Environmental Operations

Terms of reference for an environmental impact statement

TERMS OF REFERENCE

FOR THE

LAKE LINDSAY PROJECT

ENVIRONMENTAL IMPACT STATEMENT

August 2004

Environmental Protection Agency
www.epa.qld.gov.au ABN 87 221 158 786

Background

Anglo Coal (Capcoal Management) Pty Ltd (Capcoal) proposes to develop the Lake Lindsay Project (the project proposal), an open cut coal mine located about 25km to the south/south-east of the town of Middlemount, in the Bowen Basin.

The project proposal will be located in proximity to existing mining operations, namely the German Creek mining complex to the north-west (operated by Capcoal) and the Foxleigh mine to the north-east (operated by CAML Resources Pty Ltd).

The proposed mine is expected to produce up to 6Mt a year of medium to high volatile bituminous black coal suitable for both export and domestic markets. The average annual output is expected to be 4Mt a year, with a life up to 30 years.

Key features of the project proposal are:

- initial development of the Lake Lindsay deposit, followed by ongoing mining operations;
- construction of:
  - flood control levees alongside Oaky Creek to prevent ingress of floodwaters to pit operations;
  - a haulage route to the existing German Creek operations;
  - an additional coal handling and processing plant at the German Creek site;
  - topsoil stockpiles;
  - water supply infrastructure;
  - run-of-mine (ROM) coal stockpiles;
  - overburden dumps; and
  - basic support facilities, such as offices, crib sheds, electrical reticulation, access roads, and ablutions.
- implementation of a water management strategy including sedimentation dams and management infrastructure that minimises any impacts on receiving water courses; and
- rehabilitation of all mining disturbance as soon as practicable after mining.

Coal will be transported to the German Creek facilities for processing at a coal handling and preparation plant. These terms of reference will discuss incremental increases in environmental impact at the German Creek operations, due to processing of the Lake Lindsay product.

The proposed mining area will be under application for a mining lease covering 4173 hectares.

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Glossary

A glossary of technical terms, acronyms and abbreviations should be provided.

Executive summary

The function of the executive summary is to convey the most important aspects and options of the Lake Lindsay Project (the project proposal) to the reader in a concise and readable form. It should use plain English and avoid the use of jargon and esoteric terms. The structure of the executive summary will follow that of the environmental impact statement (EIS) and will address the following matters:

- a summary description of the project proposal, its purpose and identification of the study area;
- the name of the project proponent;
- the title of the project proposal;
- the location of the project proposal in a State, regional and local setting;
- the objectives of the project proposal;
- the project schedule for construction, operation and decommissioning and rehabilitation;
- in summary, the background to, alternatives to and the need for the project proposal;
- a summary of the major components of the natural, cultural heritage, social and economic environment of the study area; and
- a summary of the potential impacts and mitigation measures for the project proposal, including the elements of the environmental management overview strategy (EMOS) which will give effect to the management of the impacts of the project proposal.

1. Introduction

The introduction should explain the function of the EIS, why the EIS has been prepared and the primary objectives of the EIS.

It should also define the audience to whom it is directed, and contain an overview of the structure of the document. Factual information contained in the document should be referenced wherever possible.

1.1 Project proponent

This section should provide details regarding project proponents including details of joint-venture partners.

1.2 Project objectives and scope

A statement of the objectives which have led to the development of the Lake Lindsay Project (the project proposal) and a brief outline of the events leading up to the project's formulation, including alternatives, envisage time scale for implementation and project proposal life, anticipated establishment costs and actions already undertaken within the project proposal area should be provided in this section.

1.3 The EIS process

The important aspect of this section is to make clear the objectives of the environmental impact assessment process under the *Environmental Protection Act 1994*. This section should include a description of the impact assessment process steps, timing and decisions to be made for relevant stages of the project proposal. In particular, this section should outline mechanisms in the process for public input and the public release of an EIS, which will specify all responses to stakeholder submissions.

The information required in this section is to ensure:

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

1.3.1 Objectives of the EIS

This section should provide a succinct statement of the EIS objectives. The structure of the EIS can be outlined as an explanation of how the EIS will meet its objectives. The reader should be able to distinguish the EIS as the key environmental document providing advice to decision makers considering approvals for the project proposal.

The EIS objectives should be to provide public information on the need for and likely effects of the project proposal, 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. Discussion of options and alternatives and their likely relative environmental management outcomes is a key aspect of the EIS.

The role of the EIS in developing the project's environmental management overview strategy (EMOS) should also be discussed, as should the EIS's role in providing management measures that can be carried over into conditions that would attach to the environmental authority and any other approvals for the project proposal.

It should be noted that the purpose of the EIS is to assess the potential adverse and beneficial environmental, economic and social impacts of the project proposal. Consequently, while the terms of reference provide guidance on the scope of the EIS studies, they should not be seen as exhaustive or limiting. If it transpires during the preparation of the EIS that currently unforeseen matters not addressed in the terms of reference are found to be relevant to the assessment of impacts of the project proposal, those matters should be included in the EIS.

1.3.2 Submissions

The reader should be made aware of how and when submissions regarding the draft EIS will be taken into account in the decision-making process.

1.4 Public consultation process

The public consultation process should identify broad issues of concern of the local community and other interested persons. The key objectives of the consultation should be:

- to inform the different interest groups about the project proposal;
- to seek an understanding of interest group concerns about the project proposal; and
- to explain the impact assessment research methodology and how the group's input might influence the final recommendation relating to the project proposal.

The consultation process should continue from the planning stages of the project proposal through commissioning, operation and final rehabilitation. This section should outline the methodology that was and will be adopted to identify and mitigate any identified adverse environmental and socio-economic impacts that may arise through the project proposal development.

The submission of a list of affected persons and interested persons as well as a statement of how the project proponent proposes to consult with those persons is a statutory requirement of the EIS process in the *Environmental Protection Act 1994*.

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

The public consultation program should provide opportunities for community involvement and education. It may include interviews with individuals, public meetings, interest group meetings, production of regular summary information and updates, and other consultation mechanisms to encourage and facilitate active public consultation.

The public consultation process should identify broad issues of concern to local community and interest groups, and should continue from project proposal planning through commissioning, project operations and final decommissioning. Refer to the EPA guideline **"Issue Identification and Community Consultation"**.

1.5 Relevant legislation and policy requirements

This section should explain the legislation and policies controlling the approvals process. Reference should be made to the *Environmental Protection Act 1994, Mineral Resources Act 1989*, and other relevant Queensland laws.

In particular, this section should highlight requirements of the *Environmental Protection Act 1994*, such as 'ecologically sustainable development' (ESD), 'best practice environmental management', and the 'general environmental duty' and any relevant Environmental Protection 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 proposal and the expected program for approval of applications.

This information is required to assess how the legislation applies to the project proposal, over which agencies have jurisdiction, and whether the proposed impact assessment process is appropriate.

In addition, necessary approvals for the project proposal should be identified. Consideration of the project proposal's consistency with existing zoning or long term policy framework for the area, and the legislation, standards, codes or guidelines available to monitor and control operations on-site should be given.

2. Project need and alternatives

2.1 Project socio-economic justification

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

2.2 Alternatives to the project

This section should describe feasible alternatives (including technological alternatives such as mining/processing and rehabilitation methods), to the project proposal including discussion of the consequence of not proceeding with the project proposal. Alternatives should be discussed in sufficient detail to enable an understanding of the reason for preferring certain options and courses of action and rejecting others. Reasons for selecting the preferred options should be delineated in terms of technical, commercial, social and natural environment aspects, in particular the principals of ESD should be detailed.

The interdependencies of the project 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 project proposal. This section should include a description of the proposed water supply, power, transport and/or storage infrastructure and rationale for such infrastructure.

3. Description of the project

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

3.1 Project site

A full description of the project proposal site, present land-uses and zonings, nearby industry and other land-uses should be given. A plan showing the site in relation to its surrounding land, including the location of the existing German Creek coal mine and Foxleigh coal mine should also be included. The project proposal site should be defined at both a regional and local context.

A description of the existing German Creek site and its proposed modifications should also be provided, including the proposed location of the coal handling and processing plant, associated railway loop and the system for transporting coal from the project proposal site.

3.2 Resources

This section summarises results of studies and surveys undertaken to delineate the coal resource. A description of the location, tonnage and quality of the coal resource should be made. Coal seams that are stratigraphically higher or lower than those being mined, or seams located under infrastructure should be identified.

In addition, maps should be provided showing the general location of the project proposal area including:

- the location of the resource;
- the location and boundaries of mining tenures, granted or proposed, to which the project proposal area is or will be subject;
- the location for mine excavation(s);
- the location of any proposed buffers surrounding the working areas; and
- the location and boundaries of the mine site and associated infrastructure.

The EIS should describe the way in which the project proponent will ensure that recovery of the coal resource is maximised and that (as far as practicable) other resources are not adversely affected or sterilised by the project proposal or its associated infrastructure.

Define the extent of coal seam methane (in m^3 per tonne of coal) confined in the Lake Lindsay coal resource and describe how the release of this gas will be managed during mining operations.

3.3 Mining methodology

The description of the mining methodology, based on economic considerations, including final landform establishment, should include:

- areas and depth of mining, including a plan that shows mining areas for various phases of the project proposal;
- the location of any final void left at the cessation of mining;
- the proposed mining method, including details of:
- pre-stripping;
- overburden removal;
- overburden placement;
- coal loading and haulage; and

- proposed sustainable rehabilitation and landform design and implementation options.

The reasons for the preferred operational option, including justification for any final voids should be made clear to the reader, including any details of economic evaluations.

3.4 Construction phase and materials

A description of the construction phase of the development, including the construction of the German Creek coal handling and processing plant should be provided, including;

- construction methods;
- construction timetable, including anticipated start up dates for the various components of the construction phase and other milestones, as well as anticipated plant commissioning dates;
- proposed hours of operation;
- the type of equipment to be used;
- the quantity and source of any rock aggregate or other material to be brought onto the site for the construction of roads, dams or other components of the development (and the environmental implications of removal of the material from the source);
- the identification of construction wastes; and
- the extent of surface disturbance during construction.

3.5 Mining schedule

Information should be provided on:

- construction schedule including conceptual and staging analysis of the project proposal together with an outline of the time-scale and associated costs involved;
- proposed hours of operation;
- expected life of the operation; and
- any proposals for future expansion of operations, including staging and timing.

3.6 Mine waste management

This section relates to the generation and management of mine wastes by the project proposal through construction, mining and production processes. General waste management is covered in Section 4.4.

The physical and chemical characteristics of all waste material should be provided.

An inventory of the following products produced (per unit volume) should be provided:

- the tonnage of ore processed;
- the amount of resulting process wastes;
- the tonnage and volume of waste rock removed to extract the coal; and
- the volume and tonnage of any by-products left from the processing of the coal.

The proposed location, site suitability, dimensions and volumes of overburden/waste rock and dumps should be described, including selective material handling requirements to achieve proposed post-mine land-use and their method of construction. Methods to prevent acid formation, seepage and contamination should be given. Measures to ensure stability of the dumps and impoundments should be described.

Discuss reject/tailings storage and disposal in relation to the capacity of current containment systems at German Creek and associated impacts on site water management and discharge.

The EIS should describe each distinct stage of the project proposal (e.g. construction/site preparation, operation and decommissioning) indicating the processes to be used and their associated waste streams (i.e. all waste outputs: solid, liquid and gaseous) including recycling efforts, such as stockpiling and reusing topsoil. The schematic diagrams, or an associated table, should cross-reference the relevant sections of the EIS where the potential impacts and mitigation measures associated with each waste stream are described.

The EIS should also describe the proposed means for the management of wastes produced under circumstances other than as a result of normal operation including:

- wastes from construction activities, such as rainwater run-off from disturbed land surfaces, or chemical cleaning of plant before commissioning;
- industrial wastes liable to result from accidents such as leaks from bulk storage facilities, fires, explosions; and
- wastes produced from plant and machinery maintenance.

Where any wastes are destined for off site disposal, information should be provided on:

- any proposed re-use of material and wastes;
- the location of the facilities to which each waste will be sent for disposal;
- confirmation that each facility can accept the type and quantity of nominated;
- waste and over what period of time; and
- details of the transport of wastes from the plant to the disposal facility.

3.6.1 Water

A description should be presented of the origin, quality and quantity of wastewater originating from the project proposal. Particular attention should be paid to the capacity of waters to generate acid, saline or sodic waste water. A water balance for the project proposal is required to account for the estimated usage of water.

The EIS should consider the following effects:

- groundwater from mine pits and other excavations;
- rainfall directly onto disturbed surface areas;
- runoff from haul roads, plant and industrial areas;
- drainage (i.e. runoff 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 – estimates of effluent volumes, design of the sewage treatment plant, disposal of liquid effluent and sludge; and
- water supply treatment plant – disposal of wastes.

3.6.2 Hazardous waste

Outline any hazardous wastes that will be produced and describe strategies for their management or disposal.

3.6.3 Air emissions

Describe the quantity and quality of all air emissions, including dust, fumes and odours, from the project proposal during construction and operation.

3.7 Product 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 storage facilities to the processing plant, and on to any transport facilities. Include discussion of any environmental design features of these facilities, including bunding of storage facilities and tailings disposal.

3.8 Infrastructure requirements

3.8.1 Site infrastructure

It will be necessary to provide a site layout plan, to a scale convenient for indicating:

- location and details of plant and equipment;
- materials storage areas;
- site entry and exit locations;
- key plant buildings;
- location of any on-site barracks and sleeping quarters for mining personnel;
- dams, sedimentation ponds and flood protection measures; and
- each of the stages proposed.

Descriptions of the physical facilities proposed and their arrangement within the site are required, including:

- plant, equipment, buildings, catchment drains, water and tailings impoundments, sedimentation dams and flood protection measures;
- areas to be used for handling, storage, treatment and disposal of wastes (including any chemicals required); and
- facilities to be used for the transport, handling and storage of processed and raw materials.

The nature, sources, location and quantities of all materials to be handled, including the storage and stockpiling of raw materials associated with the project proposal, should be described.

Details of site infrastructure located at the German Creek mine which will be associated with handling and processing coal from the project proposal area, including washing, rejects/tailings disposal sites and waste disposal facilities should be described as outlined above.

3.8.2 Flood protection infrastructure

Detailed descriptions are required of the flood protection infrastructure and its arrangement within the site, including:

- the location of the levees constructed for flood protection;
- details on the construction of the levees, including erosion protection;
- the design criteria of the levees in terms of flood protection capacity, including a description of flood protection afforded by the proposed levees for all mine infrastructure, including potential spoil dumps; and
- the design criteria of the levees in terms of erosion protection.

Any proposed levee, stream diversions or works on watercourses, whether temporary or for the mine life, should be described in sufficient detail in the EIS to allow a determination of whether such works will require licensing under the relevant legislation.

3.8.3 Electricity supply

Details should be provided of electricity supply requirements for the construction and operation of the plant, including anticipated dates for the start of construction, testing of plant and final commissioning. Details should include information on maximum and minimum energy demand and annual energy consumption.

Should any private power generation be contemplated, the EIS report should describe how and in what quantity power is to be generated, the fuel to be used and the anticipated emissions from such generation.

3.8.4 Water supply

A determination of raw and treated water demand should be made for the project proposal, including details of daily or seasonal peak demand requirements, ultimate total annual requirements, and an assessment of the capacity of existing supply to meet such requirements. This assessment should take into account the requirements of the project proposal for fire fighting or other emergency water supply. Details of on-site water storage should be provided. Potable water supply and associated infrastructure should conform to the Australian Drinking Water Guidelines 1996.

This should include an assessment of:

- the potable water requirements for the project proposal site and for adjacent support and service industries; and
- the necessity for the augmentation of any existing supply and possible sources, such as in-pit water.

3.8.5 Transportation requirements

Information should be provided on the transportation requirements of the project proposal for both the construction and operational phases of the project proposal. This information should detail:

- the type and quantities of materials to be transported and the origin and destination of these materials, including any haul routes;
- proposals for the transport of dangerous substances (including explosives);

- assessment of traffic generated by the mine, to a ten-year horizon, during the construction and operational phase, including the frequency of trips and types of vehicles proposed for material transport;
- map(s) of the haul route(s) and surrounding road network of State-controlled and local roads;
- the availability and suitability of existing transportation modes and facilities (i.e. existing links, storage facilities, handling equipment and other services);
- the need for new transportation facilities and/or the improvement and maintenance of existing facilities such as intersections of access roads from the project proposal to existing roads; and
- volumes and routes for workforce traffic and times of peak traffic flows.

3.9 Workforce requirements

The EIS report should provide information on the numbers of people to be employed on-site for both the construction and operational phases of the project proposal. This information should be presented according to occupational groupings of the workforce, and for the various components and stages of construction and operation. Information should also be provided on the expected dates when the workforce is required. Information on additional accommodation of various types as well as other social infrastructure facilities that will serve the expected workforce during the construction and operation phases of the project proposal should also be stated.

3.10 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 voids, overburden stockpiles, tailings dams sites, and any other wastes should be shown. The post-mining land suitability of the various land disturbance types should be described in terms of the physical chemistry of the overburden material and the landform chosen.

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. In addition, options for post-mining land condition and use should be discussed and a preferred option justified, based on:

- Consultation with relevant stakeholders;
- Research of national and international current best practice for determining rehabilitation objectives; and
- Research of national and international trends in mine rehabilitation identified through such methods as: review of recent publications and conference papers; and contact with, or policy statements by, leading researchers and agencies.

The means of decommissioning the project proposal, 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, management of any residual contaminated land and other land management issues. Post-mining land ownership and the transfer of land management and long-term maintenance responsibilities should also be discussed.

Information should be provided regarding decommissioning and rehabilitation of on-site infrastructure, rehabilitation of concrete footings and foundations, hard stand areas and storage tanks (including any

potential for reuse of these facilities). 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.

Implications for the long-term use and fate of the site should 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.

4. Environment values and management of impacts

The functions of this section are:

- To describe the existing environmental values of the area which may be affected by the mining activities. Environmental values are defined by the *Environmental Protection Act 1994* and Environmental Protection Policies. Environmental values should be described by reference to background information which may be included as appendices to the EIS.
- To describe the potential adverse and beneficial impacts of the mining activities on the environmental values. Any likely environmental harm to the environmental values at the project proposal area should be described. Include analysis of any cumulative impacts caused by the project proposal.
- To present environmental protection objectives and the standards and measurable indicators to demonstrate the standards are being achieved.

This section should address all elements of the environment (land, water, air, waste, noise, nature conservation, cultural heritage, social and community, health and safety, economy, hazards and risk) in a way that is comprehensive and clear. To achieve this, the topics to be addressed for each element are:

Environmental values affected: describe the existing environmental values of the area to be affected including areas affected by any cumulative impacts (refer to any background studies in Appendices).

Impact on environmental values: describe quantitatively the likely impact of the project proposal on the identified environmental values of the area. The cumulative impacts of the project proposal must be considered over time and in combination with other (all) impacts in the dimensions of scale, intensity, duration or frequency of the impacts. In particular, the requirements and recommendations of relevant State Planning Policies, Environmental Protection Policies, National Environmental Protection Measures and Integrated Catchment Management Plans should be addressed.

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 objectives as well as the numerical standard which defines the achievement of the objectives (this standard must be auditable).

Control strategies to achieve the objectives: describe the control principles, proposed practical actions and technologies to be implemented that are likely to achieve the environmental protection objectives.

Monitoring programs: describe the monitoring parameters, monitoring points, frequency, data interpretation 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 strategies: describe the strategies to be used to ensure the environmental protection objectives are achieved and control strategies implemented.

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 project proposal in the context of environmental values as defined by the *Environmental Protection Act 1994* and *Environmental Protection Policies*. It should also define and describe the objectives and practical measures for protecting or enhancing water resource environmental values, describe how nominated quantitative standards and indicators may be achieved, and how the achievement of the objectives will be monitored, audited and managed.

4.1.1.1 Land-use

The EIS should provide a description of current land tenures and land-uses, including native title, in the entire project 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.

A map at a suitable scale showing existing land-uses and tenures, and the proposed mine and plant locations should be provided for the entire project 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.

Provide a land suitability assessment for rainfed cropping and grazing covering all disturbed and undisturbed areas within the proposed mining lease areas. This 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 classification system referred to here can be found in Attachment 2 of the Land Suitability Assessment Techniques of the QDME Technical Guidelines for Environmental Management of Exploration and Mining in Queensland 1995.

The potential harm on adjacent agricultural land, urban and recreational areas should be described, and any constraints on future developments in the mining area outlined.

4.1.1.2 Sensitive environmental areas

The EIS should identify whether areas that are environmentally sensitive could be affected, directly and indirectly, by the project proposal. Also, areas sensitive to environmental harm caused by the project proposal can be determined through site specific environmental impact assessment processes.

The provisions of the Commonwealth's *Environment Protection and Biodiversity Conservation Act 1999* should be addressed in particular whether there are relevant national environmentally significant matters.

The proximity of the project elements to any of these areas should be identified.

4.1.1.3 Infrastructure

The location and owner/custodians of all tenures, reserves, roads and road reserves, and stock routes covering the affected land should be shown. Indicate locations of power lines and any other easements. Details should be provided of the impacts on environmental values of existing and any new roads, and road realignments.

4.1.1.4 Topography/geomorphology

The contour information for the project proposal site should be detailed at suitable increments, with levels shown with respect to Australian Height Datum (AHD).

4.1.1.5 Geology

The EIS should provide a description, map and a series of diagrammatic cross-sections of the geology of the project proposal site, with particular reference to the physical and chemical properties of surface and sub-surface materials and geological structures within the proposed areas of disturbance. Properties which may influence stability, occupational health and safety, rehabilitation programs, or the quality of waste water leaving any area disturbed by the project proposal should be described.

4.1.1.6 Soils

Soil surveys of the project proposal sites should be conducted with particular reference to the physical and chemical properties of the materials which will influence erosion potential, stormwater run-off quality, rehabilitation and agricultural productivity of the land (e.g. for dryland cropping, irrigated cropping or grazing uses). Information should also be provided on soil stability and suitability for construction of all project proposal facilities.

Soil profiles should be mapped at a suitable scale and described according to accepted standards (for example the Australian Soil and Land Survey Field Handbook (McDonald et. Al. 1990), or the Land Resource Assessment of the Windeyers Hill Area (Burgess 2003)). An appraisal of the depth and quality of useable soil should be undertaken. Information should be presented according to the standards required in the Planning Guidelines: the Identification of Good Quality Agricultural Land (DPI, DHLGP, 1993), and the State Planning Policy 1/92: Development and the Conservation of Agricultural Land.

The description of soils and overburden at the project proposal site should include:

- profile description, including stability, soil structure and texture, erodibility, dispersivity and rockiness;
- salinity and sodicity;
- nutrient status, including Cation Exchange Capacity; and
- pH.

This information should then be used to:

- describe the present land suitability of soils on the site;
- prepare a land suitability map of the proposed mining lease area, prepared in accordance with the QDME Technical Guidelines for Environmental Management of Exploration and Mining in Queensland 1995, specifically Section 6.1 Land Suitability Assessment Techniques. 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 suitability assessments should be completed for rainfed cropping and grazing covering all disturbed and undisturbed areas within the proposed mining lease areas. This assessment will set out soil and landform limitation subclasses assigned to soil mapping units in order to derive land suitability classes;
- prepare a map of Good Quality Agricultural Land based on the land suitability assessments prepared in accordance with the above requirement; and
- characterise the overburden stripped ahead of coal extraction.

Provision should also be made for the ongoing characterisation of spoil material as mining progresses to maximise the suitability of the replaced soils for the nominated final land-use.

Discuss constraints of final landform soil profile characteristics (physical and chemical) on nominated post-mining land-uses. Particular regard should be given to management and maintenance inputs required to sustain final landform stability and productivity when compared to similar undisturbed landforms.

4.1.1.7 Scenic values

Provide an assessment of the visual impact in terms of the extent and significance of the changed skyline as viewed from the sensitive locations, during all stages of the project proposal, is to be analysed and discussed.

The assessment should address the local visual impacts of the project proposal structures and associated infrastructure during construction, operation and post-mining, including final landform.

4.1.1.8 Land contamination

Conduct 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" (www.epa.qld.gov.au/environment/business/contamiated/) to determine background contamination levels, including the following information:

- Maps of areas listed on the Environmental Management Register or Contaminated Land Register under the *Environmental Protection Act 1994*;
- Maps 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 results of the PSI should be summarised in the EIS and provided in detail in an appendix.

4.1.2 Potential impacts and mitigation measures

The function of this section is to define and describe the objectives for protecting or enhancing land 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.

4.1.2.1 Land-use suitability

The potential for the construction and operation of the project proposal to change existing and potential land-uses of the project 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 and the factors favouring or limiting the establishment of those options, should be given in the context of land-use suitability prior to the project proposal. Post-mining land-use options should be detailed in accordance with the objectives of the Environmental Management Policy for Mining in Queensland 1991 and based on a post-mine land suitability assessment. The land suitability assessment should follow the QDME Technical Guidelines for Environmental Management of Exploration and Mining in Queensland 1995.

Discuss the impacts on post-mining land-use in the context of the options developed in response to Section 3.10 of the TOR.

4.1.2.2 Land disturbance

A 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 decommissioning should be described.

The methods to be used for the project proposal, including backfilling, covering, re-contouring, topsoil handling and revegetation, should be described. A description of the proposed final void landform/s post-mining (including dimensions) should also be provided.

Where dams and roads and other infrastructure are to be constructed, proposals for the management of these structures after the completion of the project proposal should be given. A contour map of the area should be provided (if relevant). Also, the final drainage and seepage control systems and any long term monitoring plans should be described.

Proposed decommissioning should be described, including consolidation, revegetation, fencing, and monitoring. Post-mine, long-term management of the levee on the Oaky Creek floodplain should be discussed.

A description of topsoil management should outline how the utilisation of soil suitability for rehabilitation purposes will be maximised. Erosion and sediment control measures should be described, particularly in relation to the management of acidic, sodic and saline overburden material.

4.1.2.3 Land contamination

The EIS should describe the possible contamination of land from aspects of the project proposal including waste material (including waste rock dumps), tailings and reject product generated from washing and processing coal at the German Creek coal handling and processing plant, and spills at chemical and fuel storage areas.

The means of preventing land contamination (within the meaning of the *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 project completion.

The potential acid forming characteristics of mine waste should be estimated and presented in the EIS. If any mine waste is identified as being potentially acid forming, management strategies for that waste should also be described in the EIS.

Procedures and actions to manage the containment and clean up of dangerous goods from accidental spills from places such as refuelling facilities and chemical storage areas should be provided.

4.1.2.4 Soil erosion

For all permanent and temporary land forms, possible erosion rates and management techniques should be described. For each soil type identified, erosion potential and erosion management techniques should be outlined. Mitigation strategies should be developed to achieve acceptable soil loss rates and levels of sediment in rainfall runoff. 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 infrastructure area including buildings;
- access roads or other transport corridors;
- any waste dumps; and

- dams, banks and creek crossings.

The EIS should include details of the depth and quality of topsoil and subsoil to be stockpiled for later use in rehabilitation and details of topsoil and subsoil soil management techniques to maximise opportunities for rehabilitating disturbed areas to the nominated land-use. 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.

4.1.2.5 Transport

The EIS should provide sufficient information for the Department of Main Roads and local government to make an independent assessment of how the State-controlled and local government road networks respectively will be affected using Main Roads' Guidelines for Assessment of Road Impacts of Development Proposals with reference to the Road Planning and Design Manual. The EIS should include analysis of the potential impacts on the roads from construction and operational traffic associated with the project proposal. The assessment of potential impacts should include:

- safety and efficiency impacts on roads;
- intersections from additional traffic associated with the project;
- a pavement impact assessment (if required);
- a potential need for increased road maintenance from hauling construction materials and components away; and
- proposed ways of dealing with any significant road impacts that are identified.

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. Information should also be provided on proposed emergency vehicle access to the project site.

4.2 Climate

The EIS should describe the air temperatures, humidity, wind (direction and speed) and any other special factors (e.g. temperature inversions) likely to affect air quality within the environs of the project proposal. Rainfall patterns including magnitude and seasonal variability of rainfall must be considered. Extremes of climate (droughts, floods, cyclones, etc) should also be discussed with particular reference to water management at the project proposal site. The vulnerability of the area to natural or induced hazards, such as floods, bushfires and earthquakes should also be addressed. The relative frequency, magnitude and risk of these events should be considered.

The potential impacts due to climatic factors should be addressed in the relevant sections of the EIS. The impacts of rainfall on soil erosion should be addressed in Section 4.1. The impacts of winds and temperature inversions on air quality should be addressed in Section 4.5.

4.3 Water resources

4.3.1 Description of environmental values

The function of this section is to describe the existing environment for water resources which may be affected by the project proposal in the context of environmental values.

4.3.1.1 Surface waterways

A description should be given of the surface water courses and their quality and quantity in the area affected by the project with an outline of the significance of these waters to the river catchment system in which they occur with particular reference to the draft Central Queensland Strategy for Sustainability. Details provided should include a description of existing surface drainage patterns and flows in major streams. A map or maps should be provided at a suitable scale depicting the nature of any aquatic features within or adjacent to the project site including wetlands, waterways, drainage channels, intermittent water features, dams, man-made channels etc.

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 project. Flood studies should include a range of annual exceedance probabilities for affected waterways, where data permits.

An assessment is required of existing water quality in surface waters (including Oaky and German creeks) likely to be affected by the project. The basis for this assessment should be a baseline water quality monitoring program, with sampling stations located upstream and downstream of the project.

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

- values identified in the Environmental Protection (Water) Policy and the Central Queensland Strategy for Sustainability;
- sustainability, including both quality and quantity;
- 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 catchments, including the Fitzroy Basin Natural Management Plan – Central Queensland Strategy for Sustainability 2.

Details provided should include a description and map(s) of existing surface drainage patterns, flows in major streams and wetlands.

A description of the environmental values of the surface waterways or wetlands of the project site and surrounding land is required. The descriptions should include:

- values identified in the Environmental Protection (Water) Policy 1997;
- sustainability, including both quality and quantity; and
- physical integrity, fluvial processes and morphology of watercourses or wetlands, including riparian zone vegetation and form.

4.3.1.2 Groundwater

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

The review should include a survey of existing groundwater supply facilities such as bores, wells, or excavations.

The EIS should include an assessment of local and regional groundwater resources. A description of existing groundwater usage, based on consultation with surrounding landholders, should be provided and

should include details and location of surrounding residents using groundwater for drinking, stock watering or irrigation purposes.

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; and
- physical-chemical characteristics.

4.3.2 Potential impacts and mitigation measures

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 project proposal to environmental values for water, including the biological integrity of the aquatic ecosystem and agricultural, industrial and recreational uses. 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. 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 project proposal.

Extremes of climate (droughts, floods, cyclones, etc) should also be discussed with particular reference to water management at the project proposal site.

4.3.2.1 Surface water and water courses

An assessment should be made of the potential impact of the project on the flow and quality of surface waters, in the catchment area of the site. The assessment on flow of surface waters should include:

- The impacts of surface water flow on existing infrastructure, including access roads to the project site, with reference to the Environmental Protection (Water) Policy 1997. In particular, assessment of impacts on the flow and the quality of surface waters should include an assessment of the likely effects of any waterway barriers proposed in any water course or flood protection infrastructure proposed adjacent to any water course.
- The potential impacts of the proposed project on the integrity and stability of watercourses. Watercourses to be assessed include Oaky and German creeks.
- The impacts on floodplain morphology.
- The impacts of flood protection infrastructure on local catchment hydrology, including water availability to downstream water users, and impacts on riparian vegetation and wetland ecology in the floodplain adjacent to Oaky Creek.
- The impacts of the project proposal on erosion of agricultural land and erosion of the post-mining landform under the proposed post-mining land-use.
- The impacts of levee construction on erosion and waterway realignment.
- Any changes to sediment drop both in waterways and on the floodplain due to any proposed changes in flow.
- Any changes to flood water velocity.

- Changes to frequency of flow events impacting on adjacent land-use.
- Velocity of flow events at sensitive locations on the floodplain.
- An assessment of the stability of any proposed flood protection infrastructure, the risk of failure of flood protection infrastructure and potential impacts arising from such failure.
- The impact of the final void landform/s on overland flow hydrology and associated impacts on riparian areas and aquatic ecosystems, both at the site and downstream of the project.

The assessment of impacts on the flow and the quality of surface waters should be reported with particular reference to their affects on environmental values for water, including the biological integrity of the aquatic ecosystem and agricultural, industrial and recreational uses.

The EIS report should provide details of:

- Flood potential and flood prevention strategies, including modelling for flood prevention for a:

< 1-in-10-year flood event;

< 1-in-20-year flood event;

< 1-in-50-year flood event; and a

< 1-in-100-year flood event.

- How the water management system will conform to the relevant regional Water Resource Plan (WRP).
- Changes to the flow regime of surface waters resulting from the alteration of drainage networks and the extraction of water, if required.
- Water management storage and treatment facilities, including their capacity and location.
- Proposed uses of water management systems, if required.
- The location of fuel storage areas in terms of the identified 1% Annual Exceedance Probability flood level.
- The chemical and physical properties of any waste water at the potential discharge point/s to natural surface waters.
- The effect of surface run-off potentially containing elevated concentrations of suspended solids, and the effect of surface run-off potentially containing contaminants, from hazardous material storage sites, on local aquatic and terrestrial ecosystems, neighbouring properties and Oaky and German creeks. The effect of surface runoff should be discussed in terms of the identified water quality values.

Management strategies should be adequately detailed to demonstrate best practice management and that environmental values of receiving waters will be protected.

The potential environmental harm to the flow and the quality of surface waters from all phases of mining activities should be discussed, with particular reference to their impact on environmental values for water, including the biological integrity of the aquatic ecosystem and agricultural, industrial and recreational uses. Refer to the Environmental Protection (Water) Policy 1997, *Water Resources Act 1989*, and *Water Act 2000.*

In relation to water supply and usage, and wastewater disposal, the EIS should discuss anticipated flows of water to and from the project proposal area. Where dams, weirs 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 (including referable 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, Mines and Energy. The Australian and New Zealand Environment and Conservation Council (ANZECC) 'National Water Quality Management Strategy, Australian Water Quality Guidelines for Fresh and Marine Waters' (November 1992) and the Environmental Protection (Water) Policy 1997 should be used as references for evaluating the effects of various levels of contamination.

4.3.2.2 Groundwater

The EIS should include an assessment of the potential environmental harm caused by the project proposal to local groundwater resources. 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 project proposal to groundwater depletion or recharge, groundwater quality, and subsequent impact to the floodplain and any aquatic features. Propose management options available to monitor and mitigate these effects. The response of the groundwater resource to the progression and finally cessation of the project proposal should be described.

Details of the following should be provided when evaluating the potential impact of the project on the groundwater regime:

- chemical and physical properties of waste water (including leachate) that has the potential to enter the groundwater;
- control strategies for groundwater flow into mining pits;
- management strategies to dispose of groundwater that has entered the pit during the operational phase of the project;
- the likely quality of water in the final void, together with its use and management post-mining; and
- the potential to contaminate groundwater resources, including potential for contamination by hazardous materials, and measures to prevent, mitigate and remediate such contamination.

4.4 Air

4.4.1 Description of environmental values

The function of this section is to describe the existing air environment which may be affected by the project proposal in the context of environmental values as defined by the *Environmental Protection Act 1994* and the Environmental Protection (Air) Policy 1997.

A description of the existing ambient air quality should be provided having regard for particulate matter, gaseous and odorous compounds.

The EIS should describe the air temperatures, wind (direction and speed) and any other special factors (e.g. temperature inversions) likely to affect air quality within the environs of the project proposal. Rainfall patterns including magnitude and seasonal variability of rainfall must be considered.

4.4.2 Management of impacts on environmental values

The function of this section is to define and describe the objectives for protecting or enhancing environmental values for air, to describe how compliance with 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 proposed levels of emissions should be compared with the standards and goals contained in the Environmental Protection (Air) Policy.

The assessment of the project proposal's impact on air quality should consider the following matters:

- Features of the project proposal designed to suppress or minimise emissions, including dusts, should be detailed.
- The proposed levels of emissions of dust, fumes and odours 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 risk of nuisance to local inhabitants should be assessed.

Greenhouse gas abatement

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

- an inventory of proposed future annual emissions for each greenhouse gas (including coal seam methane gas released during mining operations) and total emissions expressed in 'CO2 equivalent' terms for each component of the project proposal and for the combined total project proposal;
- the intended measures to avoid and minimise greenhouse emissions; and
- methodologies by which estimates were made.

Environmental management documents for the project proposal should include a specific module to address abatement of greenhouse emissions including at least:

- a listing of specific actions and commitments taken to avoid and minimise emissions;
- consideration of alternatives to the release of greenhouse gases to the atmosphere; and
- consideration of any additional voluntary initiatives consistent with the strategies outlines in the National Greenhouse Strategy or proposals undertaken as a component of the Commonwealth Greenhouse Challenge program.

4.5 Waste

4.5.1 Description of environmental values

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 (Waste Management) Policy 2000, the proposals for waste avoidance, reuse, recycling, treatment and disposal should be described.

4.5.2 Potential impacts and mitigation measures

The function of this section is to define and describe the objectives for protecting or enhancing environmental values from impacts by wastes, to describe 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.

Waste management issues should be identified for each phase of the project, including the following:

- planning and design—develop and implement strategies to avoid, reduce, reuse and/or recycle waste;
- pre-construction—identify potential wastes and develop and implement strategies for managing waste during the clearing of vegetation and earthworks;
- construction—identify and characterise major waste streams and determine waste avoidance/minimisation opportunities. Alternative methods for waste treatment, other than landfilling should be considered, and include re-use or recycling of materials and use of alternative materials; and
- operation—identify and characterise major waste streams during operation of the project and develop waste management strategies that include waste minimisation, re-use and/or recycling.

With reference to the waste streams identified in section 3.6, 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;
- 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;
- level of impact on environmental values; and
- waste minimisation techniques processes proposed.

Having regard for the Environmental Protection (Waste Management) Policy 2000, the EIS should indicate the results of investigation into the feasibility of using waste minimisation and cleaner technology options during the construction and operating phases of the project proposal.

4.6 Noise and vibration

4.6.1 Description of environmental values

The function of this section is to describe the existing environment values that may be affected by noise and vibration from mining activities in the context of environmental values as defined by the *Environmental Protection Act 1994*, the Environmental Protection (Noise) Policy, and the *Environmental Protection Regulation 1998*.

The results of any baseline monitoring of noise and vibration in the proposed vicinity of the project proposal should be described. Baseline monitoring should include a selection of any sensitive areas affected by the project proposal. Sufficient data should be gathered to provide a baseline for later studies.

Monitoring methods should adhere to relevant Environmental Protection Agency Guidelines and relevant Standards, and any relevant requirements of the Environmental Protection (Noise) Policy 1997.

Comment should be provided on any current activities near the project proposal site that may cause a background level of ground vibration.

4.6.2 Potential impacts and mitigation measures

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.

Anticipated noise levels from on-site construction, from the project site, and from project-related activities, such as traffic movements, should be included. Reference to future expansions that may cause or increase noise should also be included.

Information should be supplied on blasting that 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. The impact of airblast overpressures from blasting should be estimated. Measures to prevent or minimise environmental harm, including nuisance, should be discussed.

4.7 Nature conservation

4.7.1 Description of environmental values

The function of this section is to 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*.

Describe the environmental values of nature conservation for the affected area 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 should be presented on the nature conservation values of the areas likely to be affected by the project proposal. The flora and fauna communities which are rare or threatened, environmentally sensitive localities, riparian zones, wilderness and habitat corridors should be described. The description should include a plant species list, a vegetation map at a scale of 1:100,000 and an assessment of the significance of native vegetation, from a local, regional and state perspective as identified in the Biodiversity Planning Assessment for the Brigalow Belt North.

A map should be provided at a scale of 1:100,000 depicting the nature of any aquatic features within or adjacent to the project site including wetlands, waterways, drainage channels, intermittent water features, dams, man-made channels etc.

The EIS should identify issues relevant to sensitive areas, or areas which may have low resilience to environmental change. Areas of special sensitivity include any significant habitat or relevant bird flight paths for migratory species, bat roosting and breeding areas, and habitat of threatened plants, animals and

communities. The capacity of the environment to assimilate discharges/emissions should be assessed. The project proposal's proximity to any biologically sensitive areas should be described.

Reference should be made to both State and Commonwealth 'endangered' species legislation.

The occurrence of pest plants and animals at the project site should be described.

The EPA's guidelines for "Fauna and Flora Assessment in EIA" provide further details.

4.7.1.1 Terrestrial flora

The terrestrial vegetation communities within the affected areas should be described at a scale of 1:100,000 with mapping produced from aerial photographs and ground truthing. Sensitive or important vegetation types should be highlighted, including 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 should be specifically addressed. The surveys should include species structure, assemblage, diversity and abundance. Floristic information should also include:

- location and extent of vegetation types with a description of each community using a standard system according to Specht (1970), or Walker and Hopkins (1990), or Webb (1978) if rainforest;
- classification of vegetation types in accordance with the Queensland Herbarium for the *Vegetation Management Act 1999* with discussion of any differences;
- comparison of site mapping with mapping produced by the Queensland Herbarium for the *Vegetation Management Act 1999* with discussion of any differences;
- assessment of the habitat value of vegetation communities;
- assessment of the condition of vegetation communities and impacting or threatening processes; and
- identification of vegetation of conservation significance based on regional ecosystem status recognised by the EPA and status under the Vegetation Management Regulation 2000 and the *Environment Protection and Biodiversity Conservation Act 1999*, occurrence of species listed as rare, vulnerable or endangered under the Nature Conservation (Wildlife) Regulation 1994 and the *Environment Protection and Biodiversity Conservation Act 1999*, habitat value and condition.

Flora survey methodology should be stated and should be consistent with current best practice and comparable with methodology used by the Queensland Herbarium.

The existence of important local and regional weed species should also be discussed.

4.7.1.2 Terrestrial fauna

The terrestrial fauna occurring in the areas affected by the project proposal should be described, noting the broad distribution patterns in relation to vegetation, topography and substrate. The conservation values of remnant vegetation and fauna habitat should be defined using principles consistent with methodology used by the EPA. Fauna survey methodology should be stated and should be consistent with current best practice. Fauna survey should be carried out in all identified habitat types for the range of vertebrate species potentially occurring. Survey intensity and period should be consistent with the difficulty of locating species listed as rare, vulnerable or endangered under the Nature Conservation (Wildlife) Regulation 1994 or the *Environment Protection and Biodiversity Conservation Act 1999* that potentially occur in the area.

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

- species diversity (i.e. a species list) and abundance of animals, including amphibians, birds, reptiles, mammals and bats;

- any species that are poorly known, but suspected of being rare or threatened;
- habitat requirements and sensitivity to changes, including movement corridors and barriers to movement;
- the existence of feral or exotic animals; and
- use of the area by migratory birds, nomadic birds, and terrestrial fauna.

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

4.7.1.3 Aquatic Biology

The aquatic flora and fauna occurring in the areas affected by the project proposal should be described, noting the patterns and distribution in the waterways in accordance with the Australian Guidelines for Water Quality Monitoring and Reporting (ANZECC/ARMCANZ 2000), with particular reference to Chapter 3 – Study Design. The description of the flora and fauna present, or likely to be present in the area, should include:

- fish species, mammals, reptiles, amphibians, crustaceans and aquatic invertebrates occurring in the waterways;
- aquatic plants;
- aquatic substrate and stream type; and
- downstream habitat.

Outline the suitability and effectiveness of the proposed buffer widths (ecological buffer between development and aquatic features) in terms of filtration, water treatment, and amelioration of bordering impacts, in order to preserve water quality and habitat within and adjacent to aquatic features.

Determine the fisheries values within the aquatic features both upstream and downstream of the project site.

4.7.2 Potential impacts and mitigation measures

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. Cumulative effects to environmental values should be considered.

The discussion should cover all likely direct and indirect environmental harm on flora and fauna, particularly sensitive areas and species, including their long and short-term resilience to environmental change through the imposition of a levee or other works associated with the project. The potential impact of the project on aquatic features including wetlands, waterways, drainage channels and intermittent water features should be described. Also provide possible alternatives to any disturbance to the aquatic features identified above.

Details should be provided on the measures to be employed to avoid or mitigate damage occurring to ‘of concern’, ‘endangered regional ecosystems’, riparian areas and aquatic features. The performance requirements of the State Policy for Vegetation Management on freehold Land must be addressed.

Measures to mitigate the environmental harm to habitat or the inhibition of normal fauna movement, propagation or feeding patterns, and change to food chains should be described. Specific management measures to minimise the impact of additional traffic on all road networks associated with the mining operations on fauna movement should be detailed.

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

Weed control strategies aimed at containing existing weed species (e.g. parthenium and other noxious weeds) and ensuring no new invasive weeds are introduced to the area should be detailed in the EIS. Specific components of the weed control strategies should be outlined such as washdown procedures, education of onsite staff and reporting mechanisms during construction and operational phases.

Feral animal management strategies should be addressed. The study should develop strategies to ensure that the project does not contribute to increased encroachment of a feral animal species. Reference should be made to the local government authority's Pest Management Plan when determining control strategies.

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

4.8 Cultural heritage

4.8.1 Description of environmental values

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, the *Aboriginal Cultural Heritage Act 2003*, and the *Queensland Heritage Act 1992*.

A cultural heritage study will be required to describe indigenous and non indigenous cultural heritage sites and places, and their values. In accordance with the above legislation such a study must be conducted by an appropriately qualified cultural heritage practitioner and must include the following:

- liaison with relevant indigenous community/communities concerning:
  - places of significance to that community (including archaeological sites, natural sites and story sites; and
  - 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;
- assessment of significance of any cultural heritage sites/places located;
- the impact of the proposed development on cultural heritage values; and
- a report of work done which includes background research (e.g. identification of sites in the historic inventory of Broadsound Shire), relevant environmental data and methodology, as well as results of field surveys, significance assessment and recommendations.

The consultation process should include representatives from relevant groups. Liaison with relevant indigenous and non-indigenous community/communities should include the following issues:

- places of significance to the community;
- opportunity for community involvement in field surveys; and
- any requirements by communities and/or informants relating to confidentiality of site data.

This section of the EIS should include a description of the assessment process, including background research undertaken, relevant environmental data and methodology, as well as results of field surveys, and significance assessment.

4.8.2 Potential impacts and mitigation measures

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

Strategies to mitigate the potential impacts on any sites or places of cultural or heritage significance within the project site and its vicinity, should be detailed in the EIS. The potential environmental impacts on cultural heritage values of the site and area in the vicinity of the project should be managed under a cultural heritage management agreement (CHMA).

The CHMA will provide a process for the management of cultural heritage places at the project site. It is usual practice for the CHMA 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 cultural heritage mitigation strategies should represent the outcomes of consultation with the communities potentially affected by the project proposal. The likely response of significantly affected communities of interest should also be identified, including details of the possible positive and negative impacts on sites and values of cultural and heritage significance and how these will be incorporated into a cultural heritage management plan.

4.9 Social

4.9.1 Description of environmental values

The function of this section is to describe the existing social values that may be affected by the mining activities.

The amenity and use of the project site and adjacent areas for rural and agriculture, 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;
- current property markets and availability of accommodation;
- recreational, cultural, leisure and sporting facilities and activities in affected area.
- number of properties directly affected by the project; and
- number of families directly affected by the project, including not only property owners but families of workers either living on the property or workers where the property is their primary employment.

Through the public consultation and participation process, the EIS should identify both the positive and negative impacts (both direct and cumulative) of the project in its developmental and operational stages. The profile of the affected communities should be based on quantitative data (readily available) and qualitative data (which can be gained through the consultation process).

4.9.2 Potential impacts and mitigation measures

The function of this section is to define and describe the objectives for protecting or enhancing social 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 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 nature and extent of the community consultation program is to be described and a summary of the results incorporated in the EIS.

Describe the likely response of affected communities and identify possible beneficial and adverse impacts (both direct and cumulative). These impacts should be considered both at the regional and local level during the construction and operational stages. 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;
- impacts on local residents values and aspirations;
- impact on existing services such as Emergency Services and general human and community services;
- availability of housing during construction and operation; and
- development of local community capacity initiatives in partnership with the local community.

Details should be provided on the following:

- housing and accommodation requirements for the construction and permanent workforce;
- standard of accommodation i.e. houses, hostels, caravan parks, existing houses, private boardings; and
- timing for provision of accommodation.

Details of housing and accommodation alternatives considered and the reasons for the preferred option should be detailed in the EIS. The proposed location of additional housing and other accommodation facilities required for the project should be specified.

4.10 Health and safety

4.10.1 Description of environmental values

The function of this section is to describe the existing community values for health and safety that may be affected by the mining activities.

Any impacts on the health and safety of the community, workforce, suppliers and other stakeholders should be detailed in terms of health and safety from factors such as dust and noise. Assessment of the impacts on health and safety should also consider impacts from any additional road traffic generated by the mine during construction and operation. Health and safety issues relating to on-site first aid and emergency capability and disaster preparedness should also be included. Details of fire safety features, fire fighting facilities and emergency evacuation areas proposed at the project site should be provided. Details should also be

provided on the initial response measures for managing vehicle incidents along the haulage routes based on the requirements of the *Coal Mining Safety and Health Act 1999*.

4.10.2 Potential impacts and mitigation measures

This section should include an assessment of health and safety risks to employees, the community and the general public, both on-site and off-site. This includes defining and describing 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 the project workforce of occupational health and safety risks and impacts on the community in terms of health and safety from project operations and emissions.

The EIS should also identify any health risks associated with areas of poor drainage and proposed strategies to control insect breeding in such areas, if required.

The EIS should include an assessment of bushfire and flood risks and precautions taken to reduce these risks. Details of disaster management planning should also be provided in the EIS. Mitigation strategies to be implemented to minimise risk (including maintenance of bunding) should be described.

The EIS should discuss from a legal context the options for transfer of public safety risk liability and duty of care responsibility post-mining.

4.11 Economy

4.11.1 Description of environmental values

The function of this section is to describe the existing economic environment that may be affected by the mining activities.

The character and basis of the local and regional economies should be described including:

- economic viability (including economic base and economic activity); and
- existing housing market, particularly rental accommodation which may be available for the project workforce.

4.11.2 Potential impacts and mitigation measures

The function of this section is to define and describe the objectives 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 analysis of general economic impacts of the project should include:

- the relative significance of the project in the local and regional economic context;
- the direct long and short-term beneficial (e.g. job creation) and adverse (e.g. competition with local and small business) impacts that are likely to result from implementation of the proposed development;
- implications for future development in the locality (including constraints on surrounding land-uses and existing industry);

- the value of lost opportunities or gained opportunities for other economic activities anticipated in the future; and
- impacts on local property values.

Attention should be focussed on the long and short-term direct effects of the project (including mine closure) on the regional income and employment and the State economy.

The effect on local labour markets should be discussed with regard to the source of the workforce. In relation to the source of the workforce, clarification is required as to whether the project 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.

The economic impacts of any short term or long term loss of agricultural land should be discussed.

4.12 Hazard and risk

4.12.1 Description of environmental values

The function of this section is to describe the potential hazards and risk that may be associated with the mining activities.

The EIS will provide details of the environmental values likely to be affected by any hazardous materials and actions incorporated in the project proposal. The location of dangerous goods storage areas and the proximity of these facilities to both the built and natural environment, having regard to prevailing wind conditions and the proximity to waterways, including feeder streams should be provided in the EIS. 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 emergency situations on sensitive areas and resources.

The EIS should discuss from a legal context the options for transfer of public safety risk liability and duty of care responsibility post-mining.

4.12.2 Potential impacts and mitigation measures

The function of this section is to define and describe the objectives for protecting or enhancing environmental values from hazards and risk, to describe 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. 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.

5. Draft EMOS

The project proponent will be required to submit a Draft EMOS with the EIS. The Draft EMOS will be prepared with reference to the EPA Guideline 8 “Preparation of an Environmental Management Overview Strategy”.

The Draft EMOS will outline:

- the environmental values likely to be affected by the mining activities;
- the potential adverse and beneficial impacts of the mining activities on the environmental values;
- the environmental protection commitments, to enhance the environmental values and mitigate potential environmental impacts that may be generated by the project, including monitoring programs to monitor the affects of the major environmental impacts identified in the EIS;and
- draft environmental authority conditions which will form the basis for the Environmental Authority application and licencing of the project under the *Environmental Protection Act 1994..*

The environmental protection commitments must address the requirements of Section 203(2) of the *Environmental Protection Act 1994*.

6. References

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

7. Recommended appendices

A1. Final Terms of Reference for this EIS

A copy of the final TOR should be included in the EIS. Where it is intended to bind appendices in a separate volume from the main body of the EIS, the TOR at least should be bound with the main body of the EIS for ease of cross-referencing. A summary, cross-referencing specific items of the TOR to the relevant section of the EIS, should also be provided in Section 4.14 of the EIS. For this purpose the TOR should be line numbered.

A2. Development approvals

A list of the development approvals required by the project should be presented.

A3. The standard criteria

A brief summary of the project proposal’s compatibility with ESD policy and other relevant policy instruments such as the Standard Criteria as defined by the *Environmental Protection Act 1994* 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 project proposal conforms. A life-of-project perspective should be shown.

A4. Research

Proposals for researching alternative environmental management strategies or for obtaining any further necessary information should be outlined in an appendix.

A5. Consultation report

A list of referral agencies should be provided in a summary Consultation Report, which should also list the Commonwealth, state and local government agencies consulted, and the individuals and groups of stakeholders consulted. A summary of the issues raised by these groups, and the means by which the issues have been addressed, should be provided in the text of the EIS.

The EIS should summarise the results of the community consultation program, providing a summary of the groups and individuals consulted, the issues raised, and the means by which the issues were addressed. The discussion should include the methodology used in the community consultation program including criteria for identifying stakeholders and the communication methods used.

A6. Study team

The qualifications and experience of the study team and specialist subconsultants and expert reviewers should be provided.

A7. Specialist studies

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