The Coordinator-General

Balaclava Island Coal Export Terminal project

Terms of reference for the environmental impact statement

June 2011

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Synopsis

Xstrata Coal Queensland (XCQ) proposes to establish a new coal terminal at Balaclava Island, near Port Alma, approximately 40 kilometres north of Gladstone. It will be designed to enable up to 35 million tonnes per annum of coal to be exported to global markets from the Surat and Bowen Basins. The proposed project consists of four main components:

(1) construction of a rail spur from the existing North Coast Line (NCL) near Raglan to a new stockpile area

(2) construction of a 10-kilometre overland conveyor from the stockpile to the proposed jetty

(3) construction of a new coal export terminal to be located on Balaclava Island and associated dredged shipping channel

(4) development of infrastructure associated with the new port, including water, sewerage, power and telecommunications.

The Coordinator-General has declared the Balaclava Island Coal Export Terminal (BICET) project to be a 'significant project' requiring an environmental impact statement (EIS) under section 26(1)(a) of the *State Development and Public Works Organisation Act 1971*.

The Australian Government has determined that the project constitutes a controlled action pursuant to the *Environment Protection and Biodiversity Conservation Act 1999* (Cwlth) . The controlling provisions under the EPBC Act have been determined as:

- sections 12 and 15(a) (World Heritage properties)
- sections 15(b) and 15(c) (National Heritage places)
- sections 16 and 17(b) (wetlands of international importance)
- sections 18 and 18(a) (listed threatened species and communities)
- sections 20 and 20(a) (listed migratory species).

The declaration of the project as a significant project does not indicate support for, nor approval of the project by the Coordinator-General or the Queensland Government. Rather, it is a requirement for the project to undergo a rigorous EIS process.

The EIS process is being coordinated by the Department of Employment, Economic Development and Innovation on behalf of the Coordinator-General.

These terms of reference (TOR) for an EIS have been prepared by the Coordinator-General, incorporating comment by advisory agencies and the public. The TOR will be issued to the proponent as matters to be addressed in the preparation of the EIS.

The TOR are divided into two parts:

- Part A: General information and administrative procedures
- Part B: Contents of the EIS.

Part A: General information and administrative procedures

1 Project summary

The Balaclava Island Coal Export Terminal (BICET) (the project) is proposed to be located on Balaclava Island, approximately five kilometres from Port Alma and on the nearby mainland, approximately 40 kilometres north of Gladstone and 45 kilometres south of Rockhampton.

The project is proposed to export up to 35 million tonnes per annum of coal to global markets from Queensland's Bowen and Surat Basins using vessels of up to 110 000 tonnes capacity.

The current capital value of the project is approximately $1.5 billion. During the planned construction period between 2013 and 2015, approximately 800 jobs are anticipated to be created, with a further 100 new long-term jobs for the region when BICET is fully operational.

Balaclava Island is owned by Gladstone Ports Corporation (GPC) and is designated Strategic Port Land. GPC has given Xstrata Coal Queensland Pty Ltd (XCQ) rights to build, own and operate the project and to undertake a feasibility study and environmental assessment as part of GPC's strategic plan for the Port Alma area to become a significant new port precinct.

The project will consist of a new ship loading facility, construction of a rail spur from the North Coast Line (NCL), just north of the township of Raglan to the proposed coal stockpile areas. Owing to the tidal nature of Balaclava Island, the stockpiles will need to be established on higher ground on the mainland, approximately seven kilometres from the ship loader. Due to this, the project includes construction of an overland conveyor system to transport the coal from the stockpile area to the ship loader at the proposed BICET jetty site.

The proponent proposes to locate the stockpile area, railway line and part of the conveyor route on privately owned land. XCQ is currently discussing land access and future tenure rights with the private landowners, and this process is proposed to continue throughout the project's study and development phase. The project could be a catalyst for future development of other export activities at Port Alma and on Balaclava Island, though this would trigger separate assessment and approval processes.

XCQ is conducting an environmental impact assessment for the project and associated infrastructure only. The project aims to accommodate the future strategic potential of Balaclava Island. Any future proposals would be subject to separate environmental and development approval processes.

During construction, temporary accommodation facilities are likely to be required. The need for, and possible location of, such facilities will be investigated further as part of the EIS. Subject to further investigations, developing and operating water treatment facilities for treating groundwater and/or seawater may also be required.

Further information on the project can be viewed on the Department of Employment, Economic Development and Innovation (DEEDI) website at www.dlgp.qld.gov.au/bicet and the proponent's project website at www.balaclavaislandcoal.com.au

2 Project proponent

The proponent for this project is Xstrata Coal Queensland Pty Ltd (XCQ). XCQ, with its principal office in Brisbane, is a wholly owned subsidiary of Xstrata Plc.

Xstrata Plc is a major globally diversified mining group, listed on the London and Swiss Stock Exchanges and is included in the FTSE top 15. The Xstrata group is headquartered in Zug, Switzerland and has approximately 43 000 employees worldwide, including contractors. Xstrata Plc obtains approximately 25 per cent of its revenue from Australia and has invested more than $8.5 billion in Australia since 2002 in its coal, copper and zinc operations in Queensland, New South Wales and the Northern Territory.

Xstrata Coal, the coal commodity business unit of Xstrata Plc, is the world's largest exporter of thermal coal and the fifth largest producer of hard coking coal. With its headquarters in Sydney, Australia, Xstrata Coal has interests in more than 30 operating coal mines throughout Australia, South Africa and Colombia.

In Queensland, XCQ manages several existing operations including:

- Oaky Creek Mine east of Tieri (underground operations)
- Newlands Mine at Glenden (underground and open-cut operations)
- Collinsville Mine near Collinsville (open-cut operations)
- Rolleston Coal Mine near Rolleston (open-cut operations).

In 2009, the total managed equivalent saleable production in Queensland was 29.7 million tonnes of coal (of which 9.4 million tonnes was coking and 20.3 million tonnes was thermal). XCQ, via Abbot Point Bulk Coal Pty (APBC), also operates the Abbot Point Coal Terminal (north of Bowen) and holds directorships for the Dalrymple Bay Coal Terminal (DBCT) and Wiggins Island Coal Terminal (WICT).

XCQ is also one of the participants (together with ICRA Wandoan Pty Ltd and Sumisho Coal Australia Pty Ltd) in the Wandoan Joint Venture, which is the proponent of the proposed Wandoan Coal Project (WCP). The WCP was declared a significant project in December 2007 by the Coordinator-General and the project was approved by the Coordinator-General on 12 November 2010. The WCP is a joint venture by XCQ, ICRA (Wandoan) Pty Ltd and Sumisho Coal Australia Pty Ltd to

develop a new coal mine approximately five kilometres west of the township of Wandoan. The WCP would comprise open-cut coal operations which would initially produce approximately 22 million tonnes per annum of thermal coal for export.

Xstrata Coal Surat Basin Rail Pty Ltd, a subsidiary of XCQ, is a participant in the Surat Basin Rail (SBR) Joint Venture, which is undertaking feasibility studies into the construction of an approximately 210 kilometres of new railway to connect the existing Queensland Rail (QR)/QR National network near Wandoan with the QR/QR National network Moura system. The SBR would be a multi-user, open access railway to facilitate export of coal through the Port of Gladstone and potentially other freight. The EIS and the Supplementary EIS (SEIS) for SBR has been completed and the Coordinator-General's report was released on 9 December 2010.

The contact details for the proponent are:

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www.xstratacoal.com.au

3 Legislative framework

On 7 May 2010, the Coordinator-General declared the project to be a significant project under section 26(1)(a) of the Queensland *State Development and Public Works Organisation Act 1971* (SDPWO Act). This declaration initiates the statutory environmental impact assessment procedure of Part 4 of the SDPWO Act, which requires the proponent to prepare an EIS for the project.

On 31 March 2010, the delegate of the Commonwealth Minister for the Environment determined that the project is a controlled action under the *Environment Protection and Biodiversity Conservation Act 1999* (Cwlth) (EPBC Act) due to the potential impacts on matters of national environmental significance. The controlling provisions under the EPBC Act are:

- sections 12 and 15A (World Heritage properties)
- sections 15B and 15C (National Heritage places)
- sections 16 and 17B (wetlands of international importance)
- sections 18 and 18A (listed threatened species and communities)
- sections 20 and 20A (listed migratory species).

As a consequence, the project must be assessed and approved by the Commonwealth Minister under Part 9 of the EPBC Act before it can proceed.

On 5 February 2010, the proponent submitted an application under the *Environmental Protection (Sea Dumping) Act 1981* to dispose of dredged material at sea as part of the project. On 31 March 2010, the delegate of the Commonwealth Minister determined that the project is a prescribed action due to the likely significant impact on the environment in regard to disposing of dredged material at sea and as such, assessment under Part 8 of the EPBC Act will be required.

On 21 May 2010, a delegate of the Commonwealth Minister for the Environment determined that the assessment approach under section 89 of the EPBC Act will be by EIS in accordance with the bilateral agreement between the Commonwealth and Queensland governments. This will enable the EIS to meet the impact assessment requirements under both Commonwealth and Queensland legislation.

DEEDI is managing the EIS process on behalf of the Coordinator-General. DEEDI has invited relevant Commonwealth, state and local government representatives, and other relevant authorities, to participate in the process as advisory agencies.

The first step in the impact assessment process is to develop TOR for an EIS for the project. The process involves formulating draft TOR that is made available for public and advisory agency comment. To finalise the TOR, the Coordinator-General will consider all properly made submissions received on the draft TOR and present the final TOR the proponent. Submissions on the draft TOR were received by the Coordinator-General from 26 February 2011 to 11 April 2011. Seventeen submissions were received during this period—nine from organisations and members of the community and eight from advisory agencies.

In accordance with section 32(1) of the SDPWO Act, the proponent must provide an EIS that addresses these TOR. The EIS must be acceptable to the Coordinator-General and be provided within two years of these TOR being finalised (unless the Coordinator-General grants an extension in writing, pursuant to section 32(4)(b) of the SDPWO Act).

Once the Coordinator-General accepts the EIS, the proponent must publicly notify its availability in regional and national newspapers, pursuant to section 33 of the SDPWO Act. The notice will state where copies of the EIS can be viewed or purchased, the submission period and where submissions should be sent. After reviewing the EIS, the Coordinator-General may also require the proponent to provide supplementary information to address specific matters raised during the EIS submission period, pursuant to section 35(2) of the SDPWO Act.

At the completion of the EIS phase, the Coordinator-General will prepare a report (Coordinator-General's report) evaluating the EIS and other relevant material, pursuant to section 35 of the SDPWO Act. The Coordinator-General's report will include an assessment and conclusion about the environmental effects of the project and any associated mitigation measures. Material that will be assessed includes:

- the EIS
- properly made submissions

- other submissions accepted by the Coordinator-General
- any other material the Coordinator-General considers relevant to the project (e.g. supplementary information, comments and advice from advisory agencies and other entities and technical reports).

The Coordinator-General's report will be placed on the DEEDI website at www.deedi.qld.gov.au for public notification purposes. The Coordinator-General's report will also be presented to the proponent, the *Sustainable Planning Act 2009* (SPA) assessment manager and the Australian Government Minister for the Environment, as minister responsible for administering Part 9 of the EPBC Act.

If the project requires an application for a development approval under SPA, the Coordinator-General's report may, under section 39(1) of the SDPWO Act, state for the assessment manager one or more of the following:

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

Alternatively, under section 39(2) of the SDPWO Act, the Coordinator-General's report must state for the assessment manager that:

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

Under Part 9 of the EPBC Act there is a separate Australian Government approval process. The Australian Government minister must decide whether or not to approve, for the purposes of each controlling provision, the taking of the action and what conditions (if any) to attach to the approval.

Note: It is the responsibility of the proponent (or its consultants) to address the requirements of new or amended legislation or policies that come into effect after these TOR have been finalised. This requirement applies regardless of whether or not the legislation or policies are covered in these TOR.

4 EIS objectives

The objective of the EIS is to ensure that all potential environmental, social and economic impacts of the project are identified and assessed and that adverse impacts are avoided or mitigated. Direct, indirect, cumulative and consequential impacts must be fully examined and addressed. The project should be based on sound environmental protection and management criteria.

The EIS document should provide information for the following persons and groups, as the project stakeholders:

- for interested bodies and persons—a basis for understanding the project, prudent and feasible alternatives, affected environmental values, impacts that may occur and the measures to be taken to mitigate all adverse impacts
- for affected persons—that is, groups or persons with rights or interests in land (as defined under section 38 of the *Environmental Protection Act 1994* (Qld) (EP Act)) or water (as defined under the *Water Act 2000* (Qld) (Water Act)) an outline of the effects of the proposed project
- for government agencies and referral bodies—a framework for decision-makers to assess the environmental aspects of the proposed project with respect to legislative and policy provisions, and based on that information, to make an informed decision on whether the project should proceed or not and if so, subject to what conditions, if any
- for the proponent—a mechanism by which the potential environmental impacts of the project are identified and understood, including information to support the development of management measures, such as an environmental management plan (EMP), to mitigate the effects of adverse environmental impacts of the development.

The proponent is required to address the TOR to the satisfaction of the Coordinator-General before the EIS is made publicly available. Completion of the EIS in accordance with the final TOR does not mean the project will be approved.

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

5 EIS guidelines

The EIS should be a self-contained and comprehensive document that provides sufficient information for an informed decision on the potential impacts of the project and the management measures employed to mitigate adverse impacts. The main EIS report needs to be supported by appendices containing relevant data, technical reports and other sources of the EIS analysis. The EIS must:

- use scientific studies to predict environmental impacts and provide details of their methodology, reliability, and any relevant assumptions or scientific judgements
- present all technical data, sources or authority and other information used to assess impacts
- describe and evaluate proposed measures to mitigate and manage identified issues
- qualitatively describe residual impacts that are not quantifiable, in as much detail as reasonably practicable

- include a discussion of the criteria adopted in assessing the proposed project and its impacts, for instance, compliance with relevant legislation, policies, standards and community acceptance
- ensure the level of investigation of potential/uncertain impacts on the environment is proportionate to both the severity and the likelihood of those events occurring
- adequately address issues that may emerge, both during investigations and in preparing the EIS, including undertaking any necessary studies and reporting the results
- address all relevant matters concerning environmental values, impacts and proposed mitigation measures for the first time in the main text of the EIS and not in an appendix or the draft EMP
- present adverse and beneficial effects in quantitative and/or qualitative terms as appropriate.

Information provided in the EIS should be clear, logical, objective and concise, so that non-technical people may easily understand it. Where appropriate, text should be supported by maps and diagrams and factual information in the document should be referenced. Where applicable, aerial photography and/or digital information (e.g. of project site) should be presented.

The terms 'describe', 'detail' and 'discuss' should be taken to include both quantitative and qualitative matters as practical and meaningful. Should the proponent require any information in the EIS to remain confidential, this should be clearly indicated and separate information should be prepared on these matters.

The proponent should ensure that the EIS addresses the matters stated in Schedule 4 of the Environment Protection and Biodiversity Conservation Regulations 2000. Matters to be addressed by draft public environment report and environmental impact statement are in Attachment A of the Regulations.

While every attempt has been made to ensure that these TOR address the major issues associated with projects of this type, the TOR may not be exhaustive. If a proponent (or its consultants) deem a matter to be significant, but that matter is not included in these TOR, the matter should be addressed in the project's EIS. Similarly, if environmental or other studies reveal a matter that was not foreseen when the TOR were prepared, the EIS should address the matter.

6 Stakeholder consultation

The proponent should undertake a comprehensive and inclusive consultation plan with the stakeholders identified in Part A, Section 4. Consultation with advisory agencies should be the principal forum for identifying legislation, regulations, policies and guidelines relevant to the project and EIS process.

The public consultation plan should identify broad issues of concern to local and regional community and interest groups and address issues from project planning

through commencement, project operations and decommissioning. The consultation plan should identify:

- the types of consultation and communication activities to be undertaken
- timing of activities
- how it will target the stakeholder/community representatives
- integration with other EIS activities and the project development process
- consultation responsibilities
- communication protocols
- reporting and feedback arrangements.

7 EIS format and copy numbers

7.1 General requirements

The EIS should be written in a format matching the TOR or include guidelines (preferably as an appendix) describing how the EIS responds to the TOR. Where the project is made up of several components, the EIS should make it clear which project component is being discussed, to allow assessment agencies and other readers to differentiate between the components.

The EIS should contain (as part of the executive summary) a one-page table that explains where readers can find categories of information in the report. This should particularly cover subjects that are presented in multiple places in the EIS.

Include maps, diagrams and other illustrative material in the EIS to assist readers to interpret information.

7.2 Specific format and copy requirements

The proponent must publish the EIS as follows:

(1) On a website that is hosted at the proponent's own expense, in both HTML and PDF formats, as follows:

  (a) pages produced in HTML format must meet the *W3C web content accessibility guidelines.*[1] All cross-references to sections elsewhere in the EIS must be hyperlinked; and all external web links must be hyperlinked

  (b) PDF files must meet the following requirements:

    (i) no larger than two megabytes in size (documents can be uploaded in sections to meet this requirement)

[1] Refer to www.w3.org

(ii) text size and graphics files included in the PDF documents should be of sufficient resolution to facilitate reading and enable legible printing

(iii) produced in accordance with Adobe's PDF accessibility best practice guides available at: www.adobe.com/accessibility/products/acrobat/training.html and meet the following minimum accessibility requirements:

A. document structure tags and proper read order

B. searchable text

C. alternative text descriptions

D. security that does not interfere with assistive technology.

(2) As a single PDF file on a CD-ROM, DVD or other electronic memory device. This PDF file, which will be read by staff from DEEDI and other assessment agencies, must include:

(a) bookmarks (links) to all sections of the document (down to five heading levels); and the PDF file must be set to open with the bookmarks showing by default

(b) active (clickable) internal hyperlinks to any pages, sections or diagrams that have been cross-referenced within the EIS

(c) active (clickable) hyperlinks to any external websites/documents that have been included in the EIS.

(3) Provide a PDF version of the executive summary, no larger than two megabytes in size, on a CD-ROM or DVD. This file will be placed on the DEEDI website; and the PDF file must meet the accessibility requirements listed under point (1)(b) above.

(4) Provide all maps/diagrams/figures in JPG format, on a separate CD-ROM, DVD or other electronic memory device. All JPG files should be a minimum of 300 dpi.

(5) Limited copies of the EIS should be produced on A4-size paper capable of being photocopied, with maps and diagrams of A4 or A3 size (discuss this requirement with DEEDI staff in the early stages of the EIS process).

8 DEEDI contact details

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

EIS project manager—Balaclava Island Coal Export Terminal
Significant Projects Coordination
Department of Employment, Economic Development and Innovation
PO Box 15517
City East Qld 4002
tel: + 61 7 3227 8548
fax: + 61 7 3225 8282
bicet@dlgp.qld.gov.au
www.dlgp.qld.gov.au/bicet

Part B: Contents of the EIS

The EIS should follow the format and content outlined in these TOR; however changes to the structure can be discussed with the EIS project manager.

Executive summary

The executive summary should convey to the reader the most important aspects and options relating to the project in a concise and readable form. It should use plain English and avoid using jargon. It should be written as a stand-alone document and be structured to follow the EIS. It should be able to be reproduced on request and distributed to interested parties who may not wish to read or purchase the whole EIS.

The executive summary should include:

- project title
- the name and contact details of the proponent and a discussion of previous projects undertaken by the proponent, if applicable, and their commitment to effective environmental management
- a concise statement of the aims and objectives of the project
- the legal framework, decision-making authorities and advisory agencies
- an outline of the background and need for the project, including the consequences of not proceeding with the project
- an outline of the alternative options considered and reasons for selecting the proposed development option
- a brief description of the project (pre-construction, construction, operational activities and decommissioning) and the existing environment, using visual aids where appropriate
- an outline of the principal environmental impacts predicted and the proposed environmental management strategies and commitments to minimise the significance of these impacts
- a discussion of the cumulative impacts in relation to social, economic and environmental factors of associated infrastructure projects proposed within the region.

Include detailed maps of the proposed project location and any other critical figures.

Glossary of terms

A glossary of technical terms, acronyms, abbreviations and references should be provided in the EIS.

1 Introduction

The introduction should clearly explain the function of the EIS, why it has been prepared and what it sets out to achieve. It should contain an overview of the structure of the document.

1.1 Project proponent

Describe the experience of the project proponent, including the nature and extent of business activities, experience and qualifications, and environmental record, including the proponent's environmental, health, safety and community policies.

1.2 Project description

Briefly describe the key elements of the project, using illustrations or maps if necessary. Summarise any major associated infrastructure requirements. Detailed descriptions of the project should follow in Part B, Section 2.

1.3 Project rationale

Describe the specific objectives and justification for the project, including its strategic, economic, environmental and social implications, technical feasibility and commercial drivers. Discuss the status of the project in a regional, state and national context. The project's compatibility with relevant policy, planning and regulatory frameworks should also be mentioned.

1.4 Relationship to other projects

Assess and describe how the project relates to any other infrastructure projects (of which the proponent should reasonably be aware) that have been or are being undertaken or that have been proposed or approved in the area affected by the project.

As a result of this assessment, opportunities may exist to co-locate existing or proposed infrastructure, enabling efficiency gains and mitigating environmental and property impacts. Where co-location may be likely, outline opportunities to coordinate or enhance impact mitigation strategies. Discuss the opportunities in sufficient detail to enable an understanding of the reasons for preferring certain options or courses of action and rejecting others.

Identify and discuss the relevance of any consequential impacts (as defined under the EPBC Act) and projects that will be considered as part of cumulative impact assessment.

1.5 Alternatives to the project

- Include a realistic, comprehensive and technical desktop analysis of all reasonable and feasible alternatives including conceptual, technological and locality alternatives to the proposed project. This should include, but not be limited

to, alternatives that locate the proposal off Balaclava Island and outside of the Great Barrier Reef World Heritage Area, including elsewhere at Port Alma, using the Wiggins Island Coal Terminal (WICT) and Gladstone Port.

- Within the analysis, include the comparative environmental impacts of each alternative with clear reference to the potential impacts on each matter of national environmental significance (NES) protected under Part 3 of the EPBC Act.
- Discuss alternatives in sufficient detail to enable an understanding of the reasons for preferring certain options or courses of action and rejecting others; discuss the methodology adopted to discern between the feasible options.
- Explain the interdependencies of the project components, particularly in regard to how each infrastructure requirement relates to the viability of the project.
- Discuss the consequences of not proceeding with the project.

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

As the project is declared as a controlled action with assessment approach under the bilateral agreement, the proponent must comply with section 2.01(g) of Schedule 4 of the EPBC Act Regulations.

1.6 The environmental impact assessment process

1.6.1 Methodology of the EIS

Provide an outline of the EIS process, including the role of the EIS in the Coordinator-General's and Australian Government minister's decision-making process. Include information on relevant stages of developing the EIS, statutory and public consultation requirements and any interdependencies that exist between approvals sought. The information in this section is required to ensure:

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

1.6.2 Objectives of the EIS

Provide a statement of the objectives of the EIS process. The structure of the EIS can then be outlined as an explanation of how the EIS will meet its objectives. The purpose of the EIS is to:

- provide public information on the need for the project, alternatives to it and options for its implementation
- present the likely effects of the project on the natural, social and economic environment

- demonstrate how environmental impacts can be avoided, managed or mitigated and offsets for any residual impacts
- discuss the role of the EIS in providing information for formulating the EMP for the project.

1.6.3 Submissions

Inform the reader how to properly make a submission, what form the submission should take and by what date it should be received. It should also be noted that submissions can be lodged in several different formats, including by regular mail and via email. The reader should be informed as to how and when properly made public submissions on the EIS will be addressed and taken into account in the decision-making process. Also, indicate any implications for submissions in the event of any appeal processes.

1.7 Public consultation process

The public consultation process should provide opportunities for community involvement and education. It may include:

- interviews with individuals
- public communication activities
- interest group meetings
- production of regular summary information and updates (i.e. newsletters)
- other consultation mechanisms to encourage and facilitate active public consultation.

The public consultation processes (community engagement) for all parts of the EIS should be integrated.

This section should outline the methodology that was adopted to:

- identify the stakeholders and how their involvement was facilitated
- identify the processes conducted to date and the future consultation strategies and programs, including those during the operational phase of the project
- indicate how consultation involvement and outcomes were integrated into the EIS process, discussing future site activities, including opportunities for engagement and providing feedback and action, if necessary.

Provide a list of the stakeholders consulted during the program and any meetings held, presentations made and any other consultation undertaken for the EIS process.

Include information about the consultation process that has taken place and the results.

1.8 Project approvals

1.8.1 Relevant legislation and approvals

Describe and list Commonwealth, state and local laws and policies relevant to the planning, approval, construction and operation of the project.

Identify all approvals, permits, licences and authorities that will need to be obtained for the proposed project. Outline the triggers for the application of each of these and identify relevant approval requirements.

Relevant Commonwealth legislation may include, but is not limited to:

- *Environment Protection and Biodiversity Conservation Act 1999*
- *Environment Protection (Sea Dumping) Act 1981*
- *Maritime Transport and Offshore Facilities Security Act 2003*
- *Navigation Act 1912*
- *Great Barrier Reef Marine Park Act 1975*
- *Native Title Act 1993*
- *Aboriginal and Torres Strait Islander Heritage Protection Act 1994.*

Outline and identify relevant Commonwealth obligations such as:

- protecting World Heritage values
- migratory animals (China–Australia Migratory Bird Agreement (CAMBA), Japan–Australia Migratory Bird Agreement (JAMBA), Republic of Korea–Australia Migratory Bird Agreement (ROKAMBA) and Bonn Convention)
- biodiversity, climate, wetlands of international importance (Ramsar)
- sea dumping (London Protocol).

Where relevant, refer to Queensland legislation which may include, but is not limited to:

- *State Development and Public Works Organisation Act 1971* (SDPWO Act)
- *Environmental Protection Act 1994* (EP Act)
- *Sustainable Planning Act 2009* (SPA)
- *Aboriginal Cultural Heritage Act 2003*
- *Coastal Protection and Management Act 1995*
- *Fisheries Act 1994* (Fisheries Act)
- *Land Act 1994*
- *Land Protection (Pest and Stock Route Management) Act 2002*
- *Nature Conservation Act 1992* (NC Act)

- *Queensland Heritage Act 1992*
- *Transport Infrastructure Act 1994*
- *Transport Operations (Road Use Management) Act 1995*
- *Transport Operations (Marine Pollution) Act 1995*
- *Transport Planning and Coordination Act 1994*
- *Transport Operations (Marine Safety) Act 1994*
- *Transport Security (Counter Terrorism) Act 2008*
- *Vegetation Management Act 1999* (VM Act)
- *Water Act 2000* (Water Act)
- *Building Act 1975*
- *Marine Parks Act 2004.*

Describe local government planning controls, local laws and policies applying to the project, and provide a list of the approvals required (including those related to the conduct of prescribed environmentally relevant activities) and the expected program for assessing applications.

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

1.8.2 Relevant plans

Outline the project's consistency with the existing national, state, regional and local planning framework that applies to the project location. Include reference to all relevant statutory and non-statutory plans, planning policies, guidelines, strategies and agreements.

Refer to all relevant state and regional planning policies, including:

- any planning controls, by-laws and policies relating to the study area and adjacent lands
- details of all licences, planning and environmental approvals required or previously granted
- regional strategies or plans that relate to the study area or the project (existing or in preparation)
- transport and road plans at a network and link level
- the Port Alma Land Use Plan
- relationship to other significant developments (existing or proposed) in the study area or surrounding area.

With specific relevance to maritime safety, the following policies, guidelines and standards should be referenced:

- Queensland
  - *Queensland Counter-Terrorism Strategy 2008–2010*
  - *Queensland Infrastructure Protection and Resilience Framework*
  - *Queensland Government Information Security Classification Framework.*
- National
  - *National Counter-Terrorism Plan*
  - *Critical Infrastructure Protection National Strategy*
  - *Critical Infrastructure Emergency Risk Management and Assurance Handbook.*

1.8.3 Environmentally relevant activities

Briefly describe each environmentally relevant activity (ERA) under the EP Act and associated activities which are to be carried out in connection with the project. Present a detailed description of each ERA in Section 3, Environmental values and management of impacts, and provide details of the impact on land, water, air, noise and any other relevant environmental values.

The above information will allow for informed decisions to be made with respect to the project, consistent with the provisions of the EP Act.

1.8.4 Accredited process for controlled actions under Commonwealth legislation

The EIS will be developed pursuant to the bilateral agreement between the Commonwealth and Queensland governments for the purposes of the Australian Government's assessment under Part 8 of the EPBC Act. The EIS should address potential impacts on the matters of NES that were identified when the project was determined to be a controlled action. Part A, Section 3, describes that there is a separate Australian Government approval process under Part 9 of the EPBC Act.

2 Project description

Describe the project through its lifetime of pre-construction, construction, operation and potential decommissioning. 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.

2.1 Project overview

Provide an overview of the project to put it into context. Describe:

- how the preferred operating scenario was selected, including details such as cost, environmental impacts, and the operational efficiencies of each option
- the key components of the project, using design plans where applicable
- any environmental design features of the project

- the expected cost, timing, and overall duration of the project, including details of, and justification for, any staging of the development.

2.2 Location

Describe, using maps at suitable scales, the regional and local context of the project and all associated infrastructure. Provide real property descriptions of the project. Maps should show the precise location of the project area, in particular the:

- location and boundaries of current or proposed land tenures that the project area and alternative locations within the Port Alma precinct are, or will be, subject to, and details of land ownership
- description and location of surrounding land users
- location and boundaries of the project footprint, including easement widths and access requirements for project elements
- views to and from the site
- location of:
  - any proposed buffers surrounding the working areas (for construction and operation)
  - infrastructure (i.e. rail spur, including connections to the NCL, overland conveyor and port/marine infrastructure and associated infrastructure such as roads, services (including telecommunications, power and water (source, treatment, capture and storage)), waste (treatment, transport and disposal) and built waterways)
  - any proposed site offices and workforce accommodation sites
  - any significant environmental or landscape features such as waterways, wetlands areas, shore lines, ecological communities, habitat for listed threatened or migratory species and vegetation
  - State and Commonwealth marine parks, and fish habitat reserve boundaries within or adjacent to the project area.

2.3 Construction

Provide the following information on the pre-construction, construction and commissioning of the project and include detailed plans where appropriate.

2.3.1 Pre-construction activities

Describe all pre-construction activities, including:

- approvals required for this stage
- land acquisitions required, be it in full or as easements, leases etc.
- nature, scale and timing for vegetation clearing and its disposal
- site access

- earthworks, including disposal and re-use of material
- interference with watercourses and floodplain areas, including wetlands
- site establishment requirements for construction facilities, including access restriction measures and expected size, source and control of the construction workforce accommodation, services (water, sewerage, communication, power, recreation) and safety requirements
- temporary works, including any potential disruption to flows of waterways and diversion works
- upgrade, relocation, realignment, deviation of, or restricted access to, roads and other infrastructure
- estimated numbers and roles of persons to be employed during the pre-construction phase of the project.

2.3.2 Construction

Describe the construction elements of the project, including:

- works needed within project sites and off-site (e.g. erosion protection)
- an indicative construction timetable, including expected commissioning and start-up dates and hours of operation
- licensing/permit requirements for construction works
- major work programs for the construction phase, including an outline of construction methodologies, design, construction standards and site management
- alternative construction methodologies, justified in terms of minimising adverse impacts on water quality, marine and terrestrial biodiversity, matters of NES and the local community
- construction inputs, handling and storage including an outline of potential locations for sourcing construction materials (e.g. quarry materials)
- the number and type of vehicles, machinery and equipment used for construction activities
- estimates of the quantity of water required for construction purposes and the sources from which this water will be obtained
- hazardous materials to be transported, stored and/or used on site, including environmental toxicity data and biodegradability
- clean up and restoration of areas used during construction, including accommodation site(s), storage areas and loading and unloading areas, particularly in inter-tidal zones
- crossing techniques including restoration works that would be used at creek crossings, and road, rail, and other service corridor crossings

- estimated numbers and roles of persons to be employed during the construction phase of the project
- description of lighting requirements.

2.3.3 Dredging and spoil disposal

Describe the dredging and spoil disposal elements of the project, supported by maps and sediment plume and water circulation predictive modelling data, including:

- the type and method of dredging proposed with the expected length and timing of the dredging activities
- the dredge equipment and methodology used in disposing of dredged material, including sediment testing when transferring spoil from the dredge site to the disposal site, the amount of dredged material to be relocated and the planned relocation sites
- potential impacts (direct, indirect and cumulative) on the marine habitats and species within, adjacent and surrounding the proposed dredged area, including any marine flora and fauna protection measures proposed
- potential disposal options in accordance with the *National Assessment Guidelines for Dredging* (NAGD)[2] and the London Protocol on Sea Dumping, identifying the preferred disposal option(s) and explaining how the preferred option was selected
- future maintenance dredging requirements
- any previous sea dumping permits applied for including dates and volumes
- a plan of the land to be reclaimed, drawn to an appropriate scale, showing the following information:
  - the boundary of the land to be reclaimed, tied to real property boundaries
  - the location of the line of mean high water spring tide and highest astronomical tide in relation to the area of reclamation
  - existing levels of the land and proposed final levels of reclamation in relation to the lowest astronomical tide or Australian Height Datum (AHD)
  - location of marine plants and species habitat within, adjacent and surrounding the land to be reclaimed and existing and proposed bunds
  - typical cross-section across the land to be reclaimed showing the proposed finished levels and method of protecting the seaward boundary of the reclamation from erosion.

Discuss how the land reclamation may affect erosion and deposition patterns in the area of the proposed action and its potential impact on the relevant matters of NES (World Heritage, National Heritage, Wetlands of International Importance, listed

[2] Department of Environment, Water, Heritage and the Arts, *National Assessment Guidelines for Dredging*, Department of Environment, Water, Heritage and the Arts, Canberra, 2009, viewed 20 December 2010, www.environment.gov.au/coasts/pollution/dumping/publications/guidelines.html

threatened species and ecological communities, and listed migratory species). This discussion should be underpinned by data and information specific to the proposed action and may include site monitoring data and/or modelling.

Describe the method, location and issues associated with the disposal of dredged material, including the following:

- The characteristics of the dredged material disposal area(s) proposed including the history of the site and the predicted fate of the material after disposal and over time and the potential zone of impact.
- How the dredged material will be managed while being loaded.
- The physical and chemical qualities of the dredged material, and an assessment of the suitability of this material for land deposition and reclamation and offshore disposal at any proposed spoil ground. Obtain this information by implementing a sediment sampling and analysis plan (SAP) prepared in accordance with the NAGD.[3] The EIS must include a SAP implementation report prepared in accordance with the NAGD.
- Management strategies for dredging, loading and spoil disposal, including trigger levels for management actions linked to quantitative measurements of water quality and Benthic Primary Producer Habitat (BPPH) and based on baseline data
- The criteria used to assess the results of acid sulfate soils (ASS) screening tests, to identify actual ASS or potential ASS must be taken from Queensland Acid Sulfate Soils Investigation Team (QASSIT) guidelines.[4] The action criterion from the Chromium suite of tests, which triggers a requirement for ASS disturbance to be managed, should be derived from the *Acid Sulfate Soils Laboratory Methods Guidelines*[5] and the *Soil Management Guidelines*.[6] The EIS must also include a commitment to develop an ASS management plan under the guidance of the QASSIT. An outline of this management plan, including the structure, potential monitoring strategies and a likely timeframe for development, must be appended to the EIS.
- Modelling of sediment plumes, including likely dispersion and re-suspension from both dredging operations and dredge spoil disposal during all hydrodynamic conditions and weather events (including 'worst case' conditions). Include a justification of the parameters used to model 'worst case' conditions, including data source, quality and any uncertainties.
- Consideration of potential effects of mobilised sediments (e.g. metal or contaminant release).

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[3] Department of Environment, Water, Heritage and the Arts, *National Assessment Guidelines for Dredging*, Department of Environment, Water, Heritage and the Arts, Canberra, 2009, viewed 20 December 2010, www.environment.gov.au/coasts/pollution/dumping/publications/guidelines.html
[4] Available from www.derm.qld.gov.au/land/ass/products.html#guidelines
[5] CR Ahern, AE McElnea and LA Sullivan, *Acid Sulfate Soils Laboratory Methods Guidelines*, 2004, viewed 15 December 2010, www.derm.qld.gov.au/land/ass/lab_methods.html
[6] SE Dear, NG Moore, SK Dobos, KM Watling and CR Ahern, *Soil Management Guidelines*, 2002, viewed 15 December 2010, www.derm.qld.gov.au/land/ass/pdfs/soil_mgmt_guidelines_v3_8.pdf

- Impacts to benthic habitat, in particular BPPH. The benthic habitat should be mapped and the potential impacts described, taking into consideration the sediment plume monitoring. Describe the cumulative impacts of the entire dredge operation and likely maintenance dredging requirements.
- Management of the dredged material disposal area(s) during disposal operations.
- Consideration of the risk of introducing, or increasing the abundance, of marine invasive species via ballast water and on the hulls of vessels involved in dredging operations; and how these risks will be appropriately managed through vessel management protocols and through the development of an outline ballast water management plan.
- Proposed monitoring, before, during and after dumping, of water quality parameters that are likely to be affected. Water quality parameters being monitored should include, but may not be restricted to, dissolved oxygen, nutrients, pH, turbidity, light attenuation, metals and metalloids, toxicants and BPPH. Baseline water quality data that includes values for these parameters needs to be included in the EIS. Also include the likely impacts on turbidity and water quality from dredging and dredge spoil disposal and establish the triggers for management actions.
- Proposed monitoring of marine fauna and flora before, during and after disposal of dredged material and an investigation of the likely impacts from changes in water quality on the marine flora and fauna in the area and how these will be mitigated.
- Other uses of the dredged material including any possible future use.

For land-based dredge spoil disposal, present a detailed description of potential methods, location issues/risks and proposed management. This should include how water quality will be monitored and managed to ensure that water quality objectives for this area are achieved and the environmental values of the connected surface water and groundwater are maintained. Refer to the National Water Quality Management Strategy (NWQMS),[7] including the *Australian and New Zealand Guidelines for Fresh and Marine Water Quality*[8] and the *Australian Guidelines for Water Quality Monitoring and Reporting*.[9] Any toxicants that may occur in the sediments must be identified and managed according to best practice.

Consideration should be given to:

- quantities and quality of tail water likely to be generated from dredging activities and the rate of their discharge

[7] See www.environment.gov.au/water/policy-programs/nwqms/
[8] Australian and New Zealand Environment and Conservation Council and Agriculture and Resource Management Council of Australia and New Zealand, *The Australian and New Zealand Guidelines for Fresh and Marine Water Quality*, 2000, viewed 15 December 2010, www.mincos.gov.au/publications/australian_and_new_zealand_guidelines_for_fresh_and_marine_water_quality
[9] Australian and New Zealand Environment and Conservation Council and Agriculture and Resource Management Council of Australia and New Zealand, *Australian Guidelines for Water Quality Monitoring and Reporting*, 2000, viewed 15 December 2010, www.mincos.gov.au/publications/australian_guidelines_for_water_quality_monitoring_and_reporting

- the settling rate of fine sediments from all dredge material types
- the residence time within settling ponds prior to discharge (related to dredge pumping rate, ratio of solids to water in spoil, settling rates, available capacity of the disposal and settling areas, potential bulking factor, intensity and duration of rainfall events, considering the worst case scenario for these factors)
- source of material for bunds and bund wall stability
- measures to limit channelling and sediment re-suspension in settling ponds
- measures to limit erosion and sediment re-suspension in discharge channels
- monitoring of water quality and operational performance monitoring
- contingency measures in the event that discharge limits are exceeded.

A discussion of how dredging and disposal may affect the area of the proposed action and its potential impact on the relevant matters of NES (World Heritage, National Heritage, Wetlands of International Importance, listed threatened species and ecological communities and listed migratory species). This discussion should be underpinned by data and information specific to the proposed action and should include site monitoring data and/or modelling, and maps identifying the potential impacts and the locations of relevant matters of NES. The potential for the disturbance of ASS with dredging and reclamation works should be considered and appropriate monitoring data provided in the discussion. Identify and describe the potential impacts to these relevant matters of NES that are associated with the suspension of benthic sediments in the marine and estuarine environment as a result of proposed dredging and reclamation works, and provide the appropriate modelling, data and maps. The information regarding the potential impacts should include the suspension and transportation (or mobilisation) of nutrients, metals and contaminants into the water column of the marine and estuarine environment as a result of benthic disturbance with proposed dredging and disposal activities. Provide historical and current baseline data in the EIS on the metals, contaminants and nutrients located in benthic sediments and explain how this may impact upon water quality parameters and marine habitats, flora and fauna.

2.3.4 Commissioning

Describe the commissioning process including the associated environmental impacts.

2.4 Operation

Provide full details of the operation for all elements of the project, including:

- a description of the project site, including concept and layout plans of buildings, structures, plant and equipment to be employed
- nature and description of all key operational activities
- the capacity of the project equipment and operations
- nature of lighting requirements

- estimated numbers and roles of persons to be employed during the operational phase of the project.

2.5 Associated infrastructure

Detail, with concept and layout plans, the requirements for new infrastructure or the upgrading/relocating of existing infrastructure to service the project, justified in terms of ecologically sustainable development. Matters to be considered include such infrastructure for transportation, water supply, energy supply, telecommunications, stormwater, waste disposal and sewerage.

Discuss infrastructure alternatives, justified in terms of ecologically sustainable development. Briefly describe energy and water conservation and the reduction, re-use, recycling and recovery of waste in the context of relevant Commonwealth, state and local government policies.

Identify and address any potential impacts of the required infrastructure within the relevant technical section (identified under Section 3, Environmental values and management of impacts of these TOR).

2.5.1 Road transport

Provide information on road transportation requirements on public roads (both state and local) for both construction and operations phases, including:

- any proposed new roads to provide access to or within project sites
- existing traffic levels, vehicle types and numbers and trip lengths for roads surrounding the access points to project sites
- construction traffic (including vehicle types, oversize loads and number of vehicles likely to be used)
- operational traffic (including vehicle types and number of vehicles likely to be used), across various stages of development
- anticipated times at which movements may occur
- proposed transport routes (including any waterway crossings)
- need for increased road (and waterway crossing) maintenance and upgrading
- methods of communicating these issues to the public.

More detailed information regarding transport infrastructure will be required in accordance with Section 3.9, Transport, of these TOR. The EIS should include cross-references between the sections as appropriate.

2.5.2 Rail transport

Provide information on rail transportation and infrastructure requirements for both construction and operational phases, including:

- the proposed new railway components (including rail corridor boundaries and ownership/tenure arrangements) to provide access to project sites

- analysis and design plans for any interface with the NCL (including supporting infrastructure) in consultation with the Department of Transport and Main Roads (TMR), Queensland Rail and QR National
- proposed transport routes of all project-related transport movements associated with rail (including associated infrastructure such as railway crossings)
- need for increased rail crossing maintenance and upgrading (in consultation with TMR and QR and QR National)
- quantities of material proposed to be transported by rail and timing requirements
- all rail infrastructure required to be constructed, upgraded, relocated, commissioned or decommissioned for the construction and/or operation of the project, including the design and construction standards to be met. Rail crossings should be designed to meet QR and QR National's requirements.

More detailed information regarding transport infrastructure will be required in accordance with Section 3.9, Transport, of these TOR. The EIS should include cross-references between the sections as appropriate.

2.5.3 Port description

Provide concept and layout plans, highlighting proposed structures, plant and equipment associated with terminal operations. The description of the port and the layout of key components should include, but is not limited to:

- port boundaries
- jetty and wharf alignment
- ship loading equipment and capacity
- berths for tugs and other non-bulk carrier vessels
- ship numbers, size, frequency, speed and route within Port Alma and through the Great Barrier Reef Marine Park for the current and future Port Alma operations, where known, and proposed operations for the project
- offshore ship mooring locations
- any other associated facilities

Describe the location and nature of the processes and operations associated with the long-term operation of the port, including:

- a general description of the operations of the coal terminal, including proposed quarantine management
- the capacity of stockpiling, in-loading and out-loading operations for each stage of the port's development
- the expected shipping frequency, ship size, intensity, piloting requirements and route through Port Alma and the Great Barrier Reef Marine Park
- number of additional tugs, location of tug berths and tug operations

- hours of operation
- expected access, navigational and anchorage arrangements (including emergency anchorages)
- maintenance dredging operations
- an outline of a long-term dredge management and monitoring plan (LTDMMP), written in accordance with the Department of Sustainability, Environment, Water Population and Communities (DSEWPaC) requirements and indicating potential monitoring strategies, management actions and likely management action triggers and a likely timeframe for developing the full management plan, and appended to the EIS
- environmental management measures incorporated in the operation of the port.

2.5.4 Product handling

Describe and show on plans at an appropriate scale the proposed methods and facilities to be used for storing coal and for transferring coal from the NCL to the proposed stockpile and from the stockpile to the export berths. Include discussion of any environmental design features of these facilities including bunding of storage facilities.

Discuss the possibility of coal spillage during the ship loading and conveying and the feasibility and relative effectiveness of complete coverage of conveyers compared with other duct control methods. Describe the nature, sources, location and quantities of all materials to be handled, including storage and stockpiling of coal. Identify and describe all potential issues due to product handling. Identify and quantify hazards and risks where possible and consider cumulative impacts. How these hazards and risks will be managed according to best practice should be articulated.

2.5.5 Energy

Describe all energy requirements, including electricity, natural gas, and/or solid and liquid fuel requirements for the construction and operation of the project. Detail the location, design and capacity of power generation and transmission infrastructure for construction and ongoing use. The locations of any easements must be shown on the infrastructure plan. Briefly describe energy conservation in the context of any Commonwealth, state and local government policies.

2.5.6 Water supply, treatment and storage

Provide information on the proposed water usage by the project, including:

- water supply design
- the ultimate supply and sources of this supply required to meet the demand for full occupancy of the development

- the quality and quantity of all water supplied to the site during the construction and operational phases based on minimum yield scenarios for water re-use, rainwater re-use and bore water volumes
- a water balance analysis
- water storage details (potable and stormwater)
- firefighting flows required
- a site plan outlining actions to be taken if the main water supply fails
- any recycling of treated waste water.

Given the implications of any approvals required under the Water Act, report on proposed sources of either allocated or independent water supply to address project requirements (both during construction and for the life of the project operationally) that does not counteract current water allocations and supply demands in the region. This is to include demonstrating an adequate water balance assessment for the project (e.g. during all stages of development and ongoing use, including reasonable predicted low rainfall).

Provide estimated rates of supply from each source (average and maximum rates) and describe proposed water conservation and management measures.

Describe how the project would adhere to the NWQMS.[10] Provide information on how water quality will be managed in accordance with relevant NWQMS guidelines, including:

- *Australian Drinking Water Guidelines*[11]
- *Australian and New Zealand Guidelines for Fresh and Marine Water Quality*[12]
- *Australian Guidelines for Water Quality Monitoring and Reporting*[13]
- *Guidelines for Groundwater Protection*[14]
- *Environmental Protection (Water) Policy 2009* (EPP (Water)
- the National Guidelines for Sewerage Systems Guidelines series[15]
- the water recycling guidelines series[16]

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[10] See www.environment.gov.au/water/policy-programs/nwqms/ for further details.
[11] National Health and Medical Research Council and Natural Resource Management Ministerial Council, *Australian Drinking Water Guidelines*, 2004, viewed 15 December 2010, www.nhmrc.gov.au/_files_nhmrc/file/publications/synopses/adwg_11_06.pdf
[12] Australian and New Zealand Environment and Conservation Council and Agriculture and Resource Management Council of Australia and New Zealand, *The Australian and New Zealand Guidelines for Fresh and Marine Water Quality*, 2000, viewed 15 December 2010, www.mincos.gov.au/publications/australian_and_new_zealand_guidelines_for_fresh_and_marine_water_quality
[13] Australian and New Zealand Environment and Conservation Council and Agriculture and Resource Management Council of Australia and New Zealand, *Australian Guidelines for Water Quality Monitoring and Reporting*, 2000, viewed 15 December 2010, www.mincos.gov.au/publications/australian_guidelines_for_water_quality_monitoring_and_reporting
[14] Agriculture and Resource Management Council of Australia and New Zealand and Australian and New Zealand Environment Conservation Council, *Guidelines for Groundwater Protection*, 1995, viewed 15 December 2010 www.mincos.gov.au/__data/assets/pdf_file/0010/316099/guidelines-for-groundwater-protection.pdf
[15] Available from www.environment.gov.au/water/policy-programs/nwqms/#guidelines

- relevant state and local water quality policies.

Determination of potable water demand must be made for the project, including the temporary demands during the construction period. Include details of any existing town water supply to meet such requirements. Detail should also be provided to describe any proposed on-site water storage and treatment for use by the site workforce during construction and operational phases.

Where water supplies require on-site treatment, provide details of any infrastructure used for treatment and how and where any contaminated water (if any is generated) will be disposed of. Information should be provided on what monitoring will occur and what management triggers will be established to protect water quality. Where temporary water supply/treatment infrastructure is required, provide details on requirements and timing.

Describe how the development will manage operation of the water supply system in circumstances of disaster or disruption to power supplies.

2.5.7 Stormwater drainage

Describe the proposed stormwater drainage system and the proposed disposal arrangements, including any off-site services.

Detail the sources of stormwater and the quantity, quality and location of discharge to watercourses including the Great Barrier Reef Marine Park. Discuss the potential impacts of stormwater discharge to water quality and its associated impacts on species; and describe mitigation measures to reduce the potential impacts. Provide details on the standard of proposed stormwater treatment systems, including examples of quality improvement devices (sediment removal, gross pollutant traps) and potential discharge points (spread of flow and scour protection). Provide information on how water quality will be managed in accordance with the relevant NWQMS guidelines, *Water Quality Guidelines for the Great Barrier Reef Marine Park*[17] and state and local policies and guidance.

2.5.8 Waste

Detail the proposed management of solid and liquid wastes, considering the suitability of available waste disposal options. Particular attention must be given to the capacity of wastes to generate acidic, saline or sodic conditions.

Describe the sewerage infrastructure required by the project, including:

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[16] Available from www.ephc.gov.au/taxonomy/term/39
[17] Great Barrier Reef Marine Park Authority, *Water Quality Guidelines for the Great Barrier Reef Marine Park*, 2009, viewed 15 December 2010, www.gbrmpa.gov.au/__data/assets/pdf_file/0016/33802/Water_Quality_Guidelines_for_the_GBR.pdf

- options assessed for wastewater treatment
- the treatment measures/precautions of any wastewater generated on the site, whether temporary or not, that will be discharged to council sewerage infrastructure so that the sewage will not adversely impact on treatment processes at council's wastewater treatment plants
- measures required to mitigate any risks to the environment from discharges and overflows, giving reference to relevant NWQMS guidelines and other state and local water quality policies and guidance
- buffers between disposal and irrigation areas and other use areas, i.e. current rural operations of landholders surrounding the proposed rail corridor
- peak design capacity evaluation of the wastewater treatment system and associated infrastructure using equivalent persons as the measure of capacity
- the proposed disposal and/or re-use of the treated effluent and the management of such use. An irrigation plan should be provided detailing where the use of treated effluent is likely. Details of the likely impacts of treated effluent on groundwater quality should also be provided
- the siting and maintenance regime for the system
- how the development will manage operation of the wastewater treatment and disposal system in circumstances of disaster or disruption to power supplies, including determination of the potential emergency effluent storage that would be required in an extended rain event (one in 50 and one in 100-year) wet weather storage accounting for climate change.

2.5.9 Telecommunications

Describe any potential impacts on existing infrastructure (such as optical cables, microwave towers, etc.), identifying and consulting with infrastructure owners regarding any proposed impacts.

2.5.10 Other infrastructure

Describe all other infrastructure (including temporary and permanent accommodation facilities, and emergency response facilities) that need to be constructed, upgraded, relocated, commissioned or decommissioned for the construction and/or operation of the project. This includes the design and construction standards to be met (e.g. waterway crossings should be designed to meet the requirements of the Fisheries Act and in consultation with the Department of Employment, Economic Development and Innovation).

Discuss alternative approaches or the opportunity of obtaining materials from alternative sources.

2.6 Decommissioning and rehabilitation

Describe the options, strategies and methods for progressive and final rehabilitation of the environment disturbed by the project. The EIS should include:

- details of a preferred rehabilitation strategy that minimises the amount of land disturbed at any one time
- maps of suitable scale showing the final topography of any excavations, waste areas and dam sites
- a description of the means of decommissioning the project, in terms of removing equipment, structures and buildings, and the methods proposed for stabilising the affected areas
- a discussion of the options and methods for disposing of wastes from the demolition of the project infrastructure, in sufficient detail for their feasibility and suitability to be established
- a description of water quality and aquatic ecosystem monitoring program that will assess the performance of any rehabilitation and decommissioning activities in the project area, in sufficient detail for its effectiveness to be established in relation to environmental values and including details of sampling parameters, frequency and duration
- a discussion of future land tenure arrangements post decommissioning of the project.

Discuss the detail of the impacts of the preferred rehabilitation strategy in the appropriate subsections of Section 3, Environmental values and management of impacts.

Refer also to infrastructure that is not intended to be decommissioned. In this situation, the entity, to which the infrastructure is intended to be transferred, should be described with the proposed environmental management regimes.

3 Environmental values and management of impacts

Detail the environmental protection and mitigation measures incorporated in the planning, construction, rehabilitation, commissioning, operational and decommissioning of all facets of the project. Measures should prevent, or where prevention is not possible, minimise environmental harm and maximise environmental benefits of the project. Describe and identify preferred measures in more detail than other alternatives.

The objectives of subsequent sections are to:

- Describe the existing environmental values (including any matters of NES) of the area that may be affected by the project, using background information and/or new studies. This shall include reference to all definitions of environmental values set out in relevant legislation, policies and plans,.
- Describe the potential adverse and beneficial impacts of the project on the identified environmental values (including human health).
- Describe the measures that will be taken to avoid, minimise and/or mitigate those impacts.
- Describe any cumulative impacts on environmental values/matters of NES caused by the project, either in isolation or by combining with other known existing or planned projects.
- Present objectives, standards and measurable indicators that protect the identified environmental values.
- 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.
- Discuss the available techniques to control and manage impacts in relation to the nominated objectives.

In accordance with the *Queensland Government Environmental Offset Policy* (2008), proposals to offset impacts should be presented.

The EIS should follow the format and content outlined in these TOR; however, changes to the structure can be discussed with DEEDI staff. The mitigation measures, monitoring programs etc. identified in this section of the EIS should be used to develop the EMP for the project (see Section 8, Environmental management plan).

Detail on baseline data, potential impacts and mitigation measures for matters of NES in this section should also be included in Section 9, Matters of national environmental significance.

3.1 Climate, natural hazards and climate change

Describe the climatic conditions that may affect management of the project. This includes a description of the vulnerability of the project area to seasonal conditions, extremes of climate and natural or induced hazards, and a description of the rainfall patterns (including magnitude and seasonal variability of rainfall), air temperatures, humidity, wind (direction and speed) and any other special factors (e.g. temperature inversions) that may affect management of the project, including existing air quality within the region.

Discuss extremes of climate (droughts, floods, cyclones, etc.), with particular reference to water management at each component site of the project; and address the vulnerability of the area to natural or induced hazards, such as floods and bushfires. Consider the relative frequency and magnitude of these events together with the risk they pose to managing the project.

Address any potential impacts due to climatic factors (such as the impact of rainfall on soil erosion or the impact of temperature inversions on air quality) in the relevant sections of the EIS.

Climate change, through alterations to weather patterns and rising sea level, has the potential to impact in the future on developments designed now. 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 to the project from climate change impacts including 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
- 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. Proponents should use their best efforts to incorporate adaptation to climate change in their EIS and project design.

3.2 Land

Detail the existing land environment values for all areas associated with the project. Describe the potential for the construction and operation of the project to change existing and potential land uses of the project sites and adjacent areas.

3.2.1 Land use and tenure

Description of environmental situation

Identify, using maps:

- land tenure—including reserves, tenure of special interest (such as protected areas and forest reserves), existing and proposed gas infrastructure, water pipelines, power line and transport corridors (including local roads, state-controlled roads and rail corridors), mineral/coal exploration tenures, mining leases, mineral development licences, extractive industry permits, authorities to prospect for petroleum, petroleum leases, pipeline licences, pipeline facility licences, geothermal exploration and development authorities, greenhouse gas authorities and state development areas (current and under application/proposed) and tenure at any alternative site locations
- existing land uses and facilities surrounding the project (current and proposed)
- areas covered by applications for native title claims or native title determinations, providing boundary descriptions of native title representative body(ies). The proponent should also identify in the EIS whether there are any necessary notifications required to the representative body(ies) or evidence that native title does not exist
- areas of contamination on or adjacent to the site
- distance of the project from residential and recreational areas
- declared water storage catchments
- location of the project in relation to environmentally sensitive areas
- information on any known occurrences of economic mineralisation, extractive resources (including key resource areas) and petroleum and gas deposits.

Potential impacts and mitigation measures

Detail the potential for the construction and operation of the project to change existing and potential land uses of the project site and adjacent areas.

Describe the following:

- impacts on surrounding land uses and human activities and strategies for minimisation, such as:
  - good quality agricultural land (GQAL) (refer to *State Planning Policy 1/92: Development and the Conservation of Agricultural Land*[18] and its accompanying *State Planning Policy 1/92 Guideline: The Identification of Good Quality Agricultural Land*)[19]

[18] Department of Housing, Local Government and Planning and Department of Primary Industries, State Planning Policy 1/92: Development and the Conservation of Agricultural Land, 1992, viewed 17 March 2011, www.dlgp.qld.gov.au/docs/ipa/spp1_92.pdf

[19] Department of Primary Industries and Department of Housing, Local Government and Planning, *Planning guidelines: The identification of good quality agricultural land*, 1993.

- key resource areas (refer to *State Planning Policy (SPP) 2/07: Protection of Extractive Resources* and its accompanying *State Planning Policy 2/07 Guideline: Protection of Extractive Resources*)[20]
- residential and industrial uses

- possible effect on town planning objectives and controls, including relevant statutory regional plans, local government zoning and strategic plans, strategic port land use plans, and state development area development schemes
- constraints to potential developments and possibilities of re-zoning adjacent to the development area
- management of the immediate environs of the project including construction buffer zones
- identifying the potential native title rights and interests likely to be impacted by the project and the potential for managing those impacts by an Indigenous land use agreement or other native title compliance outcomes
- proposed land use changes in any areas of high conservation value and information on how easement widths and vegetation clearance in sensitive environmental areas will be minimised, and measures to address fragmentation of these areas
- potential issues involved in proximity and/or co-location of other current or proposed infrastructure services
- potential impacts on future road upgrades
- potential impacts on mining tenements/tenures and the access to, and development of identified resource deposits
- identification of any land units requiring specific management measures.

Detail post-operations land use options, including suitability of the area to be used for agriculture, industry, or nature conservation. The factors favouring or limiting the establishment of those options should be given, in the context of land use suitability prior to the proposal and minimising potential liabilities for long-term management.

Describe the potential environmental harm caused by the project on the adjacent areas currently used for agriculture, commercial fishing, urban development, recreation, tourism or other business; and the implications of the project for future developments in the impact area including constraints on surrounding land uses. If the development adjoins or potentially impacts on GQAL, then an assessment of the potential for land use conflict is required. Investigations should follow the procedures

[20] Department of Mines and Energy, *State Planning Policy 2/07 Guideline: Protection of Extractive Resources*, Department of Mines and Energy, Brisbane, 2007.

set out in *Planning guidelines: The Identification of Good Quality Agricultural Land*,[21] which supports State Planning Policy 1/92.

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

3.2.2 Topography, geology and soil

Description of environmental values

Provide maps locating the project in state, regional and local contexts. The topography should be detailed with contours at suitable increments, shown with respect to AHD. Identify significant features of the landscape and topography on the maps.

Provide a description, map and a series of cross-sections of the geology of the project area relevant to the project components. Describe geological properties that may influence ground stability, occupational health and safety, or the quality of stormwater leaving any area disturbed by the project. In locations where the age and type of geology is such that significant fossil specimens may be uncovered during construction/operations, the EIS must address the potential for significant finds.

A soil survey of the project area should be conducted at an appropriate scale following the standards in Guidelines for Surveying Soil and Land Resources (McKenzie et al., 2008).

Soil profiles should be described according to the *Australian soil and land survey field handbook*,[22] grouped according to their parent material and position in the landscape, and classified according to *Australian soil classification*.[23] Particular reference to the physical and chemical properties of the materials that will influence erosion potential, storm water run-off quality, rehabilitation and agricultural productivity of the land should be included. Representative soils must be sampled down the profile for laboratory analysis as outlined in the Land Suitability Assessment Techniques in the *Technical Guidelines for the Environmental Management of Exploration and Mining in Queensland*.[24]

Assess the agricultural suitability of the soils mapped in the project area according to the limitations and land suitability classification system in Attachment 2 of Land Suitability Assessment Techniques.[24] Provide land suitability maps of the mapped soil units and an Agricultural Land Class map according to the *Planning Guideline:*

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[21] Department of Primary Industries and Department of Housing, Local Government and Planning, *Planning guidelines: The identification of good quality agricultural land*, 1993.
[22] National Committee on Soil and Terrain, *Australian soil and land survey field handbook*, 3rd edn, CSIRO Publishing, Collingwood, 2009.
[23] R Isbell, *Australian soil classification*, CSIRO Publishing, Collingwood, 2002.
[24] Department of Minerals and Energy, *Technical Guidelines for the Environmental Management of Exploration and Mining in Queensland*, Department of Mines and Energy, 1995, viewed 10 January 2010, www.derm.qld.gov.au/environmental_management/land/mining/technical_guidelines.html

The Identification of Good Quality Agricultural Land.[25] Discuss the GQAL status and comment on and justify any variation with the GQAL mapping shown in the Calliope Shire Council Planning Scheme Guideline Map 1 'Agricultural Land Classes, Calliope Shire'.

An assessment of the depth and quality of useable topsoil and subsoil to be stripped and stockpiled for rehabilitation should be undertaken and documented.

Provide geotechnical information on soil stability and suitability for construction of project facilities.

As required by *State Planning Policy 2/02: Planning and Managing Development involving Acid Sulfate Soils*,[26] undertake an onshore and offshore investigation of ASS for proposed disturbances according to the *Guidelines for Sampling and Analysis of Lowland Acid Sulfate Soils (ASS) in Queensland 1998*.[27] If the density of sampling undertaken for this investigation is not in accordance with the guidelines, the EIS will describe the proposed strategy for undertaken additional survey and the development of an ASS management plan, to be completed as part of the subsequent application for development approval under SPA.

Consider also the geology underlying the proposed infrastructure corridors for electricity easements, rail line, pipeline easements and any other associated infrastructure.

Summarise the results of studies and surveys undertaken to identify and delineate mineral resources (including commercially extracted salt) within the project area (including any areas underlying related infrastructure).

The location, tonnage and quality of existing mineral resources within the project area should be described in detail as indicated below.

In addition, provide maps (at appropriate scales) showing the general location of the project area and in particular:

- the location and general extent of any mineral resources currently developed
- the location and boundaries of existing mining tenures, granted or proposed
- any part of existing mineral resources that may be sterilised by the proposed project.

Potential impacts and mitigation measures

Provide details of any potential impacts to the topography or geomorphology associated with the project and proposed mitigation measures, including:

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[25] Department of Primary Industries and Department of Housing, Local Government and Planning, *Planning guidelines: The identification of good quality agricultural land*, 1993.
[26] Available from: www.dlgp.qld.gov.au/docs/ipa/spp1_92.pdf
[27] CR Ahern, MR Ahern and B Powell, *Guidelines for Sampling and Analysis of Lowland Acid Sulfate Soils (ASS) in Queensland 1998*, Queensland Acid Sulfate Soils Investigation Team, Department of Natural Resources, Indooroopilly, 1998, viewed 24 May 2011, www.derm.qld.gov.au/land/ass/pdfs/sample_analysis_guide.pdf

- a discussion of the project in the context of major topographic features and any measures taken to avoid or minimise impact to such, if required
- the objectives to be used for the project in any re-contouring or consolidation, rehabilitation, landscaping, and fencing
- the effectiveness of the project in avoiding any unnecessary sterilisation of land over which mineral development rights have been established
- the identification and mitigation measures necessary to address the potential impacts of landslide in accordance with *State Planning Policy 1/03: Mitigating the Adverse Impacts of Flood, Bushfire and Landslide*.[28]

Identify the possible soil erosion rate for all permanent and temporary landforms and describe the techniques used to manage the impact. Identify all soil types and outline the erosion potential (both wind and water) and erosion management techniques to be used. Outline the proposed erosion monitoring program, including rehabilitation measures for erosion problems identified during construction, and provide acceptable mitigation strategies.

Assess and describe likely erosion effects, especially those resulting from the removal of vegetation, and construction of retaining walls both on-site and off-site for all disturbed areas.

Summarise methods proposed to prevent or control erosion with regard to:

- the *Soil Erosion and Sediment Control—Engineering Guidelines for Queensland Construction Sites*[29]
- the former Environment Protection Agency (EPA) *Guideline: EPA Best Practice Urban Stormwater Management—Erosion and Sediment Control*[30]
- preventing soil loss in order to maintain land capability/suitability
- preventing degradation of local waterways.

Should action criteria be triggered by acid generation potential as the result of the investigation, provide a site specific and construction specific ASS management plan with management strategies according to the latest version of the *Queensland Acid Sulfate Soil Technical Manual, Soil Management Guidelines*.

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[28] Department of Local Government and Planning, Department of Emergency Services, *State Planning Policy 1/03: Mitigating the Adverse Impacts of Flood, Bushfire and Landslide*, 2003, viewed 22 December 2010, www.emergency.qld.gov.au/publications/spp/pdf/spp.pdf

[29] Institution of Engineers Australia, *Soil Erosion and Sediment Control—Engineering Guidelines for Queensland Construction Sites*, Institution of Engineers Australia Queensland Division, Brisbane, 1996.

[30] Environment Protection Agency, *Guideline: EPA Best Practice Urban Stormwater Management—Erosion and Sediment Control*, 2008, viewed 16 December 2010, www.derm.qld.gov.au/register/p02301aa.pdf

3.2.3 Scenic amenity and lighting

Description of environmental values

Describe in general terms the existing character of the landscape and the general impression that would be obtained while travelling through and around it. Outline existing landscape features, panoramas and views that have, or could be expected to have, value to the community. Information in the form of maps and photographs should be used, particularly where addressing the following issues:

- major views, view sheds, outlooks, and features contributing to the amenity of the area, including assessment from private residences
- focal points, landmarks, waterways and other features contributing to the visual quality of the area and the project site(s)
- character of the local and surrounding areas including vegetation and land use
- the values of the Great Barrier Reef World Heritage Area (GBRWHA), which includes values under the following listing criteria: 'contains unique, rare and superlative natural phenomena, formations and features and areas of exceptional beauty'. Specific reference should be made to the values that fall under these criteria. A full list of GBRWHA values is included at Appendix 1.

At a level of detail appropriate to the scale of the project, describe the relevant geomorphology, supported by illustrative mapping, highlighting any significant features and associated environmental values.

Potential impacts and mitigation measures

Describe the potential beneficial and adverse impacts of the project on landscape character and visual qualities of the site and the surrounding area. Provide details about measures to be undertaken to mitigate or avoid the identified impacts.

Lighting

Provide an assessment of all potential impacts of the project's lighting, during all stages, with particular reference to objectives to be achieved and management methods to be implemented to manage, mitigate or avoid, including:

- the visual impact at night
- night operations/maintenance and effects of lighting on fauna and sensitive receptors, particularly during nesting or periods of higher susceptibility to impact (i.e. turtles)
- the potential impact of increased vehicular traffic, shipping movement, navigational and trestle/port facility lighting
- changed habitat conditions for nocturnal and marine fauna and associated impacts.

3.2.4 Land contamination

Description of environmental values

Discuss the potential for land contamination within the project area from existing and past uses, based on land use history and the nature and quantity of any contaminants. The following information should be presented in the EIS:

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

Potential impacts and mitigation measures

Discuss the management of any contaminated land and potential for contamination from construction, commissioning and operation, in accordance with the Department of Environment and Resource Management (DERM—formerly EPA) *Draft Guidelines for the Assessment and Management of Contaminated Land in Queensland*[31] and the *National Environment Protection (Assessment of Site Contamination) Measure 1999*.

Describe the possible contamination of land from aspects of the project, including waste, reject coal, overburden, coal washing plant and spills at chemical and fuel storage and handling areas; identify and describe all potential issues. Identify and quantify, where possible, hazards and risks; and consider cumulative impacts. Explain how these hazards and risks will be managed according to best practice.

Describe strategies and methods to be used to prevent and manage any land contamination resulting from the project, including managing acid generation, metal release and managing chemicals and fuels to prevent spills or leaks.

Describe strategies for addressing the classification of land contamination after project completion.

3.3 Nature conservation

Describe the existing nature conservation values of the project area and how these have changed over time. Describe the environmental values in terms of:

- integrity of ecological processes, including habitats of rare and threatened species together with listed threatened and migratory species protected under Part 3 of the EPBC Act.
- conservation of resources

[31] Department of Environment, *Draft Guidelines for the Assessment and Management of Contaminated Land in Queensland, Department of Environment, Brisbane*, 1998, viewed 20 December 2010, www.derm.qld.gov.au/register/p00090aa.pdf

- biological diversity, including habitats of rare and threatened species together with listed threatened and migratory species protected under Part 3 of the EPBC Act
- integrity of landscapes and places including wilderness and similar natural places
- aquatic, marine and terrestrial ecosystems.

Survey effort should be sufficient to identify, or adequately extrapolate, the floral and faunal values over the range of seasons, particularly during and following a wet season. The survey should account for the ephemeral nature of watercourses traversing the proposal area, and seasonal variation in fauna populations.

Wherever possible, seek the involvement of the local Indigenous community to conduct field observations and survey activities to identify the traditional and contemporary Indigenous uses of species.

Outline the proposed strategies to avoid, or minimise and mitigate, impacts on the identified values within the project's footprint.

Identify key flora and fauna indicators for future ongoing monitoring.

3.3.1 Sensitive environmental areas

Description of environmental values

Identify areas that are environmentally sensitive in proximity to the project on a regional scale. This should include areas classified as having international, national, state, regional or local biodiversity significance, those that may or are known to be habitat for listed threatened or migratory species protected under Part 3 of the EPBC Act or flagged as important for their integrated biodiversity values. Refer to both Queensland and Commonwealth legislation and policies on threatened species and ecological communities and listed migratory species.

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

- important habitats of species listed under the *Nature Conservation Act 1992* (NC Act) and/or the EPBC Act as presumed extinct, critically endangered, endangered, vulnerable, rare or migratory
- regional ecosystems listed as 'endangered' or 'of concern' under state legislation, and/or ecosystems listed as presumed extinct, critically endangered, endangered or vulnerable under the Commonwealth EPBC Act
- good representative examples of remnant regional ecosystems or regional ecosystems which are described as having 'medium' or 'low' representation in the protected area estate as defined in the Regional Ecosystem Description Database (REDD) available at the DERM website at www.derm.qld.gov.au
- sites listed under international treaties such as Ramsar wetlands and World Heritage areas

- wetlands of state significance, including any Wetlands of High Ecological Significance (HES) in Great Barrier Reef (GBR) catchments
- 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 other countries (i.e. JAMBA, CAMBA and ROKAMBA)
- sites within or adjacent to nesting beaches, feeding, resting or calving areas of species of special interest, including but not limited to, marine turtles, sawfish, dugong, birds and cetaceans
- sites containing common species that 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; such land may contain:
  - natural vegetation in good condition or other habitat in good condition (e.g. wetlands)
  - degraded vegetation or other habitats that still supports high levels of biodiversity or acts as an important corridor for maintaining high levels of biodiversity in the area
- a site containing other special ecological values, for example, high habitat diversity and areas of high endemism
- ecosystems which provide important ecological functions such as
  - wetlands of national, state and regional significance
  - coral reefs
  - riparian vegetation
  - important buffer to a protected area or important habitat corridor between areas
- declared fish habitat areas and sites containing protected marine plants under the Fisheries Act
- sites of palaeontologic significance such as fossil sites
- sites of geomorphological significance
- protected areas which have been proclaimed under the NC Act and *Marine Parks Act 2004* or are under consideration for proclamation
- areas of major interest, or critical habitat declared under the NC Act or high nature conservation value areas or areas vulnerable to land degradation under the *Vegetation Management Act 1999* (VM Act)

- areas which are important or potentially important as migratory corridors or for population connectivity
- World Heritage areas and National Heritage places.

Areas of special sensitivity include the marine environment and wetlands, wildlife breeding or roosting areas, any significant habitat or relevant bird flight paths for migratory species, bat roosting and breeding caves including existing structures such as adits and shafts, and habitat of threatened plants, animals and communities.

Additionally, the potential impacts and proposed mitigation measures regarding threatened or migratory species are to be addressed, including but not limited to:

- the yellow chat (Dawson) (*Epthianura crocea macgregori*) and other listed migratory birds
- the semi-evergreen vine thickets of the brigalow belt, the weeping myall woodlands, littoral vine thickets and *Cycas megacarpa*
- terrestrial species including the false water rat (*Xeromys myoides*) and reptiles including the ornamental snake (*Denisonia maculata*), Dunmall's snake (*Furina dunmalli*) and the yakka skink (*Egernia rugosa*)
- marine species including turtles, sawfish, dolphins and dugong that are known or likely to occur in the region.

Identify the project's potential impacts on water quality that may potentially have a significant impact on the ecological character of the Shoalwater and Corio Bays Ramsar site. A precautionary approach should be taken in making this assessment.

Potential impacts and mitigation measures

Discuss the impact of the project on species, communities and habitats of local, regional or national significance in sensitive environmental areas as identified above. Include human impacts and the control of any domestic animals introduced to the area.

The EIS should demonstrate how the project would comply with the following hierarchy:

- avoiding impact on areas of remnant vegetation and other areas of conservation value including listed species and their habitat
- mitigation of impacts through rehabilitation and restoration including, where relevant, a discussion of any relevant previous experience or trials of the proposed rehabilitation
- measures to be taken to replace or offset the loss of conservation values where avoidance and mitigation of impacts cannot be achieved.

The EIS should explain why measures above would not apply in areas where loss would occur.

Discuss the boundaries of the areas impacted by the project within or adjacent to an endangered ecological community, including details of footprint width. Where the project area would impact upon a threatened community, the discussion should include reasons for the preferred alignment and the viability of alternatives.

Address any actions of the project or likely impacts that require an authority under the NC Act, and/or would be assessable development for the purposes of the VM Act.

Outline how these measures will be implemented in the overall EMP for the project.

Where relevant, discuss environmental offset requirements in accordance with the Queensland Government Environmental Offsets Policy (2008) and take into account the applicable specific-issue offset policies, as follows:

- *Policy for Vegetation Management Offsets*[32]
- *Mitigation and Compensation for Works or Activities Causing Marine Fish Habitat Loss*[33]
- Draft Policy for Biodiversity Offsets (consultation draft).[34]

Describe any departure from no net loss of ecological values.

3.3.2 Terrestrial flora

Description of environmental values

Provide a map of terrestrial vegetation at a regional scale for all relevant project sites, including new transport and water infrastructure and accommodation facilities, if relevant, with descriptions of the units mapped. Highlight sensitive or important vegetation types, including any riparian vegetation, and their value as habitat for fauna and conservation of specific rare floral and faunal assemblages or community types. Address the existence of rare or threatened species or ecological communities, including their conservation status, their locations and abundance, condition and the significance of the presence of those species on site.

The surveys should include species structure, assemblage, diversity and abundance. The description should contain a review of published information that assesses the significance of the vegetation to conservation, recreation, scientific, educational and historical interests.

Adjacent areas should also be mapped to illustrate interconnectivity. Mapping should also illustrate any larger scale interconnections between areas of remnant or

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[32] Department of Environment and Resource Management, *Policy for Vegetation Management Offsets*, version 2.4, Department of Environment and Resource Management, Brisbane, 2009, viewed 20 December 2010, http://www.derm.qld.gov.au/about/policy/documents/3450/veg_2006_2888.pdf

[33] Department of Primary Industries, *Mitigation and Compensation for Works or Activities Causing Marine Fish Habitat Loss*, Department of Primary Industries, Brisbane, 2002, viewed 20 December 2010, http://www.dpi.qld.gov.au/documents/Fisheries_Habitats/FHMOP005-Fish-Hab-Manage.pdf

[34] Environment Protection Agency, Draft Policy for Biodiversity Offsets (consultation draft), 2008, viewed 20 December 2010, http://www.derm.qld.gov.au/register/p02762aa.pdf

regrowth vegetation where the project site includes a corridor connecting those other areas.

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

- location and extent of vegetation types using the regional ecosystem type descriptions in accordance with the REDD
- location of vegetation types of conservation significance based on regional ecosystem types and occurrence of species listed as protected plants under the Nature Conservation (Wildlife) Regulation 2006 and subsequent amendments, as well as areas subject to the VM Act
- 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 and conservation reserves under the *Land Act 1994*)
- any plant communities of cultural, commercial or recreational significance
- the location of any horticultural crops on or in the vicinity of the project area
- location and abundance of any exotic or weed species
- any plant communities of cultural, commercial or recreational significance.

Highlight sensitive or important vegetation types, including any marine littoral and subtidal zone and riparian vegetation, and their value as habitat for fauna and conservation of specific rare floral and faunal assemblages or community types. The description should contain a review of published information that assesses the significance of the vegetation to conservation, recreation, scientific, educational and historical interests.

For each significant natural vegetation community likely to be impacted by the project, vegetation surveys should be undertaken at an appropriate number of sites, allowing for seasonal factors, and satisfying the following:

- the relevant Regional Vegetation Management Codes
- 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 surveys to include species structure, assemblage, diversity and abundance
- the relative abundance of plant species present to be recorded
- any plant species of conservation, cultural, commercial or recreational significance to be identified

- specimens of species listed as ‘protected plants’ under the Nature Conservation (Wildlife) Regulation 2006, other than common species, are to be submitted to the Queensland Herbarium for identification and entry into the HERBRECS database
- vegetation mapping and data should be submitted to the Queensland Herbarium to assist with updating the CORVEG database.

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

Show the occurrence of pest plants (weeds), particularly declared plants under the *Land Protection (Pest and Stock Route Management) Act 2002* (Qld) on a map at an appropriate scale. Any survey to identify the presence of such plants will need to occur after significant summer rainfall events, to allow germination.

Potential impacts and mitigation measures

Describe 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; also, discuss the indirect effects on remaining vegetation. Discuss the impacts of changes to hydrology regimes, water quality and soil structure on vegetation. Short and long-term effects should be considered, with comment on whether the impacts are reversible or irreversible. Consideration of impacts is to include the quantity and condition of vegetation to be removed (in terms of the total area), whether the proposal will bisect remnants and the magnitude of edge effects. Describe action plans for protecting rare or threatened species and vegetation types identified as having high conservation value and discuss any obligations imposed by Queensland or Commonwealth biodiversity protection legislation or policy.

With regard to all components of the project, include:

- any management actions and plans to minimise vegetation disturbance and clearance
- a discussion of the ability of identified vegetation to withstand any increased pressure resulting from the project and any measures proposed to mitigate potential impacts
- a description of the methods to ensure rapid rehabilitation of disturbed areas following construction, including the species chosen for revegetation which should be consistent with the surrounding associations
- details of any post construction monitoring programs
- a discussion of the potential environmental harm on flora due to any alterations to the local surface and groundwater environment with specific reference to impacts on riparian vegetation or other sensitive vegetation communities.

Outline how these measures will be implemented in the overall EMP for the project.

Describe any construction and operation components of the project involving clearing or translocation of vegetation, and indirect impacts on vegetation not cleared (such as edge effects of infrastructure in close proximity to riparian vegetation and fauna movement corridors, impacts of linear infrastructure and fragmentation) should be discussed. If clearing is assessable vegetation under the VM act, provide information on how clearing will the meet relevant Regional Vegetation Management Code.

Assess impacts during construction and operation of the project. Identify the number of hectares of remnant vegetation proposed to be cleared (by conservation status and regional ecosystem type). These figures should be discussed in terms of the long-term sustainability of these ecosystems to remain in the landscape at a regional level. Short and long-term durations should be considered.

The description needs to include the potential for: impacts on protected areas (e.g. nature reserves, national parks, conservation parks, resource reserves, nature refuges); identifying the amount of vegetation to be removed from these protected areas and impacts on other environmental values of these protected areas.

Describe the measures proposed to mitigate the impacts of the project on vegetation, with particular reference to vegetation types identified as having high conservation values, listed species and sensitive habitat or the inhibition of propagation. Measures described should avoid, minimise and mitigate impact to native plants. This should also include identifying potential offset areas and measures for unavoidable impact to endangered, vulnerable or near threatened plants, in an 'offset strategy', consistent with Queensland Government and Commonwealth offset policies. If the project is required to provide an offset to meet a performance requirement of the regional vegetation management code, the EIS must include proposals for an offset in accordance with the *Policy for Vegetation Management Offsets*, Version 2.4, dated 21 October 2010.

With regard to the project area, this Section should include:

- the significance of impacts at local, catchment, bioregional, state or national levels
- impact on any plants of potential or recognised environmental or economic significance
- a discussion of the ability of identified stands of vegetation to withstand any increased pressure resulting from the project and measures proposed to mitigate impacts
- a description of the methods to ensure progressive rehabilitation of disturbed areas following construction, including the species chosen for revegetation which should be consistent with the surrounding associations
- a description of the potential for the introduction and/or spread of weeds or plant disease, including:
  - identification of the origin of construction materials, machinery and equipment
  - staff/operator education programs

- determination of the potential for the introduction of, or facilitation of, exotic, non-indigenous and noxious plants
- a weed management plan to address the management of weeds and other exotic species related to the project site.

Weed management strategies are required for containing existing weed species and ensuring no new declared plants are introduced to the area. Reference should be made to the local government authority's pest management plan and any strategies and plans recommended for the project area by Biosecurity Queensland. The strategies should be discussed in accordance with provisions of the *Land Protection (Pest and Stock Route Management) Act 2002* (Qld) in the main body of the EIS and in the pest management plan within the EMP for the project.

The above assessment should also include, where relevant, threatened species and ecological communities listed as matters of NES under the EPBC Act.

3.3.3 Terrestrial fauna

Description of environmental values

Describe the terrestrial and riparian fauna occurring in the areas affected by the proposal, noting the broad distribution patterns in relation to vegetation, topography and substrate. Targeted surveys should be undertaken at an appropriate time of year for listed fauna likely to be impacted by the project.

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 fauna of recognised significance
- any species that are poorly known but suspected of being rare or threatened
- habitat requirements and sensitivity to changes; including movement corridors and barriers to movement
- the existence of feral and introduced animals including those of economic or conservation significance
- existence (actual or likely) of any species/communities of conservation significance or listed as threatened or migratory under the EPBC Act in the study area, including a desktop review of information relating to population size, spatial and temporal distribution with relation to range, habitat, breeding, recruitment, feeding and movement requirements as well as migration routes within the project site, field identification of important, suitable or adjacent habitat and current level of protection (e.g. any requirements of protected area management plans or threatened species recovery plans). Where sufficient baseline data is not available from previous studies, field surveys will be undertaken
- habitat requirements and sensitivity to changes, including movement corridors and barriers to movement

- an estimate of commonness or rarity for the listed or otherwise significant species
- use of the area by migratory fauna.

Identify any listed species by the EPBC Act and the NC Act occurring in the project area. Identify species listed by the DERM 'Back on Track' species prioritisation methodology.[35]

Indicate how well any affected communities are represented and protected elsewhere in the bio-region where the project occurs. Specify the methodology used for fauna surveys. Relevant site data should be provided to DERM in a format compatible with the Wildlife Online[36] database for listed threatened species.

Potential impacts and mitigation measures

Discuss potential direct and indirect impacts on terrestrial fauna. Describe strategies for protecting rare or threatened species and discuss any obligations imposed by Queensland or Australian Government threatened species legislation or policy.

Outline any EPBC Act or state recovery plans for potentially affected threatened species, and describe strategies for complying with the objectives and management practices of relevant recovery plans. Describe measures to mitigate the impact on habitat or the inhibition of normal movement, breeding or feeding patterns and change to food chains. Discuss any provision for buffer zones and movement corridors or special provisions for migratory or nomadic animals.

The assessment of potential impact should consider impacts the project may have on terrestrial fauna, relevant wildlife habitat and other fauna conservation values, including but not limited to:

- impacts due to loss of range/habitat, food supply, nest sites, breeding/recruiting potential or movement corridors or as a result of hydrological change
- impacts on native species, particularly species of conservation significance, including impacts on rare and threatened or otherwise noteworthy animal species
- cumulative effects of direct and indirect impacts and consequential impacts, discussed in terms of the cumulative impacts of existing or proposed projects that occur within the region
- threatening processes leading to progressive loss
- identification of the conservation importance of identified populations at the regional, state and national levels
- whether the proposal will dissect identified habitat areas
- risks associated with edge effects

[35] For information on DERM's Back on Track methodology, refer to www.derm.qld.gov.au/wildlife-ecosystems/wildlife/back_on_track_species_prioritisation_framework/index.html
[36] Formerly the WildNet database. Refer to www.derm.qld.gov.au/wildlife-ecosystems/wildlife/wildlife_online/index.html

- measures to minimise wildlife capture and mortality during construction and operation.

Address any actions of the project or likely impacts that require an authority under the NC Act. With respect to mitigation strategies, provide the following:

- Measures to avoid and mitigate the identified impacts. Any provision for buffer zones and movement corridors, nature reserves or special provisions for migratory animals should be discussed and coordinated with the outputs of the flora assessment.
- Details of the methodologies that would be used to avoid injuries to livestock and native fauna as a result of the project's construction and operational works, and if accidental injuries should occur the methodologies to assess and handle injuries.
- Strategies for complying with the objectives and management practices of relevant recovery plans.

Outline how these measures will be implemented in the overall EMP for the project. Rehabilitation of disturbed areas should incorporate, where appropriate, provision of nest hollows and ground litter.

Address feral and introduced animal management strategies and practices. The study should develop strategies to ensure that the project does not contribute to increased encroachment of a feral animal species. Refer to the local government authority's pest management plan and any strategies and plans recommended for the project area by Biosecurity Queensland. The strategies should be discussed in accordance with provisions of the *Land Protection (Pest and Stock Route Management) Act 2002* in the main body of the EIS and in the pest management plan within the EMP for the project.

3.3.4 Aquatic biology

Description of environmental values

General

Where appropriate, describe and map the aquatic flora and fauna (both freshwater and marine) occurring in the region, noting the patterns and distribution in the waterways and any associated wetlands. Indicator species likely to be sensitive to impacts resulting from this project should be selected for monitoring purposes before, during and after this work and any baseline data and information on these indicator species presented in the EIS. The description of the flora and fauna present or likely to be present in the area should include desktop information on the following, supported by field investigations as appropriate:

- fish species, mammals, reptiles, amphibians, crustaceans and aquatic invertebrates occurring in the waterways and marine environments within the affected area and any associated wetlands
- any rare or listed threatened or migratory marine species (including the snub fin dolphin)

- information about the genetic diversity of populations using the area (where this information is publicly available)
- description of the habitat requirements and the sensitivity of aquatic species to changes in flow regime, water levels and water quality in the project areas
- aquatic plants including native and exotic/weed species
- aquatic and benthic substrate and stream type, including extend of tidal influence and common levels such as highest astronomical tide and mean high water springs
- habitat downstream of the project or potentially impacted due to currents in associated lacustrine and marine environments
- baseline data on noise in the marine environment
- baseline data on water quality, including turbidity, taking into account the flows of the Fitzroy River during all seasons and weather events
- baseline data on hydrology
- data on the current erosion and deposition patterns and rates in the area
- the importance of the Narrows as a migratory corridor
- the importance of the populations of different species which inhabit or utilise the broader Port Alma region (i.e. studies should be conducted at biologically appropriate spatial and temporal scales to account for the potential impacts to populations that utilise the regional area)
- the importance of the broader Port Alma region for feeding, breeding and calving of listed threatened and migratory species.

Wetlands listed by DERM as areas of national, state or regional significance should be described and their values and importance for aquatic flora and fauna species.

Flora

Define the nature and extent of existing marine features such as littoral and sub-littoral lands, waterways, affected tidal and subtidal lands, corals and marine vegetation (e.g. salt couch, seagrass and mangroves) within the proposed area of development and in the areas adjacent to the project.

Field assessments should be conducted for plant species, preferably in both pre- and post-wet season conditions, as follows:

- record site data in a form compatible with the Queensland Herbarium CORVEG database
- record a complete list of species present at each site, including those defined and protected under the Fisheries Act
- record the relative abundance of plant species present
- identify and map any plant species of conservation, cultural, commercial or recreational significance

- submit specimens of species listed as protected plants under the NC Regulation (other than common species) to the Queensland Herbarium for identification and entry into the HERBRECS database.

Fish habitat

Describe the nature, extent and condition of fish habitats that have the potential to be impacted, with particular reference to fish nursery habitat and fish spawning areas. The location and density of marine plants should be mapped at an appropriate scale.

Show the location of any declared fish habitat areas proximal to the proposed development site.

Benthic macro invertebrates

A survey of benthic macro invertebrates should be conducted. Benthic macro invertebrate communities likely to be directly or indirectly impacted by the project should be characterised for the assessment of the potential impacts of proposed capital works. The effect of ongoing maintenance activities including dredging on benthic fauna should also be considered. Consider and discuss consequential impacts on the food chain.

Potential impacts and mitigation measures

Propose and describe in detail measures to be taken to avoid and minimise potential adverse impacts of the proposal on marine flora and fauna values. Include objectives and practical measures for protecting or enhancing such values, and describe how nominated quantitative standards and indicators may be achieved for marine flora and fauna management, and how the achievement of the objectives will be monitored, audited and managed.

Address any actions of the project or likely impacts that require an authority under the NC Act and/or would be assessable development for the purposes of the VM Act. Describe potential impacts on matters of NES and how these would be avoided, minimised, mitigated and/or managed. This should also be included in Section 9, Matters of national environmental significance. Address the assessment criteria, outlined in the Great Barrier Reef Marine Park Regulation 1983, including (as derived from the regulations):

- the objective of the zone in which any part of the proposal is located
- the need to protect the cultural and heritage values held in relation to the marine park by traditional owners and other people
- the likely effect of granting permission on future options for the marine park
- the conservation of the natural resources of the marine park
- the nature and scale of the proposed use in relation to the existing use and amenity, and the future or desirable use and amenity of the relevant area and of nearby areas

- the likely effects of the proposed use on adjoining and adjacent areas, and any possible effects of the proposed use on the environment and the adequacy of safeguards for the environment
- the means of transport for entry into, use within or departure from the zone or designated area and the adequacy of provisions for aircraft or vessel mooring, landing, taking off, parking, loading and unloading
- the arrangements for making good any damage caused to the marine park by the proposed activity
- any other requirements for ensuring the orderly and proper management of the marine park.

Describe strategies for protecting Queensland state marine parks (in accordance with Marine Park Regulations 2004 (Qld), the Great Barrier Reef Marine Park and World Heritage property, and any rare or threatened species together with listed threatened and migratory species protected under Part 3 of the EPBC Act. Discuss any obligations imposed by State or Commonwealth legislation or policy or international treaty obligations (i.e. JAMBA, CAMBA, ROKAMBA).

Describe 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 removing marine habitats; and discuss the indirect effects on remaining habitats and species. Short- and long-term effects should be considered with comment on whether the impacts are reversible or irreversible. Mitigation measures should be proposed for adverse impacts.

Describe environmental offsets that would counterbalance the residual impacts and loss of environmental values after mitigation measures have been implemented. Proposed environmental offsets should be consistent with the requirements set out in the specific-issue offset policies under the framework of the Queensland Government Environmental Offset Policy (QGEOP) 2008 and with the EPBC Act draft offsets policy (or finalised offsets policy if applicable).

Describe strategies to mitigate identified impacts from the project on flora and fauna in relation to dredging. Specific attention should be paid to the potential for marine fauna to be injured or captured by the dredge and/or other vessels used for the project, the potential impacts from reduced water quality including increased turbidity from dredging (and offshore disposal if proposed), and the potential impact of noise and shipping movements on marine fauna, especially the inshore snubfin dolphin. Potential mitigation measures should be reviewed and effectiveness presented.

Discuss the potential environmental harm to habitats, species and ecological communities due to any alterations to the local surface and groundwater environment, making specific reference to environmental impacts on riparian vegetation or other sensitive vegetation communities. Describe measures to mitigate the environmental harm to habitat or the inhibition of normal movement, the effects on vulnerable life stages, recruitment or feeding patterns, and change to food chains.

Discuss providing buffer zones and movement corridors, and strategies to minimise environmental harm on migratory, nomadic and marine animals.

Present modelling of sediment plumes extending from dredging and any proposed spoil dumping activities in relation to identified habitats and areas where species are known to occur, including estimated off-target deposition of suspended solids. Include modelling of sediment plumes under characteristic conditions, considering the currents, but also modelling under 'worst case' conditions for the different receptors. Include a justification of the parameters used to determine what the 'worst case' scenario is. Modelling should also consider:

- temporary decreases in water transparency
- increased concentrations in suspended matter
- increased rates in sedimentation
- disposal of sediments with high organic matter
- changes to bathymetry
- changes to sediment composition
- removal or burial of sessile and motile organisms that are unable to burrow through the deposited layer
- introduction of marine pests.

Cumulative impacts should also be considered, such as:

- reduction in light penetration
- changes to benthic structure
- alteration in current regimes
- reductions in dissolved oxygen.

A commitment to prepare a draft LTDMMP in accordance with state and Commonwealth requirements, written with reference to the requirements of the NAGD,[37] should be made. Include a template for this plan, outlining the likely content and expected timeframe for development, as part of the project EMP and attached as an appendix to the EIS. The LTDMMP should include detailed management plans addressing the identified potential impacts upon habitats, species and water quality and included proposed monitoring and management actions linked to quantitative triggers.

Outline mitigation methods to reduce impacts on identified environmental values. Also outline restoration strategies for the disturbed area (especially where marine plants have been removed).

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[37] Department of Environment, Water, Heritage and the Arts, *National Assessment Guidelines for Dredging*, Department of Environment, Water, Heritage and the Arts, Canberra, 2009, viewed 20 December 2010, www.environment.gov.au/coasts/pollution/dumping/publications/guidelines.html

Describe vectors for the possible introduction of marine pests, possible impacts of a marine pest incursion and potential changes in abundance of invasive species that may already be in the area and proposed mitigation measures. Describe ongoing monitoring for marine pests in the port and proposed response arrangements if a marine pest incursion occurs.

3.4 Water resources

3.4.1 Description of environmental values

Describe the existing water resources that may be affected by the project in the context of environmental values as defined in the EP Act, *Environmental Protection (Water) Policy 2009* (EPP (Water)), *Australia and New Zealand Guidelines for Fresh and Marine Water Quality 2000*[38] and the *Queensland Water Quality Guidelines 2009*.[39] The EIS should contain maps of surface water courses and bodies and groundwater relevant to the project components.

The environmental values of the surface waterways of the affected area (e.g. rivers, creeks, streams and other water bodies including drainage lines and wetlands) should be described in terms of:

- the physical, chemical and biological characteristics of existing surface water
- existing surface drainage patterns, flows, history of flooding including extent, levels and frequency, and present water uses
- environmental values identified in the EPP (Water)
- physical integrity, fluvial processes and morphology of watercourses, including riparian zone vegetation and form, if relevant
- any impoundments, e.g. dams, levees, weirs, etc.
- hydrology of waterways
- sustainability, including both quality and quantity
- dependent ecosystems
- existing and other potential surface water users
- downstream water resource uses, including their significance to the local community and/or environment
- any water resource plans, land and water management plans relevant to the affected catchment, particularly the *Water Resource (Fitzroy Basin) Plan 1999*

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[38] Australian and New Zealand Environment and Conservation Council and Agriculture and Resource Management Council of Australia and New Zealand, *The Australian and New Zealand Guidelines for Fresh and Marine Water Quality*, 2000, viewed 15 December 2010, www.mincos.gov.au/publications/australian_and_new_zealand_guidelines_for_fresh_and_marine_water_quality

[39] Department of Environment and Resource Management, *Queensland Water Quality Guidelines 2009*, Department of Environment and Resource Management, Brisbane, 2009, viewed 20 December 2010, www.derm.qld.gov.au/environmental_management/water/queensland_water_quality_guidelines/queensland_water_quality_guidelines_2009.html

and the *Water Resource (Calliope River Basin) Plan 2006* listed under the Water Act.

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

An assessment is required of existing water quality in surface waters and wetlands likely to be affected by the project. The basis for this assessment should be a monitoring program, with sampling stations located upstream and downstream of the project area. Complementary stream-flow data should also be obtained from historical records (if available) to aid in interpretation. Where no background receiving water quality data is available for this purpose, XCQ is required to begin collecting samples as soon as possible in accordance with the appropriate guidelines and manuals.

Describe the water quality, including seasonal variations or variations with flow where applicable. A relevant range of physicochemical (refer to the *Queensland Water Quality Guidelines*[40]), chemical and biological parameters (refer to the *Australian and New Zealand Guidelines for Fresh and Marine Water Quality*[41]) should be measured to benchmark the extent of any potential future environmental harm on any potentially affected waterway or wetland system. All sampling should be performed in accordance with the *Monitoring and Sampling Manual 2009*.[42]

If the project is likely to use or affect local sources of groundwater, this section should provide a description of groundwater resources in the area in terms of:

- geology/stratigraphy
- aquifer type—such as confined, unconfined
- depth to and thickness of the aquifers
- depth to water level and seasonal changes in levels
- groundwater flow directions (defined from water level contours)
- interaction with surface water
- possible sources of recharge

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[40] Department of Environment and Resource Management, *Queensland Water Quality Guidelines 2009*, Department of Environment and Resource Management, Brisbane, 2009, viewed 20 December 2010, www.derm.qld.gov.au/environmental_management/water/queensland_water_quality_guidelines/queensland_water_quality_guidelines_2009.html

[41] Australian and New Zealand Environment and Conservation Council and Agriculture and Resource Management Council of Australia and New Zealand, *The Australian and New Zealand Guidelines for Fresh and Marine Water Quality*, 2000, viewed 15 December 2010, www.mincos.gov.au/publications/australian_and_new_zealand_guidelines_for_fresh_and_marine_water_quality

[42] Department of Environment and Resource Management, *Monitoring and Sampling Manual 2009*, version 2, Department of Environment and Resource Management, Brisbane, 2009, viewed 20 December 2010, www.derm.qld.gov.au/environmental_management/water/pdf/monitoring-man-2009-v2.pdf

- potential exposure to pollution
- current access to groundwater resources in the form of bores, springs, ponds, including quantitative yield of water and locations of access.

The groundwater assessment should also be consistent with relevant guidelines for the assessment of ASS, including spatial and temporal monitoring to accurately characterise baseline groundwater characteristics.

Review the quality, quantity and significance of groundwater in the project area, together with groundwater use in neighbouring areas. Specific reference should be made to relevant legislation or water resource plans for the region. The review should also assess and describe the potential take of water from the aquifer and how current users, the aquifer itself and any connected aquifers will be affected by the take of water.

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
- seasonal variations (if records exist) of groundwater quality and levels.

A network of groundwater sampling sites, selected to give an adequate representation of, and provide statistically robust inferences for, groundwater resources (both before and after commencement of operations) should be developed. Refer to the *Australian Guidelines for Water Quality Monitoring and Reporting*[43] and *Guidelines for Groundwater Protection*.[44]

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.

3.4.2 Potential impacts and mitigation measures

Assess potential impacts of the project on water resource environmental values identified in the previous section. Define and describe the objectives and practical measures for protecting or enhancing water resource environmental values, to describe how nominated quantitative standards and indicators may be achieved, and

[43] Australian and New Zealand Environment and Conservation Council and Agriculture and Resource Management Council of Australia and New Zealand, *Australian Guidelines for Water Quality Monitoring and Reporting*, 2000, viewed 15 December 2010, www.mincos.gov.au/publications/australian_guidelines_for_water_quality_monitoring_and_reporting

[44] Agriculture and Resource Management Council of Australia and New Zealand and Australian and New Zealand Environment Conservation Council, *Guidelines for Groundwater Protection*, 1995, viewed 15 December 2010 www.mincos.gov.au/__data/assets/pdf_file/0010/316099/guidelines-for-groundwater-protection.pdf

how the achievement of the objectives will be monitored, audited and managed. Address the following matters:

- potential impacts on the flow and the quality of surface and groundwater from all phases of the project, with reference to their suitability for the current and potential downstream uses and discharge licences
- an assessment of all likely impacts on groundwater depletion or recharge regimes
- potential impacts of surface water flow on existing infrastructure, with reference to the EPP (Water) and the Water Act
- chemical and physical properties of any waste water including stormwater at the point of discharge into natural surface waters, including the toxicity of effluent to flora and fauna. Having regard to the requirements of EPP (Water), present the methods to avoid stormwater contamination and the means of containing, recycling, re-using, treating and disposing of stormwater
- potential impacts on connected environments
- the results of a risk assessment for uncontrolled releases of 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
- an assessment of the potential to contaminate surface and groundwater resources and measures to prevent, mitigate and remediate such contamination.

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. Describe monitoring programs that will assess the effectiveness of management strategies for protecting water resources during the construction, operation and decommissioning of the project. Also, outline how these strategies are incorporated into appropriate sections of the EMP.

Surface water and water courses

The hydrological impacts of the proposal on surface water and water courses should be assessed, particularly with regard to stream diversions, scouring and erosion, and changes to flooding levels and frequencies both upstream and downstream of the project. When flooding levels will be affected, modelling of afflux should be provided and illustrated with maps.

Analysis of potential impacts of the diversion of affected waterways on existing and proposed relocated roads should also be carried out. This analysis should identify any likely inundation and duration, as this may affect emergency vehicle access.

Describe monitoring programs that will assess the effectiveness of management strategies for protecting water quality during the construction, operation and decommissioning of the project. Monitoring programs should also be designed to evaluate changes in the physical integrity and geomorphic processes associated with waterway crossings.

If on-site storage of water sourced from wastewater treatment plants is proposed, detail how this water would be managed to avoid environmental harm. Describe the design features of any such storages to effectively contain saline water and other harmful constituents.

Key water management strategy objectives include:

- maintaining sufficient quantity and quality of surface waters to protect existing beneficial downstream uses of those waters (including maintaining in-stream biota)
- maintaining or replicating the existing geomorphic condition of local watercourses
- minimising impacts on flooding levels and frequencies both upstream and downstream of the project.

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

Discuss potential impacts to the flow and the quality of surface waters from all phases of project activities, including waterway diversions or crossings and land reclamation. Give particular consideration to implications for current and potential downstream uses and sensitive receptors, including the requirements of any affected riparian area and in-stream biological uses in accordance with the EPP (Water) and the Water Act.

Include details of any proposed waterway barrier works with justification detailing the need for the barrier and any alternatives considered. Waterway crossings should be designed with reference to the Department of Primary Industries and Fisheries *Fish Habitat Guideline FHG001—Fish Passage in Streams: Fisheries guidelines for design of stream crossings*.[45] The impacts of surface water flow on any existing water infrastructure should also be considered.

Describe the proposed stockpile stormwater drainage system and the proposed disposal arrangements, including any off-site services and downstream impacts. Discuss options for storing and/or disposing of surplus groundwater (if applicable), including the beneficial and adverse impacts of each option. Identify the licensing requirements for each option.

Where settlement ponds are proposed, investigate the effects of predictable climatic extremes (droughts, floods) upon the structural integrity of the containing walls, and the quality of water contained, and flows and quality of water discharged.

A dam failure impact assessment should be carried out for any proposed settlement ponds or dams that, due to their size, trigger the need for such an assessment under

[45] E Cotterell, *Fish Habitat Guideline FHG001—Fish Passage in Streams: Fisheries guidelines for design of stream crossings*, Department of Primary Industries, Brisbane, 1998, viewed 20 December 2010, www.dpi.qld.gov.au/documents/Fisheries_Habitats/FHG001-Fish-Habitat-Guideline.pdf

the Water Act. Any dams that are likely to be referrable under the Water Act should be noted and emergency response procedures incorporated into the Project's EMP.

Discuss the need, or otherwise, for licensing of any dams (including referable dams) or waterway diversions, under the Water Act and the Fisheries Act. The process for water allocation and water discharge should be established in consultation with DERM. Consideration should also be given to any water allocation and management plans.

Consider the potential impacts of the project on floodplain hydrology (including changes to flooding characteristics), existing land use and infrastructure and the integrity of any watercourses. Minimising risk to life and property and protection of water (flood harvesting) entitlements should also be addressed. Discuss potential impacts to the natural environment from stream diversions.

The environmental values of the surface waters potentially affected by the project should be identified in accordance with the EPP (Water). Surface water quality objectives should be determined after consideration of the *Queensland Water Quality Guidelines*[46] and the *Australian and New Zealand Guidelines for Fresh and Marine Water Quality*.[47]

Assess and discuss risks to downstream habitats from potentially contaminated surface water flow, particularly during flood events.

Discuss options for flood mitigation and the effectiveness of mitigation measures, with particular reference to sediment, salinity and other emissions of a hazardous or toxic nature to human health, flora or fauna. This assessment should consider the flood hazard mitigation requirements of *State Planning Policy 1/03: Mitigating the Adverse Impacts of Flood, Bushfire and Landslide*.[48]

Wastewater treatment

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

In relation to water supply and usage, and wastewater disposal, discuss anticipated flows of water to and from the proposal area. Where dams, weirs or ponds are

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[46] Department of Environment and Resource Management, *Queensland Water Quality Guidelines 2009*, Department of Environment and Resource Management, Brisbane, 2009, viewed 20 December 2010, www.derm.qld.gov.au/environmental_management/water/queensland_water_quality_guidelines/queensland_water_quality_guidelines_2009.html

[47] Australian and New Zealand Environment and Conservation Council and Agriculture and Resource Management Council of Australia and New Zealand, *The Australian and New Zealand Guidelines for Fresh and Marine Water Quality*, 2000, viewed 15 December 2010, www.mincos.gov.au/publications/australian_and_new_zealand_guidelines_for_fresh_and_marine_water_quality

[48] Department of Local Government and Planning, Department of Emergency Services, *State Planning Policy 1/03: Mitigating the Adverse Impacts of Flood, Bushfire and Landslide*, 2003, viewed 22 December 2010, www.emergency.qld.gov.au/publications/spp/pdf/spp.pdf

proposed, investigate and report on the effects of predictable climatic extremes (storm events, floods and droughts) on:

- the capacity of the water storages (dams, weirs, ponds), and the ability of these storages to retain contaminants
- the structural integrity of the containing walls
- relevant operating regime and the quality of water contained, and flows and quality of water discharged.

The design of all water storage facilities should follow the technical guidelines on site water management.

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

Groundwater

Include an assessment of the potential environmental impact caused by the project (and its associated project components) to local groundwater resources, including the potential for groundwater-induced salinity.

Describe the response of the groundwater resource to the progression and finally cessation of the proposal.

Assess the impact of the project on the local groundwater regime caused by the altered porosity and permeability of any land disturbance.

Assess and describe any potential for the project to impact on groundwater-dependent vegetation; describe avoidance and mitigation measures.

Assess and describe the potential environmental harm the project may cause to local groundwater resources. Matters to be addressed should include:

- potential impacts on the flow and the quality of groundwater from all phases of the project, with reference to their suitability for the current and potential downstream uses
- an assessment of all likely impacts on groundwater depletion or recharge regimes
- potential impacts on other downstream receiving environments, if it is proposed to discharge water to a riverine system
- 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
- an assessment of the potential to contaminate groundwater resources and measures to prevent, mitigate and remediate such contamination.

Undertake an assessment of the impact of the project on the local groundwater regime caused by any land disturbance.

Management strategies should be adequately detailed to demonstrate that environmental values of receiving waters will be maintained to nominated water quality objectives. Describe monitoring programs that will assess the effectiveness of management strategies for protecting water resources during the construction, operation and decommissioning of the project.

Rainfall and flood level information that has been utilised when designing storage design requirements or methods of treating and discharging site run off water should identify whether data from 2010/2011 events has been incorporated. This will help confirm that adequate mitigation measures for potential impacts have been developed.

3.5 Coastal environment

Describe the existing coastal environment that may be affected by the project in the context of coastal values identified in the *Queensland State of the Environment* reports[49] and environmental values as defined by the EP Act and environmental protection policies.

Identify actions associated with the project that are assessable development within the coastal zone and will require assessment under the provisions of the *Coastal Protection and Management Act 1995*.

Assess the project's consistency with the relevant policies of the State Coastal Management Plan [50] and the Curtis Coast Regional Coastal Management Plan 2003.

3.5.1 Hydrodynamics and sedimentation

Description of environmental values

Describe the physical processes of the coastal environment related to the project, including:

- waves
- currents
- tides
- storm surges/tides
- freshwater flows
- the key influencing factors of cyclones and other severe weather events such as flooding upstream that greatly increases the flows of the Fitzroy River, and their interaction in relation to the assimilation and transport of pollutants entering marine waters from, or adjacent to, the project area.

[49] Refer to www.derm.qld.gov.au/environmental_management/state_of_the_environment/
[50] Refer to www.derm.qld.gov.au/environmental_management/coast_and_oceans/coastal_management/state_coastal_management_plan/

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.

Describe the tidal hydrodynamics of the project area and the adjoining tidal waterways in terms of water levels and current velocities and directions at different tidal states. Provide details of water levels and flows associated with historical and predicted storm surges.

Predict the likely changes to hydrodynamics (including water levels and freshwater flows) in the project area due to climate change.

Discuss the relationship of these processes to marine flora and fauna and biological processes within the study area. Describe the relationship between currents, wave action and extreme events (such as cyclones) and how they influence coastal processes.

Potential impacts and mitigation measures

Describe the potential changes to the hydrodynamic processes and local sedimentation due to the proposed works. This should include:

- impacts on tidal flows and water levels
- changes to sediment transport patterns, including the potential of the proposal to impact on bank erosion and/or bed degradation within adjacent waterways
- an assessment of the erosive effects of vessel wash associated with boat traffic generated by the proposal (supported by a vessel traffic impact assessment to determine the increase of vessels (size and number) that can be expected as a result of the project relative to the existing situation)
- impacts on siltation and any implications for marine flora and fauna and/or biological processes, including generation and migration of turbid plumes. Information on currents in the region should be used to predict impacts, including an assessment of these impacts on marine environmental values.

Discuss strategies to mitigate potential impacts on coastal processes, as a consequence of the project.

This assessment should also discuss the potential impacts associated with extreme events such as storm tide flooding. Assess the project's vulnerability to storm tide flooding and the project's potential to affect adjacent properties' vulnerability to storm tide flooding. The assessment must include effects of potential climate change and sea level rise.

3.5.2 Marine water quality

Description of environmental values

Provide baseline information on water quality of coastal waters. This information should include, but not be limited to general physical chemical water quality parameters such as:

- dissolved oxygen
- pH
- metals and metalloids
- nutrients
- temperature
- salinity
- oil in water
- chemical contaminants (including pesticides and herbicides)
- a measure of light attenuation
- turbidity.

Consider stage of tide, lunar tidal phase and water movement, e.g. currents, ebb or flood tides, neap or spring tides etc. For coastal areas potentially affected by sediment run-off or dredging, also include suspended solids concentration, Secchi depth and light attenuation. Discuss the interaction of freshwater flows with coastal waters and the significance of this in relation to marine flora and fauna adjacent to the project area.

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

- variability associated with the lunar tide phase (spring and neap tides), stage of tide (e.g. peak of the flood, tide half-way out or bottom of ebb tide), local wind climate, seasonal factors, freshwater flows and extreme events
- declared fish habitat areas
- values identified in the EPP (Water)
- the State Coastal Management Plan and any regional coastal plan
- the Great Barrier Reef Marine Park
- the Great Barrier Reef Coastal Marine Park
- the Great Barrier Reef Zoning Plan.[51]

Provide an assessment of the physical and chemical characteristics of sediments for:

- the area to be dredged at any point in the proposal lifetime
- if offshore disposal is proposed, the disposal location.

The description of sediments should be based on the results of sediment sampling and analysis conducted as per a SAP prepared under the *Environment Protection (Sea Dumping) Act 1981.*

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[51] Great Barrier Reef Marine Park Authority, *Great Barrier Reef Marine Park Zoning Plan 2003*, Great Barrier Reef Marine Park Authority, Townsville, 2003, viewed 20 December 2010, www.gbrmpa.gov.au/__data/assets/pdf_file/0016/10591/Zoning_Plan.pdf

Summarise the chemical and physical characteristics of the material to be dredged, the spoil ground and control sites. If the material is to be disposed of in an offshore area, include a statement on the suitability of the sediment for unconfined ocean disposal, using a framework within the NAGD.[52] In accordance with the NAGD, evaluate and discuss all potential disposal and waste minimisation options, sediment quality, potential impacts on the environment and management and monitoring measures. Identify the preferred disposal option(s) and explain how the preferred option was selected.

Potential impacts and mitigation measures

Define and describe the water quality objectives and 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 would be monitored, audited and managed during both construction of the project and ongoing operation.

Describe the potential environmental harm the project may cause to coastal resources and processes in the context of controlling such effects. Address:

- *State Planning Policy 2/02: Planning and Managing Development Involving Acid Sulfate Soils*[53]
- the *State Coastal Management Plan*[54]
- the *Curtis Coast Regional Coastal Management Plan*[55]
- *Fish Habitat Guideline FHG 002—Restoration of fish habitats: fisheries guidelines for marine areas*.[56]

Address the following issues:

- the water quality objectives used (including how they were developed), and how predicted activities will meet these objectives (refer to *Queensland Water Quality*

[52] Department of Environment, Water, Heritage and the Arts, *National Assessment Guidelines for Dredging*, Department of Environment, Water, Heritage and the Arts, Canberra, 2009, viewed 20 December 2010, www.environment.gov.au/coasts/pollution/dumping/publications/guidelines.html

[53] Department of Natural Resources and Mines and Department of Local Government and Planning, *State Planning Policy 2/02 Guideline: Acid Sulfate Soils*, Department of Natural Resources and Mines and Department of Local Government and Planning, Brisbane, 2002.

[54] Refer to www.derm.qld.gov.au/environmental_management/coast_and_oceans/coastal_management/state_coastal_management_plan

[55] Environmental Protection Agency, *Curtis Coast Regional Coastal Management Plan*, Environmental Protection Agency, Rockhampton, 2003, viewed 24 May 2011, www.derm.qld.gov.au/environmental_management/coast_and_oceans/coastal_management/regional_coastal_management_plans/curtis_coast.html

[56] E Hopkins, M White and A Clarke, *Restoration of fish habitats: fisheries guidelines for marine areas*, Department of Primary Industries, Brisbane, 1998.

Guidelines[57] and *The Australian and New Zealand Guidelines for Fresh and Marine Water Quality*)[58]

- potential threats to the water quality and sediment quality of the coastal environment within the project footprint, specifically associated with the construction and operation of the facilities.

This assessment shall consider, at a minimum:

- dredging and dredge material disposal, including disturbance of fine grained sediments and contaminated material
- potential accidental discharges of contaminants during construction and operation
- oil and chemical spills from increased shipping
- release of contaminants, including potential for the introduction of pests
- stormwater run-off from the marine precinct facilities and associated infrastructure
- flooding of relevant river systems and other extreme events.

Assessment of runoff or spillage of port products and pollutants should address seasonal variations, adverse weather conditions and sensitive receptors. Water quality modelling should include 'worst case scenario' conditions such as a 1 in 10-year flood event from the Fitzroy River. Where appropriate, undertake modelling of spillage or runoff.

Describe strategies for protecting Ramsar wetlands, and discuss any obligations imposed by state or Australian legislation or policy or international treaty obligations (i.e. JAMBA, CAMBA, ROKAMBA).

Discuss the role of buffer zones in sustaining fisheries resources through maintaining connectivity between coastal and riparian vegetation and estuarine and freshwater reaches of catchments.

If required, address impacts on water quality due to increased water turbidity, suspended solids and nutrients from the sediment due to dredging and sea disposal of material. Use means such as modelling of sediment plumes extending from dredging and spoil dumping activities and strategies developed to address potential impacts.

Discuss the potential impacts of sediment quality on the marine environment. This assessment should be guided by the suitability of the sediment for ocean disposal as determined by the framework outlined in the NAGD.[59]

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[57] Department of Environment and Resource Management, *Queensland Water Quality Guidelines 2009*, Department of Environment and Resource Management, Brisbane, 2009, viewed 20 December 2010, www.derm.qld.gov.au/environmental_management/water/queensland_water_quality_guidelines/queensland_water_quality_guidelines_2009.html

[58] Australian and New Zealand Environment and Conservation Council and Agriculture and Resource Management Council of Australia and New Zealand, *The Australian and New Zealand Guidelines for Fresh and Marine Water Quality*, 2000, viewed 15 December 2010, www.mincos.gov.au/publications/australian_and_new_zealand_guidelines_for_fresh_and_marine_water_quality

Describe a long-term dredge spoil disposal strategy that will protect and enhance environmental values. The duration of the strategy should be greater than 20 years of the design life of the proposal. Appropriate beneficial use should be investigated.

In addition, consider the following guidelines and standards:

- the EPP (Water), and any recent or proposed amendments that incorporate recommendations of the National Environment Protection Measures
- *The Australian and New Zealand Water Quality Guidelines for Fresh and Marine Water Quality*[60]
- amelioration or mitigation measures to address each activity identified to impact on local and regional water quality
- any monitoring of water quality recommended during the dredging activities to protect environmental values.

3.6 Air quality

3.6.1 Description of environmental values

Describe the existing air quality that may be affected by the project in the context of environmental values as defined by the EP Act and EPP (Air).

Discuss the existing air shed environment, both local and regional, including:

- background levels and sources of particulates, gaseous and odorous compounds and any major constituent
- pollutants including greenhouse gases which may be affected by the project
- baseline monitoring results, sensitive receptors
- data on local meteorology and ambient levels of pollutants to provide a baseline for later studies or for modelling air quality environmental harms.

Parameters should include air temperature, wind speed and direction, atmospheric stability, mixing depth and other parameters necessary for input to the models.

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[59] Department of Environment, Water, Heritage and the Arts, *National Assessment Guidelines for Dredging*, Department of Environment, Water, Heritage and the Arts, Canberra, 2009, viewed 20 December 2010, www.environment.gov.au/coasts/pollution/dumping/publications/guidelines.html

[60] Australian and New Zealand Environment and Conservation Council and Agriculture and Resource Management Council of Australia and New Zealand, *The Australian and New Zealand Guidelines for Fresh and Marine Water Quality*, 2000, viewed 15 December 2010, www.mincos.gov.au/publications/australian_and_new_zealand_guidelines_for_fresh_and_marine_water_quality

3.6.2 Potential impacts and mitigation measures

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

- the features of the project designed to suppress or minimise emissions, including dust (PM10 fraction of particulates) and odours
- emissions of dust, fumes and odours during both normal and upset conditions and the potential impacts of such emissions on surrounding land uses and nearest sensitive receptors (including accommodation camps)
- identification of climatic patterns that could affect dust generation and movement
- impact on terrestrial flora and fauna
- predicted changes to existing air quality from vehicle emissions and dust generation along haulage routes (internal and external to construction sites)
- impacts on air quality from gaseous emissions including greenhouse gas emissions and ozone depleting substances
- the project's contribution of nitrogen oxides, sulphur oxides and volatile hydrocarbon emissions to impacts within the local air shed, including both acute and cumulative impacts, in conjunction with existing emission sources within the region
- the human health risk associated with emissions from the facility of all hazardous or toxic pollutants, whether or not they are covered by the NEPM or the EPP (Air)
- air quality predictions should be compared to the relevant goals in the NEPM and the EPP (Air) goals
- air shed management and the project's contribution to air shed capacity in view of existing and future users of the air shed for assimilation and dispersion of emissions.

For the railway component, consider the following air quality issues in particular:

- impacts of dust generation from construction activities, especially in areas where the corridor follows existing road networks or passes in close proximity to residences
- predicted changes to existing air quality from vehicle emissions and dust generation along haulage routes and storage locations of construction materials, including ballast
- potential for impacts on air quality from operating diesel powered locomotives in rail operations
- the potential for coal dust emissions to provide an environmental nuisance to any sensitive receptor along the proposed rail corridor.

For the port component, consider the following issues in particular:

- the potential impact of coal dust on the operations of other existing or proposed projects within the vicinity of the port
- the potential impact of dust deposition on surrounding flora and fauna and marine waters.

Where appropriate, provide the predicted average ground level concentrations in nearby areas. These predictions should be made for both normal and expected maximum emission conditions and the worst case meteorological conditions should be identified and modelled where necessary. Ground level predictions should be made at any residential, industrial and agricultural site believed to be sensitive to the effects of predicted emissions. The techniques used to obtain the predictions should be referenced, and key assumptions and datasets explained.

For each component of the project, describe the proposed dust mitigation measures, (including coal dust mitigation) to achieve air quality goals. Detail the mitigation measures, together with proactive and predictive operational and maintenance strategies that could be used to prevent and mitigate impacts.

3.7 Noise and vibration

3.7.1 Description of environmental values

Describe the existing environmental values that may be affected by the noise and vibration of the project as defined by the *Environmental Protection (Noise) Policy 2008* (EPP (Noise)). DERM's *Noise Measurement Manual*[61] should be considered and references should be made to the EPA's *Guideline: Noise and vibration from blasting*.[62]

Identify sensitive noise receptors adjacent to all project components and measure or estimate typical background noise and vibration levels based on surveys at representative sites. Noise loggers should be deployed in the water. Discuss the potential sensitivity of such receptors and nominate performance indicators and standards. Receptors should include marine fauna potentially impacted by noise and vibration. Measured background noise levels that take into account seasonal variations are required. The locations of sensitive receptors (including accommodation camps) should be identified on a map at a suitable scale. Describe the results of all baseline monitoring of noise and vibration in the proposed vicinity of the proposal.

Gather sufficient data to provide a baseline for later studies. The daily variation of background noise levels at nearby sensitive sites should be monitored and reported on, with particular regard given to detailing variations at different periods of the night. Monitoring methods should adhere to accepted best practice methodologies,

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[61] Department of Environment and Resource Management, *Noise Measurement Manual*, 3rd edn, Department of Environment and Resource Management, Brisbane, 2000, viewed 20 December 2010 www.derm.qld.gov.au/register/p00367aa.pdf

[62] Environment Protection Agency, *Guideline: Noise and vibration from blasting*, Environment Protection Agency, Brisbane, 2006, viewed 20 December 2010, www.derm.qld.gov.au/register/p01382aa.pdf

relevant DERM guidelines and Australian Standards and any relevant requirements of EPP (Noise).

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

3.7.2 Potential impacts and mitigation measures

Describe the impacts of noise and vibration generated during the construction and operational phases of the project. Include:

- the levels of noise and vibration generated, including noise contours, assessed against current typical background levels, using modelling where appropriate
- impact of noise, including low frequency noise (noise with components below 200 Hz) and vibration at all potentially sensitive receivers compared with the performance indicators and standards nominated above.

The need or otherwise for noise modelling should take into account the distance of relevant project sources of noise from neighbouring sensitive receptors such as residential and commercial developments believed to be sensitive to the effects of noise. Noise from the project should be modelled, where appropriate, using a suitable acoustic model covering the construction and operational phases.

The assessment should also include environmental impacts on terrestrial and aquatic fauna, particularly species listed as threatened or migratory under the EPBC Act. Consider impacts for each species potentially impacted and the species' physiological vulnerability to noise and vibration as well as the species' life history and habitat use that may contribute to potential behavioural impacts. Describe proposed measures for minimising or eliminating impacts, including details and illustrations of any screening, lining, enclosing or bunding. Discuss timing schedules for construction and operations with respect to minimising environmental nuisance and harm from noise and vibration. Refer to the EPA's *Guideline*: *Planning for noise control*.[63]

This assessment should address impacts of any activity and associated noise generation (e.g. from pile driving, through water and air on marine habitats and species, during all stages of the project.

Provide information on blasting that might cause ground vibration or fly rock on, or adjacent to, the site, paying particular attention to places of work, residence, recreation, worship and general amenity. Discuss the magnitude, duration and frequency of any vibration. Also discuss measures to prevent or minimise environmental nuisance and harm. Blasting noise and vibration limits are provided in

[63] Environment Protection Agency, *Guideline: Planning for noise control*, Environment Protection Agency, Brisbane, 2004, viewed 20 December 20102, www.derm.qld.gov.au/register/p01369aa.pdf

the EP Act, section 440ZB, Blasting. Refer also to the EPA's *Guideline: Noise and vibration from blasting*.[64]

The assessment should also address off-site noise and vibration impacts that could arise due to increased road, rail or other transportation directly resulting from the project. Mitigation measures should be described to minimise identified noise and vibration impacts.

Examine any potential for ground vibration effects on underground pipelines and telecommunication lines.

Include proposed mitigation measures, including but not limited to the use of exclusion zones, to reduce the impacts of noise and vibration on listed threatened and migratory species. Discuss and analyse the effectiveness of proposed mitigation measures and any uncertainty.

3.8 Waste

Provide details of waste treatment and minimisation, with proposed emission, discharge and disposal criteria. Waste should be defined and considered in accordance with the EP Act, the *Environmental Protection (Waste Management) Policy 2000* (EPP (Waste)) and the Environmental Protection (Waste Management) Regulation 2000, including gas, liquid or solid, or combination.

3.8.1 Waste generation

Identify and describe all sources, likely volumes and quality (where applicable) of waste associated with construction, operation and decommissioning of all aspects of the project. Describe:

- waste generated by delivery of material to site(s)
- all chemical and mechanical processes conducted on the construction sites that produce waste
- the amount and characteristics of solid and liquid waste produced on site by the project
- hazardous materials to be stored and/or used on site, including environmental toxicity data and biodegradability.

3.8.2 Waste management

Having regard for best practice waste management strategies, the EPP (Waste) and the Environmental Protection (Waste) Regulation 2000, assess the potential impact of all wastes generated during construction and operation and provide details of each waste in terms of:

[64] Environment Protection Agency, *Guideline: Noise and vibration from blasting*, Environment Protection Agency, Brisbane, 2006, viewed 20 December 2010, www.derm.qld.gov.au/register/p01382aa.pdf

- the options available for avoidance/minimisation
- operational handling and fate of all wastes including storage
- on-site treatment methods proposed for any wastes
- methods and discharge/disposal criteria 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
- measures to ensure stability of the waste storage areas and impoundments, including impacts of storm events on the capacity of waste containment systems (e.g. site bunding/stormwater management)
- methods to prevent seepage and contamination of groundwater from stockpiles and/or storage areas and impoundments
- measures to minimise attraction of vermin, insects and pests
- options available for using recycled materials
- market demand for recyclable waste (where appropriate)
- decommissioning of the construction site.

Indicate the results of investigations into the feasibility of using waste minimisation and cleaner technology options during all phases of the project, having regard for the EPP (Waste).

Waste minimisation and treatment, and the application of cleaner production techniques, should also be applied to gaseous wastes, particularly particulates and greenhouse gases. Particular attention should be paid to measures that will maximise energy efficiency and minimise internal energy consumption of the project.

Detail cleaner production waste management planning, especially how these concepts have been applied to prevent or minimise environmental impacts at each stage of the project. Provide details on natural resource use efficiency (e.g. energy and water), integrated processing design, co-generation of power and by-product re-use, as shown in a material/energy flow analysis.

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

- Air emissions—provide information on air emissions, including particulates, fumes and odours, during the construction and operation stages of the project. Particulate emissions include those that would be produced by any industrial process, or disturbed by wind action on stockpiles and conveyors, or by transportation equipment (e.g. trucks, either by entrainment from the load or by passage on unsealed roads). Describe the methods to be employed to mitigate air emissions impacts in Section 3.6, Air quality.

- Excavated waste—describe and show the location, design and methods for constructing dumps for waste rock and subsoil. The location of the dumps should be shown on a map relative to topography and other natural features of the area.
- Solid waste disposal—describe the quantity and quality of solid wastes (other than waste rock and subsoil) and the proposed methods of their disposal. Show the proposed location, site suitability, dimensions and volume of any landfill, including its method of construction.
- Liquid waste—describe the origin, quality and quantity of wastewater and any immiscible liquid waste originating from the project. Pay particular attention to the capacity of wastes to generate acid, and saline or sodic wastewater. A water balance for the port is required to account for the estimated usage of water. This waste is also to include implications for relevant quarantine waste and the Quarantine Act 1908 (Cwlth)

3.9 Transport

3.9.1 Existing infrastructure

Present the transport assessment in separate sub-sections of the EIS, for each project-affected mode (road, rail, air and sea) as appropriate. These assessments should provide sufficient information to allow an independent assessment of how existing transport infrastructure will be affected by project transport at the local and regional level, for both the construction and operations phases of the project. They should also include all base data assumptions, including the current condition of the affected network and its performance.

Describe the extent, condition and capacity of the existing transport infrastructure on which the project will depend.

3.9.2 Transport tasks and routes

Describe (using maps and data tables) transport methods and routes for all aspects of the transport task associated with the construction and operation of all components of the project. Include the following:

- expected volumes of project inputs and outputs of transported raw materials, wastes, hazardous goods, finished products for all phases of the project
- how identified project inputs and outputs will be moved through the transport network (volume, composition, trip timing and routes)
- traffic generated by workforce personnel including visitors (volume, composition, timing and routes)
- likely heavy and oversize/indivisible loads (volume, composition, timing and routes) highlighting any vulnerable bridges and structures along proposed routes
- any proposed new, or alterations to, transport-related infrastructure required by the project (as distinct from impact mitigation works), including modifications to

roads for access works and realignments, rail lines (including level crossings and services) and air and sea port facilities

- analysis of project road and rail traffic impacts on the existing NCL and the Bruce Highway and identification of any requirements for grade-separation.
- details of hazardous material transport, including fuel or other combustible material. This should be considered in relation to the Transport Operations (Road Use Management – Dangerous Goods) Regulation 2008 and the Transport Infrastructure (Dangerous Goods by Rail) Regulation 2008
- the construction of any project-related plant and utilities, within or impacting on the jurisdiction of any transport authority
- existing traffic volumes and capacity on the proposed transport routes
- volumes, tonnage, and composition of construction inputs and production outputs
- hazardous or dangerous material that may be transported
- method of transport (e.g. sea, rail, road) and the type and number of vehicles most likely to be used for transport
- traffic generated by workforce personnel including visitors (volume, composition, timing and routes)
- number of trips generated (both light and heavy vehicles) for sea, rail and road
- origin and destination of inputs and outputs and transport routes proposed (with the use of maps)
- likely heavy and oversize/indivisible loads (volume, tonnage, composition, timing and routes), highlighting any vulnerable structures or deficient road width or geometry along proposed routes
- timing and duration of transport activities.

Discuss how transport elements of the project relate to the state and local government road authorities existing transport strategies for the region and the future infrastructure needs of this area as presented in local and state government documentation.

Provide sufficient detail to allow road authorities to ascertain compliance with legislative and design requirements to ensure the safe and efficient operation of state-controlled roads and railways are not compromised and the integrity of preserved transport corridors is protected.

Provide sufficient information for an assessment of how the state-controlled and local government road and the rail networks will be affected by the project.

3.9.3 Potential impacts and mitigation measures

The impact assessment must include details on:

- the adopted assessment methodology (for impacts on roads: the road impact assessment report (RIA) in general accordance with the *Guidelines for Assessment of Road Impacts of Development 2006*[65]
- possible interruptions to transport operations, including any delays to road traffic at any rail crossings
- any impacts on the natural environment within the jurisdiction of an affected transport authority (for example road and rail corridors)
- the nature and likelihood of product-spill during transport
- capacity, safety, local amenity, efficiency and condition of transport operations, services and assets (from either transport or project operations)
- driver fatigue for workers travelling to and from regional centres and key destinations
- any existing or proposed strategies for public passenger transport and active transport, and address, where relevant, requirements of Part 2A of the *Transport Planning and Coordination Act 1994*
- access to transport for people with a disability
- a summary of consultation undertaken with transport authorities regarding the scope and methodology of the impact assessment
- road impacts, assessing the project's impacts on:
  - the safety, efficiency and condition of road operations and assets (from either transport or project operations), including project related transportation movements and workforce accommodation proposals as they impact on emergency services response requirements
  - overland water flows and their interaction with the road network
  - any existing or proposed pedestrian/cycle networks
  - any existing public transport networks (assets and services)
- rail impact considerations, assessing the project's impacts on:
  - existing coal and other rail freight and passenger services on sections of the NCL relevant to the transport of coal to the project
  - capacity of the NCL to support future growth in rail freight and passenger movements servicing regions north and south of the project that must traverse the sections of the NCL relevant to transport of coal to the project

[65] Department of Main Roads, *Guidelines for Assessment of Road Impacts of Development*, Department of Main Roads, Brisbane, 2006, viewed 20 December 2010, www.tmr.qld.gov.au/~/media/ace67ef2-b6c3-46a3-91a7-39f790c309fe/garid_guidelines_200406.pdf

- the amenity and health of adjacent land users as a result of dust, noise and vibration.

- The proponent should identify appropriate noise mitigation measures to achieve the following criteria:

  (a) Internal – A maximum sound level (between 10.00pm and 6.00am) of not greater than 45 decibels dB(A)

  (b) External –

  (i) 65 dB(A) assessed as a 24–hour average equivalent continuous A-weighted sound pressure level

  (ii) 87 dB(A) assessed as a single maximum sound pressure level when measured one metre from the most exposed part of the noise sensitive place.

- passenger transport and services, should the project generate large public transport trip movements
- the current and future use of the Stanwell–Gladstone Infrastructure Corridor
- the location and nature of proposed rail-road crossings and the requirement for safety measures
- sea port impacts considerations, assessing the project's impacts on the ongoing operation of existing sea port facilities, including capacity of throughput and any land-use impacts as a result of the project's operations.

3.9.4 Infrastructure alterations

Detail:

- any proposed alterations or new transport-related infrastructure and services required by the project (as distinct from impact mitigation works)
- construction of any project-related plant and utilities, within or impacting on the jurisdiction of any transport authority.

3.9.5 Transport management strategies

Discuss and recommend how identified impacts will be mitigated so as to maintain safety, efficiency and condition of each mode. These mitigation strategies are to be prepared by the proponent in close consultation with relevant transport authorities and consider those authorities' works program and forward planning.

Findings of studies and transport infrastructure impact assessments should be an input into preparing a transport management plan.

3.10 Greenhouse gas emissions

3.10.1 Description of environmental situation

Provide an inventory of projected annual emissions for each relevant greenhouse gas, with total emissions expressed in 'CO_2 equivalent' terms for the following categories:

- Scope 1 emissions, where 'Scope 1 emissions' means direct emissions of greenhouse gases from sources within the boundary of the facility and as a result of the facility's activities
- Scope 2 emissions, where 'Scope 2 emissions' means emissions of greenhouse gases from the production of electricity, heat or steam that the facility will consume, but that are physically produced by another facility

Briefly describe method(s) by which estimates were made.

The Australian Government Department of Climate Change and Energy Efficiency's *National Greenhouse Accounts (NGA) Factors*[66] can be used as a reference source for emission estimates and supplemented by other sources where practicable and appropriate. As a requirement of the NGA factors, estimates should include the loss of carbon sink capacity of vegetation due to clearing and impoundment.

3.10.2 Potential impacts and mitigation measures

Discuss the potential for greenhouse gas abatement measures, including:

- a description of the proposed measures (alternatives and preferred) to avoid and/or minimise direct greenhouse gas emissions
- an assessment of how the preferred measures minimise emissions and achieve energy efficiency
- a description of any opportunities for further offsetting greenhouse gas emissions through indirect means including sequestration and carbon trading.

The EMP 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

[66] Department of Climate Change and Energy Efficiency, *National Greenhouse Accounts (NGA) Factors*, Department of Climate Change and Energy Efficiency, Canberra, 2010, viewed 20 December 2010, www.climatechange.gov.au/~/media/publications/greenhouse-acctg/national-greenhouse-factors-july-2010-pdf.pdf

- 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
- commitments to monitor, audit and report on greenhouse emissions from all relevant activities and the success of offset measures.

3.11 Indigenous cultural heritage

3.11.1 Description of existing Indigenous cultural heritage values

Describe the existing Indigenous cultural heritage values that may be affected by the project and the environmental values of the cultural landscapes of the affected area in terms of the physical and cultural integrity of the landforms.

Describe how, in conjunction with the appropriate Indigenous people, the cultural heritage values were ascertained (e.g. this could include the results of any Aboriginal cultural heritage survey undertaken; the DERM Aboriginal Cultural Heritage Register and database; any existing literature relating to Indigenous cultural heritage in the project area).

3.11.2 Potential impacts and mitigation measures

Define and describe the objectives and practical measures for protecting or enhancing Indigenous cultural heritage environmental values. Describe how nominated quantitative standards and indicators may be achieved for cultural heritage management, and describe how the achievement of the objectives will be monitored, assessed and managed.

To the greatest extent practicable, significant cultural heritage areas should be avoided by the project. Provide an assessment of likely effects on sites of Indigenous cultural heritage values, including but not limited to the following:

- description of the significance of artefacts, items or places of conservation or cultural heritage values likely to be affected by the project and their values at a local, regional and national level
- recommended means of mitigating any negative impact on cultural heritage values and enhancing any positive impacts. As a minimum, impact assessment, management and protection strategies should satisfy statutory responsibilities and duties of care.

A native title agreement (NT agreement)—as defined under the *Aboriginal Cultural Heritage Act 2003* (ACH Act)—should be initiated (if required) during the EIS

process. The NT agreement should include management and protection strategies for Indigenous cultural heritage or a cultural heritage management plan under the ACH Act (CHMP). An NT agreement or an approved CHMP, in a form which complies with Part 7 of the ACH Act, will ensure that the project meets the Aboriginal cultural heritage duty of care imposed by the ACH Act.

If an NT agreement is not finalised or a CHMP has not been approved, when the EIS is submitted to the Coordinator-General the following must be provided:

- an outline of the draft CHMP or draft plan within the NT agreement which addresses management and protection strategies for cultural heritage, subject to any confidentiality provisions, outlining the position of the relevant parties
- details of the proposed steps and timeframes for finalising the CHMP or NT agreement.

An NT agreement (if required) or CHMP should be negotiated between the proponent and the appropriate native title/Indigenous parties and should address and include processes for the following:

- including Indigenous people associated with the development areas in protection and management of Indigenous cultural heritage
- mitigating, managing and protecting identified cultural heritage sites and objects in the project areas, including associated infrastructure developments, during both the construction and operational phases of the project
- managing the accidental discovery of cultural material, including burials
- initial management and recording of accidental discoveries
- a cultural heritage induction for project staff
- developing a cultural heritage awareness program to be incorporated into the contractor/employee manual as well as induction manual. This is to be in the form of a plain language, short document which is easy for contractors and staff 'on the ground' to understand
- conflict resolution.

3.12 Non-Indigenous cultural heritage

3.12.1 Description of existing non-Indigenous cultural heritage values

Include a cultural heritage study that describes non-Indigenous cultural heritage sites and places, and their values. Any such study should be conducted by an appropriately qualified cultural heritage practitioner and should include the following:

- consultation with:
  - the Australian Heritage Places Inventory
  - the Queensland Heritage Register and other information regarding places of potential non-Indigenous cultural heritage significance

- any local government heritage register
- any existing literature relating to the heritage of the affected areas

- liaison with relevant community groups/organisations (e.g. local historical societies) concerning:
  - places of non-Indigenous cultural heritage significance
  - opinion regarding significance of any cultural heritage places located or identified
- the location of historical mining areas, which should be shown on maps, including the potential for former mining zones or historical workings to cause slumping or other problems
- locations of culturally and historically significant sites, shown on maps, that are likely to be impacted by the project
- a constraints analysis of the proposed development area to identify and record non-Indigenous cultural heritage places.

The analysis and consultation should determine what level of field survey is necessary to provide for ground truthing of expected heritage occurrences. Systematic non-Indigenous cultural heritage field survey of the project footprint should be undertaken by a qualified heritage professional, unless this is shown not to be necessary following the results of desktop analysis and consultation.

3.12.2 Potential impacts and mitigation measures

Assess and describe any likely effects on sites of non-Indigenous cultural heritage values, including but not limited to the following:

- description of the significance of artefacts, items or places of conservation or non-Indigenous cultural heritage value likely to be affected by the project and their values at a local, regional, state and national level
- recommended means of mitigating any negative impacts on non-Indigenous cultural heritage values and enhancing any positive impacts
- strategies to manage places of historic heritage significance, taking account also of community interests and concerns.

As a minimum, investigation, consultation, impact assessment, management and protection strategies should satisfy statutory responsibilities and duties of care, including those under the EPBC Act and *Queensland Heritage Act 1992*.

4 Social values and management of impacts

4.1 Description of existing social values

The social impact assessment (SIA) should be conducted in consultation with the DEEDI Social Impact Assessment Unit. Matters to be considered include the social

and cultural area, community engagement, a social baseline study, a workforce profile, potential impacts and mitigation measures and management strategies.

4.1.1 Social and cultural area

Define the project's social and cultural area of influence, including the local, district, regional and state level as relevant, taking into account the:

- potential for social and cultural impacts to occur
- location of other relevant proposals or projects
- location and types of physical and social infrastructure, settlement and land use patterns
- social values that might be affected by the project (e.g. integrity of social conditions, visual amenity and liveability, social harmony and wellbeing, and sense of community)
- Indigenous social and cultural characteristics such as native title rights and interests and cultural heritage.

4.1.2 Community engagement

Consistent with national and international good practice, the proponent should engage with likely affected parties at the earliest practical stage to discuss and explain the project, and to identify and respond to issues and concerns regarding social impacts.

Detail the community engagement processes used to conduct open and transparent dialogue with stakeholders. This dialogue should include the project's planning and design stages and future operations including affected local and state authorities. Engagement processes will involve consideration of social and cultural factors, customs and values, and relevant consideration of linkages between environmental, economic, and social impact issues.

4.1.3 Social baseline study

A targeted baseline study of the people residing in the project's social and cultural area is required to identify the project's critical social issues, potential adverse and positive social impacts, and strategies and measures developed to address the impacts. The social baseline study should be based on qualitative, quantitative, and participatory methods. It should be supplemented by community engagement processes, and reference relevant data contained in local and state government publications, reports, plans, guidelines and documentation, including regional plans and, where available, community plans.

The social baseline study should describe and analyse a range of demographic and social statistics determined relevant to the project's social and cultural area including:

- major population trends/changes that may be occurring irrespective of the project

- total population (the total enumerated population for the social and cultural area and the full time equivalent transient population), 18 years and older
- estimates of population growth and population forecasts resulting from the proposal
- family structures
- age and gender distributions
- education, including schooling levels
- health and wellbeing measures
- cultural and ethnic characteristics
- the Indigenous population including age and gender
- income including personal and household
- labour force by occupation and industry
- housing costs (monthly housing repayments (per cent of dwellings in each category)), and weekly rent (per cent of dwellings in each category), housing tenure type and landlord type, household and family type
- housing availability and affordability: the rental market (size, vacancy rate, seasonal variations, weekly rent by percentage dwellings in each category); the availability and typical costs of housing for purchase, monthly housing repayments by percentage dwellings in each category; and the availability of social housing
- disability prevalence
- the social and economic index for areas, index of disadvantage—score and relative ranking
- crime, including domestic violence
- any other indicators determined through the community engagement process as relevant.

The social baseline study should take account of current social issues such as:

- social infrastructure including community and civic facilities, services and networks (for definition see *South East Queensland Regional Plan 2005–2026: Implementation Guideline No.5: Social infrastructure planning*[67]
- settlement patterns including the names, locations, size, history and cultural aspects of settlement in the social and cultural area
- the identity, values, lifestyles, vitality, characteristics and aspirations of communities in the social and cultural area, including Indigenous communities

[67] Department of Infrastructure, *South East Queensland Regional Plan 2005–2026: Implementation Guideline No. 5: Social impact assessment*, Department of Infrastructure, Brisbane, 2007, viewed 21 December 2010, www.dlgp.qld.gov.au/resources/guideline/Implementationguideline5.pdf

- land use and land ownership patterns including:
  - rural properties, farms, croplands and grazing areas including on-farm activities near the proposed activities
  - the number of properties directly affected by the project
  - the number of families directly and indirectly affected by the project including Indigenous traditional owners and their families, property owners, and families of workers either living on the property or workers where the property is their primary employment
  - use of the social and cultural area for forestry, fishing, recreation, business and industry, tourism, aquaculture, and Indigenous cultural use of flora and fauna.

4.1.4 Workforce profile

Include a profile of the workforce which describes the:

- number of personnel to be employed, the skills base of the required workforce and the likely sources (i.e. local, regional or overseas) for the workforce during the construction and operational phases for each component of the project
- estimated number of people to be employed during construction and operation, and arrangements for transporting them to and from the project areas, including proposed use of regional or charter air services.

The above estimates should be provided according to occupational groupings and variations in the workforce numbers for the duration of the project and show anticipated peaks in worker numbers during the construction period.

Provide an outline of recruitment schedules and policies for recruitment of workers, addressing recruitment of local and non-local workers including Indigenous workers, people from culturally and linguistically diverse backgrounds and people with a disability.

If relocatable camp sites are to be used to accommodate the workforce, provide details on the number, size, location (shown on a map), management, proximity to the construction site, and typical facilities for these sites. Information should outline any local government or other regulatory approvals required to establish and operate such camps, including building, health and safety and waste disposal purposes.

Provide information on the location of other major projects or proposals under study within the social and cultural area, together with workforce numbers.

4.2 Potential impacts

Assess and describe the type, level and significance of the project's social impacts (both beneficial and adverse) on the local and cultural area, based on outcomes of community engagement processes and the social baseline study. Furthermore:

- describe and summarise outcomes of community engagement processes including the likely response of the affected communities, including Indigenous people
- include sufficient data to enable affected local and state authorities to make informed decisions about the project's effect on their business and plan for the provision of social infrastructure in the project's social and cultural area. If the project is likely to result in a significant increase in the population of the area, then the proponent should consult the relevant management units of the state authorities and summarise the results of the consultations.
- address and describe direct, indirect and secondary impacts from any existing projects and the proposed project including an assessment of the size, significance, and likelihood of these impacts at the local and regional level. Consider the following:
  - key population/demographic shifts; disruptions to existing lifestyles, the health and social wellbeing of families and communities; social dysfunction including alcohol and drugs, crime, violence, and social or cultural disruption due to population influx
  - the needs of vulnerable groups including women, children and young people, the aged and people with a disability
  - Indigenous peoples including cultural property issues
  - local, regional and state labour markets, with regard to the source of the workforce; present this information according to occupational groupings of the workforce; provide information on whether the proponent, and/or contractors are likely to employ locally or through other means and whether there are initiatives for local employment business opportunities
  - proposed new skills and training related to the project including the occupational skill groups required and potential skill shortages anticipated
  - comment on how much service revenue and work from the project would be likely to flow to the project's social and cultural area
  - impacts of construction and operational workforces, their families, and associated contractors on housing and accommodation availability and affordability, land use and land availability; discuss the capability of the existing housing and rental accommodation, to meet any additional demands created by the project, including direct impacts on Indigenous people.

Evaluate the potential cumulative social impacts resulting from the project, including an estimation of the overall size, significance and likelihood of those impacts. 'Cumulative impacts' in this context are defined as the additional impacts on population, workforce, accommodation, housing, and use of community infrastructure and services, from the project, and other proposals for development projects in the area which are publicly known or communicated by DEEDI, if they overlap the proposed project in the same time frame as its construction period.

4.2.1 Mitigation measures and management strategies

For identified social impacts, social impact mitigation strategies and measures should be presented to address the:

- recruitment and training of the construction and operational workforces and the social and cultural implications this may have for the host community, including if any part of the workforce is sourced from outside the social and cultural area
- housing and accommodation issues, in consultation with relevant local authorities and state government agencies, with proposals for accommodating the project workforce and their families that avoid, mitigate or offset any short- and medium-term adverse effects on housing affordability and availability, including the rental market, in the social and cultural area
- demographic changes in the profile of the region and the associated sufficiency of current social infrastructure, particularly health and welfare, education, policing and emergency services
- adequate provision of education, training and employment for women, people with a disability, and Indigenous peoples.

Describe any consultation about acceptance of proposed mitigation strategies and how practical management and monitoring regimes would be implemented.

Present a draft social impact management plan that promotes an active and ongoing role for impacted communities and local authorities through the project life cycle from planning through to approvals, construction, operations and decommissioning.

5 Economies and management of impacts

5.1 Economy

5.1.1 Description of affected local and regional economies

Describe the existing economy in which the project is located and the economies materially impacted by the project. Include:

- a map illustrating the local and regional economies (local government areas) that could be potentially affected by the project
- Gross Regional Product or other appropriate measure of annual economic production
- population
- labour force and unemployment statistics
- economic indicators
- the regional economy's key industries and their contribution to regional economic income
- the key regional markets relevant to the project
- labour market
- housing and land markets
- construction services and building inputs market
- regional competitive advantage and expected future growth
- infrastructure
- availability and prices of goods and services
- a description of the regional economy's key industries and their contribution to regional economic income including historical descriptions of large-scale resource developments and their effects in the region
- a discussion on regional resource endowment, competitive advantage and expected future growth
- a description of the key regional markets relevant to the project:
  - labour market
  - housing and land markets and their values, particularly rental accommodation which may be available for the project workforce
  - availability of suitable land for support industrial uses
  - education and training facilities
  - construction services and building inputs market
- a discussion on the region's key industries and factor prices, including:

- information on current input costs (wage rates, building costs, housing rent etc.)
- types and numbers of businesses
- information on land values in the region by type of use.

5.1.2 Potential impacts and mitigation measures

The potential impacts should consider local, regional, state and national perspectives as appropriate to the scale of the project.

Describe both the potential and direct economic impacts including estimated costs, if material, on industry and the community, assessing the following:

- property values
- industry output
- employment
- the indirect impacts likely to flow to other industries and economies from the development of the project (this should also consider the implications of the project for future development)
- the distributional effects of the proposal including proposals to mitigate any negative impact on disadvantaged groups.

The analysis should also assess any forgone:

- industry output from the project
- opportunities and impacts to households (e.g. recreation, increased travel times).

Strategies for local participation

The assessment of economic impacts should outline strategies for local participation, including:

- strategies for assessing the cost effectiveness of sourcing local inputs from the regional economy during the construction, operation and rehabilitation of the project
- employment strategies for local residents including members of Indigenous communities and people with a disability, including a skills assessment and recruitment and training programs to be offered
- strategies responding to relevant government policy, relating to:
  - the level of training provided for construction contracts on Queensland Government building and construction contracts, with regard to the

Queensland Government Building and Construction Contracts Structured Training Policy[68] (the 10 per cent policy)

- Indigenous employment opportunities, with regard to the *Indigenous Employment Policy for Queensland Government Building and Civil Construction Projects*[69] (the 20 per cent policy)
- the use of locally sourced goods and services, with regard to the *Local Industry Policy*.[70]

Strategies to mitigate disruption to the local economy during construction and operation

The economic assessment should outline strategies to mitigate disruption to the local economy during construction and operation to address:

- potential changes to industry practices likely to occur during project construction and operation
- potential impacts on households (travel time, noise etc.) likely to occur during project construction and operation
- the estimated cost of these changes, if material
- the measures to be taken to minimise disruption or alleviate cost impacts of the project.

Impact upon property management

Address the current and future management processes for adjacent properties which are likely to be impacted by the project during construction and/or operation. Mention the:

- impact of the project on existing agricultural land uses and management practices (e.g. disruption to stockyards, fences, water points, sowing or harvesting of crops, movement of livestock, agricultural machinery and any loss of agricultural land)
- range of measures required to mitigate real and potential disruptions to rural practices and management of properties.

5.2 Sustainable development

Provide a comparative analysis of how the project conforms to the objectives for 'sustainable development'—see the *National Strategy for Ecologically Sustainable Development*.[71]

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[68] Department of Education and Training, 1993
[69] Department of Employment and Training, 2004.
[70] Department of Employment, Economic Development and Innovation, 2008.
[71] Ecologically Sustainable Development Steering Committee, *National Strategy for Ecologically Sustainable Development*, Australian Government Publishing Service, Canberra, 1992, viewed 21 December 2010, www.environment.gov.au/about/esd/publications/strategy/index.html

This analysis should consider the cumulative impacts (both beneficial and adverse) of the project from a life-of-project perspective. Consider the scale, intensity, duration and frequency of the impacts and the cumulative impacts from the known existing and proposed developments for the region, to demonstrate a balance between environmental integrity, social development and economic development.

Provide a summary, with cross-references to relevant parts of the EIS, on how the project aligns with the principles of ecologically sustainable development as set out in the EPBC Act. The principles are:

- decision-making processes should effectively integrate both long-term and short-term economic, environmental, social and equitable considerations
- if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation
- the principle of inter-generational equity—that the present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations
- the conservation of biological diversity and ecological integrity should be a fundamental consideration in decision-making
- improved valuation, pricing and incentive mechanisms should be promoted.

This information is required to demonstrate that sustainable development aspects have been considered and incorporated during the scoping and planning of the project.

6 Hazard and risk

6.1 Hazard and risk assessment

Describe the potential hazards and risks to people and property that may be associated with the project, which may include but are not restricted to:

- identifying potential hazards, accidents, spillages and abnormal events (including fires) which may occur during all stages of the project, including possible frequency of occurrence
- identifying all hazardous substances to be used, stored, processed or produced and the rate of usage
- potential wildlife hazards, natural events and implications related to climate change.

Undertake a preliminary risk assessment for all components of the project in accordance with *Australia/New Zealand AS/NZS ISO 31000:2009 Risk management—Principles and guidelines.* With respect to risk assessment the EIS should:

- deal comprehensively with external and on-site risks including transport risks
- assess risks during the construction, operational and decommissioning phases of the project
- include an analysis of the consequences of each hazard on safety in the project area should be conducted, examining the likelihood of both individual and collective consequences, involving injuries and fatalities to workers and to the public
- present quantitative levels of risks should be presented from the above analysis, where possible.

Provide details on the safeguards that would reduce the likelihood and severity of hazards, consequences and risks to persons, within and adjacent to the project area(s).

Present a comparison of assessed and mitigated risks with acceptable risk criteria for land uses in and adjacent to the project area(s).

Develop and provide a risk management plan in consultation with the Queensland Fire and Rescue Service, Emergency Management Queensland and the Queensland Ambulance Service.

Conduct a hazard identification study to identify the nature and scale of hazards which might occur during the construction and operation of the project. This would be expected to include hazards involving:

- construction accidents
- pipeline, processing unit or storage vessel rupture or loss of containment, and explosions and fires associated with such incidents
- release to the environment of liquid gaseous or particulate pollutants or any other hazardous material used, produced or stored on the site
- any type of potential marine collisions including grounding
- site incursion by fauna
- spills of materials during loading, unloading and transport
- natural events such as cyclones, earthquakes, storm surge, bushfires or local flooding.

A set of representative incident scenarios should be selected. This set should include credible event scenarios (e.g. a catastrophic failure of a processing unit and the consequential explosion zone). This will require an evaluation of the likelihood of each scenario occurring in order to calculate the level of risk in surrounding areas due to the presence of the facility.

The risk analysis should include fatality and serious injury consequences, and present individual fatality risk contours at 0.5, 1, 5, 10, and 50 × 10-6 per year and

injury risk contours at 10 and 50 × 10-6 per year. Risk contours should be presented on a suitably scaled location map.

In addition, undertake detailed risk assessment of the plant and associated operational activities to identify risks and mitigation measures to ensure containment within the site boundaries, so as not to impact on future industrial development on adjacent industrial land. Any identified impact on the project should also be extended to determine the resultant impact on the surrounding areas and community.

Assess the acceptability of the risk on-site and to surrounding land uses by referring to nationally adopted risk criteria presented in *Hazardous Industry Planning Advisory Paper No. 4: Risk Criteria for Land Use Safety Planning*.[72] Provide details of the methodology and results of each step described above.

6.2 Health and safety

6.2.1 Description of public health and safety community values

Describe the existing health and safety values of the community, workforce, suppliers and other stakeholders in terms of the environmental factors that can affect human health, public safety and quality of life, such as air pollutants, odour, lighting and amenity, dust, noise and water. This description should outline the existing health services available within the region.

6.2.2 Potential impact and mitigation measures

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

Assess the effects, including cumulative effects on the project workforce, of occupational health and safety risks and the health, safety, and quality of life impacts on the community from project operations and emissions. Assess the impacts on health services in the region and describe necessary management strategies, including consultation with appropriate regional health service district. Any impacts on the health and safety of the community, workforce, suppliers and other stakeholders should be detailed, covering factors such as air emissions, odour, dust and noise. Also recommend practical monitoring regimes in this section.

Assess and discuss driver fatigue for workers travelling to and from regional centres and key destinations. Include cross-references to the transport section of these TOR in assessing this issue.

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[72] Department of Planning (NSW), *Hazardous Industry Planning Advisory Paper No. 4: Risk Criteria for Land Use Safety Planning*, consultation draft, Sydney, 2008, viewed 21 December 2010, www.planning.nsw.gov.au/plansforaction/pdf/hazards/haz_hipap4_rev2008.pdf

Provide map(s) showing the locations of sensitive receptors, such as, but not necessarily limited to, kindergartens, schools, hospitals, aged care facilities, residential areas (including accommodation camps), and centres of work (e.g. office buildings and workshops). Discuss, illustrated by maps, how planned discharges from the project could impact on public health in the short and long term, and include an assessment of the cumulative impacts on public health values caused by the project, either in isolation or in combination with other known existing or planned sources of contamination.

Include a review of control measures to prevent increases in local populations and the spread of biting insect species of pest and health significance, associated with construction activities and disposal of construction wastes.

Address the project's potential for providing disease vectors. Describe measures to control and prevent mosquito and biting midge breeding sites during construction and operation, with reference to Queensland Health's Guidelines to minimise mosquito and biting midge problems in new development areas.

Any use of recycled water should be assessed for its potential to cause infection by the transmission of bacteria and/or viruses by contact, dispersion of aerosols and ingestion (e.g. via use on food crops). Similarly, the use of recycled water should be assessed for its potential to cause harm to health via the food chain due to contaminants such as heavy metals and persistent organic chemicals. Recommend practical monitoring regimes in this section.

6.3 Emergency management plan

The development of emergency planning, action plans and response procedures are to be determined in consultation with Commonwealth, state and regional emergency service providers.

Provide an outline of the proposed integrated emergency management planning procedures (including evacuation plans). The procedures should cover the range of situations identified in the risk assessment developed in this section, including strategies to deal with natural disasters during operation and construction. Procedures should address how any fire or emergency incident will be managed until any arrival of emergency services and what fire protection measures are to be implemented.

This assessment should consider the existing fire hazard severity of the areas immediately adjacent to the study area and identify mitigation measures in accordance with the requirements of *State Planning Policy 1/03: Mitigating the Adverse Impacts of Flood, Bushfire and Landslide*.[73] Provide information on the design and operation of proposed safety and contingency systems to address

[73] Department of Local Government and Planning, Department of Emergency Services, *State Planning Policy 1/03: Mitigating the Adverse Impacts of Flood, Bushfire and Landslide*, 2003, viewed 22 December 2010, www.emergency.qld.gov.au/publications/spp/pdf/spp.pdf

Queensland's counter-terrorism and critical infrastructure protection policies and arrangements and an operational security plan.

The emergency management plan is to include a maritime security plan that meets the Commonwealth security requirements pursuant to the requirements of the *Maritime Transport and Offshore Facilities Security Act 2003* and Maritime Transport and Offshore Facilities Security Regulation 2003 (Cwlth). The maritime security plan, which is to be developed in consultation with national and state maritime security representatives and incorporated as part of the EIS, should contain:

- an outline of relevant project information, such as the contact details of the proponent and port operator and security officer responsible for implementing the plan
- a map showing each zone that is covered by the plan, along with site boundaries and any security zones within the area that will be covered by the plan
- a security assessment that is in accordance with Regulation 3.05 of the Maritime Transport and Offshore Facilities Security Regulation
- details of common requirements for security plan audits and reviews
- the security measures or activities to be implemented at each level of security
- details on how the plan will be implemented and will contribute towards achieving maritime security outcomes
- specific requirements that are detailed in Regulation 3.20 of the Maritime Transport and Offshore Facilities Security Regulation.

As part of the maritime security plan, include a security assessment, which details:

- when the assessment was completed
- the scope of the assessment, including assets, infrastructure and operations
- how the assessment was conducted
- the skills and experience of those involved in the assessment
- the risk context/threat situation of the port facility
- how important assets, infrastructure and operations will be identified and evaluated
- how possible risks or threats to important assets, infrastructure and operations will be identified
- existing security measures, procedures and operations
- weaknesses in infrastructure, policies and procedures
- the identification, selection and prioritisation of possible risk treatments.

All contractors will be required to hold a Maritime Security Identification Card and all goods, including vehicles, weapons and people, are required to be screened and cleared before entering cleared zones.

7 Cumulative impacts

Summarise the project's cumulative impacts and describe these cumulative impacts in combination with those of existing or proposed project(s) publicly known or advised by DEEDI to be in the region, to the greatest extent practicable. Cumulative impacts should be assessed with respect to both geographic location and environmental values.

Present the methodology used to determine the cumulative impacts of the project, detailing the range of variables considered, including where applicable, relevant baseline or other criteria upon which the cumulative aspects of the project have been assessed.

8 Environmental management plan

Detail the environmental management plans (EMPs) for both the construction and operation phases of the project. These EMPs should be developed from, and be consistent with, the information in the EIS. The EMPs must address discrete project elements and provide life-of-proposal control strategies. They must be capable of being read as stand-alone documents without reference to other parts of the EIS.

The EMPs must comprise the following components for performance criteria and implementation strategies:

- the proponent's commitments to acceptable levels of environmental performance, including environmental objectives, performance standards and associated measurable indicators, performance monitoring and reporting
- a comprehensive list and description of the issues and quantification (where possible) of hazards and risks (outlining the probability and likelihood) and considering cumulative hazards and risks
- impact prevention or mitigation actions to implement the commitments
- corrective actions to rectify any deviation from performance standards
- an action program to ensure the environmental protection commitments are achieved and implemented. This will include strategies in relation to:
  - continuous improvement
  - environmental auditing
  - monitoring
  - reporting
  - staff training
  - a rehabilitation program for land proposed to be disturbed under each relevant aspect of the proposal.

The recommended structure of each element of the EMP is:

Element/issue	Aspect of construction or operation to be managed (as it affects environmental values).
Operational policy	The operational policy or management objective that applies to the element.
Performance criteria	Measurable performance criteria (outcomes) for each element of the operation.
Implementation strategy	The strategies, tasks or action program (to nominated operational design standards) that would be implemented to achieve the performance criteria.
Monitoring	The monitoring requirements to measure actual performance (e.g. specified limits to pre-selected indicators of change).
Auditing	The auditing requirements to demonstrate implementation of agreed construction and operation environmental management strategies and compliance with agreed performance criteria.
Reporting	Format, timing and responsibility for reporting and auditing of monitoring results.
Corrective action	The action (options) to be implemented in case a performance requirement is not reached and the person(s) responsible for action (including staff authority and responsibility management structure).

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

9 Matters of national environmental significance

The controlling provisions under the EPBC Act have been determined as:

- sections 12 and 15(a) (World Heritage properties)
- sections 15(b) and 15(c) (National Heritage place)
- sections 16 and 17(b) (wetlands of international importance)
- sections 18 and 18(a) (listed threatened species and communities)
- sections 20 and 20(a) (listed migratory species).

This section brings together assessments of impacts on matters of NES in other sections (e.g. water resources, flora and fauna, cultural heritage and cumulative impacts etc.) to produce a stand-alone assessment in a format suited for assessment under the EPBC Act. This includes a description of the existing environment, relevant impacts to matters of NES, proposed mitigation measures and any residual impacts and proposed offsets. Where information on matters related to the EPBC Act is presented elsewhere in the EIS document, this should be cross-referenced. The

proponent should also ensure that the EIS addresses the matters stated in Schedule 4 of the Environment Protection and Biodiversity Conservation Regulations 2000 (refer to Appendix 3). The project should initially be assessed in its own right followed by an assessment of the cumulative and consequential impacts related to all known existing and proposed developments in the region with respect to each controlling provision and all identified consequential actions. Cumulative impacts not solely related to the project development should also be assessed.

Predictions of the extent of threat (risk), impact and the benefits of any mitigation measures proposed, should be based on sound science and quantified where possible. All sources of information relied upon should be referenced and an estimate of the reliability of predictions provided. Any positive impacts should also be identified and evaluated.

The extent of any new field work, modelling or testing should be commensurate with risk and should be such that when used in conjunction with existing information, provides sufficient confidence in predictions that well-informed decisions can be made.

Provide information on mitigation measures for each of the matters of NES. Provide and substantiate specific and detailed measures, based on best available practices and include the following elements:

- a description of proposed safeguards and mitigation measures to deal with relevant impacts of the action including mitigation measures proposed to be taken by state governments, local governments or the proponent
- an assessment of the expected or predicted effectiveness of the mitigation measures
- an explanation of any statutory or policy basis for the mitigation measures
- the cost of the mitigation measures.

Data collected on species listed under the EPBC Act should be provided to DSEWPaC in electronic format, using the relevant sections of the Species Information Sheet (Appendix 2). Providing this information will help facilitate decision-making under the EPBC Act and assist in the protection and recovery of species and communities.

9.1 Impacts on world heritage properties and national heritage places

9.1.1 Values

Provide a review of the values of the GBRWHA and National Heritage place, which are expressed on Balaclava Island and its surrounding waters and how this expression contributes to the broader World Heritage values of the GBRWHA. Values include but are not restricted to, erosion and deposition processes along the coastline, marine flora and fauna communities (including coral and benthic communities, salt marsh, seagrass and mangroves), species of conservation

significance and the significant regional habitat for listed threatened and migratory species and natural beauty. A full list of values is included at Appendix 1.

9.1.2 Impacts

Provide a review of the potential direct, indirect, cumulative and consequential impacts on the values of the GBRWHA and National Heritage place which exist at Balaclava Island and its surrounding waters. Also provide a review of how these impacts would affect the values of the GBRWHA and National Heritage place as a whole.

The potential direct, indirect, cumulative and consequential impacts should include but not be limited to those impacts arising from:

- vegetation clearing
- elevated turbidity and other contaminant levels
- other changes to water quality
- altered hydrodynamic regimes
- increased lighting during dredging, construction and operations
- increased noise and vessel activity
- increased risks from introduced marine pest species
- impacts of habitat modification affecting food availability or other resources used by species that form part of the values of the GBRWHA and National Heritage Place, including but not limited to fish nursery areas within the broader Port Alma region
- consequential impacts from increased vessel activity such as groundings and spills
- modifications to the landscape including removing vegetation or erecting structures that affect aesthetic or natural beauty values
- any positive impacts the project may have.

Describe any mitigation measures proposed to reduce the impact on the values of the GBRWHA and National Heritage Place.

Include any proposed offsets for impacts on the values of the GBRWHA and National Heritage place.

9.2 Wetlands of international importance

Provide baseline information regarding the ecological character of the Shoalwater and Corio Bays Ramsar-listed wetland, gathered at a desktop level and supported by field surveys where required. This should include but not be limited to a description of:

- the water quality
- the hydrological regime
- species habitat or species dependent upon the wetland.

For wetlands of international importance, discuss potential impacts from both construction and operation of the project. Consider how the project may impact:

- the hydrological regime of the wetlands, including the volume, timing, duration or frequency of ground and surface water flows to and within the wetland
- ecological characteristics and values of the wetland
- the habitat or lifecycle of native species, including invertebrate fauna, fish species, bird and marine species dependent upon the wetland being affected
- the likelihood of an invasive species that may be harmful to the ecological character of the wetlands being introduced to or spread within the wetland
- potential impacts to water quality transport of potential pollutants, chemicals, oil from spills and sediment plumes from dredging and dredge spoil disposal. Seasonal variation and 'worst case' scenarios should be considered.

Describe any mitigation measures proposed to protect the wetland site from impacts.

Include any proposed offsets for impacts to the ecological character of the Corio Bay and Shoalwater Bay wetlands.

9.3 Impact on listed threatened species and ecological communities and listed migratory species

9.3.1 Baseline data

Using publicly available information supported by field surveys as required, include baseline data on all listed threatened and migratory species that may be present in the vicinity of the proposal, including:

- regional status
- population size
- spatial and temporal distributions in relation to habitat use, including that used for breeding, nesting, roosting or feeding
- migration routes within the region
- suitable habitat within the region.

Baseline data should be included at biologically appropriate spatial and temporal scale.

Include the details of the scope, timing (survey/season/s) and methodology for studies or surveys undertaken to provide information and baseline data on the listed threatened and migratory species and their habitat in the region. These details must be determined in consultation with recognised experts for the listed threatened and

migratory species. The use of peer review for studies and surveys should also be considered. The studies should include, but not be limited to:

- A migratory bird survey of the greater Port Alma region. Consider using survey methodologies and collecting data as outlined in the draft Migratory Shorebirds Policy Statement.[74]
- Identification of habitat that may be impacted by the project, including identification of the function of the habitat for the lifecycle of specific listed threatened and migratory species and listed ecological communities. This should include habitat mapping on a regional scale, including seagrass.
- Identification, description, and (where relevant) mapping, of broader habitats in the region that may support individuals or populations displaced by construction or operations.
- A study of the habitat use, behaviour acoustic repertoire and movement of inshore dolphins, the Indo-Pacific humpback dolphin (*Sousa chinensis*) and the snubfin dolphin (*Orcaella heinsohni*) within the region. This should include study of the Port Alma resident population's importance within the region and its interaction with other known populations in Gladstone and Shoalwater Bay.
- A study of the habitat use, behaviour and movement of marine turtles and dugongs within the region, specifically including but not limited to the Peak Island Preservation Zone, other zoned areas of the GBRMP and other areas of Keppel Bay.
- A study to determine the importance of The Narrows as a migratory corridor for listed species within the region, and the potential cumulative impact of development at both the northern and southern ends of The Narrows.
- A study of the importance of the region for the green sawfish (*Pristis zijsron*).
- A study of the extent and condition of threatened ecological communities that may occur within the region including the semi-evergreen vine thickets of the brigalow belt and the weeping myall woodlands bioregions.

9.3.2 Impacts

Impacts to habitat should be considered in terms of the proportion of total important or suitable habitat within the broader region that will or may be impacted. If species are likely to be displaced by the action, include a discussion regarding the likely habitat to which species would be displaced and the impacts of such displacement.

Discuss all potential direct, indirect, consequential and cumulative impacts on listed threatened species and communities and listed migratory species. Identify which aspects of the project are relevant to which impacts. Describe all the potentially relevant impacts of the action on the ecology, hydrology and geomorphology of the

[74] Available at: www.environment.gov.au/epbc/publications/pubs/migratory-shorebirds.pdf

region as it relates to matters of NES protected under Part 3 of the EPBC Act, including but not restricted to:

- habitat removal, fragmentation and modification affecting food availability or other resources/requirements of threatened and migratory species, including but not limited to the impacts of removing wetland, shoreline and mangroves and modifying wetland tidal flows, increased noise, vibration & lighting from increased vessel traffic in shipping lanes and adjoining areas (specifically surrounding Peak Island); and increase in vessel traffic, which may result in increased ship strike, groundings, increased risk of chemical and oil spill and noise/disturbance to marine cetaceans, turtles, dugongs and other species in their nesting and feeding areas and areas of movement
- the construction of linear infrastructure
- changes to water quality or air quality, including dust and emissions, with particular reference to coal dust
- increase in vessel traffic, which may result in increased ship strike, groundings, increased risk of chemical and oil spill and noise/disturbance
- noise and disturbance associated with construction and continued operation of the coal terminal including but not limited to pile driving, dredging, blasting and ongoing shipping
- increased lighting
- changes to hydrology, coastal geomorphology and water circulation processes
- potential impacts of ASS
- potential impacts of runoff and spillage of port products, pollutants and stormwater through the construction and ongoing operation of the proposal. Modelling of spills should take into account seasonal variations and adverse climatic conditions as well as proximity to sensitive receptors.

Consider and assess the impacts to listed threatened species and ecological communities and any others that are found to be or may potentially be present in areas that may be impacted by the project. Identify which component of the project is of relevance to each species or community or if the threat of impact relates to consequential actions.

Identify and evaluate any positive impacts.

9.3.3 Mitigation measures and offsets

Describe any mitigation measures proposed to reduce the impacts on the listed threatened species and ecological communities and listed migratory species and discuss the anticipated benefit of proposed mitigation measures.

Describe any proposed offsets for impacts to listed threatened species and ecological communities and listed migratory species.

10 Conclusions and recommendations

The EIS should make conclusions and recommendations with respect to the project based on the studies presented, the EMP and conformity of the project with legislative and policy requirements.

11 References

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

12 Appendices

12.1 Final TOR for this EIS

A copy of the final TOR should be included in the EIS.

12.2 TOR cross-reference table

Provide a cross-reference table that links the requirements of each section/subsection of the TOR with the corresponding section/subsection of the EIS, where those requirements have been addressed

12.3 Project approvals

Provide a list of the project approvals required, including the name of the approving agency.

12.4 Consultation report

Include the methodology used in the public consultation plan including:

- criteria for identifying stakeholders and the communication methods used (the consultation plan)
- a list of stakeholders identified, including the Commonwealth, Queensland and local government agencies, and/or the affected parties (as defined by the EP Act)
- a summary of the issues raised by stakeholders and the means by which the issues have been addressed
- plans for ongoing consultation to be outlined and included in the EMP.

12.5 Study team

List the relevant qualifications and experience of the key study team members and specialist sub-consultants.

Provide a glossary of technical terms.

12.6 Specialist studies

All reports generated on specialist studies undertaken as part of the EIS are to be included as appendices. These may include, but are not limited to:

- air pollution, noise and vibration
- groundwater and surface water hydrology
- marine
- geology and geomorphology
- economic studies and/or cost-benefit analyses
- transport studies
- cultural heritage
- hazard and risk studies
- land use and land capability studies.

12.7 Corporate environmental policy

Attach a copy of the proponent's corporate environmental policy and planning framework document.

Provide a list of all commitments made by the proponent in the EIS, together with a reference to the relevant section in the report.

12.8 Sampling and analysis plan (SAP) implementation report

Provide the SAP implementation report prepared in accordance with the NAGD.[75]

12.9 Draft long-term dredge management and monitoring plan (LTDMMP)

Provide a template for a draft LTDMMP that satisfies DSEWPaC and state requirements, including those requirements pertaining to a Sea Dumping permit under the *Environment Protection (Sea Dumping) Act 1981* should one be required.

12.10 Draft acid sulfate soil management plan

Develop a framework for ASS management based on the results of sampling and analysis conducted, using the *SPP 2/02 Guideline: Planning and Managing Development involving Acid Sulfate Soils*[76] and the *Queensland Acid Sulfate Soil*

[75] Department of Environment, Water, Heritage and the Arts, *National Assessment Guidelines for Dredging*, Department of Environment, Water, Heritage and the Arts, Canberra, 2009, viewed 20 December 2010, www.environment.gov.au/coasts/pollution/dumping/publications/guidelines.html

[76] Available from www.derm.qld.gov.au/land/ass/products.html#guidelines

Technical Manual, Soil Management Guidelines.[77] If the density of sampling undertaken for the EIS is not in accordance with the Guidelines, the EIS will describe the proposed strategy for further survey and the development of an ASS management plan, to be completed prior to Development Approval under the *Sustainable Planning Act 2009*. ASS information provided in the EIS must include sufficient survey data to give reasonable certainty to requirements for management and disposal of excavated material containing ASS, including estimation of costs.

[77] SE Dear, NG Moore, SK Dobos, KM Watling and CR Ahern, *Soil Management Guidelines*, 2002, viewed 15 December 2010, www.derm.qld.gov.au/land/ass/pdfs/soil_mgmt_guidelines_v3_8.pdf

Acronyms and abbreviations

Acronym/abbreviation	Definition
ACH Act	*Aboriginal Cultural Heritage Act 2003*
AHD	Australian height datum
ANZECC	the Australian and New Zealand Environment Conservation Council
APBC	Abbot Point Bulk Coal Pty Ltd
AS/NZS	Australian standard/New Zealand standard
ASS	acid sulfate soils
BICET	Balaclava Island Coal Export Terminal
BPPH	Benthic Primary Producer Habitat
CAMBA	China–Australia Migratory Bird Agreement
CHMP	cultural heritage management plan
CLR	Contaminated Land Register
DBCT	Dalrymple Bay Coal Terminal
DEEDI	Department of Employment, Economic Development and Innovation, Queensland
DERM	Department of Environment and Resource Management, Queensland
DSEWPaC	Australian Government Department of Sustainability, Environment, Water Population and Communities (formerly the Department of Environment, Water, Heritage and the Arts)
TMR	Department of Transport and Main Roads, Queensland
EIS	environmental impact statement
EMP	environmental management plan
EP Act	*Environmental Protection Act 1994* (Qld)
EPA	former Environmental Protection Agency, Queensland (now DERM)
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Cwlth)
EPP	Environmental Protection Policy (water, air, waste, noise)
ERA	environmentally relevant activity
GBRMP	Great Barrier Reef Marine Park
GBRWHA	Great Barrier Reef World Heritage Area
GPC	Gladstone Ports Corporation
JAMBA	Japan–Australia Migratory Bird Agreement
ML	mega litres
MNES	matters of national environmental significance (under the EPBC Act)
MRA	*Mineral Resources Act 1989* (Qld)
NAGD	*National Assessment Guidelines for Dredging*
NC Act	*Nature Conservation Act 1992* (Qld)

Acronym/abbreviation	Definition
NCL	North Coast Line
NEPM	National Environmental Protection Council
NGA	National Greenhouse Accounts
NT agreement	native title agreement
NWQMS	National Water Quality Management Strategy
Proponent	Xstrata Coal Queensland Pty Ltd (ABN 69 096 156 702)
QASSIT	Queensland Acid Sulfate Soils Investigation Team
QASSMAC	Queensland Acid Sulfate Soils Management Advisory Committee
QGEOP	Queensland Government Environmental Offset Policy 2008
QR	Queensland Rail
REDD	Regional Ecosystem Description Database
RIA	road impact assessment (report)
ROKAMBA	Republic of Korea–Australia Migratory Bird Agreement
ROP	Resource operations plan (under the Water Act)
SBR	Surat Basin Rail
SDPWO Act	*State Development and Public Works Organisation Act 1971* (Qld)
SEIS	supplementary environmental impact statement
SIA	social impact assessment
SPA	*Sustainable Planning Act 2009*
SPP	state planning policy
TOR	terms of reference
VM Act	*Vegetation Management Act 1999*
WCP	Wandoan Coal Project
WICT	Wiggins Island Coal Terminal
WRP	water resource plan (under the Water Act)
XCQ	Xstrata Coal Queensland Pty Ltd (ABN 69 096 156 702)

Appendix 1

Great Barrier Reef World Heritage Values

The Great Barrier Reef was inscribed on the World Heritage List in 1981. The World Heritage criteria against which the Great Barrier Reef was listed remain the formal criteria for this property. The World Heritage criteria are periodically revised and the criteria against which the property was listed in 1981 are not necessarily identical with the current criteria.

Criteria

Outstanding example representing a major stage of the earth's evolutionary history

The Great Barrier Reef is by far the largest single collection of coral reefs in the world. The World Heritage values of the property include:

- 2904 coral reefs covering approximately 20,055 km^2;
- 300 coral cays and 600 continental islands;
- reef morphologies reflecting historical and on-going geomorphic and oceanographic processes;
- processes of geological evolution linking islands, cays, reefs and changing sea levels, together with sand barriers, deltaic and associated sand dunes;
- record of sea level changes and the complete history of the reef's evolution are recorded in the reef structure;
- record of climate history, environmental conditions and processes extending back over several hundred years within old massive corals;
- formations such as serpentine rocks of South Percy island, intact and active dune systems, undisturbed tidal sediments and ‘blue holes’; and
- record of sea level changes reflected in distribution of continental island flora and fauna.

Outstanding example representing significant ongoing geological processes, biological evolution and man's interaction with his natural environment

Biologically the Great Barrier Reef supports the most diverse ecosystem known to man and its enormous diversity is thought to reflect the maturity of an ecosystem, which has evolved over millions of years on the north-east continental shelf of Australia. The World Heritage values include:

- the heterogeneity and interconnectivity of the reef assemblage;
- size and morphological diversity (elevation ranging from the sea bed to 1142m at Mt. Bowen and a large cross-shelf extent encompass the fullest possible representation of marine environmental processes);

- on going processes of accretion and erosion of coral reefs, sand banks and coral cays, erosion and deposition processes along the coastline, river deltas and estuaries and continental islands;
- extensive *Halimeda* beds representing active calcification and sediment accretion for over 10 000 years;
- evidence of the dispersion and evolution of hard corals and associated flora and fauna from the 'Indo-West Pacific centre of diversity' along the north-south extent of the reef;
- inter-connections with the Wet Tropics via the coastal interface and Lord Howe Island via the East Australia current;
- indigenous temperate species derived from tropical species;
- living coral colonies (including some of the world's oldest);
- inshore coral communities of southern reefs;
- five floristic regions identified for continental islands and two for coral cays;
- the diversity of flora and fauna, including:
  - Macroalgae (estimated 400-500 species);
  - Porifera (estimated 1500 species, some endemic, mostly undescribed);
  - Cnidaria: Corals - part of the global centre of coral diversity and including:
    - hexacorals (70 genera and 350 species, including 10 endemic species);
    - octocorals (80 genera, number of species not yet estimated);
  - Tunicata: Ascidians (at least 330 species);
  - Bryozoa (an estimated 300-500 species, many undescribed);
  - Crustacea (at least 1330 species from 3 subclasses);
  - Worms:
    - Polychaetes (estimated 500 species);
    - Platyhelminthes: include free-living Tubelleria (number of species not yet estimated), polyclad Tubelleria (up to 300 species) and parasitic helminthes (estimated 1000s of species, most undescribed);
  - Phytoplankton (a diverse group existing in two broad communities);
  - Mollusca (between 5000-8000 species);
  - Echinodermata (estimated 800 extant species, including many rare taxa and type specimens);
  - fishes (between 1200 and 2000 species from 130 families, with high species diversity and heterogeneity; includes the whale shark *Rhynchodon typus*);
  - seabirds (between 1.4 and 1.7 million seabirds breeding on islands);

  - marine reptiles (including 6 sea turtle species, 17 sea snake species, and 1 species of crocodile);
  - marine mammals (including 1 species of dugong (*Dugong dugon*), and 26 species of whales and dolphins);
  - terrestrial flora: see 'Habitats: Islands' and;
  - terrestrial fauna, including:
    - invertebrates (pseudoscorpions, mites, ticks, spiders, centipedes, isopods, phalangids, millipedes, collembolans and 109 families of insects from 20 orders, and large over-wintering aggregations of butterflies); and
    - vertebrates (including seabirds (see above), reptiles: crocodiles and turtles, 9 snakes and 31 lizards, mammals);
- the integrity of the inter-connections between reef and island networks in terms of dispersion, recruitment, and the subsequent gene flow of many taxa;
- processes of dispersal, colonisation and establishment of plant communities within the context of island biogeography (e.g. dispersal of seeds by air, sea and vectors such as birds are examples of dispersion, colonisation and succession);
- the isolation of certain island populations (e.g. recent speciation evident in two subspecies of the butterfly *Tirumala hamata* and the evolution of distinct races of the bird *Zosterops spp);*
- remnant vegetation types (hoop pines) and relic species (sponges) on islands.
- evidence of morphological and genetic changes in mangrove and seagrass flora across regional scales; and
- feeding and/or breeding grounds for international migratory seabirds, cetaceans and sea turtles.

Contain unique, rare and superlative natural phenomena, formations and features and areas of exceptional natural beauty

The Great Barrier Reef provides some of the most spectacular scenery on earth and is of exceptional natural beauty. The World Heritage values include:

- the vast extent of the reef and island systems which produces an unparalleled aerial vista;
- islands ranging from towering forested continental islands complete with freshwater streams, to small coral cays with rainforest and unvegetated sand cays;
- coastal and adjacent islands with mangrove systems of exceptional beauty;
- the rich variety of landscapes and seascapes including rugged mountains with dense and diverse vegetation and adjacent fringing reefs;
- the abundance and diversity of shape, size and colour of marine fauna and flora in the coral reefs;

- spectacular breeding colonies of seabirds and great aggregations of over-wintering butterflies; and
- migrating whales, dolphins, dugong, whale sharks, sea turtles, seabirds and concentrations of large fish.

Provide habitats where populations of rare and endangered species of plants and animals still survive

The Great Barrier Reef contains many outstanding examples of important and significant natural habitats for *in situ* conservation of species of conservation significance, particularly resulting from the latitudinal and cross-shelf completeness of the region. The World Heritage values include:

- habitats for species of conservation significance within the 77 broad-scale bioregional associations that have been identified for the property and which include:
  - over 2900 coral reefs (covering 20 055 km^2) which are structurally and ecologically complex;
  - large numbers of islands, including:
    - 600 continental islands supporting 2195 plant species in 5 distinct floristic regions;
    - 300 coral cays and sand cays;
    - seabird and sea turtle rookeries, including breeding populations of green sea turtles and Hawksbill turtles; and
    - coral cays with 300-350 plant species in 2 distinct floristic regions;
      - seagrass beds (over 5000 km^2) comprising 15 species, 2 endemic;
      - mangroves (over 2070 km^2) including 37 species;
      - *Halimeda* banks in the northern region and the unique deep water bed in the central region; and
- large areas of ecologically complex inter-reefal and lagoonal benthos; and
- species of plants and animals of conservation significance.

Appendix 2

Australian Government

Department of the Environment, Water, Heritage and the Arts

Species Information Sheet

Important notes:

- For all facts and all information presented – identify your references/information sources, document reasons and supportive data. Indicate the quality of facts/information, for example was it based on research or anecdotal data; on observed data or estimated or inferred from data; or suspected to be the case.
- Personal communications - Identify data/opinions based on personal communications (including your own). These need to be supported by permission slips (available from the Department) so that opinions can be cited on the Department's website if needed.
- Confidential material – Identify confidential material and explain the sensitivity.
- Tables – Can be included at the end of this document or prepared as separate electronic documents. Refer to tables in the relevant area of the text.
- Species - applies to the entity nominated under the Act, either species and subspecies
- Population – refers to populations within a species or total population numbers for a species.
- Definitions – SPRAT – The Department's Species Profiles and Threats database; EPBC –Environment Protection and Biodiversity Conservation Act. If more guidance on definitions is needed, see IUCN Guidelines at http://www.iucn.org/themes/ssc/redlists/RedListGuidelines.pdf

Section 1 - Legal Status, Distribution, Biological, Ecological

Legal status

1. *What is the species' current conservation status under Australian and State/Territory Government legislation?*
2*. Does the species have specific protection (e.g. listed on an annex or appendix) under other legislation or intergovernmental arrangements, e.g. Convention on International Trade in Endangered Fauna and Flora (CITES), Convention on Migratory Species (CMS)*

Taxonomy

3*. What are the currently accepted scientific and common name/s for the species? Note any other scientific names that have been recently used.*
4. *Is this species conventionally accepted? If not, explain why. Is there any controversy on the*

taxonomy?

Description

5. *Give a brief description of the species': appearance, including size and/or weight, and sex and age variation if appropriate; social structure and dispersion (e.g. solitary/clumped/flocks)*

Australian Distribution

6. *Describe the species' distribution in Australia and, if available, attach a map*
7. *What is the extent of occurrence (in km^2) for the species (described in Attachment A); explain how it was calculated and datasets used* a. *What is the current extent of occurrence?* b. *What data is there to indicate past declines in extent of occurrence (if available, include data that indicates the percentage decline over the past 10 years or 3 generations whichever is longer)?* c. *What data is there to indicate future changes in extent of occurrence (if available, include data that indicates the percentage decline over 10 years or 3 generations whichever is longer (up to a maximum of 100 years in the future) where the time period is a continuous period that may include a component of the past)*?
8. *What is the area of occupancy (in km^2) for the species (described in Attachment A; explain how calculated and datasets that are used)* a. *What is the current area of occupancy?* b. *What data is there to indicate past declines in area of occupancy (if available, include data that indicates the percentage decline over the past 10 years or 3 generations whichever is longer)?* c. *What data is there to indicate future changes in area of occupancy (if available, include data that indicates the percentage decline over 10 years or 3 generations whichever is longer (up to a maximum of 100 years in the future) where the time period is a continuous period that may include a component of the past)?*
9*. How many locations do you consider the species occurs in and why?* *The term 'location' defines a geographically or ecologically distinct area in which a single threatening event can rapidly affect all individuals of the species present. The size of the location depends on the area covered by the threatening event and may include part of one or many subpopulations. Where a species is affected by more than one threatening event, location should be defined by considering the most serious plausible threat.*
10*. Give locations of: captive/propagated populations; populations recently re-introduced to the wild; and sites for proposed population re-introductions. Note if these sites have been identified in recovery plans*
11*. Is the species' distribution severely fragmented? Why?* *Severely fragmented refers to the situation in which increased extinction risk to the taxon results from most individuals being found in small and relatively isolated subpopulations (in certain circumstances this may be inferred from habitat information). These small subpopulations may go extinct, with a reduced probability of recolonization.*
12*. DEWHA Use Only:* ***Distribution Public***

Global Distribution

13. *Describe the species' global distribution*
14. *Give an overview of the global population's size, trends, threats and security of the species outside Australia*

15. *Explain the relationship between the Australian population and the global population, including:*

a. *What percentage of the global population occurs in Australia;*
b. *Is the Australian population distinct, geographically separate or does part or all of the population move in/out of Australia's jurisdiction (give an overview; details in Movements section);*
c. *Do global threats affect the Australian population*?

Surveys Conducted

16*. Has the species been reasonably well surveyed? Provide an overview of surveys to date and the likelihood of its current known distribution and/or population size being its actual distribution and/or population size*

Population Information

17. *What is the species' total population size in terms of number of mature individuals? Are there other useful measures of population size and what are they?*
In the absence of figures, terms such as common, abundant, scarce can be of value.

18. *Does the species occur in a number of smaller populations? How many? If available, for each population give the locality, numbers and trends in numbers and tenure of land (if available) (include extinct populations). Can these be considered to be subpopulations and why?*
Subpopulations are defined as geographically or otherwise distinct groups in the population between which there is little demographic or genetic exchange (typically one successful migrant individual or gamete per year or less).

19. *What is the population trend for the entire species?*

a. *What data is there to indicate past decline in size (if available, include data on rate of decline over past 10 years or 3 generations whichever is longer)?*
b. *What data is there to indicate future changes in size (if available, include data which will indicate the percentage of decline over 10 years or 3 generations whichever in longer (up to a maximum of 100 years in the future) where the time period is a continuous period that may include a component of the past)?*

20. *Does the species undergo extreme natural fluctuations in population numbers, extent of occurrence or area of occupancy? To what extent and why?*

Extreme fluctuations can be said to occur in a number of taxa when population size or distribution area varies widely, rapidly and frequently, typically with a variation greater than one order of magnitude (i.e. a tenfold increase or decrease).

21*. What is the generation length and how it is calculated?*
Generation length is the average age of parents of the current cohort (i.e. newborn individuals in the population). Generation length therefore reflects the turnover rate of breeding individuals in a population. Generation length is greater than the age at first breeding and less than the age of the oldest breeding individual, except in taxa that breed only once. Where generation length varies under threat, the more natural, i.e. pre-disturbance, generation length should be used.

22*. Identify important populations necessary for the species' long-term survival and recovery? This may include: key breeding populations, those near the edge of the species' range or those needed to maintain genetic diversity*

23. *Describe any cross-breeding with other species in the wild, indicating how frequently and where this occurs*

24. *DEWHA Use only:* ***Population Public***

Populations In Reserve

25. *Which populations are in reserve systems? Which of these are actively managed for this species? Give details*

Habitat

26*. Give a brief description of the species' habitat/s (Details entered in Section 2)*
27*. Describe the species' non-biological habitat (e.g. aspect, topography, substrate, climate) and biological habitat (e.g. forest type, associated species, sympatric species). If the species uses different habitats for different activities (e.g. breeding, feeding, roosting, dispersing, basking), then describe each habitat*
28. *Does the species use refuge habitat, e.g. in times of fire, drought or flood? Describe this habitat*
29. *Is the species part of, or does it rely on, a listed threatened ecological community? Is it associated with any other listed threatened species?*

Life Cycle

Sexual Maturity, Life Expectancy and Mortality

30. *Provide details on ages of sexual maturity, life expectancy and natural mortality*

Reproduction

31. *For plants: When does the species flower and set fruit? What conditions are needed for this? What is the pollinating mechanism? If the species is capable of vegetative reproduction, a description of how this occurs, the conditions needed and when. Does the species require a disturbance regime (e.g. fire, cleared ground) in order to reproduce?* *For animals: provide overview of breeding system and of breeding success, including: when does it breed; what conditions are needed for breeding; are there any breeding behaviours that may make it vulnerable to a threatening process?*

Feeding

32*. Summarize the species' food items or sources and timing/seasonality*
33. *Briefly describe the species' feeding behaviours, including those that may make the species vulnerable to a threatening process*

Movement Patterns

34. *Describe any relevant daily and seasonal pattern of movement for the species, including relevant arrival/departure dates if migratory*
35. *Give details of the species' home ranges/territories*

Survey Guidelines

36. *Give details of the distinctiveness and detectability of the species*
37. *Describe methods for detecting species including when to conduct surveys (e.g. season, time of day, weather conditions); length, intensity and pattern of search effort; and limitations and expert acceptance; recommended methods; survey-effort guide*

37a. *DEWHA Use only : Survey Guidelines Public*

Section 2 - Threats and Threat Abatement

Threats

38. *Identify past, current and future threats, to the species indicating whether they are actual or potential. For <u>each</u> threat, describe:* *a. how and where it impacts on this species* *b. what its effect has been so far (indicate whether it is known or suspected; present supporting information/research; does it only affect certain populations)* c. *what is its expected effect in the future (is there supporting research/information; is the threat only suspected; does it only affect certain populations)*
39. *If not included above, identify catastrophic threats, i.e. threats with a low predictability that are likely to severely affect the species - Identify the threat, explain its likely impact and indicate the likelihood of it occurring (e.g. a drought/cyclone in the area every 100 years)*
40. *Identify and explain any additional biological characteristics particular to the species that are threatening to its survival (e.g. low genetic diversity)? Identify and explain any models addressing survival of the species.*
41. *Is there other information that relates to the survival of this species that you would like to address?*

Threat Abatement and Recovery

42. *Give an overview of how threats are being abated/could be abated and other recovery actions underway/proposed. Identify who is undertaking these activities and how successful the activities have been to date*

43. *For DEWHA Use only:*

Mitigation Approach

44. *Describe any mitigation measures or approaches that have been developed for the species*

Major Studies

45. *Identify major studies on the species*

Management Documentation

46. *Identify key management documentation available for the species, e.g. recovery plans, conservation plans, threat abatement plans.*

Section 3 – References, compilers, referees

References

48. *Reference List*

Signature block

49. *Compiler's name/s*
50. *Organisation/s*
I understand that material in this template may be used on the Department's website in the Species Profile and Threats Database (SPRAT) and in listing advice for entities assessed under the threatened species provisions of the *Environment Protection and Biodiversity Conservation Act*.
Signed:
51. *Date signed*
52. Has this document been refereed? If so, indicate by whom.

Provide copies of key documentation/references

Attachment A – Area of occupancy and extent of occurrence

Also see IUCN Guidelines at
http://www.iucn.org/themes/ssc/redlists/RedListGuidelines.pdf

Extent of occurrence

Extent of occurrence is defined as the area contained within the shortest continuous imaginary boundary which can be drawn to encompass all the known, inferred or projected sites of present occurrence of a taxon, excluding cases of vagrancy (see Figure 1). This measure may exclude discontinuities or disjunctions within the overall distributions of taxa (e.g. large areas of obviously unsuitable habitat) (but see 'area of occupancy', point 10 below). Extent of occurrence can often be measured by a minimum convex polygon (the smallest polygon in which no internal angle exceeds 180 degrees and which contains all the sites of occurrence).

Area of occupancy

Area of occupancy is defined as the area within its 'extent of occurrence' (see point 9 above) which is occupied by a taxon, excluding cases of vagrancy. The measure reflects the fact that a taxon will not usually occur throughout the area of its extent of occurrence, which may contain unsuitable or unoccupied habitats. In some cases (e.g. irreplaceable colonial nesting sites, crucial feeding sites for migratory taxa) the area of occupancy is the smallest area essential at any stage to the survival of existing populations of a taxon. The size of the area of occupancy will be a function of the scale at which it is measured, and should be at a scale appropriate to relevant biological aspects of the taxon, the nature of threats and the available data (see point 7 in the Preamble). To avoid inconsistencies and bias in assessments caused by estimating area of occupancy at different scales, it may be necessary to standardize estimates by applying a scale-correction factor. It is difficult to give strict guidance on how standardization should be done because different types of taxa have different scale-area relationships.

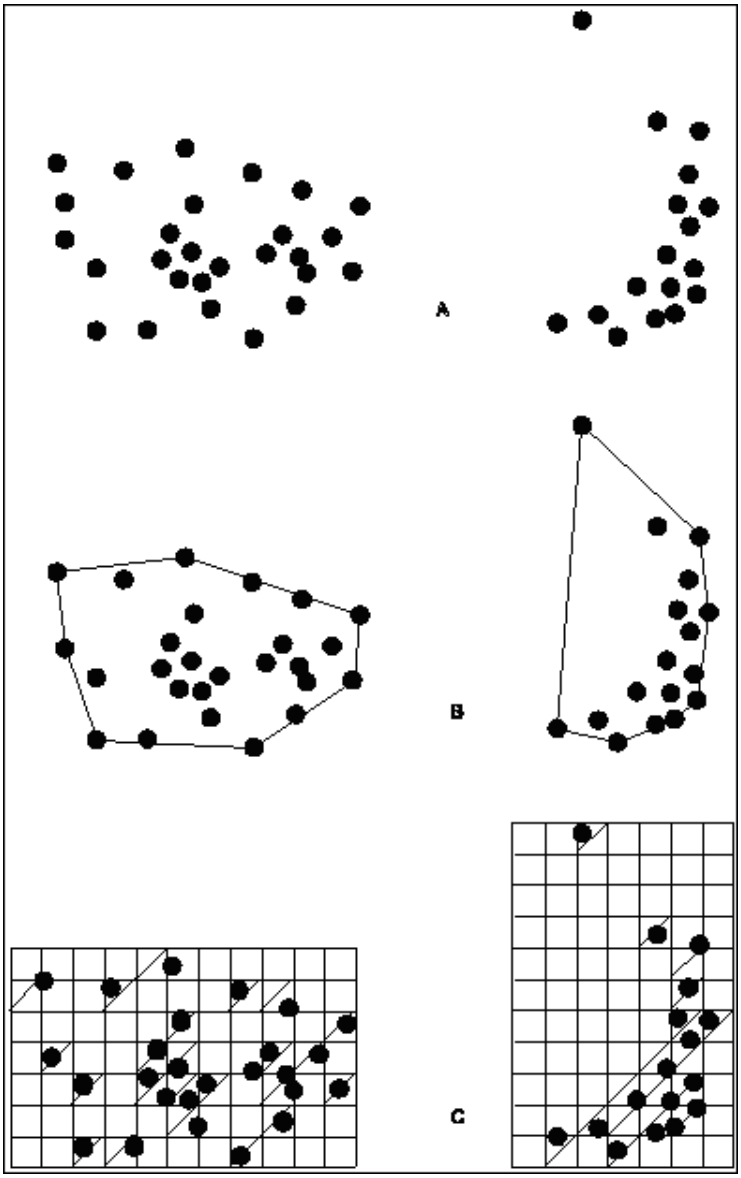

Figure 1. *Two examples of the distinction between extent of occurrence and area of occupancy. (A) is the spatial distribution of known, inferred or projected sites of present occurrence. (B) shows one possible boundary to the extent of occurrence, which is the measured area within this boundary. (C) shows one measure of area of occupancy which can be achieved by the sum of the occupied grid squares.*

Appendix 3

Schedule 4 Matters to be addressed by draft public environment report and environmental impact statement

(Regulation 5.04)

1 General information

1.01 The background of the action including:

(a) the title of the action;

(b) the full name and postal address of the designated proponent;

(c) a clear outline of the objective of the action;

(d) the location of the action;

(e) the background to the development of the action;

(f) how the action relates to any other actions (of which the proponent should reasonably be aware) that have been, or are being, taken or that have been approved in the region affected by the action;

(g) the current status of the action;

(h) the consequences of not proceeding with the action.

2 Description

2.01 A description of the action, including:

(a) all the components of the action;

(b) the precise location of any works to be undertaken, structures to be built or elements of the action that may have relevant impacts;

(c) how the works are to be undertaken and design parameters for those aspects of the structures or elements of the action that may have relevant impacts;

(d) relevant impacts of the action;

(e) proposed safeguards and mitigation measures to deal with relevant impacts of the action;

(f) any other requirements for approval or conditions that apply, or that the proponent reasonably believes are likely to apply, to the proposed action;

(g) to the extent reasonably practicable, any feasible alternatives to the action, including:

(i) if relevant, the alternative of taking no action;

(ii) a comparative description of the impacts of each alternative on the matters protected by the controlling provisions for the action;

(iii) sufficient detail to make clear why any alternative is preferred to another;

(h) any consultation about the action, including:

(i) any consultation that has already taken place;

(ii) proposed consultation about relevant impacts of the action;

(iii) if there has been consultation about the proposed action — any documented response to, or result of, the consultation;

(i) identification of affected parties, including a statement mentioning any communities that may be affected and describing their views.

3 Relevant impacts

3.01 Information given under paragraph 2.01 (d) must include:

(a) a description of the relevant impacts of the action;

(b) a detailed assessment of the nature and extent of the likely short term and long term relevant impacts;

(c) a statement whether any relevant impacts are likely to be unknown, unpredictable or irreversible;

(d) analysis of the significance of the relevant impacts;

(e) any technical data and other information used or needed to make a detailed assessment of the relevant impacts.

4 Proposed safeguards and mitigation measures

4.01 Information given under paragraph 2.01 (e) must include:

(a) a description, and an assessment of the expected or predicted effectiveness of, the mitigation measures;

(b) any statutory or policy basis for the mitigation measures;

(c) the cost of the mitigation measures;

(d) an outline of an environmental management plan that sets out the framework for continuing management, mitigation and monitoring programs for the relevant impacts of the action, including any provisions for independent environmental auditing;

(e) the name of the agency responsible for endorsing or approving each mitigation measure or monitoring program;

(f) a consolidated list of mitigation measures proposed to be undertaken to prevent, minimise or compensate for the relevant impacts of the action,

including mitigation measures proposed to be taken by State governments, local governments or the proponent.

5 Other approvals and conditions

5.01 Information given under paragraph 2.01 (f) must include:

(a) details of any local or State government planning scheme, or plan or policy under any local or State government planning system that deals with the proposed action, including:

(i) what environmental assessment of the proposed action has been, or is being, carried out under the scheme, plan or policy;

(ii) how the scheme provides for the prevention, minimisation and management of any relevant impacts;

(b) a description of any approval that has been obtained from a State, Territory or Commonwealth agency or authority (other than an approval under the Act), including any conditions that apply to the action;

(c) a statement identifying any additional approval that is required;

(d) a description of the monitoring, enforcement and review procedures that apply, or are proposed to apply, to the action.

6 Environmental record of person proposing to take the action

6.01 Details of any proceedings under a Commonwealth, State or Territory law for the protection of the environment or the conservation and sustainable use of natural resources against:

(a) the person proposing to take the action; and

(b) for an action for which a person has applied for a permit, the person making the application.

6.02 If the person proposing to take the action is a corporation — details of the corporation's environmental policy and planning framework.

7 Information sources

7.01 For information given in a draft public environment report or environmental impact statement, the draft must state:

(a) the source of the information; and

(b) how recent the information is; and

(c) how the reliability of the information was tested; and

(d) what uncertainties (if any) are in the information.

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