

Draft EIS Terms of Reference
Goonyella Riverside Coal Mine
Expansion Project

Prepared for

BM Alliance Operations Pty Ltd

Riverside Centre
123 Eagle Street
Brisbane QLD 4000

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42625678/DRAFT EIS TERMS OF REFERENCE

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1.1 Executive Summary

The function of the executive summary is to convey the most important aspects relating to the project in a concise and readable form. The structure of the executive summary should follow that of the Environmental Impact Statement (EIS), focussing strongly on the key issues and conclusions.

1.2 Introduction

The function of the introduction is to explain the reasons why the EIS has been prepared and what is sets out to achieve. It should also define the audience to whom it is directed, and contain an overview of the structure of the document.

1.2.1 Project Proponent

This section should provide details regarding BHP Billiton Alliance Coal Operations Pty Ltd (BMA) who manage the mine on behalf of the Central Queensland Coal Associates (CQCA) Joint Ventures. Details will include: postal address, contact details and information regarding the Joint Venture.

1.2.2 Project Description

A brief description of the key elements of the project should be provided. This will also include any major infrastructure requirements.

1.2.3 Project Objectives and Scope

A statement of the objectives that have led to the development of the proposal and a brief outline of the events leading up to the proposal's formulation, envisaged time scale for implementation, project life and the anticipated establishment costs.

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

1.2.4 The Environmental Impact Assessment (EIA) Process

The aim of this section is to clearly state and explain the objectives of the EIA process under the relevant legislation.

This section should include a description of the impact assessment process steps, timing and the decision to be made for relevant stages of the project. This section should also outline mechanisms in the processes

for public input and the public release of an EIS which will specify all responses to stakeholder submissions. The information in this section is required to ensure:

- All relevant legislation is addressed;
- There is awareness of the process to be followed; and
- Stakeholders are aware of opportunities for input and participation.

Objectives of the EIS

This section should provide a statement of the objectives of the environmental impact assessment. The structure of the EIS can then be outlined as can an explanation of how the EIS will meet its objectives. The purpose of the EIS is to:

- provide public information on the need for and likely effects of the project;
- to set out acceptable standards and levels of impacts (both beneficial and adverse) on environmental values;
- and demonstrate how environmental impacts can be managed through the protection and enhancement of the environmental values.

The role and purpose of the EIS should be outlined, and the audience able to distinguish the EIS as the key environmental document providing advice to decision makers considering approvals for the project. The role of the EIS in providing the project's Environmental Management Plan (EMPlan) for ongoing regulation should also be discussed.

Discussion of options and alternatives and their likely relative environmental management outcomes is a key aspect of the EIS.

Submissions

Information should be provided on how submissions on the EIS will be addressed and taken into account during the decision making process.

1.2.5 Public Consultation Process.

An appropriate public consultation program, developed to the satisfaction of the EPA, is essential to the full conduct of the impact assessment. This section should outline the methodology that will be adopted to identify and mitigate socio-economic impacts that may arise from the project. Information about the consultation that has already taken place and the results of such consultation should be provided.

The public consultation program should provide ongoing opportunities for community involvement and education. It may include public meetings, interest group meetings, production of regular summary

information and updates, and other consultation mechanisms as required to encourage and facilitate active public consultation.

1.2.6 Project Approvals

Relevant Legislation and Policy Requirements

This section should explain the legislation and policies controlling the approvals process. Reference should be made to the Queensland EP Act, Water Act 2000, IP Act, Aboriginal Cultural Heritage Act 2003 and other relevant Queensland laws. Any requirements of the Commonwealth EPBC Act should also be included.

Local Government planning controls, local laws and policies applying to the development should be described, and a list provided of the approvals required for the project and the expected program for approval of applications. This information is required to assess how the legislation applies to the proposal, which agencies have jurisdiction and whether the proposed EIS process is appropriate.

Planning Processes and Standards

This section should discuss the project's consistency with existing land uses or long term policy framework for the area (eg as reflected in local and regional plans), and the legislation, standards, codes or guidelines available to monitor and control operations on site. This section should refer to all relevant State and Regional Planning Policies.

Local Government planning controls, local laws and policies applying to the development should be described, and a list provided of the approvals required for the project and the expected program for approval of applications.

This information is required to make clear how the proposal conforms with State, regional and local plans for the project area.

Accredited process for controlled actions under Commonwealth legislation

Projects that are undergoing an EIS under a State statutory process may also be controlled actions under the Commonwealth's Environment Protection and Biodiversity Conservation Act 1999 (EPBC). In which case, the Commonwealth may accredit the State's EIS process for the purposes of the Commonwealth's assessment under Part 8 of the EPBC.

When a State EIS process has been accredited, it will be necessary for the terms of reference to address potential impacts on the matters of National Environmental Significance (NES) that were identified in the 'controlling provisions' when the project was declared a controlled action.

As a minimum requirement, the TOR and the EIS should provide separate discussions under sub-headings in the relevant sections that describe the values and address the potential impacts on NES matters. The locations of those sub-headings should be readily identifiable from the Table of Contents. Alternatively, a stand-alone report could be provided as an appendix to the EIS that exclusively and fully addresses the issues relevant to the controlling provisions. In which case, it should follow the following template outline:

- Introduction;
- Description of the proposed action;
- Description of the affected environment relevant to the controlling provisions;
- Assessment of impacts on the National Environmental Significance (NES) and mitigation measures;
- Conclusions; and
- References.

2.1 Project Justification

The justification for the project should be described with particular reference made to the economic and social benefits, including employment and spin-off business development, which the project may provide. The status of the project should be discussed in a regional, State and national context.

2.2 Alternatives to the Project

This section should describe feasible alternatives, including conceptual, technological and locality alternatives to the project, and 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 and courses of action and rejecting others. Should water supply, power, transport and/or storage infrastructure be included as an element of the proposal, this section should include a description of and rationale for such infrastructure. Reasons for selecting the preferred options should consider technical, commercial, social and natural environmental aspects, in particular the principles of sustainable development.

Comparative environmental impacts of each alternative should be summarised. The interdependencies of the proposal components should be explained, particularly in regard to how each of any industrial developments, or various combinations of industrial developments, and any infrastructure requirements relate to the viability of the proposal. The relationship of options chosen for waste management and any emissions produced should be detailed. This information is required to assess why the scope of the proposal is as it is and to ensure that the ESD principles and sustainable development aspects have been considered and incorporated during the scoping and planning of the proposal.

The objective of this section is to describe the project through its lifetime of construction, operation and decommissioning. This information is required to allow assessment of all aspects of a proposal including all phases of the proposal. It also allows further assessment of which approvals may be required and how they may be managed through the life of the proposal.

3.1 Location

The regional and local context of the proposal should be described and illustrated on maps at suitable scales. Real property descriptions of the project site should be included.

3.1.1 Resource

Summarise the results of studies and surveys undertaken to identify and delineate the mineral resource. On the proposed mining lease, the location, tonnage and quality of mineral resource should be described. The geological reserves/resources should be defined using formal terminology as recommended by the Australian Stock Exchange, the Australasian Institute of Mining and Metallurgy and the Australian Mining Industry Council.

Maps should be provided showing the general location of the project area, and in particular:

- The locations of the resources to be explored, developed or mined;
- The location and boundaries of mining tenures, granted or proposed, to which the project area is or will be subject;
- The location of mine excavation(s);
- The location and boundaries of the plant site;
- The location of local authority boundaries; and
- The location of current and proposed road and rail alignments.

Consideration should be given to providing an air photo enlargement to illustrate components of the project in relation to natural features of the area.

3.1.2 Location and Tenure

Summarise the results of studies and surveys undertaken to identify the natural resources required to implement the proposal. The location, volume, tonnage and quality of natural resources required should be described (e.g. land, water, forests, energy, etc.). Maps at suitable scales should be provided showing the precise location of the project area, and in particular:

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- the location and boundaries of land tenures, in place or proposed, to which the project area is or will be subject, including the proposed tenure (i.e. private or State owned) of any new rail networks;
 - the location and boundaries of the project footprint showing all key aspects including excavations, stockpiles, areas of fill, watercourses, plant locations, road and rail networks water storages, buildings (including any construction workers' accommodation), bridges, culverts, hardstands, car parks, etc; and
 - the location of any proposed buffers surrounding the working areas.

Consideration should be given to providing a rectified air photo enlargement to illustrate components of the project in relation to the land and mining tenures and natural and built features of the area.

3.1.3 Construction

The extent and nature of the project's construction phase should be described. The description should include the type and methods of construction to be employed, the construction equipment to be used and the items of plant to be transported onto the construction site. The estimated numbers of persons to be employed on the project construction phase should also be given.

Any staging of the proposal should be described and illustrated showing site boundaries, development sequencing and timeframes.

3.2 Mining Operations

The location of the proposed mining project should be illustrated on maps and described, including probable mining boundaries, mine path and mine development sequence or timeframes and any final void to be left at the cessation of mining. The rationale for the preferred operational program is to be explained.

The location and nature of the mining processes to be used should be described in the text and illustrated with maps, diagrams and artist's impressions as required. Operational issues to be addressed should include, but may not be limited to:

- a description of the mining methods for open pit and/or underground mining;
- a description of plant and equipment to be employed;
- the capacity of plant and equipment, and
- chemicals to be used.

Concept and layout plans should be provided highlighting proposed buildings, structures, plant and equipment associated with the processing operation. The nature, sources, location and quantities of all materials to be handled, including the storage and stockpiling of raw materials, should be described.

Indicative process flow-sheets should be provided showing material balances for the processing plant, and the anticipated rates of inputs, along with similar data on products, wastes and recycle streams.

Specific details should be provided of the proposed mine life and an outline of the coal/mineral resource base.

3.2.1 Processing Plant

The current and proposed processing plant should be illustrated on maps and described. The criteria for selecting the plant site should be described and the rationale for the preferred option should be explained.

The location and nature of the processes to be used should be described; including:

- a description of the plant and equipment to be employed,
- the capacity of plant and equipment, and
- chemicals to be used.

Concept and layout plans should be provided highlighting proposed buildings, structures, plant and equipment associated with the processing operation. The nature, sources, location and quantities of all materials to be handled, including the storage and stockpiling of raw materials should be described. Indicative process flow-sheets should be provided showing material balances for the mine and processing plant, and the anticipated rates of inputs, along with similar data on products, wastes and recycle streams. A description should be provided of the quantities and characteristics of the products produced. Information should be provided on the workforce numbers employed in processing plant operations.

3.2.2 Coal Handling

Describe and show on plans at an appropriate scale the proposed methods and facilities to be used for product storage and for transferring product from the processing plant to the storage facilities and from the storage facilities to the transport facilities. Include discussion of any environmental design features of these facilities including bunding of storage facilities. This section should also discuss the capacity of the rail networks and coal terminals to handle the proposed coal volumes generated by the project over all phases of development. This discussion should also make reference to the cumulative longer-term demands on coal handling capacity at the coal terminals from all regional coal export proposals, even though the capacity to manage these impacts may fall beyond the scope of this project EIS.

3.2.3 Mine Sequencing

Specific details should be provided of the following:

- the quantity and location of coal to be mined at each stage of development and annually;

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- the proposed sequence and timing of mining of each seam within the mining lease;
 - the physical extent of excavations, location of overburden stockpiles and extent of coal reject to be handled during the project's operation or left after mining ceases—the description should include the rate of throughput of stockpiles of product, reject and overburden;
 - the proposed progressive backfilling of excavations;
 - the area disturbed at each major stage of the project;
 - mining methods and equipment to be utilised which will include the following:
 - the mining type and methods to be used, including the major equipment to be used in the various components of the operation;
 - the use of different techniques in areas of different topographic or geotechnical character; and
 - chemicals to be used.

Information should also be provided on the workforce numbers to be employed in the facility's operations during its various phases (construction, commissioning, operation and decommissioning) and stages with a brief description of where those people may be accommodated and/or how they will be transported to the site. Comment should be made on the anticipated basis of employment (permanent, contract, etc).

3.2.4 On-going evaluation and exploration activities

This section should describe the extent and nature of any proposed on-going exploration or geological/geo-technical evaluation within the project area that may be required over the life of the project.

3.3 Infrastructure

This section should provide descriptions and layout plans of requirements for constructing, upgrading or relocating all infrastructures in the vicinity of the project area. The matters to be considered could include but not be limited to infrastructure such as roads, rail, bridges, tracks and pathways, dams and weirs, bore fields, power lines and other cables and pipelines for any services.

3.3.1 Transport – Road/Rail/Ship

Arrangements for the transport of plant, equipment, ore, products, wastes and personnel during both the construction phase and operational phases of the project should be described. The traffic impacts shall be addressed in detail under Section 4.

3.3.2 Energy

The EIS should describe all energy requirements, including electricity, natural gas, and/or solid and liquid fuel requirements for the construction and operation of the proposal. The locations of any easements should be shown on the infrastructure plan.

3.3.3 Water supply and storage

The EIS should provide information on water usage by the project, including the quality and quantity of all water supplied to the mine and processing plant. The proposed sources of water supply should be described (e.g. bores, mine water, any surface storages such as dams and weirs and /or municipal water supply pipelines).

Estimated rates of water supply from the source should be given. Any proposed water conservation and management measures should be described.

Determination of potable water demand should be made for the project, including the temporary demands during the construction period. Details should be provided of any existing town water supply to meet such requirements. If water storage and treatment is proposed on site, for use by the site workforce, then this should be described.

3.3.4 Stormwater drainage

A brief description should be provided of the proposed stormwater drainage system and the proposed disposal arrangements, including any off-site services. Water management, including stormwater management, should be addressed in detail under Section 4.

3.3.5 Sewerage

The EIS should describe industrial and domestic effluent that will be produced and the proposed method of disposal. The physical and chemical characteristics and expected volumes of such effluent should be addressed in detail under Section 4. If discharging into an existing sewerage system, an assessment of the capacity of the existing system to accept the effluent should be provided.

3.3.6 Accommodation and other infrastructure

A description should be provided of any other developments directly related to the project not described in other sections, such as:

- on-site and/or off-site accommodation for the construction workforce that addresses the estimated housing needs of both single and accompanied construction workers, including maps to illustrate the location, size and management of temporary or permanent worker accommodation on-site or in the vicinity of the project;

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- site offices;
 - fuel storage areas;
 - roads (both haul roads and access roads);
 - equipment hardstand and maintenance areas; and
 - technical workshops and laboratories.

3.4 Waste Management

Provide an inventory of all wastes generated by the project through construction, mining and production processes. 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 ore processed
- the amount of resulting process wastes
- the tonnage and volume of waste rock removed to extract the mineral
- the volume and tonnage of any by-products left from the processing of the mineral.

The physical and chemical characteristics of waste material from the mine and process plant should be provided.

Having regard for best practice waste management strategies and the Environmental Protection (Waste) Policy, the proposals for waste avoidance, reuse, recycling, treatment and disposal should be described in the appropriate sub-section below. Information should also be provided on the variability, composition and generation rates of all waste generated 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 minimizing environmental impacts at each stage of the proposal. Details on natural resource use efficiency (e.g. energy and water), integrated processing design, 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.

3.4.1 Solid Waste

The proposed location, site suitability, dimensions and volume of dumps (overburden, waste rock and tailings), including their method of construction, should be shown. Methods to prevent acid formation,

seepage and contamination should be given. Measures to ensure stability of the dumps and impoundments should be described.

The proposed location, site suitability, dimensions and volume of any landfill, including its method of construction, should be shown.

3.4.2 Liquid Waste

A description should be presented of the origin, quality and quantity of waste water and liquid waste originating from the project. Particular attention should be paid to the capacity of wastes to generate acid, saline or sodic waste water. A water balance for the mining project and processing plant is required to account for the estimated usage of water. The EIS may need to consider the following effects:

- groundwater from mine pits and other excavations;
- rainfall directly onto disturbed surface areas;
- run-off from haul roads, plant and industrial areas, chemical storage areas;
- drainage (ie. run-off plus any seepage or leakage) from dumps and stockpiles;
- seepage from other waste storages;
- water usage for:
 - domestic purposes,
 - process use, and
 - dust suppression.
- evaporation;
- domestic sewage treatment - disposal of liquid effluent and sludge; and
- water supply treatment plant - disposal of wastes.

3.4.3 Air Emissions

Describe in detail the quantity and quality of all air emissions (including particulates, fumes and odours) from the project during construction and operation. 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). Information should be provided either in this section or section 4 on methods to mitigate impact from air emissions.

3.5 Rehabilitation and Decommissioning

This section should describe the options, strategies and methods for progressive and final rehabilitation of the environment disturbed by the proposal (including the use of threatened plant species during revegetation with the goal of achieving a nil loss of conservation value). The strategic approach to progressive and final rehabilitation should be described. 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, overburden dumps, waste areas and dam sites should be shown conceptually in plan form. The rehabilitation methods to be used for the project, including backfilling, landform construction, slope profiling, selective material handling, soil profile construction, covering, re-contouring, drainage, topsoil handling and revegetation, should be described.

The strategies and methods should have the following objectives:

- Mining and rehabilitation should aim to create a landform with land use capability and/or suitability similar to that prior to disturbance unless other beneficial land uses are pre-determined and agreed;
- Mine wastes and disturbed land should be rehabilitated to a condition that is self-sustaining, or to a condition where the maintenance requirements are consistent with an agreed post mining land use; and
- Surface and ground waters that leave the lease should not be degraded to a significant extent. Current and future water quality should be maintained at levels that are acceptable for users downstream of the site.

The means of decommissioning the proposal, in terms of the removal of plant, equipment, structures and buildings should be described, and the methods proposed for the stabilisation of the affected areas should be given. Information should be provided regarding decommissioning and rehabilitation of the plant site, removal of processing plant, rehabilitation of concrete footings and foundations, hardstand areas and storage tanks (including any potential for reuse of these facilities). Options and methods for the disposal of wastes from the demolition of plant and buildings should be discussed in sufficient detail for their feasibility and suitability to be established.

The strategies and methods presented for progressive and final rehabilitation of disturbed areas should demonstrate compliance with the objectives of the Environmental Management Policy for Mining in Queensland (1991) or with updated versions of that policy as they become available. Land suitability assessment should follow the Technical Guidelines for the Environmental Management of Exploration and Mining in Queensland (1995).

Proposals to divert creeks during operations, and, if applicable, for the reinstatement of the creeks after operations have ceased, should be provided. Where dams are to be constructed, proposals for the management of these structures after the completion of the project should be given. Also, the final drainage and seepage control systems and long-term monitoring plans should be described.

A description of topsoil management should consider transport, storage and replacement of topsoil to disturbed areas. The minimisation of topsoil storage times (to reduce fertility degradation) should also be addressed.

Implications for the long-term use and fate of the site should also be addressed, particularly with regard to the on-site disposal of waste and the site's inclusion on the Environmental Management Register or Contaminated Land Register.

3.6 Financial Feasibility

This section shall detail the financial feasibility of the proposal, including details of costs of development and ongoing maintenance, operational and decommissioning costs; the capacity of the proponents to satisfactorily develop the project; the costs of decommissioning the project and rehabilitation of the site. This part of the EIS may be confidential.

Environmental Values and Management SECTION 4

of Impacts

This section should address all elements of the natural and built environment, (such as land, water, air, waste, noise, nature conservation, cultural heritage, housing, transport, social and community, health and safety, and economy) in a way that is comprehensive and clear. To achieve this, the following issues should be considered for each environmental value relevant to the project:

- **environmental values affected** – describe the existing environmental values of the area to be affected including values and areas that may be affected by any cumulative impacts. In the case of the built environment such as rail or roads, environmental values affected should be interpreted to mean the current road characteristics such as width or road condition. Establishing these characteristics will then serve as a benchmark for assessing project impacts and proposing mitigation measures;
- **impact on environmental values** – describe quantitatively the likely impact of the proposal on the identified environmental values of the area. The cumulative impacts of the proposal must be considered over time or in combination with other impacts in the dimensions of scale, intensity, duration or frequency of the impacts. In particular, any requirements and recommendations of the relevant State planning policies, environmental protection policies, national environmental protection measures and integrated catchment management plans should be addressed. Cumulative impacts on the environmental values of land, air and water and cumulative impacts on public health and the health of terrestrial and aquatic ecosystems must be discussed in the relevant sections. This assessment may include air and water sheds affected by the proposal and other proposals competing for use of the local air and water sheds. Consultative arrangements with other industries in the proposal area to undertake cooperative monitoring and/or management of environmental parameters are recommended;
- **environmental protection objectives** – describe qualitatively and quantitatively the proposed objectives for enhancing or protecting each environmental value. Include proposed indicators to be monitored to demonstrate the extent of achievement of the objective as well as the numerical standard that defines the achievement of the objective (this standard must be auditable). Objectives for progressive and final rehabilitation and management of contaminated land should be included;
- **control strategies to achieve the objectives** – describe the control principles, proposed actions and technologies to be implemented that are likely to achieve the environmental protection objectives. Include designs and relevant performance specifications of plant. For roads, options such as preparing a traffic management plan to formalise agreed strategies for mitigating project impacts on transport should be considered. For example, an agreement between the proponent and the Department of Main Roads to formalise agreed design standards and commitments to funding of requirements such as the construction of the intersection between the mine access road and public roads may be appropriate;
- **monitoring programs** – describe the monitoring parameters, monitoring points, frequency and reporting proposals;

- **auditing programs** – describe how progress towards achievement of the objectives will be measured, reported and whether external auditors will be employed;
- **management and review strategies** – describe the strategies to be used to ensure the environmental protection objectives are achieved and control strategies implemented e.g. continuous improvement framework including details of corrective action options, reporting (including any public reporting), monitoring, staff training, management responsibility pathway, and any environmental management systems and how they are relevant to each element of the environment; and
- **information quality** – information given under each element should also state the sources of the information, how recent the information is, how any background studies were undertaken (e.g. intensity of field work sampling) and what uncertainties (if any) are in the information.

The mitigation measures and monitoring programs identified in this section of the EIS should be used to develop the environmental monitoring programs that will be included in the Environmental Management Plan for the project.

4.1 Land

4.1.1 Description of Environmental Values

This section describes the existing environment values of the land area that may be affected by the proposal. It should also define and describe the objectives and practical measures for protecting or enhancing landbased environmental values, describe how nominated quantitative standards and indicators may be achieved, and how the achievement of the objectives will be monitored, audited and managed.

Environmentally Sensitive Areas

The EIS should identify whether areas that are environmentally sensitive could be affected, directly and indirectly, by the proposal. Also, areas sensitive to environmental harm caused by the proposal can be determined through site specific environmental impact assessment processes. In particular, the EIS should indicate if the land affected by the proposal is or is likely to become part of the protected area estate, or is subject to any treaty. Consideration should be given to national parks, conservation parks, fish habitat areas, wilderness areas, aquatic reserves, heritage/historic areas or items, national estates, world heritage listings and sites covered by international treaties or agreements (eg RAMSAR, JAMBA, CAMBA), areas of cultural significance and scientific reserves. In addition the Commonwealth's *Environment Protection and Biodiversity Conservation Act 1999* should be addressed and whether there are national environmentally significant matters that should be described. The proximity of the proposal elements to any of these areas should be identified. Maps should identify areas of conservation value in any locality that may be impacted by the proposal.

Infrastructure

The location and owner/custodians of all tenures, reserves, roads and road reserves, railways and rail reserves, stock routes and the like, covering the affected land should be shown. Indicate locations of gas and water pipelines, power lines and any other easements. Describe the environmental values affected by this infrastructure.

Topography and Geomorphology

Maps should be provided locating the project in both regional and local contexts. The topography of the proposal site should be detailed with contours at suitable increments, shown with respect to Australian Height Datum (AHD). Significant features of the locality should be included on the maps.

Geology

The EIS should provide a description and map and a series of cross-sections of the geology of the project areas, with particular reference to the physical and chemical properties of surface and sub-surface materials and geological structures within the proposed areas of disturbance. Geological properties that may influence: ground stability (including seismic activity, geological faults and associated geological hazards), rehabilitation programs; or the quality of wastewater leaving any area disturbed by the proposal should 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 should address the potential for significant finds.

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 and, 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) 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) as appropriate.

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

- the location and areal extent of the mineral resources to be developed or mined;

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

Resource Utilisation

The EIS should analyse the effectiveness of the mining proposal in achieving the optimum utilisation of the coal 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.

Soils

A soil survey of the sites affected by the proposal should be conducted, with particular reference to the physical and chemical properties of the materials that will influence erosion potential, storm water run-off quality, rehabilitation and agricultural productivity of the land (e.g. for dry-land cropping, irrigated cropping or grazing uses). Information should also be provided on soil stability and suitability for construction of all project facilities.

Soil profiles should be mapped at a suitable scale and described according to the *Australian Soil and Land Survey Field Handbook* (McDonald et al, 1990) and *Australian Soil Classification* (Isbell, 1996). An appraisal of the depth and quality of useable soil should be undertaken. Information on the extent of good quality agricultural land should be presented in accordance with the planning guideline *Identification of Good Quality Agricultural Land* that supports *State Planning Policy 1/92*.

The requirements for soils mapping in terms of area and mapping scale should follow the *QDME Technical Guidelines for Environmental Management of Exploration and Mining in Queensland, 1995*. These guidelines recommend that disturbed areas be mapped more intensively than non-disturbed areas and provide guidance on acceptable mapping scale and site intensity.

Land Use

The EIS should provide a description of current land tenures and land uses, including native title issues, in the proposal area, with particular mention of land with special purposes. The location and owner/custodians of native title in the area and details of native title claims should be shown.

Maps at suitable scales showing existing land uses and tenures, and the proposal location, should be provided for the entire proposal area and surrounding land that could be affected by the development. The location of existing dwellings, and the zoning of all affected lands according to any existing town or strategic plan should be included.

A land suitability assessment covering all disturbed and undisturbed areas within the proposed mining lease areas should be provided. The assessment should set out soil and landform limitation subclasses assigned to soil mapping units in order to derive land suitability classes. The limitations and land suitability classifications system can be found in Attachment 2 of *Land Suitability Assessment Techniques of the QDME Technical Guidelines for Environmental Management of Exploration and Mining in Queensland, 1995*.

Describe the land use suitabilities of the affected area in terms of the physical and economic attributes. The potential environmental harm caused by the proposal on the adjacent areas currently used for agriculture, urban development, recreation, tourism, other business and the implications of the proposal for future developments in the impact area including constraints on surrounding land uses should be described. The assessment should set out soil and landform subclasses assigned to soil mapping units in order to derive land suitability classes. The limitations and land suitability classification system to use is that in Attachment 2 of *Land Suitability Assessment Techniques in the Technical Guidelines for the Environmental Management of Exploration and Mining in Queensland (1995)*.

Provide a land suitability map of the proposed and adjacent area, and setting out land suitability and current land uses, e.g. for grazing of native and improved pastures and horticulture. Land classified as Good Quality Agricultural Land in the Department of Natural Resources and Mines land classification system is to be shown in accordance with the planning guideline *Identification of Good Quality Agricultural Land*, which supports *State Planning Policy 1/92*.

4.1.2 Potential Impacts and Mitigation Measures

This section defines and describes the objectives and practical measures for protecting or enhancing the environmental values identified through the studies outlined in the previous section. It should describe how nominated quantitative standards and indicators may be achieved, and how the achievement of the objectives will be monitored, audited and managed.

Land Use Suitability

The potential for the construction and operation of the proposal to change existing and potential land uses of the proposal site and adjacent areas should be detailed. Post mining land use options should be detailed

including suitability of the area mined to be used for agriculture, industry, or nature conservation. The factors favouring or limiting the establishment of those options should be given in the context of optimising the long term stability of the site and minimising potential liabilities for long term management.

If the development adjoins or potentially impacts on good quality agricultural land or residential land, then an assessment of the potential for land use conflict is required. Investigations should follow the procedures set out in the planning guidelines *Separating Agricultural and Residential Land Uses* and/or *The Identification of Good Agricultural Land*.

Outline incompatible land uses, whether existing or potential, adjacent to all aspects of the project, including essential and proposed ancillary developments or activities and areas directly or indirectly affected by the construction and operation of these activities should be identified and measures to avoid unacceptable impacts defined.

The potential environmental harm caused by the proposal on the adjacent areas currently used for agriculture, urban development, recreation, tourism, other business and the implications of the proposal for future developments in the impact area including constraints on surrounding land uses should be described.

Soil Erosion and Land Disturbance

A strategy should be developed with a view to minimising the amount of land disturbed at any one time. This section of the EIS should provide information on land disturbance management methods to be used for the proposal, including backfilling, covering, re-contouring, topsoil handling and revegetation, and include:

- topsoil management such as transport, storage, re-use on disturbed areas and storage;
- consideration to the use of threatened plant species during any landscaping and revegetation; and
- erosion and sediment control.

The report should include an assessment of likely erosion effects, especially those resulting from the removal of vegetation, both on-site and off-site for all disturbed areas such as:

- the plant site, including buildings ;
- access roads or other transport corridors;
- any waste dumps; and
- dams, banks and creek crossings.

Methods proposed to prevent or control erosion should be specified and should be developed with regard to (a) preventing soil loss in order to maintain land capability/suitability, and (b) preventing significant degradation of local waterways by suspended solids.

Land Contamination

The EIS should describe the possible contamination of land from aspects of the proposals including waste, reject product, acid generation from exposed sulfidic material and spills at chemical and fuel storage areas.

The means of preventing land contamination (as defined by the Queensland *Environmental Protection Act 1994*) should be addressed. Methods proposed for preventing, recording, containing and remediating any contaminated land should be outlined. Intentions should be stated concerning the classification (in terms of the Queensland Contaminated Land Register) of land contamination on the land, processing plant site and product storage areas after proposal completion.

A Preliminary Site Investigation (PSI) of the site consistent with the EPA's *Draft Guidelines for the Assessment and Management of Contaminated Land in Queensland* should be undertaken to determine background contamination levels. The results of the PSI should be summarised in the EIS.

If the results of the preliminary site investigation indicate potential or actual contamination, a detailed site investigation managed in accordance with the stages outlined in Appendix 5 of the *Draft Guidelines for the Assessment and Management of Contaminated Land in Queensland* should be undertaken.

In short, the following information may be required in the EIS:

- mapping of any areas listed on the Environmental Management Register or Contaminated Land Register under the *Environmental Protection Act 1994*;
- identification of any potentially contaminated sites not on the registers which may need remediation; and
- a description of the nature and extent of contamination at each site and a remediation plan and validation sampling.

The EIS should address management of any existing or potentially contaminated land in addition to preventing and managing land contamination resulting from project activities. The *Draft Guidelines for the Assessment and Management of Contaminated Land in Queensland* can be downloaded from the EPA website at: http://www.epa.qld.gov.au/ecoaccess/contaminated_land/ . Proponents should refer study proposals to the EPA for review prior to commencement (consult with the contaminated land section in the Queensland EPA).

Rehabilitation and Decommissioning

The strategies and methods for progressive and final rehabilitation of the environment disturbed by the mining activities should be described in the context of the expected final landforms for nominated final land uses. The final topography of excavations, waste dumps and tailings dams sites should be shown. The post mining land suitability of the various land disturbance types should be described.

The means of decommissioning the project, in terms of removal of plant, equipment, structures and buildings should be described. The methods proposed for the stabilisation of the affected areas should be given. Final rehabilitation of the plant site should be discussed in terms of ongoing land use suitability, stability, sustainability and management of any residual contaminated land and other land management issues.

A rehabilitation strategy should be developed with a view to minimising the amount of land disturbed at any one time. The strategic approach to progressive and final rehabilitation should be described.

The rehabilitation methods to be used for the project, including backfilling, covering, re-contouring, topsoil handling and revegetation, should be described. Consideration should be given to the use of threatened plant species during revegetation. The techniques to be employed to dispose of overburden, especially any potentially acid-forming spoil or waste and the methods employed to rehabilitate those areas should be described. Discuss how settling or subsidence of rehabilitated areas may affect the use of the land in its agreed post mine form.

Proposals to divert creeks during mining, and, if applicable, for the reinstatement of the creeks after mining has ceased, should be provided. Where dams are to be constructed, proposals for the management of these structures after the completion of the project should be given. A contour map of the lease area after the proposed mining operation is completed should be provided. Also, the final drainage and seepage control systems and long term monitoring plans should be described.

Rehabilitation of tailings dams should be described in detail, including consolidation, capping, revegetation, fencing, and monitoring. A description of topsoil management should consider pre-stripping, transport, storage and replacement of topsoil to mined areas. The minimisation of topsoil storage times (to reduce fertility degradation) should also be addressed.

Information should be provided regarding decommissioning and rehabilitation of the plant site, removal of processing plant, rehabilitation of concrete footings and foundations, hard stand areas, storage tanks including any potential for reuse of these facilities.

Rehabilitation of any voids remaining after mining should be described in detail including land use, void water quality, suitability for use by stock, safety of access, and stability of void walls. Voids should be, where possible, backfilled.

4.2 Transport

4.2.1 Existing Environmental Values and Impacts

The EIS should provide sufficient information for the Department of Main Roads to make an independent assessment of how the State-controlled and local government road networks will be affected. Sufficient information should also be provided to enable Queensland Rail to make an independent assessment of how the rail network (including infrastructure) will be affected.

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Information should be provided on road transportation requirements on public roads for both construction and operations phases, including:

- the volume, composition (types and quantities), origin and destination of goods to be moved including construction materials, plant, raw materials, wastes, hazardous materials, finished products;
- the volume of traffic generated by workforce personnel, visitors and service vehicles;
- method of movement (including vehicle types and number of vehicles likely to be used);
- anticipated times at which movements may occur;
- details of vehicle traffic and transport of heavy and oversize indivisible loads (including types and composition);
- the proposed transport routes; and
- need for increased road maintenance and upgrading;

4.2.2 Management of Impacts

Details should be provided of the impacts on environmental values of any new roads or road realignments. The EIS should include detailed analysis of probable impact of identified construction and operational traffic generated by the project with particular concern to impacts on road infrastructure, road users and road safety.

The EIS needs to identify impacts on the State-controlled and local government road networks and to indicate clearly the corrective measures necessary to address adverse road impacts and the costs involved. This will require the proponent to compare the traffic situation and road conditions with, and without, the project.

Information about the impacts and proposed measures for dealing with those impacts should be prepared by the proponent in close consultation with the local District Office of the Department of Main Roads. The EIS should provide details of the impact on any current or proposed rail infrastructure. Provide information on product spill contingency plans and the adequacy of equipment and facilities to deal with possible spills for the transport nodes of the proposal. Indicate whether there is a need to update the plans based on increase in frequency of traffic and volumes to be transported.

4.3 Scenic Values

4.3.1 Existing Environmental Values and Impacts

The visual impact, in terms of the extent and significance of the changed skyline as viewed from places of residence, work, and recreation and other known vantage points day and night, during all stages of the project as it relates to the surrounding landscape is to be analyzed and discussed. The assessment is to address the local and broader visual impacts of the project structures and associated infrastructure, using appropriate simulation. Sketches, diagrams, computer imaging and photos are to be used where possible to portray the near views and far views of the completed structures and their surroundings from visually sensitive locations. Special consideration is to be given to public roads, public thoroughfares, and places of residence or work which are within the line-of-sight of the project.

4.3.2 Management of Impacts

Scenic values should be managed as follows. List all management options to be implemented and how these will mitigate or avoid the identified impacts.

Lighting

An assessment of all potential impacts of lighting of the project, 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:

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

Landscape Character

Describe how the impacts of the project on the visual quality and landscape character of the site and the surrounding area are to be mitigated or avoided. Particular reference should be made to the following:

- impacts on existing land use that contribute to the character of the local area;
- potential impacts to scenic amenity of any conservation area (eg National Park); and
- the visual absorption capacity of the site - it's ability to absorb the impact of the proposed development.

Visual Amenity

Appropriate simulation to portray broad and near views and impacts of the project on visually sensitive areas, including the extent of the significance of the skyline as viewed from known vantage points, is to be included.

An assessment is to be made of the existing visual quality/landscape character of the project site and the surrounding area and its prominence including local, regional, State-wide, national and international significance. Information in the form of maps, sections, elevations and photographs is to be utilised, particularly addressing the following:

- major views, view sheds, existing viewing outlooks, ridgelines and other features contributing to the amenity of the area, including assessment from private residences in the affected area;
- focal points, landmarks (built form or topography), gateways associated with project site and immediate surrounding areas, waterways, and other features contributing to the visual quality of the area and the project site;
- character of the local and surrounding areas including character of built form (scale, form, materials and colours) and vegetation (natural and cultural vegetation) directional signage and land use;
- identification of the areas of the proposal that have the capacity to absorb land use changes without detriment to the existing visual quality and landscape character; and
- the value of existing vegetation as a visual screen.

4.4 Water Resources

4.4.1 Existing Environmental Values and Impacts

The function of this section is to describe the existing environment for water resources which may be affected by the proposal in the context of environmental values as defined by the Environmental Protection Act 1994 and Environmental Protection Policies.

Surface Waterways

A description should be given of the surface water courses and their quality and quantity in the area affected by the proposal with an outline of the significance of these waters to the river catchment system in which they occur. Details provided should include a description of existing surface drainage patterns, flows in major streams and wetlands. Also provide details of the likelihood of flooding, history of flooding including extent, levels and frequency, and a description of present and potential water uses downstream of the areas affected by the proposal. Flood studies should include a range of annual exceedance probabilities for affected waterways, where data permits.

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An assessment is required of existing water quality in surface waters and wetlands likely to be affected by the proposal. The basis for this assessment should be a monitoring program, with sampling stations located upstream and downstream of the mining proposal. Complementary stream-flow data should also be obtained from historical records (if available) to aid in interpretation.

The water quality should be described, including seasonal variations or variations with flow where applicable. A relevant range of physical, chemical and biological parameters should be measured to gauge the environmental harm on any affected creek or wetland system.

Describe the environmental values of the surface waterways of the affected area in terms of:

- values identified in the Environmental Protection (Water) Policy;
- sustainability, including both quality and quantity; and
- physical integrity, fluvial processes and morphology of watercourses, including riparian zone
- vegetation and form; and
- any Water Resource Plans, Land and Water Management Plans relevant to the affected catchment.

Rainfall patterns including magnitude and seasonal variability of rainfall must be considered. Extremes of climate (droughts, floods, etc) should also be discussed with particular reference to water management at the proposal site. The vulnerability of the area to natural or induced hazards, such as floods, should also be addressed. The relative frequency, magnitude and risk of these events should be considered.

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 should form the basis for the planning and subsequent monitoring of rehabilitation of the watercourses during or after the operation of the proposal.

Groundwater

The function of this section is to describe the existing environment for water resources which may be affected by the proposal in the context of environmental values as defined by the Environmental Protection Act 1994 and Environmental Protection Policies.

The EIS should review the quality, quantity and significance of groundwater in the proposal area, together with groundwater use in neighboring areas.

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

- location;

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- pumping parameters (where such information exists);
 - draw down and recharge at normal pumping rates (where such information exists); and
 - 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.

This section should include reference to:

Nature of the aquifer/s

- Geology/stratigraphy - such as alluvium, volcanic, metamorphic
- Aquifer type - such as confined, unconfined
- Depth to and thickness of the aquifers
- Hydrology of the aquifer/s
- 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 and zones of potential discharge
- Vulnerability to pollution

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.

Describe the environmental values of the underground waters of the affected area in terms of:

- values identified in the Environmental Protection (Water) Policy;
- sustainability, including both quality and quantity;
- physical integrity, fluvial processes and morphology of groundwater resources.

4.4.2 Management of Impacts

The function of this section is to define and describe the objectives 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.

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The EIS should describe the possible environmental harm caused by the proposed proposal to environmental values for water as expressed in the Environmental Protection (Water) Policy. Water management controls should be described, addressing surface and groundwater quality, quantity, drainage patterns and sediment movements. The beneficial (environmental, production and recreational) use of nearby surface and groundwater should be discussed, along with the proposal for the diversion of affected creeks during mining, and the stabilisation of those works. Monitoring programs should be described which will assess the effectiveness of management strategies for protecting water quality during the construction, operation and decommissioning of the proposal.

Key water management strategy objectives include :

- protection of important local aquifers and protection of their waters,
- maintenance of sufficient quantity and quality of surface waters to protect existing beneficial downstream uses of those waters (including maintenance of in-stream biota and the littoral zone), and
- minimisation of impacts on flooding levels and frequencies both upstream and downstream of the project.

Conduct a risk assessment for uncontrolled emissions to water due to system or catastrophic failure, determine implications of such emissions for human health and natural ecosystems, and list strategies to prevent, minimise and contain impacts.

Surface Waters and Water Courses

The potential changes to the flow and the quality of surface waters from all phases of the proposal should be discussed, with particular reference to their suitability for the current and potential downstream uses, including the requirements of any affected riparian area, any spring, wetland and in-stream biological uses.

The hydrological impacts of the proposal should be assessed, particularly with regard to stream diversions, scouring and erosion, and changes to flooding levels and frequencies both upstream and downstream of the project. Modelling of afflux should be provided and illustrated where appropriate.

Quality characteristics discussed should be those appropriate to the downstream and upstream water uses that may be affected. Chemical and physical properties of any waste water (including concentrations of constituents) at the point of entering natural surface waters should be discussed along with toxicity of effluent constituents to flora and fauna.

Reference should be made to the technology for settling suspended clays from contaminated water, and the techniques to be employed to ensure that contaminated water is successfully treated (settled) on the site.

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In relation to water supply and usage, and wastewater disposal, the EIS should discuss anticipated flows of water to and from the project area. The potential impact of the project on the reliability and quality of water supply for downstream users should be discussed. Where dams, weirs, creek diversions, levee banks or ponds are proposed, the EIS should investigate the effects of predictable climatic extremes (droughts, floods) upon the structural integrity of the containing walls; and the quality of water contained, and flows and quality of water discharged. The design of all water storage facilities should follow the technical guidelines on site water management.

The need or otherwise for licensing of any dams or creek diversions, under the Water Act 2000 should be discussed. Water allocation and water sources should be established in consultation with Department of Natural Resources and Mines.

The Australian and New Zealand Environment and Conservation Council (ANZECC) *National Water Quality Management Strategy*, *Australian Water Quality Guidelines for Fresh and Marine Waters* (ANZECC 2000) and the *Environmental Protection (Water) Policy 1997* should be used as a reference for evaluating the effects of various levels of contamination.

Options for mitigation and the effectiveness of mitigation measures should be discussed with particular reference to sediment, acidity, salinity and other emissions of a hazardous or toxic nature to human health, flora or fauna. Where it is proposed that creeks will be diverted, the EIS should detail how rehabilitation will affect both the physical and ecological condition of the creek's bed and banks and the quality of water in it. Furthermore, the EIS should describe the monitoring that will be undertaken after decommissioning, and who will have responsibility for management measures and corrective action, to ensure that rehabilitated creeks do not degrade.

Groundwater

The function of this section is to define and describe the objectives 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.

The EIS should describe the possible environmental harm caused by the proposed proposal to environmental values for water as expressed in the Environmental Protection (Water) Policy. Water management controls should be described, addressing groundwater quality and quantity, taking into account the existing and expected groundwater flow direction. The beneficial (environmental, production and recreational) use of nearby surface and groundwater should be discussed. Monitoring programs should be described which will assess the effectiveness of management strategies for protecting water quality during the construction, operation and decommissioning of the proposal.

An assessment should be undertaken of the impact of the proposal on the local ground water regime caused by the altered porosity and permeability of any land disturbance. An assessment of the potential to contaminate groundwater resources and measures to prevent, mitigate and remediate such contamination should be discussed.

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Key water management strategy objectives should include the protection of important local aquifers and protection of their waters. Where surface waters are shown to be groundwater dependent (*i.e.* gaining streams), the maintenance of sufficient quantity and quality of surface waters to protect existing beneficial downstream uses of those waters (including maintenance of in-stream biota and the littoral zone) should also be considered.

The EIS should include an assessment of the potential environmental harm to the local groundwater resource, including its water quality.

The impact assessment should define the extent of the area within which groundwater resources are likely to be affected by the proposed operations and the significance of the proposal to groundwater depletion or recharge, and propose management options available to monitor and mitigate these effects. The response of the groundwater resource to the progression and finally cessation of the proposal should be described.

The management and/or disposal of groundwater that may enter the pit during the operational phase of the project should be described. Furthermore, the likely quality of water in the final void, together with its use and management post mining should be discussed.

Wastewater

A description should be presented of the origin, quality and quantity of wastewater originating from the project. Particular attention should be given to the capacity of wastes to generate acid, and saline or sodic waste water, or contaminants such as sediment, metals and other potentially toxic chemicals. 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 (open cut/underground);
- rainfall directly onto disturbed surface areas;
- run-off from roads, plant and industrial areas, chemical storage areas;
- seepage from waste storages;
- water usage for -
 - process use,
 - dust suppression, and
 - domestic purposes;
- evaporation;
- domestic sewage treatment - disposal of liquid effluent and sludge; and
- water supply treatment plant - disposal of wastes.

Having regard for the requirements of the *Environmental Protection (Water) Policy 1997*, the EIS should present the methods to avoid stormwater contamination by raw materials, wastes or products and present the means of containing, recycling, reusing, treating and disposing of stormwater. Where no-release water systems are to be used, the fate of salts and particulates derived from intake water should be discussed. Mitigation measures should be discussed with particular reference to any hazardous or toxic releases

4.5 Air

4.5.1 Existing Environmental Values and Impacts

This section describes the existing air environment, which may be affected by the proposal in the context of environmental values as defined by the *Environmental Protection Act 1994* and *Environmental Protection Policies*.

A description of the existing air shed environment should be provided having regard for particulates and gaseous and odorous compounds. The background levels and sources of suspended particulates, and any other major constituent of the air environment which may be affected by the proposal should be discussed.

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

The EIS should describe the air temperatures, humidity, wind (direction and speed) and any other special factors (eg temperature inversions) likely to affect air quality within the environs of the mining proposal.

4.5.2 Management of Impacts

This section defines and describes the objectives and practical measures for protecting or enhancing environmental values for air, to describe how nominated quantitative standards and indicators may be achieved, and how the achievement of the objectives will be monitored, audited and managed. The objectives for air emissions should be stated in respect of relevant standards (ambient and ground level concentrations), relevant emission guidelines, and any relevant legislation. The ground level concentration should be modelled using a recognised atmospheric dispersion model. Information such as the estimated emissions of PM10 and total suspended particles, diurnal variation or episodic levels of emission rates, wind speed and rainfall will be needed for modelling impacts of both concentration and deposition of dust emissions.

The potential for interaction between any emissions from the CPP, and emissions in the air shed, and the likely environmental harm from any such interaction, should also be detailed.

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The proposed levels of emissions should be compared with the current *National Environmental Protection (Ambient Air Quality) Measure (1998)* for ambient air quality, the National Health Medical Research Council (NHMRC) *National Guidelines for Control of Emissions from Stationary Sources 1985*, and the *Environmental Protection (Air) Policy 1997*.

Where appropriate, the predicted average ground level concentrations in nearby areas should be provided. These predictions should be made for both normal and expected maximum emission conditions and the worst case meteorological conditions should be identified and modelled where necessary. Ground level predictions should be made at any nearby residential, industrial and agricultural developments believed to be potentially affected and sensitive to the effects of the emissions. The techniques used to obtain the predictions should be referenced, and key assumptions and data sets explained. The assessment of the proposal's impact, i.e. environmental harm, on air quality should consider the following matters:

- features of the proposal designed to suppress or minimise dusts should be detailed;
- the proposed levels of emissions of dust should include emissions during normal and upset conditions. Consideration should be given to the range of potential upset condition scenarios including the air emissions that may be generated as a result;
- the limitations and accuracy of the applied atmospheric dispersion models should be discussed. The air quality modelling results should be discussed in light of the limitations and accuracy of the applied models;
- air quality predictions should be compared to the relevant goals in the *National Environmental Protection Council (Ambient Air Quality) Measure (1988)* and the *Environmental Protection (Air) Policy (1997)*; and
- air shed management and the contribution of the proposal to air shed capacity in view of existing and future users of the air shed for assimilation and dispersion of emissions.

Greenhouse Gas Abatement

A full assessment of greenhouse gas emissions from the proposal should be provided including:

- an inventory of proposed future annual emissions for each Greenhouse Gas and total emissions expressed in 'CO₂ equivalent' terms for each component of the proposal and for the combined total proposal;
- the intended measures to avoid and minimise greenhouse emissions;
- methodologies by which estimates were made; and
- opportunities for offsetting greenhouse gas emissions, such as through forestry plantations, investing in renewable energy projects, purchase of renewable energy or support for relevant research.

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The above assessment should be undertaken with due consideration of relevant protocols, agreements and strategies including The National Greenhouse Strategy, National Greenhouse Gas Inventory, The Kyoto Protocol and The Framework Convention on Climate Change, Queensland Government Energy Policy, Queensland Implementation Plan, and voluntary programs under the Australian Greenhouse Office.

4.6 Waste

4.6.1 Existing Environmental Values and Impacts

The function of this section is to describe the existing environment values that may be affected by wastes from mining activities in the context of environmental values as defined by the *Environmental Protection Act 1994* and *Environmental Protection Policies*.

4.6.2 Management of Impacts

The function of this section is to define and describe the objectives and practical measures for protecting or enhancing environmental values from impacts by wastes, describes how nominated quantitative standards and indicators may be achieved for waste management, and how the achievement of the objectives will be monitored, audited and managed.

This section should assess the potential impact of all wastes to be generated and provide details of each waste in terms of:

- operational handling and fate of all wastes including storage;
- on-site treatment methods proposed for the 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;
- proposed discharge/disposal criteria for liquid and solid wastes;
- measures to ensure stability of the dumps and impoundments should be described;
- methods to prevent seepage and contamination of groundwater from stockpiles and/or dumps should be given;
- market demand for recyclable waste (where appropriate) should be addressed;
- waste minimisation techniques processes proposed; and
- decommissioning of the site.

Having regard for the Environmental Protection (Waste) Policy, the EIS should indicate the results of investigation into the feasibility of using waste minimisation and cleaner technology options during all phases of the proposal. The EPA has also released draft guidelines covering aspects of waste management under this EPP, which should be addressed.

Waste minimisation and treatment, and also the application of cleaner production techniques, should also be applied to gaseous wastes, particularly nitrogen oxides, sulfur oxides, particulates and carbon dioxide.

Particular attention should be paid to measures, which will maximize energy efficiency and minimize internal energy consumption in the proposal.

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. Details on natural resource use efficiency (e.g. energy and water), integrated processing design, co-generation of power and by-product reuse as shown in a material/energy flow analysis are required.

4.7 Noise and Vibration

4.7.1 Existing Environmental Values and Impacts

This section describes the existing environment values that may be affected by noise and vibration from the proposal in the context of environmental values as defined by *Environmental Protection Act 1994* and *Environmental Protection Policies*.

If the proposed activity could adversely impact on the noise environment, baseline monitoring should be undertaken at a selection of sensitive sites affected by the proposal. Noise sensitive places are defined in the *Environmental Protection (Noise) Policy 1997*. The locations of sensitive sites should be identified on a map at a suitable scale. The results of any baseline monitoring of noise and vibration in the proposed vicinity of the proposal should be described.

Sufficient data should be gathered to provide a baseline for later studies. The daily variation of background noise levels at nearby sensitive sites should be monitored and reported in the EIS, with particular regard given to detailing variations at different periods of the night. Monitoring methods should adhere to relevant Environmental Protection Agency Guidelines and Australian Standards, and any relevant requirements of the *Environmental Protection (Noise) Policy 1997*.

4.7.2 Management of Impacts

The function of this section is to define and describe the objectives for protecting or enhancing environmental values from impacts by noise and vibration, to describe how nominated quantitative standards and indicators may be achieved for noise and vibration management, and how the achievement of the objectives will be monitored, audited and managed.

Information (noise contours, modelling results) should be submitted on the proposed generation of noise. The potential environmental harm of noise and vibration at all potentially sensitive places, in particular, any place of work or residence should be quantified in terms of objectives, standards and indicators to be achieved. This should also include environmental harm on terrestrial and avifauna particularly migratory species. Proposals to minimise or eliminate these effects including details of any screening, lining, enclosing or bunding should be provided. Timing schedules for construction and operations should be discussed, with respect to minimising environmental harm, including environmental nuisance from noise.

Information should be supplied on blasting which might cause ground vibration or fly rock on or adjacent to the site with particular attention given to places of work or residence, recreation, worship and general amenity. The magnitude, duration and frequency of any vibration should be discussed. Measures to prevent or minimise environmental harm, including nuisance, should be discussed.

Reference should also be made to the EPA Guideline: Noise and vibration from blasting. The assessment should also address off-site noise and vibration impacts that could arise due to increased road or rail transportation directly resulting from the project.

4.8 Nature Conservation

4.8.1 Existing Environmental Values and Impacts

This section will describe the existing environment values for nature conservation that may be affected by the mining activities in the context of environmental values as defined by the *Environmental Protection Act 1994* and *Environmental Protection Policies*, and the *Nature Conservation Act 1992*.

The environmental values of nature conservation for the affected area will be described in terms of:

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

A discussion will be presented on the nature conservation values of the areas likely to be affected by the proposal. The flora and fauna communities which are rare or threatened, environmentally sensitive localities including waterways, riparian zones and habitat corridors will be described. The description will include a plant species list, a vegetation map at appropriate scale and an assessment of the significance of native vegetation, from a local and regional and state perspective.

The EIS will identify issues relevant to sensitive areas, or areas which may have low resilience to environmental change. Proposal proximity to any biologically sensitive areas will be described. Reference

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will be made to both State and Commonwealth Endangered Species Legislation. The Queensland *Vegetation Management Act, 1999* and the findings of any Regional Vegetation Management Plan will also be referenced. The occurrence of pest species in the proposal area will be highlighted. Key flora and fauna indicators will be identified for future ongoing monitoring.

Terrestrial Flora

For terrestrial vegetation a map at a suitable scale will be provided, with descriptions of the units mapped.

Sensitive or protected vegetation types will be highlighted, including any riparian vegetation, and their value as habitat for fauna and conservation of specific rare floral and faunal assemblages or community types. The existence of rare or threatened species will be specifically addressed. The surveys will include species structure, assemblage, diversity and abundance. The description will contain a review of published information regarding the assessment of the significance of the vegetation to conservation, recreation, scientific, educational and historical interests. The location of any horticultural crops in the vicinity of the site will be shown. The existence of local and regional weed species will also be discussed.

Vegetation mapping for all relevant project sites will be included. Adjacent areas may also require mapping. The terrestrial vegetation communities within the affected areas will be described at an appropriate scale with mapping produced from aerial photographs and ground truthing, showing the following:

- the current extent (bioregional and catchment) of protected vegetation types of conservation significance within the protected area estate (National Parks, Conservation Parks, Resource Reserves, Nature Refuges);
- location and extent of vegetation types using the EPA's regional ecosystem type descriptions in accordance with *The Conservation Status of Queensland's Bioregional Ecosystems* (Sattler P.S. & Williams R.D. 1997 2nd edition) and the EPA's Website listing the biodiversity status of regional ecosystems;
- location of vegetation types of biodiversity significance based on EPA's regional ecosystem types and occurrence of species listed as protected plants under the *Nature Conservation (Wildlife) Regulation 1994* and subsequent amendments, as well as areas subject to the *Vegetation Management Act 1999*;
- any plant communities of cultural, commercial or recreational significance should be identified; and
- a description of any exotic or weed species.

Within each defined regional ecosystem, suitable sites will be surveyed for plant species as follows:

- site data will be recorded in a form compatible with the Queensland Herbarium CORVEG database.
- the minimum site size will be 10 by 50 metres;

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- a complete list of species present at each site will be recorded;
 - the relative abundance of plant species present will be recorded;
 - any plant species of conservation, cultural, commercial or recreational significance will be identified; and
 - specimens of species listed as Protected Plants under the *Nature Conservation (Wildlife) Regulation 1994*, other than common species, will be submitted to the Queensland Herbarium for identification and entry into the HERBRECS database.

Flora surveys will be conducted under the necessary EPA Scientific Purposes Permit issued under the *Nature Conservation (Wildlife) Regulation, 1994*. Existing information on plant species may be used in addition to new survey work.

Terrestrial Fauna

The terrestrial and riparian fauna occurring in the areas affected by the proposal will be described, noting the broad distribution patterns in relation to vegetation, topography and substrate. Fauna surveys will be conducted throughout the year to reflect seasonal variation in species and to identify migratory species. Survey site locations, conditions at the time of survey and methodology of sampling will be provided along with additional information sources used to identify species likely to occur. Fauna surveys will be conducted under the necessary EPA Scientific Purposes Permit issued under the *Nature Conservation (Wildlife) Regulation, 1994*. Methodology employed for fauna surveys will adhere to conditions outlined in the Scientific Purposes Permit.

Methodology employed for fauna surveys and will be in keeping with standard methodology as set out in the "Systematic Vertebrate Fauna Survey in the Southeast Queensland Bioregion" (Qld Dept of Environment, 1997)

The description of the fauna present or likely to be present in the area will include:

- species diversity (ie. a species list) and abundance of animals, including amphibians, fish, birds, reptiles, mammals and bats,
- any species which are poorly known but suspected of being rare or threatened, habitat requirements and sensitivity to changes; including movement corridors and barriers to movement;
- the existence of feral or exotic animals;
- existence of any rare, threatened or otherwise noteworthy species/communities in the study area, including discussion of range, habitat, breeding, recruitment, feeding and movement requirements, and current level of protection (eg any requirements of Protected Area Management Plans); and
- use of the area by migratory birds, nomadic birds, fish and terrestrial fauna.

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The EIS should indicate how well any affected communities are represented and protected elsewhere in the province where the site of the proposal occurs.

Aquatic Biology

The aquatic flora and fauna occurring in the areas affected by the proposal will be described, noting the patterns and distribution in the waterways. The description of the fauna and flora present or likely to be present in the area will include:

- fish species, mammals, reptiles, amphibians, crustaceans and aquatic invertebrates occurring in the waterways within the affected area, and downstream;
- any rare or threatened species;
- aquatic plants;
- aquatic and benthic substrate; and
- potentially impacted habitat downstream of the project.

4.8.2 Management of Impacts

The function of this section is to define and describe the objectives for protecting or enhancing nature conservation environmental values, to describe how nominated quantitative standards and indicators may be achieved for nature conservation management, and how the achievement of the objectives will be monitored, audited and managed.

The discussion will cover all likely direct and indirect environmental harm on flora and fauna particularly sensitive areas as listed below.

Terrestrial and aquatic environments will be covered, including human originated impacts and the control of any domestic animals introduced to the area.

Strategies for protecting relevant World Heritage properties, and any rare or threatened species will be described, and any obligations imposed by State or Commonwealth endangered species legislation or policy or international treaty obligations (ie. JAMBA, CAMBA) will be discussed.

The potential environmental harm to the ecological values of the area affected arising from the construction, operation and decommissioning of the project including clearing, salvaging or removal of vegetation will be described, and the indirect effects on vegetation not cleared will be discussed. Short term and long term durations will be considered and whether the effects are reversible or irreversible.

The potential environmental harm on flora and fauna of any alterations to the local surface and ground water environment will be discussed with specific reference to environmental harms on riparian vegetation or other sensitive vegetation communities. Measures to mitigate the environmental harm to

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habitat or the inhibition of normal movement, propagation or feeding patterns, and change to food chains will be described.

The provision of buffer zones and movement corridors, and strategies to minimise environmental harm on migratory, nomadic and aquatic animals will be discussed.

Weed control strategies aimed at containing existing weed species (eg. Parthenium and other noxious weeds) and ensuring no new invasive weeds are introduced to the area will be presented, and feral animal management strategies will be addressed. The study will develop strategies to ensure that the project does not contribute to increased encroachment of any feral animal species. Reference will be made to the local government authorities Pest Management Plan when determining control strategies.

Rehabilitation of disturbed areas will incorporate where appropriate provision of nest hollows and ground litter.

Areas which would be regarded as sensitive with regard to flora and fauna have one or more of the following features (and which should be identified, mapped, avoided or effects minimised):

- habitats of species listed under the *Nature Conservation Act 1992* and/or Commonwealth EPBC Act as presumed extinct, endangered, vulnerable or rare;
- regional ecosystems recognised by the Environmental Protection Agency as endangered or of concern and/or ecosystems listed as presumed extinct, endangered or vulnerable under the Commonwealth EPBC Act;
- good representative examples of remnant regional ecosystems or regional ecosystems which are poorly represented in protected areas;
- 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 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 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; and/or

- degraded vegetation or other habitats that still supports high levels of biodiversity or acts as a 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 ecological functions such as: wetlands of national, state and regional significance; riparian vegetation; buffer to a protected area or habitat corridor between areas;
- sites of palaeontologic significance such as fossil sites;
- protected areas which have been proclaimed under the *Nature Conservation Act 1992* or are under consideration for proclamation; and/or
- 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*.

Mitigation measures and/or offsets should be proposed for adverse impacts. Any departure from no net loss of ecological values should be described.

4.9 Cultural Heritage

4.9.1 Existing Environmental Values and Impacts

The function of this section is to describe the existing environment values for cultural heritage that may be affected by the mining activities in the context of environmental values as defined by the *Environmental Protection Act 1994* and *Environmental Protection Policies*, and the *Aboriginal Cultural Heritage Act 2003*.

A cultural heritage study may be required which will describe indigenous and non-indigenous cultural heritage sites and places, and their values. In accordance with the above legislation such a study must be endorsed by the relevant Aboriginal people and must include the following:

- Liaison with relevant indigenous community/communities concerning:
 - places of significance to that community (including archaeological sites, natural sites, story sites etc;
 - appropriate community involvement in field surveys;
- Any requirements by communities and /or informants relating to confidentiality of site data must be highlighted. Non-indigenous communities may also have relevant information.

- A systematic survey of the proposed development area to locate and record indigenous and non-indigenous cultural heritage places.
- Significant assessment of any cultural heritage sites/places located.
- The impact of the proposed development on cultural heritage values.

The methodology used to determine the cultural heritage values and impacts associated with the project should be described.

4.9.2 Management of Impacts

The function of this section is to define and describe the objectives for protecting or enhancing cultural heritage environmental values, to describe how nominated quantitative standards and indicators may be achieved for cultural heritage management, and how the achievement of the objectives will be monitored, audited and managed.

The environmental harm to cultural heritage values in the vicinity of the project should be managed under a Cultural Heritage Management Plan (CHMP). The CHMP will provide a process for the management of cultural heritage places both identified and sub-surface at the project sites. It is usual practice for the CHMP to be based on information contained in archaeological/anthropological reports on the survey area and cultural reports and/or information from affiliated traditional owners. The CHMP should address and include the following:

- A process for including Aboriginal/Torres Strait islander people associated with the development areas in protection and management of indigenous cultural heritage;
- Processes for mitigation, management and protection of identified cultural heritage places and material in the project areas, including associated infrastructure developments, both during the construction and operational phases of the project;
- Provisions for the management of the accidental discovery of cultural material, including burials;
- The monitoring of foundation excavations and other associated earthwork activities for possible sub-surface cultural material;
- Cultural awareness training or programs for project staff; and
- A conflict resolution process.

The development of the CHMP should be negotiated with the lead agency, the Department of Natural Resources and Mines, and all stakeholder representatives, and where there is a role or responsibility identified for the Environmental Protection Agency, such as managing the EIS process under the EP Act, it should be party to the discussions.

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Any collection of artefact material as part of a mitigation strategy will need to be done by an appropriately qualified cultural heritage practitioner holding a permit under provisions of the Aboriginal Cultural Heritage Act 2003. The EPA regional manager should be consulted for the provision of general advice including the appropriate conduct of cultural heritage surveys and the necessary permits.

Aspects of the above matters may be referred to the Land and Resources Tribunal and some may also involve native title considerations.

4.10 Social

4.10.1 Existing Environmental Values and Impacts

The function of this section is to describe the existing social values that may be affected by the mining activities in the context of environmental values as defined by the *Environmental Protection Act 1994* and *Environmental Protection Policies*.

The amenity and use of the proposal area and adjacent areas for rural, agricultural, forestry, fishing, recreational, industrial, educational or residential purposes should be described. Consideration should be given to:

- community infrastructure and services, access and mobility;
- population and demographics of the affected community;
- local community values, vitality and lifestyles;
- recreational, cultural, leisure and sporting facilities and activities in relation to the affected area;
- health and educational facilities;
- on farm activities near the proposed mining activities;
- current property values;
- number of properties directly affected by the project;
- number of families directly affected by the project, this should include not only property owners but families of workers either living on the property or workers where the property is their primary employment;

Describe the environmental values of social attributes for the affected area in terms of:

- the integrity of social conditions, including amenity and livability, harmony and well being, sense of community, access to recreation, and access to social and community services and infrastructure.;
- and

- public health and safety.

4.10.2 Management of Impacts

The social impact assessment of the project should consider the project's impact, both beneficial and adverse, on the local community through the information gathered in the community consultation program and the analysis of the existing socio-economic environment. The impacts of the project on local and regional residents, community services and recreational activities are to be analysed and discussed for all stages of the development. The nature and extent of the community consultation program is to be described and a summary of the results incorporated in the EIS.

The assessment of the impacts should describe the likely response of affected communities and identify the possible beneficial and adverse impacts (both direct and cumulative). These impacts should be considered at the local, regional and state level. Attention should be paid to:

- impacts on demographic, social, cultural and economic profiles;
- impacts on local residents, current land uses and existing lifestyles and enterprises,
- impacts on local 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. The impacts of both construction and operational workforces and associated contractors on housing demand, community services and community cohesion is to be addressed. The capability of the existing housing stock, including rental accommodation, to meet any additional demands created by the project is to be discussed;
- impacts on local residents values and aspirations and;
- impacts on human service delivery.
- particular attention should be paid to the effects on –
 - the ability of both indigenous and non-indigenous people to live in accordance with their own values and priorities
 - the use of and access to culturally important areas and landscapes
 - the access to existing human and commercial services and housing
 - the ability to participate in regional and local employment and training opportunities and
 - the new project workforce and their families.

The potential environmental harm on the amenity of adjacent areas used for cropping, grazing, forestry, recreation, industry, education, aesthetics, or scientific or residential purposes should be discussed. The

implications of the proposal for future developments in the local area including constraints on surrounding land uses should be described.

The social impact assessment should include sufficient data to enable State authorities, such as Queensland Health and Education Queensland, to plan for the continuing provision of public services in the region of the project. Proponents of projects that are likely to result in a significant increase in population of an area should consult the relevant management units of the State authorities, and summarise the results of the consultations in the EIS. The summary should discuss how the impacts of population increase on public services, particularly health and education, would be mitigated.

Comment should be made on how much service revenue and work from the project (e.g. provisioning, catering and site maintenance) would be likely to flow to existing communities in the area of the project, particularly if a fly-in, fly-out workforce is proposed;

The effects of the proposal on local and regional residents, including land acquisition and relocation issues and property valuation and marketability, community services and recreational activities should be described for the construction and operations phases of the development.

4.11 Health and Safety

4.11.1 Existing Environmental Values and Impacts

The function of this section is to describe the existing community values for health and safety that may be affected by the mining activities in the context of environmental values as defined by *the Environmental Protection Act 1994* and *Environmental Protection Policies*.

Any impacts on the health and safety of the community, workforce, suppliers and other stakeholders should be detailed in terms of health, safety, quality of life from factors such as air emissions, odour, dust noise, long shifts, and long distance travel. It should include details of;

- Compliance with relevant Health and Safety legislation;
- Security arrangements;
- Emergency plans and safety management strategies;
- Details of on-site emergency response capabilities for the construction and operational phases of the proposal.
- The risk assessment conclusions reached and level of the off-site risk from the proposal.

4.11.2 Management of Impacts

The function of this section is to define and describe the objectives for protecting or enhancing health and safety community values, to 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 effects on project workforce of occupational health and safety risks and impacts on the community in terms of health, safety, and quality of life from project operations and emissions.

Measures to control mosquito and biting midge breeding need to be described.

Practical monitoring regimes should also be recommended in this section.

Any impacts on the health and safety of the community, workforce, suppliers and other stakeholders should be detailed in terms of health, safety, quality of life from factors such as air emissions, odour, dust and noise.

Map(s) should be provided showing the locations of sensitive receptors, such as, but not limited to, kindergartens, schools, hospitals, aged care facilities, residential areas, and centres of work (e.g. office buildings, factories and workshops). The EIS, illustrated by the maps, should discuss how planned discharges from the project could impact on public health in the short and long term, and should include an assessment of the cumulative impacts on public health values caused by the proposal, either in isolation or by combination with other known existing or planned sources of contamination.

The EIS should address the project's potential for providing disease vectors. Measures to control mosquito and biting midge breeding should be described. Any use of recycled water should be assessed for its potential to cause infection by the transmission of bacteria and/or viruses by contact, dispersion of aerosols, and ingestion (e.g. via use on food crops). Similarly, the use of recycled water should be assessed for its potential to cause harm to health via the food chain due to contaminants such as heavy metals and persistent organic chemicals.

4.12 Economy

4.12.1 Existing Environmental Values and Impacts

This section describes the existing economic environment that may be affected by the proposal. The character and basis of the local and regional economies should be described including (if data available):

- existing housing market, particularly rental accommodation which may be available for the project workforce;

- economic viability (including economic base and economic activity, future economic opportunities, current local and regional economic trends.); and
- historical descriptions of large-scale resource developments and their effects in the region.

The economic impact statement should include estimates of the opportunity cost of the project and the value of ecosystem services provided by natural or modified ecosystems to be disturbed or removed during development.

4.12.2 Management of Impacts

The function of this section is to define and describe the objectives and practical measures for protecting or enhancing economic values, to describe how nominated quantitative standards and indicators may be achieved for economic management, and how the achievement of the objectives will be monitored, audited and managed.

The effect on local and State labour markets should be discussed with regard to the source of the workforce. This information should be presented according to occupational groupings of the workforce. In relation to the source of the workforce, clarification is required as to whether the proponent, or contractors, are likely to employ locally or through other means and whether there are initiatives for local employment opportunities. The impacts of both construction and operational workforces and associated contractors on housing demand should be addressed. The capability of the existing housing stock, particularly rental accommodation, to meet any additional demands created by the project should be discussed.

Any new skills and training to be introduced in relation to the project should be identified. Adequate provision should be made for apprenticeship and worker training schemes. If possible, the occupational skill groups required and potential skill shortages anticipated should be indicated.

An economic analysis, including a cost-benefit analysis, should be presented from national, state, regional and local perspectives as appropriate to the scale of the project. The general economic benefits from the project should be described.

The analysis is to include:

- the significance of this proposal on the local and regional economic context;
- the long and short-term beneficial (e.g. job creation) and adverse (e.g. competition with local small business) impacts that are likely to result from the development (including impact on the reliability and quality of water supply for downstream users);
- the cost to all levels of government of any additional infrastructure provision;
- implications for future development in the locality (including constraints on surrounding land uses and existing industry);

- the potential economic impact of any major hazards;
- qualitatively determine the distributional effects of the proposal including proposals to mitigate any negative impact on disadvantaged groups;
- qualitatively determine the value of lost opportunities or gained opportunities for other economic activities anticipated in the future; and
- qualitatively determine impacts on local property values.

Consideration of the impacts of the project in relation to energy self-sufficiency, security of supply and balance of payments benefits may be discussed. Attention should be directed to the long and short-term effects of the project on the land-use of the surrounding area and existing industries, regional income and employment and the state economy. The scope of any studies should be referred to the government for input before undertaking the studies.

For identified impacts to economic values, suggest mitigatory and enhancement strategies and facilitate initial negotiations towards acceptance of these strategies. Practical monitoring regimes should also be recommended.

4.13 Hazard and Risk

4.13.1 Existing Environmental Values and Impacts

The function of this section is to describe the potential hazards and risk that may be associated with the mining activities in the context of their potential effect on environmental values *Environmental Protection Act 1994* and *Environmental Protection Policies*.

Detail the environmental values likely to be affected by any hazardous materials and actions incorporated in the proposal. The degree of risk and sensitivity of the environmental values at risk should be detailed.

An analysis is to be conducted into the potential impacts of both natural and induced emergency situations and counter disaster and rescue procedures as a result of the proposal on sensitive areas and resources such as forests, water reserves, State and local Government controlled roads, places of residence and work, and recreational areas.

4.13.2 Management of Impacts

This section defines and describes the objectives and practical measures for protecting people and places from hazards and risk, describes how nominated quantitative standards and indicators may be achieved for hazard and risk management, and how the achievement of the objectives will be monitored, audited and managed.

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The EIS should provide an inventory for each class of substances listed in the Australian Dangerous Goods Codes to be held on-site. This information should be presented by classes and should contain:

- chemical name;
- concentration in raw material chemicals;
- concentration in operation storage tank;
- U.N. number;
- packaging group;
- correct shipping name; and
- maximum inventory of each substance.

Details should be provided of:

- safeguards proposed on the transport, storage, use, handling and on-site movement of the materials to be stored on-site;
- the capacity and standard of bunds to be provided around the storage tanks for classified dangerous goods and other goods likely to adversely impact upon the environment in the event of an accident; and
- the procedures to prevent spillages, and the emergency plans to manage hazardous situations.

The proponent should develop an integrated risk management plan and emergency response plan for the whole of the life of the project including construction, operation and decommissioning phases in consultation with the Department of Emergency Services. The emergency response plan should reflect the social, cultural, economic and natural aspects of the 'environment' as defined in the *Integrated Planning Act 1997*.

The integrated risk management plan should include a preliminary hazard analysis (PHA), conducted in accordance with appropriate guidelines for hazard analysis (e.g. HAZOP Guidelines, NSW Department of Urban Affairs and Planning (DUAP)). The assessment should outline the implications for and the impact on the surrounding land uses, and should involve consultation with Department of Emergency Services, Queensland Fire and Rescue Authority, and Queensland Ambulance Service. The PHA should incorporate:

- all relevant major hazards both technological and natural;
- the possible frequency of potential hazards, accidents, spillages and abnormal events occurring;
- indication of cumulative risk levels to surrounding land uses;
- the life of any identified hazards;

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- a list of all hazardous substances to be used, stored, processed, produced or transported;
 - the rate of usage;
 - description of processes, type of the machinery and equipment used;
 - potential wildlife hazards such as crocodiles, snakes, and disease vectors; and
 - public liability of the State for private infrastructure and visitors on public land.

The plan should include the following components:

- operational hazard analysis;
- regular hazard audits;
- fire safety, emergency;
- response plans;
- qualitative risk assessment; and
- construction safety.

Where relevant, each of these components should be prepared in accordance with the appropriate guidelines (e.g NSW DUAP Hazardous Industry Planning Advisory Paper (HIPAP)).

The Environmental Management Plan (EMPlan) for a proposed mining project is an integral part of the EIS. It can be developed from the preceding information in the EIS. Its purpose is to set out the proponents commitments to environmental management, i.e. how environmental values will be protected and enhanced. Protection of environmental values will be achieved by preventing or minimizing environmental harm in accordance with the commitments made in the text of the EIS. The EM Plan is based on these commitments. The general content of the EM Plan comprises:

- The proponent's commitments to acceptable levels of environmental performance, including environmental objectives, ie. levels of expected environmental harm, performance standards and associated measurable indicators, including progressive and final rehabilitation, performance monitoring and reporting; and .
- Control strategies to implement the commitments.
- Corrective actions to rectify any deviation from performance standards.

The conditions on the Environmental Authority for the proposed expansion of the mine will be drawn from the EMPlan.

6.1 References

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

6.2 Recommended Appendices

6.2.1 Final Terms of Reference for the EIS

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

A summary, cross-referencing specific items of the TOR to the relevant section of the EIS, should also be provided

6.2.2 Study Team

The qualifications and experience of the study team and specialist sub-consultants and expert reviewers should be provided.

6.2.3 Glossary of Terms

A glossary of technical terms and acronyms should be provided.

6.2.4 Specialist Studies

All reports generated on specialist studies undertaken as part of the EIS are to be included as appendices.

These may include:

- flora and fauna studies
- waterway hydrology
- groundwater
- geology
- economic studies,
- hazard and risk studies
- land use and land capability studies
- community consultation

6.2.5 The Standard Criteria

A brief summary of the proposal's compatibility with ESD policy and other relevant policy instruments such as the standard criteria as defined by the Environmental Protection Act (Qld) should be presented. Consideration should focus on The National Strategy for Ecologically Sustainable Development, published by the Commonwealth Government in December 1992 (available from the Australian Government Publishing Service). Each principle should be discussed and conclusions drawn as to how the proposal conforms. A life-of-project perspective should be shown.