation of impacts should be proposed for all site earthworks and construction activities. Should action criteria be triggered by acid generating potential as a result of testing, management measures are to be outlined in an Acid Mine Drainage Management Plan prepared in accordance with the *Assessment and Management of Acid Drainage* guideline of the Technical Guidelines for the Environmental Management of Exploration and Mining in Queensland series (DME, 1995), *Managing Acid and Metalliferous Drainage* published by the Leading Practice Sustainable Development Program (Commonwealth of Australia, 2007) and any other applicable best practice guidelines.

The potential for acid, saline, neutral or alkaline drainage from waste dumps should be discussed. Characterise the potential quality of leachate from the mined waste under field conditions, including contaminants such as sulphate, pH, chloride, iron, major cations and anions, and any chemical species in sufficient quantity that is likely to cause environmental harm including nuisance. Cross-references in this section to those sections of the EIS that assess in detail the potential impacts of any direct or indirect discharge of leachate on downstream sensitive environments or users of receiving waters should be provided.

### Resource utilisation

The EIS should 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. It should 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

This section will provide comprehensive surface subsidence predictions taking into account factors such as topographic variations and geological complexities, with a full description of the methodology and including an assessment of the reliability of the predictions. The results of the predictions will be shown on maps with one metre contour increments and a scale appropriate for assessment of surface subsidence impacts. Mitigation measures will be proposed to deal with any significant impacts that would result from subsidence.

Impacts of subsidence on water resources should be addressed in section 3.4.2.

### Land disturbance

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

Where waterways are proposed to be diverted, the impact on land use due to hydrology changes, both upstream and downstream, should be described and any long-term monitoring plans should be detailed. The EIS should also describe:

- the rehabilitation of diverted creeks during operations and the reinstatement of the creeks after operations cease
- the removal of dams or the transfer of responsibility for dams to the landholder and their on-going management
- the final drainage and seepage control systems
- the rehabilitation objectives, indicators and completion criteria.



The EIS should describe the transfer of responsibility to the landholder and the ongoing maintenance and monitoring that would be required for any features of mining activity, such as dams, levee banks, waterway diversions, other waterway barriers and other infrastructure that would remain after the mine is decommissioned.

The EIS should demonstrate 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 from nearby watercourses such that the protection 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.

The EIS should include, but not be limited to:

- the predicted storage capacity of void water during AEP 1 in 25, 1 in 50, 1 in 100, 1 in 200 and 1 in 1000 year rainfall events and potential for discharge
- the predicted quality of void water during potential release events
- the predicted impact on the environment caused by the release of any void water
- modelling and assessment of practicable management measures to mitigate contaminant increases in storage dams
- develop a monitoring program to be undertaken both during and after mining, to assess the performance of the proposed management measures
- the ability of the final void water to meet the rehabilitation criteria being safe, stable and non-polluting.

The mitigation measures for land disturbance to be used on decommissioning the site should be assessed in sufficient detail to decide their feasibility. In particular, the EIS should 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.

Alternatives to leaving a final void and derive a preferred option should be reviewed and discussed.

A description of topsoil management should consider transport, storage and replacement of topsoil to disturbed areas. The topsoil management should also outline how soil from good quality agricultural land will be best utilised. Minimising topsoil storage times (to reduce fertility degradation) should also be addressed. Erosion and sediment control measures should be described, particularly in relation to the management of 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.

### **3.2.3 Land contamination**

#### **3.2.3.1 Description of environmental values**

The following information needs to be presented in the EIS:

- mapping of any areas listed on the Environmental Management Register or Contaminated Land Register under the EP Act
- identification of any potentially contaminated sites not on the registers which may need remediation
- a description of the nature and extent of contamination at each site.

#### **3.2.3.2 Potential impacts and mitigation measures**

The EIS should discuss the management of any contaminated land and potential for contamination from construction, commissioning and operation, in accordance with DERM's *Draft Guidelines for the*





*Assessment and Management of Contaminated Land in Queensland* (1998) and the *National Environment Protection (Assessment of Site Contamination) Measure* (1999).

This section should 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.

Intentions should be stated concerning the classification of land contamination after project completion.

### 3.2.4 Land use and tenure

#### 3.2.4.1 Description of environmental situation

The EIS should identify, with the aid of maps:

- land tenure, including reserves and extractive resource areas, tenure of special interest such as protected areas and forest reserves, identification of existing and proposed gas, water pipelines, power lines and transport corridors, including local roads, state-controlled roads and rail corridors
- existing land uses and facilities surrounding the project. 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* (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* (DHLGP 1993). Comment on and assess any variation with the GQAL mapping shown in the Strategic Plan for the former Jericho Shire as required under SPP 1/92, Development and the Conservation of Agricultural Land. Identify any land shown as Strategic Cropping Land on current trigger maps
- areas covered by applications for native title claims or native title determinations, providing boundary descriptions of native title representative body/ies. The proponent should also identify in the EIS whether there are any necessary notifications required to the representative body/ies or evidence that native title does not exist
- include the identification of affected stock routes and consultation with Stock Route Management Unit staff of DERM
- distance of the project from residential and recreational areas
- declared water storage catchments
- location of the project in relation to environmentally sensitive areas.

#### 3.2.4.2 Potential impacts and mitigation measures

The potential for the construction and operation of the project to change existing and potential land uses of the project site and adjacent areas should be detailed.

A description of the following should be included:

- impacts on surrounding land uses and human activities and strategies for minimisation, such as:
  - good quality agricultural land or strategic cropping land with particular reference to any residual impacts on the area, class or productivity of such land
  - key resource areas (refer to *State Planning Policy 2/07: Protection of Extractive Resources and Guideline*)
  - residential and industrial uses
- assess the impacts on good quality agricultural land or strategic cropping land with particular reference to any residual impacts on the area, class or productivity of such land



- 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
- the identification of the potential native title rights and interests likely to be impacted upon by the project and the potential for management of those impacts by an Indigenous land use agreement or other native title compliance outcomes
- include mitigation strategies for potential adverse impacts of the project on the state's stock route network in consultation with DERM's Stock Route Management Unit
- 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
- potential impacts on future road and rail upgrades
- identification of any land units requiring specific management measures.





## 3.3 Nature conservation

This section should detail the existing nature conservation values that may be affected by the proposal. The environmental values should be described in terms of:

- integrity of ecological processes, including habitats of near threatened and threatened species
- conservation of resources
- biological diversity, including habitats of near threatened and threatened species
- integrity of landscapes and places including wilderness and similar natural places
- aquatic and terrestrial ecosystems.

The flora and fauna surveys should address species structure, assemblage, diversity and abundance. 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. The survey should account for the ephemeral nature of watercourses traversing the proposal area, and seasonal variation in fauna populations. Methodologies and standards used for flora and fauna surveys should be described and compared to best practice in the appendices to the EIS.

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

The section should also outline the proposed strategies to avoid, or minimise and mitigate impacts on the identified values within the project's footprint.

Key flora and fauna indicators should be identified for future ongoing monitoring.

### 3.3.1 Sensitive environmental areas

#### 3.3.1.1 Description of environmental values

The EIS should identify areas that are environmentally sensitive in proximity to the project on a map of suitable scale. This should include areas classified as having national, state, regional or local biodiversity significance, or flagged as important for their integrated biodiversity values. Reference should be made to both state and federal government 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 which should be identified and mapped:

- important habitats of species listed as extinct in the wild, endangered, vulnerable or near threatened under the *Nature Conservation Act 1992* or as extinct, extinct in the wild, critically endangered, endangered, vulnerable and conservation dependent under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*
- regional ecosystems listed as 'endangered' or 'of concern' under state legislation, and/or ecological communities listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*
- good representative examples of remnant regional ecosystems or regional ecosystems which are described as having 'medium' or 'low' representation in the protected area estate as defined in the Regional Ecosystem Description Database (REDD) available at DERM's website [www.derm.qld.gov.au](http://www.derm.qld.gov.au)
- sites listed under international treaties such as Ramsar wetlands and World Heritage areas
- sites containing near threatened or bio-regionally significant species or essential, viable habitat for near threatened or bio-regionally significant species
- sites in, or adjacent to, areas containing important resting, feeding or breeding sites for migratory species of conservation concern listed under the Convention of Migratory Species of Wild Animals, and/or bilateral agreements between Australia and Japan (JAMBA) and between



#### Australia and China (CAMBA)

- sites adjacent to nesting beaches, feeding, resting or calving areas of species of special interest, for example, marine turtles, dugong and cetaceans
- sites containing common species which represent a distributional limit and are of scientific value or which contains feeding, breeding, resting areas for populations of echidna, koala, platypus and other species of special cultural significance
- sites containing high biodiversity that are of a suitable size or with connectivity to corridors/protected areas to ensure survival in the longer term; such land may contain:
  - natural vegetation in good condition or other habitat in good condition (e.g. wetlands)
  - degraded vegetation or other habitats that still supports high levels of biodiversity or acts 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 which provide important ecological functions such as: wetlands of national, state and regional significance; coral reefs; riparian vegetation; important buffer to a protected area or important habitat corridor between areas
- sites of palaeontologic significance, such as fossil sites
- sites of geomorphological significance, such as lava tubes or karst
- protected areas which have been proclaimed under the *Nature Conservation Act 1992* and *Marine Parks Act 1982* or are under consideration for proclamation
- areas of major interest, or critical habitat declared under the *Nature Conservation Act 1992* or high nature conservation value areas or areas vulnerable to land degradation under the *Vegetation Management Act 1999*.

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 audits and shafts, colonial breeding species and habitat of threatened plants, animals and communities.

#### 3.3.1.2 Potential impacts and mitigation measures

This section should discuss all the likely direct and indirect the impacts of the project on species, communities and habitats of local, regional or national significance in sensitive environmental areas as identified above. Terrestrial and aquatic environments should be covered and any fragmentation impacts should be addressed. It should also include human impacts and the control of any domestic animals introduced to the area.

The EIS should demonstrate how the project would comply with the following hierarchy:

- avoiding impact on areas of remnant vegetation and other areas of conservation value
- mitigation of impacts through rehabilitation and restoration including, where relevant, a discussion of any relevant previous experience or trials of the proposed rehabilitation
- measures to be taken to replace or offset the loss of conservation values where avoidance and mitigation of impacts cannot be achieved
- explanation of why measures above would not apply in areas where loss would occur.

The boundaries of the areas impacted by the project within or adjacent to an endangered ecological community, including details of footprint width should be discussed. Where the project area would impact upon a threatened community, the discussion should include reasons for the preferred alignment and the viability of alternatives.



The EIS should address any actions of the project or likely impacts that require an authority under the *Nature Conservation Act 1992*, and/or would be assessable development for the purposes of the *Vegetation Management Act 1999*.

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

Where relevant, this section should discuss environmental offset requirements in accordance with the *Queensland Government Environmental Offsets Policy* and take into account the applicable specific-issue offset policies, as follows:

- *Policy for Vegetation Management Offsets* (DERM, 2009)
- *Mitigation and Compensation for Works or Activities Causing Marine Fish Habitat Loss* (DPI&F, 2002)
- draft *Policy for Biodiversity Offsets* (consultation draft, EPA, 2008)

Any departure from no net loss of ecological values should be described.

### 3.3.2 Terrestrial flora

#### 3.3.2.1 Description of environmental values

The EIS should specifically assess any potential impacts on a category A or B environmentally sensitive area and propose measures to avoid impacts.

This section should provide vegetation mapping for all relevant project sites. Adjacent areas should also be mapped 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.

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

- location and extent of vegetation types using the regional ecosystem type descriptions in accordance with the REDD
- location of vegetation types of conservation significance based on regional ecosystem types and occurrence of species listed as protected plants under the *Nature Conservation (Wildlife) Regulation 2006* as well as areas subject to the *Vegetation Management Act 1999*
- 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 *Land Act 1991*)
- location of any horticultural crops in the vicinity of the project area
- location and abundance of any exotic or weed species. Reference should be made to Biosecurity Queensland's Annual Pest Distribution Survey 2008 data and predictive maps available on the DEEDI website and be used in conjunction with Queensland Herbarium naturalised flora data to source the occurrence of pest plants in the project area. Local Government Area Pest Management Plans should also be utilised to source the occurrence of priority pest plants in the project area
- any plant communities of cultural, commercial or recreational significance should be identified.

Sensitive or important vegetation types should be highlighted, including any marine littoral and sub-tidal zone and 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, allowing for seasonal factors, 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
- the minimum site size should be 10 x 50 metres
- a complete list of species present at each site should be recorded
- the surveys to include species structure, assemblage, diversity and abundance
- any plant species of conservation, cultural, commercial or recreational significance to be identified
- survey data should include tree heights, canopy cover and species composition sufficient to determine the remnant status of the vegetation and identify the regional ecosystems
- specimens of species of conservation significance, including those listed as protected plants under the *Nature Conservation (Wildlife) Regulation 2006*, other than common species, are to be submitted to the Queensland Herbarium with sufficient information to enable their lodgement as voucher specimens.

Existing information on plant species may be used instead of new survey work, provided that the data is derived from previous surveys at the site consistent with the above methodology.

### 3.3.2.2 Potential impacts and mitigation measures

The potential environmental harm to the ecological values of the area arising from the construction, operation and decommissioning of the project, including clearing, salvaging or removal of vegetation, should be described and the indirect effects on remaining vegetation should be discussed. Short-term and long-term effects should be considered with comment on whether the impacts are reversible or irreversible.

With regard to all components of the project, this section should include:

- any management actions to minimise vegetation disturbance and clearance
- a discussion of the ability of identified vegetation to withstand any increased pressure resulting from the project and any measures proposed to mitigate potential impacts
- where loss of native vegetation is unavoidable, offsets consistent with the Queensland Government's *Environmental Offsets Policy* should be proposed
- a description of the methods to ensure rapid rehabilitation of disturbed areas following construction, including the species chosen for revegetation which should be consistent with the surrounding associations
- details of any post construction monitoring programs
- a discussion of the potential environmental harm on flora due to any alterations to the local surface and ground water environment with specific reference to impacts on riparian vegetation or other sensitive vegetation communities.

It will also outline how these measures will be implemented in the overall EMP for the project. Weed management strategies are required for containing existing weed species (e.g. parthenium and other declared plants) and ensuring no new declared plants are introduced to the area. Reference should be made to the local government authority's pest management plan and any strategies and plans recommended for the project area by Biosecurity Queensland. The strategies should be discussed 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.

If offsets are proposed as a result of the unavoidable loss of vegetation, it must be explained how the offsets would be managed in a way consistent with the Queensland Government's *Environmental Offsets Policy*.



### 3.3.3 Terrestrial fauna

#### 3.3.3.1 Description of environmental values

The terrestrial and riparian fauna occurring in the areas affected by the proposal should be described, 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 area should include:

- species diversity (i.e. a species list) and abundance of animals of recognised significance
- any species that are poorly known but suspected of being near-threatened 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. Reference should be made to Biosecurity Queensland's *Annual Pest Distribution Survey 2008* data and predictive maps available on DEEDI's website [www.deedi.qld.gov.au](http://www.deedi.qld.gov.au) Local Government Area Pest Management Plans should also be utilised to source the occurrence of priority pest animals in the project area
- existence (actual or likely) of any species/communities of conservation significance in the study area, including discussion of range, habitat, breeding, recruitment feeding and movement requirements, and current level of protection (e.g. 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.

The EIS should indicate how well any affected communities are represented and protected elsewhere in the bio-region where the project occurs. Relevant site data should be provided to DERM in a format compatible with the *WildNet* database for listed threatened species. The occurrence of feral species in the project area should be described.

#### 3.3.3.2 Potential impacts and mitigation measures

The assessment of potential impact should consider impacts the project may have 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 species of conservation significance
- cumulative effects of direct and indirect impacts
- threatening processes leading to progressive loss.

The EIS should describe and assess the potential impacts of any actions of the project or likely impacts that require an authority under the *Nature Conservation Act 1992*, and/or would be assessable development for the purposes of the *Vegetation Management Act 1999*. The assessment and supporting information should be sufficient for the administering authority to decide whether an approval should be granted and developing recommended conditions.

With respect to mitigation strategies, the following should be provided:

- 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 injuries to 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.

It should be described how these measures will be implemented in the overall EMP for the project. Rehabilitation of disturbed areas should incorporate, where appropriate, provision of nest hollows and ground litter.

Feral animal management strategies and practices should be addressed. The study should develop strategies to ensure that the project does not contribute to increased encroachment of a feral animal species. Reference should be made to the local government authority's pest management plan and any strategies and plans recommended for the project area by Biosecurity Queensland. The strategies should be discussed 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.

### 3.3.4 Aquatic ecology

#### 3.3.4.1 Description of environmental values

The aquatic flora and fauna occurring in the areas affected by the proposal should be described, noting the patterns and distribution in the waterways (e.g. rivers, streams, creeks and other bodies of water) and any associated wetlands. The description of the flora and fauna present or likely to be present in the area should include:

- fish species, mammals, reptiles, amphibians, crustaceans and aquatic invertebrates occurring in the waterways within the affected area and any associated wetlands
- any near threatened or threatened aquatic species
- description of the habitat requirements, including movement 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 and exotic/weed species. Reference should be made to Biosecurity Queensland's Annual Pest Distribution Survey 2008 data and predictive maps available on DEEDI's website ([www.deedi.qld.gov.au](http://www.deedi.qld.gov.au)) and used in conjunction with Queensland Herbarium naturalised flora data to source the occurrence of aquatic pest plants in the project area. Local Government Area Pest Management Plans should also be utilised to source the occurrence of priority aquatic pest plants in the project area
- aquatic and benthic substrate
- habitat upstream and downstream of the project or potentially impacted due to currents in associated lacustrine and aquatic environments
- identification of all types of groundwater dependent ecosystems occurring within and outside the project area and potentially impacted by project activities. An assessment should be made of the environmental water requirements for the protection of the identified groundwater dependent ecosystems. Groundwater dependent ecosystems may include:
  - subterranean ecosystems
  - phreatophytic terrestrial and riparian vegetation
  - springs and other wetlands
  - stream communities dependent on baseflow
- aquatic substrate and stream type, including the locations and extent of any permanent and semi-permanent water holes or streams potentially affected by the mine and its operations and location.

Wetlands listed by DERM as areas of national, state or regional significance should be described and their values and importance for aquatic flora and fauna species.





#### 3.3.4.2 Potential impacts and mitigation measures

This section should provide a discussion of the potential permanent and temporary impacts of the project on the aquatic ecosystems and a description of proposed measures to avoid, minimise or mitigate actions, including:

- details of proposed stream diversions, causeway construction and crossing facilities, stockpiled material and other impediments that would restrict free movement of aquatic fauna
- measures to avoid fish spawning periods, such as seasonal construction of waterway crossings or other waterway barriers and measures to facilitate fish movements through water crossings
- details of alternatives to waterway crossings or other waterway barriers where possible
- offsets proposed for unavoidable, permanent loss of fisheries habitat
- a description of methods to minimise the potential for the introduction and/or spread of weed species or plant disease
- measures to avoid or mitigate potential impacts on groundwater dependant ecosystems. Describe the proposed monitoring for each identified groundwater dependent ecosystem
- monitoring of aquatic ecology health, productivity and biodiversity in areas upstream and downstream of the project area.

The EIS should address any actions of the project or likely impacts that require an authority under the relevant legislation including the *Nature Conservation Act 1992* and/or the *Fisheries Act 1994*. Outline how these measures will be implemented in the overall EMP for the project.



## 3.4 Water resources

### 3.4.1 Description of environmental values

This section of the EIS should provide a description of the existing water resources that may be affected by the project in the context of environmental values as defined in such documents as the EP Act, *Environmental Protection (Water) Policy 2009* (EPP (Water)), *Australia and New Zealand Guidelines for Fresh and Marine Water Quality 2000* and the *Queensland Water Quality Guidelines 2009* (DERM 2009).

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, and reference to any licences held by users. Provide a detailed description of the quality and quantity of surface and ground water resources in the area potentially affected by the project. This section should describe:

- existing surface waters, wetlands and groundwater in terms of physical, chemical and biological characteristics
- existing surface drainage patterns, flows, history of flooding including extent, levels and frequency and present water uses.

The surface water and groundwater quality should be described considering seasonal variations in depth and flow and all times of natural flow in ephemeral streams. Parameters should include a broad range of water quality indicators including, but not necessarily limited to, electrical conductivity, major cations and anions, dissolved metals (including Al, Ag, As, B, Br, Ca, Co, Cr, Cu, Fe, Hg, Mo, Mn, Ni, Pb, Se, U, V, Zn), minor ions (such as ammonia, nitrite, nitrate, fluoride), hydrocarbons, any other potential toxic or harmful substances, turbidity, suspended sediments and pH. All sampling should be performed in accordance with the *Water Quality Sampling Manual* (DERM 2009) or the most current edition. The description of water quality should include medians, ranges and percentiles appropriate for comparison with appropriate trigger levels and guidelines for the protection of aquatic ecosystems and downstream users.

The EIS should investigate the relationship between groundwater and surface water to assess the nature of any interaction between the two resources and any implications of the proposed mine that would affect the interaction.

The environmental values of the surface waterways and groundwater of the affected area should be described in terms of:

- values identified in the EPP (Water)
- physical integrity, fluvial processes and morphology, including riparian zone vegetation and form, if relevant
- any impoundments (e.g. dams, levees, weirs etc.) or natural (e.g. cascades) waterway barriers
- hydrology of waterways and groundwater
- sustainability, including both quality and quantity
- dependent ecosystems
- existing and other potential surface and groundwater users
- details of any proposed buffer widths between project activities and waterways (e.g. rivers, streams, creeks, other bodies of water and wetlands) and other fisheries values, as well as any potential temporary and/or permanent impacts to aquatic flora and fauna (if any)
- any water resource plans relevant to the affected catchments.

If the project is likely to use or affect local sources of groundwater, this section should provide a description of groundwater resources in the area in terms of:

- a comprehensive hydrogeological description covering: the coal seams and surrounding aquifers, both artesian and sub-artesian (including the Great Artesian Basin); inter-aquifer





connectivity; flow of water; recharge and discharge mechanisms; and hydrogeological processes at work

- current extraction regime
- geology/stratigraphy
- aquifer type—such as confined and 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)
- interaction with surface water
- possible sources of recharge
- potential exposure to pollution
- current access to groundwater resources in the form of bores, springs, ponds, including quantitative yield of water and locations of access.

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

For the taking of groundwater, the EIS should review the significance of groundwater in the project area, together with groundwater use in neighbouring areas. Specific reference should be made 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.

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

- location, type and status of existing water entitlements and associated infrastructure (bores, wells or excavations)
- pumping parameters
- draw down and recharge at normal pumping rates
- seasonal variations (if records exist) of groundwater levels.

A network of observation points which would satisfactorily monitor groundwater resources both before and after commencement of operations should be developed.

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.

### **3.4.2 Potential impacts and mitigation measures**

This section should assess potential impacts of the project on water resource environmental values identified in the previous section. It should also define and describe the objectives and practical measures for protecting or enhancing water resource environmental values, to describe how nominated quantitative standards and indicators may be achieved, and how the achievement of the objectives will be monitored, audited and managed. Matters to be addressed include:

- potential impacts on the flow and the quality of surface and groundwaters from all phases of the project, with reference to their suitability for the current and potential downstream uses and discharge licences
- an assessment of all likely impacts on groundwater depletion or recharge regimes
- the likely volume of groundwater to be dewatered during the operations, and its likely quality characteristics, including salinity



- an assessment of the impacts on groundwater resources in each aquifer of any take of groundwater or dewatering as a result of the mine's operation
- a description of how extracted groundwater will be managed in the surface water management system to minimise the likelihood of discharging highly saline water
- measures to prevent, mitigate and remediate any impacts on existing users or groundwater dependent ecosystems
- an assessment of the potential environmental impact caused by the project (and its associated project components) to local groundwater resources, including the potential for groundwater induced salinity
- the response of the groundwater resource to the progression and finally cessation of the proposal should be described
- an assessment the project's impact on the local ground water regime caused by the altered porosity and permeability of any land disturbance
- any potential for the project to impact on groundwater dependent vegetation should be assessed and described, including avoidance and mitigation measures
- potential impacts of surface water flow on existing infrastructure, with reference to the EPP (Water) and the *Water Act 2000*
- chemical and physical properties of any waste water including stormwater at the point of discharge into natural surface waters, including the toxicity of effluent to flora and fauna
- how contaminants and wastes are avoided, minimised, treated and managed in accordance with section 13 of the *Environmental Protection (Water) Policy 2009*
- environmental monitoring to check the effectiveness of mitigation measures
- potential impacts on other downstream receiving environments, considering the available assimilative capacity of the receiving waters, if it is proposed to discharge water to a riverine system
- if it is proposed to discharge water to a riverine system, mitigation measures for water treatment should be discussed
- the results of a risk assessment for uncontrolled releases to water due to system or catastrophic failure, implications of such emissions for human health and natural ecosystems, and list strategies to prevent, minimise and contain impacts
- an assessment of the potential to contaminate surface and ground water resources and measures to prevent, mitigate and remediate such contamination.

The EIS should describe and address the impacts of subsidence including but not limited to:

- surface water resources
- local drainage patterns
- floodplains and overland flows
- areas susceptible to higher levels of erosion such as watercourses confluences
- ponding areas within the floodplain
- volumes of local and large scale catchment runoff, including the interception of low flow events
- downstream users.

The EIS should assess any potential surface water and groundwater interaction as a result of subsidence of a watercourse. Also assess the potential impacts on the groundwater regime in alluvial and deeper aquifers due to altered porosity, permeability and interconnectivity from any land disturbance, including subsidence.



The EIS should assess the potential impacts of subsidence on the sediment load within watercourses. The EIS must identify any existing Quarry Material Allocation Notice (QMAN) Holders in, or downstream of, subsidence areas; and if there are any QMAN Holders also assessing whether there would be potential impacts on their resource or entitlement. The EIS should provide mitigation measures for any impacts on any QMAN holders.

The EIS should assess the impacts of subsidence on the ecological condition of the bed and banks of surface drainage and in-stream ecology, including fish passage.

The EIS should detail measures that would mitigate the impacts of subsidence.

The EIS should describe and illustrate any proposed diversions of watercourses, including any staging and whether the diversions are proposed to be temporary or permanent. The EIS should provide a description, with photographic evidence, of the geomorphic condition of any watercourses likely to be affected by disturbance or stream diversion. The results of this description will form the basis for the planning and subsequent monitoring of rehabilitation of the watercourses during or after the operation of the proposal. 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 DERM or the Australian Coal Association Research Program for mines in the Bowen Basin. The EIS should contain enough information on each diversion, to demonstrate the diversion can be constructed to meet engineering requirements and be monitored and managed in accordance with relevant best practice guidelines.

The EIS should contain an outline of the impacts on all surface water resources and changes to flow immediately downstream of the project by:

- describing local overland flow catchment characteristics and estimated change to mean and median (50th percentile) annual run-off from local overland flow catchments
- describing changes to flows, including mean and median (50th percentile) annual flow, in watercourses immediately downstream of the site.

The EIS should describe the options for supplying water to the project, and assess the consequential impacts in relation to any water resource plan, resource operations plan and wild river declaration that may apply. Water allocation and water sources will be established in consultation with DERM. The EIS should 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 .

Reference should be made to the properties of the land disturbed and processing liquid wastes, the technology for settling suspended clays from contaminated water, and the techniques to be employed to ensure that contaminated water is contained and successfully treated on the site.

The EIS should describe the proposed stormwater drainage system and the proposed disposal arrangements, including any off-site services. Illustrate the description with figures and contours at suitable intervals (one metre contours in areas of low relief), showing drainage pathways and the locations and discharge points of sediment detention basins and any other stormwater quality improvement devices.

The stormwater drainage system should be appropriate for:

- the topography of, and climatic conditions affecting, the receiving environment
- soil type, its characteristics and the way it is managed
- the characteristics and containment of the material or waste that is exposed to rainfall or stormwater run-off.

The EIS should provide management strategies that are adequately detailed to demonstrate best practice management and that environmental values of receiving waters will be maintained to nominated water quality objectives. Monitoring programs, which will assess the effectiveness of management strategies for protecting water resources during the construction, operation and decommissioning of the project, should be described. Such programs will include upstream and downstream sampling sites at the proposed area and at reference locations, i.e. non-impacted sites. Downstream monitoring will include sites located near to the proposed discharge points in addition to



other relevant downstream locations. Sites will include permanent and semi permanent water holes, known aquatic habitats, weirs or reservoirs. Complementary stream flow data should also be obtained (where available) and discussed to aid interpretation. This section should also outline how management strategies will be incorporated into appropriate sections of the EMP.

The principles and objectives of the proposed monitoring in the coal seams and surrounding aquifers should be identified and include a supporting rationale for the monitoring. The approach should describe the parameters to be monitored, the frequency of monitoring and the proposed recording mechanisms and reporting arrangements.

## 3.5 Air quality

### 3.5.1 Description of environmental values

This section should 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*.

A discussion of the existing air shed environment, both local and regional, should be provided, including:

- background levels and sources of particulates, gaseous and odorous compounds and any major constituent
- pollutants, including greenhouse gases, which may be affected by the project
- 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.

### 3.5.2 Potential impacts and mitigation measures

The following air quality issues and their mitigation should be considered and include:

- an inventory of air emissions from the project expected during construction and operational activities
- an accurate description of the activities carried out on the site and process flow diagram, clearly showing all unit operations to be carried out on the premises and detailed discussion of all unit operations
- a description of all pollution control equipment and pollution control techniques employed on the premises and the features of the proposal designed to suppress or minimise emissions, including dusts
- a description of the back-up measures to be incorporated that will act in the event of failure of primary measures to minimise the likelihood of upsets and adverse air impacts
- an air emission inventory of the proposed site for all potential point, area and volume sources including fugitive emissions of dusts. A complete list of emissions to the atmosphere including SO<sub>x</sub>, NO<sub>x</sub>, CO<sub>2</sub>, particulates, PM<sub>10</sub> and PM<sub>2.5</sub> should be provided
- all expected emissions of the hazardous air pollutants must be identified and their emissions from known and fugitive sources must be provided
- an estimation of emission rates should be based on actual measurements on 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
- an impact assessment with relevant inputs of emissions and local meteorology to an air dispersion model to provide estimates of 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 month average dust deposition values at the nearest sensitive receptor(s). Results of the dispersion modelling must be presented as concentration contour plots and concentrations at the discrete sensitive receptors. The 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

- a description of 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
- an averaging period for ground level concentrations of pollutants that are modelled. This should be consistent with the relevant averaging periods for air quality indicators and goals in the *Environmental Protection Policy (Air) 2008* and the *National Environmental Protection Measure (NEPM) Air*. For example, the modelling of PM10 must be conducted for 1-hour, 24-hours and annual averaging periods
- identification of the worst case meteorological conditions based on the modelled ground level predictions and using this information, develop the dust mitigation measures for the mining activities. The dust management plan that will be employed for the mitigation of adverse air impacts under the worst meteorological conditions should also be described
- discussions on the limitations and accuracy of the applied atmospheric dispersion models. The air quality modelling results should be discussed in light of the limitations and accuracy of the applied models
- where there is no single atmospheric dispersion model that is able to handle the different atmospheric dispersion characteristics exhibited in the proposal area (e.g. sea breezes, strong convection, terrain features, temperature inversions and pollutant re-circulation), a combination of acceptable models will need to be applied
- identification of 'worst case' emissions that may occur during operation. If these emissions are significantly higher than those for normal operations, it will be necessary to 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 residential, industrial, agricultural, commercial and community developments believed to be sensitive to the effects of predicted emissions
- dust generation from construction activities, especially in areas where construction activities are adjacent to existing road networks or are in close proximity to sensitive receivers
- climatic patterns that could affect dust generation and movement
- vehicle emissions and dust generation along major road and rail haulage routes both internal and external to the project site
- human health risk associated with emissions from the facility of all hazardous or toxic pollutants should be assessed
- impacts on terrestrial flora and fauna.

Potential air quality impacts from emissions must be discussed with reference to the National Environmental Protection Measures (NEPM) for ambient air quality (1998) and the *Environmental Protection (Air) Policy 2008*. If an emission is not addressed in these legislative instruments, the emission should be discussed with reference to its risks to human health, including appropriate health-based guidelines/standards.

To ensure that appropriate coal rail-transport related dust mitigation measures are implemented at the South Galilee Coal Project, the proponent should consult with QR Limited's QR 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 the implementation of the Transitional Environmental Program and *QR Coal Dust Management Plan* across all coal railways in Queensland.

## 3.6 Greenhouse gas emissions

### 3.6.1 Description of environmental situation

This section should provide an inventory of projected annual emissions for each relevant greenhouse gas, with total emissions expressed in 'CO<sub>2</sub> equivalent' terms for the following categories:

- Scope 1 emissions, where '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
- Scope 2 emissions, where '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.

The Department of Climate Change *National Greenhouse Accounts Factors* can be used as a reference source for emission estimates and supplemented by other sources where practicable and appropriate. As a requirement of the *National Greenhouse Accounts Factors*, estimates should include the loss of carbon sink capacity of vegetation due to clearing and impoundment.

### 3.6.2 Potential impacts and mitigation measures

This section should discuss the potential for greenhouse gas abatement measures, including:

- a description of the proposed measures (alternatives and preferred) to avoid and/or minimise direct greenhouse gas emissions
- an assessment of how the preferred measures minimise emissions and achieve energy efficiency
- a description of any opportunities for further offsetting greenhouse gas emissions through indirect means including sequestration and carbon trading.





## 3.7 Noise and vibration

### 3.7.1 Description of environmental values

This section should describe the existing noise and vibration environment that may be affected by the project in the context of environmental values as defined by the *Environmental Protection (Noise) Policy 2008*. DERM's Noise Measurement Manual should be considered and references should be made to the *EPA Guideline: Noise and Vibration from Blasting*.

Sensitive noise receptors adjacent to all project components should be identified and typical background noise and vibration levels estimated based on surveys at representative sites. The potential sensitivity of such receptors should be discussed and performance indicators and standards nominated. The locations of any noise sensitive receptors, as listed in Schedule 1 of the *Environmental Protection (Noise) Policy 2008*, should be identified on a map at a suitable scale.

Where a railway is also proposed to be constructed and operated, an assessment of the acoustic impacts of the rail should be carried out in the context of the *QR Code of Practice for Railway Noise Management*.

### 3.7.2 Potential impacts and mitigation measures

The EIS should describe the impacts of noise and vibration generated during the 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 where appropriate
- impact of noise, including low frequency noise (noise with components below 200 hertz) and vibration at all potentially sensitive receivers compared with the performance indicators and standards nominated above
- impact on terrestrial and aquatic 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.

## 3.8 Waste

### 3.8.1 Waste generation

The EIS should provide an inventory of all wastes to be generated by the project during the construction, operational and decommissioning phases of the project. In addition to the expected total volumes of each waste produced, include an inventory of the following per-unit volume of product produced:

- the tonnage of raw materials processed
- the amount of resulting process wastes
- the volume and tonnage of any re-usable by-products.

The EIS should provide schematic diagrams of processes to be used at each distinct stage of the project, indicating each waste stream and its intended fate. This applies to all waste outputs—solid, liquid and gaseous—including fugitive emissions from coal seams, and recycling efforts such as stockpiling and reusing topsoil. The schematic diagrams, or an associated table, will cross-reference the relevant sections of the EIS where the potential impacts and mitigation measures associated with each waste stream are described. Describe the physical and chemical characteristics and the variability of composition and generation rates of each waste material.

Each subsection on waste management will assess how the proposed methods for waste management at each stage of the project achieve the highest possible level on the waste management



hierarchy with regard to the principles in the *Environmental Protection (Waste Management) Policy 2000*.

The EIS should describe how the project would achieve natural resource use efficiency (such as minimum use of energy and water, and minimum footprint on used land), integrated processing design, co-generation of power and by-product reuse 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.

### 3.8.2 Waste management

Having regard for best practice waste management strategies and the *Environmental Protection (Waste Management) Policy 2000* and the *Environmental Protection (Waste Management) Regulation 2000*, this section should assess the potential impact of all wastes generated during construction and operation and provide details of each waste in terms of:

- the options available for avoidance/minimisation
- operational handling and fate of all wastes including storage
- on-site treatment methods proposed for any wastes
- methods of disposal (including the need to transport wastes off-site for disposal) proposed to be used for any trade wastes, liquid wastes and solid wastes
- the potential level of impact on environmental values
- measures to ensure stability of the waste storage areas and impoundments
- methods to prevent seepage and contamination of groundwater from stockpiles and/or storage areas and impoundments
- measures to minimize attraction of vermin, insects and pests
- options available for using recycled materials
- market demand for recyclable waste (where appropriate)
- decommissioning of the construction site.

The EIS should provide details of waste management strategies (including reduction, reuse, recycling, storage, transport and disposal of waste) which demonstrate that waste minimisation and cleaner production techniques and designs have been implemented through the selection of processes, equipment and facilities to prevent or minimise environmental impacts.

Information should also be provided on the variability, composition and generation rates of all waste produced at the site and processing plant.

Cleaner production waste management planning should be detailed, especially as to how these concepts have been applied to preventing or minimising environmental impacts at each stage of the proposal. Measures to improve natural resource use efficiency (e.g. energy and water), integrated processing design, any co-generation of power and by-product reuse as shown in a material/energy flow analysis should be presented.

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—this section should 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 (e.g. trucks, either by entrainment from the load or by passage on unsealed roads). The methods to be employed in the mitigation of impacts from air emissions should be described in the section 3.5.
- excavated waste—the EIS should describe the materials to be excavated as waste. It should also describe and illustrate the location, design and methods for constructing dumps for waste rock and any subsoil that will not be replaced in rehabilitation, including the following:





- an estimation of the tonnage and volume of waste rock and subsoil to be excavated during the various stages of operation
- an estimation will be made for each separate rock and soil type. Describe the expected proportion and source of waste rock that is mineralised but currently uneconomical for processing
- a description of the chemical and physical properties of the waste rock and subsoil, and assessment of the properties that affect their erosion and leaching potential. Undertake the characterisation of the waste in accordance with the *Assessment and Management of Acid Drainage* guideline of the Technical Guidelines for the Environmental Management of Exploration and Mining in Queensland series (DME, 1995), *Managing Acid and Metalliferous Drainage* published by the Leading Practice Sustainable Development Program (Commonwealth of Australia, 2007) and any other applicable best practice guidelines.
- the characterisation of waste rock and subsoil will include, but not necessarily be limited to: sulfides; metals; pH, conductivity and chloride of slurry samples; the Net Acid Producing Potential (NAPP), and Net Acid Generation (NAG) potential of the mined waste. Particular attention should be paid to materials, such as waste rock immediately above or below coal seams, where potentially acid forming material may be concentrated. The sampling effort must be sufficient to provide a statistically valid characterisation of each of the various types of waste rock, taking account of the geological variability and complexity within and between rock types
- a discussion of the potential for acid, neutral, alkaline or saline drainage from waste dumps. Characterise the potential quality of leachate from the mined waste under field conditions, including contaminants such as sulphate, pH, chloride, iron, major cations and anions, and any chemical species in sufficient quantity that is likely to cause environmental harm including nuisance. Provide cross-references in this section to those sections of the EIS that assess in detail the potential impacts of any direct or indirect discharge of leachate on downstream sensitive environments or users of receiving waters
- use the estimated amounts and characteristics of excavated waste to develop appropriate measures for dealing with that waste, including designs for waste dumps, and alternatives for excavated waste disposal such as in-filling of voids, off-site options and treatment of contaminated soil. Assess the likely performance of the proposed waste disposal options with particular regard to:
  - segregating and encapsulating sub-economic but mineralised rock and/or potentially acid-forming rock
  - managing surface drainage and sub-surface leachate both during operations at the mine and after mining ceases (note: avoid placing dumps across drainage lines that would pond water behind the dump and cause infiltration)
  - slope profiles and the stability and erosion potential of waste dumps
  - the intended land use after mining ceases, and the land management and maintenance requirements for the subsequent landholder.
- consideration of 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
- illustration of the location and cross-sections of the proposed dumps on maps, drawings and diagrams relative to topography and other natural features of the area
- tailings—describe the methods and materials that would be used to produce tailings waste (tailings should be understood to include any fine reject material) including the following:
  - state whether the methods to be used to produce and treat tailings would be novel or established. For novel methods, describe the testing undertaken to determine if the



method would be suitable for the proposed use. For established methods, provide examples of where the method has been, or is being, used and assess the equivalence of those examples to the proposed use

- estimate the annual production of tailings waste at the various stages of the project
- describe how the methods used to produce and treat tailings would be in accordance with the waste management hierarchy and the tailings management principles in the *Tailings Management Guideline* of the Technical Guidelines for the Environmental Management of Exploration and Mining in Queensland series, DME, 1995
- describe in detail the likely physical and chemical characteristics of the tailings waste and the likely chemical characteristics of waste water from the pressing plant, the decant water from any tailings storage facility (TSF), and the pore water and leachate from any dump containing tailings
- describe and illustrate the proposed locations of any pits, dams, bunds or dumps that would be used for the disposal of tailings
- describe and illustrate the proposed design of any TSF, including any cells for non-flowable tailings within waste rock dumps (note: a shear strength of greater than 1000 pascals would generally be required of pastes suitable for dry tailings stacking, while pastes with lower shear strength must be contained in a regulated dam. However, the slumping and plastic properties of any tailings considered for disposal by dry stacking will be derived from tests on representative samples and reported in the EIS)
- describe the source, and assess the suitability, of the materials to be used to construct containment systems. Describe any proposed staging of the construction for any TSF or disposal cells and demonstrate that the design has been produced by a suitably qualified and experienced engineer
- conduct, and report on a risk assessment and describe how it has been used to derive the design storage allowance for any regulated dams. Assess whether the proposed design and methods of disposal would minimise the potential hazards and risks, particularly in relation to the potential impacts of failure caused by mass release from structural failure or contaminant release from overflow. Also, assess whether the proposed design maximises site efficiency, such as by minimising the footprint
- if some form of co-disposal of fine and coarse rejects is proposed, describe the range of proportions, size fractions and mixing method that would produce a stable deposit
- describe the proposed discharge locations and conditions for any TSF. Describe the flow path any discharge would take, illustrated on contour maps, and provide an overview of the potentially affected receiving environment with particular regard to downstream sensitive ecosystems or users of receiving waters. Discharge should be taken to mean any planned or unplanned overflow or release, any leachate, or any potentially contaminated runoff leaving a TSF. Assess in detail the potential impacts of any discharge on downstream sensitive environments or users of receiving waters in the appropriate sections of the EIS and cross-reference to them in this section
- describe the proposed monitoring network and regime that would be used to detect any leak from the TSF
- describe the proposed measures to be used to decommission any TSF or dump used for the disposal of tailings. Assess any legacy issues for the subsequent landholder
- 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
- 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. The proposed location, site suitability, dimensions and volume of any landfill, including its method of construction, should be shown



- liquid waste—a description should be presented of the origin, quality and quantity of wastewater and any immiscible liquid waste originating from the project other than that addressed in other sections. Particular attention should be given 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 onto disturbed surface areas
- run-off from roads, plant and industrial areas, chemical storage areas
- drainage (i.e. run-off plus any seepage or leakage)
- seepage from other waste storages
- water usage for (1) process use (2) dust suppression, and (3) domestic purposes
- evaporation
- domestic sewage treatment—disposal of liquid effluent and sludge
- water supply treatment plant—disposal of wastes.

## 3.9 Transport

### 3.9.1 Existing infrastructure

The transport assessment is to be presented in separate reports for each project-affected mode (road, rail, air and sea) as appropriate. 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. They should also include all base data assumptions, including current condition of the affected network and its performance.

### 3.9.2 Transport tasks and routes

This section should describe for all phases of the project (for example traffic data should be presented as AADT and percentage of vehicle by class - including light vehicles, heavy vehicles etc):

- expected volumes of project inputs and outputs of transported raw materials, wastes, hazardous goods, finished products
- how identified project inputs and outputs will be moved through the transport network (volume, composition, trip timing and routes)
- traffic generated by workforce personnel including visitors (volume, composition, timing and routes)
- likely heavy and oversize/indivisible loads (volume, composition, timing and routes) highlighting any vulnerable bridges and structures along proposed routes.



### 3.9.3 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 general accordance with TMR *Guidelines for Assessment of Road Impacts of Development 2006*)
- description of input data and assumptions
- a summary of consultation undertaken with transport authorities and QPS regarding scope of impact assessment and methodology.

The EIS should assess project impacts on:

- capacity, safety, efficiency and condition of transport operations, services and assets (from either transport or project operations)
- any other proposed rail projects in the vicinity of the subject proposal
- possible interruptions to transport operations
- the natural environment within the jurisdiction of an affected transport authority (e.g. road and rail corridors)
- the nature and likelihood of product-spill 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*
- accessibility to transport for people with a disability.

### 3.9.4 Infrastructure alterations

The EIS should 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
- requirements to upgrade existing level crossings arising as a result of increased project traffic during both the construction and operations phase of the project.

### 3.9.5 Transport management strategies

The proponent is to 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 by the proponent in close consultation with relevant transport authorities and QPS and include consideration of each authority's works program and forward planning.

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



## 3.10 Indigenous cultural heritage

### 3.10.1 Description of existing Indigenous cultural heritage values

This section should describe the existing Aboriginal cultural heritage values that may be affected by the project and the environmental values of the cultural landscapes of the affected area in terms of the physical and cultural integrity of the landforms.

The section should also describe how in conjunction with the appropriate Aboriginal people, the cultural heritage values were ascertained, including for example, the results of any Aboriginal cultural heritage survey undertaken; the DERM Aboriginal Cultural Heritage Register and Database; any existing literature relating to Indigenous cultural heritage in the project area.

### 3.10.2 Potential impacts and mitigation measures

This section should define and describe the objectives and practical measures for protecting or enhancing Indigenous cultural heritage environmental values, describe how nominated quantitative standards and indicators may be achieved for cultural heritage management, and describe how the achievement of the objectives will be monitored, assessed and managed.

To the greatest extent practicable, significant cultural heritage areas should be avoided by the project. The EIS should provide an assessment of likely effects on sites of Indigenous cultural heritage values, including but not limited to the following:

- description of the significance of artefacts, items or places of conservation or cultural heritage values likely to be affected by the project and their values at a local, regional and national level
- recommended means of mitigating any negative impact on cultural heritage values and enhancing any positive impacts.

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

A Native Title Agreement, as that term is defined under the *Aboriginal Cultural Heritage Act 2003* (ACH Act), that includes management and protection strategies for Aboriginal cultural heritage (NT Agreement) or a Cultural Heritage Management Plan (CHMP) under the ACH Act (CHMP) should be initiated during the EIS process.

An NT Agreement or an approved CHMP in a form which 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 an NT Agreement is not finalised or a CHMP has not been approved, when the EIS is submitted to the Coordinator-General, the following must be provided:

- an outline of the draft CHMP or draft plan within the NT Agreement which addresses management and protection strategies for cultural heritage, subject to any confidentiality provisions, outlining the position of the relevant parties
- details of the proposed steps and timeframes for finalising the CHMP or NT Agreement.

An NT Agreement or CHMP should be negotiated between the proponent and the appropriate Native Title/Indigenous parties and should address and include the following:

- a process for including Indigenous people associated with the development areas in protection and management of Indigenous cultural heritage
- processes for mitigation, management and protection of identified cultural heritage sites and objects in the project areas, including associated infrastructure developments, during both the construction and operational phases of the project
- provisions for the management of the accidental discovery of cultural material, including burials
- a clear recording process to be developed to assist initial management and recording of



accidental discoveries

- a cultural heritage induction for project staff
- the development of a cultural heritage awareness program to be incorporated into the contractor/employee manual as well as induction manual. This is to be in the form of a plain language, short document which is easy for contractors and staff 'on the ground' to understand
- a conflict resolution process.

## 3.11 Non-Indigenous cultural heritage

### 3.11.1 Description of existing non-Indigenous cultural heritage values

The EIS should include a cultural heritage study that describes non-Indigenous cultural heritage sites and places, and their values. Any such study should be conducted by an appropriately qualified cultural heritage practitioner and should include the following:

- the desktop component of the cultural heritage study will include a literature review of:
  - local, regional and thematic histories
  - primary sources as appropriate
  - any existing literature available from Queensland Government sources or provided to the consultants by local community groups and organisations relating to the affected areas
  - any other relevant heritage surveys, reports and publications
- consultation with:
  - 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 (e.g. local historical societies) concerning:
  - places of non-Indigenous cultural heritage significance
  - opinion regarding significance of any cultural heritage places located or identified
- locations of culturally and historically significant sites, shown on maps, that are likely to be impacted by the project
- a constraints' analysis of the proposed development area to identify and record non-Indigenous cultural heritage places.

The EIS should describe a systematic field survey of non-Indigenous cultural heritage of the project footprint area undertaken by a qualified heritage professional. The report of the survey should address:

- legislative and regulatory framework
- background research and relevant environmental data
- methods used
- results of field surveys, with an illustrated description (including location, photographs, maps etc.) of the significant artefacts, items, places or landscapes of conservation or cultural heritage values likely to be affected by the project
- an assessment of 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.



### 3.11.2 Potential impacts and mitigation measures

The proponent should provide an assessment of any likely effects on sites of non-Indigenous cultural heritage values, including but not limited to the following:

- description of 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
- recommended means of mitigating any negative impacts on non-Indigenous cultural heritage values and enhancing any positive impacts
- strategies to manage places of historic heritage significance, taking account also of community interests and concerns.

As a minimum, investigation, consultation, impact assessment, management and protection strategies should satisfy statutory responsibilities and duties of care, including those under the EPBC Act and *Queensland Heritage Act 1992*.

The EIS should assess the potential impacts on non-Indigenous historical cultural heritage values. It will also propose measures for the avoidance or mitigation of impacts, and the enhancement of identified values, in a historical heritage management plan. The historical heritage management plan will:

- address the legislative requirements
- include practical measures for the recognition, reporting and preservation of cultural heritage material
- provide a process for managing yet undiscovered values should they become apparent during development of the project
- describe training that will be provided to site personnel during the site induction
- require a plain English manual summarising the training that will be given to all site workers for their future reference.





## 4 Social values and management of impacts

### 4.1 Description of existing social values

The social impact assessment (SIA) should be conducted in consultation with the DIP Social Impact Assessment Unit. Matters to be considered include the social and cultural area, community engagement, a social baseline study, a workforce profile, potential impacts and mitigation measures and management strategies.

#### 4.1.1 Social and cultural area

The SIA should 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
- the location of other relevant proposals or projects
- the location and types of physical and social infrastructure, settlement and land use patterns
- the social values that might be affected by the project (e.g. including integrity of social conditions, visual amenity and liveability, social harmony and wellbeing, and sense of community)
- Indigenous social and cultural characteristics such as native title rights and interests and cultural heritage.

#### 4.1.2 Community engagement

Consistent with national and international good practice, the proponent should engage at the earliest practical stage with likely affected parties to discuss and explain the project and to identify and respond to issues and concerns regarding social impacts.

This section of the SIA should detail the community engagement processes used to conduct open and transparent dialogue with stakeholders. This dialogue should include the project's planning and design stages and future operations including affected local and state authorities. Engagement processes will involve consideration of social and cultural factors, customs and values, and relevant consideration of linkages between environmental, economic, and social impact issues.

#### 4.1.3 Social baseline study

A targeted baseline study of the people residing in the project's social and cultural area is required to identify the project's critical 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.

The social baseline study should describe and analyse a range of demographic and social statistics determined relevant to the project's social and cultural area including:

- major population trends/changes that may be occurring irrespective of the project
- total population (the total enumerated population for the social and cultural area and the full time equivalent (FTE) 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 (percent of dwellings in each category)), and weekly rent (percent 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 Plan 2005-2026 Implementation Guideline No. 5: [www.dip.qld.gov.au/resources/guideline/Implementationguideline5.pdf](http://www.dip.qld.gov.au/resources/guideline/Implementationguideline5.pdf)*). Maps illustrating the identified social infrastructure in the area effected by the project should be included
- 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.

#### **4.1.4 Workforce profile**

The SIA should include a profile of the workforce which describes the:

- number of personnel to be employed, the skills base of the required workforce and the likely sources (i.e. local, regional or overseas) for the workforce during the construction and operational phases for each component of the project
- estimated number of people to be employed during construction and operation, and arrangements for their transport to and from the project areas, including proposed use of regional or charter air services



The SIA should include a profile of the workforce which describes the occupational groupings and variations in the workforce numbers for the duration of the project and show anticipated peaks in worker numbers during the construction period.

The SIA should provide an outline of recruitment schedules and policies for recruitment of workers, addressing recruitment of local and non-local workers including Indigenous workers, people with a disability and people from culturally and linguistically diverse backgrounds.

If re-locatable camp sites and permanent operational villages are to be used to accommodate the workforce, details on the number, size, location (shown on a map), management, proximity to the construction site and typical facilities for these sites should be provided. Information should outline any local government or other regulatory approvals required for establishment and operation of such camps, including building, health and safety and waste disposal purposes.

The section should provide information in relation to the location of other major projects or proposals under study within the social and cultural area, together with workforce numbers.

## 4.2 Potential impacts

This section should 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, it should:

- 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 (including QPS) 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 by considering the following:
  - key population/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 women, children and young people, the aged and people with a disability
  - Indigenous peoples including cultural property issues
  - local, regional and state labour markets, with regard to the source of the workforce. This information is to be presented according to occupational groupings of the workforce. Information is required as to whether the proponent, and/or contractors, is likely to employ locally or through other means and whether there are initiatives for local employment business opportunities
  - proposed new skills and training related to the project including the occupational skill groups required and potential skill shortages anticipated
  - comment on 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. The capability of the existing housing and rental accommodation, to meet any additional demands created by the project is to be discussed including direct impacts on Indigenous people. The social impacts on FIFO workforce arrangements should also be assessed.



The SIA will include an evaluation of 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 are defined as the additional impacts on population, workforce, accommodation, housing and use of community infrastructure and services, from the project, and other proposals for resource development projects in the area, which are publicly known or communicated by DIP if they overlap the proposed project in the same time frame as its construction period.

#### 4.2.1 Mitigation measures and management strategies

For identified positive and negative social impacts, social impact mitigation strategies and measures should be presented to address these impacts including:

- 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 in consultation with relevant local authorities and state government agencies, with proposals for accommodating the project workforce and their families that avoid, mitigate or offset any short and medium term adverse effects on housing affordability and availability, including the rental market, in the social and cultural area. If re-locatable camp sites and permanent operational villages are to be used to accommodate the workforce, management of health and safety issues associated with these accommodation types should be addressed in consultation with relevant local authorities and state government agencies
- the demographic changes in the profile of the region and the associated sufficiency of current social infrastructure to support community health, safety and wellbeing; education, employment and training; policing and emergency services
- the adequate provision of education, training and employment opportunities for women, people with a disability and Indigenous peoples
- collaborative stakeholder engagement strategies/partnership arrangements to develop and implement project benefit strategies and social impact mitigation measures.

The proponent should describe any stakeholder engagement processes regarding the development and acceptance of proposed mitigation strategies and measures, and how practical management and monitoring regimes are proposed to be implemented.

A draft social impact management plan (SIMP) should be prepared that promotes an active and ongoing role for impacted communities and local authorities through the project life cycle. The draft SIMP should be consistent with DIP's *Social Impact Assessment: guideline to preparing a social impact management plan* (2010). The SIMP, which will be subject to external review, should focus on action plans to implement mitigation strategies and include performance measures against which annual progress can be reported and 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 stakeholder engagement processes
- practical mechanisms to monitor and adjust mitigation strategies and action plans.



# 5 Economies and management of impacts

## 5.1 Economy

### 5.1.1 Description of affected local and regional economies

This section should describe the existing economy in which the project is located and the economies materially impacted by the project. It should include:

- a map illustrating the local and regional economies (local government areas) that could be potentially affected by the project
- gross regional product or other appropriate measure of annual economic production
- population
- labour force statistics
- economic indicators
- the regional economy's key industries and their contribution to regional economic income
- relevant government programmes and policies that affect the project
- the key regional markets relevant to the project:
  - labour market
  - housing and land markets
  - construction services and building inputs 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 (wage rates, building costs, housing rent etc)
- land values in the region by type of use.

### 5.1.2 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 by assessing the following:

- property values
- industry output
- employment
- the indirect impacts likely to flow to other industries and economies from the development of the project. This should also consider the implications of the project for future development
- the distributional effects of the proposal, including proposals to mitigate any negative impact on disadvantaged groups
- mitigation strategies to manage project impacts through relevant government policies and programmes.



### 5.1.2.1 Strategies for local participation

The assessment of economic impacts should outline strategies for local participation, including:

- strategies for assessing the cost effectiveness of sourcing local inputs from the regional economy during the construction, operation and rehabilitation of the project
- employment strategies for local residents including members of Indigenous communities and people with a disability, that include skills assessment and recruitment and training programs to be offered
- strategies responding to relevant government policy, relating to the use of locally sourced goods and services, with regard to *the Local Industry Policy* (Department of State Development, 1999)
- the potential impact on extractive resource availability in the regions both during and after construction and any economic consequences for the regions.

### 5.1.2.2 Impact upon property management

This section should also address the current and future management processes for adjacent properties which are likely to be impacted by the project during construction and/or operation. It should mention the:

- impact of the project on existing agricultural land uses and management practices (e.g. disruption to stockyards, fences, water points, sowing or harvesting of crops, movement of livestock, agricultural machinery and any loss of agricultural land)
- range of measures required to mitigate real and potential disruptions to rural practices and management of properties.

## 5.2 Sustainable development

The EIS should provide a comparative analysis of how the project conforms to the objectives for 'sustainable development'—see the *National Strategy for Ecologically Sustainable Development* (1992), available from the Australian Government Publishing Service.

This analysis should 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.



## 6 Hazard and risk

### 6.1 Hazard and risk assessment

This section of the EIS should 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:

- identification of potential hazards, accidents, spillages and abnormal events which may occur during all stages of the project, including possible frequency of occurrence
- identification of all hazardous substances to be used, stored, processed or produced and the rate of usage
- potential wildlife hazards, natural events and implications related to climate change.

A preliminary risk assessment for all components of the project shall be undertaken as part of the EIS process in accordance with *Australia/New Zealand AS/NZS 4360:2004 Risk Management*. With respect to risk assessment:

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

In regard to fires, in consultation with emergency services agencies (including QPS), the EIS should 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 under the SPP 1/03
- on-site fire fighting 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, fire fighting equipment, etc.
- an outline of any dangerous goods stores associated with the plant operations, including fuel storage and emergency response plans.

Details should be provided 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).

A comparison of assessed and mitigated risks with acceptable risk criteria for land uses in and adjacent to the project area(s) should be presented.

A risk management plan should be presented.





## 6.2 Health and safety

### 6.2.1 Description of public health and safety community values

This section should 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 and water.

### 6.2.2 Potential impacts and mitigation measures

This section should 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 impacts management, and how the achievement of the objectives will be monitored, audited and managed.

The EIS should assess the cumulative effects on public health values as well as occupational health and safety impacts on the community and workforce from project operations and emissions. Practical monitoring regimes should be recommended in this section.

## 6.3 Emergency management plan

The development of emergency planning and response procedures is to be determined in consultation with state and regional emergency service providers.

An outline of the proposed integrated emergency management planning procedures is to be provided (including evacuation plans, if required) for the range of situations identified in the risk assessment developed throughout section 6, including strategies to deal with natural disasters during operation and construction.

# 7 Cumulative impacts

This section is to provide a summary of the project's cumulative impacts and a description of these cumulative impacts both in isolation and in combination with those of existing or proposed project(s) publicly known or advised by DIP to be in the region, to the greatest extent practicable. Cumulative impacts should be assessed with respect to both geographic location and environmental values. Cumulative impacts on the groundwater resources in the area, including impacts on existing users and any groundwater dependent ecosystems, should also be assessed. The methodology used to determine the cumulative impacts of the project should be presented, detailing the range of variables considered, including where applicable, relevant baseline or other criteria upon which the incremental aspects of the project have been assessed.



## 8 Environmental management plan

This section should detail the environmental management plans (EMP) for both the construction and operation phases of the project. The EMP should be developed from, and be consistent with, the information in the EIS. The sections of the EMP must address discrete project elements and must provide life-of-proposal control strategies. The EMP must be capable of being read as a stand-alone document without reference to other parts of the EIS.

The EMP included within the EIS should comply with section 203 of the EP Act.

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
  - 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:

- element/issue—the 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
- monitoring—the monitoring requirements to measure actual performance (e.g. 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).

Through the EMP, the EIS' commitments to environmental performance can be used as regulatory controls via conditions to comply with those commitments. Therefore, the EMP is a relevant document for project approvals, environmental authorities and permits, and may be referenced by them.



## 9 Matters of national environmental significance

This section of the EIS should be a stand-alone section and should address the issues relevant to the relevant controlling provisions of the EPBC Act. This section should bring together assessments of impacts on MNES in other chapters (e.g. water resources, flora and fauna, cumulative impacts) and produce a stand-alone assessment in a format suited for assessment under the EPBC Act.

The controlling provisions under the EPBC Act have been determined as:

- sections 18 and 18A (Listed threatened species and communities); and
- sections 20 and 20A (Listed migratory species).

Predictions of the extent of threat (risk), impact and the benefits of any mitigation measures proposed, should be based on sound science and quantified where possible. All sources of information relied upon should be referenced and an estimate of the reliability of predictions provided. Any positive impacts should also be identified and evaluated.

If environmental offsets are required, in accordance with the EPBC Draft Environmental Offsets Policy Statement (August 2007), then an offset strategy should be proposed.

The extent of any new field work, modelling or testing should be commensurate with risk and should be such that when used in conjunction with existing information, provides sufficient confidence in predictions that well informed decisions can be made. Obligations under and implications of any species recovery plans must be specifically addressed.

### Introduction

The introduction in this section of the EIS should provide background to the project, including:

- a) how the action relates to any other actions (of which the proponent should reasonably be aware) that have been, or are being, taken or that have been approved in the region affected by the action
- b) a list of persons and agencies consulted during the preparation of the EIS
- c) the names of, and qualifications and experience of the persons involved in preparing the EIS, including sub-consultants and reviewers
- d) the environmental record of AMCI (Alpha) Pty Ltd and Alpha Coal Pty, including details of their environmental policy and planning framework and details of any proceedings under a Commonwealth or state law for the protection of the environment against them. The conclusions of any audits carried out on a coal mining project undertaken by AMCI (Alpha) Pty Ltd or Alpha Coal Pty where the impacts of long-wall mine subsidence have been addressed. This section should include any agency or expert assessments of AMCI (Alpha) Pty Ltd or Alpha Coal Pty environmental record in managing subsidence impacts.

### 9.1 Matters of national environmental significance

The function of this section of the EIS is to provide descriptions of the matters protected under the EPBC Act that may potentially be affected by the proposed action. This should include the listed threatened species, migratory species and ecological communities. This information will serve as a baseline against which impacts and management of the proposal and alternatives can be assessed.



### 9.1.1 Listed threatened species

Identify listed threatened species that could be affected, directly and indirectly and as a consequence of the proposal. This section must include the following information:

- a) a description of the distribution, ecology, and habitat preferences of listed threatened species;
- b) listed threatened species that need to be addressed includes but is not limited to:
  - *Acacia deuteroneura*
  - *Acacia ramiflora*
  - *Dichanthium queenslandicum* (King Blue-grass)
  - *Geophaps scripta scripta* (Squatter Pigeon (southern))
  - *Neochmia ruficauda ruficauda* (Star Finch (eastern), Star Finch (southern))
  - *Poephila cincta cincta* (Black-throated Finch (southern))
  - *Rostratula australis* (Australian Painted Snipe)
  - *Furina dunmalli* (Dunmall's Snake)
  - *Egernia rugosa* (Yakka Skink)
  - *Paradelma orientalis* (Brigalow Scaly-foot)
  - *Dasyurus hallucatus* (Northern Quoll)
- c) maps for listed threatened species showing:
  - all potential habitat for each species
  - habitat components important for each species such as breeding habitat
  - the location of known records (including those from databases and all surveys previously conducted in the project area).

### 9.1.2 Listed threatened ecological communities (TEC's)

Identify listed TEC's that could be affected, directly and indirectly, by the proposal. This section must include baseline information and a discussion of the relative importance of the occurrence of the TEC that occurs in the proposed project area.

TEC's to be addressed in the EIS must include:

- a) Brigalow (*Acacia Harpophylla* dominant and co-dominant)
- b) Weeping Mayall Woodlands
- c) natural grasslands of the Queensland Central Highlands and the northern Fitzroy Basin
- d) the community of native species dependent on natural discharge of groundwater from the Great Artesian Basin.

This section must include the following information:

- a) known information on the distribution of TEC's
- b) maps showing the distribution of TEC's in the project area
- c) maps showing vegetation condition of TEC's
- d) for each of the identified TEC's, provide a detailed discussion of known threats.



### 9.1.3 Listed migratory species

Identify listed migratory species that could be affected, directly and indirectly and as a consequence of the proposal. This section must include the following information:

- a) a description of the distribution, ecology, and habitat preferences of listed migratory species
- b) listed migratory species that need to be addressed includes but is not limited to:
  - *Merops ornatus* (Rainbow bee-eater)
  - *Hirundapus Caudacutus* (White-throated Needle-tail)
  - *Ardea alba s. lat* (Great Egret)
  - *Ardea ibis* (Cattle Egret)
  - *Apus pacificus* (Fork-tailed Swift)
- c) maps for listed migratory species showing:
  - all potential habitat for each species
  - habitat components important for each species such as breeding habitat
  - the location of known records (including those from databases and all surveys previously conducted in the project area).

### 9.1.4 Species surveys

Adequate and detailed surveys are required to provide baseline information to further refine information described above and may provide a baseline for monitoring. This section should:

- a) provide justification of survey methods used
- b) describe the expertise of staff undertaking surveys
- c) describe the survey effort including targeted survey effort for EPBC listed species
- d) describe why certain areas required more detailed survey effort than other areas
- e) detailed description of how TEC's were identified.

## 9.2 Relevant impacts

The function of this section of the EIS is to assess in detail the relevant impacts of the proposal addressing all the identified environmental values. Any technical data and other information used or needed to make a detailed assessment of the relevant impacts (reliability of forecasts and predictions, confidence limits and margins of error) should be indicated, and where necessary, included as an appendix. Risk assessment should be conducted and documented to address potential impacts, including direct and indirect impacts and impacts possible in both the short and long-term, as well as consequential and cumulative impacts.

### 9.2.1 Land clearing

This section should clearly describe the potential impacts that clearing vegetation will have on listed species and communities, including but not limited to:

- a) the approximate area in hectares of native vegetation to be cleared as a result of all mining activities
- b) a map showing approximate area to be cleared
- c) a description of the impacts of fragmentation and edge effects
- d) the impacts of vegetation loss on surface and groundwater hydrology.



## 9.2.2 Subsidence

A description of subsidence and subsidence effects must be provided. This section should include, but not be limited to:

- a) a description of long-wall mining and the physical process of subsidence
- b) 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
- c) a detailed description of the known or likely subsidence effects on surface and groundwater hydrology
- d) a detailed 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)
- e) a summary of the impact of subsidence 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
- f) a description of the known impacts of subsidence on groundwater
- g) a description of any known incidents where subsidence effects have (or been implicated to have) caused damage to the environment in Queensland
- h) geological features, such as faults, that may affect the level of subsidence or subsidence effects, must be described and mapped
- i) a detailed description and analysis of the likely level of subsidence from the proposed action, including maps showing expected subsidence level contours
- j) a detailed description of potential impacts to aquatic and terrestrial ecosystems from subsidence effects as a result of the proposed mine.

## 9.2.3 Water resources and pollution

This section should describe all water consumption that will occur during the construction, operation and decommissioning of the proposed action, including but not limited to:

- a) a description of water sources
- b) approximate volumes (ML per annum) of all water that may be used during the operation of the proposed mine from the various sources.

This section should describe how much waste water will be produced by the mine, what pollutants wastewater may contain, and how waste water will be managed, including:

- a) a description of the expected impacts upon surface and ground water from the mine
- b) a summary of the cumulative impacts on water resources for the proposed action with regard to present water use in the region, expected water consumption from the mine, loss of ground or surface water from subsidence, and indirect increases in water demand that may result from the mine.

## 9.2.4 Weeds and exotic fauna

Identify and describe the potential impacts of the proposed action on exotic fauna and weeds within and adjacent to the study area including:

- a) a description of the potential for mining activities and infrastructure (such as roads) in increasing the threat of weeds and exotic fauna within and adjacent to the project area
- b) a description of the potential impacts that an increase or change in exotic fauna or weeds may have on listed species and communities.





### 9.2.5 Impact assessment for MNES

A detailed assessment of the impacts of subsidence on listed threatened species, migratory species and TEC's should be included in the EIS. Specific impacts that must be assessed in detail include (but should not be limited to):

- a) for each of the identified threatened species, migratory species and TEC, provide a discussion of how potential impacts may affect threatened species, migratory species and TEC's in the project area (and downstream of the project area) in the short-term and long-term
- b) a discussion of cumulative impacts upon threatened species, migratory species and TEC's, where potential impacts are in addition to impacts of other existing or planned activities, considering threatening processes for threatened species, migratory species and ecological communities that occur in the project area.

## 9.3 Avoidance and mitigation measures to reduce the impacts to MNES

The EIS must explore any feasible alternatives to the action, in particular, exploring options to reduce the impacts on listed species and communities. This section should include how ecological values were defined in the referral to determine which features should be buffered and sufficient details to make it clear why any alternative is preferred to another.

### 9.3.1 Avoidance

Avoidance measures that must be considered in the EIS include potential options to the project as proposed in the referral, in regard to:

- a) longwall setback (offset) distances to potential habitat for listed species and communities
- b) longwall design (panel width and gap between longwall panels), including 'strip pillar mining'.

### 9.3.2 Mitigation measures

Mitigation measures that must be considered in the EIS include:

- a) an outline of an environmental management plan that sets out the framework for continuing management and mitigation
- b) a description of how the mitigation measures will be funded in the long-term
- c) evidence that demonstrates the efficacy of the proposed mitigation measures. This section must include the results of studies that have been used to test and demonstrate the techniques proposed.

## 9.4 Proposed offsets for residual impacts

The purpose of this section is to provide a detailed description of proposed mitigation measures and offsets, and must include:

- a) a consolidated list of mitigation measures and offsets proposed to be undertaken or provided to minimise or compensate for the relevant impacts of the action, including mitigation measures proposed to be taken by state governments, local governments or the proponent
- b) a detailed description of proposed offsets.



## 9.5 Monitoring and reporting

This section of the EIS must:

- a) outline the environmental impacts to be monitored
- b) identify any baseline monitoring that will be required before the proposal commences
- c) identify the parameters to be monitored, and their response trigger values and response activities, along with procedural and compliance audit programs and reporting requirements and arrangements to be implemented.

## 10 Conclusions and recommendations

The EIS should make conclusions and recommendations with respect to the project based on the studies presented, the EMP and conformity of the project with legislative and policy requirements.

## 11 References

All references consulted should be presented in the EIS in a recognised format.

## 12 Appendices

### 12.1 Final EIS TOR

A copy of the final TOR should be included in the EIS.

### 12.2 TOR cross-reference table

A cross reference table should be provided, 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.

### 12.3 Project approvals

Required project approvals should be listed.

### 12.4 Consultation report

This report should include:

- the methodology used in the public consultation plan including criteria for identifying stakeholders and the communication methods used (the consultation plan)
- a list of stakeholders identified, including the federal, state and local government agencies, and/or the affected parties (as defined by the EP Act) should be provided
- a summary of the issues raised by stakeholders and the means by which the issues have been addressed, should be provided
- plans for ongoing consultation should be outlined and included in the EMP.



## 12.5 Study team

The relevant qualifications and experience of the key study team members and specialist sub-consultants should be provided.

## 12.6 Glossary of terms

A glossary of technical terms should be provided.

## 12.7 Specialist studies

All reports generated on specialist studies undertaken as part of the EIS are to be included as appendices. These may include, but are not limited to:

- air pollution, noise and vibration
- groundwater and surface water hydrology
- geology and geomorphology
- economic studies and/or cost-benefit analysis
- cultural heritage
- hazard and risk studies
- land use and land capability studies.

## 12.8 Corporate environmental policy

The proponent should attach a copy of its corporate environmental policy and planning framework document.

## 12.9 List of proponent commitments

A list of all commitments made by the proponent in the EIS should be provided together with a reference to the relevant section in the report.

