BHP Billiton Mitsubishi Alliance

Draft Terms of Reference

Environmental Impact Statement

Norwich Park (East Pit)
Coal Mine Proposal

BHP Billiton Mitsubishi Alliance

August 2005

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General Instructions

All potential impacts of the proposed Proposal on the environment are to be investigated. Control strategies for the mitigation of any adverse impacts are to be detailed in the Environmental Impact Statement (EIS) report. The focus of the EIS will be on the relevant features of the proposal and the impacts associated with them. It is the responsibility of the proponent to address any issues that arise during the preparation of the EIS that are not covered in these Terms of Reference (ToR).

The impacts of the Proposal are to be addressed to the degree necessary to enable all relevant decision makers and the general public to be adequately informed. The nature and level of investigations should be relative to the likely extent and gravity of impacts.

The EIS report should consist of three major parts:

- the executive summary;
- the main text of the document, which should be written in a clear and concise manner so as to be readily understood by general readers; and
- appendices containing detailed technical information.

The following sections of this ToR detail the required content of the EIS report. This information has been set out in a manner that may be adopted as the format for the main text of the EIS report. However, this format need not be followed where the required information can be more effectively presented in an alternative format.

The EIS report should be written so that any conclusions reached can be independently assessed. This means that all sources must be appropriately referenced.

Relevant maps, diagrams and other illustrative materials at easily understood scales which allow proper identification of features such as contour lines, should be included in the EIS report where appropriate.

The EIS report should be produced on A4 size paper capable of being photocopied with maps and diagrams also at A4 or A3. The EIS report should be produced in electronic format (PDF) and made available on the Internet to facilitate accessibility. Copies of the EIS should also be made available at cost of reproduction via means such as compact disc. A minimum text size of 10 point font should be used for PDF documents to facilitate readability.

Abbreviations

CHMP – Cultural Heritage Management Plan
DES – the Queensland Department of Emergency Services
DET – the Queensland Department of Employment and Training
DHLGP – the former Queensland Department of Housing, Local Government and Planning
DoH – the Queensland Department of Housing
DLGP – the Queensland Department of Local Government and Planning
DME – the former Queensland Department Mines and Energy
DMR – the Queensland Department of Main Roads
DNR – the former Queensland Department of Natural Resources
DNRM – the Queensland Department of Natural Resources and Mines
DPI – the Queensland Department of Primary Industries
DSDI – the Queensland Department of State Development and Innovation
EIS – Environmental Impact Statement
EMP – Environmental Management Plan
EP Act – *Environmental Protection Act 1994*
EPA – the Queensland Environmental Protection Agency
EPBC Act - *Environment Protection & Biodiversity Conservation Act 1999* (Cwth)
EPPs – Environmental Protection Policies
IAS – Initial Advice Statement
IPA – *Integrated Planning Act 1997*
JORC – the Australasian Joint Ore Reserves Committee
ML – Mining Lease issued pursuant to the *Mineral Resources Act 1989*
MLA – Mining Lease Application issued pursuant to the *Mineral Resources Act 1989*
MRA - *Mineral Resources Act 1989*
QH – the Queensland Department of Health
QT – the Queensland Department of Transport
QR – Queensland Rail
ToR – Terms of Reference

Project Background

Project Proponent

The Proponent for the development of the proposed East Pit ("the Proposal"), is BHP Billiton Mitsubishi Alliance Norwich Park Mine (BMA).

Project Summary

The EIS is being prepared for the development and operation of 'East Pit' adjoining the current Norwich Park Mine. Existing mining and associated Environmentally Relevant Activities of the Norwich Park Coal Mine (MLs 70126, 70127& 1782(part) are subject to Environmental Authority MIM800126503 and an approved Environmental Management Overview Strategy (EMOS). In addition, activities on ML1782 are subject to the *Central Queensland Coal Associates Agreement Act 1968*. These existing mining activities are not to be considered as part of the current proposal except where changes to those operations are proposed. Approval of the East Pit proposal will result in a new Environmental Authority (mining project) for MLs 70126, 70127 & East Pit and an Integrated Environmental Authority for ML 1782.

The proposed East Pit operations will be located 30 kilometres (km) south of Dysart in Central Queensland, and 256 km south-west of Mackay. The pit will complement existing operations at Norwich Park by extending the life of mine. The pit will not add any additional yearly through put, and will serve to maintain the existing 5.7 million tonnes/annum (mt/a) production capacity of Norwich Park mine approved under the current environmental authority and other regulatory requirements, enabling BMA to blend high quality coking coal from existing and new pits to meet customer quality specifications.

East Pit will be situated on land to the east of the existing Roper Pit, with all development, operational, decommissioning and rehabilitation works staffed by existing Norwich Park employees and utilising existing mine infrastructure. There will be no additional plant, vehicles and staff employed or commissioned as a result of the East Pit Development.

Progressive rehabilitation aims to return a mixture of grazing and native bushland to all disturbed areas. The pit itself will disturb an area of 263 ha over approximately 16 years, and will support mining production at Norwich Park Mine, by producing a high quality coking coal which can be easily blended with product from the existing pits to extend mine life and meet customer quality specifications. Water management on site aims to protect the downstream water quality in Rolf Creek to support existing grazing use.

A total area of approximately 450 hectares (including ex-pit dumps, haul roads, access tracks and a dragline walk road) will be disturbed over the life of the Proposal, with the site to be fully rehabilitated within 5 years of completion of mining activities. This is in line with BMA Norwich Park Mine's existing commitments.

Run of Mine coal from East Pit will be transported via a proposed 5.3 kilometre haul road to the existing Norwich Park Industrial Area and once processed by the CPP, will continue to be transported by rail to Hay Point Coal Terminal near Mackay for distribution to national and international markets. The CPP and rail load-out facility are currently operating close to maximum capacity, being 5.7 mt/a. The East Pit development will not significantly increase the throughput of the CPP. Norwich Park Mine's CPP and Industrial area are operated under an approved Environmental Authority MIM 800126503 and an approved EMOS and are not part of this proposal.

Norwich Park's existing coal mining fleet will be used to carry out mining in the proposed East Pit, with approximately 10 m^3 of prime overburden to be removed for each tonne of coal mined. This will predominantly be carried out by one of the six existing Norwich Park dragline fleet in combination with truck and shovel operations.

The Bingegang pipeline which delivers raw water to the Norwich Park CPP and other local mines and townships from the Mackenzie River, currently traverses the proposed East Pit site. This will be diverted along the Warwick Park Road and around the western extent of East Pit and will join up with the existing utility easement. This will ensure disturbance of relocating the infrastructure corridor is minimised.

At present the western portion of the proposed East Pit is owned by BHP Coal & Others (Lot 3 CNS335, SL 12/45187), and covered by a Mining Lease Application (MLA 70315). The eastern portion is currently private freehold land owned by the 'Curran' Family (Lot 4 on CNS 38, GHFL 12/2444) and is covered by an Exploration Permit-Coal (EPC 636). An agreement between BMA and the Curran Family for land swap of the eastern portion of East Pit has been signed and a land transfer is in progress. Once this occurs a new ML and surface rights approval will be sought for the East Pit area.

The ephemeral Rolf Creek and associated tributaries traverse the East Pit area in a west to east direction, which form part of the Isaac River catchment. The head waters have been modified previously with the development of Roper Creek in the 70's.

Establishment of East Pit will require the removal of approximately 85 ha of Brigalow (*Acacia harpophylla*) dominant and co-dominant communities (as described under the VM Act). As such the Proposal was referred to the Department of Environment and Heritage as a 'controlled action' under the EPBC Act, and subsequently received notification that this was the case on 15 April 2004 (referral number 2004/1447). The controlling provisions were considered to be Section 18 and Section 18A – Threatened Species or Ecological Communities.

Existing operations at NPM are authorised under Environmental Authority MIM 800126503 and an approved EMOS. In addition, activities on ML1782 are subject to the *Central Queensland Coal Agreement Act 1968*. These existing mining activities are not to be considered as part of the current proposal except where changes to these operations are proposed. These operations are mentioned in the Terms of reference purely to give context to the East Pit proposal, and not to offer operations currently authorised up for comment or alteration. The extent of the East Pit proposal is outlined in the initial advice statement.

East Pit will utilise the processing, rail load out, maintenance facilities of Norwich Park Mine, Project 70071, and will not require such standalone facilities, or additional labour, housing or transport requirements that may be required by a 'greenfield' site.

Executive Summary

The function of the executive summary is to convey the most important aspects and options relating to the proposal to the reader in a concise and readable form in plain English. The structure of the executive summary should follow that of the EIS, and focus strongly on the key issues and conclusions.

Glossary of Terms

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

1 Introduction

The function of the introduction is to explain why the EIS has been prepared, what the EIS relates to in terms of the overall Norwich Park mining operations and what the EIS sets out to achieve. It should also define the audience to whom it is directed, and contain an overview of the structure of the document. Throughout the EIS, factual information contained in the document should be referenced.

1.1 Project proponent

Provide details of the proponents, including details of any joint venture partners.

1.2 Project description

A brief description of the key elements of the proposal should be provided and how the development of East Pit relates to the existing Norwich Park operations will be illustrated. Detailed descriptions of the proposal should follow in Section 3.

A brief description should be provided of any studies or surveys that may have been undertaken for the purposes of developing the EIS. This should include reference to relevant baseline studies or investigations undertaken or approvals granted previously.

1.3 Project objectives and scope

A statement of the objectives which have led to the development of the proposal and a brief outline of the events leading up to the proposal's formulation, envisaged time scale for implementation and mine life within the pit area. The consequences of not proceeding with the proposal should also be discussed.

1.4 The environmental impact assessment (EIS) process

The purpose of this section is to make clear the methodology and objectives of the environmental impact statement under the relevant legislation.

1.4.1 Methodology of the EIS

This section should provide a description of the impact assessment process steps, timing and decisions to be made for relevant stages of the proposal. This section should also indicate how the consultation process (which will be described in detail in section 1.5) would integrate with the other components of the impact assessment, including the stages, timing and mechanisms for public input and participation. The information in this section is required to ensure:

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

1.4.2 Objectives of the EIS

Having described the methodology of the environmental impact assessment, a succinct statement should be made of the EIS objectives. The structure of the EIS can then be outlined as an explanation of how the EIS will meet its objectives.

If it transpires during the preparation of the EIS that previously unforeseen matters not addressed in the terms of reference are found to be relevant to the assessment of impacts of the proposal, those matters should be included in the EIS.

In addition, it is essential that the main text of the EIS should address all relevant matters concerning environmental values, impacts on those values and proposed mitigation measures. No relevant matter should be raised for the first time in an appendix or the draft EM Plan.

In brief, the EIS objectives should be to provide public information on the need for and likely effects of the 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 providing the proposal's draft environmental management plan (EM Plan) should also be discussed, with particular reference to the EM Plan's role in providing management measures that can be carried over into conditions that would attach to any approval(s), environmental authorities and permits for the proposal.

1.4.3 Submissions

The reader should be informed as to how and when public submissions on the draft EIS will be addressed and taken into account in the decision-making process.

1.5 Public consultation process

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

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

1.6 Project approvals

1.6.1 Relevant legislation and policy requirements

This section should explain the legislation and policies controlling the approvals process. Reference should be made to the Queensland *Environmental Protection Act 1994*, the *Central Queensland Coal Associates Agreement Act 1968* and other relevant Queensland laws. Any requirements of the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* should also be included.

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

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

1.6.2 Planning processes and standards

This section should discuss the proposal's consistency with existing land uses or long-term policy framework for the area (e.g. as reflected in local and regional plans), and with legislation, standards, codes or guidelines available to monitor and control operations on site. This section should refer to all relevant State and regional planning policies. This information is required to demonstrate how the proposal conforms with State, regional and local plans for the area.

1.7 Accredited process for controlled actions under Commonwealth legislation

When a State EIS process has been accredited under Part 8 of the Commonwealth's *Environment Protection and Biodiversity Conservation Act 1999* (EPBC), it is necessary for the terms of reference to address potential

impacts on the matters of National Environmental Significance (NES) that were identified in the 'controlling provisions' when the proposal was declared a controlled action.

BMA referred the proposed action of East Pit under the EPBC Act, dated 26 March 2004, to the Commonwealth's Department of Environment & Heritage (DEH).

The DEH responded to this referral (EPBC ref: 2004/1447) on 15 April 2004, declaring the action as proposed by BMA at East Pit, as a controlled action. The controlling provisions are section 18 and 18A (listed threatened species and communities). BMA will be required to carry out certain steps to assess the environmental impact under Part 8 of the EPBC Act.

BMA will address the requirements of the EPBC Act through the submission of an Environmental Impact Statement under Queensland State's *Environmental Protection Act 1994*, satisfying the requirements through the approved bilateral agreement.

As a minimum requirement, the EIS should provide separate discussions under sub-headings in the relevant sections that describe the values and address the potential impacts on NES matters. The locations of those sub-headings should be readily identifiable from the Table of Contents. For example, if one of the controlling provisions was 'Listed threatened species and communities', then subsections, headed 'Matters of National Environmental Significance', should be placed in Section 4.8 (Nature conservation) under both the Description of environmental values and Potential impacts and mitigation measures headings. Those subsections should address exclusively and fully the issues relevant to the controlling provisions.

2 Project need and alternatives

2.1 Project justification

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

2.2 Alternatives to the Project

This section should describe feasible alternatives, including conceptual, technological and locality alternatives to the proposal, and discussion of the consequences of not proceeding with the proposal. Alternatives should be discussed in sufficient detail to enable an understanding of the reasons for preferring certain options and courses of action and rejecting others. Comparative environmental impacts of each alternative should be summarised.

Reasons for selecting the preferred options should include technical, commercial, social and natural environment aspects. In particular, the principals of ESD and sustainable development should be included. The relationship of options chosen for waste management and any emissions produced should be detailed.

3 Description of the project

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

3.1 Location

3.1.1 Regional & Local context

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

3.2 Construction

The extent and nature of the construction phase should be described. The description should include the type and methods of construction, the construction equipment to be used and the items of plant to be transported onto the construction site. Any staging of the proposal should be described and illustrated showing site boundaries, development sequencing and timeframes. The estimated numbers of people to be employed in the proposal construction phase should also be provided with a brief description of where those people may be accommodated.

3.3 Operations

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

- a description and capacity of plant and equipment to be employed.

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

Indicative process flows should be described and the anticipated rates of inputs, along with similar data on products, wastes and recycle streams.

3.3.1 Location and tenure

Summarise the the natural resources required to implement the proposal. The location, volume, tonnage and quality of natural resources required should be described (eg land, water, forests, energy, etc.). Maps at suitable scales should be provided showing the precise location of the proposed East Pit, and in particular:

- the location and boundaries of land tenures, in place or proposed, to which the pit will be subject;
- the location and boundaries of the footprint showing all key aspects including excavations, stockpiles, areas of fill, watercourses, plant locations, water storages, buildings, bridges, culverts, hardstands, car parks, etc; and
- the location of any proposed buffers surrounding the working areas.

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

3.3.2 Mine life and coal resource base

Specific details should be provided of the following:

- the proposed life of East Pit and an outline of the coal resource base (further detail should be provided in section 4.1.1.2, Geology);

- the quantity of coal to be mined annually including any proposed ramping of production or staging of development;

3.3.3 Mining methods and equipment

Specific details should be provided of the following:

- the mining type and methods to be used, including the major equipment to be used in the various components of the operation; and
- the use of different techniques in areas of different topographic or geo-technical character;

The description should refer to, and be complemented by, the figures previously presented in section 3.3.1 showing the locations of key aspects of the proposal. Additional figures should be provided if required.

3.3.4 Mine sequencing

Specific details should be provided of the following:

- the physical extent of excavations, location of stockpiles of overburden and/or coal reject to be handled during the Proposal's operation or left after mining ceases—the description should include the rate of throughput of stockpiles of product, reject and overburden;
- the proposed progressive backfilling of excavations;
- the area disturbed at each major stage of the proposal.

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

3.3.5 Processing and products

This section should describe the quantities and characteristics of the products produced from the proposal, on an annual basis, and comparisons made with the existing Norwich Park Mine operations

3.3.6 On-going evaluation and exploration activities

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

3.4 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 processing plant to the storage facilities and from the storage facilities to the transport facilities.

3.5 Infrastructure Requirements

This section should provide descriptions, with concept and layout plans, of requirements for constructing, upgrading or relocating all infrastructure in the vicinity of the proposal area. The matters to be considered include such infrastructure as roads, rail, bridges, tracks and pathways, dams and weirs, bore fields, power lines and other cables, wireless technology (e.g. microwave telecommunications), and pipelines for any services (whether underground or above).

3.5.1 Transport—road/rail/ship

Describe arrangements for the transport of plant, equipment, products, wastes and personnel during both the construction phase and operational phases of East Pit. The description should address the use of existing facilities and all requirements for the construction, upgrading or relocation of any transport related infrastructure.

Provide details of rail for the transporting of products from the site.

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

- the volume of traffic generated by workforce personnel, visitors and service vehicles;
- method of movement (including vehicle types and number of vehicles likely to be used);
- anticipated times at which movements may occur;
- details of any vehicle traffic and transport of heavy and oversize indivisible loads (including types and composition);
- the proposed transport routes; and
- need for increased road maintenance and upgrading.

3.5.2 Energy

The EIS should describe all energy requirements, including electricity, natural gas, and/or solid and liquid fuel requirements for the construction and operation of the proposal. The locations of any easements should be shown on the infrastructure plan. Energy conservation should be briefly described in the context of any Commonwealth, State and local government policies.

3.5.3 Water supply and storage

The EIS should provide information on water usage by East Pit, including the quality and quantity of all water supplied. In particular, the proposed and optional sources of water supply should be described (eg. bores, any surface storages such as dams and weirs, municipal water supply pipelines).

Determination of potable water demand should be made for the proposal, including the temporary demands during the construction period. If water storage and treatment is proposed on site, for use by the site workforce, then this should be described.

3.5.4 Stormwater drainage

A description should be provided of the proposed stormwater drainage system and the proposed disposal arrangements, including any off-site services.

3.5.5 Sewerage

This section should describe, in general terms, any sewerage infrastructure that may be required by the proposal.

3.5.6 Telecommunications

The EIS should describe any impacts on existing telecommunications infrastructure (such as optical cables, microwave towers, etc.) and identify the owners of that infrastructure.

3.5.7 Accommodation and other infrastructure

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

- camps, townships or residential developments;
- fuel storage areas;
- equipment hardstand and maintenance areas; and
- technical workshops and laboratories.

3.6 Waste management

3.6.1 Character and quantities of waste materials

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

- the tonnage of raw materials processed; and
- the amount of resulting process wastes.

Schematic diagrams, which for the operational phase may be simplified versions of those provided in section 3.3, should be provided for each distinct stage of the proposal (e.g. construction/site preparation, commissioning, operation and decommissioning) indicating the processes to be used and highlighting 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 physical and chemical characteristics of waste material from the process plant should be provided.

Having regard for best practice waste management strategies and the Environmental Protection (Waste) Policy, the proposals for waste avoidance, reuse, recycling, treatment and disposal should be described in the appropriate sub-section below. Information should also be provided on the variability, composition and generation rates of all waste generated at the site and processing plant.

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

3.6.1.1 Air emissions

Describe in detail the quantity and quality of all air emissions (including particulates, fumes and odours) from the proposal during construction and operation. Particulate emissions include those that would be produced by any industrial process, or disturbed by wind action on stockpiles and conveyors, or by transportation equipment (e.g. trucks, either by entrainment from the load or by passage on unsealed roads).

The methods to be employed in the mitigation of impacts from air emissions should be described in section 4.5.

3.6.1.2 Solid waste disposal

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

3.6.1.3 Liquid waste

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

The EIS may need to consider the following effects:

- groundwater from excavations;
- rainfall directly onto disturbed surface areas;
- drainage (i.e. run-off plus any seepage or leakage);
- seepage from other waste storages;
- water usage for:
  - process use, and
  - dust suppression, .
- Evaporation.

3.7 Rehabilitation and decommissioning

This section should describe the options, strategies and methods for progressive and final rehabilitation of the environment disturbed by the proposal. The strategic approach to progressive and final rehabilitation should be described. A preferred rehabilitation strategy should be developed with a view to minimising the amount of land disturbed at any one time. The final topography of any excavations, waste areas and dam sites should be shown on maps at a suitable scale.

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

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

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

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

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

Detail of the impacts of the preferred rehabilitation strategy should be discussed in the appropriate subsections of Section 4 (Environmental values and management of impacts) with regard to such issues as the disposal of waste and the long-term quality of water in any final voids. Implications for the long-term use and fate of the site should also be addressed, particularly with regard to the on-site disposal of waste and the site's inclusion on the Environmental Management Register or Contaminated Land Register.

4 Environmental 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 proposal. Environmental values are defined in section 9 of the *Environmental Protection Act 1994*, environmental protection policies and other documents such as the ANZECC 2000 guidelines. Environmental values may also be derived following recognised procedures, such as described in the ANZECC 2000 guidelines. Environmental values should be described by reference to background information and studies, which should be included as appendices to the EIS.
- To describe the potential adverse and beneficial impacts of the proposal on the identified environmental values. Any likely environmental harm on the environmental values should be described.
- To describe any cumulative impacts on environmental values caused by the proposal, either in isolation or by combination with other known existing or planned sources of contamination.
- To present environmental protection objectives and the standards and measurable indicators to be achieved. and
- To examine viable alternative strategies for managing impacts. These alternatives should be presented and compared in view of the stated objectives and standards to be achieved. Available techniques, including best practice, to control and manage impacts to the nominated objectives should be discussed. This section should detail the environmental protection measures incorporated in the planning, construction, operations, decommissioning, rehabilitation and associated works for the proposal. Measures should minimise environmental harm and maximise socio-economic and environmental benefits of the proposal. Preferred measures should be identified and described in more detail than other alternatives.

Environmental protection objectives may be derived from legislative and planning requirements which apply to the proposal including Commonwealth strategies, State planning policies, local authority strategic plans, environmental protection policies under the *Environmental Protection Act 1994*, and any catchment management plans prepared by local water boards or land care groups. Special attention should be given to those mitigation strategies designed to protect the values of any sensitive areas and any identified ecosystems of high conservation value within the area of possible proposal impact.

This section should address all elements of the environment, (such as land, water, coast, 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 following issues should be considered for each environmental value relevant to the proposal:

- Environmental values affected: describe the existing environmental values of the area to be affected including values and areas that may be affected by any cumulative impacts (refer to any background studies in Appendices - note such studies may be required over several seasons). It should be explained how the environmental values were derived (e.g. by citing published documents or by following a recognised procedure to derive the values).
- Impact on environmental values: describe quantitatively the likely impact of the proposal on the identified environmental values of the area. The cumulative impacts of the proposal must be considered over time or in combination with other (all) impacts in the dimensions of scale, intensity, duration or frequency of the impacts. In particular, any requirements and recommendations of the Great Barrier Reef Marine Park Authority, relevant State planning policies, environmental protection policies, national environmental protection measures and integrated catchment management plans should be addressed.

  Cumulative impacts on the environmental values of land, air and water and cumulative impacts on public health and the health of terrestrial, aquatic and marine ecosystems must be discussed in the relevant sections. This assessment may include air and water sheds affected by the proposal and other proposals competing for use of the local air and water sheds.

  Where impacts from the proposal will not be felt in isolation to other sources of impact, it is recommended that the proponent develop consultative arrangements with other industries in the proposal's area to undertake cooperative monitoring and/or management of environmental parameters. Such arrangements should be described in the EIS.

- Environmental protection objectives: describe qualitatively and quantitatively the proposed objectives for enhancing or protecting each environmental value. Include proposed indicators to be monitored to

demonstrate the extent of achievement of the objective as well as the numerical standard that defines the achievement of the objective (this standard must be auditable). The measurable indicators and standards can be determined from legislation, support policies and government policies as well as the expected performance of control strategies. Objectives for progressive and final rehabilitation and management of contaminated land should be included.

- Control strategies to achieve the objectives: describe the control principals, proposed actions and technologies to be implemented that are likely to achieve the environmental protection objectives; include designs, relevant performance specifications of plant. Details are required to show that the expected performance is achievable and realistic.
- 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. Include scope, methods and frequency of auditing proposed.
- Management strategies: describe the strategies to be used to ensure the environmental protection objectives are achieved and control strategies implemented eg. continuous improvement framework including details of corrective action options, reporting (including any public reporting), monitoring, staff training, management responsibility pathway, and any environmental management systems and how they are relevant to each element of the environment.
- Information quality: information given under each element should also state the sources of the information, how recent the information is, how any background studies were undertaken (eg intensity of field work sampling), how the reliability of the information was tested, and what uncertainties (if any) are in the information.

4.1 Land

4.1.1 Description of environmental values

This section describes the existing environment values of the land area that may be affected by the proposal. It should also define and describe the objectives and practical measures for protecting or enhancing land-based 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 Topography/geomorphology

Maps should be provided locating the proposal in both regional and local contexts. The topography of the proposal site should be detailed with contours at suitable increments, shown with respect to Australian Height Datum (AHD). Significant features of the locality should be included on the maps. Such features would include any locations subsequently referred to in the EIS (e.g. the nearest noise sensitive locations) that are not included on other maps in Section 4.1. Commentary on the maps should be provided highlighting the significant topographical features.

4.1.1.2 Geology

The EIS should provide a description, map and a series of cross-sections of the geology of the proposal area, with particular reference to the physical and chemical properties of surface and sub-surface materials and geological structures within the proposed areas of disturbance. Geological properties that may influence ground stability (including seismic activity, if relevant), occupational health and safety, rehabilitation programs, or the quality of wastewater leaving any area disturbed by the proposal should be described. In locations where the age and type of geology is such that significant fossil specimens (such as of dinosaurs or their tracks) may be uncovered during construction/operations, the EIS should address the potential for significant finds.

4.1.1.3 Mineral resources

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

The location, tonnage and quality of the mineral resources within the proposed pit should be described in detail as indicated below and, for coal projects, where possible it should be presented on a 'seam by seam' basis and include the modifying factors and assumptions made in arriving at the estimates. The mineral resources should be estimated and reported in accordance with the 'Australasian Code for Reporting of Mineral Resources and Ore Reserves' (the JORC Code - available at www.jorc.org/main.php) and the principles outlined in the 'Australian Guidelines for the Estimating and Reporting of Inventory Coal, Coal Resources and Coal Reserves' (available at www.jorc.org/pdf/coalguidelines.pdf) as appropriate.

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

- the location and areal extent of the mineral resources to be developed or mined;
- the location and boundaries of mining tenures, granted or proposed, to which the proposal area is, or will be subject;
- the location of the proposed mine excavation(s);
- the location and boundaries of any proposal sites;
- the location and boundaries of any other features that will result from the proposed mining including waste/spoil dumps, water storage facilities and other infrastructure;
- the location of any proposed buffers, surrounding the working areas; and
- any part of the resource not intended to be mined and any part of the resource that may be sterilised by the proposed mining operations or infrastructure.

Resource Utilisation

The EIS should analyse the effectiveness of the mining proposal in achieving the optimum utilisation of the coal/mineral resources within the proposal area and consider its impacts on other resources. It should demonstrate that the mining proposal will 'best develop' the mineral resources within the proposal area, minimise resource wastage and avoid any unnecessary sterilisation of these or any other of the State's coal, mineral, and petroleum (including gas and coal seam methane) resources that may be impacted upon or sterilised by the mining activities or related infrastructure.

4.1.1.4 Soils

A soil survey of the sites affected by the proposal should be conducted at a suitable scale, with particular reference to the physical and chemical properties of the materials that will influence erosion potential, storm water run-off quality, rehabilitation and agricultural productivity of the land. Information should also be provided on soil stability and suitability for construction of proposal facilities.

Soil profiles should be mapped at a suitable scale and described according to the Australian Soil and Land Survey Field Handbook (McDonald et al, 1990) and Australian Soil Classification (Isbell, 1996). An appraisal of the depth and quality of useable soil should be undertaken. Information 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.

4.1.1.5 Land use

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

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

Describe the land use suitabilities of the affected area in terms of the physical and economic attributes. The assessment should set out soil and landform subclasses assigned to soil mapping units in order to derive land suitability classes. The limitations and land suitability classification system to use is that in Attachment 2 of Land

Suitability Assessment Techniques in the Technical Guidelines for the Environmental Management of Exploration and Mining in Queensland (1995).

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

4.1.1.6 Infrastructure

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

4.1.1.7 Sensitive environmental areas

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

In particular, the EIS should indicate if the land affected by the proposal is, or is likely, to become part of the protected area estate, or is subject to any treaty. Consideration should be given to national parks, conservation parks, wilderness areas, heritage/historic areas or items, national estates, world heritage listings and sites covered by international treaties or agreements (e.g. Ramsar, JAMBA, CAMBA), areas of cultural significance and scientific reserves (see section 4.7 for further guidance on sensitive areas).

In addition, the Commonwealth's *Environment Protection and Biodiversity Conservation Act 1999* will be addressed, as a determination has been made (ref 1447/2004).

The proximity of the proposal elements to any of these areas will be identified.

4.1.1.7.1 Landscape character

This section should describe in general terms the existing character of the landscape that will be affected by the proposal. It should comment on any changes that have already been made to the natural landscape since European settlement. It should 'set the scene' for the description of particular scenic values in the following section on visual amenity. The difference being that this section describes the general impression of the landscape that would be obtained while travelling through and around it, while the visual amenity section addresses particular panoramas and views (e.g. from constructed lookouts, designated scenic routes, etc.) that have amenity value.

4.1.1.7.2 Visual amenity

This section should describe existing landscape features, panoramas and views that have, or could be expected to have, value to the community whether of local, regional, State-wide, national or international significance. Information in the form of maps, sections, elevations and photographs is to be used, particularly where addressing the following issues:

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

4.1.2 Potential impacts and mitigation measures

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

4.1.2.1 Land use suitability

The potential for the construction and operation of the proposal to change existing and potential land uses of the proposal site and adjacent areas should be detailed. Post operations land use options should be detailed including suitability of the area to be used for agriculture or nature conservation. The factors favouring or limiting the establishment of those options should be given in the context of land use suitability prior to the proposal and minimising potential liabilities for long-term management.

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

If the development adjoins or potentially impacts on good quality agricultural land, then an assessment of the potential for land use conflict is required. Investigations should follow the procedures set out in the planning guideline, The Identification of Good Quality Agricultural Land, which supports State Planning Policy 1/92.

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

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 proposal, including backfilling, covering, re-contouring, topsoil handling and revegetation, should be described. Consideration should be given to the use of threatened plant species during any landscaping and revegetation.

Proposals should be provided to divert creeks during construction or operations, and, if applicable, for the reinstatement of the creeks. Where dams and roads and other infrastructure are to be constructed, proposals for the management of these structures after the completion of the 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 in detail, including consolidation, revegetation, fencing, and monitoring.

A description of topsoil management should consider transport, storage and replacement of topsoil to disturbed areas. The minimisation of topsoil storage times (to reduce fertility degradation) should also be addressed. Erosion and sediment control should be described (also see section 4.1.12).

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

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

4.1.2.3 Land contamination

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

The means of preventing land contamination (within the meaning of the *Queensland Environmental Protection Act 1994*) should be addressed. Methods proposed for preventing, recording, containing and remediating any

contaminated land should be outlined. Intentions should be stated concerning the classification (in terms of the Queensland Contaminated Land Register) of land contamination at the proposed East Pit, processing plant site and product storage areas after completion.

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

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

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

4.1.2.4 Soil erosion

For all permanent and temporary landforms, possible erosion rates and management techniques should be described. For each soil type identified, erosion potential (wind and water) and erosion management techniques should be outlined. An erosion-monitoring program, including rehabilitation measures for erosion problems identified during monitoring, should also be outlined. Mitigation strategies should be developed to achieve acceptable soil loss rates, levels of sediment in rainfall runoff and wind-generated dust concentrations.

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

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

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

4.1.2.4.1 Landscape character

Describe the potential impacts of the proposal landscape character of the site and the surrounding area. Particular mention should be made of any changes to the broad-scale topography and vegetation character of the area, such as due to spoil dumps, excavated voids and broad-scale clearing.

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

4.1.2.5 Visual amenity

This section should analyse and discuss the visual impact of the proposal on particular panoramas and outlooks. It should be written in terms of the extent and significance of the changed skyline as viewed from places of residence, from the road and from the air and other known vantage points day and night, during all stages of the proposal as it relates to the surrounding landscape. The assessment is to address the visual impacts of any structures and associated infrastructure, using appropriate simulation. Sketches, diagrams, computer imaging and photos are to be used where possible to portray the near views and far views of the completed structures and their surroundings from visually sensitive locations. Special consideration is to be given to public roads, public thoroughfares, and places of residence or work, which are within the line-of-sight of the proposal.

Detail should be provided of all management options to be implemented and how these will mitigate or avoid the identified impacts.

4.1.2.5.1 Lighting

Management of the lighting of the proposal, during all stages, is to be provided, with particular reference to objectives to be achieved and management methods to be implemented to mitigate or avoid:

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

4.1.2.6 Transport

The EIS should provide sufficient information to make an independent assessment of how the State-controlled and local government road networks may be affected. Sufficient information should also be provided to enable an independent assessment of how the rail network (including infrastructure) may be affected. In both cases the impact on stakeholders along the whole route should be detailed and how any impacts will be managed.

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

The EIS needs to identify impacts on the State-controlled and local government road networks and to indicate clearly the corrective measures necessary to address adverse road impacts and the costs involved.

The EIS should provide details of the impact on any current or proposed rail infrastructure.

Provide information on product spill contingency plans and the adequacy of equipment and facilities to deal with possible spills for the transport nodes of the proposal. Indicate whether there is a need to update the plans based on increase in frequency of traffic and volumes to be transported.

4.2 Climate

This section should describe the rainfall patterns (including magnitude and seasonal variability of rainfall), air temperatures, humidity, wind (direction and speed) and any other special factors (eg temperature inversions) that may affect air quality within the region of the proposal. Extremes of climate (droughts, floods, cyclones, etc) should also be discussed with particular reference to water management at the proposal site. The vulnerability of the area to natural or induced hazards, such as floods and bushfires, 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 storm events on the capacity of waste containment systems (e.g. site bunding/stormwater management and tailings dams) should be addressed in Section 4.3 with regard to contamination of waterways and in Section 4.6 with regard to the design of waste containment systems. The impacts of winds, rain, humidity and temperature inversions on air quality should be addressed in Section 4.5.

4.3 Water resources

4.3.1 Description of environmental values

This section describes the existing environment for water resources, which may be affected by the proposal, in the context of environmental values as defined in such documents as the *Environmental Protection Act 1994*, Environmental Protection (Water) Policy 1997 and ANZECC 2000.

Where a licence or permit will be required under the *Water Act 2000* to take or interfere with the flow of water, this section of the EIS should provide sufficient information for a decision to be made on the application.

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 proposal with an outline of the significance of these waters to the river catchment system in which they occur.

Details provided should include a description of existing surface drainage patterns and flows in major streams. Also provide details of the likelihood of flooding, history of flooding including extent, levels and frequency, and a description of present and potential water uses downstream of the areas affected by the proposal. Flood studies should include a range of annual exceedance probabilities for affected waterways, where data permits.

The EIS should provide a description, with photographic evidence, of the geomorphic condition of any watercourses likely to be affected by disturbance or stream diversion. The results of this description should form the basis for the planning and subsequent monitoring of rehabilitation of the watercourses during or after the operation of the proposal.

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

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

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

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

4.3.1.2 Groundwater

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

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

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

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

This section should include reference to:

Nature of the aquifer/s

- geology/stratigraphy - such as alluvium, volcanic, metamorphic;
- aquifer type - such as confined, unconfined; and
- depth to and thickness of the aquifers.

Hydrology of the aquifer/s

- depth to water level and seasonal changes in levels;
- groundwater flow directions (defined from water level contours);
- interaction with surface water;
- possible sources of recharge; and
- vulnerability to pollution.

The data obtained from the groundwater survey should be sufficient to enable specification of the major ionic species present in the groundwater, pH, electrical conductivity and total dissolved solids.
Describe the environmental values of the underground waters of the affected area in terms of:

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

4.3.2 Potential impacts and mitigation measures

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

The EIS should describe the possible environmental harm caused by the proposed proposal to environmental values for water as expressed in the Environmental Protection (Water) Policy.

Water management controls should be described, addressing surface and groundwater quality, quantity, drainage patterns and sediment movements. The beneficial (environmental, production and recreational) use of nearby surface and groundwater should be discussed, along with the proposal for the diversion of affected creeks during mining, and the stabilisation of those works. Monitoring programs should be described which will assess the effectiveness of management strategies for protecting water quality during the construction, operation and decommissioning of the proposal.

Key water management strategy objectives include:

- protection of important local aquifers and protection of their waters;
- minimisation of impacts on flooding levels and frequencies both upstream and downstream of the proposal.

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

4.3.2.1 Surface water and water courses

The potential environmental harm to the flow and the quality of surface waters from all phases of the proposal should be discussed, with particular reference to their suitability for the current and potential downstream uses, including the requirements of any affected riparian area and in-stream biological uses. The impacts of surface water flow on existing infrastructure should be considered. Refer to the *Environmental Protection (Water) Policy 1997* and *Water Act 2000*.

The hydrological impacts of the proposal should be assessed, particularly with regard to stream diversions, scouring and erosion, and changes to flooding levels and frequencies both upstream and downstream of the proposal. Modelling of afflux should be provided and illustrated where appropriate. Assessment of impacts on the flow and the quality of surface waters and effects on ecosystems should include an assessment of the likely effects on estuarine habitats as a result of any temporary diversion of existing water courses.

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

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

In relation to water supply and usage, and wastewater disposal, the EIS should discuss anticipated flows of water to and from the proposal area. Where dams, weirs or ponds are proposed, the EIS should investigate the effects of predictable climatic extremes (storm events, floods and droughts) on: the capacity of the dams to retain contaminants; 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 at East Pit, under the *Water Act 2000* should be discussed. Water allocation and water sources should be established in consultation with Department of Natural Resources and Mining.

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

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

Options for mitigation and the effectiveness of mitigation measures should be discussed with particular reference to sediment, acidity, salinity and other emissions of a hazardous or toxic nature to human health, flora or fauna.

Where it is proposed that creeks will be diverted, the EIS should detail how rehabilitation will affect both the physical and ecological condition of the creek's bed and banks and the quality of water in it. Furthermore, the EIS should describe the monitoring that will be undertaken after decommissioning, and who will have responsibility for management measures and corrective action, to ensure that rehabilitated creeks do not degrade.

4.3.2.2 Groundwater

The EIS should include an assessment of the potential environmental harm caused by the 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 proposal to groundwater depletion or recharge, and propose management options available to monitor and mitigate these effects. The response of the groundwater resource to the progression and finally cessation of the proposal should be described.

An assessment should be undertaken of the impact of the proposal on the local ground water regime caused by the altered porosity and permeability of any land disturbance.

An assessment of the potential to contaminate groundwater resources and measures to prevent, mitigate and remediate such contamination should be discussed.

4.4 Air

4.4.1 Description of environmental values

This section describes the existing air environment that may be affected by the proposal. The following topics may be addressed.

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

Sufficient data on local meteorology and ambient levels of pollutants should be gathered to provide a baseline for later studies.

4.4.2 Potential impacts and mitigation measures

This section defines and describes the objectives and practical measures for protecting or enhancing environmental values for air, to describe how nominated quantitative standards and indicators may be achieved, and how the achievement of the objectives will be monitored, audited and managed.

The objectives for air emissions should be stated in respect of relevant standards (ambient and ground level concentrations), relevant emission guidelines, and any relevant legislation. The potential for interaction between

the emissions from pit, emissions in the air shed, and the likely environmental harm from any such interaction, should also be detailed.

The proposed levels of emissions should be compared with the national environmental protection measures (NEPM) for ambient air quality (1998), the National Health Medical Research Council (NHMRC) national guidelines (1985) for control of emissions from stationary sources, and the Environmental Protection (Air) Policy (1998), as appropriate.

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

- The human health risk associated with emissions from the facility of a hazardous or toxic nature should be assessed (i.e. those pollutants that are not covered by the National Environmental Protection Council (Ambient Air Quality) Measure or the Environmental Protection (Air) Policy 1998).
- Features of the proposal designed to suppress or minimise emissions, including dusts and odours, should be detailed.
- The proposed levels of emissions of dust should include emissions during normal and upset conditions. Consideration should be given to the range of potential upset condition scenarios including the air emissions that may be generated as a result.

4.5 Waste

This section should complement other sections of part 4 of the EIS by providing technical details of waste treatment and minimisation, with proposed emission, discharge and disposal criteria, while other sections describe how those emissions, discharges and disposals would impact on the relevant environmental values. The purpose of this format is to concentrate the technical information on waste management into one section in order to facilitate its transfer into the EM Plan.

4.5.1 Description of environmental values

This section describes the existing environment values that may be affected by the proposal's wastes. Refer to each of the waste streams described in section 3.6 and provide references to environmental values described in other sections of part 4 of the EIS.

4.5.2 Potential impacts and mitigation measures

This section defines and describes the objectives and practical measures for protecting or enhancing environmental values from impacts by wastes, describes how nominated quantitative standards and indicators may be achieved for waste management, and how the achievement of the objectives will be monitored, audited and managed.

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

- operational handling and fate of all wastes including storage;
- on-site treatment methods proposed for the wastes;
- methods of disposal (including the need to transport wastes off-site for disposal) proposed to be used for any trade wastes, liquid wastes and solid wastes;
- the potential level of impact on environmental values;
- proposed discharge/disposal criteria for liquid and solid wastes;
- measures to ensure stability of the dumps and impoundments should be described;
- methods to prevent, seepage and contamination of groundwater from stockpiles and/or dumps should be given;

- market demand for recyclable waste (where appropriate) should be addressed;
- waste minimisation techniques processes proposed; and
- decommissioning of the site.

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

Waste minimisation and treatment, and the application of cleaner production techniques, should also be applied to particulates.

Cleaner production waste management planning should be detailed especially as to how these concepts have been applied to preventing or minimising environmental impacts at each stage of the proposal. Details on natural resource use efficiency (eg energy and water).

4.6 Noise and vibration

4.6.1 Description of environmental values

This section describes the existing environment values that may be affected by noise and vibration from the proposal.

If the proposed activity could adversely impact on the noise environment, baseline monitoring should be undertaken at a selection of sensitive sites affected by the proposal. Noise sensitive places are defined in the *Environmental Protection (Noise) Policy 1997*. Long-term measured background noise levels that take into account seasonal variations are required. The locations of sensitive sites should be identified on a map at a suitable scale. The results of any baseline monitoring of noise and vibration in the proposed vicinity of the proposal should be described.

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

Comment should be provided on any current activities near the proposal area that may cause a background level of ground vibration (for example: major roads, quarrying activities, etc.).

4.6.2 Potential impacts and mitigation measures

This section defines and describes the objectives and practical measures for protecting or enhancing environmental values from impacts by noise and vibration, describes how nominated quantitative standards and indicators may be achieved for noise and vibration management, and how the achievement of the objectives will be monitored, audited and managed.

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

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

Off-site transport noise and vibration factors due to road or rail should be described.

4.7 Nature conservation

4.7.1 Description of environmental values

This section describes the existing environment values for nature conservation that may be affected by the proposal. It should address any actions of the proposal that require an authority under the *Nature Conservation Act 1992*, and/or would be assessable development for the purposes of the *Vegetation Management Act 1999*.

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 proposal. The flora and fauna communities which are rare or threatened, environmentally sensitive localities including waterways, riparian zones, wilderness and habitat corridors should be described. The description should include a plant species list, a vegetation map at appropriate scale and an assessment of the significance of native vegetation, from a local and regional and state perspective. The description should indicate any areas of state or regional significance identified in an approved biodiversity planning assessment (BPA) produced by the EPA.

The EIS should identify issues relevant to sensitive areas, or areas, which may have, low resilience to environmental change. Areas of special sensitivity include wildlife breeding or roosting areas, any significant habitat or relevant bird flight paths for migratory species, bat roosting and breeding caves including existing structures such as adits and shafts, and habitat of threatened plants, animals and communities. The capacity of the environment to assimilate discharges/emissions should be assessed. Proposal proximity to any biologically sensitive areas should be described.

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

The Queensland *Vegetation Management Act 1999* and the findings of any regional vegetation management plan should also be referenced.

The occurrence of pest plants and animals in the proposal area should be described.

Key flora and fauna indicators should be identified for future ongoing monitoring. Surveys of flora and fauna need to be conducted throughout the year to reflect seasonal variation in communities and to identify migratory species.

4.7.1.1 Terrestrial flora

For terrestrial vegetation a map at a suitable scale should be provided, with descriptions of the units mapped. Sensitive or important vegetation types should be highlighted, including riparian vegetation, and their value as habitat for fauna and conservation of specific rare floral and faunal assemblages or community types. The existence of rare or threatened species should be specifically addressed. The surveys should include species structure, assemblage, diversity and abundance. The description should contain a review of published information regarding the assessment of the significance of the vegetation to conservation, recreation, scientific, educational and historical interests.

The location of any horticultural crops in the vicinity of the site should be shown. The existence of important local and regional weed species should also be discussed.

Vegetation mapping should provide vegetation mapping for all relevant proposal sites including new transport infrastructure, port facilities and irrigation land if relevant. Adjacent areas may also require mapping.

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

- location and extent of vegetation types using the EPA's regional ecosystem type descriptions in accordance with The Conservation Status of Queensland's Bioregional Ecosystems. (Sattler P.S. & Williams R.D. 1997 2nd edition) and the current version of the EPA's listing of the conservation status of regional ecosystems;

- location of vegetation types of conservation significance based on EPA's regional ecosystem types and occurrence of species listed as Protected Plants under the *Nature Conservation (Wildlife) Regulation 1994* and subsequent amendments, as well as areas subject to the *Vegetation Management Act 1999*;
- the current extent (bioregional and catchment) of protected vegetation types of conservation significance within the protected area estate (National Parks, Conservation Parks, Resource Reserves, Nature Refuges);
- any plant communities of cultural, commercial or recreational significance should be identified; and
- location and abundance of any exotic or weed species.

Within each defined (standard system) vegetation community, a minimum of three sites (numbers should be discussed with the EPA) should be surveyed for plant species, preferably in both summer and winter, as follows:

- site data should be recorded in a form compatible with the Queensland Herbarium CORVEG database.
- the minimum site size should be 10 by 50 metres;
- a complete list of species present at each site should be recorded;
- the relative abundance of plant species present should be recorded;
- any plant species of conservation, cultural, commercial or recreational significance should be identified; and
- specimens of species listed as Protected Plants under the Nature Conservation (Wildlife) Regulation 1994, other than common species, are to be submitted to the Queensland Herbarium for identification and entry into the HERBRECS database.

Existing information on plant species may be used instead of new survey work provided that the data is derived from surveys consistent with the above methodology. Methodology used for flora surveys should be specified in the appendices to the report. .

4.7.1.2 Terrestrial fauna

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

- species diversity (i.e. a species list) and abundance of animals, 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;
- existence of any rare, threatened or otherwise noteworthy species/communities in the study area, including discussion of range, habitat, breeding, recruitment, feeding and movement requirements, and current level of protection (e.g. any requirements of Protected Area Management Plans); and
- use of the area by migratory birds, nomadic birds, fish 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 proposal occurs.

4.7.1.3 Aquatic biology

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

- fish species, mammals, reptiles, amphibians, crustaceans and aquatic invertebrates occurring in the waterways within the affected area, and/or those in any associated lacustrine environment;
- aquatic plants;

- aquatic and benthic substrate; and
- habitat downstream of the proposal or potentially impacted due to currents in associated lacustrine environments.

4.7.2 Potential impacts and mitigation measures

This section defines and describes the objectives and objectives and practical measures for protecting or enhancing nature conservation environmental values, describes how nominated quantitative standards and indicators may be achieved for nature conservation management, and how the achievement of the objectives will be monitored, audited and managed.

The discussion should cover all likely direct and indirect environmental harm on flora and fauna particularly sensitive areas as listed below. Terrestrial and aquatic (freshwater) environments should be covered. Also include human impacts and the control of any domestic animals introduced to the area.

Strategies for protecting any rare or threatened species should be described, and any obligations imposed by State or Commonwealth legislation or policy or international treaty obligations (i.e. JAMBA, CAMBA) should be discussed. Emphasis should be given to potential environmental harm to benthic communities.

Strategies for collecting and preserving any significant fossils should be described.

The potential environmental harm to the ecological values of the area arising from the construction, operation and decommissioning of East Pit including clearing, salvaging or removal of vegetation should be described, and the indirect effects on remaining vegetation should be discussed. Short-term and long-term effects should be considered with comment on whether the impacts are reversible or irreversible. Mitigation measures and/or offsets should be proposed for adverse impacts. Any departure from no-net-loss of ecological values should be described.

The potential environmental harm on flora and fauna of any alterations to the local surface and ground water environment should be discussed with specific reference to environmental harms on riparian vegetation or other sensitive vegetation communities. Measures to mitigate the environmental harm to habitat or the inhibition of normal movement, propagation or feeding patterns, and change to food chains should be described.

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

Weed management strategies aimed at containing existing weed species (eg. parthenium and other declared plants) and ensuring no new declared plants are introduced to the area are required, and feral animal management strategies should be addressed. The study should develop strategies to ensure that the proposal does not contribute to increased encroachment of a feral animal species. Reference should be made to the local government authorities pest management plan when determining control strategies. The strategies for both flora and fauna should be discussed in the main body of the EIS and provided in a working form in a Pest Management Plan as part of the overall EM Plan for the proposal.

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

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

- important habitats of species listed under the *Nature Conservation Act 1992* and/or Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* as presumed extinct, endangered, vulnerable or rare;
- regional ecosystems recognised by the Environmental Protection Agency as 'endangered' or 'of concern' and/or ecosystems listed as presumed extinct, endangered or vulnerable under the *Commonwealth Environment Protection and Biodiversity Conservation Act 1999*;
- good representative examples of remnant regional ecosystems or regional ecosystems which are poorly represented in protected areas;
- sites containing near threatened or bio-regionally significant species or essential, viable habitat for near threatened or bio-regionally significant species;
- sites in, or adjacent to, areas containing important resting, feeding or breeding sites for migratory species of conservation concern listed under the Convention of Migratory Species of Wild Animals, and/or bilateral agreements between Australia and Japan (JAMBA) and between Australia and China (CAMBA);

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

4.8 Cultural heritage

4.8.1 Description of environmental values

This section describes the existing cultural heritage values that may be affected by the proposal. Describe the environmental values of the cultural landscapes of the affected area in terms of the physical and cultural integrity of the landforms.

A cultural heritage study may be required that will describe indigenous and non-indigenous cultural heritage sites and places, and their values. Any such study must be conducted by an appropriately qualified cultural heritage practitioner and must include the following:

- liaison with relevant indigenous community concerning:
  - places of significance to that community (including archaeological sites, natural sites, story sites etc;
  - appropriate community involvement in field surveys;
- any requirements by communities and /or informants relating to confidentiality of site data must be highlighted. Non-indigenous communities may also have relevant information;
- a systematic survey of the proposed development area to locate and record indigenous and non-indigenous cultural heritage places;
- significant assessment of any cultural heritage sites/places located;
- the impact of the proposed development on cultural heritage values;
- a report of work done which includes background research, relevant environmental data and methodology, as well as results of field surveys, significance assessment and recommendations; and
- a permit to conduct the research and survey will be required under the provisions of the *Aboriginal Cultural Heritage Act* 2003 and/or the *Queensland Heritage Act 1992*.

4.8.2 Potential impacts and mitigation measures

This section defines and describes the objectives and practical measures for protecting or enhancing cultural heritage environmental values, describes how nominated quantitative standards and indicators may be

achieved for cultural heritage management, and how the achievement of the objectives will be monitored, audited and managed.

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

- a process for including Aboriginal people associated with the development areas in protection and management of indigenous cultural heritage;
- processes for mitigation, management and protection of identified cultural heritage places and material in the proposal areas, including associated infrastructure developments, both during the construction and operational phases of the proposal;
- provisions for the management of the accidental discovery of cultural material, including burials;
- the monitoring of foundation excavations and other associated earthwork activities for possible sub-surface cultural material;
- cultural awareness training or programs for proposal staff; and
- a conflict resolution process.

4.9 Social

4.9.1 Description of environmental values

This section describes the existing social values that may be affected by the proposal.

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

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

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

- the integrity of social conditions, including amenity and liveability, harmony and well being, sense of community, access to recreation, and access to social and community services and infrastructure.; and
- public health and safety (refer to section 4.11).

Social, economic and cultural values are not as easily separated as physical and ecological values. Therefore it may be necessary for some material in this section to be cross referenced with in section 4.9 Cultural Heritage and Section 4.12 Economy.

4.9.2 Potential impacts and mitigation measures

This section defines and describes the objectives and practical measures for protecting or enhancing social values, describes 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 proposal should consider the information gathered in the community consultation program and the analysis of the existing socio-economic environment, and describe the proposal's impact, both beneficial and adverse, on the local community. The impacts of the proposal on local and regional residents, community services and recreational activities are to be analysed and discussed for all stages of the development. The nature and extent of the community consultation program are to be described and a summary of the results incorporated in the EIS.

The assessment of impacts should describe the likely response of affected communities and identify possible beneficial and adverse impacts (both immediate and cumulative). These impacts should be considered both at the regional and local level.

Attention should be paid to:

- impacts on demographic, social, cultural and economic profiles;
- impacts on local residents, current land uses and existing lifestyles and enterprises;
- impacts on local and state labour markets, with regard to the source of the workforce. This information is to be presented according to occupational groupings of the workforce. The impacts of both construction and operational workforces and associated contractors on any potential housing demand, community services and community cohesion is to be addressed. The capability of the existing housing stock, including rental accommodation, to meet any additional demands created by the proposal is to be discussed;
- comment should be made on how much service revenue and work from the proposal (e.g. provisioning, catering and site maintenance) would be likely to flow to existing communities in the area of the proposal, particularly if a fly-in, fly-out workforce is proposed;
- impacts on local residents' values and aspirations; and
- in regard to affected indigenous and non-indigenous communities respectively, particular attention should be paid to the effects on:
  - the ability of both indigenous and non-indigenous people, to live in accordance with their own values and priorities;
  - the use of and access to culturally important areas and landscapes;
  - the access to existing human and commercial services and housing;
  - the ability to participate in regional and local employment and training opportunities; and
  - the proposal workforce and their families.

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

The potential environmental harm on the amenity of adjacent areas used for cropping, grazing, forestry, recreation, industry, education, aesthetics, or scientific or residential purposes should be discussed. The implications of the proposal for future developments in the local area including constraints on surrounding land uses should be described.

The educational impacts of the proposed development, is to be analysed and described, particularly in regard to:

- primary, secondary and tertiary educational sectors;
- improved appreciation of conservation areas; and
- environmental education for the general public.

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

4.10 Health and safety

4.10.1 Description of environmental values

This section describes the existing community values for health and safety that may be affected by the proposal.

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

4.10.2 Potential impacts and mitigation measures

This section defines and describes the objectives and practical measures for protecting or enhancing health and safety community values, describes 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 proposal workforce of occupational health and safety risks and the impacts on the community in terms of health, safety, and quality of life from proposal operations and emissions.

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

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

Practical monitoring regimes should also be recommended in this section.

4.11 Economy

4.11.1 Description of environmental values

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

- existing housing market, particularly rental accommodation which may be available for the proposed workforce;
- economic viability (including economic base and economic activity, future economic opportunities, current local and regional economic trends, in particular drought and rural downturn etc); and
- historical descriptions of large-scale resource developments and their effects in the region.

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

4.11.2 Potential impacts and mitigation measures

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

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

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

At a level of detail appropriate to the scale of the proposal, the analysis is to consider:

- the significance of this proposal on the local and regional economic context;
- the long and short-term beneficial (eg. job creation) and adverse (eg. competition with local small business) impacts that are likely to result from the development;
- the potential, if any, for direct equity investment in the proposal by local businesses or communities;
- the cost to all levels of government of any additional infrastructure provision;
- implications for future development in the locality (including constraints on surrounding land uses and existing industry);
- the potential economic impact of any major hazard identified in section 4.13;
- the distributional effects of the proposal including proposals to mitigate any negative impact on disadvantaged groups;
- the value of lost opportunities or gained opportunities for other economic activities anticipated in the future; and
- impacts on local property values.

Consideration of the impacts of the proposal in relation to energy self-sufficiency, security of supply and balance of payments benefits may be discussed. Attention should be directed to the long and short-term effects of the proposal on the land-use of the surrounding area and existing industries, regional income and employment and the state economy.

4.12 Hazard and risk

4.12.1 Description of environmental values

This section describes the potential hazards and risk that may be associated with the proposal.

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

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

4.12.2 Potential impacts and mitigation measures

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

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

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

Details should be provided of:

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

The proponent should develop an integrated risk management plan for the whole of the life of the proposal including construction, operation and decommissioning phases. The plan should include a preliminary hazard analysis (PHA), conducted in accordance with appropriate guidelines for hazard analysis (eg HAZOP Guidelines, NSW Department of Urban Affairs and Planning (DUAP)). The assessment should outline the implications for and the impact on the surrounding land uses. The preliminary hazard analysis should incorporate:

- all relevant majors hazards both technological and natural;
- the possible frequency of potential hazards, accidents, spillages and abnormal events occurring;
- indication of cumulative risk levels to surrounding land uses;
- life of any identified hazards;
- a list of all hazardous substances to be used, stored, processed, produced or transported;
- the rate of usage;
- description of processes, type of the machinery and equipment used;
- potential wildlife hazards such as crocodiles, snakes, and disease vectors; and
- public liability of the State for private infrastructure and visitors on public land.

The plan should include the following components:

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

4.13 Cross-reference with the terms of reference

This section provides a cross reference of the findings of the relevant sections of the EIS, where the potential impacts and mitigation measures associated with the proposal are described, with the corresponding sections of the TOR.

5 Environmental management plan

The environmental management plan (EM Plan) should be developed from the mitigation measures detailed in part 4 of the EIS. Its purpose is to set out the proponents' commitments to environmental management. That is, how environmental values will be protected and enhanced.

The EM Plan is an integral part of the EIS, but should be capable of being read as a stand-alone document without reference to other parts of the EIS. The general contents of the EM Plan should comprise:

- the proponents' commitments to acceptable levels of environmental performance, including environmental objectives, i.e. levels of expected environmental harm, performance standards and associated measurable indicators, performance monitoring and reporting; and
- control strategies to implement the commitments.

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

For further information, see the EPA guideline **"Preparing environmental management plans"**.

6 References

All references consulted should be presented in the EIS in a recognised format. Example references are in Attachment 1.

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. The standard criteria

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

A3. Technical Data

Technical data used to support EIS analysis and support EIS outcomes should be provided in suitable detail and format.

A4. Consultation Report

The summary Consultation Report appendix for an EIS under the EP Act should commence by including the details of affected and interested persons, and the statement of planned consultation with those persons, originally provided with the draft terms of reference. It should describe how 'interested' and 'affected persons,' and any 'affected parties' as defined in the EPBC Act, were identified.

A further list should be provided that includes the Commonwealth, state and local government agencies consulted, and the individuals and groups of stakeholders consulted.

The Consultation Report appendix 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.

A5. Specialist studies

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

- geology;
- soil survey and land suitability studies;
- waterway hydrology;
- groundwater;
- flora and fauna studies;
- economic studies, CBA; and
- hazard and risk studies.