



Terms of reference for an environmental impact statement

Nathan Dam and Pipelines project

Under Part 4 of the Queensland
State Development and Public Works Organisation Act 1971

The Coordinator-General
February 2009

Terms of reference

Preamble

Project background

A dam on the Dawson River was originally proposed in 1922. The project gained impetus during the 1990s due to ongoing drought and increasing water demands in the region. An impact assessment study was completed by Hyder Consulting Pty Ltd for the Department of Natural Resources in September 1997. The study found that, with appropriate management, no significant adverse impacts existed that would prevent the development from being progressed. Expressions of interest to build the dam were then sought from the private sector. SUDAW Developments Ltd (SUDAW) was chosen as the preferred developer on a fully commercial basis.

In August 2002, SUDAW referred the project for assessment under the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act). The (then) Australian Minister for the Environment and Heritage determined that Nathan Dam was a ‘controlled action’ under the Act. In December 2002 the Queensland Conservation Council and the World Wide Fund for Nature (Australia) applied for a judicial review of the Minister’s decision. They argued that the environmental assessment report needed to address potential impacts on the Great Barrier Reef. In May 2004, the Federal Court of Australia found that the Commonwealth Minister had erred in not considering the indirect impacts of Nathan Dam. The Federal Court found the Commonwealth Minister was required to consider the downstream impacts and as a result “other controlling provisions” of the Environmental Protection and Biodiversity Conservation Act may have been triggered. The Federal Court directed that the decision be re-examined.

In 2006, the Central Queensland Regional Water Supply strategy was released. The strategy examined the adequacy of current water supplies for existing and future demands across the Fitzroy River Basin and associated coastal areas and highlighted a short- to medium-term need for additional supplies in the Dawson–Callide sub-region that could not be met by water trading or efficiency measures. It indicated that these demands could be met through the construction of a dam on the Dawson River, hereafter referred to as Nathan Dam.

In 2006, the Queensland Government released its Statewide Water Policy, which outlined a plan to improve water security and support future economic growth in regional Queensland. The policy supports a \$420 million investment in regional water infrastructure which aims to meet the needs of urban and rural users as well as:

- enable the development of Bowen as a major industrial centre of the future
- provide additional water to the rapidly growing coalfield and coal mining communities in the Bowen Basin
- drought-proof coastal communities to ensure the viability of valuable tourism and manufacturing industries
- provide secure water supplies to the Surat Basin to open up the vast thermal coal reserves for mining and stimulate the rural economy
- provide secure water supplies for industrial and urban users in Central Queensland.



The Statewide Water Policy identifies eleven regional water infrastructure projects with \$222 million committed for the development of dams and weirs and \$198 million for channels and pipelines. Funding of \$120 million was allocated toward the design and construction of the proposed Nathan Dam, subject to the Australian Government's approval under the Act.

In July 2007, the Queensland Government released a Program of Works for the regional water infrastructure projects and designated proponents to progress the projects through feasibility investigations and approvals through to the development of a business case. SunWater was designated as the proponent to develop the business case for Nathan Dam.

Given the timeframes within the Program of Works which water supply enhancements are required, the environmental approvals process will be conducted in parallel with the refinement of other components of the business case. As such, robust estimates of demand levels and location, the means of transporting water to demand points and the end uses of the water will progress in line with the various studies. Development of the business case and the environmental impact statement (EIS) are complementary processes in that each component will take into account the outputs of the other in decision-making. The definition of the project included in the submitted EIS will consequently be more precise than that included here.

When the business case for the Nathan Dam has been finalised, the government will be in a position to consider whether or not to proceed to construction and assess the commerciality of the proposed development.

The project

The proposed dam is located on the Dawson River about 315 km adopted middle thread distance near Nathan Gorge in Banana Shire about 35 km directly north east of Taroom. A locality map is attached at the end of this document. The dam construction type has yet to be determined but will be either mass concrete or roller compacted concrete. Other features of the project include:

- a yield of 70 000 megalitres (ML) per annum of high priority water at a full supply level of approximately 185.3 m Australian Height Datum based on a capacity of 880 000 ML
- a water distribution pipeline from the storage south through the Surat Basin
- fish ways and water outlets (fish migration and water release).

The details may vary as the project is refined, notably the capacity of the dam which may increase as the design is progressed. Further project details are in the Initial Advice Statement dated March 2008 which can be on the departmental website, www.dip.qld.gov.au.

Project justification

The Central Queensland Regional Water Supply strategy highlighted the ongoing growth in urban and industrial development in the region, particularly in the Lower Fitzroy and Gladstone areas, and in the Bowen and Surat coal basins. Water entitlements in some of the existing supply systems in the region are at or approaching full usage and some are performing below water users' requirements. Based on projections of water demand to meet urban, industrial, coal mining and agriculture requirements from 2005–2020, supply shortfalls have been predicted throughout much of the region, affecting future economic prosperity.

The existing Dawson Valley Water Supply Scheme, in which the proposed Nathan dam is located, relies on a series of relatively small-capacity weirs along the Dawson River. These storages are dependent on regular seasonal flows and access to medium priority water (for agricultural purposes) is often restricted at the start of the water year.



Similarly, urban and industrial users with access to high priority water may occasionally experience restricted supplies until wet season flows replenish the weir storages.

The Central Queensland Regional Water Supply strategy identified an immediate shortfall in high-priority water supply potential of 3,300 ML per annum for urban and industrial use in the Moura area (downstream of the proposed dam). The longer-term shortfall for high-priority urban and industrial supplies across the Dawson–Callide subregion was estimated at 6 000 ML by 2010, 10 000 ML by 2015 and 12 000 ML by 2020. In addition, there is a potential need for reserve supplies for the Lower Fitzroy during times of critical supply needs.

The proponent is undertaking demand surveys of likely future high-priority water requirements for coal mining and power generation in the area. Current indications are that by 2020 demand could be in the order of 40 000 ML per annum from the Surat Coal Basin in addition to the demands from the Dawson–Callide subregion, indicating a critical need for additional high-reliability supplies in the region. Rigorous demand surveys will be undertaken by the proponent as part of the project business case development to confirm the preliminary estimates.

The proponent

In July 2007, SunWater was announced by the Queensland Government as the proponent to develop the business case and undertake the EIS process for the Nathan Dam project.

The proponent owns and operates bulk water supply and distribution infrastructure located throughout regional Queensland that has a replacement value of \$4.6 billion. It supplies about 40% of the water used commercially in Queensland via 27 water supply schemes and three subsidiary companies. Its water supply customers number close to 6000 and include mining, industrial and manufacturing companies, local governments, power stations, irrigators and local water boards.

The proponent is also the business case proponent for other water resource projects in the region nominated in the Queensland Regional Water Infrastructure Program, specifically Connors River Dam and, as part of a joint venture, the Lower Fitzroy Weirs project.

The contact details for the proponent are:

SunWater
Project Manager–Nathan Dam
Level 9, 120 Edward Street, Brisbane
PO Box 15536
City East QLD 4002
Phone: +61 7 3120 0094
Fax: +61 7 3120 0242
Email: nathandam@sunwater.com.au

Administrative procedures for these terms of reference

On 19 March 2008, the proponent lodged an Initial Advice Statement for the project with the Coordinator-General (CG). The Initial Advice Statement provides an outline of the proposed project, including the project rationale and its potential impacts.

On 2 May 2008, the CG declared the project to be a “significant project for which an EIS is required”, pursuant to section 26(1)(a) of the *State Development and Public Works Organisation Act 1971* (Qld).



On 30 July 2008, the Commonwealth Minister for the Environment, Heritage and the Arts determined that the project is a “controlled action” under the EPBC Act due to the likely 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)
- sections 23 and 24A (Commonwealth marine areas).

As a consequence, the project requires assessment and approval under the EPBC Act. The Australian Government has accredited the EIS process, to be conducted under the SDPWO Act, under a Bilateral Agreement between the Australian and Queensland Governments. This will enable the EIS to meet the impact assessment requirements under both Australian and Queensland legislation. The project will require approval from the responsible Commonwealth Minister under Part 9 of the EPBC Act before it can proceed.

The Department of Infrastructure and Planning (DIP) is managing the EIS process on behalf of the CG. DIP has invited relevant Australian, Queensland and local government representatives and other relevant authorities to participate in the process as advisory agencies.

The first step in the impact assessment process was developing these terms of reference (ToR) for an EIS for the project, as required under the SDPWO Act. This involved developing draft ToR that was made available for public and advisory agency comment. When finalising these ToR the CG considered all properly made submissions. These ToR were then presented to the proponent.

The proponent will then prepare an EIS to address these ToR. Once the EIS has been prepared to the satisfaction of the CG, a public notice will be advertised in relevant newspapers circulated in the district, the state and nationally. The notice will state: where copies of the EIS are available for inspection and how it can be purchased, how submissions may be made to the CG about the EIS and the submission period. The proponent may be required to prepare a supplementary report to the EIS that addresses specific matters raised in the submissions received on the EIS.

At the completion of the EIS phase, the CG will prepare a report evaluating the EIS and other relevant material, pursuant to section 35 of SDPWO Act. The 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 CG, any other material the CG thinks relevant to the project such as a supplementary report to the EIS, comments and advice from advisory agencies and other entities, technical reports and legal advice.

The report will be publicly notified by placing it on the DIP website at www.dip.qld.gov.au. The report will be presented to the proponent, the *Integrated Planning Act 1997* (Qld) (IPA) assessment manager, the Queensland Minister for Sustainability, Climate Change and Innovation and the Queensland Minister for Natural Resources and Water. A copy will also be provided to the Commonwealth Minister for the Environment, Heritage and the Arts to enable assessment under the Initial Advice Statement to commence.



If the project involves development requiring an application for a development approval under IPA, the report may, under section 39 of the SDPWO Act, state for the assessment manager one or more of the following:

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

Alternatively the Report must state for the assessment manager that:

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

Results of consultation on these terms of reference

Advertisements inviting public comment on the draft ToR for the project were placed in The Weekend Australian and The Courier Mail on 13 September 2008, the Dalby Herald on 16 September 2008 and the Biloela Central Telegraph on 19 September 2008. A similar notice was placed on the DIP website.

During the public and advisory agency consultation process the government released the Sustainable Resource Communities Policy. This policy builds on the Sustainable Futures Framework for Queensland Mining Towns released by the state government in June 2007. The initiatives contained in this policy reinforce the principles of leadership, collaboration, corporate responsibility, sustainability, communication and community engagement as outlined in the Framework. A common key issue raised in the public and advisory agency comments related to the need for the EIS to address the impacts of the project on the social and economic environment and to propose mitigation strategies. The social and economic chapters of these ToR have been substantially updated to reflect the aims of the policy and the public and advisory agency comments.

The submission period closed on 17 October 2008. Three late submissions were accepted, two up until 20 October 2008 and a third on 16 December 2008 from Disability Services Queensland. It was agreed with Disability Services Queensland that as significant changes were likely to the social section of the ToR that their comment would be based on the amended social section. This occurred after the submission period closed. A total of 34 submissions were received, including sixteen from advisory agencies, two from local governments, seven from private individuals and nine from community groups. Copies of submissions were provided to the proponent.

All submissions have been reviewed and considered by the CG in finalising the ToR. The following is a list of submissions received on the draft ToR:



No.	Agency/Individual/Area interest groups	Date
1	Department of Main Roads	26/9/08
2	Queensland Rail	24/09/08
3	Department of Education, Training and the Arts	Undated
4	Department of Housing	8/10/08
5	Enterprise Biloela	8/10/08
6a	Banana Shire Council	10/10/08
6b	Banana Shire Council	13/10/08
7	Department of Tourism, Regional Development and Industry	10/10/08
8	W Blackley	11/10/08
9	Department of Emergency Services	13/10/08
10	Department of Communities	14/10/08
11	Department of Primary Industries and Fisheries	14/10/08
12	Queensland Transport	15/10/08
13	Wildlife Preservation Society	15/10/08
14	Wildlife Preservation Society, Upper Dawson Branch	17/10/08
15	Taroom District Development Association	15/10/00
16a	Department of Natural Resources and Water	16/10/08
16b	Department of Natural Resources and Water	16/10/08
17	Bruce Hood	16/10/08
18	Dalby Regional Council	16/10/08
19	Capricorn Conservation Council	17/10/08
20	Queensland Conservation Council	17/10/08
21	3MK Pty Ltd	17/10/08
22	Hutchinson Farming Pty Ltd	17/10/08
23	Errol Conachan	17/10/08
24	Fitzroy Basin Food and Fibre	17/10/08
25	Dawson Valley Development Association	17/10/08
26	Great Barrier Reef Marine Park Authority	17/10/08
27	Department of Infrastructure and Planning – Planning Group	17/10/08
28	Department of Mines and Energy – Mineral and Extractive Planning	17/10/08
29	Sam Jerard	17/10/08



30	Australian Freshwater Turtle Conservation and Research Association	17/10/08
31	Geoffrey Croke	17/10/08
32	Environmental Protection Agency	20/10/08
33	Queensland Health	20/10/08
34	Disability Services Queensland	16/12/08

These ToR are presented in two broad categories:

- Part A: Information and advice on the preparation of the EIS
- Part B: Specific requirements – Contents of the EIS.

The CG's contact details for any further enquiries are:

EIS Project Manager–Nathan Dam and Pipelines
Significant Projects Coordination
Department of Infrastructure and Planning
PO Box 15009
City East QLD 4002
Phone: +61 7 3224 2171
Fax: +61 7 3225 8282
Email: nathan.dam@dip.qld.gov.au

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Abbreviations

The following abbreviations have been used in this document:

CG	The Coordinator-General
EIS	Environmental impact statement
EP Act	<i>Environmental Protection Act 1994 (Qld)</i>
EPA	Environmental Protection Agency
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999 (Cth)</i>
ML	Megalitre
IPA	<i>Integrated Planning Act 1997 (Qld)</i>
SDPWO Act	<i>State Development and Public Works Organisation Act 1971 (Qld)</i>
The project	<p>A proposed dam located on the Dawson River about 315 km adopted middle thread distance near Nathan Gorge in Banana Shire about 35 km directly north east of Taroom. The dam construction type has yet to be determined but will be either mass concrete or roller compacted concrete. Other features of the project include:</p> <ul style="list-style-type: none">• a yield of 70 000 ML per annum of high priority water at a full supply level of approximately 185.3 m Australian Height Datum based on a capacity of 880 000 ML• a water distribution pipeline from the storage south through the Surat Basin• fish ways and water outlets (fish migration and water release). <p>These details may vary as the project is refined, notably the capacity of the dam which may increase as the design is progressed.</p>
The proponent	SunWater – for the development of the business case and undertake the EIS process.
ToR	Terms of reference



Part A: Information and advice on the preparation of the EIS

1. Introduction

These terms of reference (ToR) are for an environmental impact statement (EIS) for a proposed dam located on the Dawson River about 315 km adopted middle thread distance near Nathan Gorge in Banana Shire about 35 km directly north east of Taroom. The dam construction type has yet to be determined but will be either mass concrete or roller compacted concrete. Other features of the project include:

- a yield of 70 000 ML per annum of high priority water at a full supply level of approximately 185.3 m Australian Height Datum based on a capacity of 880 000 ML
- a water distribution pipeline from the storage south through the Surat Basin
- fish ways and water outlets (fish migration and water release).

The details may vary as the project is refined, notably the capacity of the dam which may increase as the design is progressed.

These ToR have been prepared in accordance with sections 29 and 30 of the *State Development and Public Works Organisation Act 1971* (Qld).

The objective of these ToR is to identify those matters that should be addressed in the EIS for the project that has been described in the Initial Advice Statement and which was declared to be a significant project by the Coordinator-General (CG) on 2 May 2008. The project has also been determined to be a “controlled action” under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act) and the EIS will be conducted under a Bilateral Agreement between the Australian and Queensland Governments.

Within these ToR, the term “project” includes all activities necessary for construction and operation of the dam and distribution pipelines or other distribution systems that are the business responsibility of the proponent.

In order to clarify the nature and level of investigations that are envisaged in these ToR, SunWater (the proponent) may consult further with relevant government bodies (advisory agencies), peak community interest organisations and groups, as necessary during the preparation of the EIS to ensure that these ToR are addressed.

Culturally sensitive information should not be disclosed in the EIS or any associated documents and the disclosure of any such information should only be in accordance with the arrangements negotiated with the traditional custodians. Confidential information to be taken into consideration in making a decision on the EIS should be marked as such and included as a separate attachment to the main report.

An executive summary should be provided in the EIS and be able to be provided separately for public information.

2. 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, where possible, how any adverse impacts would be avoided or mitigated. Direct, indirect and cumulative impacts must be fully examined and addressed. The project, including selection of the preferred pipeline alignment, should be based on sound environmental protection and management criteria.

The EIS should be a self-contained and comprehensive document that provides sufficient information for informed decisions to be made. The EIS document should provide information for the following persons and groups, as the project “stakeholders”:

- affected persons: 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): an outline of the effects of the proposed project on that land, including access arrangements
- interested persons: groups or persons identified by the proponent, as defined under section 43(3)(b) of the EP Act: a basis for understanding the project, prudent and feasible alternatives, affected environmental values, potential impacts that may occur and measures to mitigate potential adverse impacts
- advisory agencies: a framework for decision makers to assess the environmental aspects of the 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, on what conditions, if any
- the Commonwealth Minister for the Environment, Heritage and the Arts: information to determine the extent of potential impacts of the project on matters of national environmental significance, in particular the controlling provisions under the EPBC Act :
 - sections 12 and 15A (world heritage)
 - sections 15B and 15C (national heritage place)
 - sections 16 and 17B (wetlands of international importance)
 - sections 18 and 18A (listed threatened species and ecological communities)
 - sections 20 and 20A (listed migratory species) and
 - sections 23 and 24A (Commonwealth marine area).
- The proponent: a mechanism by which the potential environmental impacts of the project are identified and understood. Information to support the development of management measures including environmental management plans, to mitigate the adverse effects of residual environmental impacts of the development.

The proponent is required to address these ToR to the satisfaction of the CG before the EIS is made publicly available. It should be noted that the CG does not evaluate the EIS until public notification is completed and the CG has obtained any other material the CG considers relevant to the project, including additional information or comment about the EIS and the project from the proponent.

Completion of the EIS does not mean that the project will necessarily be approved.

3. General EIS guidelines

The EIS is to provide stakeholders with sufficient information to understand the type and nature of the project, the potential environmental, social and economic impacts, and the measures proposed by the proponent to mitigate all adverse impacts on the natural, built and social environment. It should be recognised that the Australian, Queensland and local governments, special interest groups and the general public will have an interest in the EIS.

All phases of the project should be described in the EIS including pre-construction, construction, operation and maintenance of all project related sites and how the project will deal with any redundant infrastructure. Direct, indirect and cumulative impacts should be identified and assessed with respect to the environmental values of the project area and its potential area of impact. Cumulative impacts include impacts accumulating over time and impacts exacerbated by intensity, scale, frequency, duration or multiplicity of impacts associated with the project.

Specifically, the EIS should provide the items listed below:

- an executive summary of the EIS
- an overview of the proponent and its operations
- a description of the project's objectives and rationale, as well as its relationship to strategic policies and plans
- a description of the entire project, including associated infrastructure requirements
- a description of feasible alternatives capable of substantially meeting the project's objectives
- an outline of the various approvals required for the project to proceed
- descriptions of the existing environment, particularly where this is relevant to the assessment of impacts
- measures for avoiding, minimising, managing and monitoring impacts, including a statement of commitment to implement the measures
- rigorous assessment of the residual risks of environmental impacts arising from the project and relevant alternatives on environmental, social and economic values, relative to the 'no project' scenario. The extent of baseline and predictive studies should be commensurate to risks. Assessments should address direct and indirect, combined, short- and long-term, beneficial and adverse impacts, as well as cumulative impacts in combination with other known relevant activities. An estimation of the reliability of predictions should also be provided
- a description of the stakeholder consultation undertaken
- responses to issues raised during public and the stakeholder consultation
- the main report needs to be supported by technical appendices containing relevant data, information or detailed analyses developed by the proponent that is not included in the main report but upon which the conclusions in the main report are based. Large reports or volumes of data may alternatively be made available via electronic means. Abridged versions of such reports can be included as appendices but the original complete version must be otherwise available. Commercial-in-confidence information may be removed from such reports or the main report if approved by the CG. The CG may request a separate report on such information. The EIS will therefore consist of the main report together with appendices.



In preparing the EIS, the approach to be adopted requires that:

- predictions of environmental impacts are based on soundly based studies
- the EIS is to present all technical data, sources of authority and other information used to assess impacts
- the methods used to undertake the specialist studies are outlined, together with the relevant assumptions and professional or scientific judgments
- the reliability of investigations and predictions is indicated, including the estimated degree of certainty or if possible, statistical confidence wherever appropriate
- proposed measures to mitigate and manage identified issues are described
- residual impacts that are not quantifiable are described qualitatively, in as much detail as reasonably practicable.

The assessment of all environmental impacts needs to encompass both potential impacts on, and uncertain risks to, the environment. The level of investigation of potential impacts or particular risks needs to be proportionate to both the severity of the potential consequences of possible events and the likelihood of those events occurring. Any prudent and feasible alternative approaches to management or mitigation should be discussed and treated in sufficient detail, and reasons for selection of the preferred option should be clearly identified.

With reference to the intended uses of the water and any secondary or consequential impacts that may result, the EIS will identify circumstances in which the project is a material and substantial cause of those impacts (to be presented in accordance with Section 1.4 of Part B). For example, while the project may not be considered a primary determinant of the development of mines or power stations, it may be with respect to new or enhanced irrigation or other agricultural development. While it is recognised that no new irrigation scheme is proposed in relation to the project and that water is a tradeable commodity, the impacts of enhanced agricultural production, or other identified consequential actions should be assessed to the extent reasonably practicable.

Specific types of relevant impacts requiring investigation are set out in Part B. The EIS will need to address other issues or aspects that may emerge during the investigations and preparation of the EIS. It is the proponent's responsibility to ensure that adequate studies are undertaken and reported in the EIS.

The EIS should state the criteria adopted in assessing the proposed project and its impacts, such as compliance with relevant legislation, policies, standards, community acceptance and maximisation of environmental benefits and minimisation of risks.

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

The terms "detail" and "discuss" should be taken to include quantitative and/or qualitative matters as practicable and meaningful. Similarly, adverse and beneficial effects should be presented in quantitative and/or qualitative terms as appropriate.

4. Stakeholder consultation

The proponent should undertake a comprehensive program of consultation with the stakeholders identified in Part A, Section 2 EIS Objective (above).

The consultation program should provide the stakeholders with the opportunity to obtain information about the project being examined by this EIS, to raise issues and express their concerns and to receive feedback on how the proponent intends to address the issues and mitigate all adverse impacts of the project. Consultation with the advisory agencies should be the principal forum for identifying legislation, policies, regulations and guidelines relevant to the project and the EIS process.

Appropriate communication processes, possibly including information bulletins and discussion papers, should be used to disseminate information about the project to a wider audience and to inform the stakeholders of the proponent's progress in the EIS process, in particular on specific issues of recognised significance.

The proponent is encouraged to provide opportunities for the general public to obtain information about, and comment on, the project through such forums as public information sessions.

As part of this EIS process, consultation will also be undertaken to better understand the social impacts of the proposed project and opportunities for mitigation of those impacts (refer Part B, Section 1.9 Public Consultation Process).

5. General EIS format

The EIS should explain how the EIS responds to these ToR. The EIS documentation is to include appendices containing at least the following:

- a copy of the finalised ToR
- a list of persons and advisory agencies consulted during the EIS
- a list of advisory agencies with an appropriate contact
- the names of, and work done by, all personnel significantly involved in the preparation of the EIS.

Maps, diagrams and other illustrative material should be included in the EIS to assist in the interpretation of the information. This material should be provided in a format compatible with ArcGIS. Maps, figures or text describing project features should use GDA94 datum.

The proponent should include a separate chapter/section in the EIS in which all of the controlling provisions of the EPBC Act are addressed in one place. This section will bring together relevant information from the body of the EIS and present it in a manner which accords with Commonwealth processes for addressing matters of "national environmental significance" under the EPBC Act.

The EIS should be produced on A4 size paper capable of being photocopied, with legible maps and diagrams on A4 or A3 size. The EIS document should not contain watermarks across the body of the text. The EIS should also be produced on CD-ROM/DVD.



Two separate CD-ROM/DVD copies should be provided:

1. CD-ROM/DVD copies resolution equivalent to the printed document for distribution to the stakeholders
2. CD-ROM/DVD copies for placement on the internet: Copies should be in Adobe® PDF format with text size and graphics of sufficient resolution to facilitate reading and enable legible printing, but within a maximum file size of 1 MB. The executive summary should be supplied in HTML 3.2 format with *.jpg graphics files.

Different file sizes or compressions may be presented on the proponent's web site. The final nature and number of EIS copies required to be submitted and made available, should be discussed and agreed with the CG in the early stages of the EIS process.



Part B: Specific requirements – 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 DIP.

Executive summary

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

The structure of the executive summary should generally follow that of the EIS, and focus on the key issues to enable the reader to obtain a clear understanding of the project, its potential adverse and beneficial environmental, social and economic impacts and the management measures to be implemented by the proponent to mitigate all impacts.

The executive summary should include:

- the title of the project
- 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 the selection of the proposed development option
- a brief description of the project (pre-construction, construction and operational activities) and the existing environment, utilising 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.

Detailed maps of the proposed project location and any other critical figures should also be included.

Glossary of terms

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

1 Introduction

The introduction should clearly explain the background and purpose of the EIS, to whom it is directed and contain an overview of the structure of the document.

1.1 Project proponent

This section should name the project proponent and describe their experience including the nature and extent of business activities, experience and qualifications, and environmental record.

1.2 Project description

A brief description of the key elements of the project should be provided and illustrated. Any major associated infrastructure requirements should also be summarised. Detailed descriptions of the project should follow in Section 2 Description of the project.

1.3 Need for the project

The EIS should address the specific objectives and justification for the project. Issues to be addressed include:

- the context of the project within the Central Queensland Regional Water Supply Strategy, Statewide Water Policy and any other strategies or planning processes to which it relates. In particular, the strategic, economic and environmental implications of the project including future water supply security and distribution requirements to meet demands
- short- and long-term demands should be identified and/or predicted and the basis of those predictions explained.

1.4 Relationship to other projects

This section should also describe how the project relates to any other actions (if it does), of which the proponent should reasonably be aware, that have been or are being taken or that have been approved in the area affected by the project.

Consequential impacts as defined under the EPBC Act, and projects which will be considered as part of cumulative impact assessment (Section 7) should be identified and their relevance discussed.

1.5 Socio-economic cost and benefits of the project

This section should summarise with respect to short- and long-term cycles:

- the economic costs and benefits of the project itself to businesses and the wider community, at a range of geographic scales as applicable, including capital and operating costs (costs should include all facets of construction and operation, necessary environmental offsets and costs to all of government, such as monitoring and environmental mitigation/management costs), direct and indirect employment and local business involvement

- direct social costs and benefits, including community disruption, related land use changes, employment, skills development and any workforce accommodation issues
- the flow-on economic and social costs and benefits that result from satisfaction of water demand or security of supply issues by the project
- any increased demand for natural resources as a result of the project.

1.6 Alternatives to the project

This section should describe feasible alternatives to the project, including the option of taking no action (i.e. of not building the dam or pipelines). Alternatives should be discussed in relation to each identifiable major demand (industrial, agricultural, urban) and in sufficient detail to enable an understanding of reasons for preferring certain options and courses of action and rejecting others. Reasons for selecting preferred options should be delineated in terms of technical, commercial, social and/or natural environment aspects as appropriate to the decision making process.

Demand reduction techniques should be discussed along with alternative supply sources, such as other sources of water supply appropriate to the demand node or type, possibly including:

- recycling
- groundwater (alluvial, or artesian)
- coal seam
- desalination
- surface water.

Project alternatives may involve a combination of supply sources such as an existing or raised weir supplemented by coal seam gas water.

When pipelines are the preferred means for distributing water to the demand nodes, route alternatives should be considered and the preferred alternative justified in economic, social and environmental terms as appropriate.

In relation to the alternative water pipeline corridor alignments the EIS should describe:

- the alignments considered, aided by maps and diagrams
- the rationale for selecting the preferred alignment over alternative alignments, in consideration of:
 - ecologically sustainable development principles
 - broad costs of each alignment
 - water pipeline lengths
 - the number of impacted properties, including tenure and ownership (private/public).

Alternative engineering and project design solutions should be discussed for each major component of the project.

1.7 Co-location opportunities

Opportunities may exist for efficiency gains and the mitigation of environmental and property impacts through the co-location of the water pipeline within existing or proposed linear infrastructure (such as rail, gas or electricity). This may also include the co-location of other proposed linear infrastructure in, near or parallel to the water pipeline.

The project proponent should identify any proposals to develop infrastructure within the vicinity of the water pipeline investigation corridors. This includes rail corridors. Such proposals would be limited to those projects which are in the public arena during the period of preparation of this EIS and for which a proponent can be readily identified.

It is the responsibility of the individual proponents of those other linear infrastructure projects to provide the required information to the proponent. The DIP can, at the proponent's request, assist with the facilitation of meetings with known proponents of other linear infrastructure in the project area.

It would be inappropriate for this EIS to evaluate the environmental impacts of other infrastructure not directly required for this project. However, the EIS should describe the implications of locating other forms of linear infrastructure within or near the water pipeline. Where co-location may be likely, the EIS should consider opportunities to coordinate or enhance any of the impact mitigation strategies proposed for the water pipeline through cooperation with other proponents in the locality. In particular, the potential implications of any infrastructure co-location on the water pipeline corridor width and alignment should be described.

1.8 The environmental impact assessment process

1.8.1 Methodology of the EIS

This section should outline the stages of the EIS process, including information on the relevant stages of the approvals process; Commonwealth referrals; statutory and public consultation requirements; any associated licence or permit application processes; and any interdependencies that exist between approvals. (Details of specific approvals will be presented under Section 1.10.) The information in this section is required to ensure:

- stakeholders are informed of the EIS process to be followed
- stakeholders understand the relationships between the EIS and associated approvals
- stakeholders are aware of any opportunities for input and participation
- relevant legislation is addressed.

1.8.2 Objectives of the EIS

This section should provide a statement of the objectives of the environmental impact assessment 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

- 
- set out acceptable standards and levels of impacts (both beneficial and adverse) on environmental values
 - demonstrate how environmental impacts can be managed or mitigated.

The role of the EIS in providing information for the formulation of the environmental management plan for the project should be discussed.

1.8.3 Submissions

The reader should be informed as to how and when public submissions on the EIS will be addressed and taken into account in the decision-making process. The EIS should inform the reader how to make submissions and what form the submissions should take. The EIS should also indicate any implications for submissions in the event of any appeal processes.

1.9 Public consultation process

An appropriate public consultation program is an important component of the EIS process. The public consultation program should provide opportunities for community involvement. It could include interviews with individuals, public communication activities, interest group meetings, production of regular summary information and updates, and other consultation mechanisms to encourage and facilitate active public consultation.

The public consultation program must enable people with a disability, families and carers to participate. This can be achieved through an inclusive communication strategy that uses a variety of communication modes, provision of information in alternative formats on request, holding public meetings in accessible venues with provision for those with special needs (e.g. sign language translation), and acceptance of submissions in alternative forms, including orally.

The public consultation process should identify broad issues of concern to local and regional communities and interest groups and address issues from project planning through commissioning and project operations.

A consultation plan should be prepared during the initial phase of the EIS process. This should identify:

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

This section should outline the methodology adopted to:

- identify stakeholders and how their involvement was facilitated
- identify the process conducted to date and future consultation strategies and programs, including during the operational phase of the project

- indicate how consultation involvement and outcomes were integrated into the EIS process and future site activities, including opportunities for engagement and provision for feedback and action if necessary.

Detailed results of the consultation process should be provided as a Consultation Report and presented as an appendix to the EIS. A summary of the key processes and outcomes should be provided in this section.

1.10 Project approvals

1.10.1 Relevant legislation

This section should identify and explain the State and Commonwealth legislation and policies controlling the approvals process. Reference should be made to the SDPWO Act and its relationship with other relevant Queensland laws. A description of the Environmentally Relevant Activities, as defined under the EP Act and subordinate legislation, necessary for each aspect of the project should be given.

The EIS should include the project's relationship with the relevant Water Resource Plans, e.g. *Water Resource (Fitzroy Basin) Plan 1999*, and subsequent Resource Operations Plans, the Great Artesian Basin Water Resource Plan and resource operations plan, any other specific management plans and methods for compliance with the environmental objectives, including the objectives of the EPBC Act. Comment should be made on the future review of the *Water Resource (Fitzroy Basin) Plan 1999* and how this impacts on the project if at all.

The proponent may wish to apply for community infrastructure designation under the IPA Act as a mechanism to obtain project approval. If community infrastructure designation is applied for, the requirement for "adequate environmental assessment and public consultation" under section 2.6.7(1) of the IPA Act is fulfilled by the preparation of the CG's report evaluating the EIS. Further information should be provided in the EIS to assist the Minister with considerations under section 2.6.7(2) including information in relation to:

- each relevant state planning policy
- for land in a designated region – the region's regional plan
- for land in a relevant area for a State planning regulatory provision – the provision
- for land in a declared master planned area – any master plans for the area
- each relevant planning scheme.

1.10.2 Planning process and standards

This section should outline the project's consistency with existing policy framework for the region, and in particular in relation to the Central Queensland Regional Water Supply Strategy and with legislation, standards, codes or guidelines available to monitor and control operations of the project. It should refer to all relevant planning policies; local, state and national, including: the National Water Initiative; National Water Quality Management Strategy, water reform under the National Competition Policy; the National Strategy on Conservation of Australia's Biological Diversity; the National Strategy for Ecologically Sustainable Development; the Queensland Natural Resources (Water) Policy, Water Resource Plan, Resource Operations Plan, Fitzroy Basin (CQSSII 2004, FBA), CQ A New Millennium, agreements relating to climate change and greenhouse gases and other relevant policies. This information is required to demonstrate how the project conforms to national, state, regional and local policies for the area.

1.10.3 Accredited process for controlled actions under Commonwealth legislation

The project is a controlled action under the EPBC Act and a significant project under the SDPWO Act. The EIS will be developed pursuant to the Bilateral Agreement between the Australian 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 national environmental significance that were identified when the project was determined to be a controlled action.

A stand-alone report should be provided as part of the EIS that exclusively and fully addresses the issues relevant to the controlling provisions. It should follow the following outline:

1. introduction
2. description of proposed action (as it would impact on matters of national environmental significance)
3. description of the affected environment relevant to the controlling provisions (i.e. describe the features of the environment that are matters of national environmental significance protected under the EPBC Act)
4. assessment of impacts on matters of national environmental significance and mitigation measures (in accordance with available guidelines and species recovery plans)
5. consideration of any potential offsets to ameliorate residual impacts
6. conclusions
7. references.

2 Description of the project

The objective of this section is to describe the project through its lifetime of construction, operation and 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 Overview of the project

The EIS should provide an overview of the project to put it into context. This section should include:

- a description of the key components of the project through the use of text and design plans where applicable. The key components are:
 - water storage infrastructure (the dam)
 - water distribution infrastructure (pipes, pumps etc.)
 - other infrastructure impacted by the works (including roads, riverine crossings, power, telecommunication or other services and any new resource extraction sites)
- the expected cost and overall duration and timing of the project
- a summary of any environmental design features of the project.

2.2 Location

The regional and local context of the project and associated infrastructure should be described and illustrated on maps at suitable scales and reference points. These features should be overlaid on a rectified air photo enlargement. Real property descriptions of the project should be provided. Maps should show the precise location of the project area, and in particular:

- the location and boundaries of land tenures, in place or proposed, to which the project area is, or will be subject
- the location and boundaries of the project footprint showing all key aspects of the water storage, water distribution infrastructure and other infrastructure, including full supply level, dam wall, intake tower(s), pipeline routes (if applicable) and easement widths and resource extraction
- the location of any proposed buffers surrounding the working areas (for construction)
- the identification of all site access points to, from and within the project on maps, to assist in the assessment of emergency planning.

The process and criteria used for the selection of the specific project and infrastructure sites, including relocated infrastructure should be described. This should also include justification of the corridor width for the water pipelines. The extent of land that is required for each component should be documented and each impacted land parcel identified (by property name and by a list of the impacted, in part or whole, lots which make up each property).

2.3 Design

The process and criteria used for the selection of the preferred design and preferred construction techniques should be described separately for each component of the project:

- water storage infrastructure
- water distribution infrastructure
- other infrastructure, which may include roads.

The following should be described for the project:

2.3.1 Water storage infrastructure (the dam wall)

- full supply level and details of any staging or prospects for future expansion
- maximum (final) crest height and spillway height, including height above stream bed
- length and width of crest
- storage capacity, maximum depth, average depth, area of inundation at full supply level, area of any buffer required and means of its determination, length of river bed (and tributaries) inundated
- estimated water yields (with appropriate allowances for environmental requirements)
- general design of outlet works including sitting, capacity, off-take level and ability to regulate flows
- spillway design, including gate specification, if included
- details of any energy dissipaters at the downstream foot of the barrier
- details of any provision for incorporating a fish way or other fish transfer mechanism in the design, should it be required and its effect on the viability of the proposed project
- details of the physical form of the stream bed within 200 m of the downstream foot of the barrier.

2.3.2 Water distribution infrastructure

- the method of extracting and/or releasing water from the storage
- any treatment methods proposed
- if distribution is by pipe:
 - provision for route refinement and right of way
 - pipeline design parameters, including capacity and design life
 - above ground facilities – physical dimensions and construction materials for surface facilities along the pipeline route, including information on pipeline markers
 - the location and/or frequency of (if applicable) cathodic protection points, off-take valves, pump stations, balance tanks, control valves (isolation points), pigging facilities and any other project facilities and linkages to existing water supply infrastructure along the pipeline route.

2.3.3 Other infrastructure

All other infrastructure required to be constructed, upgraded, relocated or decommissioned for the construction and/or operation of the project, such as access roads, power supply, connection to sewerage or water supply must be described including the design and construction standards to be met (e.g. waterway crossings should be designed in line with the *Fisheries Act 1994*, Department of Primary Industries and Fisheries *Fish Habitat Guideline FHG 001 Fish Passage in Streams: fisheries guidelines for design of stream crossings* (August 1998) and in consultation with the Department of Primary Industries and Fisheries.

2.4 Construction

The following information should be provided on the construction and operation of the project and be supported by detailed plans where appropriate.

2.4.1 Pre-construction activities

This section should set out a description of the pre-construction activities, including:

- the land acquisition process
- obtaining licences/permits for the construction works
- vegetation clearing
- provision of site access, power, telecommunications, water supply and other infrastructure
- site establishment requirements for construction facilities.

2.4.2 Construction

This section should identify the extent and nature of construction for each major component of the project (water storage infrastructure, water distribution infrastructure and other infrastructure). Illustrations showing site boundaries, development sequencing and timeframes and the layout of construction facilities should be used. The general description should include, as appropriate to each component:

- the construction standards, methods and site management arrangements
- works needed within the site and off-site (e.g. erosion protection, fencing)
- general construction requirements including blasting, excavation, dredging, haul road establishment, crushing, screening, concrete batching, fuel storage, workshop facilities, office facilities, on-site mess, ablutions facilities
- the number and type of vehicles, machinery and equipment used for construction activities and including the method of transport of construction materials to and within the site(s) (full details of transport volumes, modes and routes should be provided in accordance with Section 3.9 Transport.)
- chemicals and hazardous goods to be utilised (if any)
- water supply (for each component of the works, the requirement for water (drinking, dust suppression, ablutions etc.) should be identified and quantified. For each water requirement, the source, volume, means of access and transport, treatment processes (if applicable) and storage method should be provided. The treatment and disposal of any wastewater should be described. For each source of supply the EIS should address the quality and quantity, security of supply and resource availability

- stormwater drainage systems and the proposed treatment, disposal and/or re-use arrangements, including any off-site services
- capture, containment/disposal of construction spoil
- waste management (full details of the waste volumes, characteristics and management strategies should be provided in accordance with Section 3.8 Waste)
- timetable for the construction phase, including hours of construction
- public and workforce safety, medical facilities to be provided on site and provision for access to emergency services
- allowance for provision of power back-up in emergency and potential impact on local supplies in the area
- security
- construction site demobilisation
- rehabilitation.

The “environmentally relevant activities” under the EP Act which are to be undertaken during the project should be listed and described.

2.4.3 Rehabilitation

This section should describe the options, strategies and methods for rehabilitation of the environment disturbed by the project. A preferred rehabilitation strategy should be developed with a view to minimising the amount of land disturbed at any one time. The final topography of any quarries, borrow areas, trenches, sediment control structures, waste areas, temporary dam sites, construction areas and all other items of significant landform impact should be described and shown on maps (if appropriate) at a suitable scale.

Any proposals to divert waterways during construction and, if applicable, proposals for the reinstatement of the waterways after construction has ceased, should be provided.

2.4.4 Workforce and accommodation

This section should provide details on the employment requirements and skills base of the required workforce for the construction phase of the project, including:

- size and source of construction workforce
- deployment strategies proposed for the workforce over the construction period
- employment opportunities, including details of the required professional, skilled and semi-skilled labour requirements of the project
- information regarding the occupational groupings required for the workforce
- new skills and training to be introduced in relation to the project.

This section should also discuss an accommodation strategy for the construction workforce that addresses the estimated housing needs of both single and accompanied construction workers. This should include details of the size, location and management of any temporary worker accommodation that will be required either on-site or off-site. Maps should be included as necessary to illustrate the site.



This section should describe the concept plans for a site office during the construction phase that will act as a logistics base, materials/vehicle storage depot and workshop area, and highlight the need for power, water and sewerage at the site office. Information in relation to the site office and any construction camp should include:

- food preparation and storage
- ablution facilities
- vector and vermin control
- safety and emergency services.

Local government approvals required for establishment and operation of such camps or site office should be outlined.

2.4.5 Commissioning

A description of the commissioning process including any related potential environmental impacts should be provided for all components for the project.

2.5 Operation

This section should describe the proposed system of allocation of water from the project, with particular reference to the Water Resource Plan and Resource Operations Plan and include any proposed specific high priority allocations to urban or industrial users or medium priority allocations to agricultural users. The description should include details of the likely extraction regime (e.g. when water will be sourced) including likely release timings by each extraction mechanism (downstream release or pipeline) based on predicted user demands (described in detail in Section 3.2.4.1).

The location, design and ownership of any new water distribution infrastructure (pump stations, pipelines etc.) should be described, as well as the expected use of any such existing infrastructure. The capacity of any existing water infrastructure to accept additional loading resulting from any new or increased allocations of water should also be described.

The following should be discussed:

- arrangements for administration and control of the works (dam, fish ways, pipes, roads, recreational facilities and all other components)
- operational arrangements for the project including flow releases, operation of gates (if relevant), outlet works, pumps, including details of remote operation and administration, on-site staffing, safety requirements for staff and the public, routine maintenance etc.
- proposed access points associated with the storage and dam wall, infrastructure for recreational purposes and any easements required for distribution infrastructure
- any restrictions on access or land usage within the buffer zone, of land exposed at water levels below full supply level, within the storage or within any easements required for distribution infrastructure
- energy and telecommunications requirements and sources
- solid, liquid and gaseous waste generated and proposed methods of treatment and disposal
- transport needs and expected traffic
- the expected life of the infrastructure and any anticipated major maintenance periods.



2.6 Decommissioning

It is recognised that dams are anticipated to have a very long operational life spanning many decades, and there is less expectation of detailed decommissioning strategies in the EIS for this project than for other types of projects. Nonetheless, this section should present general strategies and methods for decommissioning and rehabilitation of the project should it ever be required.

3 Environmental values and management of impacts

The functions of this section are to:

- describe the existing environmental values of the area which may be affected by the project. Environmental values should be described by reference to background information and/or new studies
- describe the potential adverse and beneficial impacts of the project on the identified environmental values
- describe any cumulative impacts on environmental values caused by the project, either in isolation or by combination with other known existing or planned projects
- present environmental protection objectives and the standards and measurable indicators to be achieved
- examine viable alternative strategies for managing impacts. These alternatives should be presented and compared in view of the stated objectives and standards to be achieved. Available techniques, including best practice, to control and manage impacts to the nominated objectives should be discussed
- describe any likely residual environmental harm on the environmental values, why it cannot be avoided and discuss potential offsets.

This section should address all elements of the environment (physical, biological and cultural) in a way that is comprehensive and clear.

The EIS should assess the impacts of pre-construction, construction, rehabilitation of disturbed lands, commissioning and operation and potential decommissioning. The impacts associated with potential ongoing maintenance, access and servicing resulting from the development and any other facilities required for the project should also be assessed.

This section should detail the environmental protection and mitigation measures incorporated in the planning, construction, rehabilitation, commissioning, operations 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. Preferred measures should be identified and described in more detail than other alternatives.

Action or recovery plans for protecting rare or threatened species and vegetation types identified as having high conservation value should be described, and any obligations imposed by them or by Queensland or Australian Government biodiversity protection legislation, relevant policies or codes should be discussed.

The EIS should follow the format and content outlined in these ToR; however changes to the structure can be discussed with the DIP. The mitigation measures, monitoring programs etc., identified in this section of the EIS should be used to develop the environmental management plans for the project (see Section 9 Environmental management plan).

3.1 Climate and natural disasters

This section should describe the rainfall patterns (including magnitude and seasonal variability of rainfall), air temperatures, humidity, wind (direction and speed) and any other special factors (e.g. temperature inversions) that may affect management of the project. The vulnerability of the area to natural or induced hazards, such as bushfires, earthquakes, cyclones, thunderstorms and floods should be presented. The risk they pose to the construction and operation of the project should be assessed and approaches to management outlined. Extremes of climate (e.g. droughts, floods etc.) should be discussed with particular reference to water management at the project site.

The most recent information on potential climate change impacts as applicable to the project should be discussed. The information presented in this section will allow more detailed assessment of:

- implications for nature conservation under Section 3.3
- implications for water resource management under Section 3.4
- implications for the project's commercial viability under Section 1.5
- implications for hazard and risk management under Section 6.

Impacts of climate change risks and adaptation measures should include the following:

- analyse risks to the project from climate change impacts (e.g. increased risk and severity of flood; increased vulnerability to more intense bushfires)
- identify adaptation measures to minimise risk to the project from climate change impacts, particularly where there may be a significant impact to human safety or property.

Hazard and risk assessment and management should be provided in Section 6 Hazard and Risk.

3.2 Land

This section should detail the existing land environment values for all areas associated with the project, including areas affected by the dam construction site, inundation area, pipeline route/s, and any new permanent or temporary infrastructure constructed for the project.

This section should also 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 Topography and geomorphology

3.2.1.1 Description of environmental values

Maps should be provided locating the project and its environs in state, regional and local contexts. The topography should be detailed with contours at suitable increments, shown with respect to Australian Height Datum. Significant features of the landscape should be included on the maps. Commentary on the maps should be provided highlighting the significant topographical features. (Note that fluvial geomorphology is addressed in Section 3.4.1 Surface Water.)



3.2.1.2 Potential impacts and mitigation measures

This section should provide details of any potential impacts to the topography; geomorphology or landscape character associated with the project and proposed mitigation measures, including:

- 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, fencing and monitoring.

3.2.2 Landscape character and visual amenity

3.2.2.1 Description of environmental values

This section should describe in general terms the existing character of the landscape and the general impression that would be obtained while travelling through and around it.

This section should describe 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.

3.2.2.2 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. Particular mention should be made of any changes to the broad-scale clearing, the open water body and the realignment of roads.

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

3.2.3 Geology and soils

3.2.3.1 Description of environmental values

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

Information should also be provided on soil stability and suitability for construction of all project facilities.



Soils should be mapped at a suitable scale and described according to the *Australian Soil and Land Survey Field Handbook* (Gunn et al. 1988 and McDonald et al., 1990) using the *Australian Soil Classification* (Isbell, 1996). Information should be presented according to the standards required in the Planning Guidelines: *The Identification of Good Quality Agricultural Land* (Department of Primary Industries, Department of Housing, Local Government and Planning, 1993), which supports *State Planning Policy 1/92: Development and the Conservation of Agricultural Land*. The area of good quality agricultural land that will be inundated or otherwise impacted should be clearly indicated. Any highly erodible soils, saline sites and sites which are particularly susceptible to becoming saline (including downstream of the project, where applicable) should be especially identified.

Soil descriptions should be for all relevant soil horizons, and include:

- horizon differentiation and depths, field texture, colour, mottles
- profile depth, stability, permeability, erodibility, drainage, soil structure, rockiness
- salinity, sodicity, pH
- a measurement of dispersibility.

The investigation area should include all areas potentially affected by the project including associated infrastructure corridors and riparian areas downstream of the dam for a distance of five kilometres.

3.2.3.2 Potential impacts and mitigation measures

This section should provide details of any potential impacts to the land resources and proposed mitigation measures, including:

- the environmental consequences to the geology/soils of the construction earth-moving works, water storage and release/extraction
- influence of time of year of construction and the potential that localised rain events may have on soils
- assessment of likely erosion effects of all project's aspects, both on and off the project area(s)
- erosion and sediment control should be described with a soil erosion and sediment control plan included in the environmental management plan. For soil types with major differences in erosion potential, specific erosion management techniques should be outlined. Erosion monitoring should be discussed along with the development of rehabilitation/mitigation measures to achieve acceptable soil loss rates
- description of topsoil and other material management, including excavation, transport, stockpiling and replacement. These aspects should be specifically developed for the environmental management plan
- the potential for the project to adversely impact on the stability of landforms within the impoundment area, infrastructure areas and adjacent lands should be addressed in detail. This should include the stability and potential for erosion of periodically inundated land below full supply level and the buffer zone and adjacent catchment areas. The stability and potential for erosion of the watercourse and associated riparian zone downstream of the project should be addressed, including changes to sediment delivery, transport and deposition
- the impact of sedimentation on dam storage volumes and bed profile should be discussed

- an assessment of the potential for land use conflict with good quality agricultural land is required with investigations following the procedures set out in the planning guidelines referred to above
- the impact of clearing intake areas and construction on saline sites should be determined. Where impacts are envisaged, salinity management and monitoring techniques should be outlined in the environmental management plan.

3.2.4 Land use and infrastructure

3.2.4.1 Description of environmental values

The EIS should identify, with the aid of maps:

- land tenure, including reserves, tenure of special interest such as protected areas and forest reserves, mining and petroleum exploration tenures, mining leases, identification of existing and proposed gas, power lines and transport corridors (includes local roads, state-controlled roads, existing and proposed rail corridors, stock routes) and easements for any purpose
- land use and zoning (urban, residential, industrial, agricultural, mining, forestry, recreational, mining claims, mineral development licences and extractive industry Key Resource Areas, etc.)
- areas covered by applications for Native Title claims or Native Title determinations, providing boundary descriptions of Native Title Representative Bodies. The proponent should also identify in the EIS whether there are any necessary notifications required to the Representative Body (or Bodies) or evidence that Native Title does not exist
- information on any known occurrences of economic mineralisation and extractive resources within the project area
- distance of the project from residential or recreational areas.

3.2.4.2 Potential impacts and mitigation measures

The potential for the construction and operation of the project to change existing and potential land uses of the project site(s) and adjacent areas should be detailed. Post operations land use options should be detailed including suitability of the area within any pipeline right of way, or dam storage buffer for agriculture, industry, mining, nature conservation or other purpose. The factors favouring or limiting the establishment of those options should be given in the context of land use suitability prior to the project and minimising potential liabilities for long-term management.

A description of the following should be included:

- the land acquisition strategy and the proposed tenure (easements, leases etc.)
- management of the immediate environs of the project including construction buffer zones, and information on how easement widths and vegetation clearance in sensitive environmental areas will be minimised
- strategies addressing individual property impacts affected by the project – viability to continue its current use and if not viable, alternative uses; access changes to and within the property
- potential for management of impacts to native title rights and interests by an Indigenous Land Use Agreement or other native title compliance outcomes

- direct or indirect impacts on any protected areas, World Heritage areas, Ramsar wetland sites, or other areas designated to be of high conservation value (including impacts on accessibility)
- impacts on surrounding land uses and human activities and strategies for minimisation, including
 - good quality agricultural land
 - forestry land (addressing loss of access to land, fragmentation of sites, increase of fire risk and loss of productive land for those purposes)
 - mining activities
 - residential and active and passive open space
 - industrial uses.
- possible effect on town planning objectives and controls, including local government zoning and strategic plans
- constraints to potential developments and possibilities of rezoning adjacent to the project area, including upstream of the inundation area
- potential recreational use of the water storage and surrounding area should be explicitly addressed within any likely restrictions specifically identified
- possible impacts on, or sterilisation of, identified mineral or energy resources and extractive industry deposits resulting from the construction and/or operation of the project
- any native forest hardwoods, cypress pine or quarry resources from state forests, timber reserves and other state-controlled lands within the project area to the satisfaction of the Department of Natural Resources and Water – Forest Products
- potential issues involved in proximity and/or co-location of other current or proposed infrastructure services
- potential impacts of construction work on essential services, and function of other infrastructure
- any land units requiring specific management measures.

3.2.5 Land contamination

3.2.5.1 Description of environmental situation

A review should be undertaken within the project site and adjacent areas, to identify any area which has been or is being used for a “notifiable activity” as listed in Schedule 2 of the EP Act, is potentially contaminated, or is on the Environmental Management Register or Contaminated Land Register. A preliminary site investigation in accordance with the Environmental Protection Agency (EPA) *Draft Guidelines for the Assessment and Management of Contaminated Land in Queensland* (1998) and *The National Environmental Protection (Assessment of Site Contamination) Measures 1999* should be prepared where evidence of existing or past contamination is encountered and where it may be impacted by the project. The results of the preliminary site investigation should be summarised in the EIS and provided in detail in an appendix.



If the results of the preliminary site investigation indicate potential or actual contamination (including any areas of potential unexploded ordinance), a schedule of investigation, remediation and validation and/or specific management strategies, must be developed in accordance with the EPA *Draft Guidelines for the Assessment and Management of Contaminated Land in Queensland (1998)*. This schedule is to be undertaken if the project is approved and advanced to the construction phase.

The results of the site investigations, remediation and validation should be certified by a third party reviewer before being submitted to the EPA.

In short, the following information should be provided as part of 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.

3.2.5.2 Potential impacts and mitigation measures

This section should provide details of any potential impacts from existing land contamination and proposed mitigation measures, including:

- a schedule of further investigations and remediation activities recommended for those land parcels where contamination may have an impact on construction or operation of the project
- details of any risks to occupational or human health, as a result of any residual contamination levels, to any of the proposed uses of the dam or other project areas, including recreational use, animal or human consumption of produce or potential impacts on surface and groundwater quality

The means of preventing land contamination (within the meaning of the EP Act) should be addressed. Methods proposed for preventing, recording, containing and remediating any contaminated land should be outlined. Intentions should be stated concerning the classification (in terms of the Queensland Environmental Management Register or Contaminated Land Register) of land contamination on the land after completion of construction of the project.

3.3 Nature conservation

This section should detail the existing nature conservation values of the area that may be affected by the project. The description should include species lists with reference to with reference to species of international, national, state and local significance.

Reference should be made to relevant Queensland and Australian Government legislation and policies on threatened species and ecological communities including recovery plans.

All surveys undertaken should be in accordance with recognised best practice, including consideration of advice from the EPA, and should include consideration of seasonality, potential for occurrence of significant species, rarity of species and the sensitivity of the species to disturbance. Each sub-section should also discuss all likely direct, indirect, consequential and cumulative environmental impacts on flora and fauna in both terrestrial and aquatic environments and in sensitive areas.



Each subsection should assess potential impacts on the environmental values identified. It should also define and describe the objectives and practical measures for protecting or enhancing those environmental values, to describe how nominated quantitative standards and indicators may be achieved, and how the achievement of the objectives will be monitored, audited and managed. Any potential implications of climate change, as determined in Section 3.1, should be discussed.

The EIS should demonstrate how the project (including all associated infrastructure requirements such as access tracks) would comply with the following hierarchy:

- avoiding impact on areas of remnant vegetation and other areas of conservation value
- mitigation of impacts through rehabilitation and restoration
- measures to be taken to replace or offset the loss of conservation values where avoidance and mitigation of impacts cannot be achieved
- explanation of why measures above would not apply in areas where loss would occur.

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

3.3.1 Sensitive environmental areas

The EIS should identify areas that are environmentally sensitive in proximity to the project or which may potentially be impacted by the project. The proximity of the project to any environmentally sensitive areas should be shown on a map of suitable scale.

Environmentally sensitive areas include those designated or zoned under legislation or a planning scheme such as nature refuges, national parks, conservation parks, declared fish habitat areas, wilderness areas, aquatic reserves, heritage/historic areas or items, national estates, world heritage areas and sites covered by international treaties or agreements (e.g. Ramsar), areas of cultural significance and scientific reserves.

Areas which are not specifically proclaimed but which would be regarded as sensitive with regard to the natural environment have one or more of the following features:

- important habitats of species listed as threatened under the *Nature Conservation Act 1992* (Qld) and/or the EPBC Act
- regional ecosystems recognised as 'endangered' or 'of concern' under State legislation and/or communities listed as threatened under the EPBC Act
- ecosystems which provide important ecological functions, such as riparian vegetation, buffers to a protected area, refugia or important habitat corridor between areas (such as determined by the EPA's Biodiversity Planning Assessment process)
- wetlands or flight paths of importance to migratory birds protected under the Japan-Australia Migratory Bird Agreement or China-Australia Migratory Bird Agreement.

3.3.2 Terrestrial flora

3.3.2.1 Description of environmental values

The terrestrial vegetation communities within the affected areas should be described and shown on maps at an appropriate scale with mapping produced from aerial photographs and ground-truthing, showing the following:

- location and extent of vegetation types including recognised regional ecosystem type descriptions and any areas of national, state or regional significance
- location of vegetation types of conservation significance
- vegetation map unit descriptions, including their relationship to regional ecosystems. Sensitive or important vegetation types should be highlighted and their value for conservation of specific rare floral and faunal assemblages or community types discussed
- the current extent (bioregional and catchment) of vegetation types of conservation significance within protected areas (e.g. national parks, conservation parks, resource reserves, nature refuges etc.)
- any special landscape values of any natural vegetation communities
- any plant communities of cultural, commercial or recreational significance
- the location of any horticultural crops in the vicinity of the project area
- the distribution and abundance of exotic and weed species.

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:

- all data requirements of the Queensland Herbarium CORVEG database
- selection of appropriate minimum site sizes observing recognised sampling approaches and to providing an adequate sample of surveyed communities
- a list of species present at each site
- the relative abundance and community structure of plant species present
- recognition of any plant species of conservation, cultural, commercial or recreational significance
- submission of vegetation mapping and data to the Queensland Herbarium to assist the updating of the CORVEG database
- submission of specimens of species listed as Protected Plants under the *Nature Conservation (Wildlife) Regulation 1994*, other than common species, are to be submitted to the Queensland Herbarium for identification.

The existence of species of conservation significance should be specifically addressed under sensitive areas.

Existing information on plant species may be used instead of new survey work provided that the data are derived from surveys consistent with the above methodology and describe existing conditions. Methodology used for flora surveys should be specified. Any existing information should be revised and comments provided on whether the areas are degraded, cleared or affected in ways that would affect their environmental value.

3.3.2.2 Potential impacts and mitigation measures

Construction and operation of the project involving clearing, salvaging or removal of vegetation should be described, and indirect impacts on vegetation not cleared should be discussed.

Measures to mitigate the impacts of the project on vegetation types identified as having high conservation values, listed species and sensitive habitat or the inhibition of propagation should be described. This should also include the identification of potential offset areas, in an "offset strategy" to compensate for any loss of vegetation.

With regard to all components of the project, this section should include:

- the significance of impacts at a local, catchment, bioregional, state or national levels as appropriate
- impact on any plants of potential or recognised environmental or economic significance (the commercial value of the timber resource should be estimated and described)
- a discussion of the ability of identified stands of vegetation to withstand any increased pressure, such as by fragmentation, resulting from the project and identify measures proposed to mitigate impacts
- a description of the methods to ensure 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 and what benchmarks would be used for review of monitoring should be included
- a description of methods of minimising the potential for the introduction and/or spread of weeds or plant disease, including:
 - identification of the origin of construction materials, machinery and equipment
 - the need for vehicle and machinery wash-down and any other hygiene protocols
 - 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 should be included in an environmental management plan, to be developed in consultation with local government environmental officers, to cover construction, rehabilitation and operation periods (to be included in the environmental management plan).

3.3.3 Terrestrial fauna

3.3.3.1 Description of environmental values

The terrestrial and riparian fauna occurring in the areas affected by the project should be described, noting the broad distribution patterns in relation to vegetation, topography and substrate. Wildlife corridors and refugia impacted by the project should be identified and mapped.

The description of the fauna present or likely to be present in the area should include:

- species diversity (i.e. a species list) and abundance of animals, including amphibians, birds, reptiles, mammals and any invertebrates of recognised significance

- existence (actual or likely) of any species/communities of conservation significance in the study area, including discussion of range, habitat, breeding, recruitment feeding and movement requirements, and current level of protection (e.g. any requirements of Protected Area Management Plans or Threatened Species Recovery Plans)
- any species that are poorly known but suspected of being a species of conservation significance
- 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
- the existence of feral or exotic animals, including invertebrates of economic or conservation significance
- use of the area by migratory fauna.

The EIS should indicate how well any affected communities are represented and protected elsewhere in the bio-region where the project occurs.

Methodology used for fauna surveys should be specified. Relevant site data should be provided to the EPA in a format compatible with the EPA WildNet database for listed threatened species.

3.3.3.2 Potential impacts and mitigation measures

The assessment of potential impact should consider:

- impacts the project may have on terrestrial fauna, relevant wildlife habitat and other fauna conservation values, including:
 - 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 species of conservation significance
 - cumulative effects of direct and indirect impacts
 - threatening processes leading to progressive loss.

With respect to mitigation strategies the following should be provided:

- measures to 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
- methods for minimising the introduction of feral animals, and other exotic fauna such as declared pest species (including ant species and terrestrial biting insect species of pest and health significance)
- strategies for complying with the objectives and management practices of relevant recovery plans. In particular, specific reference should be made to the recovery plan for the EPBC Act listed critically endangered Boggomoss snail (*Adclarkia dawsonensis*).

3.3.4 Aquatic flora

3.3.4.1 Description of environmental values

The discussion of the flora present or likely to be present at any time during the year in the areas potentially affected by the project should include the following habitats:

- in-stream pools/runs, riffles/rapids
- off-stream perennial and ephemeral pools (billabongs, ox-bow lakes etc.)

and should be described, noting:

- the extent and location of submerged, emergent, rooted and free-floating aquatic vegetation communities and species
- the presence of any species of conservation significance
- the presence of any declared pest plants or weed species.

The natural state should be estimated. A description of the habitat requirements and the sensitivity of aquatic flora species to change should be described. The impact of existing impoundments, flow regulation and non-water resource development on the natural aquatic flora should be discussed using literature based and/or survey data as appropriate.

Estuarine and marine environments should be described at a level of detail commensurate to the risks (including cumulative risks) the project poses to those environments.

3.3.4.2 Potential impacts and mitigation measures

The discussion should include:

- the flora community to be lost within the impoundment area
- the flora community expected to develop within the impoundment area
- effects of variations in water level of the impoundment including desiccation, drowning and colonisation of temporarily exposed bed
- the potential for blue-green algae outbreaks as a result of the project
- changes to flow regime and associated factors downstream and resultant changes to habitat (in-river and off stream) and consequential floristic changes (note flow regime indicators and nodes other than those used in the Water Resource Plan can be used if more appropriate to impact assessment). The risks to estuarine and marine environments should be identified and the impacts associated with significant risks estimated and quantified as far as possible
- impacts of barriers to interbreeding opportunities between populations
- identification of the conservation importance of identified populations at the regional, State or National levels as appropriate
- determination of the potential for the introduction or facilitation of exotic, non-indigenous and noxious plants.

3.3.5 Aquatic fauna

3.3.5.1 Description of environmental values

The discussion of the fauna (macroinvertebrates, fish, aquatic reptiles and aquatic mammals) present or likely to be present at any time during the year in each habitat (riverine, weir pool, off stream water body etc.) that may be impacted should include:

- description of representative habitats (natural or otherwise) within, upstream and downstream of the storage area including: distribution of pool and riffle formations; presence of snags, overhanging vegetation, aquatic macrophytes, sand and gravel bars (including known or potential turtle nesting banks); sediment type; river profile (bank width and depth), floodplain wetlands
- diversity, distribution and abundance (where feasible and practicable)
- listed threatened or migratory species
- commercial and recreational fish species and any stocking undertaken
- otherwise significant species or populations
- introduced and exotic species
- habitat requirements of key species, including water depth, substrate, nesting or breeding habitat, flow, water quality and sensitivity changes, including barriers to movement
- a description of the conditions necessary for breeding and/or migration of key potentially affected species including minimum flows, seasonal conditions, stream characteristics and migratory behaviour and assessment of existing impacts in this regard
- an estimate of the natural condition and changes that have occurred related to water resource development and non-water resource development activities.

This section should indicate how well any affected communities are represented and/or protected elsewhere.

Estuarine and marine environments should be described at a level of detail commensurate to the risks (including cumulative risks) the project poses to those environments.

3.3.5.2 Potential impacts and mitigation measures

The discussion should include:

- impacts on habitat, nesting, burrowing, food supply, reproduction, different life stages, population and community structure, movement or status etc.
- construction phase impacts including physical disturbance, temporary barrier creation, ponding and trapping and water quality impacts
- any proposed stream diversions, causeway construction and crossing facilities, stockpiled material and other impediments that will restrict free movement of fish
- potential for, and mitigation measures to prevent, the creation of new mosquito and biting midge breeding sites during construction (e.g. in quarries and borrow pits)
- the extent and importance of the habitats that will be lost as a result of the dam
- the extent and importance of any downstream wetlands impacted by reduced flooding and the type and degree of impact
- impacts during the first filling stage of the water storage



- the likely fauna that will colonise the different habitats available within the storage
- effects of fluctuating water level in the impoundment and particularly in creeks flowing into the impoundment
- operational impact of proposed in-stream structures including water off-takes (at intake and discharge point), spillway and gate operation (if applicable), energy dissipation devices, any proposed fauna transfer devices or techniques, roads and bridges, pipeline crossings etc.
- effects of changes to flow regime downstream, including the effect of changes in water quality, salinity, habitat structure (e.g. permanence and depth of flow in riffles) and flow regime (seasonality of releases, decreased flooding etc.). The risks to estuarine and marine environments should be identified and the impacts associated with significant risks estimated and quantified as far as possible
- effects on species of conservation significance including listed threatened and listed migratory species and their habitat
- determination of the potential impacts on commercial and recreational fisheries, addressing issues such as access, changes to stocks, potential for fish kills etc.
- determination of the potential for the introduction or increased translocation of exotic or noxious aquatic fauna.

3.4 Water resources

3.4.1 Surface water

3.4.1.1 Description of environmental values

This section should describe the existing hydrologic regime of the Dawson River and the Fitzroy catchment, its tributaries and any other river system, including downstream systems, subject to water related impact as a result of the project. It should include the following:

- a map of waterways or water features, including drainage channels, wetlands, flood-prone or low lying land on or adjacent to the dam site. The position of the dam in the Fitzroy catchment and the waterways crossed by any pipelines, should also be shown
- a description of existing surface drainage patterns, flows in major streams, and the length of stream already impounded and regulated
- discussion of the likelihood of flooding, history of flooding including extent, levels and frequency (upstream and downstream). The extent of flood modelling will be to the points at which no significant impact occurs. Flood studies will include a range of annual exceedence probabilities. Actual hydrographs should be used for representative floods at different locations
- a description of the current operation and management of the water storage and distribution system, including yield, operating strategy, supply reliability, allocation and use of water supplies, water use efficiency and the environmental flow regime. This should include a description of the Water Resource Plan, Resource Operations Plan, water allocation security objectives and environmental flow objectives
- a description of the pre-development (without current water resource development), current and full entitlement flow characteristics including seasonal flow patterns, flow volumes and duration using relevant indicators from the Water Resource Plan and others as appropriate to this project after consultation with fluvial geomorphologists and ecologists. Graphical representations at a range of nodes should be included
- a discussion of the changes in the parameters from pre-development to current conditions, and the corresponding changes that may be anticipated or have occurred in:
 - in-stream and off stream wetland inundation frequency
 - sediment/nutrient/energy processes in the catchment, including delivery to the coastal and near shore environment.

3.4.1.2 Potential impacts and mitigation measures

Matters to be addressed should include clear descriptions of the following:

- a level of service analysis (based on the security, frequency and duration of restriction) should be provided
- the effects of drainage or dewatering works, excavation, placement of fill, clearing or any other alterations to existing topography and landform on the hydrology of works sites including any alteration to drainage patterns and the water table and secondary influence on flooding. If levee banks or stream diversion constructions are proposed, the effects on neighbouring landholders should be considered
- proposed drainage structures for all aspects of the project, including supporting facilities such as access roads

- timing of the construction works relative to likely periods of flooding and proposals to minimise the risk of flood damage
- with regard to dam operational impacts, the following should be provided:
 - a discussion of impacts of the project on flow regime indicators (water allocation security objectives and environmental flow objectives in accordance with the Fitzroy Basin Water Resource Plan) and stipulation of the assumptions made (e.g. extraction patterns, release patterns, release capacity, consumptive uses)
 - the effect of environmental flow requirements on dam reliability and water availability for consumptive use
 - changes in the reliability of supply to current water entitlement holders and any impacts on the operation of existing water extraction
 - changes in flow patterns including changes in frequency, volumes and duration and changes in flows reaching estuarine waters, when compared at a meaningful scale with pre-regulation and current flows in the system
- potential impacts on flood levels upstream and downstream of the storage area and at any new crossing of watercourses
- changes in flood regimes including frequency and duration of floodplain/wetland inundation
- determination of the effects of the proposal on sediment transport, potential erosion/scouring and changes in deposition upstream and downstream
- any potential implications of climate change, as determined in Section 3.1.

3.4.2 Groundwater

3.4.2.1 Description of environmental values

This section should describe the existing environment for hydrogeology resources that may be affected by the project and the possible significance of the project to groundwater depletion or recharge, or potential saltwater intrusion of existing aquifers. The review should include a survey of existing groundwater supply facilities (i.e. bores, wells or excavations) within the project area. This section should include reference to:

- proximity of groundwater facilities to the project and value of these facilities for rural, industrial and/or domestic use
- the current use of groundwater for irrigated agriculture within any potential area of impact
- known nature of the aquifers at and near the sites, geology/stratigraphy, aquifer type, depth to and thickness of the aquifer, hydrology of the aquifers, depth to water level and seasonal changes in levels, groundwater flow directions
- interaction with surface water, including with mound springs (Boggomosses) and possible sources of recharge
- basic water quality of the aquifer, vulnerability to pollution
- groundwater resources proposed to be used by the project (if applicable), including a description of the quality, quantity, usage rate and required location of those resources
- the characteristics of target aquifers (if applicable), including seasonal variability, capacity to provide the required volumes of water at the expected usage rate, recharge potential and profile of existing extraction.



3.4.2.2 Potential impacts and mitigation measures

Matters to be addressed should include clear descriptions of the following:

- an assessment of the potential impacts on the objectives and requirements of the Great Artesian Basin Water Resource Plan and Resource Operations Plan
- the impacts of the project on the stygofauna within groundwater dependant ecosystems
- affect of dewatering of dam foundations
- affect of dam wall construction and grouting on the availability and quality of groundwater resources downstream
- impacts of vegetation clearing, sedimentation and salinity on local groundwater resources
- extent of the area within which groundwater resources are likely to be affected by the proposed operations, including effects of water storage, presence of the dam wall and downstream flow releases
- impacts the dam will have on the local Boggomoss springs and wider Great Artesian Basin
- impacts of the required extraction of groundwater resources (if applicable) and proposed mitigation measures to reduce the impact of the project on groundwater quality including the potential for interconnection between the target and underlying aquifers
- decommissioning of any temporary groundwater bores.

3.4.3 Surface water quality

3.4.3.1 Description of environmental values

This section should describe the existing environment for water quality that may be affected by any component of the project in the context of environmental values as defined in local, state or national guidelines. The discussion should be at both local and catchment scales as related to the direct impacts of the project and the potential uses of water from the project.

Existing and historic surface water quality should be described in terms of physical, chemical and biological characteristics within the proposed storage area, upstream and downstream of the area, and in significant waterways crossed by any pipelines, including consideration of seasonal or flow variations where applicable. Off stream water bodies and existing weir pools should be included.

The basis for this assessment should be a literature review supplemented by a sampling program, as appropriate. The following should be discussed:

- the relationship of water quality to flow, using local catchment examples where available
- water quality issues within and downstream from existing storages in the system
- the confirmed or likely causes of present water quality impacts
- the suitability of existing raw water quality for present uses and any treatment required
- current water quality issues related to specific uses of water as related to the project (e.g. potable supply, agricultural water (if applicable)).

3.4.3.2 Potential impacts and mitigation measures

Matters to be addressed should include clear descriptions of the following:

- possible sources of water pollution or other changes in water quality during specific construction activities such as sand and gravel extraction, site clearing, excavation, dewatering of foundations, temporary or permanent road construction and related drainage, wastewater from concrete batch plants, vehicle and equipment wash down activities, sewage or grey water treatment and disposal, use of chemicals in foundation cleaning, grouting or testing and accidents or spillage
- the likely quality of water leaving construction sites taking into account the management and mitigation measures proposed
- quality of water within the impoundment during the first filling phase
- quality of water within the impoundment under projected operating conditions including annual seasonal variation, extended wet or dry periods, the effects of inundated soil types and wind driven re-suspension, impacts of surrounding or upstream land uses
- the effects of depth and holding time within the storage, particularly on turbidity
- potential for stratification and 'turn-over' of the storage (including potential for blue-green algae blooms) and implications for water quality management, supply and use (including for stock and domestic users, industrial users, urban potable use or recreational use of the storage)
- the potential effect of algae and macrophytes on water quality and vice versa
- the effects on downstream water quality under varying scenarios of flow release including potential impacts on estuarine and near shore environments.

3.5 Air quality

3.5.1 Description of environmental values

This section of the EIS should 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 *Environmental Protection (Air) Policy 1997*.

Ambient air quality conditions in terms of particulate matter and any other major constituent of the air environment that may be affected by the proposal should be described for any sensitive localities such as residences. These descriptions should include any baseline monitoring results.

3.5.2 Potential impacts and mitigation measures

The following air quality issues and their mitigation should be considered:

- the quality and quantity of air emissions within the project area expected during construction and operational activities
- dust generation from construction activities (including blasting, excavation and extraction), especially in areas where construction activities are adjacent existing road networks or are in close proximity to sensitive receivers
- climatic patterns that could affect dust generation and movement

- 
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- vehicle emissions and dust generation along haulage routes (internal and external to construction sites)
 - air quality from gaseous emissions including greenhouse gas emissions and ozone depleting substances
 - terrestrial flora and fauna.

3.6 Greenhouse gas emissions

3.6.1 Description of environmental situation

This section of the EIS should:

- provide an inventory of projected annual emissions for each relevant greenhouse gas, with total emissions expressed in 'CO₂ equivalent' terms
- estimate emissions from upstream activities
- briefly describe method(s) by which estimates were made.

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

3.6.1.1 Potential impacts and mitigation measures

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

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

3.7 Noise and vibration

3.7.1 Description of environmental values

This section should describe the existing noise and vibration environment that may be affected by the project in the context of environmental values as defined by the *Environmental Protection (Noise) Policy 1997*. The EPA's Noise Measurement Manual should be considered and references should be made to the EPA Guideline Noise and Vibration from Blasting.

Sensitive noise receptors adjacent to all project components should be identified and typical background noise levels estimated based on surveys at representative sites. The potential sensitivity of such receptors should be discussed and performance indicators and standards nominated.

3.7.2 Potential impacts and mitigation measures

The EIS should describe the impacts of noise and vibration generated during the construction and operational phases of the project. An analysis of noise and vibration impacts should include:

- the levels of noise and vibration generated assessed against current typical background levels, using modelling where appropriate
- impact of noise, including low frequency noise (noise with components below 200Hz) and vibration at all potentially sensitive receivers, should be quantified and compared with the performance indicators and standards nominated above
- impact on terrestrial and aquatic fauna
- proposals to minimise or eliminate these effects, including details of any screening, lining, enclosing or bunding of facilities, or timing schedules for construction and operations that would minimise environmental harm and environmental nuisance from noise and vibration.

3.8 Waste

3.8.1 Waste generation

The EIS should identify and describe all sources, likely volumes and quality (where applicable) of waste associated with construction, construction phase decommissioning and operation of all aspects of the project. This section should describe:

- waste generated by delivery of material to site(s)
- chemical and mechanical processes conducted on the construction sites that produce waste (e.g. chemical storage, sewage treatment, all forms of waste water, power generation, fuel storage and use, mechanical workshop, offices and camp (if applicable), vegetation clearing)
- the amount and characteristics of solid and liquid waste (including run-off from roads, plant areas, chemical storage areas and workshops) 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 *Environmental Protection (Waste) Policy 2000* and the *Environmental Protection (Waste) Regulation 2000*, the proposals for waste avoidance, reuse, recycling, storage, treatment, transport and disposal should be described including measures to minimize attraction of vermin, insects and pests.

This section should assess the potential impact of all wastes generated during construction and operation and provide details of each waste in terms of:

- the options available for avoidance
- operational handling and fate of all wastes including storage
- on-site treatment methods proposed for any wastes

- methods of disposal (including the need to transport wastes off-site for disposal) proposed to be used for any trade wastes, liquid wastes and solid wastes
- the potential level of impact on environmental values
- measures to ensure stability of the waste storage areas and impoundments
- methods to prevent, seepage and contamination of groundwater from stockpiles and/or storage areas and impoundments
- market demand for recyclable waste (where appropriate)
- decommissioning of the construction site.

3.9 Transport

3.9.1 Transport methods and routes

The transport assessment is to be presented in separate reports for each project-affected mode (road, rail, air and sea) as appropriate. These assessment reports 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.

The EIS should detail:

- any proposed new or alterations to transport-related infrastructure 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
- expected volumes of project inputs and outputs of transported raw materials, wastes, hazardous goods, finished products and so on 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.

3.9.2 Potential impacts and mitigation measures

Impact assessment reports should include:

- assessment methodology adopted (for impacts on roads: The Road Impact Assessment Report should be in general accordance with the Department of Main Roads 'Guidelines for Assessment of Road Impacts of Development' (2006))
- all base data assumptions, including current condition of the affected network and its performance
- possible interruptions to transport operations
- 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 if relevant.



The Road Impact Assessment Report should include:

- project impacts (from either transport or project operations) on the safety, efficiency and condition of road operations and assets
- project impacts on overland water-flows and their interaction with the road network
- driver fatigue for workers travelling to and from regional centres and key destinations
- project impacts on any existing or proposed pedestrian cycle networks
- project impacts on any existing public transport networks (assets and services).
- **For impacts on rail:** In performing the Rail Impact Assessment Report, the proponent is to consider:
 - project impacts on the amenity and health of adjacent land users as a result of dust, noise and vibration
 - impacts on passenger transport and services, should the project generate large public transport trip movements.
- **For air and sea ports:** In performing air and sea impact assessment reports, the proponent is to consider project impacts on the ongoing operation of existing air and sea port facilities, including capacity of throughput and any land-use impacts as a result of the project's operations.

The proponent is to 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 include consideration of those authority's works program and forward planning.

3.10 Indigenous cultural heritage

3.10.1 Description of existing indigenous cultural heritage values

The EIS should describe the known indigenous cultural heritage values that may be affected by the project. An indigenous cultural heritage survey (as part of the cultural heritage management plan process or otherwise) should be undertaken for Significant Aboriginal Objects and Significant Aboriginal Areas. The indigenous cultural heritage survey should:

- refer to the Department of Natural Resources and Water Indigenous Site Database and any existing literature relating to the affected areas
- refer to:
 - the consultation and negotiation with traditional owners and the outcomes about:
 - significant Aboriginal Objects and Significant Aboriginal Areas
 - confidentiality of culturally sensitive information
 - the involvement of traditional owners in field surveys
- include locations of Significant Aboriginal Objects and Significant Aboriginal Areas identified during the survey and which are likely to be impacted by the project

- 
- provide a report of work done which includes background research, relevant environmental data and methodology, as well as results of field surveys, significance assessment and conclusions and management recommendations (having due for any confidentiality requirements specified by community representatives).

3.10.2 Potential impacts and mitigation measures

The management of indigenous cultural heritage impacts should be detailed in either a native title agreement with traditional owners or in a cultural heritage management plan, with the native title agreement or plan to be developed in a form that complies with the provisions of Part 7 of the *Aboriginal Cultural Heritage Act 2003*, thereby meeting the cultural heritage duty of care. The agreement or plan must provide a process for the conduct of comprehensive cultural heritage investigations and the identification of Significant Aboriginal Objects and Significant Aboriginal Areas in the proposed project area. It is also to provide a process for the management of those objects, areas and values identified in the proposed project area.

The agreement or plan should include the following:

- a process for including Aboriginal communities or Aboriginal Parties in the identification, management and protection of Aboriginal cultural heritage in the project area
- a process for undertaking a comprehensive and systematic cultural heritage assessment
- processes for the mitigation, management and protection of identified cultural heritage objects and areas in the project area, and in any areas to be affected by development of any associated infrastructure, both during construction and operational phases of the project
- provision for the management of the accidental discovery of cultural material, including burials, in the project area
- processes for determining any requirements for monitoring of the project during construction, and measures by which any monitoring program is to be implemented
- indigenous cultural heritage induction and awareness programs for project staff, subcontractors and staff, consultants and agents of the project
- a conflict resolution process.

The development of the agreement or plan should be negotiated with all relevant stakeholder representatives, subject to any confidentiality specified by the Aboriginal community, registered native title applicants, and/or Aboriginal Parties as appropriate.

As a minimum, impact assessment, management and protection strategies should satisfy statutory responsibilities and duties of care under the *Aboriginal Cultural Heritage Act 2003* and the *Aboriginal and Torres Strait Islander Heritage Protection Act 1984* (Cth).

If a cultural heritage management plan has not been approved by the submission of the EIS to the CG then the following should be provided:

- a outline of the draft cultural heritage management plan, subject to any confidentiality provisions, with the position of the endorsed cultural heritage parties
- details of the proposed steps and timeframes for seeking the ratification of the cultural heritage management plan.

3.11 Non-indigenous cultural heritage

3.11.1 Description of existing non-indigenous cultural heritage values

The EIS should describe the existing environmental values for non-Indigenous cultural heritage that may be affected by the project activities. The non-Indigenous cultural heritage survey should:

- refer to:
 - the Australian Heritage Places Inventory
 - the EPA Queensland Heritage Register and other information regarding places of potential non-Indigenous cultural heritage significance
 - local government heritage register
 - any existing literature relating to the affected areas
- refer to consultations and negotiations with the local community and historical societies about:
 - places of non-Indigenous cultural heritage significance
 - the significance of any non-Indigenous cultural heritage places located or identified
- include locations of culturally significant sites likely to be impacted by the project
- provide a constraints analysis of the proposed development area to identify and record non-Indigenous cultural heritage places
- provide the location of mining areas with historical significance should be shown on maps
- provide a report of work done which includes background research, relevant environmental data and methodology, as well as results of field surveys, significance assessment and conclusions and management recommendations (having due regard for any confidentiality requirements specified by community representatives).

As a minimum, investigations and consultation should be undertaken in such manner and detail to satisfy statutory responsibilities and duties of care under the EPBC Act and *Queensland Heritage Act 1992* (Qld).

3.11.2 Potential impacts and mitigation measures

The proponent should provide an assessment of 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 non-indigenous cultural heritage value likely to be affected by the project and their values at a local, regional or national level as appropriate
- recommended means of mitigating any negative impacts and enhancing any positive impacts
- negotiations with Queensland Heritage Council and the EPA regarding management of places of historic heritage significance, taking account also of community interests and concerns



- documented management strategies in accordance with the outcomes of negotiations with Queensland Heritage Council, EPA and the community.

As a minimum, 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* (Qld).

4 Social values and management of impacts

4.1 Social

4.1.1 Description of social values

This section should describe the existing social values that may be affected by the project including effects at both footprint and benefited area locations (that is, the communities which may benefit from the water supply). The social amenity and use of the project area and adjacent areas for agriculture, forestry, mining, fishing, recreation, industrial, educational or residential purposes should be described. The scope of works to satisfy the ToR should be commensurate with the scale and risks associated with the project.

The existing social values should appear as follows.

4.1.1.1 Description of the local community area

This section should give an overview of the project's near neighbours, and the local communities at the level of townships, district, region and state and be comprised of:

- definition of the local community area: The local community area should be defined in consultation with the Social Impact Unit, DIP before the proponent commences detailed social impact assessment work
- other relevant proposals or projects: This section should include the locations of relevant projects or proposals within the local community area
- other features in the local community area: This section should include Shopping Centres, Schools, Childcare Centres, Welfare Organisations, Policing, Emergency Services, Areas of Community Congregation, Public Transport options and Access Points. The relationship between localities and district centres should be described. Access to human services and social infrastructure available to each community directly impacted by the project including access to: health care, education, recreational, cultural, leisure and sporting facilities and activities, water supply and sanitation, waste treatment and disposal, housing, power supply, transport and roads, communication, and local banking and credit facilities and any other important characteristics.

4.1.1.2 Profile of the local community (Social Baseline Study)

Local character, identity and aspirations including characteristics of each community within the project area, the name and location of the community, size, history, spatial distribution, land use and land ownership patterns, major trends/changes in the population make-up that may be occurring irrespective of the project.



Demographics including: total population (the total enumerated population for the local community area and the Full Time Equivalent (FTE) transient population), population 18 years and over, population growth, population forecasts with and without the proposal, age and gender distributions, education including schooling levels, occupation, ethnic characteristics, incidence of disability, indigenous population including age and gender, median individual and household incomes, employment, unemployment and not in the labour force, housing costs (monthly housing repayments (percent of dwellings in each category), and weekly rent (per cent dwellings in each category)), housing tenure type and landlord type, household and family type, Social and Economic Index for Areas, Index of Disadvantage – score and relative ranking, crimes including domestic violence and crimes against the person.

4.1.1.3 Profile of the local business community

This section should provide a description of the key industries including: rural properties, farms, croplands, grazing areas, livestock, agricultural equipment, small enterprise equipment etc including the number of properties directly affected by the project and the number of families directly affected by the project. This should include not only property owners but also families of workers either living on the property or workers where the property is their primary employment. Use of the project area for forestry, mining, fishing, recreation, and industrial, purposes should be described. This section should include tourism if applicable.

4.1.2 Potential impacts and mitigation measures

The social impact assessment of the project is to be carried out in consultation with affected local authorities and relevant State authorities, in particular the Department of Communities and the DIP's Social Impact Assessment team. The assessment of impacts should describe the likely response of affected communities and identify possible beneficial and adverse impacts (both immediate and cumulative) and should be considered both at the local and regional level.

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

The social impact assessment should include sufficient data to enable affected local authorities and State authorities, such as Queensland Health and Education Queensland, and to make informed decisions about how the proposal may affect their business and plan for the continuing provision of public services in the region of the project. Proponents of projects that are likely to result in a significant increase in population of an area should consult the relevant management units of the State authorities, and summarise the results of the consultations in the EIS. The summary should discuss how the impacts of population increase on public services, particularly health, education, housing, disability services and community services, would be mitigated.

Cumulative impacts: direct, indirect and secondary impacts resulting from existing projects, the proposed project and anticipated future projects should be identified including the important cause and effect relationships between human activities and resources, ecosystems, and human communities. The magnitude and significance of these cumulative effects should be determined.



The EIS should address the following matters:

- impacts on local and regional residents, current land uses and existing lifestyles and enterprises
- impacts on local, regional and state labour markets, with regard to the source of the workforce presented according to occupational groupings of the workforce
- impacts of both construction and operational workforces and associated contractors on housing demand, housing affordability, community services and community cohesion. The capability of the existing housing stock, including rental accommodation, to meet any additional demands created by the project is to be discussed
- any new skills and training to be introduced in relation to the project. Adequate provision should be made for apprenticeship and worker training schemes. If possible skill shortages anticipated should be indicated
- likely employment and revenue to flow to existing communities in the area of the project
- impacts on existing local and regional residents' values and aspirations
- impacts on the new project workforce and their families
- in regard to affected Indigenous and non-Indigenous communities respectively, particular attention should be paid to the effects on:
 - the ability of people to live in accordance with their own values and priorities
 - the use of and access to culturally important areas and landscapes.

For the construction and operational phases of the development, describe the effects of the proposal on local and regional residents, including land acquisition and relocation issues and property valuation and marketability, community services and recreational activities.

The educational impacts of the proposed development are to be analysed and described, particularly in regard to primary, secondary, post-secondary and tertiary educational sectors.

The social impact mitigation strategies should pay particular attention to:

- the sourcing of the construction and operational workforce and the social and cultural implications this may have for the host community particularly if any part of the workforce is sourced from overseas
- the availability of accommodation for the project's workforce and the possible cumulative impact on the local and regional housing and rental market
- an accommodation strategy, where necessary, in consultation with relevant State government agencies, which will detail proposals that avoid, mitigate or offset any short and medium term adverse effects on the local and regional housing market
- documenting the demographic changes in the profile of the region and the associated sufficiency of current infrastructure and services
- developing a community engagement management plan that promotes an active and on-going role for impacted communities.

The social impact assessment will contain an evaluation of the net social impacts of the proposed project including a summary table of net social impacts identified by the study, and an estimation of the overall significance of those impacts.



4.1.3 Social responsibility initiatives

Modifications or alternatives to avoid, minimise, or mitigate significant cumulative effects should be described. Key policies and procedures to be adopted or used by the proponent that would mitigate or enhance impacts should be highlighted for example, the establishment of a complaints register and a conflict resolution mechanism, consultative mechanisms etc.

Key government documents outlining proposed local, state or Australian Government initiatives or plans that would mitigate or enhance impacts should also be described here. Uncertainty should be addressed through the design of an effective monitoring system.

5 Economies and management of impacts

5.1 Economy

5.1.1 Description of affected local and regional economies

This section should describe the existing economy in which the project is located and the economies materially impacted by the project.

Define the economy in which the project is to be located.

Describe the economy including:

- Gross Regional Product or other appropriate measure of annual economic production;
- population
- labour force statistics
- infrastructure.

Describe the regional economy's key industries and their contribution to regional economic income.

Discuss regional resource endowment, competitive advantage and expected future growth.

Describe the key regional markets relevant to the project:

- labour market
- housing and land markets
- construction services and building inputs market.

With regard to the region's key industries and factor prices:

- describe current demand and usage of water
- provide information on current input costs (wage rates, building costs, housing rent etc)
- provide information on land values in the region by type of use.

5.1.2 Potential Impacts and mitigation measures

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

The analysis should include the direct economic impacts on industry and citizens of the project including:

- property values
- industry output
- employment

- factor incomes.

The analysis should also:

- assess forgone Industry output from the project (e.g. production no longer possible quarries, agriculture and forestry)
- assess forgone opportunities and impacts to Households (e.g. recreation, increased travel times)
- assess 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
- discuss climate change risks from the project and mitigated by the project.

5.1.2.1 Strategies for local participation

The assessment should outline:

- strategies for assessing the cost effectiveness of sourcing local inputs from the regional economy during the construction, rehabilitation and operation of the project
- employment strategies for local residents including members of Indigenous communities including a skills assessment and recruitment and training programs to be offered
- strategies responding to 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 (the 10% Policy)
 - Indigenous employment opportunities, with regard to the Indigenous Employment Policy for Queensland Government Building and Civil Construction projects (the 20% Policy)
 - the use of locally sourced goods and services, with regard to the Local Industry Policy (Department of State Development, 1999).

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

The assessment should:

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



5.1.2.3 Impact upon property management

This section should address the current and future management processes for properties which are impacted by the project during construction and operation, by virtue of the fact that the water pipeline and dam may intersect these properties, or separate adjoining properties, and there is potential for current farming or grazing practices to be affected in some material way. Mention should be made of the following:

- 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; and
- Describe the range of measures required to mitigate real and potential disruptions to rural practices and management of properties (both within properties and with adjoining landholdings), such as separation of stock areas by the project and the types of alternative crossing points.

5.2 Sustainable development

The EIS should provide a comparative analysis of how the project conforms to the objectives for “sustainable development” (refer *National Strategy for Ecologically Sustainable Development* (Australian Government, 1992)).

This analysis should consider the cumulative impacts (both beneficial and adverse) of the project from a life-of-project perspective, taking into consideration the scale, intensity, duration and frequency of the impacts to demonstrate a balance between environmental integrity, social development and economic development.

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

This section of the EIS should describe the potential hazards and risks that may be associated with all aspects of the project and should incorporate all known hazards, which may include:

- identification of potential hazards, accidents, spillages and abnormal events occurring during all stages of the project, including possible frequency of occurrence
- indication of cumulative risk levels to surrounding land uses
- identification of all hazardous substance to be used, stored, processed or produced and the rate of usage
- potential wildlife hazards such as snakes and disease vectors.

Any potential implications related to climate change, as determined in Section 3.1, should be discussed. A preliminary risk assessment for all components of the project (dam wall, pipeline(s), quarries, clearing, downstream flooding etc.) shall be undertaken as part of the EIS process in accordance with *Australia/New Zealand Standards AS/NZS 4360:2004 Risk Management*. With respect to risk assessment:

- the EIS should deal comprehensively with on-site risks. External risks to the project should also be considered. External risks from natural hazards could be determined on the basis of *AS/NZS Risk Management Standard 4360:1999*
- the study should assess risks during the construction, operational and decommissioning phases associated with the project. These risks should be assessed in quantitative terms where possible
- analysis of the consequences of each hazard on safety and environmental damage in the project area should be conducted, including:
 - injuries and death to workers and to the public
 - direct harm to the environment as a result of project hazards.
- the analysis should examine the likelihood of these consequences being experienced, both individually and collectively
- quantitative levels of risks should be presented from the above analysis
- details should be provided on the safeguards that would be employed or installed to reduce the likelihood and severity of hazards, consequences and risks to persons, fauna (such as trapping in pipeline trenches) and environmentally sensitive sites within and adjacent to the project area(s).

A comparison of assessed and mitigated risks with acceptable risk criteria for land uses adjacent to the project area(s) should be presented.

6.1.2 Emergency management plan

An outline of the proposed emergency management procedures should be provided for the range of situations identified in the above risk assessment where there are measurable risks. This should include an overview of the objectives and management principles to be adopted for the preparation of a detailed emergency plan (including emergency response and recovery/cleanup procedures) in consultation with the relevant emergency services.

Planning should include reference to *State Planning Policy 1/03: Mitigating the Adverse Impacts of Flood, Bushfire and Landslide*.

In particular, the following should be presented:

- contingency plans to deal with hydrocarbon (e.g. diesel, lubricating oils) oil spills during construction, operation and maintenance of the project
- contingency plans to account for natural disasters such as storms and fires during the construction, operation and maintenance phases
- emergency planning and response procedures that have been determined in consultation with state and regional emergency service providers
- plans for involvement of the relevant state agencies (such as the Department of Emergency Services, which includes the Queensland Ambulance Service, Queensland Fire and Rescue Service and Emergency Management Queensland) in relation to emergency medical response and transport and first aid matters.

7 Cumulative impacts

The purpose of this section is to provide clear and concise information on the overall impacts of the project, and to discuss the interrelationship of these impacts. The methodology to be used to determine cumulative impacts should be discussed. The range of variables to be considered including, where applicable, relevant baseline or other criteria upon which the incremental aspects of the project should be assessed. Cumulative impacts should be assessed with respect to both geographic location and environmental value.

Cumulative impacts specific to the project may relate to:

- multiple forms of impact at one location (e.g. the nearest sensitive receiver will probably be impacted by noise, dust, air quality, traffic, land acquisition etc.)
- a form of impact occurring at a number of locations (e.g. noise impacts will occur at a number of construction sites and along transport routes – this type of cumulative impact should feature in the relevant sub-section 3 Environmental Values)
- an environmental value being impacted at several locations or by a number of forms of impact (e.g. water quality will be effected by construction activities at a number of locations, by habitat change (river to dam) and by operational activities (such as downstream flow regime change)
- the potentially counter-active effects of negative and positive impacts (e.g. loss of income to the local region from loss of agricultural land may be offset by enhanced agricultural productivity elsewhere, or locally by economic benefits derived from construction phase expenditure).

Cumulative impacts also include those of the project acting in combination with other known activities in the region/catchment including:

- other water resource development projects for which the proponent is responsible
- other water resource developments for which the proponent is not responsible
- other known developments or types of development that may impact upon the same environmental values as the project (e.g. projects impacting on the same local or regional communities (Wandoan Coal or Surat Basin Rail for example), projects involving land clearing, impacts on good quality agricultural land, or impacts that relate water volume, the flow regime or water quality).

The assessment of the significance of identified cumulative impacts should include evaluation of the scale, intensity, duration and/or frequency of included impacts and the possible additive nature of impacts.

8 Matters of national environmental significance

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

- sections 12 and 15A (World Heritage properties)
- sections 15B and 15C (National Heritage place)
- sections 16 and 17B (Wetlands of International importance)
- sections 18 and 18A (Listed threatened species and communities)
- sections 20 and 20A (Listed migratory species)
- sections 23 and 24A (Commonwealth marine areas).

This section should bring together assessments of impacts on Matters of National Environmental Significance in other chapters (e.g. water resources, flora and fauna, cultural heritage, cumulative impacts) and produce a stand-alone assessment in a format suited for assessment under the EPBC Act.

The project should initially be assessed in its own right followed by an assessment of the cumulative impacts related to all known proposed water resource developments in the Fitzroy basin with respect to each controlling provision and all identified consequential actions. Cumulative impacts not solely related to water resource 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. Obligations under and implications of any species recovery plans, such as that for the Boggomoss Snail (*Adclarkia dawsonensis*), must be specifically addressed.

8.1 Impacts on World Heritage properties, National Heritage places, wetlands of international importance and Commonwealth marine environment

A description of the values of the Great Barrier Reef World Heritage Area, National Heritage place, Shoalwater Bay Ramsar site that is likely to be impacted by the proposal, including but not restricted to, the significant regional habitat for listed threatened and migratory marine species.

Specifically with respect to the Commonwealth marine environment, a description of the area that is likely to be impacted by the proposal, including the airspace, seabed or any other areas of sea or seabed that is included in a Commonwealth reserve.



The potential direct and indirect impacts on each area, place, site or reserve, resulting from:

- modification, destruction, fragmentation, isolation or disturbance of an important, sensitive or substantial area of habitat
- a substantial change in water quality (including temperature) and hydrological regime which may adversely impact on biodiversity, ecological integrity, social amenity or human health
- persistent organic chemicals, heavy metals, or other potentially harmful chemicals accumulating in the marine environment such that biodiversity, ecological integrity, social amenity or human health may be adversely affected.

Specifically with respect to Commonwealth marine environments, the potential impacts on important amenities, navigation, culturally and historically significant sites or sensitive habitats.

The EIS will outline the extent to which identified impacts can be forecast or predicted and managed.

A description of any mitigation measures proposed to reduce the impact on the environments of each area, place, site or reserve should be provided.

8.2 Impact on a listed threatened species and ecological communities

A description of the listed threatened species and ecological communities identified below (including EPBC Act listed status, distribution, life history, habitats etc.).

The EIS should consider and assess the impacts to the listed threatened species and communities and any others that are found to be or may potentially be present in areas that may be impacted by the project. The EIS should identify which component of the project is of relevance to each species or community or if the threat of impact relates to consequential actions, resulting from:

- decrease in the size of a population or a long term adverse affect on an ecological community
- reduction in the area of occupancy of the species or extent of occurrence of the ecological community
- fragmentation an existing population or ecological community
- disturbance or destruction of habitat critical to the survival of the species or ecological community
- disruption of the breeding cycle of a population
- modification, destruction, removal, isolate or reduction of the availability or quality of habitat to the extent that the species is likely to decline
- modification or destruction of abiotic (non-living) factors (such as water, nutrients, or soil) necessary for the ecological community's survival
- the introduction of invasive species that are harmful to the species or ecological community becoming established
- interference with the recovery of the species or ecological community
- action which may be inconsistent with a recovery plan.

Any positive impacts should also be identified and evaluated.

A description of any mitigation measures proposed to reduce the impact on the listed threatened species and ecological communities should be discussed within the EIS.

List of potential ecological communities and listed threatened species and their status:

- the community of native species dependent on natural discharge from the Great Artesian Basin — endangered
- ecological communities of Bluegrass, Brigalow & Semi-evergreen vine thickets of the Brigalow Belt — endangered
- White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland — Critically endangered
- boggomoss snail (*Adclarkia dawsonensis*) — Critically endangered
- Fitzroy River turtle (*Rheodytes leukops*) — vulnerable
- loggerhead turtle (*Caretta caretta*) — endangered
- green turtle (*Chelonia mydas*) — vulnerable
- hawksbill turtle (*Eretmochelys imbricate*) — vulnerable
- flatback turtle (*Nataor depressus*) — vulnerable
- ornamental snake (*Denisonia maculate*) — vulnerable
- dunmall's snake (*Furina dunmalli*) — vulnerable
- yakka skink (*Egernia rugosa*) — vulnerable
- brigalow scaly-foot (*Paradelma orientalis*) — vulnerable
- five-clawed worm-skink, long-legged worm-skink (*Anomalopus mackayi*) — vulnerable
- grassland earless dragon (*Tympanocryptis pinguicolla*) — endangered
- large-eared pied bat, large pied bat (*Chalinolobus dwyeri*) — vulnerable
- water mouse (*Xeromys myoides*) — vulnerable
- northern quoll (*Dasyurus hallucatus*) — endangered
- eastern long-eared bat (*Nyctophilus timoriensis* – South-eastern form) — vulnerable
- murray cod, cod, goodoo (*Maccullochella peelii peelii*) — vulnerable
- swift parrot (*Lathamus discolor*) — endangered
- red goshawk (*Erythrorchis radiatus*) — vulnerable
- black-breasted button-quail (*Turnix melanogaster*) — vulnerable
- star finch (eastern), star finch (southern) (*Neochmia ruficauda ruficauda*) — endangered
- squatter pigeon (*Geophaps scripta scripta*) — vulnerable
- yellow chat (Dawson) (*Epthianura crocea macgregori*) — Critically endangered
- hairy-joint grass (*Arthraxon hispidus*) — vulnerable
- ooline (*Cadellia pentastylis*) — vulnerable

- cadarga (*Commersonia sp.*) — vulnerable
- spotted-throat cowslip, tricolour diuris, tricolour donkey-orchid (*Diuris tricolor*) — vulnerable
- finger panic grass (*Digitaria porrecta*) — vulnerable
- king blue-grass (*Dichanthium queenslandicum*) — vulnerable
- *Acacia chinchillensis* — vulnerable
- curly-bark wattle (*Acacia curranii*) — vulnerable
- *Calytrix gurulmundensis* — vulnerable
- *Denhamia parvifolia* — vulnerable
- *Homopholis belsonii* — vulnerable
- cobar greenhood orchid (*Pterostylis cobarensis*) — vulnerable
- austral cornflower, native thistle (*Stemmacantha australis*) — vulnerable
- austral toadflax, toadflax (*Thesium australe*) — vulnerable
- *Westringia parvifolia* — vulnerable

8.3 Impact on a listed migratory species

A description of the listed migratory species identified below (including EPBC Act listed status, distribution, life history, habitats etc.).

The EIS should consider and assess the impacts to the listed migratory species identified below and any others that are found to be or may potentially be present in areas that may be impacted by the project. The EIS should identify which component of the project is of relevance to each species or if the threat of impact relates to consequential actions, resulting from:

- the destruction, isolation or modification of habitat important to a migratory species
- the introduction of invasive species in an important habitat that would be harmful to a migratory species
- the disruption of the lifecycle (breeding, feeding, migration, or resting behaviour) of an ecologically important proportion of the population of a migratory species
- interference with the recovery of the species or ecological community
- action which may be inconsistent with a recovery plan.

Any positive impacts should also be identified and evaluated.

A description of any mitigation measures proposed to reduce the impact on migratory species should be discussed within the EIS.

List of potential migratory species:

- white-bellied sea-eagle (*Haliaeetus leucogaster*)
- rufous fantail (*Rhipidura rufifrons*)
- great egret, white egret (*Ardea alba*)



- cattle egret (*Ardea ibis*)
- black-faced monarch (*Monarcha melanopsis*)
- spectacled monarch (*Monarcha trivirgatus*)
- magpie goose (*Anseranas semipalmata*)
- lathams snipe (*Gallinago hardwicki*)
- Australian cotton pygmy-goose (*Nettapus coromandelianus albipennis*)
- little curlew, little whimbrel (*Numenius minutus*)
- painted snipe (*Rostratula benghalensis*)
- eastern curlew (*Numenius madagascariensis*)
- common greenshank (*Trigg nebularia*)
- bar-tailed godwit (*Limosa lapponica*)
- grey-tailed tattler (*Heteroscelus incanus*)
- curlew sandpiper (*Calidris ferruginea*)
- whimbrel (*Numenius phaeopus*)
- glossy ibis (*Plegadis falcinellus*)
- brolga (*Grus rubicunda*)
- sharp-tailed sandpiper (*Calidris acuminata*)
- paradise parrot (*Psephotus pulcherrimus*)
- southern boobook (*Ninox novaseelandiae*)
- yellow-tufted honeyeater (*Lichenostomus melanops*)
- cicadabird (*Coracina tenuirostris*)
- dugong (*Dugong dugong*)
- green turtle (*Chelonia mydas*)
- hawksbill turtle (*Eretmochelys imbricate*)
- flatback turtle (*Nataor depressus*)
- loggerhead turtle (*Caretta caretta*)

9 Environmental management plan

This section of the EIS should detail the environmental management plans developed for the project. Separate environmental management plans should individually address the discrete project elements, including Greenhouse Gas. The environmental management plans should be developed from, and be consistent with, the preceding information in the EIS.

An environmental management plan should provide control actions in accordance with agreed performance criteria for specified acceptable levels of environmental harm. In addition, the environmental management plans should identify:

- potential impacts on environmental values
- mitigation strategies
- relevant monitoring
- appropriate indicators and performance criteria
- reporting requirements
- appropriate corrective actions, should an undesirable impact or unforeseen level of impact occur
- the recording of and response to complaints.

The aims of the environmental management plans are to provide:

- commitments by the proponent to practical and achievable strategies and design standards (performance specifications) for the management of the project to ensure that environmental requirements are specified and complied with
- an integrated plan for comprehensive monitoring and control of impacts
- local, Queensland and Australian government authorities, stakeholders and the proponent with a common focus for approvals conditions and compliance with policies and conditions
- the community with evidence that the environmental management of the project is acceptable.

The recommended structure of each element of the environmental management plan 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 (i.e. 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).



An environmental management plan should commit to manage, enhance or protect identified environmental values. The commitments should contain the following components for performance criteria and implementation strategies:

- environmental protection objectives for enhancing or protecting each relevant value
- indicators to be measured to demonstrate the extent to which the environmental protection objective is achieved
- environmental protection standards (a numerical target or value for the indicator), which defines the achievement of the objective
- an action program to ensure the environmental protection commitments are achieved and implemented. This will include strategies in relation to:
 - communication
 - continuous improvement
 - environmental auditing
 - monitoring
 - reporting
 - staff training
 - a decommissioning program for land proposed to be disturbed under each relevant aspect of the project.



10 Conclusions and recommendations

The EIS should make conclusions and recommendations with respect to the project based on the studies presented, the environmental management plans 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 ToR for this EIS

A copy of these ToR should be included in the EIS. A summary cross-referencing specific items of these ToR to the relevant section of the EIS should also be provided.

12.2 Development approvals

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

12.3 Consultation report

The report should include the methodology used in the community consultation program including criteria for identifying stakeholders and the communication methods used (the consultation plan). A list of stakeholders identified, including the Australian, Queensland and local government agencies, the individuals and groups should be provided.

A summary of the issues raised by stakeholders and the means, by which the issues have been addressed, should be provided.

Plans for ongoing consultation should be outlined and included in the environmental management plan.

12.4 Study team

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

12.5 Glossary of terms

A glossary of technical terms and acronyms should be provided.



12.6 Technical data and baseline studies

Relevant supporting data and information generated from specialist studies undertaken as part of the EIS are to be included as appendices if not included within the main report. These may include:

- geological surveys
- soil surveys
- flora and fauna studies
- waterway hydrology and groundwater
- air quality modelling
- noise and vibration modelling
- transport impact assessment
- cultural heritage studies
- social impact assessment.

12.7 List of proponent commitments

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

