

## Terms of Reference for the proposed Dawson South Stage 2 Coal Project

<b>PREAMBLE</b> .....	<b>3</b>
The project.....	3
Aims of the study.....	3
The environmental impact assessment process.....	4
Summary role of the Environmental Protection Agency.....	4
<b>CONTENT OF THE ENVIRONMENTAL IMPACT STATEMENT</b> .....	<b>4</b>
<b>1.0 EXECUTIVE SUMMARY</b> .....	<b>4</b>
1.1 Glossary of Terms .....	5
<b>2.0 INTRODUCTION</b> .....	<b>5</b>
2.1 Project Proponent .....	5
2.2 Project Description.....	5
2.3 Project Objectives and Scope.....	5
2.4 The Environmental Impact Assessment (EIA) Process.....	5
2.4.1 Methodology of the EIS .....	5
2.4.2 Objectives of the EIS.....	6
2.4.3 Submissions .....	6
2.5 Public Consultation Process.....	6
2.6 Project Approvals.....	6
2.6.1 Relevant Legislation and Policy Requirements .....	6
2.6.2 Planning Processes and Standards .....	6
<b>3.0 PROJECT NEED AND ALTERNATIVES</b> .....	<b>7</b>
3.1 Project Justification .....	7
3.2 Alternatives to the Project.....	7
<b>4.0 DESCRIPTION OF THE PROJECT</b> .....	<b>7</b>
4.1 Location.....	7
4.1.1 Regional Context.....	7
4.1.2 Local Context .....	7
4.1.3 Location of Surface Area Application .....	8
4.2 Construction .....	8
4.3 Operations.....	8
4.3.1 Location and Tenure .....	8
4.3.2 Operational issues .....	8
4.4 Product Handling.....	9
4.5 Infrastructure Requirements .....	9
4.5.1 Transport - Road/Rail/Ship .....	9
4.5.2 Energy.....	10
4.5.3 Water Supply and Storage .....	10
4.5.4 Stormwater Drainage .....	11
4.5.5 Sewerage .....	11
4.5.6 Telecommunications .....	11
4.5.7 Accommodation and Other Infrastructure.....	11
4.6 Waste Management .....	11
4.6.1 Character and Quantities of Waste Materials.....	11
4.6.1.1 Air Emissions.....	12
4.6.1.2 Solid Waste Disposal .....	12
4.6.1.3 Wastewater .....	12
4.7 Financial feasibility .....	12
4.8 Rehabilitation and Decommissioning .....	13

<b>5.0 ENVIRONMENTAL VALUES AND MANAGEMENT OF IMPACTS .....</b>	<b>13</b>
<b>5.1 Land .....</b>	<b>14</b>
5.1.1 Description of Environmental Values .....	14
5.1.1.1 Topography/Geomorphology .....	15
5.1.1.2 General Geology .....	15
5.1.1.3 Coal Resources .....	15
5.1.1.4 Resource Utilisation .....	15
5.1.1.5 Soils .....	16
5.1.1.6 Land Use .....	16
5.1.1.7 Sensitive Environmental Areas .....	16
5.1.1.8 Scenic Values .....	17
5.1.1.9 Lighting .....	17
5.1.1.10 Landscape character .....	17
5.1.1.11 Visual amenity .....	17
5.1.2 Potential Impacts and Mitigation Measures .....	18
5.1.2.1 Land Use Suitability .....	18
5.1.2.2 Land Disturbance .....	18
5.1.2.3 Land Contamination .....	19
5.1.2.4 Soil Erosion .....	19
5.1.2.5 Scenic Values .....	20
5.1.2.6 Lighting .....	20
5.1.2.7 Landscape Character .....	20
5.1.2.8 Visual Amenity .....	20
5.1.2.9 Rehabilitation and Decommissioning .....	20
<b>5.2 Climate .....</b>	<b>21</b>
<b>5.3 Water Resources .....</b>	<b>21</b>
5.3.1 Description of Environmental Values .....	21
5.3.1.1 Surface Waterways .....	21
5.3.1.2 Groundwater .....	22
5.3.2 Potential Impacts and Mitigation Measures .....	23
5.3.2.1 Surface Water and Water Courses .....	23
5.3.2.2 Groundwater .....	24
<b>5.4 Air .....</b>	<b>24</b>
5.4.1 Description of Environmental Values .....	24
5.4.2 Potential Impacts and Mitigation Measures .....	25
5.4.3 Greenhouse Gas Abatement .....	26
<b>5.5 Waste .....</b>	<b>27</b>
5.5.1 Description of Environmental Values .....	27
5.5.2 Potential Impacts and Mitigation Measures .....	27
<b>5.6 Noise and Vibration .....</b>	<b>28</b>
5.6.1 Description of Environmental Values .....	28
5.6.2 Potential Impacts and Mitigation Measures .....	28
<b>5.7 Nature Conservation .....</b>	<b>28</b>
5.7.1 Description of Environmental Values .....	28
5.7.1.1 Terrestrial Flora .....	29
5.7.1.2 Terrestrial Fauna .....	30
5.7.1.3 Aquatic Biology .....	31
5.7.2 Potential Impacts and Mitigation Measures .....	31
<b>5.8 Cultural Heritage .....</b>	<b>32</b>
5.8.1 Description of Environmental Values .....	32
5.8.2 Potential Impacts and Mitigation Measures .....	33
<b>5.9 Social .....</b>	<b>34</b>
5.9.1 Description of Environmental Values .....	34
5.9.2 Potential Impacts and Mitigation Measures .....	34
<b>5.10 Health and Safety .....</b>	<b>36</b>
5.10.1 Description of Environmental Values .....	36
5.10.2 Potential Impacts and Mitigation Measures .....	36
<b>5.11 Transport .....</b>	<b>36</b>
5.11.1 Description of Environmental Values .....	36
5.11.2 Potential Impacts and Mitigation Measures .....	36
<b>5.12 Economy .....</b>	<b>37</b>
5.12.1 Description of Environmental Values .....	37

5.12.2	Potential Impacts and Mitigation Measures.....	38
<b>5.13</b>	<b>Hazard and Risk.....</b>	<b>39</b>
5.13.1	Description of Environmental Values .....	39
5.13.2	Potential Impacts and Mitigation Measures.....	39
<b>6.0</b>	<b>ENVIRONMENTAL MANAGEMENT OVERVIEW STRATEGY.....</b>	<b>40</b>
<b>7.0</b>	<b>REFERENCES .....</b>	<b>40</b>
<b>8.0</b>	<b>RECOMMENDED APPENDICES.....</b>	<b>40</b>
8.1	Final Terms of Reference for this EIS .....	40
8.2	Statutory Approvals .....	41
8.3	The Standard Criteria .....	41
8.4	Research .....	41
8.5	Consultation Report.....	41
8.6	Interested and Affected Persons .....	41
8.7	Study Team .....	41
8.8	Specialist Studies.....	41
<b>9.0</b>	<b>APPROVED BY .....</b>	<b>42</b>

## PREAMBLE

### The project

Anglo Coal Australia Pty Ltd is the proponent for a new coal mine project titled “Dawson South Stage 2 Coal Project” which is to be located 10km northwest of the Theodore township and proceed in a southerly direction, adjacent to the Dawson River on Mining Lease 5657. The coal deposit is within Central Queensland’s Bowen Basin and is in the northern part of the Theodore Coalfield, a large thermal coal resource extending over a strike length of more than 50km (25km north and 25km south of the town of Theodore) adjacent to the Dawson River.

The mine objective is to produce an export thermal coal over a life-of-mine of approximately 15 years with production of up to 6Mtpa ROM coal envisaged. The mine infrastructure and facilities are to be established in conjunction with the infrastructure on the Theodore North project. Mining operations will commence on the proposed Dawson South Stage 2 area in line with the normal progress of mining in a southerly direction from the Theodore North area.

The project site is located in Central Queensland 10km northwest of Theodore, which is a small town approximately 160km southwest of Gladstone and 50km south of Banana. The area is an established mining, grazing and farming region and is wholly within the Banana Shire.

The Environmental Protection Agency (EPA) will be managing the Environmental Impact Assessment (EIA) process under Chapter 3 of the *Environmental Protection Act 1994* (EP Act).

### Aims of the study

The objective of the EIA process is to ensure that all impacts, whether direct or indirect, and particularly environmental, social, and economic impacts are fully examined and addressed. Consistent with this objective, the EIA report (termed Environmental Impact Statement, EIS) should be a self-contained and comprehensive document, which provides:

- for interested bodies and persons, a basis for understanding the proposal, alternatives and preferred solutions, the existing environmental values which it would affect, both on and off the site, and the impacts that may occur and the measures to be taken to mitigate all adverse impacts;
- for government agencies and referral bodies, a framework for assessing the impacts of the project and associated development in view of legislative and policy provisions; and
- for the proponents, a definitive statement of measures or actions to be undertaken to mitigate any adverse impacts during and following the implementation of the proposal. The recommended means of achieving this objective is the inclusion in the EIS of a draft environmental management plan (EM Plan) that describes acceptable impacts and environmental management strategies to agreed performance criteria.

The key principle is that there should be sufficient detail presented in the EIS to enable readers to judge (assess) the impact of the proposal on environmental values. Readers are likely to include representatives of Commonwealth, State and local governments, special interest groups and the general public.

### **The environmental impact assessment process**

The processes for EIA typically includes:

- an application stage, including an Initial Advice Statement or project description that involves consideration of triggers or criteria for EIA and the process that is most suitable for the proposal;
- development of Terms of Reference (ToR) or information requirements for an EIS or similar report, including public review of the draft ToR document;
- development and implementation of a consultation plan by the proponent;
- preparation of a draft EIS and EM Plan by the proponent;
- public review of the draft EIS and EM Plan;
- response by the proponent to stakeholder views usually in the form of a supplementary or additional report;
- draft and/or final assessment report by government that contains recommendations for the proposal; and
- further development of the EM Plan and other statutory requirements by the proponent as required (should the proposal proceed).

While every attempt has been made to ensure that these ToR address all of the major issues associated with this proposal, they are not necessarily exhaustive and should not be interpreted as excluding from consideration matters deemed to be significant but not incorporated in them or matters (currently unforeseen) that emerge as important or significant from environmental studies, or otherwise, during the course of preparation of the EIS.

These ToR address the major issues associated with the proposal, but may be refined during the preparation of the EIS if other pertinent matters arise.

### **Summary role of the Environmental Protection Agency**

The EP Act provides for the following EPA roles:

- decision-making on appropriate EIA processes including the need for an EIS;
- reviewer of ToR prepared by a proponent and approval of final ToR for advertising;
- manager of the EIA process including seeking and coordinating stakeholder input;
- decision-making on EIA outcomes including the EIS assessment report;
- assessment of Environmental Management Plans and any Environmental Management Overview Strategy; and
- enforcement and auditing of any resulting environmental authorities.

## **CONTENT OF THE ENVIRONMENTAL IMPACT STATEMENT**

### **1.0 Executive Summary**

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

## 1.1 Glossary of Terms

A glossary of technical terms and acronyms should be provided.

## 2.0 Introduction

The function of the introduction is to explain why the EIS has been prepared and what it sets out to achieve. In particular, the introduction should address the level of detail of information required to meet the level of approval being sought (for example, whether the proponent is seeking only a preliminary approval through IDAS or a full approval with all permits). 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.

### 2.1 Project Proponent

Provide details of the project proponents, including details of any joint venture partners and details of the environmental performance of the adjacent Theodore North Project to date.

### 2.2 Project Description

A brief description of the key elements of the project should be provided and illustrated. Any major associated infrastructure requirements should also be summarised. Detailed descriptions of the project should follow in Section 4. A brief description of the monetary valuation of the project should be included in this section.

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

### 2.3 Project Objectives and Scope

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

Describe the current status of the project and outline the relationship of the project to other developments or actions that may relate whether or not they have been approved. The consequences of not proceeding with the project should also be discussed.

While this EIS is focussed on the Stage 2 part of mining activities on ML5657 (Theodore Project) it will provide the basis upon which a draft environmental authority for the whole of the mining lease surface area will be prepared. Descriptions of activities and impacts that are integrated with Stage 1 (Theodore North) such as the proposed continuous pit and successive diversion of run-off from the Malikoff Range from Stage 1 should be included so that the total impact and control measures can be understood.

### 2.4 The Environmental Impact Assessment (EIA) Process

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

#### 2.4.1 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 project. This section should also indicate how the consultation process (which will be described in detail in section 2.5) 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;
- there is awareness of the process to be followed; and
- that stakeholders are aware of any opportunities for input and participation.

## **2.4.2 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. The reader should be able to distinguish the EIS as the key environmental document providing advice to decision makers considering approvals for the project.

In brief, the EIS objectives should be to provide public information on the need for and likely effects of the project, to set out acceptable standards and levels of impacts (both beneficial and adverse) on environmental values, and demonstrate how environmental impacts can be managed through the protection and enhancement of the environmental values. 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 project's Environmental Management Overview Strategy (EMOS) should also be discussed, with particular reference to the EMOS' role in providing management measures that can be carried over into conditions that would attach to the environmental authority for the project.

## **2.4.3 Submissions**

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

## **2.5 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 project. Information about the consultation that has already taken place and the results of such consultation should be provided.

The submission of a list of affected persons and interested stakeholders as well as information on consultation with these persons is recommended (See section 8).

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

The public consultation process should identify broad issues of concern to local community and interest groups and should continue from project planning through commissioning, project operations and final rehabilitation and decommissioning. Refer to the DME technical guideline on Community Consultation (QDME 1995) and the EPA Guideline "**Issue Identification and Community Consultation**". Issues raised should be reported in the EIS along with response to those issues.

## **2.6 Project Approvals**

### **2.6.1 Relevant Legislation and Policy Requirements**

This section should explain the legislation and policies controlling the approvals process under current and un-enacted legislation for the life (including rehabilitation) of the proposal. Reference should be made to the *Queensland Environmental Protection Act 1994*, *Water Act 2000*, *Fisheries Act 1994*, *Integrated Planning Act 1997*, and other relevant Queensland laws. The Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* should also be discussed.

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

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

### **2.6.2 Planning Processes and Standards**

This section should discuss the project'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 to State, regional and

local plans for the area. The information provided under this section should separate areas within ML5657 from those areas external to ML5657. Reference to any planning scheme for Banana Shire should occur when detailing the planning controls of those areas external to ML5657.

### **3.0 Project need and alternatives**

#### **3.1 Project Justification**

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

#### **3.2 Alternatives to the Project**

This section should describe feasible alternatives, including conceptual, technological and locality alternatives to the project, and discussion of the consequences of not proceeding with the project. Alternatives, including different final land forms, 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.

There should be specific discussion of the difficulties experienced in Stage 1 of mining across watercourses parallel to the Malikoff Range and the implications of ongoing crossings of watercourses as mining proceeds south into Stage 2. Alternatives such as breaking the continuous pit to allow watercourses, roads and railways across the mine path should be evaluated and the cost compared with the total cost of relocation of services, the risk of flooding to mining operations and on-going diverting, holding and pumping surface water.

The interdependencies of the proposal components should be explained, particularly in regard to how each of any industrial developments, or various combinations of industrial developments, and any infrastructure requirements relate to the viability of the proposal. Should water supply, power, transport and/or storage infrastructure be included as an element of the proposal, this section should include a description of and rationale for such infrastructure.

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

This information is required to assess why the scope of the proposal is as it is and to ensure that the ESD principles and sustainable development aspects have been considered and incorporated during the scoping and planning of the proposal.

### **4.0 Description of the project**

The objective of this section is to describe the project through its lifetime of construction and operation and decommissioning. The extent and nature of the project's exploration, mineral development or mining operations must be described, including the interactions between the existing Stage 1 and the proposed Stage 2 of the mine.

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 the proposal.

#### **4.1 Location**

##### **4.1.1 Regional Context**

The regional and catchment context of the proposal should be described and illustrated on maps at suitable scales.

##### **4.1.2 Local Context**

The local context of the proposal should be described and illustrated on maps at suitable scales. Site access points to, from and within the project area should be clearly identified on the aforementioned maps. Real property descriptions of the project site should be provided.

#### **4.1.3 Location of Surface Area Application**

Provide a map(s) of options for the application for surface rights over the existing mining lease and show considerations and justification for including any land west of the Dawson River, on the flood plain or in the riparian corridor.

## **4.2 Construction**

The extent and nature of the project's 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 (construction) should be described and illustrated showing site boundaries, development sequencing, and timeframes. The estimated numbers of people to be employed in the project construction phase should also be provided with a brief description of where those people may be accommodated.

## **4.3 Operations**

This section should cover the extent, nature, timing for implementation, and duration of the project's operational phases. Areas to be discussed should include but not necessarily be limited to the following:

### **4.3.1 Location and Tenure**

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

- the location and boundaries of land tenures, in place or proposed, to which the project area is or will be subject,
- the location and boundaries of the project footprint, and
- the location of any proposed buffers surrounding the working areas.

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

### **4.3.2 Operational issues**

Concept and layout plans should be provided highlighting proposed buildings, structures, plant and equipment associated with the mining and 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. The location and nature of the processes to be used should be illustrated with maps and diagrams, and described in the text.

Specific details should also be provided on the following:

- the proposed mine life and mineral resource base;
- the mining type and methods to be used, including the major equipment to be used in the various components of the operation;
- the use of different techniques in areas of different topographic or geo-technical character;
- the proposed sequence and timing of mining of each seam within the Project area;
- the extent of excavations, location of overburden stockpiles and extent of wastes to be handled during the Project's operation or left after mining ceases;
- the proposed progressive backfilling of excavations and drill holes;
- the area disturbed at each major stage of the Project;
- a description of the quantities and characteristics of the products produced on an annual basis including any scheduled ramping up of production or staging of development. Indicative process flow-sheets should be

provided showing material balances for the processing plant, and the anticipated rates of inputs, along with similar data on products, wastes and recycle streams;

- the extent and nature of any proposed on-going exploration or geological/geo-technical evaluation within the Project area that may be required over the life of the Project;
- chemicals to be used; and
- the operational workforce employed in the Project together with the anticipated basis of employment (permanent or contract etc) in addition to the proposed workforce to be used during the construction phase.

#### **4.4 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. Include discussion of any environmental design features of these facilities including bunding of storage facilities, dust extraction devices etc.

#### **4.5 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 project area. The matters to be considered include (but not limited to) such infrastructure as roads, rail, bridges, jetties, ferries, 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).

##### **4.5.1 Transport - Road/Rail/Ship**

Describe arrangements for the transport of plant, equipment, products, wastes and personnel during both the construction, operational and decommissioning phases of the project. The description should address the use of existing facilities and all requirements for the construction, upgrading or relocation of any transport related infrastructure. Information should be provided on all transport options with adequate justification provided on the preferred option(s).

Provide details of proposed use of rail and rail facilities for transport of materials, products or wastes to or from the project site. Frequency and magnitude of rail shipments, their routes and ultimate source or destination should be described. Details should also be provided on the following:

- an analysis of the option of railing coal from the proposed mine location to port in contrast to hauling the coal 50km from the mine to the wash plant and then to the port;
- use of the existing rail system or track in close proximity to existing track (including the proposed Dawson Valley Railway);
- the capacity of the existing loadout facility at Moura;
- any capital upgrade required to rail systems or infrastructure (eg. track, loading/unloading facilities);
- number and types of any new track;
- layouts for new loading and unloading facilities;
- number and types of trains operating daily on each corridor to be used;
- transport of dangerous goods;
- proposed arrangements for the acquisition and ownership of land needed for the rail corridor, loading/unloading facilities;
- staging and timing for construction and operation of new rail infrastructure;
- rail infrastructure management and ownership;
- a description of the new rail infrastructure under the local planning scheme;
- impacts on the current rail activities within the region;

- alternative alignments of proposed rail infrastructure; and

This information should be supplied in concert with/to any Environmental Investigation and Risk Management Report (EIRMR) of potential impacts associated with rail traffic, as required by QR.

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

- a detailed description and map(s) at suitable scale of the proposed haul route should be provided;
- the volume, composition (types and quantities), origin and destination of goods to be moved including construction materials, plant, raw materials, wastes, hazardous materials, finished products;
- the volume of traffic generated by workforce personnel, visitors and service vehicles;
- method of movement (including vehicle types and number of vehicles likely to be used);
- anticipated times at which movements may occur;
- details of vehicle traffic and transport of heavy and oversize indivisible loads (including types and composition);
- transport of dangerous goods;
- the proposed transport routes and any new access to State-controlled roads if required; and
- need for increased road maintenance and upgrading.

The proposal should also consider public transport requirements and links to or development of pedestrian and cycle networks where relevant. These modes of transport:

- reduce dependency on cars (more transport choices)
- reduce emissions and therefore improve air quality; and
- provide opportunities for recreation and contribute to social and community wellbeing.

Describe agreements on the proposed closure or impacts upon any public reserves, roads or railways in Stages 1 & 2. The potential impacts on this project of the proposed rail link between the Wandoan and Gladstone that is expected to pass through Theodore should also be described.

#### **4.5.2 Energy**

The EIS should describe all energy requirements, including electricity, natural gas, and/or solid and liquid fuel requirements for the construction, operation and decommissioning 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.

#### **4.5.3 Water Supply and Storage**

The EIS should provide information on water usage by the project, including the quality and quantity of all water supplied to the site. 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) including any sampling regime used to ensure potable water quality is maintained (potable water should comply with the National Health and Medical Research Council (NHMRC) guidelines). Consideration should be given to the *Water Allocation and Management Plan (Fitzroy Basin) 1999* and the *Fitzroy Basin draft Resource Operations Plan 2002* in relation to any proposals to utilise sources of surface water and the disposal of excess groundwater into watercourses.

Estimated rates of supply from each source (average and maximum rates) should be given. Any proposed water conservation and management measures should be described.

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

#### **4.5.4 Stormwater Drainage**

A description should be provided of the proposed stormwater drainage system and the proposed disposal arrangements, including any off-site impacts for construction and operation through to the finalisation of decommissioning.

#### **4.5.5 Sewerage**

The EIS should provide volume estimates of industrial and domestic effluent that will be produced and the proposed method of disposal. This should include the physical and chemical characteristics of such effluent. If discharging into an existing sewerage system, an assessment of the capacity of the existing system to accept the effluent should be provided. If not discharging into an existing sewerage system, details of proposed sewerage treatment and disposal facilities, particularly when associated with camps or residential developments should be provided.

#### **4.5.6 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.

#### **4.5.7 Accommodation and Other Infrastructure**

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

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

### **4.6 Waste Management**

#### **4.6.1 Character and Quantities of Waste Materials**

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

- the tonnage of products processed;
- the amount of resulting process wastes; and
- the volume and tonnage of any by-products.

Schematic diagrams, which may be simplified versions of those provided in section 4.3, should be provided for each distinct stage of the project (e.g. construction/site preparation, 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. Information should also be provided on the variability, composition and generation rates of all waste generated at the site and processing plant.

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

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

#### 4.6.1.1 Air Emissions

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

The methods to be employed in the mitigation of impacts from air emissions should be described in section 5.4.

#### 4.6.1.2 Solid Waste Disposal

The proposed location, site suitability, dimensions and volume of any landfill, including its method of construction, should be shown. Where wastes are to be transported to another location, an assessment of the capacity of that location(s) to accept such wastes for the life of the mine.

#### 4.6.1.3 Wastewater

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

The EIS may need to consider the following effects:

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

## 4.7 Financial feasibility

This section shall detail the financial feasibility of the proposal, including details of costs of development and ongoing maintenance, operational and decommissioning costs; the capacity of the proponents to satisfactorily develop the project; the costs of decommissioning the project and rehabilitation of the site; fare pricing structures and cash-flow projections; estimated losses in income due to climatic conditions and both natural and human induced hazards; applicable commercial and government fees; financial assurances and joint venture arrangements; and Foreign Investment Review Board issues.

For projects with large energy inputs a sensitivity analysis should be conducted on the possible imposition of a financial cost on such emissions.

This part of the EIS may be provided in a separate confidential document.

#### 4.8 Rehabilitation and Decommissioning

This section should present the strategies and methods for progressive and final rehabilitation of the environment disturbed by the proposal. Strategies and methods presented for progressive and final rehabilitation of disturbed areas should demonstrate (as a minimum) compliance with the objectives of the *1991 Environmental Management Policy for Mining in Queensland* (or updates as they become available), specifically:

- 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 which is self-sustaining, or to a condition where the maintenance requirements are consistent with an agreed post mining land use, and
- Surface and ground waters that leave the lease should not be degraded to a significant extent. Current and future water quality should be maintained at levels that are acceptable for users downstream of the site.

The final topography of any excavations, waste areas and dam sites should be shown. The land use suitability of the various land disturbance types should be described.

The means of decommissioning the project, 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. Final rehabilitation of the site should be discussed in terms of ongoing land use suitability, management of any residual contaminated land and any other land management issues as recommended in the *1995 Technical Guidelines for the Environmental Management of Mining in Queensland* (as a minimum).

An assessment of how the proposed decommissioning and rehabilitation works relate to national and international trends is to be included.

#### 5.0 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 by the *Environmental Protection Act 1994* and environmental protection policies. 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. Include analysis of any cumulative impacts on environmental values caused by the proposal;
- 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 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 project:

- Environmental values affected: describe the existing environmental values of the area to be affected including values and areas that may be affected by any cumulative impacts (refer to any background studies in Appendices - note such studies may be required over several seasons).
- 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 of relevant State planning policies, environmental protection policies, national environmental protection measures and integrated catchment management plans should be addressed.

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

Consultative arrangements with other industries in the project area to undertake cooperative monitoring and/or management of environmental parameters are recommended.

- Environmental protection objectives: describe qualitatively and quantitatively the proposed objectives for enhancing or protecting each environmental value. Include proposed indicators to be monitored to demonstrate the extent of achievement of the objective as well as the numerical standard that defines the achievement of the objective (this standard must be auditable). 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 (e.g. intensity of field work sampling), how the reliability of the information was tested, and what uncertainties (if any) are in the information.

It is recommended that the final ToR and the EIS follow the heading structure shown below. The mitigation measures, monitoring programs, etc., identified in this section of the EIS should be used to develop the environmental monitoring program for the project (see section 6).

## 5.1 Land

### 5.1.1 Description of Environmental Values

This section describes the existing environment values of the land area that may be affected by the proposal (both on and off site) in the context of environmental values as defined by the *Environmental Protection Act*

1994 and Environmental Protection Policies. It should also define and describe the objectives and practical measures for protecting or enhancing 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.

#### 5.1.1.1 Topography/Geomorphology

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

#### 5.1.1.2 General Geology

The EIS should provide a description, map and a series of cross-sections of the geology of the project area (including out-of-mine areas that will be impacted by the mine and associated infrastructure), 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.

#### 5.1.1.3 Coal Resources

The EIS should provide a summary of the results of studies and surveys undertaken to identify and delineate the coal resources within the Project area (including out-of-mine areas that will be impacted by the mine and associated infrastructure).

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

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

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

#### 5.1.1.4 Resource Utilisation

The EIS should analyse the effectiveness of the mining proposal in achieving the optimum utilisation of the mineral resources within the Theodore North and Dawson South Project areas and consider its impacts on other resources. It should demonstrate that the mining proposal will 'best develop' the mineral resources within the Project area, minimise resource wastage and avoid any unnecessary sterilisation of these or any other of the

State's coal, mineral, and petroleum (including gas and coal seam methane) resources that may be impacted upon or sterilised by the mining activities or related infrastructure.

#### 5.1.1.5 Soils

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

Soil profiles should be mapped and described according to the Australian Soil and Land Survey Field Handbook (McDonald *et al*, 1990) and Australian Soil Classification (Isbell, 1996). An appraisal of the depth and quality of useable soil should be undertaken. Information on the extent of Good Quality Agricultural Land should be presented in accordance with the Planning Guidelines – *The Identification of Good Quality Agricultural Land* that support State Planning Policy 1/92.

The requirement for soils mapping in terms of area and mapping scale should at least follow the *QDME Technical Guidelines for Environmental Management of Exploration and Mining in Queensland, 1995*, specifically Section 6.1 which is headed *Land Suitability Assessment Techniques*. These guidelines recommend that disturbed areas be mapped more intensively than non-disturbed areas and provide guidance on acceptable mapping scale and site intensity.

#### 5.1.1.6 Land Use

The EIS should provide a description of current land tenures and land uses, including native title issues, in the project 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 project area and surrounding land that could be affected by the development. The maps should identify areas of conservation value and aquatic 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 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.

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

#### 5.1.1.7 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, declared fish habitat areas, wilderness areas, Nature Refuges, aquatic reserves, 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, endangered and of concern regional ecosystems and scientific reserves (see section 5.7 for further guidance on sensitive areas).

To obtain copies of plans of declared fish habitat areas contact Queensland Fisheries Service of the QDPI at the call centre 13 25 23.

In addition, the Commonwealth's *Environment Protection and Biodiversity Conservation Act 1999* should be addressed and whether there are national environmentally significant matters that should be described.

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

#### 5.1.1.8 *Scenic Values*

The visual impact, in terms of the extent and significance of the changed skyline as viewed from places of residence, work, and recreation, from road, cycle and walkways, from the air and other known vantage points day and night, during all stages of the project as it relates to the surrounding landscape is to be analysed and discussed. The assessment is to address the local and broader visual impacts of the project structures and associated infrastructure, using appropriate simulation. Sketches, diagrams, computer imaging and photos are to be used where possible to portray the near views and far views of the completed structures and their surroundings from visually sensitive locations.

Special consideration is to be given to public roads, public thoroughfares, and places of residence or work, which are within the line-of-sight of the project.

#### 5.1.1.9 *Lighting*

An assessment of all potential impacts of lighting of the project, during all stages, is to be provided, with particular reference to:

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

#### 5.1.1.10 *Landscape character*

All impacts of the project on the visual quality and landscape character of the site and the surrounding area are to be considered on both the broad and local level. Particular reference is to be made to the following:

- impacts on existing land use that contribute to the character of the local area;
- the visual absorption capacity of the site - the ability to absorb the impact of the proposed development.

The EIS should detail the landscape values of the area.

#### 5.1.1.11 *Visual amenity*

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

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

- identification of elements within the proposal and surrounding area that contribute to their image of the town/city as discussed in the any local government strategic plan - city image and townscape objectives and associated maps;
- 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 project site and immediate surrounding areas, waterways, and other features contributing to the visual quality of the area and the project site;
- character of the local and surrounding areas including character of built form (scale, form, materials and colours) and vegetation (natural and cultural vegetation) directional signage and land use;

- identification of the areas of the proposal that have the capacity to absorb land use changes without detriment to the existing visual quality and landscape character; and
- the value of existing vegetation as a visual screen.

### 5.1.2 Potential Impacts and Mitigation Measures

This section defines and describes the objectives and practical measures for protecting or enhancing 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.

#### 5.1.2.1 Land Use Suitability

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

If the project site 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 Guidelines "*The Identification of Good Quality Agricultural Land* that support State Planning Policy 1/92.

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

Post-mine land use options should be detailed in accordance with the objectives of the *1991 Environmental Management Policy for Mining in Queensland* (as a minimum and as outlined above) and based on a post-mine land suitability assessment. The land suitability assessment should follow *QDME Technical Guidelines for Environmental Management of Exploration and Mining in Queensland, 1995*. An assessment of "post-mine land capability" is not necessary as this is superseded by land suitability assessment techniques."

#### 5.1.2.2 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.

Project plans for the reinstatement and management of creeks both during and after the completion of the proposal should be included where it is proposed to divert creeks during construction or operations.

Where dams, 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. Documents to be considered in relation to stream diversions should include:

- *ACARP (May 2000) Final Report Maintenance of Geomorphic Processes in Bowen Basin River Diversions C8030*, and
- *ACARP (January 2001) Final Report Monitoring Geomorphic Processes in Bowen Basin River Diversions C9068*.

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 and should also outline how the utilisation of soil suitable for rehabilitation purposes will be maximised, as areas of Good Quality Agricultural Land are likely to be disturbed by mining. The minimisation of topsoil storage

times (to reduce fertility degradation) should also be addressed. Erosion and sediment control should be described, particularly in relation to the management of sodic and saline overburden material.

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

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

#### 5.1.2.3 Land Contamination

The EIS should describe the possible contamination of land from aspects of the proposals including waste, reject product, and spills at chemical and fuel storage areas, and acid generation and saline impacts from mining activities.

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 on the land, processing project site and product storage areas after proposal completion.

A Preliminary Site Investigation (PSI) of the site consistent with the EPA's "Draft Guidelines for the Assessment and Management of Contaminated Land in Queensland" (Refer to References section – Queensland EPA, 1998) should be undertaken to determine background contamination levels. The results of the PSI should be summarised in the EIS and provided in detail in an appendix.

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

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

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

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

#### 5.1.2.4 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 project site, including buildings and any off-site infrastructure;
- 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.

#### 5.1.2.5 *Scenic Values*

List all management options to be implemented and how these will mitigate or avoid the identified impacts.

#### 5.1.2.6 *Lighting*

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

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

#### 5.1.2.7 *Landscape Character*

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

- impacts on existing land use that contribute to the character of the local area;
- potential impacts to scenic amenity of any conservation area (e.g. national park); and
- the visual absorption capacity of the site - its ability to absorb the impact of the proposed development.

#### 5.1.2.8 *Visual Amenity*

An outline of the resulting visual quality/landscape character of the project site and the surrounding area and its prominence including local, regional, statewide, national and international significance. Information in the form of maps, sections, elevations and photographs is to be utilised. Detail the impact on visual amenity and the intended proposal design to achieve the visual character specified.

#### 5.1.2.9 *Rehabilitation and Decommissioning*

The strategies and methods for progressive and final rehabilitation of the environment disturbed by the proposal and related activities should be described in the context of the expected final landform for nominated final land uses. The final topography of any excavations, overburden dumps, and voids should be described and shown conceptually on plan form.

In cases where the proposed final land forms differ from national and international trends, justification should be provided for such divergence.

The means of decommissioning the project, in terms of removal of plant, equipment, structures, and buildings should be described. The methods proposed for the stabilisation of the affected areas should be given.

A rehabilitation strategy should be developed with a view to minimising the amount of land disturbed at any one time. The strategic approach to progressive and final rehabilitation should be described. The rehabilitation methods to be used for the project, including backfilling, covering, re-contouring, topsoil handling and revegetation, should be described in detail. Consideration should be given to the use of threatened plant species (where possible) during revegetation with the goal of achieving a nil loss of conservation value. The techniques to be employed to dispose of overburden, especially any potentially acid-forming spoil or waste and the methods employed to rehabilitate those areas should be described. Discuss how settling or subsidence of rehabilitated areas may affect the use of the land in its agreed post mine form.

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

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.

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

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

## 5.2 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 (e.g. temperature inversions) that may affect air quality within the environs of the proposal. Extremes of climate (droughts, floods, cyclones, etc) should also be discussed with particular reference to water management at the project 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 5.1. The impacts of severe climatic events on water qualities (eg. due to the overflow of process or sedimentation dams) should be addressed in section 5.3. The impacts of winds and temperature inversions on air quality should be addressed in Section 5.4.

## 5.3 Water Resources

### 5.3.1 Description of Environmental Values

This section describes the existing environment for water resources, which may be affected by the proposal (both on and off site), in the context of environmental values as defined by the *Environmental Protection Act 1994* and Environmental Protection Policies.

#### 5.3.1.1 Surface Waterways

A description should be given of the surface water courses, including waterways, lakes, dams, water holes and wetlands, and their quality and quantity in the area affected by the proposal with an outline of the significance of these waters to the river catchment system in which they occur. Details provided should include a description of existing surface drainage patterns, flows in major streams and wetlands. An evaluation of the pre-mine geomorphic condition of watercourses likely to be affected by disturbance such as stream diversions should be carried out. The results of this evaluation should form the basis for future monitoring of stream geomorphic condition and the physical integrity of affected watercourses within the Project site. 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.

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 in the Dawson River at Theodore and Woodleigh should be described, including seasonal variations or variations with flow where applicable. The flow patterns resulting from the controlled release of irrigation waters should also be described. 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 1997*;
- values and water qualities objectives (WQO) to protect those values identified by consultation with the Fitzroy Basin Association and associated stakeholder organisations such as The Dawson Catchment Coordination Association (DCCA);
- 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.

#### 5.3.1.2 Groundwater

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

The local groundwater system on the western slopes of the Malikoff Ranges should be described and outcropping strata likely to act as groundwater recharge zones mapped. The implications of locating mining activities such as diversions, clean water 'upper catchment' dams, out of pit waste dumps, actual pits – backfilled or otherwise on potential recharge zones should be described. In order to monitor such recharge (eg movement of saline or acidic waters), potential flow paths along strata and a groundwater monitoring strategy to detect any such effects should be proposed.

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 bores which would satisfactorily monitor groundwater resources at the mine site in neighbouring areas both before and after commencement of operations should be described and 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 1997*;

- sustainability, including both quality and quantity; and
- physical integrity, fluvial processes and morphology of groundwater resources.

### 5.3.2 Potential Impacts and Mitigation Measures

This section is to 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 1997*.

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 the integrity of the marine environment, and ultimately the Great Barrier Reef Marine Park and World Heritage Property by quantifying the mass load contributed from the mining lease;
- protection of the integrity and existing water quality (including salinity) of the Dawson River;
- protection of important local aquifers and protection of their waters, and
- maintenance of sufficient quantity and quality of surface waters to protect existing beneficial downstream uses of those waters (including maintenance of in-stream biota).

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

#### 5.3.2.1 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 water extraction, agricultural or other human water requirements and affected riparian area, wetland, estuary, and in-stream biological uses. Monitoring programs should also be designed to evaluate changes in the physical integrity and geomorphic processes associated with stream diversions.

In particular, 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 in-stream and off-stream habitats as a result of any temporary diversion/disturbance of existing water courses.

Consideration should be given to monitoring of the Dawson River water quality at points of outflow(s) and downstream allowing for mixing.

Potential impacts to the flow and the quality of surface waters from all phases of Project activities should be discussed, with particular reference to implications for current and potential downstream uses, including the requirements of any affected riparian area and in-stream biological uses in accordance with the *Environmental Protection (Water) Policy 1997*. The impacts of surface water flow on any existing water infrastructure should also be considered.

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. Monitoring results to date from Stage 1 should be discussed and along with projection of water qualities from Stage 2. The mass loading of contaminants leaving the project on an annual and lifetime basis should be estimated.

The diversion or taking of water from and the discharge of contaminated water to the Dawson River should be discussed in terms of:

- the Fitzroy Basin Association natural resource management plan namely the Central Queensland Strategy for Sustainability II (CQSS II - currently draft);
- Fitzroy Resource Plan; and
- Fitzroy Resource Operational Plan (ROP).

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

In relation to water supply and usage, and wastewater disposal, the EIS should discuss anticipated flows of water to and from the project area. Where dams, weirs, voids or ponds are proposed (including any proposed water storages at Cement Hill), the EIS should investigate the effects of predictable climatic extremes (droughts, floods) upon the structural integrity of the containing walls, and the quality of water contained, and flows and quality of water discharged. The design of all water storage facilities should follow the technical guidelines on site water management. When creek diversions are proposed, management plans that minimise impacts to the system should include an objective of maintenance or replication of the existing geomorphic condition of local watercourses. Details of this approach should be demonstrated.

The need or otherwise for licensing of any dams (including wastewater dams, previously called referable dams) or creek diversions, under the *Water Act 2000* and *Environmental Protection Act 1994*, and the need or otherwise for approval to build Waterway Barrier Works under the *Fisheries Act 1994* including any requirements for a fishway, should be discussed. Water allocation and water sources should be established in consultation with Department of Natural Resources and Mining.

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

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

#### 5.3.2.2 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. Measures to mitigate any potential impacts on existing groundwater supplies including those in neighbouring parcels, should also be detailed.

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

## 5.4 Air

### 5.4.1 Description of Environmental Values

This section describes the existing air environment, which may be affected by the proposal (both on and off site) in the context of environmental values as defined by the *Environmental Protection Act 1994* and Environmental Protection Policies. The following topics may be addressed (note - the topics are not an exhaustive treatment of all possible air or impacts).

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, SO<sub>x</sub>, NO<sub>x</sub>, and any other major constituent including greenhouse gases of the air environment that may be affected by the proposal should be discussed.

Sufficient data on local meteorology and ambient levels of pollutants should be gathered to provide a baseline for later studies or for the modelling of air quality environmental harms within the air shed. Parameters should include air temperature, wind speed and direction, atmospheric stability, mixing depth and other parameters necessary for input to the models.

The EIS should describe the existing visual amenity of the areas affected by the proposal, addressing the values of the areas from both local and regional landscape perspectives. Describe the current sources of dust in Stage 1 including the dragline spoiling of dry friable overburden material. The occurrence of similar seams in Stage 2 and their predisposition to dust generation should be discussed. Maps indicating any areas of scenic significance should be provided. Describe the environmental values of the air shed for the affected area in terms of the *Environmental Protection (Air) Policy 1997*.

#### **5.4.2 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. Information should be submitted on the use of new technologies to reduce air emissions from the stack(s) or other emission sources.

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, and the emissions modelled using a recognised atmospheric dispersion model. The potential for interaction between the emissions from the processing plant, and 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 current draft national environmental protection measures (1997) for ambient air quality, the National Health Medical Research Council (NHMRC) national guidelines for control of emissions from stationary sources 1985, and the *Environmental Protection (Air) Policy 1997*.

Where appropriate, the predicted average ground level concentrations in nearby areas should be provided. These predictions should be made for both normal and expected maximum emission conditions and the worst case meteorological conditions should be identified and modelled where necessary. Ground level predictions should be made at any 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:

- Dust generation during truck transportation and its effects on local human populations and ecosystems.
- The human health risk associated with emissions from the facility of a hazardous or toxic nature should be assessed (i.e. those pollutants which are not covered by the National Environmental Protection Council (Ambient Air Quality) Measure or the *Environmental Protection (Air) Policy 1997*).
- The National Health and Medical Research Council 'National guidelines for control of emissions of air pollutants from new stationary sources' covers a limited list of generic industry sources. Therefore, in order to assess the extent to which the proposal complies with best practice environmental management, the emissions from the facility should be compared to best practice emissions from a conventional petroleum refining operation (or other equivalent process).
- Features of the proposal designed to suppress or minimise emissions, including dusts and odours, should be detailed.
- The proposed levels of emissions of dust, fumes and odours should include emissions during normal and upset operational conditions. Consideration should be given to the range of potential upset condition scenarios including the air emissions that may be generated as a result. Scenarios should consider sources of dust from light friable spoil and powdered coal; mechanisms such as blasting, pre-strip, dragline

operation and coal handling; and weather conditions including hot dry winds as occur in the region in October when preparing control strategies.

- Where there is no single atmospheric dispersion model that is able to handle the different atmospheric dispersion characteristics exhibited in the project area (i.e. strong convection, terrain features, temperature inversions and pollutant re-circulation), a combination of acceptable models will need to be applied.
- The limitations and accuracy of the applied atmospheric dispersion models should be discussed. The air quality modelling results should be discussed in light of the limitations and accuracy of the applied models.
- Air quality predictions should be compared to the relevant goals in the National Environmental Protection Council (Ambient Air Quality) Measure and the *Environmental Protection (Air) Policy 1997* goals.
- Air shed management and the contribution of the proposal to air shed capacity in view of existing and future users of the air shed for assimilation and dispersion of emissions.

#### **5.4.3 Greenhouse Gas Abatement**

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

- an inventory of proposed future annual emissions for each Greenhouse Gas and total emissions expressed in 'CO<sub>2</sub> equivalent' terms for each component of the proposal and for the combined total proposal;
- the intended measures such as pre-draining coal seam methane to avoid and minimise greenhouse emissions;
- an environmental analysis of alternate technologies, processes and equipment to allow assessment of the degree to which the selected options minimise emissions and other environmental harms, with a view to achieving best practice environmental management;
- estimated emissions from upstream and downstream activities associated with the proposal;
- methodologies by which estimates were made; and
- opportunities for offsetting greenhouse gas emissions, such as through forestry plantations, investing in renewable energy projects, purchase of renewable energy or support for relevant research.

This assessment should include sufficient detail to enable comparison of the Greenhouse Gas implications of the proposal with other energy sources particularly conventional oil production.

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

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

- a listing of specific actions and commitments taken to avoid and minimise emissions.
- consideration of alternatives to the release of greenhouse gases to the atmosphere.
- provision for regular greenhouse audits;
- a process for continuous review of new technologies to identify opportunities to reduce emissions and improve energy efficiency;
- benchmarking against other similar or comparable facilities to indicate whether the most efficient technologies are being adopted;
- consideration of opportunities for offsetting greenhouse gas emissions, such as through forestry plantations or support for relevant research; and

- consideration of any additional voluntary initiatives consistent with the strategies outlines in the National Greenhouse Strategy or proposals undertaken as a component of the Commonwealth Greenhouse Challenge program.

## 5.5 Waste

This section should complement other sections of part 5 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 EMOS.

### 5.5.1 Description of Environmental Values

This section describes the existing environment values that may be affected by the project's wastes in the context of environmental values as defined by the *Environmental Protection Act 1994* and applicable Environmental Protection Policies. Refer to each of the waste streams described in section 4.6 and provide references to environmental values described in other sections of part 5 of the EIS.

### 5.5.2 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; and
- waste minimisation techniques processes proposed.

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

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

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

## 5.6 Noise and Vibration

### 5.6.1 Description of Environmental Values

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

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 project area that may contribute to a background level of ground vibration (for example: existing mines, major roads, other mining activities, etc.). Detail the environmental values of noise for the affected area in terms of the *Environmental Protection (Noise) Policy 1997*. The specific issues raised in consultation, including feedback about blasting at Stage 1, should be documented along with the responses to address those concerns.

### 5.6.2 Potential Impacts and Mitigation Measures

This section defines and describes the objectives and practical measures for protecting or enhancing human health and environmental values from impacts by noise (including air blast over pressure) 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, including mapped noise contours from a suitable acoustic model, should be submitted on the proposed generation of noise. The potential environmental harm of noise (including air blast over pressure) and vibration at all potentially sensitive places, in particular, any place of work or residence should be quantified in terms of objectives, standards and indicators to be achieved. This should also include environmental harm on terrestrial and aquatic animals and avifauna particularly migratory species. Proposals for measures (including but not limited to buffers) to minimise or eliminate these effects including details of any screening, lining, enclosing or bunding should be provided. Specific details on low frequency noise should be included. 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, air blast over pressure or fly rock on or adjacent to the site with particular attention given to places of work or residence, recreation, worship and general amenity. The magnitude, duration and frequency of any vibration and air blast over pressure should be discussed. Measures to prevent or minimise environmental harm, including nuisance, should be discussed.

The potential benefits and impacts of alternative blasting methods that may be used (eg: cast blasting) should be described along with the measures available for controlling aspects that lead to air blast exceedences. Models available for predicting the impacts of blasts should be overviewed and a preferred model discussed. Vibration and air blast over pressure monitoring results from Stage I should be discussed. The methods to be used to record (eg Video) individual blasts should be described.

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

## 5.7 Nature Conservation

### 5.7.1 Description of Environmental Values

This section describes the existing environment values for nature conservation that may be affected by the proposal (both on and off site) in the context of environmental values as defined by the *Environmental*

*Protection Act 1994* and Environmental Protection Policies, *Vegetation Management Act 1999* and the *Nature Conservation Act 1992*.

Describe the environmental values of nature conservation for the affected area in terms of:

- integrity of ecological processes, including habitats of rare and threatened species;
- conservation of resources;
- biological diversity, including habitats of rare and threatened species (specific reference should be given to Regional Ecosystems [*Regional Ecosystem Mapping - Version 4 or any updates as they become available*] and the conservation status of each Regional Ecosystem (RE), identification of the REs to be cleared, area of each RE to be cleared and their conservation status);
- 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 zone, rainforest remnants, old growth indigenous forests, 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 (e.g. see the draft Regional Nature Conservation Strategy for Southeast Queensland 2001-2006).

The EIS should identify issues relevant to sensitive areas, or areas, which may have, low resilience to environmental change. Areas of special sensitivity include wetlands, wildlife breeding or roosting areas, any significant habitat or relevant bird flight paths for migratory species, bat roosting and breeding caves including existing structures such as adits and shafts, and habitat of threatened plants, animals and communities. 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 and the proximity of the area to the Great Barrier Reef World Heritage Property.

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 project 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.

The EPA should be consulted on the scope of any biological studies **before they are undertaken**.

#### 5.7.1.1 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 any riparian vegetation, and their value as habitat for fauna and conservation of specific rare floral and faunal assemblages or community types. The existence of rare or threatened species 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 project sites including new transport infrastructure 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 2<sup>nd</sup> edition and updated versions as they become available) and the EPA's web site listing 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 (e.g. 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 pest plant 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 10m by 50m;
- 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.

#### 5.7.1.2 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, fish, 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 pest 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.

### 5.7.1.3 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. The description of aquatic biota should include that within the Dawson River both upstream of where the river intersects the mining lease and downstream of these areas as well as any other surface water where it is planned to source water for the project. 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 (including migratory species that may be transient through these areas);
- aquatic plants;
- aquatic and benthic substrate; and
- habitat upstream and downstream of the project.

### 5.7.2 Potential Impacts and Mitigation Measures

This section defines and describes the 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 (marine and freshwater) environments should also 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.

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 the project including clearing, salvaging or removal of vegetation should be described, and the indirect effects on remaining vegetation should be discussed. Short-term and long-term effects should be considered with comment on whether the effects 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.

A strategy should be developed with a view to minimising the amount of remnant vegetation disturbed.

The potential environmental harm on flora and fauna of any alterations to the local surface and ground water environment within the proposed project area and in the Dawson River 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. Proposals to link revegetated areas with undisturbed regional ecosystems should be outlined, giving consideration to proposed road diversions. (It should be noted that DPI policy recommends a separation distance of 50m to freshwater waterways and wetlands.)

Weed control strategies aimed at containing existing weed species (e.g. parthenium and other declared plants) and ensuring no new declared plants are introduced to the area should be outlined with the view to developing and implementing a Pest Management Plan for the Project area. Pest animal management strategies should also be addressed. The EIS should propose strategies to ensure that the Project does not contribute to increased encroachment by any feral animal species. Reference should be made to the local government authorities Pest Management Plan when determining control strategies..

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 EPA 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*.

Details should be provided on the measures to be employed to avoid or mitigate damage occurring to "Of Concern, Endangered Regional Ecosystems", and riparian areas. The performance requirements of the State Policy for Vegetation Management on freehold land must be addressed.

## 5.8 Cultural Heritage

### 5.8.1 Description of Environmental Values

This section describes the existing cultural heritage values that may be affected by the proposal (both on and off site). 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 that describes indigenous and non-indigenous cultural heritage sites and places, and their values will be required. In accordance with the above legislation, such a study must be conducted by an appropriately qualified cultural heritage practitioner and must include the following:

- liaison with relevant indigenous community/communities concerning:
  - places of significance to that community (including archaeological sites, natural sites, 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;
- assessment of the significance of any cultural heritage sites/places and objects located;
- the impact of the proposed development on cultural heritage values;
- a report of work done which includes details of written or oral authority to enter, background research, relevant environmental data and methodology, as well as results of field surveys, significance assessment and recommendations, documented evidence of agreement with landholders / occupiers about the recommendations, all relevant signatures of the endorsed parties, details of the extent to which any endorsed party does not agree with the recording of the study's findings on Aboriginal Cultural Heritage Register, and details of endorsed parties who did not participate in the study; and
- a permit to conduct the research and survey will be required under the provisions of the *Aboriginal Cultural Heritage Act 2003*.

### **5.8.2 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 project should be managed under a cultural heritage management plan (CHMP) developed specifically for the project. The CHMP will provide a process for the management of cultural heritage places both identified and sub-surface at the project sites. It is usual practice for the CHMP to be based on information contained in archaeological 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/Torres Strait islander people associated with the development areas in protection and management of indigenous cultural heritage;
- processes for mitigation, management and protection of identified cultural heritage places and material in the project areas, including associated infrastructure developments, both during the construction and operational phases of the project;
- details of who will become the owner and who will have custody of any Aboriginal cultural heritage that is to be taken away as part of the plan;
- provisions for the management of the accidental discovery of cultural material, including burials;
- the monitoring of foundation excavations and other associated earthwork activities for possible sub-surface cultural material;
- cultural awareness training or programs for project staff; and
- a conflict resolution process.

The development of the CHMP should be negotiated with all stakeholder representatives, and where there is a role or responsibility for the relevant authority administering Indigenous cultural heritage legislation, it should be party to the discussions.

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

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

In the circumstances of a cultural heritage study and/or cultural heritage management plan not being completed prior to the submission of the EIS, a cultural heritage management agreement should be submitted. Such an agreement would need to be signed by all relevant Indigenous groups and include a commitment to conduct a cultural heritage study and develop a cultural heritage management plan including all the requirements set out in sections 4.8.1 and 4.8.2 above and meeting all requirements of the relevant Indigenous cultural heritage legislation.

## 5.9 Social

### 5.9.1 Description of Environmental Values

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

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

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

Describe the 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 5.10).

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 5.8 Cultural Heritage and Section 5.12 Economy.

### 5.9.2 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 project should consider the information gathered in the community consultation program and the analysis of the existing socio-economic environment, and describe the project's

impact, both beneficial and adverse, on the local community. The impacts of the project on local and regional residents, community services and recreational activities are to be analysed and discussed for all stages of the development. The nature and extent of the community consultation program are to be described and a summary of the results incorporated in the EIS.

The social impact assessment of the project is to be carried out in consultation with the Department of Families. 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 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 in Dysart and surrounding towns created by the project is to be discussed;
- details of any proposed/necessary expansion/construction of residential accommodation;
- comment should be made on how much service revenue and work from the project (e.g. provisioning, catering and site maintenance) would be likely to flow to existing communities in the area of the project;
- 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 new project workforce and their families.

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

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.

## 5.10 Health and Safety

### 5.10.1 Description of Environmental Values

This section describes the existing community values for health and safety that may be affected by the proposal, including but not limited to public and private health facilities.

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.

### 5.10.2 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 project workforce of occupational health and safety risks and the impacts on the community in terms of health, safety, and quality of life from project operations and emissions.

Details of any proposed on-site emergency response equipment, facilities, and personnel should be provided.

Details of medical, recreational, social and cultural activities and facilities to be made available to address public health issues should be detailed.

Practical monitoring regimes should also be recommended in this section.

## 5.11 Transport

### 5.11.1 Description of Environmental Values

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 (both on the mine site and any other locations that transport infrastructure is proposed) should be shown.

### 5.11.2 Potential Impacts and Mitigation Measures

The EIS should provide sufficient information to make an independent assessment of how the State-controlled and local government road networks will be affected.

Details should be provided of the impacts on environmental values of any new roads or road realignments. The EIS should include detailed analysis of probable impact of identified construction and operational traffic generated by the project with particular concern to impacts on road infrastructure, road users and road safety. Potential road impacts of the project should be assessed using the Main Roads' *Guidelines for Assessment of Road Impacts of Development Proposals* which may be accessed at [www.mainroads.qld.gov.au](http://www.mainroads.qld.gov.au). These impacts should include but will not be limited to road safety and transport efficiency, accelerated reduction in pavement life, impacts on intersections/accesses and road drainage, along with the potential need for increased road maintenance.

The EIS needs to identify impacts on the State-controlled and local government road networks and to indicate clearly the corrective measures necessary to address adverse road impacts and the costs involved. This will require the proponent to compare the traffic situation and road conditions with, and without, the project. Furthermore, any proposal to divert naturally occurring watercourses will need to include an assessment of potential impacts on drainage that may affect State-controlled roads.

Information about the impacts and proposed measures for dealing with those impacts should be prepared by the proponent in close consultation with the local District Office of the Department of Main Roads (Mackay).

Sufficient information should also be provided to enable an independent assessment of how the rail network (including infrastructure) will be affected.

The EIS should provide details of the impact on any current or proposed rail infrastructure. These details should be clearly delineated from those of the coal mine to enable a clear assessment of those activities off the mine site. Information on the proposed mitigation measures for existing and proposed rail infrastructure should include derailment/spill contingency and noise management plans. Reference should be made to the "Code of

Practice for Railway Noise Management” produced by QR 1999. Queensland Transport should be consulted in relation to the inclusion of any proposed rail infrastructure within QT headlease/QR sublease.

Details of the potential use of proposed rail infrastructure post mine life and by other rail uses should also be provided.

In both road and rail cases, the impact on stakeholders along the whole route should be detailed and how any impacts will be managed.

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.

The EIS should also address the potential impacts on privately owned or port authority operated ports and State-controlled, Commonwealth-controlled or privately owned airports.

## 5.12 Economy

### 5.12.1 Description of Environmental Values

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

The 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 project 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.

Projects may have major economic impacts on areas geographically remote from the actual site of the project. In defining the affected community for economic analysis purposes, the following should be considered:

- impacts on the communities from which raw materials and other inputs are sourced;
- impacts on communities providing ancillary services (such as port facilities); and
- impacts on communities by discharges to air or water.

Describe the economic conditions for the affected area in terms of the economic benefits and disbenefits to the affected communities.

An analysis of the economy of the impacted areas is to be undertaken, covering the following:

- economic viability – economic base, level of economic activity, level of economic diversification, future economic opportunities;
- types and numbers of businesses and new business formation rate;
- the savings rate and investment levels;
- the skills base of the affected population;
- relative economic disadvantage as measured by the socio-economic indices prepared by the Australian Bureau of Statistics or a similar metric;
- housing-related economic hardship (e.g. the proportion of the affected population spending more than 25% of disposable income on housing);
- income distribution;
- existing property and land values; and

- availability and prices of goods and services.

This section requires inclusion of an updated economic impact statement from that included in the proponent's initial advice statement. The economic impact statement is to contain a proper monetary valuation of the proposal (using currently recognised valuation techniques such as contingent valuation and bequest value). It is also to include the full parameters of the input-output model upon which the economic projections for the project are based.

The economic impact statement should include estimates of the opportunity cost of the project and the value of ecosystem services provided by natural or modified ecosystems to be disturbed or removed during development. (Reference: <http://www.ecosystemvaluation.org/index.html>).

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

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

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

The analysis is to include:

- the significance of this proposal on the local and regional economic context;
- the long and short-term beneficial (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 project 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 5.13;
- 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 project in relation to energy self-sufficiency, security of supply and balance of payments benefits may be discussed. Attention should be directed to the long and short-term effects of the project on the land-use of the surrounding area and existing industries, regional income and employment and the state economy. The scope of any studies should be referred to the government for input before undertaking the studies.

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

## 5.13 Hazard and Risk

### 5.13.1 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.

Reference should be made to State Planning Policy 1/03 – “*Mitigating the Adverse Impacts of Flood, Bushfire and Landslide*” as an appropriate guide to ensure the safety of the crew through the consideration of:

- adequate flood immunity levels for accommodation camps;
- safe evacuation routes, adequate warning times or safe refuge from flood waters for the office camps and construction/operational crew;
- the safe location of fuel storage areas from natural hazard prone areas; and
- adequate water supply for firefighting requirements during the construction and operational phases.

### 5.13.2 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 to be held on-site. This information should be presented by classes and should contain:

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

Details should be provided of:

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

The proponent should develop an integrated risk management plan for the whole of the life of the project including construction, operation and decommissioning phases. The plan should include a preliminary hazard analysis (PHA), conducted in accordance with appropriate guidelines for hazard analysis (e.g. Hazardous Industry Planning Advisory Paper (HIPAP) No 8 – “HAZOP Guidelines” NSW Department Urban Affairs and

Planning). The assessment should outline the implications for and the impact on the surrounding land uses. The preliminary hazard analysis should incorporate:

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

Consultation with the Department of Emergency Services on the preparation and contents of the plan is recommended. The plan should include the following components: operational hazard analysis, regular hazard audits, fire safety, emergency response plans, qualitative risk assessment, and construction safety. Where relevant, each of these components should be prepared in accordance with the relevant NSW DUAP Hazardous Industry Planning Advisory Paper (HIPAP).

## **6.0 Environmental Management Overview Strategy**

The Environmental Management Overview Strategy (EMOS) for a proposed mining Project is an integral part of the EIS. It should be developed from the preceding information in the EIS, but should be capable of being read as a stand-alone document without reference to other parts 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 general contents of the EMOS 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, including progressive and final rehabilitation, performance monitoring and reporting; and
- control strategies to implement the commitments.

Mining projects on mining leases require an EMOS with the application materials for the mining lease surface area. The EIS is also a relevant document for the application.

Through the EMOS, the EIS's commitments to environmental performance are used as regulatory controls through conditions to comply with those commitments. Therefore, the EMOS is a relevant document for project approvals, environmental authorities and permits. These documents will be publicly available. The draft EMOS should address Theodore Project Stages 1 and 2 so that a draft environmental authority (EA) for the integrated project can be prepared by the administering authority for public comment.

The EPA Guideline 8 "Preparation of an Environmental Management Overview Strategy" should be used to prepare the EMOS. A Plan of Operations for a period of up to five years will also need to be lodged prior to commencement of activities.

## **7.0 References**

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

## **8.0 Recommended appendices**

### **8.1 Final Terms of Reference for this EIS**

A copy of the final terms of reference 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 Terms of Reference at least should be bound with the

main body of the EIS for ease of cross-referencing. This section should also provide a cross reference of the findings of the relevant sections of the EIS, where the potential impacts and mitigation measures associated with the project are described, with the corresponding sections of the Terms of Reference.

## **8.2 Statutory Approvals**

A list of all the statutory approvals required by the project, cross-referenced with the legislation that the approvals are issued under and the relevant administering authority for those approvals should be presented.

## **8.3 The Standard Criteria**

A brief summary should be provided of the proposal's compatibility with the standard criteria, as defined in Schedule 3 of the *Environmental Protection Act 1994*, and any other matter prescribed by a regulation. Consideration should focus on The National Strategy for Ecologically Sustainable Development, published by the Commonwealth Government in December 1992 (available from the Australian Government Publishing Service). Each principle should be discussed and conclusions drawn as to how the proposal conforms. A life-of-project perspective should be shown.

## **8.4 Research**

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

## **8.5 Consultation Report**

A list of referral agencies should be provided in a summary consultation report, which should also list the Commonwealth, State and local government agencies consulted, and the individuals and groups of stakeholders consulted.

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

The EIS should describe how 'interested' and/or 'affected persons' (EP Act) and 'affected parties' (EPBC Act) were identified.

## **8.6 Interested and Affected Persons**

A list of affected persons and interested stakeholders as defined in the *Environment al Protection Act 1994* should be provided in a summary consultation report.

## **8.7 Study Team**

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

## **8.8 Specialist Studies**

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

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

**Disclaimer:**

While this document has been prepared with care it contains general information and does not profess to offer legal, professional or commercial advice. The Queensland Government accepts no liability for any external decisions or actions taken on the basis of this document. Persons external to the Environmental Protection Agency should satisfy themselves independently and by consulting their own professional advisors before embarking on any proposed course of action.

**9.0 Approved by**

**Signed by D Ellwood**

Signature

Dean Ellwood  
Director, Integrated Assessment Branch  
Environmental Operations  
Environmental Protection Agency

**5 August 2004**

Date

Enquiries:  
EIS Coordinator  
Development Assessment Unit  
Ph. (07) 3227 7678  
Fax. (07) 3227 7677