



GUIDELINE 11 - Terms of Reference and Preparation of an Environmental Impact Statement

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1 Introduction

The purpose of this guideline is to enhance Environmental Impact Assessment (EIA) outcomes and stakeholder participation in EIA processes by providing a clear and comprehensive guide on the development of terms of reference (ie the information requirements for EIA) and drafting of environmental impact statements. The intended audience is industry, Commonwealth, State and local government agencies, and community stakeholders.

2 Background

During the feasibility stage of an exploration, mineral development or mining project (ie. mining activity) there may be a need to prepare an Environmental Impact Statement (EIS) about the proposed development to support applications for project approvals, such as an environmental authority to conduct mining activities regulated through the Environmental Protection (EP) Act. The need for an EIS can be determined by the proponent or by the government {Environmental Protection Agency (EPA) or Minister for the Environment}. Criteria have been developed for deciding if an EIS is required (see EPA Guideline 4 “Deciding the Level of Impact Assessment for the Mining Industry”). The decision to require an EIS initiates a public environmental impact assessment (EIA) process.

Refer to Guideline 12 for a more detailed description of the EIA process involving an EIS.

This guideline provides advice on how to prepare terms of reference and Environmental Impact Statements (EIS) for the mining industry under the *Environmental Protection Act 1994* (EP Act). The guideline may also be used for other environmental impact assessment processes. It is not intended to establish mandatory requirements, but provides guidance on how to effectively meet EIA information requirements in ways that will facilitate government and stakeholder assessment.

In using this guideline it should be recognised that each proposal has specific features and issues that must be taken into account in the development of terms of reference and the EIS.

Comprehensive and thorough EIA assists in achieving outcomes consistent with the principles of ecologically sustainable development (ESD), in meeting environmental management responsibilities and encouraging community participation.

3 Objectives

The objectives of these guidelines are:

- To provide direction and information on impact assessment decision making by the EPA and other relevant agencies;
- To provide advice on EIA processes;
- To assist proponents and stakeholders in identifying their responsibilities and opportunities to participate in the impact assessment process and related regulatory outcomes.

4 Triggers for an EIA

The EP Act provides three levels of EIA for mining projects in accordance with the level of risk of serious of environmental harm. These are:

- standard applications - these projects have a low risk of serious environmental harm and meet a set of criteria for defining “standard projects”. They are determined by the ability to comply with standard environmental conditions in a code of environmental compliance;
- non-standard applications - these projects have medium risk of serious environmental harm and/or do not meet the criteria for “standard projects”; and
- non-standard applications with an EIS requirement - these projects have a high risk of environmental harm, and/or there is considerable uncertainty regarding potential environmental impacts, a high level of public interest, or State or national significance.

Only the latter case requires an EIS and the development of EIS terms of reference. The EIS requirement decision (see EP Act s164) must take into account the standard criteria (EP Act schedule 3) as well as the trigger criteria listed in Guideline 4 (“Deciding the Level of Impact Assessment for the Mining Industry”).

This guideline describes the likely information requirements for the assessment processes when terms of reference and a formal environmental impact statement are required. The guideline provides advice on how to provide the information in ways that are readily assessable and readily available, and also what generic information is likely to be required. Additional site specific information requirements are developed in each final terms of reference for particular mining proposals.

5 EIA Process and Role of the EPA

The EIA process is described in EPA Guideline 12 “The EIS Process for Non-Standard Mining Projects” while the EP Act (Chapter 3) details the legislative requirements of the EIA process. Requirements include the need for terms of reference (ToR), an EIS, and an EIS assessment report.

In respect of the development of ToR, the EPA undertakes the following roles:

- reviews draft ToR submitted by the proponent;
- places advertisements inviting comments on the draft ToR;
- receives comments on draft ToR and provides copies to the proponent;
- decides and publishes the final ToR.

In respect of the progress of the EIS, the EPA undertakes the following roles:

- determines if the submitted EIS meets requirements of the terms of reference;
- accepts all submissions on the draft EIS;
- prepares an EIS assessment report;
- reviews environmental management plan (EM Plan) and/or environmental management overview strategy (EMOS) documents prepared by the proponent with the EIS; and coordinates and facilitates input from other government agencies and stakeholders.

6 Preparing the Terms of Reference

The proponent of a mining activity is responsible for preparing draft ToR for an EIS. Generic Terms of Reference may be obtained from the EPA's web site (<http://www.env.qld.gov.au>). The generic ToR aim to provide assistance to proponents preparing draft Terms of Reference for an EIS about a proposed mining activity. The generic ToR may be altered by the proponent to suit the circumstances of the proposed mining activity. The EPA can provide advice to the proponent on the appropriate development of the project-specific draft ToR. The proponent's draft ToR will be released for public comment.

The ToR for an EIS for a proposed mining activity need to be developed and finalised with input from government agencies, any stakeholder advisory panel and public respondents. The EPA will assess all submissions on the draft ToR and will decide the final ToR. The EPA will then advise the proponent to undertake the necessary assessments, research and consultations to prepare an EIS, in accordance with the ToR. The EIS can then support an application for project approvals, in particular an environmental authority.

The content of the draft ToR should be targeted at the type or level of government acceptance or approval being sought; eg, an environmental authority, associated development permit or preliminary approval under the *Integrated Planning Act 1997*, and/or government acceptance with operational approvals to follow once further information is prepared as part of separate applications. Not all aspects of a proposal may be developed to the same level at the time the ToR are being developed, and therefore different levels or types of approvals may be sought in the one EIS for different components of the proposed project. To avoid confusion, the draft ToR should make clear what level of approval is sought for each component of a proposal.

6.1 Objectives of the Terms of Reference

The Chief Executive of the EPA is responsible for the administration of applications for environmental authorities required under the EP Act. Environmental management and baseline information are required to supplement such applications. The applicant (proponent) must provide detail demonstrating how the proposal will address the requirements of the EP Act and other relevant legislation administered by the EPA (eg *Nature Conservation Act 1992*, *Environmental Protection Policies for Air, Water, Noise and Waste* - see Table 1 in the generic ToR for a complete list).

Objectives of the Terms of Reference are:

- to identify the proponent(s) for the proposal;
- to identify and describe the appropriate EIA process;
- to describe the scope and content of the EIS;
- to highlight the information requirements necessary to satisfy the requirements of the relevant local, State and Commonwealth Acts, laws and policies;
- to coordinate and integrate these information requirements for effective and efficient assessment by government;
- to provide background information on the proposals to allow assessment of the level of involvement required by stakeholders and agencies; and
- to provide a basis for acceptance or otherwise of the subsequent EIS and therefore the proposal.

The ToR objective is to ensure that all potential impacts of the proposal on environmental values are investigated, including assessment of the impacts in relation to land, water, coastal processes, air, water, waste generated, noise, economy, social and community effects, hazard and risk, cultural heritage, and nature conservation. The alternatives for the proposal should be discussed and treated in sufficient detail so that the reasons for selection of the preferred options can be clearly identified.

The ToR should make clear that the impacts of a proposal must be addressed to the degree necessary to enable all relevant decision-makers and the general public to be adequately informed and for the forming of conclusions that can be independently assessed and audited. The nature and level of studies and investigations required for the EIS must be relative to the likely extent and gravity of impacts. Any

consultants used by the proponent should be required to contact/consult the Referral Agencies/Advisory Bodies, relevant individuals and groups as necessary to clarify the required nature and level of studies and investigations.

The ToR should allow the proponent to develop a comprehensive EIS that satisfies the requirements of the EP Act and where relevant the requirements of the Commonwealth's EP&BC Act. The abbreviation 'EIS' is used to satisfy the terms used by all relevant statutes.

The Commonwealth may have an interest in actions that have a significant impact on matters of national environmental significance under the *Environment Protection and Biodiversity Conservation Act 1999* (eg a World Heritage area or endangered species). The ToR for proposals declared controlled under the EPBC Act must ensure that impacts on matters of national environmental significance (NES) are considered to the satisfaction of Environment Australia and the Queensland EPA.. Proposals not declared controlled must still ensure that any impacts on matters of NES are considered to the satisfaction of the EPA.

6.2 Content of the Draft Terms of Reference

Section 41 of the EP Act requires the proponent to prepare draft ToR for review by the EPA. The draft ToR should describe:

- information (unless already provided in other documents such as an initial advice statement) as follows:
 - what the project will be;
 - where it will be;
 - who are the likely stakeholders;
 - who the referral bodies proposed by the applicant are and how it is proposed to consult them;
 - what the EIA process is intended to be - see Guideline 12 (the EIA process may be changed in response to submissions both to the ToR and the draft EIS and any other issue arising);
 - what level of government endorsement and approval is being sought;
 - appropriate information requirements for each element of the environment; and
 - recommended references to be consulted and taken into account.
 - how any submissions on the draft ToR are to be received and incorporated;
 - the role of the EIS in the overall EIA process (see previous section for explanation of the EIA process and different outcomes that are possible); and
 - a consultation plan.

The EPA will consult other Government agencies as necessary and liaise with the proponent on the draft ToR. The aim is to ensure that the published draft terms of reference are comprehensive and reflect the interests and requirements of all key agencies and stakeholders.

At this stage of the process, the proponent is expected to be in a good position to identify the potential environmental impacts of the proposal and likely issues of significance. The ToR should comprehensively set out how these issues are to be addressed in the EIS.

6.3 Public and Stakeholder Participation

There is no standard process for public and stakeholder participation. The appropriate referral agencies or bodies or advisory bodies or persons and how they should be consulted can vary widely with different proposals. The final decision on relevant stakeholders will be made by the EPA after considering the consultation plan provided by the proponent.

The EP Act stipulates certain actions that the proponent must undertake. These include:

- the proponent must identify and consult *affected* persons when developing the draft ToR (s38 and 41 EP Act);
- the proponent must also identify and consult *interested* persons when developing the draft ToR (s39 and 41 EP Act);
- the proponent must provide copies of the draft ToR to any person when requested (s65 EP Act);

To facilitate their consultation program, the proponent may employ various advertising methods such as public meetings, shopfronts, displays, newspaper and magazine articles, web page, and letter drops that encourage feedback and comment on the proposal and scope of studies. The proponent may also appoint a consultation panel consisting of local residents, business, and community organisations to assist in developing draft ToR and the EIS.

The EP Act also stipulates certain actions that the EPA must undertake. These include:

- the EPA must advertise the draft ToR to seek comments, and must forward copies of the notice to interested and/or affected persons (s43 EP Act). In addition, the EPA may seek advice from any person, and may advertise for that advice by public notice (s62 EP Act);
- the EPA must ensure that all environment authority application and EIA process documents (eg draft ToR, draft EIS, and any submissions made) are publicly available for viewing and copying through the EPA's register (s540 EP Act).

Public and stakeholder participation also extends to the right of appeal against decisions made by the EPA concerning the EIS as provided for in Sections 523 to 539 of the EP Act.

Reference should be made to Guideline 7 "Issue Identification and Community Consultation" for more information.

6.4 Final Terms of Reference

The final ToR are prepared by the EPA after considering any comments received and the any amendments to the draft ToR proposed by the proponent. The final ToR contain the mandatory requirements for preparing an EIS.

While every attempt is made to ensure that the final ToR addresses all of the major issues associated with the proposal, other issues of significance may emerge in the course of preparing the EIS. In this case these additional issues should be addressed in the EIS as if they formed part of the final ToR.

7. Preparing the Environmental Impact Statement

7.1 Purposes and Objectives of the EIS

The purposes of an EIS are stated in s40 of the EP Act as:

- a) to assess:
 - the potential adverse and beneficial environmental, economic and social impacts of the project;
 - management, monitoring, planning and other measures proposed to minimise any adverse environmental impacts of the project;
- b) to consider feasible alternative ways to carry out the project;
- c) to give enough information about the matters mentioned in paragraphs (a) and (b) to the proponent, Commonwealth and State authorities and the public;
- d) to prepare or propose an environmental management plan for the project;
- e) to help the administering authority decide an environmental authority application for which the EIS is required;
- f) to give information to other Commonwealth and State authorities to help them make informed decisions;
- g) to meet any assessment requirements under -

- the Commonwealth Environment Act for a project that is, or includes, a controlled action under that Act; or
 - a bilateral agreement;
- h) to allow the State to meet its obligations under a bilateral agreement.

The objective of the EIS process is to ensure that all impacts, direct and indirect, particularly environmental, social and economic impacts, are fully examined and addressed. Consistent with this objective, the EIS report 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 environment 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 EPA and Referral Agencies: a framework for assessing the impacts of the proposed 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 mitigation measures will comprise a draft Environmental Management Overview Strategy or Environmental Management Plan that describes acceptable impacts and environmental management strategies designed to meet agreed performance criteria.

The key principle is that there should be sufficient detail presented in the EIS to enable readers to understand the impact of the proposal on environmental values. It should be borne in mind that readers are likely to include representatives of Commonwealth, State and Local Governments, special interest groups and the general public.

The State Government, or other organisations from which the proponent may require approvals, always retains the right to request additional information upon any matter not adequately dealt with in the EIS.

7.2 General Format and Style

The EIS should consist of four major parts:

- the executive summary;
- the text of the document, which should be structured to cover the matters raised in the ToR and written in a clear and concise manner so as to be readily understood by general readers, and so conclusions can be assessed by an expert third party;
- an environmental management document (EM Plan or EMOS) which clearly states the proposed environmental management objectives, performance criteria, control strategies, reporting monitoring and auditing regimes, management strategies (see EPA guidelines 8 and 10 - Preparation of an EMOS, Preparation of an EM Plan;)
- appendices containing detailed technical information. Source documents are to be included so that study methodologies and scope can be assessed.

As previously noted, the ToR detail the required content of the EIS report. The EIS should follow the format provided in the ToR. However, this format need not be followed where the required information can be more effectively presented in an alternative format, excepting that any significant departure from the format or any departure from the requirements and intent of the ToR must be agreed upon by EPA and relevant referral agencies. Cross-referencing should be used to avoid unnecessary duplication of text and to demonstrate where each part of the ToR is addressed in the EIS text. To assist, it is recommended that line numbering of the ToR be used to track how the ToR provisions have been addressed by the EIS.

The EIS report is to be written so that any conclusions reached can be assessed by a third party. This means that all sources should be appropriately referenced. References may be presented using the Harvard standard (refer to the Style Guide, Australian Government Publishing Service).

The main text of the EIS report must include appendices containing:

- a copy of the final Terms of Reference;
- a list of persons and agencies consulted during development of the EIS, and the methods and outcomes of the consultation;
- any background, specialist, research or scientific studies used or undertaken;
- listing and explanation of any development approvals required;
- how the standard criteria (see age 400, schedule 3 EP Act) are to be addressed;
- a list of referral agencies/advisory bodies with an appropriate contact; and
- the names, professional background and involvement of all personnel involved in the preparation of the EIS report.

Where appendices include results of studies conducted in preparing the EIS, the public availability of the studies should be indicated.

Relevant maps, diagrams and other illustrative material should be included in the EIS report as appropriate. The EIS report should be produced on A4 size paper capable of being photocopied with maps and diagrams also at A4 or A3 size. This is to facilitate public access.

The EIS must relate to the entire life of the proposal including the construction, operation, maintenance, and decommissioning stages. Information provided in the EIS should be clear, logical, objective and concise so that it may be easily understood by non-technical persons.

The EIS should enable reasonable economic and technically achievable conditions to be developed to ensure that the impact of the proposal is reduced to acceptable levels. The level of analysis and detail in the EIS should reflect the level of significance of particular impacts.

Factual information contained in the document should be referenced wherever possible.

The terms “describe”, “detail” and “discuss” often found in final ToR should be applied in both a quantitative and qualitative sense as appropriate, to provide relevant information in a practicable and meaningful manner. Similarly, adverse and beneficial effects should be presented in quantitative and/or qualitative terms as appropriate.

Should the proponent require any information in the EIS to remain confidential (eg. financial feasibility), this should be clearly indicated in the copy supplied to EPA, and separate publicly available information should be prepared on these matters and incorporated in the body of the EIS.

A ‘preliminary’ draft EIS (number of copies to be advised) must be lodged with the EPA for review prior to its release for public comment (see s49 EP Act). For the EIS to proceed it must adequately address the ToR. Further details on the EIS process are in Guideline 12 “The EIS Process for Non-Standard Mining Projects”.

Once finalised, copies (numbers will be proposal specific) of the draft EIS should be lodged with the relevant Government authorities for distribution to referral bodies for comment and review during the public review period. A quantity of the draft EIS should also be prepared for distribution to relevant interstate and intrastate libraries. There is a preference for documents to be made available in CD ROM format, however a quantity of hard copy documents should also be produced. Advice on arrangements for public review are proposal specific; however certain basic protocols should be observed (see above and following).

7.3 Publishing the EIS

Printed Copies

EPA will require a number of printed copies of the draft and final EIS for distribution to referral agencies and advisory bodies, and public display purposes. Proposals that are declared controlled actions under the EPBC Act will require additional copies. The draft and final EIS should be placed at the local City Council administration centres, the local libraries, and the offices of the EPA for public perusal. The

proponents should liaise with the local City Council to determine additional locations for placement of the draft and final EIS for public perusal. Additional copies of the final report must also be made available for purchase by the public on request in printed form, at a reasonable cost. This cost should be no more than the actual cost of copying the document.

Web Protocol

Placement of the EIS (and related documents such as the initial advice statements, and terms of reference) on the proponent's internet web site is recommended.

Downloadable parts of the document should be in manageable file sizes (eg less than 500kb parcels). The file format should be one or more of commonly used software (eg. Word, Adobe Acrobat, JPEG). The web must not be the only public advertising or place to obtain copies of the EIS, any addendum reports, initial advice statement, draft and final ToR. An email address may be provided for submissions or comment feedback, and hard copies must be kept of all submission and comments made.

The number of hits made on the web site may be recorded to assist in assessing public interest.

A link to the appropriate government web site may be made by agreement.

CD Protocol

A CD ROM format may be made available at a reasonable cost at the same time as the printed version. To maximise effectiveness of this format any CD must include:

- a file format that is text searchable by commonly available software;
- all parts of the EIS including figures, appendices (but not material that the EPA has agreed is confidential);
- contact details for submissions such as copy of the newspaper advertisement, and government contacts.

7.4 Public and Stakeholder Participation

There is no single standard for public and stakeholder participation in the EIS. The appropriate referral agencies or bodies or advisory bodies or persons and how they should be consulted can vary widely with different proposals.

The EP Act stipulates certain actions that the proponent must undertake. These include:

- the proponent must consult affected persons and interested persons and any other persons as directed by the administering authority when developing and notifying the availability of the draft EIS for comment (s51 EP Act);
- the proponent must provide copies of the draft EIS to any person when requested (s65 EP Act).

To facilitate their consultation program, the proponent may employ various advertising methods such as public meetings, shopfronts, displays, newspaper and magazine articles, web page, and letter drops that encourage feedback and comment on the proposal and scope of studies. The proponent may also appoint a consultation panel consisting of local residents, business, and community organisations to assist in developing the draft EIS.

The EP Act also stipulates certain actions that the EPA must undertake. These include:

- the EPA may give the proponent a notice that the draft EIS may proceed (s49 EP Act)
- the EPA may seek advice from any person, and may advertise for that advice by public notice (s62 EP Act);
- the EPA must ensure that all environment authority application and EIA process documents (eg draft EIS, and any submissions made) are publicly available for viewing and copying through the EPA's register (s540 EP Act).

Public and stakeholder participation also extends to the right of appeal against decisions made by the EPA concerning the EIS as provided for in Sections 523 to 539 of the EP Act.

Reference should be made to Guideline 7 “Issue Identification and Community Consultation” for more information.

8 Contacts

Further information about this guideline is available by telephoning the EPA’s regional planning offices:

Southern Region (07) 3224 5641

Central Region (07) 4936 0511

Northern Region Townsville (07) 4722 5211 or Cairns (07) 4046 6602

or by contacting the Environmental Planning Division in Brisbane on telephone (07) 3227 6267 or email eia.policy@env.qld.gov.au

9 Definitions

Advisory Body	Any Commonwealth, State or Local Government entity; corporation, statutory authority, local body or private organisation which has expertise or legislative responsibility in relation to a development proposal. EPA is to be consulted in developing a list of Advisory Bodies.
Affected person	As defined in s38 of the EP Act 1994.
All stages of the proposal	Construction, operation, maintenance and decommissioning stages.
Description/Discussion	To be taken to include both quantitative and qualitative information which is relevant, practicable and meaningful. Similarly, adverse and beneficial effects should be presented in quantitative and/or qualitative terms as appropriate.
Development	The use of land or water within the State or over which the State claims jurisdiction and includes the construction, undertaking, carrying out, establishment, maintenance, operation, management and control of any works or private works on or in land or water.
EIA	Environmental Impact Assessment is the process in which environmental management is integrated into proposals.
EIS assessment report	A report from the EPA about the submitted EIS describing whether the ToR have been adequately addressed and making recommendations on the project.
Environment	The definition in the <i>Environmental Protection Act 1994</i> (section 8) is the definitive statutory description namely: <ol style="list-style-type: none"> (a) Ecosystems and their constituent parts, including people and communities; and (b) All natural and physical resources; and (c) The qualities and characteristics of locations, places and areas, however large or small, that contribute to their biological diversity and integrity, intrinsic or attributed scientific value or interest, amenity, harmony and sense of community; and

- (d) the social, economic, aesthetic and cultural conditions that affect, or are affected by, things mentioned in paragraphs (a) to (c).

Environmental Effects	The beneficial as well as the detrimental effects of any development on the physical, biological, or social systems within which such development occurs.
ESD	To protect Queensland's environment while allowing for development that improves the total quality of life, both now and in the future in a way that maintains the ecological processes on which life depends (ecologically sustainable development - ESD is the object of the EP Act).
Mining activities	Mining activities are defined in the <i>Environmental Protection Act 1994</i> as an activity (such as prospecting, exploring or mining, processing a mineral, rehabilitation and other activities that facilitate or support mining) authorised under the <i>Mineral Resources Act 1989</i> to be carried out on land which relates to or provides access to a mining tenement.
Mining project	A mining project is defined in the <i>Environmental Protection Act 1994</i> as all mining activities to be carried out under one or more mining tenements, in any combination, as a single integrated operation.
Proposal	Any project, or development that may affect the environment.
Referral Agencies	<p>May include:</p> <ul style="list-style-type: none"> Department of Aboriginal and Torres Strait Islander Policy Development Department of Communication and Information, Local Government, Planning and Sport Department of Education Department of Emergency Services Department of Employment, Training and Industrial Relations Department of Industry, Science and Resources (Commonwealth) Department of Main Roads Department of Natural Resources & Mines Department of Premier and Cabinet Department of Tourism and Racing - Tourism Queensland Environment Australia (Commonwealth) Families, Youth and Community Care Queensland Queensland Transport
Referral Body	Any State Government department, corporation, statutory authority or local body empowered to consider an application for the granting of approval for a development proposal (by way of general consent, licence or permit etc.).
Site	All lands occupied by, or traversed, in relation to the proposal.

Stakeholders	Stakeholders may include a selection of the following:
	Government agencies
	Conservation groups
	Relevant business groups
	Relevant industry groups
	Local/ regional Chambers of Commerce
	Aboriginal groups/ Land Councils/ Councils of Elders
	Residents or businesses within hearing, sight or smell of project or project related activities (such as water users)
	Potential competitors
	Community groups
	Politicians/ elected representatives

10. References

ANZECC (1991). 'A National Approach to Environmental Impact Assessment in Australia', Australian and New Zealand Environment and Conservation Council, September 1991; and Background Paper, October 1991.

ANZECC (1996). '**Guidelines and Criteria for Determining the Need for and Level of Environmental Impact Assessment in Australia**', Australian and New Zealand Environment and Conservation Council, September 1993 and updated 1996.

ANZECC (1997). '**Basis for a National Agreement on Environmental Impact Assessment**', Australian and New Zealand Environment and Conservation Council, September 1993 and updated 1997.

Council of Australian Governments, Commonwealth of Australia (1992) '**National Strategy for Ecologically Sustainable Development**'; AGPS, Canberra, December 1992.

Council of Australian Governments, Commonwealth of Australia (1992). '**InterGovernmental Agreement on the Environment**'. Signed 28 February 1992. AGPS, Canberra.

Department of Minerals and Energy (1995) '**Technical Guidelines for the Environmental Management of Exploration and Mining in Queensland**' contact Queensland Environmental Protection Agency.

Environment Protection Agency (1995) '**Best Practice Environmental Management in Mining**' series including '**Environmental Impact Assessment**' Commonwealth of Australia
<http://www.environment.gov.au>

Environment Protection Agency (1999) legislation *Environment Protection and Biodiversity Conservation Act 1999*. Commonwealth of Australia
<http://www.environment.gov.au>

Institute of Environmental Assessment UK (1999) '**Principles of Environmental Impact Assessment Best Practice**' International Association for Impact Assessment <http://www.greenchannel.com/iea/>
<http://www.iaia.org>

Queensland Environmental Protection Agency (1994) legislation *Environmental Protection Act 1994* and *Environmental Protection and Other Legislation Amendment Act 2000*
<http://www.env.qld.gov.au>

<http://www.legislation.qld.gov.au>

Queensland Environmental Protection Agency (2000) guidelines on **Environmental Management of Mining** under the *Environmental Protection Act 1994* and *Environmental Protection and Other Legislation Amendment Act 2000*

Series of 17 guidelines of which this guideline is one.

<http://www.env.qld.gov.au>

Related guidelines

Guideline 2 - Principles and Objectives of Impact Assessment

Guideline 3 - Mining Industry Regulatory Framework

Guideline 4 - Deciding the Level of Impact Assessment for the Mining Industry

Guideline 7 - Issue Identification and Community Consultation

Guideline 12 - The EIS Process for Non-Standard Mining Projects

GENERIC
TERMS OF REFERENCE
FOR
ENVIRONMENTAL IMPACT STATEMENTS
FOR NON-STANDARD MINING PROJECTS
(Environmental Protection Act 1994)

JUNE 2001

QUEENSLAND
ENVIRONMENTAL PROTECTION AGENCY

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for Generic Terms of Reference

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GENERIC TERMS OF REFERENCE CONTENT OF THE EIS

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.

10 1. 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 level of detail of information required to meet the level of approval being sought.

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

1.1 Project Proponent

20 Provide details regarding project proponents including details of Joint Venture partners.

1.2 Project Description

A brief description of the key elements of the project should be provided. Any major associated infrastructure requirements should also be summarised. Detailed descriptions of the project should follow in the Section 3. The location of the project and its infrastructure requirements should be described and mapped.

30 A brief description should be provided of studies or surveys which 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.

1.3 Project Objectives and Scope

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

40 The current status of the project and outline of 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.

1.4 The Environmental Impact Assessment (EIA) Process

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

50

This section should further highlight the necessity for the proponent to undertake wide consultation as part of the impact assessment process.

The information required in this section is to ensure:

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

1.4.1 Objectives of the EIS

60

Having described the objectives of the environmental impact assessment process, a succinct statement should be made of the objectives of the EIS. The structure of the EIS can then be outlined as an explanation of how the EIS will meet its objectives. In brief, the purpose of the EIS is to provide public information on the need for and likely effects of the project, to set out acceptable standards and levels of impacts (both beneficial and adverse) on environmental values, and demonstrate how environmental impacts can be managed through the protection and enhancement of the environmental values. Discussion of options and alternatives is a key aspect of the EIS.

70

The role and purpose of the EIS should be outlined. The audience should be able to distinguish the EIS as the key environmental document providing advice to decision makers considering approvals for the project. The role of the EIS in providing the mining project's EMOS or EM Plan for ongoing regulation should also be discussed.

1.4.2 Submissions

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

1.5 Public Consultation Process

80

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

Section 41 of the EP Act requires the submission of a list of affected persons and interested persons as well as information on consultation with interested persons. See section 7 of this guideline - Consultation Report as a recommended appendix.

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

90

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. Refer to the DME technical guideline on Community Consultation (QDME 1995). EPA Guideline 7 "Issue Identification and Community Consultation" should also be referenced.

1.6 Project Approvals

1.6.1 Relevant Legislation and Policy Requirements

100

This section should explain the legislation and policies controlling the approvals process. Reference should be made to the Queensland *Environmental Protection Act 1994*, *Water Act 2000*, Queensland *Mineral Resources Act 1989*, and other relevant Queensland laws. Any requirements of the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* should also be included. This information is required to assess how the legislation applies to the proposal, which agencies have jurisdiction, and whether the proposed EIA process is appropriate.

Guideline 11

1.6.2 Planning Processes and Standards

110 This section should discuss the project's consistency with existing land uses or long term policy framework for the area (eg as reflected in local and regional plans), and the legislation, standards, codes or guidelines available to monitor and control operations on site. This section should refer to all relevant State and Regional Planning Policies. In particular, this section should highlight requirements of the *Environmental Protection Act 1994*, such as "ecologically sustainable development", "best practice environmental management", and the "general environmental duty" and any relevant Environmental Protection Policies. There should be an outline of the EIS process as adapted to the project requirements with approximate time lines included.

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

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

2. PROJECT NEED AND ALTERNATIVES

2.1 Project Socio-economic Justification

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

2.2 Alternatives to the Project

130 This section should describe feasible alternatives, including conceptual, technological and locality alternatives to the proposed project and including discussion of the consequences of not proceeding with the project. Alternatives should be discussed in sufficient detail to enable an understanding of the reasons for preferring certain options and courses of action and rejecting others. Reasons for selecting the preferred options should be delineated in terms of technical, commercial, social and natural environment aspects. Comparative environmental impacts of each alternative should be summarised.

140 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 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 be delineated in terms of technical, commercial, social and natural environment aspects, in particular the principals of ESD and sustainable development should be detailed. The relationship of options chosen to 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 of the proposal.

3. DESCRIPTION OF THE PROJECT

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

3.1 Location and General Description

3.1.1 Resource

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

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

- the location of the resource to be explored, developed or mined,
- the location and boundaries of mining tenures, granted or proposed, to which the project area is or will be subject,
- the location for mine excavation(s),
- the location of any proposed buffers surrounding the working areas, and
- 170 • the location and boundaries of the plant site.

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

3.1.2 Mine Operations

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

3.1.3 Processing Plant

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

3.2 Construction

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

The estimated numbers of persons to be employed on the project construction phase should also be given.

3.3 Exploration, Mineral Development and Mining

The extent and nature of the project's exploration, mineral development or mining operations must be described, including:

- the type and methods to be used, including the 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 approximate quantity of mineral to be mined;
- 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;
- 200 • the proposed progressive backfilling of excavations and drill holes;
- and the area disturbed at each major stage of the project; and
- the operational workforce employed in the project.

3.4 Processing

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

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

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

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

A description should be provided of the quantities and characteristics of the products produced.

Information should be provided on the workforce numbers employed in processing plant operations.

3.5 Product Handling

220 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.

3.6 Waste Management

Provide an inventory of all wastes generated by the project through construction, mining and production processes. In addition to the expected total volumes of each waste produced, include an inventory of the following per unit volume of product produced:

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

The physical and chemical characteristics of waste material from the mine and process plant should be provided. All other wastes, including regulated wastes, generated by the project eg tyres, packaging materials, etc, should be described.

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.

Guideline 11

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

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

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

3.6.1 Solid Waste

250 The proposed location, site suitability, dimensions and volume of dumps (overburden, waste rock and tailings), including their method of construction, should be shown. Methods to prevent acid formation, seepage and contamination should be given. Measures to ensure stability of the dumps and impoundments should be described.

3.6.2 Wastewater

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

260 The EIS may need to consider the following effects:

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

3.6.3 Air Emissions

Describe the quantity and quality of all air emissions, including dust, fumes and odours, from the project during construction and operation. Information should be submitted on the use of new technologies to reduce air emissions from the processing plant stack or other emission sources. projects with mineral processing facilities, eg. smelters, should provide more detailed information.

3.7 Infrastructure Requirements

280 Concept and layout plans should be provided highlighting proposed buildings, structures, plant, equipment, other infrastructure associated with the project and other infrastructure existing in the vicinity of the project area.

3.7.1 Transport - Road/Rail/Ship

Arrangements for the transport of plant, equipment, ore, products, wastes and personnel during both the construction phase and operational phases of the project should be described.

290 Provide details of proposed use of rail for transport of materials, products or wastes to or from the project site. In relation to shipping of products, details of the number of ships and their size should be documented.

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

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

Details should be included on any new roads, road realignments or proposed road closures required as a result of the project.

3.7.2 Energy

Electricity and natural gas supply requirements for the construction and operation of the project should be provided and the locations shown on the infrastructure plan.

310 3.7.3 Water Supply/Storage

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

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

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

3.7.4 Stormwater Drainage

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

3.7.5 Sewerage

330 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.

3.7.6 Accommodation and Other Infrastructure

A description should be provided of any other developments directly related to the project not previously described, including the following:

- camps, townships or residential developments;
- fuel storage areas;
- equipment maintenance areas;
- laboratories;
- site offices, and
- roads (both haul roads and access roads).

340

3.8 Rehabilitation and Decommissioning

This section should present the strategies and methods for progressive and final rehabilitation of the environment disturbed by mining activities. The final topography of excavations, waste dumps and tailings dam sites should be shown. The post-mining 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 plant site and waste dumps should be discussed in terms of ongoing land use suitability, management of any residual contaminated land and any other land management issues.

350

4. ENVIRONMENT VALUES AND MANAGEMENT OF IMPACTS

The functions of this section are:

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

370 Environmental protection objectives may be derived from legislative requirements and planning frameworks 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 landcare 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.

- to examine viable alternative strategies for managing impacts should be presented and compared in view of the stated objectives and standards to be achieved. Discuss available techniques, including best practice, to control and manage these impacts to the nominated objectives. The section should comment on the suitability of environmental protection measures incorporated in the planning, construction, operations, decommissioning, rehabilitation and associated works for the proposal. These measures may address minimising environmental harm and maximising socio-economic and any environmental benefits of the proposal. Preferred measures should be identified and described in more detail than alternatives.

380 This section should address all elements of the environment (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 suggested topics to be addressed (and recommended headings) for each element are:

- **Environmental Values Affected:** describe the existing environmental values of the area to be affected including areas affected by any cumulative impacts (refer to any background studies in Appendices - note such studies may be required over several seasons).
- 390 • **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, the requirements and recommendations of the Great Barrier Reef Marine Park Authority, relevant State Planning Policies, Environmental Protection Policies, National Environmental Protection Measures and Integrated Catchment Management Plans should be addressed.

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

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

- 400 • **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 which defines the achievement of the objective (this standard must be auditable). The measurable indicators and standards can be determined from legislation, support policies, 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 assure the reader that the expected performance is achievable and realistic.
- 410
- **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.
- 420
- **Information Quality:** information given under each element should also state the sources of the information, how recent the information is, how any background studies were undertaken (eg intensity of field work sampling), how the reliability of the information was tested, and what uncertainties (if any) are in the information.

The following are examples of issues to be addressed and information likely to be required for assessment of mining activities. The layout of the following sections are in accordance with the above recommendations and the requirements for an environmental management overview strategy (EMOS) to be submitted with any application for an environmental authority (s201-203 EP Act). Should an EMOS not be included with the EIS then an environmental management plan should summarise the commitments made in the EIS.

430

4.1 LAND

A. Environmental Values Affected

The function of this section is to describe the existing environment of the land area which may be affected by the proposal in the context of environmental values as defined by the *Environmental Protection Act 1994* and *Environmental Protection Policies*. The following topics may be required to be addressed (note - the topics are not an exhaustive treatment of all possible land impacts):

440

4.1.1 Land Use

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

A map at a suitable scale showing existing land uses and tenures, and the proposed mine and plant locations, should be provided for the entire proposal area and surrounding land that could be affected by the development. This map should identify areas of conservation value and marine areas in this zone. The location of existing dwellings, and the zoning of all affected lands according to any existing town or strategic plan should be included.

450

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.

Provide a land suitability map of the proposed and adjacent area, and setting out land suitability and current land uses, e.g. for grazing of native and improved pastures and horticulture. Land classified as Good Quality Agricultural Land as defined by guideline "The Identification of Good Quality Agricultural Land 1993 Department of Natural Resources and Mines" is to be shown.

460

4.1.2 Sensitive Environmental Areas

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

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

470

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.

4.1.3 Infrastructure

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

480

4.1.4 Topography/Geomorphology

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

Describe the environmental values of the cultural landscapes of the affected area in terms of the physical and cultural integrity of the landforms (refer to more detail in section 4.8 Cultural Heritage).

4.1.5 Geology

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

The proponent should consider the possibility that fossil specimens may be located during construction/operations and propose strategies for recovering same, if possible.

4.1.6 Soils

500 A soil survey of the sites affected by the proposed mining proposal should be conducted at a suitable scale, with particular reference to the physical and chemical properties of the materials which will influence erosion potential, storm water run-off quality and rehabilitation. An acid sulphate soil investigation, carried out according to ASSMAC guidelines, should be undertaken. Information should also be provided on soil stability and suitability for construction of proposal facilities. The State Planning Policy 1/00 Planning and Management of Coastal Development involving Acid Sulfate Soils should also be addressed (eg. identification and management and format of environmental management plans).

510 Soil profiles should be mapped at a suitable scale and described according to the Australian Soil and Land Survey Field Handbook (McDonald et al, 1990) and Australian Soil Classification (Isbell, 1996). An appraisal of the depth and quality of useable soil should be undertaken. Information should be presented according to the standards required in the Planning Guidelines: the Identification of Good Quality Agricultural Land (DPI, DHLGP, 1993), and the State Planning Policy 1/92: Development and the Conservation of Agricultural Land.

4.1.7 Climate/Natural Disasters

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

Assess the potential for climate change and sea level rise over the life of the proposal to impact upon it (refer to section 4.4 Air for greenhouse gas management). Information about trends in changing climate patterns at a state and regional level is available from the Queensland Centre for Climate Change, Department of Natural Resources and Mining.

4.1.8 Scenic Values

530 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.

(a) 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;
- 540 • 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.

(b) Landscape Character

All impacts of the project on the visual quality and landscape character of the site and the surrounding area considering 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;
 - potential impacts to scenic amenity of any conservation (eg National Park); and
 - the visual absorption capacity of the site - the ability to absorb the impact of the proposed development.
- 550 Appropriate simulation to portray broad and near views and impacts of the project on visually sensitive areas, including the extent of the significance of the skyline as viewed from known vantage points, is to be included.

The EIS should detail the scenic or landscape values of the area.

B Management of Impacts on Environmental Values

- 560 The function of this section is to define and describe the objectives for protecting or enhancing water resource environmental values, to describe how nominated quantitative standards and indicators may be achieved, and how the achievement of the objectives will be monitored, audited and managed. Topics that may be relevant include the following (note - the topics are not an exhaustive treatment of land management):

4.1.9 Land Use Suitability

- The potential for the construction and operation of the proposal to change existing and potential land uses of the proposal site and adjacent areas should be detailed. Post mining land use options should be detailed including suitability of the area mined to be used for agriculture, industry, or nature conservation. The factors favouring or limiting the establishment of those options should be given in the context of optimising the long term stability of the site and minimising potential liabilities for long term management.
- 570 If the development adjoins or potentially impacts on Good Quality Agricultural Land or residential land, then an assessment of the potential for land use conflict is required. Investigations should follow the procedures set out in the Planning Guidelines: Separating Agricultural and Residential Land Uses (DNR, DLGP, 1997).

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.

580 **4.1.10 Land Disturbance**

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

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

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

Proposed decommissioning should be described in detail, including consolidation, revegetation, fencing, and monitoring.

A description of topsoil management should consider transport, storage and replacement of topsoil to disturbed areas. The minimisation of topsoil storage times (to reduce fertility degradation) should also be addressed. Erosion and sediment control should be described (refer to DME Technical Guidelines 1995). Also see section 4.1.12.

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

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4.1.11 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.

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

An initial survey of the site will be necessary to determine background contamination levels. The results of such surveys should be summarised in the EIS.

In short, the following information needs to be presented in the EIS:

- mapping of any areas listed on the Environmental Management Register or Contaminated Land Register under the *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.

The EIS needs to address management of any existing or potentially contaminated land in addition to preventing and managing land contamination resulting from project activities. The relevant guideline is Queensland EPA, 1998. Study proposals should be and reviewed by EPA officers before commencement. The contact is Contaminated Land Section in the Queensland EPA.

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4.1.12 Soil Erosion

For all permanent and temporary land forms, possible erosion rates and management techniques should be described. For each soil type identified, erosion potential (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.

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

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

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

- 640 Management of acid sulphate soils should be based on assessment in accordance with the *Guidelines for Sampling and Analysis of Lowland Acid Sulphate Soils (ASS) in Queensland 1998 (Revision 4.0)* and management and monitoring plans prepared in consultation with officers of the Department of Natural Resources and Mining. Also refer to the DME Technical Guidelines 1995.

4.1.13 Scenic Values

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

Lighting

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

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

Landscape Character

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

- 660
- impacts on existing land use that contribute to the character of the local area;
 - potential impacts to scenic amenity of any conservation area (eg National Park); and
 - the visual absorption capacity of the site - it's ability to absorb the impact of the proposed development.

Visual Amenity

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

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

- 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;

- 680
- character of the local and surrounding areas including character of built form (scale, form, materials and colours) and vegetation (natural and cultural vegetation) directional signage and land use;
 - identification of the areas of the proposal that have the capacity to absorb land use changes without detriment to the existing visual quality and landscape character; and
 - the value of existing vegetation as a visual screen.

4.1.14 Transport

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

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.

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

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

The EIS should provide details of the impact on any current or proposed rail infrastructure. Provide information on product spill contingency plans and the adequacy of equipment and facilities to deal with possible spills for the transport nodes of the proposal. Indicate whether there is a need to update the plans based on increase in frequency of traffic and volumes to be transported.

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4.1.15 Rehabilitation and Decommissioning

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

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

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

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

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

Rehabilitation of tailings dams should be described in detail, including consolidation, capping, revegetation, fencing, and monitoring.

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

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

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

4.2 WATER RESOURCES

A Environmental Values Affected

750 The function of this section is to describe the existing environment for water resources which may be affected by the proposal in the context of environmental values as defined by the *Environmental Protection Act 1994* and *Environmental Protection Policies*. The following topics may be required to be addressed (note - the topics are not an exhaustive treatment of all possible water resources or impacts):

4.2.1 Surface Waterways

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

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

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

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

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

4.2.2 Groundwater

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

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

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

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

This section should include reference to:

Nature of the aquifer/s

- 790
- Geology/stratigraphy - such as alluvium, volcanic, metamorphic
 - Aquifer type - such as confined, unconfined
 - Depth to and thickness of the aquifers

Hydrology of the aquifer/s

- Depth to water level and seasonal changes in levels
- Groundwater flow directions (defined from water level contours)

- Interaction with surface water
- Interaction with sea/salt water
- Possible sources of recharge
- Vulnerability to pollution

800 The data obtained from the groundwater survey should be sufficient to enable specification of the major ionic species present in the groundwater, pH, electrical conductivity and total dissolved solids.

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

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

B Management of Impacts on Environmental Values

810 The function of this section is to define and describe the objectives for protecting or enhancing water resource environmental values, to describe how nominated quantitative standards and indicators may be achieved, and how the achievement of the objectives will be monitored, audited and managed. Topics that may be relevant include the following (note - the topics are not an exhaustive treatment of water management):

General

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.

820 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 marine, 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,
- 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 and the littoral zone).

830 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.

4.2.3 Surface Water and Water Courses

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

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 mangrove and other estuarine habitats as a result of any temporary diversion of existing water courses

Consideration should be given to monitoring of sea water quality at points of outflow.

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.

850 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 proposal area. Where dams, weirs or ponds are proposed, the EIS should investigate the effects of predictable climatic extremes (droughts, floods) upon the structural integrity of the containing walls; and the quality of water contained, and flows and quality of water discharged. The design of all water storage facilities should follow the technical guidelines on site water management.

860 The need or otherwise for licensing of any dams (including referable dams) or creek diversions, under the *Water Act 2000* should be discussed. Water allocation and water sources should be established in consultation with Department of Natural Resources 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' (November 1992) 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.

4.2.4 Groundwater

870 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.

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

4.3 COASTAL

A Environmental Values Affected

890 The function of this section is to describe the existing coastal environment which may be affected by the proposal in the context of environmental values as defined by the *Environmental Protection Act 1994* and *Environmental Protection Policies*. The following topics may be required to be addressed (note - the topics are not an exhaustive treatment of all possible coastal resources or impacts):

4.3.1 Water Quality

Provide baseline information on sea water quality, including heavy metals, acidity, turbidity and oil in water. Discuss the interaction of freshwater flows with marine waters its significance in relation to marine flora and fauna adjacent to the proposal area.

Describe the environmental values of the coastal seas of the affected area in terms of:

- values identified in the Environmental Protection (Water) Policy;
- any Regional Coastal Plan and State Coastal Management Plan

4.3.2 Coastal Processes

Provide an assessment of physical and chemical characteristics of sediments within the littoral and marine zone adjacent to the proposal area.

Describe the physical processes of the adjacent marine environment, including currents, tides, storm surges, freshwater flows and their interaction in relation to the assimilation and transport of pollutants entering marine waters from, or adjacent to, the proposal area.

910 Describe the environmental values of the coastal resources of the affected area in terms of the physical integrity and morphology of landforms created or modified by coastal processes.

B Management of Impacts on Environmental Values

The function of this section is to define and describe the objectives for protecting or enhancing coastal 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. Topics that may be relevant include the following (note - the topics are not an exhaustive treatment of coastal management):

920 The potential environmental harm caused by the proposal on coastal resources and processes should be described in the context of controlling such effects. The Acid Sulfate State Planning Policy should be addressed as should the draft State Coastal Management Plan and QDPI Fisheries Guidelines for Marine Areas.

Account for possible changes in coastal processes due to trends in climate change and sea level rise caused by the greenhouse effect.

4.4 AIR

930 A **Environmental Values Affected**

The function of this section is to describe the existing air environment which may be affected by the proposal in the context of environmental values as defined by the *Environmental Protection Act 1994* and *Environmental Protection Policies*. The following topics may be required to 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, gaseous and odorous compounds. The background levels and sources of suspended particulates, SO_x, NO_x, and any other major constituent of the air environment, including greenhouse gases which may be affected by the proposal should be discussed.

940 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 airshed. 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. 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.

B Management of Impacts on Environmental Values

950 The function of this section is to define and describe the objectives 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. Topics that may be relevant include the following (note - the topics are not an exhaustive treatment of air or emissions management):

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 airshed, and the likely environmental harm from any such interaction, should also be detailed.

960 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.

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, ie. environmental harm, on air quality should consider the following matters:

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- The extent to which nitrogen oxides and volatile hydrocarbon emissions from the proposal and existing emission sources within the region will contribute to the generation of photochemical smog.
 - The extent to which sulphur dioxide emissions from the proposal and existing emission sources within the region will contribute to the generation of acid rain.
 - The human health risk associated with emissions from the facility of a hazardous or toxic nature should be assessed (ie: Those pollutants which are not covered by the National Environmental Protection Council (Ambient Air Quality) Measure or the Environmental Protection (Air) Policy 1998).
 - The National Health and Medical Research Council 'National guidelines for control of emissions of air pollutants from new stationary sources' covers a fairly limited list of generic industry sources.

980 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 conditions. Consideration should be given to the range of potential upset condition scenarios including the air emissions that may be generated as a result.
- Where there is no single atmospheric dispersion model that is able to handle the different atmospheric dispersion characteristics exhibited in the proposal area (ie: sea breezes, strong convection, terrain features, temperature inversions and pollutant re-circulation), a combination of acceptable models will need to be applied.

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- 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 1998 goals.
- Air shed management and the contribution of the proposal to airshed capacity in view of existing and future users of the airshed for assimilation and dispersion of emissions.

Greenhouse Gas Abatement

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

- an inventory of proposed future annual emissions for each Greenhouse Gas and total emissions expressed in 'CO₂ equivalent' terms for each component of the proposal and for the combined total proposal;
- the intended measures to avoid and minimise greenhouse emissions;
- 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

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- 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.

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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

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

4.5 WASTE

A Environmental Values Affected

1040 The function of this section is to describe the existing environment values that may be affected by wastes from mining activities in the context of environmental values as defined by the *Environmental Protection Act 1994* and *Environmental Protection Policies*. The following topics may be required to be addressed (note - the topics are not an exhaustive treatment of all possible wastes or impacts):

State how any environmental values are affected by the management of wastes proposed. Refer to each of the wastes described in section 3.5 and any links to environmental values described in part 4 of this guideline.

B Management of Impacts on Environmental Values

1050 The function of this section is to define and describe the objectives for protecting or enhancing environmental values from impacts by wastes, to describe how nominated quantitative standards and indicators may be achieved for waste management, and how the achievement of the objectives will be monitored, audited and managed. Topics that may be relevant include the following (note - the topics are not an exhaustive treatment of waste management):

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;
- level of impact on environmental values;
- Market demand for recyclable waste (where appropriate);
- Waste minimisation techniques processes proposed, and

1060 Having regard for the Environmental Protection (Waste) Policy, the EIS should indicate the results of investigation into the feasibility of using waste minimisation and cleaner technology options during the construction and operating phases of the proposal. The EPA have also released draft guidelines covering aspects of waste management under this EPP which should be addressed.

1070 Having regard for the requirements of the Environmental Protection (Water) Policy, the EIS should present the methods to avoid stormwater contamination by raw materials, wastes or products and present the means of containing, recycling, reusing, treating and disposing of stormwater. Where no-release water systems are to be used, the final destination of salts present in intake water should be discussed.

Waste minimisation and treatment, and the application of cleaner production techniques, should also be applied to gaseous wastes, particularly nitrogen oxides, sulphur oxides, particulates and carbon dioxide. Particular attention should be paid to measures which will maximise energy efficiency and minimise internal energy consumption in the proposal.

1080 Cleaner production waste management planning should be detailed especially as to how these concepts have been applied to preventing or minimising environmental impacts at each stage of the proposal. Details on natural resource use efficiency (eg energy and water), integrated processing design, co-generation of power and by product reuse as shown in a material/energy flow analysis are suggested.

4.6 NOISE AND VIBRATION

A Environmental Values Affected

The function of this section is to describe the existing environment values that may be affected by noise and vibration from mining activities in the context of environmental values as defined by the *Environmental Protection Act 1994* and *Environmental Protection Policies*. The following topics may be required to be addressed (note - the topics are not an exhaustive treatment of all possible noise or vibration sources or impacts):

1090 The results of any baseline monitoring of noise and vibration in the proposed vicinity of the proposal should be described. Baseline monitoring should include a selection of sensitive areas affected by the proposal.

Sufficient data should be gathered to provide a baseline for later studies. The daily variation of background noise levels at nearby residences should be monitored and reported in the EIS. Monitoring methods should adhere to relevant Department of Environment Guidelines or Australian Standards, and any relevant requirements of the Environmental Protection (Noise) Policy 1997.

Comment should be provided on any current activities near the proposal area which may cause a background level of ground vibration. Detail the environmental values of noise for the affected area in terms of the Environmental Protection (Noise) Policy.

1100 B Management of Impacts on Environmental Values

The function of this section is to define and describe the objectives for protecting or enhancing environmental values from impacts by noise and vibration, to describe how nominated quantitative standards and indicators may be achieved for noise and vibration management, and how the achievement of the objectives will be monitored, audited and managed. Topics that may be relevant include the following (note - the topics are not an exhaustive treatment of waste management):

1110 Information (noise contours, modelling results) should be submitted on the proposed generation of noise. The potential environmental harm of noise and vibration at all potentially sensitive places, in particular, any place of work or residence should be quantified in terms of objectives, standards and indicators to be achieved. This should also include environmental harm on terrestrial and marine animals and avifauna particularly migratory species. Proposals to minimise or eliminate these effects including details of any screening, lining, enclosing or bunding should be provided. Timing schedules for operations should be discussed, with respect to minimising environmental harm, including environmental nuisance from noise.

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

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

1120 **4.7 NATURE CONSERVATION**

A Environmental Values Affected

The function of this section is to describe the existing environment values for nature conservation that may be affected by the mining activities in the context of environmental values as defined by the *Environmental Protection Act 1994* and *Environmental Protection Policies*, and the *Nature Conservation Act 1992*. The following topics may be required to be addressed (note - the topics are not an exhaustive treatment of all possible nature conservation issues or impacts):

- 1130 Describe the environmental values of nature conservation for the affected area in terms of:
- integrity of ecological processes, including habitats of rare and threatened species;
 - conservation of resources;
 - biological diversity, including habitats of rare and threatened species;
 - integrity of landscapes and places including wilderness and similar natural places; and
 - aquatic and terrestrial ecosystems.

1140 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 the marine environment, waterways, riparian zone, and littoral 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 (eg see the draft Regional Nature Conservation Strategy for SE Qld 2001 -2006).

1150 The EIS should identify issues relevant to sensitive areas, or areas which may have low resilience to environmental change. Areas of special sensitivity include the marine environment and wetlands, wildlife breeding or roosting areas, any significant habitat or relevant bird flight paths for migratory species, bat roosting and breeding caves including existing structures such as 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 2000* 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.

1160 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's guidelines for "Fauna and Flora Assessment in EIA" provide further details. The EPA should be consulted on the scope of any biological studies before they are undertaken. In particular the following should be addressed.

4.7.1 Terrestrial Flora

1170 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 marine littoral and subtidal zone and 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 address the following:

- 1180 Provide vegetation mapping for all relevant project sites including new transport infrastructure, port facilities and irrigation land if relevant. Adjacent areas may also require mapping.

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

- location and extent of vegetation types using the EPA's regional ecosystem type descriptions in accordance with *The Conservation Status of Queensland's Bioregional Ecosystems*. (Sattler P.S. & Williams R.D. 1997 in prep.) and the EPA's web site listing the conservation status of regional ecosystems;
- 1190 • location of vegetation types of conservation significance based on EPA's regional ecosystem types and occurrence of species listed as Protected Plants under the *Nature Conservation (Wildlife) Regulation 1994* and subsequent amendments, as well as areas subject to the *Vegetation Management Act 1999*;
- the current extent (bioregional and catchment) of protected vegetation types of conservation significance within the protected area estate (National Parks, Conservation Parks, Resource Reserves, Nature Refuges);
- any plant communities of cultural, commercial or recreational significance should be identified; and
- location and abundance of any exotic or weed species;

- 1200 Within each defined (standard system) vegetation community, three sites (a minimum of at least one site) 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 20 by 50 metres;
 - a complete list of species present at each site should be recorded;
 - the relative abundance of plant species present should be recorded;
 - any plant species of conservation, cultural, commercial or recreational significance should be identified;
 - 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.
- 1210

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. For more information on survey methodologies see Attachment B.

4.7.2 Terrestrial Fauna

- 1220 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 (ie. a species list) and abundance of animals, including amphibians, fish, birds, reptiles, mammals and bats,
- any species which are poorly known but suspected of being rare or threatened,
- habitat requirements and sensitivity to changes; including movement corridors and barriers to movement,
- the existence of feral or exotic animals;
- existence of any rare, threatened or otherwise noteworthy species/communities in the study area, including discussion of range, habitat, breeding, recruitment, feeding and movement requirements, and current level of protection (eg any requirements of Protected Area Management Plans).
- 1230 use of the area by migratory birds, nomadic birds, fish and terrestrial fauna, and

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

4.7.3 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 the fauna and flora present or likely to be present in the area should include:

- 1240
- fish species, mammals, reptiles, amphibians, crustaceans and aquatic invertebrates occurring in the waterways within the mine and processing plant area, and those in the nearby marine environment;
 - any rare or threatened marine species, particularly the dugong and its habitat;
 - aquatic (waterway) plants;
 - aquatic substrate and stream type; and
 - downstream habitat.

B Management of Impacts on Environmental Values

- 1250
- The function of this section is to define and describe the objectives for protecting or enhancing nature conservation environmental values, to describe how nominated quantitative standards and indicators may be achieved for nature conservation management, and how the achievement of the objectives will be monitored, audited and managed. Topics that may be relevant include the following (note - the topics are not an exhaustive treatment of nature conservation):

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

- 1260
- Strategies for protecting the Great Barrier Reef Marine Park and World Heritage Property, and any rare or threatened species should be described, and any obligations imposed by State or Commonwealth endangered species legislation or policy or international treaty obligations (ie. JAMBA, CAMBA) should be discussed. Emphasis should be given to potential environmental harm to seagrass beds and mangroves.

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

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

- 1270
- The potential environmental harm on flora and fauna of any alterations to the local surface and ground water environment should be discussed with specific reference to environmental harms on riparian vegetation or other sensitive vegetation communities. Measures to mitigate the environmental harm to habitat or the inhibition of normal movement, propagation or feeding patterns, and change to food chains should be described.

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

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

- 1280
- Rehabilitation of disturbed areas should incorporate where appropriate provision of nest hollows and ground litter.

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

- important habitats of species listed under the *Nature Conservation Act 1992* and/or *Commonwealth Environment Protection and Biodiversity Conservation Act 1999* as presumed extinct, endangered, vulnerable or rare.
- regional ecosystems recognised by the Environmental Protection Agency as 'endangered' or 'of concern' and/or ecosystems listed as presumed extinct, endangered or vulnerable under the *Commonwealth Environment Protection and Biodiversity Conservation Act 1999*.
- good representative examples of remnant regional ecosystems or regional ecosystems which are poorly represented in protected areas.
- sites listed under international treaties such as Ramsar wetlands and World Heritage areas.
- sites containing near threatened or bioregionally significant species or essential, viable habitat for near threatened or bioregionally 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) including sites adjacent to nesting beaches, feeding, resting or calving areas of species of special interest for example, marine turtles and cetaceans.
- sites containing common species which represent a distributional limit and are of scientific value or which contains feeding, breeding, resting areas for populations of echidna, koala and platypus (species of special cultural significance).
- sites containing high biodiversity which are of a suitable size or with connectivity to corridors/protected areas to ensure survival in the longer term. This land:
 - may contain natural vegetation in good condition or other habitat in good condition (e.g. wetlands); and/or
 - may contain degraded vegetation or other habitats but still supports high levels of biodiversity or acts as an important corridor for maintaining high levels of biodiversity in the area.
- a site containing other special ecological values, for example, high habitat diversity and areas of high endemism.
- ecosystems which provide important ecological functions such as wetlands of national, state and regional significance, coral reefs, riparian vegetation, important buffer to a protected area or important habitat corridor between areas.
- sites of palaeontologic significance such as fossil sites.
- sites of geomorphological significance such as lava tubes or karst.
- protected areas which have been proclaimed under the *Nature Conservation Act 1992* and *Marine Parks Act 1982* or are under consideration for proclamation.
- areas of major interest, or critical habitat declared under the *Nature Conservation Act 1992* or high nature conservation value areas or areas vulnerable to land degradation under the *Vegetation Management Act 1999*.

4.8 CULTURAL HERITAGE

A Environmental Values Affected

The function of this section is to describe the existing environment values for cultural heritage that may be affected by the mining activities in the context of environmental values as defined by the *Environmental Protection Act 1994* and *Environmental Protection Policies*, and the *Cultural Records (Landscapes Queensland and Queensland Estate) Act 1987*. The following topics may be required to be addressed (note - the topics are not an exhaustive treatment of all possible cultural heritage issues or impacts):

- 1330 A cultural heritage study may be required which will describe indigenous and non-indigenous cultural heritage sites and places, and their values. In accordance with the above legislation such a study must be conducted by an appropriately qualified cultural heritage practitioner and must include the following:
 - Liaison with relevant indigenous community/communities concerning:
 1. places of significance to that community (including archaeological sites, natural sites, story sites etc:
 2. 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.
- 1340 A systematic survey of the proposed development area to locate and record indigenous and non-indigenous cultural heritage places.
- Significant assessment of any cultural heritage sites/places located.

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- The impact of the proposed development on cultural heritage values.
- A report of work done which includes background research, relevant environmental data and methodology, as well as results of field surveys, significance assessment and recommendations.
- A permit to conduct the research and survey will be required under the provisions of the *Cultural Record (Landscapes Queensland and Queensland Estate) Act, 1987*.

B Management of Impacts on Environmental Values

1350 The function of this section is to define and describe the objectives for protecting or enhancing cultural heritage environmental values, to describe how nominated quantitative standards and indicators may be achieved for cultural heritage management, and how the achievement of the objectives will be monitored, audited and managed. Topics that may be relevant include the following (note - the topics are not an exhaustive treatment of cultural heritage):

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/anthropological reports on the survey area and cultural reports and/or information from affiliated traditional owners. The CHMP should address and include the following:

- 1360
1. A process for including Aboriginal/Torres Strait islander people associated with the development areas in protection and management of indigenous cultural heritage;
 2. 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;
 3. Provisions for the management of the accidental discovery of cultural material, including burials;
 4. The monitoring of foundation excavations and other associated earthwork activities for possible sub-surface cultural material;
 5. Cultural awareness training or programs for project staff; and
 6. A conflict resolution process.
- 1370

The development of the CHMP should be negotiated with all stakeholder representatives, and where there is a role or responsibility identified for the Environmental Protection Agency, 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 *Cultural Record (Landscapes Queensland and Queensland Estate) Act 1987*. 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.

1380 Aspects of the above matters may be referred to the Land and Resources Tribunal and some may also involve native title considerations.

4.9 SOCIAL

A Environmental Values Affected

The function of this section is to describe the existing social values that may be affected by the mining activities in the context of environmental values as defined by the *Environmental Protection Act 1994* and *Environmental Protection Policies*. The following topics may be required to be addressed (note - the topics are not an exhaustive treatment of all possible social issues or impacts):

1390 The amenity and use of the proposal area and adjacent areas for rural, agricultural, forestry, fishing, recreational, industrial, educational or residential purposes should be described. Consideration should be given to:

- community infrastructure and services, access and mobility;
- population and demographics of the affected community;
- local community values, vitality and lifestyles;
- recreational, cultural, leisure and sporting facilities and activities in relation to the affected area;
- health and educational facilities;
- on farm activities near the proposed mining activities;
- current property values;
- number of properties directly affected by the project;

1400 • number of families directly affected by the project, this should include not only property owners but families of workers either living on the property or workers where the property is their primary employment;

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

- the integrity of social conditions, including amenity and livability, harmony and well being, sense of community, access to recreation, and access to social and community services and infrastructure.; and
- public health and safety (refer to section 4.10).

B Management of Impacts on Environmental Values

1410 The function of this section is to define and describe the objectives for protecting or enhancing social values, to describe how nominated quantitative standards and indicators may be achieved for social impacts management, and how the achievement of the objectives will be monitored, audited and managed. Topics that may be relevant include the following (note - the topics are not an exhaustive treatment of social impacts issues):

1420 The social impact assessment of the project should consider the project's impact, both beneficial and adverse, on the local community through the information gathered in the community consultation program and the analysis of the existing socio-economic environment. The impacts of the project on local and regional residents, community services and recreational activities is to be analysed and discussed for all stages of the development. The nature and extent of the community consultation program is to be described and a summary of the results incorporated in the EIS.

The Social Impact Assessment of the project is to be carried out in consultation with the Department of Family, Youth and Community Care. The assessment of impacts should address the following requirements:

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

- impacts on demographic, social, cultural and economic profiles;
- impacts on local residents, current land uses and existing lifestyles and enterprises,
- impacts on local and state labour markets, with regard to the source of the workforce. This information is to be presented according to occupational groupings of the workforce. The impacts of both construction and operational workforces and associated contractors on housing demand, community services and community cohesion is to be addressed. The capability of the existing housing stock, including rental accommodation, to meet any additional demands created by the project is to be discussed;
- impacts on local residents values and aspirations, and

Guideline 11

- impacts on human service delivery.

In regard to affected indigenous and non-indigenous communities respectively, particular attention should be paid to the effects on:

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- 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.

1450

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.

1460 **4.10 HEALTH AND SAFETY**

A Environmental Values Affected

The function of this section is to describe the existing community values for health and safety that may be affected by the mining activities in the context of environmental values as defined by the *Environmental Protection Act 1994* and *Environmental Protection Policies*. The following topics may be required to be addressed (note - the topics are not an exhaustive treatment of all possible health and safety issues or impacts):

1470 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.

B Management of Impacts on Environmental Values

The function of this section is to define and describe the objectives for protecting or enhancing health and safety community values, to describe how nominated quantitative standards and indicators may be achieved for social impacts management, and how the achievement of the objectives will be monitored, audited and managed. Topics that may be relevant include the following (note - the topics are not an exhaustive treatment of health and safety impacts or issues):

1480 The EIS should assess the effects on project workforce of occupational health and safety risks and impacts on the community in terms of health, safety, and quality of life from project operations and emissions.

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

Practical monitoring regimes should also be recommended in this section.

4.11 ECONOMY

A Environmental Values Affected

1490 The function of this section is to describe the existing economic environment that may be affected by the mining activities in the context of environmental values as defined by the *Environmental Protection Act 1994* and *Environmental Protection Policies*. The following topics may be required to be addressed (note - the topics are not an exhaustive treatment of all possible economic management issues or impacts):

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

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

1500 Describe the economic attributes for the affected area in terms of the integrity of economic conditions and the economic benefits 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, future economic opportunities;
- types and numbers of businesses;
- existing property and land values; and
- availability and prices of goods and services.

B Management of Impacts on Environmental Values

1510 The function of this section is to define and describe the objectives for protecting or enhancing economic values, to describe how nominated quantitative standards and indicators may be achieved for economic management, and how the achievement of the objectives will be monitored, audited and managed. Topics that may be relevant include the following (note - the topics are not an exhaustive treatment of economic impacts or issues):

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

1520 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 implementation of the proposed development;
- the impacts on the project of a goods and services tax;
- implications for future development in the locality (including constraints on surrounding land uses and existing industry);

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

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

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

4.12 HAZARD AND RISK

A Environmental Values Affected

1550 The function of this section is to describe the potential hazards and risk that may be associated with the mining activities in the context of their potential effect on environmental values *Environmental Protection Act 1994* and *Environmental Protection Policies*. The following topics may be required to be addressed (note - the topics are not an exhaustive treatment of all possible hazard and risk issues or impacts):

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

- An analysis is to be conducted into the potential impacts of both natural and induced emergency situations and counter disaster and rescue procedures as a result of the proposal on sensitive areas and resources such as forests, water reserves, State and local Government controlled roads, places of residence and work, and recreational areas.
- 1560 □ A preliminary hazard analysis (PHA) is to be conducted for the project, to such a standard as that set by the Hazardous Industry Planning Advisory Paper (HIPAP) No 8 – “HAZOP Guidelines” NSW Department Urban Affairs and Planning. The assessment is to outline the implications for and the impacts on surrounding land uses, and should involve consultation with Department of Emergency Services, Queensland Fire and Rescue Authority, and Queensland Ambulance Service. The preliminary hazard analysis is to incorporate:
 - all relevant hazards (minor and major) and current competencies in first aid management of human casualties;
 - the possible frequency of potential hazards, accidents, spillages and abnormal events occurring during all stages of the project;
 - 1570 – indication of cumulative risk levels to surrounding land uses;
 - life of any identified hazards;
 - all hazardous substances to be used, stored, processed or produced and the rate of usage;
 - potential wildlife hazards such as crocodiles, snakes, and disease vectors;
 - description of processes, type of the machinery and equipment used; and
 - public liability of the State for private infrastructure and visitors on public land.

B Management of Impacts on Environmental Values

1580 The function of this section is to define and describe the objectives for protecting or enhancing environmental values from hazards and risk, to describe how nominated quantitative standards and indicators may be achieved for hazard and risk management, and how the achievement of the objectives will be monitored, audited and managed. Topics that may be relevant include the following (note - the topics are not an exhaustive treatment of hazard and risk impacts or issues):

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
- 1590 □ Correct shipping name
- 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.

1600 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 (eg HAZOP Guidelines, NSW Department of Urban Affairs and Planning(DUAP)). The assessment should outline the implications for and the impact on the surrounding land uses. The preliminary hazard analysis should incorporate:

- All relevant majors hazards both technological and natural,
- The possible frequency of potential hazards, accidents, spillages and abnormal events occurring,
- Indication of cumulative risk levels to surrounding land uses,
- Life of any identified hazards,
- A list of all hazardous substances to be used, stored, processed, produced or transported,
- 1610 □ The rate of usage, and
- Description of processes, type of the machinery and equipment used.

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).

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5. ENVIRONMENTAL MANAGEMENT PLAN

The environmental management plan for a proposed mining project is an integral part of the EIS. It can be developed from the preceding information in the EIS. Its purpose is to set out the proponents commitments to environmental management , ie. how environmental values will be protected and enhanced. Protection of environmental values will be achieved by preventing or minimising environmental harm in accordance with the commitments made in the text of the EIS (in Part B of each environmental value addressed). The EM Plan is based on these commitments. The general contents of the EM Plan comprises:

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- the proponent's commitments to acceptable levels of environmental performance, including environmental objectives, ie. levels of expected environmental harm, performance standards and associated measurable indicators, including progressive and final rehabilitation, performance monitoring and reporting; and .
 - control strategies to implement the commitments.

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The planning documents for inclusion in the EIS may be either an Environmental Management(EM) Plan or an Environmental Management Overview Strategy (EMOS) depending on the scale of project activities and timing of mining lease and environmental authority applications. Mining projects on mining leases require an EMOS with the application materials for the mining lease. The EIS is also a relevant document for the application. A Plan of Operations will be required to be lodged prior to commencement of activities for a period of up to 5 years.

Exploration and mineral development projects of usually shorter term require an EM Plan that should provide more operational detail in the control strategies plus specific actions and programs to implement the plan. In either case, the commitments to environmental performance can be used as regulatory controls through conditions to comply with these commitments. These documents will be publicly available.

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See EPA Guideline 8 "Preparation of an Environmental Management Overview Strategy" for further information. Other guides are listed in Attachment A.

6. REFERENCES

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

7. RECOMMENDED APPENDICES

A1. Development Approvals

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

A2. The Standard Criteria

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

A3. Final Terms of Reference for this EIS

1670 A copy of the final Terms of Reference should be included in the EIS. A summary cross-referencing specific items of the Terms of Reference to the relevant section of the EIS should also be provided. For this purpose the ToR should be line numbered (as shown in the generic ToR).

A4. Research

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

A5. Consultation Report

1680 A list of referral agencies should be provided in a summary Consultation Report, which should also list the Commonwealth, state and local government agencies consulted, and the individuals and groups of stakeholders consulted. A summary of the issues raised by these groups, and the means by which the issues have been addressed, should be provided in the text of the EIS.

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

Information about identifying affected parties (EPBC Act) and interested and/or affected persons (EP Act) should be included.

A6. Study Team

1690 The qualifications and experience of the study team and specialist sub-consultants and expert reviewers should be provided.

A7. Glossary of Terms

A glossary of technical terms and acronyms should be provided.

A8. Specialist Studies

1700 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
- land use and land capability studies.

Outline of EPA Policies and Guidelines for Environmental Authorities in Mining

Note: Attachment A contains a summary of impact assessment and environmental management guidelines developed by the Environmental Protection Agency (EPA) for the mining industry. They are available on the EPA web site www.env.qld.gov.au and from EPA offices. The legislation referred to includes the *Environmental Protection Act 1994* with amendments up to Act No.64 of 2000 reprinted as in force on 2 January 2001 (see www.legislation.qld.gov.au)

The guidelines developed for the mining industry guideline series are summarised below.

Guideline 1 - "Mining Industry Environmental Impact Assessment - Introduction to Policies and Guidelines" provides the background to the series of policies and guidelines available and under development, and introduces related initiatives such as relevant agreements and legislation.

Guideline 2 - "Principles and Objectives of Impact Assessment" outlines the objectives of the Environmental Impact Assessment (EIA) process and discusses the principles of EIA and what EIA should achieve.

Guideline 3 - "Mining Industry Regulatory Framework" describes the mining industry environmental management framework including the *Environmental Protection Act 1994*, *Environmental Protection and Other Legislation Amendment Act 2000*, *State Development and Public Works Organisation Act 1971*, and *Integrated Planning Act 1997*.

Guideline 4 - "Deciding the Level of Impact Assessment for the Mining Industry" describes the policies and triggers used in deciding the appropriate level of impact assessment required.

Guideline 5 - "Impact Assessment Process for Standard (level 2) Mining and Exploration Activities" outlines the procedure for applying for and processing environmental authorities for standard mining activities, as presented in the legislation.

Guideline 6 - "Non-Standard Mining and Exploration Activities" contains details on the planning approach, application process and what information may be required.

Guideline 7 - "Issue Identification and Community Consultation" describes the process for identifying and dealing with environmental management issues for mining activities.

Guideline 8 - "Preparation of an Environmental Management Overview Strategy" (EMOS) contains guidance on the purpose and content of an EMOS and how to prepare one.

Guideline 9 - "Preparation of a Plan of Operations and Audit Statement" contains guidance on the purpose and content of a Plan of Operations and audit statement and how to prepare them.

Guideline 10 - "Preparation of an Environmental Management Plan" (EM Plan) contains guidance on the purpose and content of an EM Plan and how to prepare one.

Guideline 11 - "Terms of Reference and Preparation of an Environmental Impact Statement" (EIS) describes how to develop terms of reference & EIS and gives examples including a generic terms of reference for mining.

Guideline 12 - "The EIS Process for Non-Standard Mining Projects" describes the EIA process as outlined in the *Environmental Protection and Other Legislation Amendment Act 2000*.

A series of technical guidelines were developed in 1995 in consultation with the mining industry, government departments, research institutions such as universities, and industry stakeholders. These guidelines provide stakeholders with detailed technical advice on a range of environmental management issues (see References). The series, developed by the Department of Mines and Energy is to be revised to provide the mining industry with up to date detailed technical advice on a range of

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environmental management issues. This advice is relevant to the EIA of mining industry proposals, operations and final rehabilitation.

EPA Suggested Methodologies for Flora and Fauna Assessment

1. Flora Assessment

The vegetation communities within the area should be described at an appropriate scale (ie. 1:10,000) with mapping produced from aerial photographs and ground survey, showing the following:

- location and extent of terrestrial and littoral vegetation types with a description of each community using a standard system;
- location and extent of terrestrial and littoral vegetation types using the DEH regional ecosystem type descriptions in accordance with The Conservation Status of Queensland's Bioregional Ecosystems. (Sattler P.S. & Williams R.D. 1997 in prep.);
- location and extent of freshwater aquatic and marine vegetation with a description of each community;
- location and extent of vegetation types of conservation significance including assessment of value to fauna. For terrestrial and littoral vegetation types this should be based on DEH regional ecosystem types and occurrence of species listed as Protected Plants under the Nature Conservation (Wildlife) Regulation 1994;
- any plant communities of cultural, commercial, scientific or recreational significance should be identified;
- location and abundance of any exotic or weed species;
- existing condition and impacting or threatening processes in relation to the communities and species of significance;
- current representation of significant communities and species in the protected estate; and
- location and description of horticultural crops.

For terrestrial and littoral flora, within each defined vegetation community, three sites (a minimum of at least one site) should be surveyed for plant species as follows:

- site data should be recorded in a form compatible with the Queensland Herbarium CORVEG database.
- the minimum site size should be 20 by 50 metres;
- a complete list of species present at each site should be recorded;
- the relative abundance of plant species present should be recorded;
- any plant species of conservation, cultural, commercial or recreational significance should be identified;
- 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.

References:

1. McDonald R.C., Isbell R.F., Speight J.G., Walker J. and Hopkins M.S. (1990) Australian soil and land survey handbook. 2nd edition. Inkata Press, Melbourne.
2. Specht R. L. (1970) Vegetation. In: The Australian Environment (4th edition). (Ed. G.W. Leeper) pp. 44-67, CSIRO, Melbourne University Press, Melbourne, Victoria.
3. Walker J. and Hopkins M.S. (1990) Vegetation. pp. 58-77 in McDonald et al (1990).
4. Webb L.J. (1978) A general classification of Australian rainforest. Australian Plants 9:349-363.

2. Fauna Assessment

The fauna species in terrestrial, freshwater aquatic and marine areas directly or indirectly affected by the project should be described, noting distribution in relation to vegetation, topography and substrate. The description of fauna present or likely to present should include:

- terrestrial and littoral vertebrate species diversity and abundance including nomadic or migratory species;
- freshwater aquatic and marine vertebrate species and invertebrates (family level) occurring within the lease area and in the adjacent marine environment;
- habitat and connectivity requirements and sensitivity to changes including fragmentation, barriers to movement and changes to freshwater flow and quality;
- any rare, vulnerable or endangered species or species of special significance;
- current level of representation of significant species in the protected estate; and
- distribution and abundance of any exotic and feral species.

Sampling sites should be selected to represent all habitat/ecosystem types as mapped in the flora surveys. Terrestrial fauna (mammals, birds, bats etc.) should be surveyed using appropriate sampling techniques, such as trapping, spotlighting, recording of calls, and general field observations. Fauna survey equipment should include Elliott traps, drift nets and pitfall traps to ensure that small vertebrates are effectively sampled. Birds should be sampled using standardised transect and wader survey techniques, whilst frogs and reptiles should be sampled by direct field observations through day and night searches. If practicable, vertebrates should be sampled twice during a 12 month survey period (1 wet season, 1 dry season).

Sampling techniques should be confirmed with the Department of Environment and Heritage prior to surveys. The following table provides guidance:

Technique	Mammals	Birds	Reptiles	Amphibians
Calls	✓	✓	✓ (geckoes)	✓
Incidental Collection/Observation	✓	✓	✓	✓
Pitfall Traps	✓	✗	✓	✓
Elliott Traps	✓	✗	✓	✓ (toads)
Spotlighting	✓	✓	✓	✓
Daytime Walk Transects, Log turning etc.	✓	✓	✓	✓
Harp Traps and Mist nets	✓ (bats)	✓	✗	✗
Dog and Owl Pellet Analysis	✓	✓	✓	✗

^a Notes on technique:

1. Pitfall and Elliott traps must run for at least four(4) days and nights
2. There should be at least one pitfall trap per habitat
3. There should be 40 - 50 Elliott traps laid per habitat
4. There should be at least 2 person hours of daytime and nighttime observation in each habitat per 24 hour period

^b Habitat = the broad landscape/ecosystem type such as riparian, rainforest, grassland, open forest etc.

A discussion should be given on the conservation status for each species recorded, its habitat and wildlife movement corridor requirements. The distribution and abundance of any exotic and feral species recorded should also be discussed.

Sensitive Areas

These areas are listed as “sensitive areas” and refer to locations, places or areas, however large or small, that have environmental values that contribute to maintaining biological diversity and integrity, have intrinsic or attributed scientific, historic or cultural heritage, or are important in providing amenity, harmony or sense of community. They may be recognised through statutory provisions and site-specific determinations. The list, while comprehensive is only indicative of possible sensitive areas.

Many of the following areas (“environmentally sensitive areas”) are used as decision criteria for mining activities allowed under an environmental authority (mining lease). For details see Schedule 1A of the Environmental Protection and Other Legislation Amendment Regulation (No.1) 2000 and Guideline 4 “Deciding the Level of Assessment for the Mining Industry”.

LAND AREA CLASSIFICATION	ADMINISTERING LEGISLATION	ADMINISTRATOR (Qld)
Aboriginal Freehold Land	Aboriginal Land Act and Torres Strait Islander Land Act	Dept. of Natural Resources & Mines
Aboriginal National Parks	Aboriginal Land Act	Dept. of Natural Resources & Mines
National Parks	Nature Conservation Act	QLD Parks and Wildlife Service
Conservation Parks	Nature Conservation Act	QLD Parks and Wildlife Service
Coordinated Conservation Areas	Nature Conservation Act	QLD Parks and Wildlife Service
Wilderness Areas	Nature Conservation Act	QLD Parks and Wildlife Service
Nature Refuge	Nature Conservation Act	QLD Parks and Wildlife Service
Areas of Critical Habitat or Areas of Major Interest identified under a Conservation Plan, areas subject to an Interim Conservation Order and endangered ecosystems	Nature Conservation Act	QLD Parks and Wildlife Service
World Heritage Management Areas	Nature Conservation Act	QLD Parks and Wildlife Service
International Agreement Area	Nature Conservation Act	Environmental Protection Agency
Queensland Marine Parks (General Use Zones)	Marine Parks Act	QLD Parks and Wildlife Service
Resource Reserves	Nature Conservation Act	QLD Parks and Wildlife Service
Catchments or watercourses; groundwater resources and recharge areas; lakes and developed surface water resources the subject of Water Resource Plans, Land and Water Management Plans, and/or declared catchment area.	Water Act	Dept. of Natural Resources & Mines

Historic Mining Site	Inter-Departmental notifications.	Environmental Protection Agency
Registered Heritage Place, Cultural Heritage Place, Protected Area, or Restricted Zone	QLD Heritage Act	Environmental Protection Agency
Designated Landscape Area places of cultural heritage significance	Cultural Records (Landscapes QLD and QLD Estate) Act	Environmental Protection Agency
State Forest, Timber Reserve including State Forest, Feature Protection Area, State Forestry Park, State Forest Scientific Area	Forestry Act	Dept. of Natural Resources & Mines
Fish Habitat Areas	Fisheries Act	Dept. of Primary Industries
DPI Research Site	Inter-Departmental Agreement	Dept. of Primary Industries
Community Reserves, or Critical Areas	Land Act & local tree clearing guidelines	Environmental Protection Agency and Dept. of Natural Resources & Mines
World Heritage Area	World Heritage Properties Conservation Act	Commonwealth Government Environment Australia
Wet Tropics	Queensland Wet Tropics World Heritage Protection and Management Act	Wet Tropics Management Authority
Great Barrier Reef and Zones for Protection of Biological Values	Great Barrier Reef Marine Park Act	Great Barrier Reef Marine Park Authority
Control Districts, key coastal sites and designated areas, areas under Coastal Management Plans	Coastal Protection and Management Act	Environmental Protection Agency
Areas prescribed by State Planning Policies	Various areas declared through State Planning Policies eg. Koala Coast	Relevant State Government Agency eg. Environmental Protection Agency
Erosion Prone Areas and Coastal Management Control Districts	Beach Protection Act	Environmental Protection Agency
Areas listed under International Agreements and treaties, areas subject to World Heritage listing, critical habitat, areas containing migratory species, conservation agreement areas, protected areas.	Various Agreements, Conventions and Treaties Environment Protection and Biodiversity Conservation Act	Commonwealth Government Environment Australia
Areas identified in Planning Schemes developed under Schedule 1 of the Integrated Planning Act	Integrated Planning Act	Dept. of Local Government and Planning. Individual local governments.

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Areas listed or interim listed on the Register of the National Estate	National Heritage Commission Act	Environment Australia
Aboriginal and Torres Strait Islander owned land and identified interests (<i>including areas in respect of which a claim under the Native Title Act has been registered by the National Native Title Tribunal</i>).	Native Title Act, Aboriginal Land Act, Torres Strait Islander Act, Community Services (Aboriginal) Act, and Community Services (Torres Strait Islander) Act	Dept. Premier and Cabinet Dept. of Natural Resources & Mines Dept. of Natural Resources & Mines Dept. of Family, Youth and Community Care.
Areas prescribed in Special Agreement Acts	Various Special Agreement Acts	Dept. State Development or other authorities as above
Areas identified through recognised environmental impact assessment processes for specific development proposals	EP Act, State Development Public Works Organisation Act, IPA and other Acts above.	Dept. State Development, Environmental Protection Agency, Department of Local Government and Planning or other authorities as above.

References

The following are selected references for use in drafting terms of reference and other documents for consideration in environmental impact assessment. While this list is comprehensive it may not include all materials required and should be considered a generic list of relevant materials. It does not include many references that may be relevant to local areas or studies that may have been undertaken.

Environmental Impact Assessment

ANZECC (1991). *'A National Approach to Environmental Impact Assessment in Australia'*, Australian and New Zealand Environment and Conservation Council, September 1991; and Background Paper, October 1991.

ANZECC (1996). *'Guidelines and Criteria for Determining the Need for and Level of Environmental Impact Assessment in Australia'*, Australian and New Zealand Environment and Conservation Council, September 1993 and updated 1996.

ANZECC (1997). *'Basis for a National Agreement on Environmental Impact Assessment'*, Australian and New Zealand Environment and Conservation Council, September 1993 and updated 1997.

Council of Australian Governments, Commonwealth of Australia (1992) *'National Strategy for Ecologically Sustainable Development'*; AGPS, Canberra, December 1992.

Council of Australian Governments, Commonwealth of Australia (1992). *InterGovernmental Agreement on the Environment*. Signed 28 February 1992. AGPS, Canberra.

Environment Protection Agency (1995) *"Best Practice Environmental Management in Mining"* series including *"Environmental Impact Assessment"* Commonwealth of Australia
<http://www.environment.gov.au>

Environment Australia (1999) legislation *Environment Protection and Biodiversity Conservation Act 1999*. Commonwealth of Australia.
<http://www.environment.gov.au>

Institute of Environmental Assessment UK (1999) *"Principles of Environmental Impact Assessment Best Practice"* International Association for Impact Assessment <http://www.greenchannel.com/iea/>
<http://www.iaia.org>

Queensland Department of Environment and Heritage (1999) *Queensland State of Environment Report* Queensland Environment Protection Agency.

Queensland Environmental Protection Agency (1994) legislation *Environmental Protection Act 1994* and *Environmental Protection and Other Legislation Amendment Act 2000*
<http://www.env.qld.gov.au>
<http://www.legislation.qld.gov.au>

Queensland Environmental Protection Agency (2001) EIA and guidelines (under development)
<http://www.env.qld.gov.au>

Land Management

Gunn RH, Beattie JA, Reid RE, van de Graff R, eds (1988) *Australian Soil and Land Survey Handbook: Guidelines for Conducting Surveys* Inkata Press Melbourne

McDonald RC, Isbell RF, Speight JG, Walker J, Hopkins MS (1990) *Australian Soil and Land Survey Field Book* Inkata Press Melbourne

Rosser J, Swartz GL, Dawson NM, Briggs HS (1974) *A Land Capability Classification for Agricultural Purposes Division Land Util. Tech. Report 14 QDPI*

Queensland Department of Environment (1998) *Draft Guidelines for the Assessment and Management of Contaminated Land in Queensland*. Department of Environment, Brisbane.

Queensland Department of Minerals and Energy (1995) *Technical Guidelines for the Environmental Management of Exploration and Mining in Queensland*. DME, Brisbane.

Water

ANZECC (1992) *National Water Quality Management Strategy: Australian Water Quality Guidelines for Fresh and Marine Waters*. Agriculture and Resource Management Council of Australia, and Australian and New Zealand Environment and Conservation Council, Canberra. See ANZECC 1998 and 1999 for latest versions.

ANZECC (1994) *National Water Quality Management Strategy: Policies and Principles , a Reference Document*. Agriculture and Resource Management Council of Australia, and Australian and New Zealand Environment and Conservation Council, Canberra.

ANZECC (1996) *National Water Quality Management Strategy: Draft Guidelines for Urban Stormwater Management*. Agriculture and Resource Management Council of Australia, and Australian and New Zealand Environment and Conservation Council, Canberra.

ANZECC (1996) *National Water Quality Management Strategy: National Principles for the Provision of Water for Ecosystems*. Agriculture and Resource Management Council of Australia, and Australian and New Zealand Environment and Conservation Council, Canberra.

ANZECC (1998) *National Water Quality Management Strategy: Implementation Guidelines*. Agriculture and Resource Management Council of Australia, and Australian and New Zealand Environment and Conservation Council, Canberra.

ANZECC (revised: in print 1998) *National Water Quality Management Strategy: Australian and New Zealand Water Quality Guidelines for Fresh and Marine Waters*. Agriculture and Resource Management Council of Australia, and Australian and New Zealand Environment and Conservation Council, Canberra.

ANZECC (new draft: released 1999) *Draft National Water Quality Management Strategy: Australian and New Zealand Water Quality Guidelines for Fresh and Marine Waters*. Agriculture and Resource Management Council of Australia, and Australian and New Zealand Environment and Conservation Council, Canberra.

Queensland Department of Environment and Heritage (1995) *Water Quality Sampling Manual: for use in testing for compliance with the Environmental Protection Act 1994*; second edition; DEH

Queensland Department of Environment and Heritage (1998) *Queensland Water Quality Guidelines: Version 1*. Queensland Department of Environment and Heritage.

Queensland Department of Environment and Heritage (1998) *Stormwater Quality Control Guidelines for Local Government*, Queensland Departments of Natural Resources and Environment and Heritage.

Queensland Department of Environment and Heritage (September 1998) *Guidebook for Local Government and Department of Environment and Heritage Authorised Officers: Delegations and Authorisations under the Environmental Protection (Water) Policy 1997*; published internally by DEH; not publicly available.

Queensland Environmental Protection Agency (1999) *Strategy for the Conservation and Management of Queensland Wetlands* Queensland Environmental Protection Agency.

Technical Papers

ANZECC (1999) *National Water Quality Management Strategy: Guidelines for Sewerage Systems - Treatment and Management of Sewerage*. Agriculture and Resource Management Council of Australia, and Australian and New Zealand Environment and Conservation Council, Canberra.

Cooperative Research Centre for Catchment Hydrology (1997) *Best Practice Environmental Management Guidelines for Urban Stormwater - Background Paper* . Prepared for Environment

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Protection Authority, Victoria, Melbourne Water Corporation and Department of Natural Resources and Environment.

Institution of Engineers Australia (Pilgrim and Canterford) (1987) *Australian Rainfall and Runoff; a guide for flood estimation*; IE Aust., Canberra

Witheridge, G. & Walker, R. (1996) *Soil Erosion and Sediment Control - Engineering Guidelines for Queensland Construction Sites*. Institution of Engineers, Australia, Queensland Division, Brisbane.

Water Resources Commission (1992) *Guideline for the Design of Sewerage Systems Volumes 1 & 2*. Department of Primary Industries.

Coast

Beumer, J., Carseldine, L., Zeller, B. 1997, *Declared Fish Habitat Areas in Queensland*, Fisheries Group, Department of Primary Industries (Queensland), Declared Fish Habitat Area Atlas QDPI, supplement to FHMOP 002.

Brown, V. 1995, *Turning the tide: Integrated local area management for Australia's coastal zone*, summary of a report produced for the Department of Environment, Sports and Territories, at http://www.environment.gov.au/library/pubs/Turning_Tide/tide1.html.

Catterall, C.P., 1993, 'The importance of riparian zones to terrestrial wildlife', in S.E. Bunn, B.J. Pusey and P. Price (eds) *Ecology and management of riparian zones in Australia*, Land and Water Resources Research and Development Corporation Occasional Paper Series No. 05/93, Canberra, Australia, pp. 41–52.

Coastcare *Annual Report 1995/96*.

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Graham, B. and Pitts, D. 1998, *Good Practice Guidelines for Integrated Coastal Planning*, Royal Australian Planning Institute and Commonwealth Department of the Environment, Coast and Clean Seas, Report Series 13, AGPS, Canberra.

Hopkins, E., White, M. and Clarke, A. 1998, *Restoration of Fish Habitats — Fisheries Guidelines for Marine Areas*, Fish habitat guideline 002, Department of Primary Industries, Queensland.

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National Committee on Coastal and Ocean Engineering 1998, *Coastal Engineering Guidelines for Working with the Australian Coast in an Ecologically Sustainable Way*, Commonwealth Department of Environment and the Institution of Engineers, Coast and Clean Seas, Report Series 14, AGPS, Canberra.

Natural Heritage Trust 1997, *Coasts and Clean Seas*.

Natural Heritage Trust 1997, *Guide to the Coastal and Marine Planning Program 1997–98*.

Queensland Environmental Protection Agency (2000) *Draft State Coastal Management Plan* Qld EPA Qld Government. Public consultation draft on www.env.qld.gov.au/environment/coast/management

Air

NEPC (1998) *National Environmental Protection Measure for Ambient Air Quality*. National Environmental Protection Council, Adelaide.

NEPC (1988) *National Environmental Protection Measure: National Pollutant Inventory*. National Environmental Protection Council, Adelaide. (Note: the first set of data on air quality has yet to be published under this NEPM).

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Department of Environment and Heritage (1998) *User's Guide to Queensland's Environmental Protection (Air) Policy 1997*. DEH, October 1998.

Queensland Environmental Protection Agency (1999) "*Queensland's Implementation Plan 1999*" *National Greenhouse Strategy*.

Health Organisation (1999) *Guidelines for Air Quality* Geneva WHO.

World Bank (1998) *Pollution Prevention and Abatement Handbook* Washington World Bank.

Australian Environment Council & National Health and Medical Research Council (1985) *National Guidelines for Emission of Air Pollutants from New Stationary Sources* Canberra AEC and NHMRC.

Environment Australia National Greenhouse Gas Inventory Committee (1995) *National Greenhouse Gas Inventory 1995*.

Environment Australia (1992) *National Greenhouse Response Strategy 1992*.

Waste

Queensland Department of Environment (1996) *Waste Management Strategy for Queensland*. Queensland Department of Environment, Brisbane.

Queensland Department of Environment (1998) *Draft Guidelines for the Assessment and Management of Contaminated Land in Queensland*. Department of Environment, Brisbane.

ANZECC (1998) *Towards Sustainability: Achieving Cleaner Production in Australia*. Australian and New Zealand Environment and Conservation Council, Canberra.

ANZECC (1994) *National Strategy for the Management of Scheduled Wastes*. Australian and New Zealand Environment and Conservation Council, Canberra.

NEPC (1999) *National Environmental Protection Measure on Assessment of Site Contamination*, NEPC Service Corporation, Adelaide.

Queensland Environmental Protection Agency (in press) *Central and Northern Queensland Land Characterisation Study*. Environmental Protection Agency, Brisbane.

The following are selected references for use in planning for proposals:

AS/NZS/ISO 14040 (1998) - *Life Cycle Assessment - Principles and Framework*.

AS/NZS/ISO 14041 (1999) - *Life Cycle Assessment - Goal, Scope and Definition*.

AS/NZS/ISO 14049 - *Life Cycle Assessment - Technical Report (Illustrative Example)*.

Noise

All Australian Standards and other documents outlined in Schedules 3 and 4 of the Environmental Protection (Noise) Policy are endorsed by the Environmental Protection Agency for use in planning and impact assessment.

Australian Standard AS1055.2-1997 *Acoustics - Description and measurement of environmental noise - Application to specific situations*.

Australian Standard AS1055.5-1997 *Acoustics - Description and measurement of environmental noise - Acquisition of data pertinent to land use*.

Australian Standard AS2670.2-1990 Evaluation of Human Exposure to Whole Body Vibration. Part 2: Continuous and shock induced vibration in buildings (1 to 80 Hz).

British Standard BS6472:1992 Evaluation of Human Exposure to Vibration in Buildings (1 Hz to 80 Hz).

Nature Conservation

Queensland Environmental Protection Agency (1999) *Strategy for the Conservation and Management of Queensland Wetlands*. Queensland Environmental Protection Agency, Brisbane.

Queensland Environmental Protection Agency (2000) *Characteristics of Important Wetlands in Queensland*. Queensland Environmental Protection Agency, Brisbane.

Queensland Environmental Protection Agency (1999) *State of the Environment Queensland 1999*. Queensland Environmental Protection Agency, Brisbane.

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Commonwealth of Australia (1992) *National Strategy for Ecologically Sustainable Development*. Commonwealth Government, Canberra.

Commonwealth of Australia (1996) *National Strategy for the Conservation of Australia's Biological Diversity*. Commonwealth Government, Canberra.

Commonwealth of Australia (1992) *Australian National Strategy for the Conservation of Australian Species and Communities Threatened with Extinction*. Commonwealth Government, Canberra.

Cultural Heritage

The Australian ICOMOS Charter of the Conservation of Places of Cultural Significance (the Burra Charter) - a set of conservation principles and processes determined by heritage professionals which are used nationally for guidance in the practice of conservation and management of heritage places.

Queensland Environmental Protection Agency (1999) Selected references and provisions for use in environmental impact assessment are contained in *Guidelines for Historical and Indigenous Cultural Heritage Management* EPA Brisbane.

Health and Safety

Australian Standards, SAA Standards Australia, Canberra.
<http://www.standards.com.au>

Economic

Commonwealth Department of Finance (1991) *Handbook of Cost/Benefit Analysis* AGPS
National Competition Council (1997) *Compendium of National Competition Policy Agreements* Canberra
Queensland Treasury (1997) *Project Evaluation Guidelines* Queensland Government Brisbane
Queensland Treasury (1999) *Community Service Obligations: A Policy Framework* Queensland Government Brisbane

Hazard and Risk

AS/NZA (1999) *Risk Management Standard 4360*
Australian Dangerous Goods Codes
NSW Department of Urban Affairs and Planning (199?) *HAZOP Guidelines* (DUAP)
NSW DUAP (1994) Hazardous Industry Planning Advisory Paper (HIPAP)
List of Designated Hazardous Substances [NOHSC:10005 1994] National Occupational Health & Safety Commission (Worksafe Australia)

Sector Specific Guidelines

Mining Industry

Department of Minerals and Energy (1995) *Technical Guidelines for the Environmental Management of Exploration and Mining in Queensland* contact Queensland Environmental Protection Agency.

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Environment Protection Agency (1995) *Best Practice Environmental Management in Mining* series including *Environmental Impact Assessment* Commonwealth of Australia
<http://www.environment.gov.au>
<http://www.ameef.com.au>

Queensland Environmental Protection Agency (2001) *Guidelines on Environmental Management of Mining* - includes:

- Introduction to Policies and Guidelines for Impact Assessment
- Mining Industry Regulatory Framework
- Deciding the Level of Impact Assessment for the Mining Industry
- Impact Assessment Process for Standard Mining and Exploration Activities
- Impact Assessment Process for Non-Standard Mining and Exploration Activities
- Issue Identification and Community Consultation
- Preparing Environmental Management Overview Strategy (EMOS) for Non-Standard Mining Projects
- Preparing Plan of Operations and Audit Statement
- Preparing an Environmental Management Plan (EM Plan) for Non-Standard Mining Projects
- Development of Terms of Reference and Preparation of an Environmental Impact Statement
- The EIS Process for Non-Standard Mining Projects

Legislation Administered by EPA

Following is a comprehensive list of the legislation (Acts, Regulations, Plans) administered by the EPA. Much of this legislation may be relevant to environmental impact assessment and any approvals arising. The legislation that directly involves an approval process or requirement is marked (*).

THE ENVIRONMENTAL PROTECTION AGENCY ADMINISTERS ALL OR PARTS OF THE FOLLOWING LEGISLATION AND SUBORDINATE LEGISLATION

Acts:

Aboriginal Land Act 1991(s 83(2)-(11); s 134)
*Beach Protection Act 1968**
*Canals Act 1958**
Coastal Protection and Management Act 1995
*Cultural Record (Landscapes Queensland and Queensland Estate) Act 1987**
Currumbin Bird Sanctuary Act 1976
*Environmental Protection Act 1994**
*Environmental Protection and Other Legislation Amendment Act 2000**
Gurulmundi Secure Landfill Agreement Act 1992
*Integrated Planning Act 1997 (Chapter 3 of IDAS under referral arrangements)**
Litter Act 1971 (Day to day administration is delegated/ devolved to other authorities)
*Marine Parks Act 1982**
Meaker Trust (Raine Island Research) Act 1981
National Environment Protection Council (Queensland) Act 1994
National Trust of Queensland Act 1963
Nature Conservation Act 1992
Newstead House Trust Act 1939
*Queensland Heritage Act 1992**
Recreation Areas Management Act 1988
Torres Strait Islander Land Act 1991 (s 80(2)-(11); s 131)
*Transport Infrastructure Act 1994 (ss 233 and 236)**
Tweed River Entrance Sand Bypassing Project Agreement Act 1998
Wet Tropics World Heritage Protection and Management Act 1993

Regulations, policies, by-laws, orders, plans, notices:

Canals Regulation 1992
Coastal Management Control Districts (Requirements for Buildings or Other Structures) Regulations 1984
Coastal Management Control Districts (Building and Subdivision of Land Applications) Regulations 1984
Construction of Harbour Works (Fees) Regulation 1992
Environmental Protection Regulation 1998
Environmental Protection (Waste Management) Regulation 2000
Environmental Protection (Air) Policy 1997
Environmental Protection (Noise) Policy 1997
Environmental Protection (Water) Policy 1997
Environmental Protection (Waste) Policy 2000
Gurulmundi Secure Landfill By-law 1992
Harbours (Reclamation of Land) Regulation 1979
Integrated Planning Regulation 1998
Litter Regulation 1988
Marine Land Dredging By-laws 1987
Marine Parks (Cairns Zoning Plan) Order 1992
Marine Parks (Cairns) Order 1992
Marine Parks (Hervey Bay) Zoning Plan 1989
Marine Parks (Mackay/Capricorn) Zoning Plan 1988
Marine Parks (Moreton Bay) Order 1993
Marine Parks (Moreton Bay) Zoning Plan 1997
Marine Parks (Townsville/Whitsunday) Zoning Plan 1988

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Marine Parks (Woongarra) Order 1991
Marine Parks (Woongarra Zoning Plan) Order 1997
Marine Parks Order 1982
Marine Parks Regulation 1990
National Trust of Queensland (Financial Arrangements) Regulation 1981
National Trust of Queensland By-law 1988
Nature Conservation (Duck and Quail) Conservation Plan 1995
Nature Conservation (Duck and Quail Harvest Period) Notice 1999
Nature Conservation (Dugong) Conservation Plan 1999
Nature Conservation (Eulo Lizard Races) Conservation Plan 1995
Nature Conservation (Macropod Harvesting) Conservation Plan 1994
Nature Conservation (Macropod Harvest Period) Notice 1997
Nature Conservation (Problem Crocodiles) Conservation Plan 1995
Nature Conservation (Protected Areas) Regulation 1994
Nature Conservation (Protected Plants Harvest Period) Notice (No. 2) 1996
Nature Conservation (Protected Plants in Trade) Conservation Plan 1995 (Expired - see Part 3A of
Nature Conservation Regulation 1994)
Nature Conservation (Whales and Dolphins) Conservation Plan 1997
Nature Conservation (Wildlife) Regulation 1994
Queensland Heritage Regulation 1992
Recreation Areas Management By-laws 1991
Recreation Areas Management Regulation 1989
*Wet Tropics Management Plan 1998**

*** Denotes Legislation which have approvals**

Note : See <http://www.legislation.qld.gov.au> for copies of the above.