Queensland Government
Department of Infrastructure

Pinkenba Ethanol Bio-Refinery

DRAFT
TERMS OF REFERENCE
FOR AN
ENVIRONMENTAL IMPACT STATEMENT

UNDER PART (4) OF THE QUEENSLAND
STATE DEVELOPMENT
AND PUBLIC WORKS ORGANISATION ACT 1971

The Coordinator-General

March 2007

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PREAMBLE

Project Summary

Primary Energy Pty Limited proposes to establish a dry milling ethanol Bio-Refinery on an existing industrial site at Pinkenba in Brisbane.

The proposed Bio-Refinery will utilise renewable raw materials in the form of wheat, sorghum, and other forms of starch to produce renewable sources of energy. Fertiliser produced from the proposed plant will assist in replacing nutrients and trace elements in the soil that are required to grow the grain feedstock required for the Bio-Refinery. An anaerobic digester will process by-products from ethanol production to produce bio-gas which will be used to produce green electricity that can be exported back into the power grid. At full production, the proposed Bio-Refinery will process up to approximately 400,000 tonnes of grain feedstock per year to produce approximately 160ML of fuel grade ethanol, 240,000 tonnes of fertiliser, 16,000 tonnes of aqueous ammonia and up to 23MW of green electricity.

It is estimated that the project will require approximately $150 million in capital expenditure to establish and will generate up to 300 construction jobs. During the operational phase of the development approximately 50 direct full-time jobs will be created.

Administrative Procedures for these Terms of Reference

The Pinkenba Ethanol Bio-Refinery (the Project) was declared to be a "significant project" under Section 26(1)(a) of the Queensland *State Development and Public Works Organisation Act 1971* (SDPWO Act) by the Coordinator-General (CG) on 23 November 2006. Matters considered by the CG in making this declaration included information in an Initial Advice Statement prepared by the proponent; relevant planning schemes and policy frameworks; infrastructure impacts; employment opportunities; environmental effects; complexity of local, State and Commonwealth requirements; level of investment; and the project's strategic significance. The declaration initiates the statutory environmental impact assessment procedure of Part 4 of the SDPWO Act, which requires the proponent to prepare an Environmental Impact Statement (EIS) for the Project.

The CG is responsible for managing the environmental impact assessment process. The CG has invited relevant Commonwealth, State and Local Government authorities to participate in the process as Advisory Agencies.

The first step in the impact assessment procedure is the development of Terms of Reference (ToR) for the preparation of an EIS. The process involves the formulation of a draft ToR that is made available for public and Advisory Agency comment. The CG has regard to all comments received on the draft ToR in finalising the ToR, which will be presented to the proponent. This document represents the draft ToR for public comment.

The proponent is to prepare an EIS to address these ToR. Once the EIS has been prepared to the satisfaction of the CG, a public notice is to be placed in relevant newspapers. The notice will state where copies of the EIS are available for inspection and how it can be purchased; that submissions may be made to the CG about the EIS; and the submission period. The proponent may be required to prepare a Supplementary EIS to address specific matters raised in submissions on the EIS.

The statutory impact assessment process under the *SDPWOA* is also the subject of a bilateral agreement between the Queensland and the Commonwealth Governments in relation to environmental assessment under the *Environment Protection and Biodiversity Conservation Act 1999* (*EPBC Act).* The proponent has advised that it has considered the relevant issues under Section 75 of the *EPBC Act*, in particular, the controlling provisions of

wetlands of international importance (sections 16 and 17B), listed threatened species and communities (section 18 and 18A), and listed migratory species (sections 20 and 20A). The proponent has concluded that the proposed development is not likely to be a controlled action under the EPBC Act and has decided not to refer the project to the Commonwealth.

At the completion of the EIS phase, the CG will prepare a report evaluating the EIS and any other related material, pursuant to Section 35 of the SDPWO Act. The CG report will reach a conclusion about the environmental effects and any associated mitigation measures, taking into account all of the relevant material including the EIS; all properly made submissions and other submissions accepted by the CG; and any other material the CG considers is relevant to the project, such as a Supplementary EIS, comments and advice from Advisory Agencies, technical reports on specific components of the project and legal advice.

Relevance of EIS process to the Project

The Project involves development that would require an application for development approval for material change of use and/or impact assessment under the *Integrated Planning Act 1997* (IPA). Consequently, the CG report may, under Section 39 of SDPWO Act, state one or more of the following for the assessment manager:

- the conditions that must attach to the development approval;
- that the development approval must be for part only of the development; and
- that the approval must be preliminary approval only.

Alternatively the CG report must state for the assessment manager:

- that there are no conditions or requirements for the project; or
- that the application for development approval be refused.

Further, the CG report must:

- give reasons for the statements (above); and
- be given to the assessment manager by the CG.

Further to the approvals that will be sought through the IDAS process, other approvals under a range of legislation including, but not limited to IPA, the *Environmental Protection Act 1994* and the *Airports Act 1996* (Cwth), are likely to be required.

These ToR provide information in two broad categories:

- Part A – Information and advice on the preparation of the EIS.
- Part B – Content of the EIS.

For further inquiries about the EIS process for the project, please contact:

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PART A — INFORMATION AND ADVICE ON THE PREPARATION OF THE EIS

Purpose of the ToR

These TOR for an EIS for the Project have been prepared in accordance with the requirements of the SDPWO Act. The ToR essentially outline the issues that should be considered in preparing the EIS. However, the ToR should not be interpreted as excluding from consideration any matters which are currently unforeseen, which may arise during ongoing scientific studies or which may arise from any changes in the nature of the project during the preparation of the EIS, the community consultation process and associated documentation. In such circumstances, these matters should be included in the EIS.

The ToR also provide the framework for the EIS, including information on the purpose and role of the EIS and the factors considered significant for the project. They indicate the types of studies and the data that should be provided in the EIS. All potentially significant impacts of the proposed development on the environment are to be investigated, and requirements for the mitigation of any adverse impacts are to be detailed in the EIS. Any prudent and feasible alternatives should be discussed and treated in sufficient detail. The reasons for selection of the preferred option should be clearly identified. The nature and level of investigations should be relative to the likely extent and gravity of impacts.

The EIS should address at least the requirements as set out in these ToR.

EIS Guidelines

The EIS process followed will be as specified in the SDPWO Act.

The objective of the EIS is to identify potential environmental impacts and to ensure that those impacts are avoided where possible. Where unavoidable, impacts must be examined fully and addressed so that the development is based on sound environmental protection and management criteria.

The term environment refers to:
a) ecosystems and their constituent parts, including people and communities;
b) all natural and physical resources;
c) the qualities and characteristics of locations, places and areas, regardless of size, that stimulate biological diversity and integrity, intrinsic or attributed scientific value or interest, amenity, harmony and sense of community;
d) the social, economic, aesthetic and cultural conditions which influence, or are affected by, the entities and attributes mentioned in paragraphs (a) to (c); and
e) the local, regional, Queensland and Australian populations and labour markets.

An EIS should provide:

- a description of the relevant aspects of the existing social, economic, natural and built environment;
- a description of the development project and means of achieving the development objectives;
- definition and analysis of the likely impacts of the development on the environment;
- a framework against which Government decision-makers can consider the environmental aspects of the project and set conditions for approval to ensure environmentally sound development;
- a definition of all significant impacts and a consolidated list of measures proposed to mitigate adverse effects; and

- recommendations on the need for and contents of any environmental management plans and/or operational plans to mitigate adverse effects.

EIS Objectives and Key Issues

The objectives of the EIS are as follows:

- to provide information on the Project and development process to the community and decision makers;
- to comprehensively identify and evaluate all relevant issues associated with the Project;
- to identify all potential environmental, economic, infrastructure requirements and actions, cultural, social, transport and land use planning impacts of the preferred concept, and recommend infrastructure and facilities needs together with other design and operational measures required to minimise or compensate for adverse impacts and enhanced benefits;
- to consult with the community and relevant stakeholders in the process of identifying, assessing and responding to the impacts of the Project;
- to identify all necessary licences, planning and environmental approvals including approval requirements pursuant to the *Integrated Planning Act 1997*, *Environmental Protection Act 1994*, *Airports Act 1996* (Cwth), other legislation and the Brisbane City Plan 2000 and the Australia TradeCoast Local Area Plan; and
- to provide an input to the decision making process, assisting with the determination of whether to accept or modify the Project, approve it with conditions or carry out further studies.

The issues to be addressed as part of the EIS can be divided into the following categories:

- detailed project description;
- project justification and alternatives;
- impacts on the marine terrestrial environment,
- impacts on infrastructure in the area including the road network, waste water treatment facilities, electricity, gas water and telecommunications networks;
- impacts on the coastal environment including water quality;
- impacts on areas of cultural heritage value and / or indigenous significance;
- air emissions and impacts;
- soil and geology issues.
- impacts of noise and vibration;
- impacts on surrounding land uses and land use planning including visual and aesthetic amenity;
- economic effects, including impacts and benefits on local and regional businesses;
- social issues and opportunities;
- safety and emergency; and
- waste management.

The EIS will be required to consider in detail relevant issues under each of these categories and all other impacts on the physical and social environment. The information required is described in the following sections.

Public Consultation on Draft ToR

The Draft ToR will be publicly notified in The Courier Mail and Quest Community newspapers and on CG website www.infrastructure.qld.gov.au inviting comment on the Draft ToR for the Project. Written comments and submissions will be accepted by the CG until the close of business on Tuesday 17 April 2007.

PART B — CONTENTS OF THE EIS

It is strongly recommended that the EIS follows the heading structure of these ToR to facilitate cross-referencing. This structure has been found through long experience to be the best option.

Executive Summary

The function of the executive summary is to convey the most important aspects and options relating to the proposed Pinkenba Ethanol Bio-Refinery project (the Project) to the reader in a concise and readable form. The structure of the executive summary should follow that of the EIS, and focus strongly on the key issues and conclusions.

Glossary of terms

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

1.0 INTRODUCTION

The function of the introduction is to explain why the EIS has been prepared and what it sets out to achieve. In particular, the introduction should address the level of detail of information required to meet the level of approval being sought (for example, whether the proponent is seeking only a preliminary approval through the Integrated Development Assessment System (IDAS) or a full approval with all permits). It should also define the audience to whom it is directed, and contain an overview of the structure of the document. Throughout the EIS, factual information contained in the document should be referenced.

1.1 Project Proponent

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

1.2 Project Description

A brief description of the key elements of the Project should be provided and illustrated. Any major associated infrastructure requirements should also be summarised. Detailed descriptions of the Project should follow in Section 3.

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

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.

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

1.4 The Environmental Impact Statement (EIS) Process

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

1.4.1 Methodology of the EIS

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

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

1.4.2 Objectives of the EIS

This section should provide a succinct statement of the objectives of the EIS for the Project. It should be highlighted that the purpose of the EIS is to:

- Provide public information on the need for, and likely effects of the Project
- 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 environmental values.

The structure of the EIS should then be outlined as an explanation of how the EIS will meet its objectives. The reader should be able to distinguish the EIS as the key environmental document for providing advice to decision makers considering approvals for the Project.

While the ToR provide guidance on the scope of the EIS studies, they should not be seen as exhaustive or limiting. It is important for proponents and their consultants to recognise that there cannot be perfect knowledge in advance of undertaking an EIS of what the EIS studies may find.

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

In addition, it is essential that the main text of the EIS should address all relevant matters concerning environmental values, impacts on those values and proposed mitigation measures. No relevant matter should be raised for the first time in an appendix or the environmental management plan (EMP). When considering whether a potential impact may or may not be significant, the proponent should take account of both the intensity of the impact and the context in which it could occur.

The EIS is a public document. Its purpose is not only to provide information to regulatory agencies, but also to inform the public of the scope, impacts and mitigation measures of the proposal. As such, the main text should be written in plain English avoiding jargon as much as possible. Additional technical detail may be provided in appendices. The main text should not assume that a reader would have a prior knowledge of the project site. It should not be necessary for the reader to have visited the site to understand the issues involved in the proposal.

In brief, the EIS objectives should be to provide public information on the need for and likely effects of the project, to set out acceptable standards and levels of impacts (both beneficial and adverse) on environmental values, and demonstrate how environmental impacts can be managed through the protection and enhancement of the environmental values. Discussion of options and alternatives and their likely relative environmental management outcomes is a key aspect of the EIS.

The role of the EIS in providing the Project's EMP should also be discussed with particular reference to the EMP's role in providing management measures that can be carried over into conditions that would be attached to any approval(s), environmental authorities and permits for the project.

1.4.3 Submissions

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

1.5 Public Consultation Process

To facilitate the assessment process, the proponent is strongly encouraged to regularly consult with Advisory Agencies and other appropriate stakeholders throughout the EIS process. This should include consultation, where necessary, with relevant Indigenous traditional owner groups and the Indigenous community.

It is the responsibility of the proponent, in consultation with Advisory Agencies, to identify legislation, policies and methodologies relevant to the EIS process, and to determine appropriate parts of the community which should be consulted during the EIS preparation stage. It is recommended that an open community consultation process be carried out in addition to the legislated environmental impact assessment process. Copies of the draft EIS will be provided to all Advisory Agencies and on request to relevant individuals and peak groups with an interest in the Project.

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

The public consultation process should identify broad issues of concern to local community and interest groups and should continue from project planning through construction, ongoing operation and maintenance; refer to the EPA guideline **"***Issue Identification and Community Consultation***"**.

1.6 Project Approvals

1.6.1 Relevant legislation and policy requirements

The aim of this section is to provide the reader with an explanation of the legislation and policies controlling the approvals process for the Project. Reference should be made to the Queensland SDPWO Act*, Environmental Protection Act 1994, Water Act 2000, Integrated Planning Act 1997* and other relevant Queensland laws. Any requirements of the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and the *Airports Act 1996* should also be included.

The EIS should describe the approvals process resulting from the gazettal of the Project as a 'significant project' pursuant to the SDPWO Act and outline the linkage to other relevant

State and Commonwealth legislation. The EIS should also indicate the level of approvals anticipated by the Proponents for each project element in order for approval agencies to be able to determine the level of completeness of the information presented and the scope to generate the anticipated approvals.

In addition, local government planning controls, local laws and policies applying to the Project should be described, and a list provided of the approvals required for the Project and the expected program for approval of applications. A description of the Environmentally Relevant Activities necessary for each aspect of the Project should be given.

1.6.2 Planning processes and standards

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

2.0 PROJECT NEED AND ALTERNATIVES

2.1 Project Justification and Alternatives

The rationale and justification for the Project should be explained in relation to current issues in the ethanol production industry and any relevant policy or regulatory framework, Australian or overseas market requirements and expected local, regional, State or national benefits. The Project justification should be outlined with particular reference to the environmental, economic and social costs and benefits, including any direct and indirect employment, and any spin-off business development which the Project may generate.

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

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

Reasons for selecting the preferred options should include technical, commercial, social and natural environment aspects, in particular the principals of ESD and sustainable development. The relationship of options chosen for waste management and any emissions produced should be detailed. This information is required to assess why the scope of the proposal is as it is and to ensure that the ESD principles and sustainable development aspects have been considered and incorporated during the scoping and planning of the proposal.

3.0 DESCRIPTION OF THE PROJECT

The objective of this section is to describe the Project through its lifetime of construction, operation and decommissioning to allow assessment of all aspects of the life of the proposal. The Project description also allows further assessment of which approvals may be required and how they may be managed through the life of the Project.

3.1 Overview of Project

The key elements of the Bio-Refinery project should be described, including a summary of:

- The proposed project location and existing infrastructure onsite, with reference to maps of an appropriate scale;
- The major production processes which will occur within the Bio-Refinery;
- Input materials and output products;
- The major infrastructure requirements;
- The relationship of the project with existing infrastructure in the area, including rail and port facilities, and any synergies with existing and/or proposed development in the area;
- Project timing, including the length of the construction phase, any staging, and the operational life of the project;
- Capital and operating costs; and
- Actions which have already been undertaken within the project area.

The EIS should also provide information on the number of personnel to be employed and the sources for the workforce during all phases of the development. Estimates should be provided according to the skilled and semi-skilled worker categories and expected dates when the workforce requirements will fluctuate for each stage of the Project.

3.2 Ecological Sustainable Development

A brief summary of the Project's compatibility with Ecological Sustainable Development (ESD) policy and other relevant policy instruments must be presented. Consideration must 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 must be discussed and conclusions drawn as to how the Project conforms. A life-of-project perspective must be shown.

This information is required to assess the Project against the ESD principles and ensure that sustainable development aspects have been considered and incorporated during the scoping and planning of the Project.

3.3 Location

This section should include a detailed description of the proposed Project site including plans of the area in relation to surrounding features and land uses. Mapping should include details of:

- the location of the facilities in a regional and local context;
- land tenures;
- present land uses and Planning Scheme zonings;
- surrounding industries and other land uses;
- features of State and National environmental significance;
- photo images at appropriate scales;
- the Project in the context of the sub-regional transport system; and

- the Project in relation to existing and adjacent infrastructure such as rail and road that provide access to the site.

The EIS should provide details on adjacent areas that could be affected by the Project.

3.4 Construction

The extent and nature of the Project's construction phase should be described. The description should include:

- type and methods of construction;
- construction timetable;
- hours of work;
- type and quantity of equipment to be used;
- the location of the source/origin of construction materials and transport details (i.e. nature, mode, frequency and hazard), and
- the extent of surface disturbance.

If the Project is to be staged, stages of development should be provided, on separate plans for each stage if necessary for clarify, and anticipated dates for start of construction, plant testing and final commissioning provided.

The estimated numbers of people to be employed in the Project construction phase must also be provided with a brief description of the skills required, whether these skills are currently available in the area and where those people may be accommodated and/or how they will be transported to the site.

3.5 Operations

3.5.1 On Site Operations

This section should describe the location and nature of all facilities and processes involved in the Project. Concept and layout plans should be provided showing proposed buildings, structures, plant and equipment associated with the process.

3.5.2 Bio-Refinery Process

The production processes which will occur within the Bio-Refinery should be described in this section, and illustrated using maps and flow charts as relevant.

3.5.3 Input Materials and Output Products

This section should describe the required input materials and output products for each component of the Bio-Refinery. Indicative process flow sheets should be provided showing material balances and the anticipated rates of inputs, along with similar data on the products, wastes and recycle streams for the Bio-Refinery.

3.5.4 Site layout and Infrastructure Requirements

A full description of all facilities required for the Project should be provided in this section.

3.5.5 Buildings and Structures

This section should provide details of all buildings and structures required onsite.

3.5.6 Plant and Equipment

This section should provide details of all plant and equipment required onsite.

3.5.7 Site and Service Access and Carparking

This section should provide details of site access, service access and carparking facilities onsite.

3.6 Infrastructure Requirements

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

3.6.1 Transport Infrastructure – road/rail/ship

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

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

3.6.2 Energy

The EIS should describe all energy requirements, including electricity, natural gas, and/or solid and liquid fuel requirements for the construction and operation of the proposal. The locations of any easements should be shown on the infrastructure plan. Timeframes should be provided for the commencement of construction of supply facilities, testing and final commissioning. This section of the EIS should include details on energy demand and annual consumption.

3.6.3 Water

The EIS should nominate the proposed (and optional) source(s) of water required for the Project and quantify the demand for raw and treated water for the various processes in the following terms:

- quality of water required, including strategies to prevent contamination;
- maximum hourly demand;
- maximum daily demand;
- mean day maximum month demand;
- total annual consumption;
- any additional water supply infrastructure, and
- requirements for fire-fighting or other emergency services.

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

The EIS should include details of strategies for minimisation, reuse, recycling and efficiency monitoring of water during the Project. In order to assess the capability of the water network to provide the necessary service for the Bio-Refinery, the following data should be detailed:

- current and projected raw and treated water consumption;
- current and projected on-site raw and treated water storage;
- contingency plans for planned and non-planned supply failures, and
- projected dates for increased raw and treated water supplies.

The EIS should describe the changes to stormwater management to be undertaken in conjunction with the Project, including a description of any discharges for construction and operational stages, as well as the topography of the site and adjacent areas if any run-off is expected to leave the site.

3.6.4 Sewerage

The EIS should also describe the Project's requirements of the external sewerage system to cater for sewage discharges from the Pinkenba Bio-Refinery site. The EIS should provide details of on-site sewerage treatment. Volume estimates of industrial and domestic effluent that will be produced and the proposed method of disposal should be provided, and the physical and chemical characteristics of such effluent described. If discharging into an existing sewerage system, an assessment of the capacity of the existing system to accept the effluent should be provided.

3.6.5 Telecommunications

The EIS should provide details of telecommunication requirements, sources and methods and the ultimate owners of that infrastructure.

3.7 Waste Products and Management

The EIS should provide details of all waste products from the process and summarise waste management methods which demonstrate that waste minimisation and cleaner production techniques are in keeping with international best practice environmental management and have been implemented through the selection of processes, equipment and facilities to prevent or minimise environmental impacts.

This information should include:

- Descriptions of processes, equipment and facilities to be incorporated into the overall Project specifically for the purpose of avoiding waste generation, reusing or recycling wastes, or treating wastes to lessen their effect on the natural environment; and

- Proposed means for management of wastes produced under circumstances other than as a result of normal Project development, including wastes generated during modification, unusual conditions where the facilities are operating (start up, maintenance, shut-down) and domestic sewage and refuse.

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

An inventory of all solid, liquid and gaseous wastes should be provided with reference to the relevant sub-sections of Section 4, and noise emissions described with reference to Section 4.8.

3.8 Decommissioning

This section should present the strategies and methods for decommissioning of the Bio-Refinery, progressive and final rehabilitation of the environment disturbed by the proposal. The means of decommissioning the proposal, in terms of the removal of plant, equipment, structures and buildings should be described, and the methods proposed for the stabilisation of the affected areas should be given. Final rehabilitation of the site should be discussed in terms of ongoing land use suitability, management of any residual contaminated land and any other land management issues.

4.0 ENVIRONMENTAL VALUES AND MANAGEMENT OF IMPACTS

The functions of this section are:

- To describe the existing environmental values of the area which may be affected by the proposal. Environmental values are defined in section 9 of the *Environmental Protection Act 1994*, environmental protection policies and other documents such as the ANZECC 2000 guidelines and South East Queensland Regional Water Quality Management Strategy. Environmental values may also be derived following recognised procedures, such as described in the ANZECC 2000 guidelines. Environmental values should be described by reference to background information and studies, which should be included as appendices to the EIS.
- To describe the potential adverse and beneficial impacts of the proposal on the identified environmental values. Any likely environmental harm on the environmental values should be described.
- To describe any cumulative impacts on environmental values caused by the proposal, either in isolation or by combination with other known existing or planned sources of contamination.
- To present environmental protection objectives and the standards and measurable indicators to be achieved.
- To examine viable alternative strategies for managing impacts. These alternatives should be presented and compared in view of the stated objectives and standards to be achieved. Available techniques, including best practice, to control and manage impacts

to the nominated objectives should be discussed. This section should detail the environmental protection measures incorporated in the planning, construction, operations, decommissioning, rehabilitation and associated works for the proposal. Measures should prevent, or where prevention is not possible, minimise environmental harm and maximise socio-economic and environmental benefits of the proposal. Preferred measures should be identified and described in more detail than other alternatives.

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

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

- Environmental values affected: describe the existing environmental values of the area to be affected including values and areas that may be affected by any cumulative impacts (refer to any background studies in appendices - note such studies may be required over several seasons). It should be explained how the environmental values were derived (e.g. by citing published documents or by following a recognised procedure to derive the values).
- Impact on environmental values: describe quantitatively the likely impact of the proposal on the identified environmental values of the area. The cumulative impacts of the proposal must be considered over time or in combination with other (all) impacts in the dimensions of scale, intensity, duration or frequency of the impacts. In particular, any requirements and recommendations of relevant State planning policies, environmental protection policies, national environmental protection measures and integrated catchment management plans should be addressed.
- Cumulative impacts on the environmental values of land, air and water and cumulative impacts on public health and the health of terrestrial, aquatic and marine ecosystems must be discussed in the relevant sections. This assessment may include air and water sheds affected by the proposal and other proposals competing for use of the local air and water sheds.
- Where impacts from the proposal will not be felt in isolation to other sources of impact, it is recommended that the proponent develop consultative arrangements with other industries in the proposal's area to undertake cooperative monitoring and/or management of environmental parameters. Such arrangements should be described in the EIS.
- Environmental protection objectives: describe qualitatively and quantitatively the proposed objectives for enhancing or protecting each environmental value. Include proposed indicators to be monitored to demonstrate the extent of achievement of the objective as well as the numerical standard that defines the achievement of the objective (this standard must be auditable). The measurable indicators and standards can be determined from legislation, support policies and government policies as well as the expected performance of control strategies. Objectives for progressive and final rehabilitation and management of contaminated land should be included.
- Control strategies to achieve the objectives: describe the control principals, proposed actions and technologies to be implemented that are likely to achieve the environmental

protection objectives; include designs, relevant performance specifications of plant. Details are required to show that the expected performance is achievable and realistic.

- Monitoring programs: describe the monitoring parameters, monitoring points, frequency, data interpretation and reporting proposals.
- Auditing programs: describe how progress towards achievement of the objectives will be measured, reported and whether external auditors will be employed. Include scope, methods and frequency of auditing proposed.
- Management strategies: describe the strategies to be used to ensure the environmental protection objectives are achieved and control strategies implemented eg. continuous improvement framework including details of corrective action options, reporting (including any public reporting), monitoring, staff training, management responsibility pathway, and any environmental management systems and how they are relevant to each element of the environment.
- Information quality: information given under each element should also state the sources of the information, how recent the information is, how any background studies were undertaken (eg intensity of field work sampling), how the reliability of the information was tested, and what uncertainties (if any) are in the information.

It is recommended that the EIS follow the heading structure shown below. The mitigation measures, monitoring programs, etc., identified in this section of the EIS should be used to develop the environmental monitoring program for the project (see section 5).

4.1 Climate

This section should describe the climate of the project site, including:

- rainfall patterns (including magnitude and seasonal variability of rainfall),
- air temperatures,
- evaporation,
- humidity,
- wind (direction and speed), and
- any other special factors (e.g. temperature inversions) that may affect air quality within the environs of the proposal.

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

The potential impacts due to climatic factors should be addressed in the relevant sections of the EIS.

4.2 Land

4.2.1 Description of Environmental Values

This section of the EIS should:

- describe the existing environment of the proposed project site through reference to background information and studies, and
- present environmental protection objectives and the standard and measurable indicators to be achieved.

Particular attention should be given to the strategies for the protection of environmentally sensitive areas or areas of a high conservation value and the requirements of any Commonwealth strategies, State planning policies, local authority planning schemes, environmental protection policies under the EP Act and any catchment plans prepared by local water boards or land care groups.

4.2.1.1 Land Characteristics

This section should describe the existing land characteristics of the project area and where relevant the project goals in relation to land characteristics which will protect or enhance the environmental values of existing land characteristics.

4.2.1.2 Topography

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

4.2.1.3 Geology

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

4.2.1.4 Soils

This section of the EIS should describe:

- Soil types and properties within the Project area;
- Landforms;
- Any areas at or below 5m AHD which would trigger a detailed acid sulphate soil investigation designed to assess the potential impact of disturbing acid sulphate soils by excavation, filling or extracting groundwater, and
- Soil stability.

With regard to acid sulfate soils (ASS), an investigation that meets the standards set out in "*Guidelines for Sampling and Analysis of Lowland Acid Sulfate Soils in Queensland 1998*" Ahern, Ahern and Powell or any subsequent updates as they become available, should be undertaken. The ASS Investigation must clearly define the extent of all potential and actual acid sulfate soils (if any) on the site and must adequately characterise all soil horizons within the areas to be excavated and the areas that may be drained.

An ASS management plan must be prepared for any works that have the potential to disturb ASS. The Plan must based on the ASS assessment in accordance with the ASS Guidelines (or any subsequent updates), and management and monitoring plans prepared in consultation with officers of the Department of Natural Resources and Water and the EPA. Reference should be made to the Soil Management Guidelines (Dear *et al*. 2002);

Instructions for the Treatment and Management of Acid Sulfate Soils (EPA 2001); and the State Planning Policy 2/02, "Planning and Managing Development involving Acid Sulfate Soils" (eg. identification and management and format of environmental management plans).

4.2.1.5 Contamination

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

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

4.2.1.6 Land Use

This section should describe current land tenures and land uses. Maps at suitable scales showing existing land uses and tenures should be provided for the project area and surrounding land that could be affected by the Project. The location of existing dwellings and the zoning of all affected lands according to any existing town or strategic plan should be included.

4.2.1.7 Sensitive Environmental Areas

The EIS should identify the proximity of the Project to any environmentally sensitive areas. This section of the EIS should then identify whether any of those environmentally sensitive areas could be affected, directly and indirectly, by the Project.

In particular, the EIS should indicate if the land affected by the Project is, or is likely, to become part of the protected area estate, or is subject to any treaty. Consideration should be given to national parks, conservation parks, declared fish habitat areas, wilderness areas, aquatic reserves, heritage/historic areas or items, national estates, world heritage listings and sites covered by international treaties or agreements (e.g. Ramsar, JAMBA, CAMBA), areas of cultural significance and scientific reserves (see section 4.9 for further guidance on sensitive areas).

4.2.1.8 Landscape Character/Visual Amenity

This section of the EIS should include an assessment of the existing landscape character/visual quality of the project site and the surrounding area and its prominence. 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 any local government strategic plan - city image and townscape objectives and associated maps;
- major views, view sheds, existing viewing outlooks, ridgelines and other features contributing to the amenity of the area, including assessment from private residences in the affected area along the route;
- focal points, landmarks (built form or topography), gateways associated with project site and immediate surrounding areas, waterways, and other features contributing to the visual quality of the area and the project site;

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

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

4.2.2 Potential Impacts and Mitigation Measures

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

4.2.2.1 Land Use Suitability

The potential for the construction and operation of the proposal to change existing and potential land uses of the proposal site and adjacent areas should be detailed. Such discussion should include:

- Description of the proposed new land use in the project area;
- An evaluation of the suitability of the project with the land use planning policy in terms of physical and economic attributes;
- Compatibility of the project with surrounding land uses, and
- Possible impacts on surrounding land uses and human activities.

4.2.2.2 Land Disturbance

This section of the EIS should address land disturbance during the construction, operating and decommissioning phases of the project. A strategy should be developed with a view to minimising the amount of land disturbed at any one time.

The methods to be used in the management of sediment and erosion control and land disturbance 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 any landscaping and revegetation.

Proposed decommissioning should be described in terms of land disturbance with reference to Section 3.8.

A description of topsoil management should be provided. This description 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.

4.2.2.3 Land Contamination

This section of 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 EP 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 within the project area after project completion.

Reference to Section 3.8 should be made where relevant.

4.2.2.4 Land Characteristics

This section should define and describe the objectives for the protection or enhancement of land characteristics identified in Section 4.2.1.1. This section should describe how nominated quantitative standards and indicators may be achieved, and how the achievement of the objectives will be monitored and managed.

4.2.2.5 Landscape Character/Visual Amenity

An outline of the resulting landscape character/visual quality of the project site and surrounding area and its prominence should be provided in this section. Information in the form of maps, sections, elevations and photographs should be utilised. The impact on visual amenity should be described, as should the intended proposal design to achieve the visual character specified.

4.2.2.6 Lighting

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

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

4.3 Infrastructure

4.3.1 Description of Environmental Values

The location and owner/custodians of all tenures, reserves, roads and road reserves, railways and rail reserves and the like, covering the affected land should be shown on maps of a suitable scale. Locations of gas and water pipelines, power lines, telecommunications and any other easements should be indicated. Any environmental values likely to be affected by this infrastructure should be described.

4.3.2 Potential Impacts and Mitigation Measures

This section is to assess the potential impacts of the Project on existing and any planned utility services. Strategies to minimise potential impacts on existing utility services, including required upgrading of infrastructure, should be provided.

4.3.2.1 Traffic and Transport

The EIS should provide sufficient information 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 an independent assessment of how the rail

network (including infrastructure) will be affected. In both cases the impact on stakeholders along the whole route should be detailed, as should how any impacts will be managed.

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

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

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

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

Information should be provided regarding product spill contingency plans and the adequacy of equipment and facilities to deal with possible spills for the transport nodes of the proposal. The EIS should indicate whether there is a need to update the plans based on increase in frequency of traffic and volumes to be transported.

The EIS should also address the potential impacts on privately owned or port authority operated ports and State-controlled, Commonwealth-controlled or privately owned airports. Additional water transport issues that should be considered including the potential of the proposal to impact on craft in the Brisbane River.

The EIS should outline details of any potential impacts on existing or proposed pedestrian and cycle networks.

4.3.2.2 Energy

The capacity of existing energy networks to service the Project should be determined in consultation with service providers.

The potential impacts on existing energy infrastructure by the Project should be assessed and details provided of upgrades required.

Energy conservation should be briefly described in the context of any Commonwealth, State and local government policies.

4.3.2.3 Telecommunications

The capacity of existing networks to service the Project should be determined in consultation with service providers.

This section should describe any impacts the Project would have on existing telecommunications infrastructure (such as optical cables, microwave towers, etc.).

4.4 Aviation Issues

4.4.1 Description of Environmental Values

Obstructions in the vicinity of an airport have the potential to create air safety hazards and to seriously limit the scope of aviation operations into and out of Brisbane Airport. This section should describe the existing aviation environment which may be affected by the Project. Environmental values should be described in the context of the controlled activities under Part 12 of the *Airports Act 1996* and the *Airports (Protection of Airspace) Regulations 1996.* Reference should be made to the *Civil Aviation Safety Regulations 1998,* the *Civil Aviation Regulations 1998* and the State Planning Policy 1/02 – Development in the Vicinity of Certain Airports and Aviation Facilities.

Where approval will be required to undertake a controlled action, this section of the EIS should provide sufficient information for a decision to be made on the application.

4.4.2 Potential Impacts and Mitigation Measures

This section should define and assess the potential impacts, during both the construction and operational stages, of the Project on the operations of Brisbane Airport in general and on the protected airspace above the Pinkenba Ethanol Bio-Refinery in particular. Details should be provided of the measures to be undertaken to mitigate or avoid the identified impacts. Issues to be addressed include:

- permanent structures, such as buildings, intruding into the protected airspace
- temporary structures such as cranes intruding into the protected airspace;
- any activities causing intrusions into the protected airspace through glare from artificial light or reflected sunlight, air turbulence from stacks or vents, smoke, dust, steam or other gases or particulate matter.

4.5 Water

4.5.1 Description of Environmental Values

This section describes the existing environment for water resources, which may be affected by the project, in the context of environmental values as defined by the EP Act and Environmental Protection Policies (EPPs).

4.5.1.1 Surface Water

This section should provide a description of any surface water courses in the vicinity of the Project site, including water quality and quantity in the area affected by the proposal. Details provided should include:

- a description of existing surface drainage patterns and flows in major streams and wetlands;
- flooding potential, including historic flood extents, levels and frequency;
- a description of present and potential water users downstream of the areas affected by the proposal, and
- an assessment of existing water quality using results obtained from a surface water monitoring program.

The environmental values of the surface waterways of the affected area should be described in terms of:

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

4.5.1.2 Groundwater

The EIS should review the quality, quantity and significance of groundwater in the project area, together with groundwater use in neighbouring areas. The 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 if warranted. This section should include reference to:

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

- The 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; and
    - vulnerability to pollution.

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

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

4.5.2 Potential Impacts and Mitigation Measures

This section should define and describe the objectives and practical measures for protecting or enhancing water resource environmental values (including those for coastal waters where relevant), to describe how nominated quantitative standards and indicators may be achieved, and how the achievement of the objectives will be monitored, audited and managed.

4.5.2.1 Surface Water

This section of the EIS should include an assessment of the potential impacts the proposed Project may have on the flow and the quality of surface waters from all phases of the Project, with particular reference to their suitability for the current and potential downstream uses and current discharge licences. The impacts of surface water flow on existing infrastructure should be considered in reference to the *EPP (Water)* and *Water Act 2000.*

The potential environmental harm caused by the proposal on coastal resources and processes should be described in the context of controlling such effects. The *State Planning Policy – Planning and Managing Development involving Acid Sulfate Soils 2002* should be addressed as should the *State Coastal Management Plan 2001* and Department of Primary Industries and Fisheries Guidelines for Marine Areas.

Quality characteristics discussed should be appropriate to the downstream, upstream and coastal water uses that may be affected. Chemical and physical properties of any waste water at the point of discharge into natural surface waters should be discussed, including the toxicity of effluent to flora and fauna.

An 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.

In relation to water supply, usage and wastewater disposal, the EIS should assess:

- anticipated flows of water to and from the Project area;
- investigate the effects of predictable climatic extremes (droughts, floods) upon the structural integrity of containment walls where dams, weirs or ponds are proposed;
- quality of water contained in dams;
- flows and quality of water discharged;
- the use of the site water management technical guidelines in the design of all water storage facilities; and
- the need or otherwise for licensing any dams (including referable dams), under the *Water Act 2000.*

The EIS should include the results of a risk assessment for uncontrolled releases to water due to system or catastrophic failure, implications of such emissions for human health and natural ecosystems, and list strategies to prevent, minimise and contain impacts.

The relevant standards and indicators mentioned in the *Australian and New Zealand Guidelines for Fresh and Marine Water Quality, (2000)* prepared under the *National Water Quality Management Strategy* should be used as a reference when assessing surface water impacts.

Management strategies should be adequately detailed to demonstrate best practice management and that environmental values of receiving waters will be maintained to nominated water quality objectives.

Monitoring programs, which will assess the effectiveness of management strategies for protecting water quality during the construction, operation and decommissioning of the Project, should be described.

4.5.2.2 Groundwater

This section of 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 operation and the significance of the proposal to groundwater depletion or recharge, and propose management options available to mitigate these effects.

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

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

4.6 Waste

4.6.1 Description of environmental values

This section should introduce and briefly describe the existing environmental values that may be affected by the project's wastes. Refer to each of the waste streams described in section 3.7 and provide references to more detailed descriptions of the relevant environmental values in other sections of part 4 of the EIS.

4.6.2 Potential impacts and mitigation measures

The purpose of this section is to bring together a description of the preferred methods (and discuss any alternatives) to be used to deal with waste streams and outline their impacts. The full description of the magnitude and nature of impacts on particular environmental values due to the management of waste should be provided in the relevant sections of part 4 of the EIS.

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

As part of the description, this section should provide details of each waste in terms of:

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

Having regard for the Environmental Protection (Waste) Policy, the EIS should indicate the results of investigation into the feasibility of using waste minimisation and cleaner technology

options during all phases of the proposal. The EPA has also released draft guidelines covering aspects of waste management under this EPP, which should be addressed.

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

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

4.7 Coastal Environment

4.7.1 Description of environmental values

This section describes the existing coastal environment, which may be affected by the Project in the context of coastal values identified in State of the Coastal Zone Reports and environmental values as defined by the EP Act and environmental protection policies. The EP (Water) Policy has a set of default environmental values for waterways that include aquatic ecosystem protection.

4.7.1.1 Water Quality

Provide baseline information on water quality in the sea and in estuaries below the limit of tidal influence, 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;
- the State Coastal Management Plan, and
- any regional coastal plan.

4.7.1.2 Coastal Processes

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

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.

4.7.2 Potential impacts and mitigation measures

This section defines and describes the practical measures for protecting or enhancing coastal environmental values, to describe how nominated quantitative standards and indicators may be achieved, and how the achievement of the water quality objectives will be monitored, audited and managed. It should assess potential impacts of construction and

operational activities on the coastal zone, identified environmental values and water quality objectives.

4.8 Air Quality

4.8.1 Description of Environmental Values

This section of the EIS should describe the existing air environment which may be affected be the proposal in the context of environmental values as defined by the EP Act and relevant EPPs.

A description of the existing air shed environment should be provided having regard for particulates and gaseous and odorous compounds. The background levels and sources of TSP, PM_{10}, $PM_{2.5}$, SO_x, NO_x, and any other major constituent of the air environment which may be affected by the proposal should be discussed.

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

4.8.1.1 Greenhouse Gas Emissions

This section of the EIS should:

- provide an inventory of projected annual emissions for each relevant greenhouse gas, with total emissions expressed in 'CO_2 equivalent' terms;
- estimate emissions from upstream activities associated with the proposed project, including fossil fuel based electricity consumed; and
- briefly describe method(s) by which estimates were made.

The Australian Greenhouse Office Factors and Methods Workbook (available via the internet) can be used as a reference source for emission estimates and supplemented by other sources where practicable and appropriate.

4.8.2 Potential Impacts and Mitigation Measures

The EIS should describe local and regional climatic and meteorological factors affecting air quality impacts. An examination of the effects of adverse conditions (e.g. inversions) and mixing heights on air quality impacts should be provided. The potential for interaction between the emissions from the Bio-Refinery, and emissions in the air shed, and the likely environmental harm from any such interaction, should also be detailed.

The EIS should include an impact assessment with relevant inputs of emissions and local meteorology to an air dispersion model to provide estimates of the likely impacts on the surrounding environment. The model inputs should be as detailed as possible, reflecting any variation of emissions with time and including at least a full year of representative hourly meteorological data. Ground level concentration at the nearest sensitive receptor(s) based on 1-hour average for maximum (99.9 percentile) and 99.5 percentile values should be estimated. Results of the dispersion modelling must be presented as concentration contour plots and frequency contour plots.

The model input parameters must be based on the actual stack conditions proposed by the Proponent for the Development Approval conditions. The Proponent must provide stack parameters such as diameter, temperature, exit velocity and volume flow rate.

The EIS should identify 'worst case' emissions that may occur at start-up, shut-down or during other 'upset' operating conditions. If these emissions are significantly higher than those for normal operations, the EIS should evaluate the worst-case odour impact, as a separate exercise to determine whether the planned buffer distance(s) between the facility and neighbouring sensitive receptors would be adequate. The odour impact assessment should conform to the criteria described in the Queensland EPA Guideline on *Odour Impact Assessment from Developments*.

The averaging period for ground level concentrations of pollutants that are modelled should be consistent with the relevant averaging periods for air quality indicators and goals in the *Environmental Protection Policy (Air) 1997* and the National Environmental Protection Measure (NEPM) Air. For example, the modelling of sulphur dioxide must be conducted for 10-minutes, 1-hour, 24-hours and annual averaging periods.

Modelled concentration levels at the "most exposed existing or likely future sensitive receptors" must be compared with the appropriate national and international ambient air quality standards.

The EIS should describe proposed back-up measures in the event of failure of primary measures to minimise the likelihood of plant upsets and adverse air impacts.

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

- the extent to which NOx and volatile hydrocarbon emissions from the Project and existing emission sources within the region will contribute to the generation of photochemical smog;
- the extent to which SOx emissions from the Project and existing emission sources within the region will contribute to the generation of acid rain or acidification of other atmospheric condensation, such as dew;
- the human health risk associated with emissions from the facility;
- the potential for the Project to generate a dust nuisance during and after construction;
- the potential for the Project to generate a dust nuisance during the operational phase of the Project as a result of any proposed new or upgraded rail operations and/or infrastructure (e.g. from loaded wagons and empty wagons with residual product, or locomotives) - this pertains to the loading/unloading sites and the entire haul route (i.e. from the core project site to the export site of the Project);
- the potential for odour impacts and an assessment of the overall odour nuisance potential;
- records of any complaints made in the area regarding air quality;
- Project technology and Project emission control systems designed to suppress or minimise emissions, including dusts, gases and odours;
- air quality aspects for forecast emissions derived from other similar projects;
- air shed management and the contribution of the proposal to air shed capacity in view of existing and future users of the air shed for assimilation and dispersion of emissions; and
- the extent to which air emissions will impact on water quality following deposition locally and within the region.

Where there is no single atmospheric dispersion model that is able to handle the different atmospheric dispersion characteristics exhibited in the proposal area (i.e. sea breezes, strong convection, terrain features, temperature inversions and pollutant re-circulation), a combination of acceptable models will need to be applied. The limitations and accuracy of the dispersion models used for calculating ground level concentrations and a sensitivity analysis of each model to variations in the input parameters should be discussed.

4.8.2.1 Greenhouse Gas Abatement

This section of the EIS should propose and assess greenhouse gas abatement measures. It should include:

- a description of the proposed measures (alternatives and preferred) to avoid and/or minimise greenhouse gas emissions directly resulting from activities of the Project, including such activities as transportation of products and consumables, and energy use by the Project;
- an assessment of how the preferred measures minimise emissions and achieve energy efficiency,
- an indication of how the preferred measures for emission controls and energy consumption compare with practice in the relevant sector of industry with a view to achieving best practice environmental management;
- a description of any opportunities for further offsetting greenhouse gas emissions through indirect means.

Direct means of reducing greenhouse gas emissions could include such measures as:

- minimising clearing at the site (which also has imperatives besides reducing greenhouse gas emissions);
- integrating transport for the project with other local industries such that greenhouse gas emissions from the construction and running of transport infrastructure are minimised;
- maximising the use of renewable energy sources.

Indirect means of reducing greenhouse gas emissions could include such measures as:

- carbon sequestration at nearby or remote locations, either:
  - above ground by such means as planting trees and other vegetation to achieve greater biomass than that cleared for the project; or
  - below ground by geosequestration.
- carbon trading through recognised markets.

The environmental management plan in the EIS should include a specific module to address greenhouse abatement. That module should include:

- commitments to the abatement of greenhouse gas emissions from the project with details of the intended objectives, measures and performance standards to avoid, minimise and control emissions,
- commitments to energy management, including undertaking periodic energy audits with a view to progressively improving energy efficiency;
- a process for regular review of new technologies to identify opportunities to reduce emissions and use energy efficiently, consistent with best practice environmental management;
- any voluntary initiatives such as projects undertaken as a component of the national Greenhouse Challenge Plus program, or research into reducing the lifecycle and embodied energy carbon intensity of the project's processes or products;
- opportunities for offsetting greenhouse emissions, including, if appropriate, carbon sequestration and renewable energy uses; and
- commitments to monitor, audit and report on greenhouse emissions from all relevant activities and the success of offset measures.

4.8.2.2 Climate Change Adaptation

Climate change, through alterations to weather patterns and rising sea level, has the potential to impact in the future on developments designed now. Most developments involve the transfer to, or use by, a proponent of a community resource in one form or another, such as the granting of a non-renewable resource or the approval to discharge pollutants to air, water or land. Therefore, it is important that the project design be adaptive to climate change so that community resources are not depreciated by projects that would be abandoned or require costly modification before their potential to provide a full return to the community is realised. Consequently, the EIS should provide an assessment of the project's vulnerabilities to climate change and describe possible adaptation strategies for the activity including:

- a risk assessment of how changing patterns of rainfall and hydrology, temperature, extreme weather and sea level (where appropriate) may affect the viability and environmental management of the project.
- the preferred and alternative adaptation strategies to be implemented; and
- commitments to undertaking, where practicable, a cooperative approach with government, other industry and other sectors to address adaptation to climate change.

It is recognised that predictions of climate change and its effects have inherent uncertainties, and that a balance must be found between the costs of preparing for climate change and the uncertainty of outcomes. However, proponents should use their best efforts to incorporate adaptation to climate change in their EIS and project design.

4.9 Noise and Vibration

4.9.1 Description of Environmental Values

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

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

Sufficient data should be gathered to provide a baseline for later studies. The daily variation of background noise levels at nearby sensitive sites should be monitored and reported in the EIS, with particular regard given to detailing variations at different periods of the night. Monitoring methods should adhere to relevant Environmental Protection Agency Guidelines and Australian Standards, and any relevant requirements of the Environmental Protection (Noise) Policy 1997.
Comment should be provided on any current activities near the proposal area that may cause a background level of ground vibration.

4.9.2 Potential Impacts and Mitigation Measures

This section should define and describe the objectives and practical measures for protecting or enhancing environmental values from impacts by noise and vibration, describes how nominated quantitative standards and indicators may be achieved for noise and vibration

management, and how the achievement of the objectives will be monitored, audited and managed.

Information, including mapped noise contours from a suitable acoustic model, 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 for buffers to minimise or eliminate these effects including details of any screening, lining, enclosing or bunding should be provided. Timing schedules for construction and operations should be discussed with respect to minimising environmental impacts from noise.

If relevant, 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.

4.10 Nature Conservation

4.10.1 Description of Environmental Values

This section should describe the existing environmental values for nature conservation in the Project area and surrounding areas likely to be affected by the proposal. Environmental values should be described in the context of the definitions set out in the EP Act, relevant EPPs, the *Vegetation Management Act 2000* and the *Nature Conservation Act 1992*.

The EIS should 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.

Key flora and fauna indicators should be identified for future ongoing monitoring.

4.10.1.1 Terrestrial Flora

This section should describe the terrestrial flora values of the areas likely to be affected by the Project.

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

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

- location of vegetation types of conservation significance based on EPA's regional ecosystem types and occurrence of species listed as Protected Plants under the Nature Conservation (Wildlife) Regulation 1994 and subsequent amendments, as well as areas subject to the Vegetation Management Act 1999;
- the current extent (bioregional and catchment) of protected vegetation types of conservation significance within the protected area estate (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.

Sensitive or important vegetation communities should be highlighted, including any marine littoral and sub-tidal 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 in the EIS.

Vegetation survey data should include species structure, assemblage, diversity and abundance.

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

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

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

4.10.1.2 Terrestrial Fauna

This section should describe the terrestrial fauna values of the areas likely to be affected by the Project.

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

- species diversity (i.e. a species list) and abundance of animals, including amphibians, birds, reptiles, mammals and bats;
- any species which are poorly known but suspected of being rare or threatened;
- habitat requirements and sensitivity to changes; including movement corridors and barriers to movement;

- the existence of feral or exotic animals;
- existence of any rare, threatened or otherwise noteworthy species/communities in the study area, including discussion of range, habitat, breeding, recruitment, feeding and movement requirements, and current level of protection (eg any requirements of Protected Area Management Plans), and
- use of the area by migratory birds, nomadic birds, fish and terrestrial fauna.

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

4.10.1.3 Aquatic Biology

If no biota surveys/studies have previously been conducted in and downstream of the project area, the aquatic flora and fauna occurring in the areas affected by the proposal should be described, noting the patterns and distribution in the waterways and/or associated lacustrine and marine environments. The description of the fauna and flora present or likely to be present in the area should include:

- fish species, mammals, reptiles, amphibians, crustaceans and aquatic invertebrates occurring in the waterways within the affected area, and/or those in any associated lacustrine and marine environment;
- any rare or threatened marine species, particularly the dugong and its habitat;
- aquatic plants;
- aquatic and benthic substrate, and
- habitat downstream of the project or potentially impacted due to currents in associated lacustrine and marine environments.

4.10.2 Potential Impacts and Mitigation Measures

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

The discussion should cover all likely direct and indirect environmental harm to flora and fauna, particularly sensitive species and communities including:

- important habitats of species listed under the *Nature Conservation Act* 1992 and/or *EPBC Act* as presumed extinct, endangered, vulnerable or rare;
- regional ecosystems recognised by the EPA as 'endangered' or 'of concern' and/or ‘not of concern’ regional ecosystems as recognised by the EPA and defined in the *Vegetation Management Act* 2000 as remnant vegetation;
- good representative examples of remnant regional ecosystems or regional ecosystems which are poorly represented in protected areas;
- sites listed under international treaties such as RAMSAR wetlands and World Heritage areas;
- sites containing near threatened or bio-regionally significant species or essential, viable habitat for near threatened or bio-regionally significant species;
- sites in, or adjacent to, areas containing important resting, feeding or breeding sites for migratory species of conservation concern listed under the Convention of Migratory Species of Wild Animals, and/or bilateral agreements between Australia and Japan (JAMBA) and between Australia and China (CAMBA);
- sites containing common species which represent a distributional limit and are of scientific value or which contain feeding, breeding, resting areas for populations of echidna, koala, platypus and other species of special cultural significance;

- sites containing high biodiversity that are of a suitable size or with connectivity to corridors/protected areas to ensure survival in the longer term;
- sites 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;
- protected areas which have been proclaimed under the *NCA* and *Marine Parks Act 1982*, or are under consideration for proclamation, and
- areas of major interest, or critical habitat declared under the *NCA* or high nature conservation value areas or areas vulnerable to land degradation under the *VMA*.

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

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

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 (e.g. parthenium and other noxious weeds) and ensuring no new invasive weeds are introduced to the area should be described. Reference should be made to the local authorities' pest management plans when determining control strategies.

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

4.11 Cultural Heritage

4.11.1 Description of Environmental Values

This section of the EIS should describe the existing cultural heritage values that may be affected by the proposal. The environmental values of the cultural landscapes of the affected area should be described in terms of the physical and cultural integrity of the landforms.

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

- liaison with relevant indigenous community/communities concerning:
    - places of significance to that community (including archaeological sites, natural sites, story sites etc);
    - appropriate community involvement in field surveys;
- any requirements by communities and /or informants relating to confidentiality of site data must be highlighted. Non-indigenous communities may also have relevant information;
- a systematic survey of the proposed development area to locate and record indigenous and non-indigenous cultural heritage places;
- significant assessment of any cultural heritage sites/places located;
- the impact of the proposed development on cultural heritage values;
- a report of work done which includes background research, relevant environmental data and methodology, as well as results of field surveys, significance assessment and recommendations; and
- a permit to conduct the research and survey will be required under the provisions of the *Cultural Record (Landscapes Queensland and Queensland Estate) Act, 1987*.

4.11.2 Potential Impacts and Mitigation Measures

This section should define and describe the objectives and practical measures for protecting or enhancing cultural heritage environmental values, describes how nominated quantitative standards and indicators may be achieved for cultural heritage management, and how the achievement of the objectives will be monitored, audited and managed.

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

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

The development of the CHMP should be negotiated with all stakeholder representatives, and where there is a role or responsibility identified for the EPA, 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.

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

4.12 Social

4.12.1 Description of Environmental Values

This section of the EIS should describe the existing social values of the local area that may be affected by the proposal.

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;
- current property values;
- number of properties directly affected by the project; and
- number of families directly affected by the project, this should include not only property owners but families of workers either living on the property or workers where the property is their primary employment.

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

- the integrity of social conditions, including amenity and liveability, harmony and well being, sense of community, access to recreation, and access to social and community services and infrastructure, and
- public health and safety (refer to section 4.13).

4.12.2 Potential Impacts and Mitigation Measures

This section should define and describe the objectives for protecting or enhancing social values, and how the achievement of the objectives will be monitored, audited and managed.

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

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

- impacts on demographic, social, cultural and economic profiles;

- impacts on local residents, current land uses and existing lifestyles and enterprises;
- impacts on affected and adjoining landowners/occupiers resulting from any land resumption;
- impacts (including potential demand) on health care services and providers (public and private) located in the vicinity of the proposed development;
- impacts on local and state labour markets, with regard to the source of the workforce with the information presented according to occupational groupings of the workforce;
- impacts of both the construction and operational workforces and associated contractors on housing demand, community services and community cohesion;
- how much household income and jobs from the Project (e.g. provisioning, catering and site maintenance) would be likely to flow to existing communities in the area of the Project; and
- impacts on local residents values.

An assessment of the predicted impacts of the Proponent's activities (including activities by any sub-contractors) on the local and regional housing markets should also be undertaken. The assessment should refer to the projected accommodation needs for the Project in both the construction and operational phases, and estimate:

- the capacity of local and regional housing markets to meet the accommodation needs of the Project, including the potential displacement of low-income residents from affordable rental accommodation and diminished availability of accommodation;
- any possible cumulative impacts on the local and regional housing market due to the presence of other existing or proposed major projects in the area, and seasonal employment factors; and
- the impact of the construction phase of the proposal on the local and regional residential development and housing construction industry, with particular reference to the demand for local contractors.

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

For identified impacts on social values, proposed mitigation and enhancement strategies should be described, and approaches to facilitate initial negotiations towards community acceptance of these strategies identified. Practical monitoring regimes should also be discussed.

4.13 Economic

4.13.1 Description of Environmental Values

This section describes the existing economic environment that may be affected by the proposal in the context of environmental values as defined by the EP Act and EPPs.

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

- existing housing market, particularly rental accommodation which may be available for the project workforce;
- economic viability (including economic base and economic activity, future economic opportunities, current local and regional economic trends, in particular drought and rural downturn etc); and

- historical descriptions of large-scale resource developments and their effects in the region.

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

4.13.2 Potential Impacts and Mitigation Measures

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

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

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

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

- the significance of this proposal on the local and regional economic context;
- the long and short-term beneficial (eg. job creation) and adverse (eg. competition with local small business) impacts that are likely to result from the development;
- the potential, if any, for direct equity investment in the Project by local businesses or communities;
- the cost to all levels of government of any additional infrastructure provision;
- implications for future development in the locality (including constraints on surrounding land uses and existing industry);
- the potential economic impact of any major hazard identified in Section 4.14;
- the distributional effects of the proposal including proposals to mitigate any negative impact on disadvantaged groups;
- the value of lost opportunities or gained opportunities for other economic activities anticipated in the future; and
- impacts on local property values.

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

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

4.14 Health and Safety

4.14.1 Description of Environmental Values

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

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

4.14.2 Potential Impacts and Mitigation Measures

This section defines and describes the objectives and practical measures for protecting or enhancing health and safety community values, describes how nominated quantitative standards and indicators may be achieved for social impacts management, and how the achievement of the objectives will be monitored, audited and managed.

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

Where relevant, measures to control mosquito and biting midge breeding need to be described. Practical monitoring regimes should also be recommended in this section.

4.15 Hazard and Risk

4.15.1 Description of Environmental Values

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

4.15.2 Potential Impacts and Mitigation Measures

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;
- 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 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.

Details should be provided of:

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

The proponent should develop an integrated risk management plan for the whole of the life of the project including construction, operation and decommissioning phases.

5.0 ENVIRONMENTAL MANAGEMENT PLANS

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

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

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

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

6.0 REFERENCES

All references used in the preparation of the EIS should be presented in a recognised format such as the Harvard standard. This standard lists references by presenting in the following order: author (date of publication) title, publisher, and place of publication.

7.0 APPENDICES

A1 Final Terms of Reference for this EIS

The finalised Terms of Reference should be included as an Appendix to the EIS.

A2 Development Approvals

A list of the development approvals required by the Project should be provided.

A3 Consultation Report

A list of advisory 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 (as defined by the *EPBC Act*) and interested and/or affected persons (as defined by the *EP Act*) should be included.

A4 Study Team

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

A5 Technical Data and Baseline Studies

Relevant supporting data and information generated from specialist studies undertaken as part of the EIS are to be included as appendices. These may include:

- geology;
- soil survey and land suitability studies;
- land use and land capability studies;
- waterway hydrology and groundwater;
- flora and fauna studies, including the subregional analysis of representativeness and adequacy of protection for the terrestrial/riparian vegetation communities and their component flora and fauna taxa within the affected areas;
- an integrated assessment of relative biodiversity/conservation values, based on the methodology outlined in "*Biodiversity Assessment and Mapping Methodology (EPA 2002)*";
- air pollution, noise and vibration;
- transport and traffic studies;
- economic studies and/or cost-benefit analyses; and
- hazard and risk studies.

A6 List of Proponent Commitments

A list of all commitments made by the Proponents in the EIS should be provided, together with a reference to the relevant section in the EIS.