

Terms of reference for an environmental impact statement:

Lower Fitzroy River Infrastructure Project

September 2014

The Department of State Development, Infrastructure and Planning is responsible for driving the economic development of Queensland.

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An electronic copy of this report is available on the Department of State Development, Infrastructure and Planning's website at www.dsdip.qld.gov.au

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Introduction

These terms of reference (TOR) set out the matters to be addressed in an environmental impact statement (EIS) for the proposed Lower Fitzroy River Infrastructure Project (the project).

The proponent for the project is the Gladstone Area Water Board (GAWB) and SunWater Limited (SunWater).

This document is divided into three parts:

- (a) About the project (page 2)
- (b) Contents of the EIS (page 5)
- (c) Matters of national environmental significance (page (c)).

These TOR must be read in conjunction with *Preparing an environmental impact statement: Guideline for proponents*, which explains the following:

- the target audience for the EIS
- stakeholder consultation requirements
- document format
- copy requirements.

The guideline is available from www.dsdip.qld.gov.au/fact-sheets-and-guidelines/coordinated-projects.html or from the EIS project manager (refer to page 3 for contact details).

The re-issued draft terms of reference (TOR) was released for public and advisory agency comment from 19 July 2014 to 18 August 2014. 8 submissions were received—7 from advisory agencies and 1 from a private organisation.

Part A. About the project

1. Project summary

GAWB and SunWater propose to develop infrastructure to capture and store water, by way of raising the existing Eden Bann Weir and constructing a new weir at Rookwood on the Fitzroy River. Associated infrastructure may include upgrades to state, local and private roads, bridges and crossings to maintain existing access after inundation. The key components of the Lower Fitzroy River Infrastructure Project include:

- The Eden Bann Weir (Stage 1) was built in 1994 to reduced level (RL) of 14.5 metres. It is proposed that a Stage 2 raise will be to RL 18.2 metres and the addition of gates as Stage 3 will raise the structure to RL 20.2 metres. The weir is located approximately 50 kilometres (km) north-west of Rockhampton.
- The proposed Rookwood Weir is a new build at a site located approximately 54 km south-west of Rockhampton. The Stage 1 infrastructure development will be built to RL 45.5 metres. The addition of gates at Stage 2 will raise the weir to RL 49 metres.
- Associated with the weirs will be fish and turtle passage structures, which are to be developed in consultation with the Department of Agriculture, Fisheries and Forestry (Queensland Fisheries) and the Department of Environment and Heritage Protection (formerly the Department of Environment and Resource Management).
- Allowing for the capture and storage of unallocated water resources that are available in the system (nominally 76 000 ML/a).
- Implementation of a flexible strategy to allow the rapid delivery of water to meet anticipated future demands.

The Fitzroy River forms at the confluence of the Mackenzie and Dawson Rivers flowing out into the Great Barrier Reef World Heritage Area and Marine Park, which is approximately 300 km downstream.

The project has been proposed to address the potential demands from urban populations, industry and agriculture within the Gladstone and Rockhampton regions and along the Capricorn coast to secure future water supply and improve water security in the short- to medium-term.

In 2006 the Central Queensland Regional Water Supply Strategy identified the project as a means of meeting short- to medium-term urban and industrial demand for water in the Lower Mackenzie-Fitzroy sub-region. Along with water trading and water efficiency gains longer term urban, industrial and agricultural demands can be achieved through the project operating in conjunction with the Fitzroy Barrage, Awoonga Dam and the proposed Nathan Dam.

A more detailed project description is contained in the project's initial advice statement (IAS), including a location map of the project site (page 2 of the IAS).

Further information on the project can be viewed at: www.dsdip.qld.gov.au/lower-fitzroy-river

2. Project proponent

GAWB commenced operations as a state-established commercialised Water Authority in October 2000. GAWB owns and operates the Awoonga Dam located on the Boyne River along with a network of delivery pipelines, water treatment plants and other bulk water distribution infrastructure in the Gladstone Region in Central Queensland.

SunWater was established as a statutory Government Owned Corporation in October 2000, and owns and operates the Queensland bulk water supply and distribution infrastructure located throughout regional Queensland.

The contact details for the proponent are:

Project Manager
The Lower Fitzroy River Infrastructure Project
Reply Paid 668
Brisbane QLD 4001
Freecall 1800 423 213
Website www.fitzroyweirs.com.au
Email Fitzroyweirs@ghd.com.au

3. Legislative framework

On 7 January 2010, the Australian Government Environment Minister determined that the project is a 'controlled action' under the Environment Protection and Biodiversity Conservation Act 1999 (Cwlth) (EPBC Act) (reference number EPBC 2009/5173), due to the likely potential impacts on MNES. The controlling provisions under the EPBC Act are:

- Listed threatened species and ecological communities (sections 18 &18A)
- Listed migratory species (sections 20 &20A)
- World Heritage Properties (sections 12 &15A)
- National Heritage Places (sections 15B &15C).

On 6 May 2011, the Coordinator General declared the project to be a 'coordinated project' under section 26(1)(a) of the State Development and Public Works Organisation Act 1971 (Qld) (SDPWO Act). This declaration initiates the statutory environmental impact assessment procedure of Part 4 of the SDPWO Act, which requires the proponent to prepare an EIS for the project.

The project will therefore require approval from both the Australian and State governments before it can proceed.

4. Accredited process for controlled actions under Commonwealth legislation

The EIS process has been accredited under the Bilateral Agreement for the assessment of the project under the EPBC Act, hence the EIS must state (in a stand-alone chapter) the controlling provisions for the project (listed at 3 above) and describe the particular aspects of the environment that led to the controlled action decision.

The assessment of the controlling provisions, avoidance mitigation measures and any offsets for residual impacts must be described and illustrated in a stand-alone report in

the EIS that fully addresses the matters relevant to the controlling provisions. Requirements for MNES are set out on pages 62–80 of this TOR.

5. Contact information

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

EIS Project Manager—Lower Fitzroy River Infrastructure Project

Coordinated Project Delivery

Office of the Coordinator-General

PO Box 15517

City East Qld 4002

tel + 61 7 3452 7461

fax+ 61 7 3452 7486

email LowerFitzroy.InfrastructureProject@coordinatorgeneral.qld.gov.au

web www.dsdip.qld.gov.au/lower-fitzroy-river

Part B. Contents of the EIS

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

1. Executive summary

- 1.1 The executive summary should 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, avoid using jargon, be written as a stand-alone document and be structured to follow the EIS. It should be easy to reproduce and distribute on request to interested parties who may not wish to read or purchase the whole EIS.
- 1.2 The executive summary should include:
 - project title
 - proponent's name and contact details
 - a discussion of previous projects undertaken by the proponent, if applicable, and their commitment to effective environmental management
 - a concise statement of the aims and objectives of the project
 - the legal framework, decision-making authorities and advisory agencies
 - an outline of the background and need for the project, including the consequences of not proceeding with the project
 - an outline of the alternative options considered and reasons for selecting the proposed development option
 - a brief description of the project (pre-construction, construction, operational activities and decommissioning) and the existing environment, using visual aids where appropriate
 - an outline of the principal environmental impacts predicted and the proposed environmental management strategies and commitments to minimise the significance of these impacts
 - a discussion of the cumulative impacts in relation to social, economic and environmental factors of associated infrastructure projects proposed within the region
 - include detailed maps of the proposed project location and any other critical figures.

2. Glossary of terms

- 2.1 Provide a glossary of technical terms, acronyms, abbreviations and references.

3. Introduction

- 3.1 Clearly explain the function of the EIS, why it has been prepared and what it sets out to achieve. Include an overview of the structure of the document.

Project proponent

- 3.2 Describe the proponent's experience, including the nature and extent of business activities, experience and qualifications, and environmental record, including the proponent's environmental, health, safety and community policies. Detail who will be the project proponent, the asset owner/operator/manager and handover procedures once the weirs are completed.

Project description

- 3.3 Briefly describe the key elements of the project with illustrations or maps. Summarise any major associated infrastructure requirements. Provide detailed descriptions of the project in Part B, Section 4 (page 10).

Project rationale

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

Relationship to other projects

- 3.5 Describe how the project relates to other infrastructure projects (of which the proponent should reasonably be aware) that have been, are being taken or that have been approved in the area affected by the project.
- 3.6 As a result of this assessment, there may be opportunities to co-locate existing or proposed infrastructure, enabling efficiency gains and mitigating environmental and property impacts. Where co-location may be likely, outline opportunities to coordinate or enhance impact mitigation strategies. Discuss the opportunities in sufficient detail to enable the reader to understand the reasons for preferring certain options or courses of action and rejecting others.

Project alternatives

- 3.7 Describe feasible alternatives including conceptual, technological and locality alternatives to the proposed project and the consequences of not proceeding with the project. Detail the criteria used to determine the alternatives and provide sufficient detail to enable the reader to understand why certain options or courses of action are preferred and why others are rejected (including the 'no action' option). Discuss the interdependencies of the project components, particularly in regard to how any infrastructure requirements relate to the viability of the project.
- 3.8 Given the likely impacts on fish and fish habitats, discussion of alternatives should specifically examine and evaluate the relative impacts on fish and fish habitat of alternative water supplies.

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

The environmental impact assessment process

Methodology of the EIS

- 3.10 Provide an outline of the environmental impact assessment process, including the role of the EIS in the Coordinator General's decision-making process. Include information on relevant stages of the EIS development, statutory and public consultation requirements and any interdependencies that exist between approvals sought. The information in this section is required to ensure:
- relevant legislation is addressed
 - readers are informed of the process to be followed
 - stakeholders are aware of any opportunities for input and participation.

Objectives of the EIS

- 3.11 Provide a statement of the objectives of the environmental impact assessment process. The structure of the EIS can then be outlined and used to explain how the EIS will meet its objectives. The purpose of the EIS is to:
- provide public information on the need for the project, alternatives to it and options for its implementation
 - present the likely effects of the project on the natural, social and economic environment
 - demonstrate how environmental impacts can be avoided, managed or mitigated and the offsets for any residual impacts
 - provide information to formulate the project's EMP.

Submissions

- 3.12 Inform the reader how to properly make submissions and what form the submissions should take. Inform the reader how and when properly made public submissions on the EIS will be addressed and taken into account in the decision-making process. Also indicate any implications for submissions in the event of any appeal processes.

Public consultation process

- 3.13 The public consultation process should provide opportunities for community involvement and education. It may include interviews with individuals, public communication activities, interest group meetings, production of regular summary information and updates (i.e. newsletters), and other consultation mechanisms to encourage and facilitate active public consultation. The public consultation processes (community engagement) for all parts of the EIS should be integrated.

- 3.14 Outline the methodology that was adopted to:
- identify the stakeholders and how their involvement was facilitated
 - identify the processes conducted to date and the future consultation strategies and programs including those during the operational phase of the project
 - indicate how consultation involvement and outcomes were integrated into the EIS process and future site activities including opportunities for engagement and provision for feedback and action if necessary.
- 3.15 List the stakeholders consulted during the program and provide details of any meetings held, presentations made and any other consultation undertaken for the EIS process. Provide information about the consultation process that has taken place and the results.

Project approvals

Relevant legislation and approvals

- 3.16 List and describe Commonwealth, state and local legislation and policies relevant to the planning, approval, construction and operation of the project. Identify all approvals, permits, licences and authorities that will need to be obtained for the proposed project. Outline the triggers for the application of each of these and identify relevant approval requirements.

Commonwealth legislation

- 3.17 Relevant Commonwealth legislation may include, but is not limited to:
- *Aboriginal and Torres Strait Islander Heritage Protection Act 1984*
 - *Environment Protection and Biodiversity Conservation Act 1999*
 - *Native Title Act 1993*.
- 3.18 Identify and outline relevant Commonwealth obligations such as:
- protection of World Heritage values
 - migratory animals (China–Australia Migratory Bird Agreement (CAMBA), Japan–Australia Migratory Bird Agreement (JAMBA), Republic of Korea–Australia Migratory Bird Agreement (ROKAMBA) and Bonn Convention)
 - biodiversity
 - climate
 - wetlands of international importance (Ramsar).

Commonwealth approvals

- 3.19 Identify and outline Commonwealth approvals required including, but not limited to the EPBC Act.
- 3.20 Also, identify and outline relevant Commonwealth obligations relating to the protection of World Heritage values, National Heritage values, declared Ramsar wetlands, listed threatened species and ecological communities, migratory animals, CAMBA, JAMBA, ROKAMBA and Bonn Convention and biodiversity.

Queensland legislation

- 3.21 Where relevant, refer to applicable Queensland legislation, which may include but is not limited to:
- *Aboriginal Cultural Heritage Act 2003 (ACH Act)*
 - *Environmental Protection Act 1994 (EP Act)*
 - *Fire and Service Rescue Act 1990*
 - *Fisheries Act 1994*
 - *Forestry Act 1959*
 - *Land Title Act 1994*
 - *Land Act 1994*
 - *Land Protection (Pest and Stock Route Management) Act 2002*
 - *Mineral Resources Act 1989*
 - *Nature Conservation Act 1992 (NC Act)*
 - *Petroleum and Gas (Production and Safety) Act 2004*
 - *Queensland Heritage Act 1992*
 - *Sustainable Planning Act 2009 (SPA)*
 - *Transport Infrastructure Act 1994 (TI Act)*
 - *Vegetation Management Act 1999 (VM Act)*
 - *Water Act 2000*
 - *Water Supply (Safety and Reliability) Act 2008.*
 - *Waste Reduction and Recycling Act 2011*
 - *Work Health and Safety Act 2011*

Queensland approvals

- 3.22 Key Queensland approvals required, and to be considered in the EIS process may include:
- operational works for constructing or raising of a waterway barrier works—Fisheries Act 1994 and SPA
 - quarry material allocation notice for the removal of quarry material in a watercourse—Water Act 2000
 - development permit for the removal of quarry material (Dredging) in a watercourse—SPA
 - operational works for taking and interfering with water—Water Act 2000
 - riverine protection permit—Water Act 2000
 - material change of use (MCU) of premises for an environmentally relevant activity (ERA)—EP Act and SPA:
 - extractive and screening activities
 - chemical storage
 - concrete batching
 - taking, destroying or interfering with forest products (e.g. timber) or quarry material (including drilling to identify resources) from State lands and specified freehold lands—Forestry Act 1959

- development permit for operational work that is the clearing of native vegetation—SPA
- a permit to clear native plants and a species management program—NC Act
- road impact assessment (including transport impact assessment) and road-use management plan for development on land not contiguous to a state-controlled road—TI Act.

3.23 Identify the relevant approval agency for each of the approvals required.

Relevant plans

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

4. Project description

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

Overview of the project

- 4.1 Provide an overview of the project to put it into context. Include:
- a rationale explaining the selection of the preferred operating scenario, including details such as cost, environmental impacts, and the operational efficiencies of each option supported by detailed information on each option in relevant sections of the EIS
 - a description of the key components of the project including the use of text and design plans where applicable
 - a summary of any environmental design features of the project
 - the expected cost, timing (of each project phase), and overall duration of the project, including details of and justification for, any staging of the development.

Location

- 4.2 Describe, using maps at suitable scales, the regional and local context of the project and all associated infrastructure. Provide real property descriptions of the project. Maps should show the precise location of the project area, in particular the:
- location and boundaries of current or proposed tenure for associated infrastructure, including transport infrastructure, relevant to the project
 - details of any proposed road changes
 - location of any stock routes in the project area or near associated infrastructure

- location and boundaries of the project footprint, including easement widths and access requirements
- location of any proposed buffers surrounding the working areas (for construction and operation)
- location of infrastructure relevant to the project, including but not limited to, the state-controlled road network, local roads and railways and marine infrastructure
- full supply level (FSL) of weirs
- current and final access to weirs and flood immunity of access points and possible delays for repairing or restarting fishways subsequent to flow events
- location of natural features such as waterways (e.g. rivers, streams, creeks, other water bodies and wetlands) and shorelines
- location of any proposed site offices
- location of any accommodation site or facility (to include but not limited to:
 - wet/dry camp (alcohol)
 - security arrangements
 - communications facilities
 - roster arrangements (if applicable)
 - travel arrangements (drive in/drive out, bus in/bus out)
- location of, and an access/evacuation map of any worker accommodation villages, construction camps and storage areas
- location of emergency first aid facilities
- location of possible landing site for both the rescue helicopter service and fixed wing aircraft services
- views to and from the site.

Design of water resources infrastructure

Water storage infrastructure

- 4.3 Describe the process and criteria used to select the preferred design and preferred construction techniques, including:
- FSL 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 weir
 - construction materials for structure e.g. earthen/sand, concrete, rock and or sheet pile
 - storage capacity, maximum depth, average depth, area of inundation at FSL, dead storage level, area of any buffer required, including a description of the flood margin and means of its determination, length of river bed (and tributaries) inundated

- appropriate representation (modelling of other) of the weir pool at FSL for each option proposed to allow assessment of the effect on aquatic and riparian habitat of the various storage levels down to full drawdown
- estimated water yields (with appropriate allowances for environmental requirements)
- general design of outlet works including siting, capacity, off-take level and ability to regulate flows, aquatic fauna exclusion and protection systems
- spillway design, including gate specification and operation, if included
- details of any energy dissipaters at the downstream foot of the barrier
- detail the weir spillway and dissipater designs and how the designs will minimise injury and mortality to fish passing over the spillway during spillway flows
- details of any provision for incorporating a fishway or other fish transfer mechanism and stream diversions in the design, modelled headwater and tailwater levels at different flows and extraction rates and its effect on the viability of the proposed project
- design and location of automated component control housings in relation to flood levels and relevant environmental conditions
- details of the physical form of the stream bed within 200 metres of the downstream foot of the barrier.

Water distribution infrastructure

- 4.4 Describe the process and criteria used to select the preferred design and preferred construction techniques, including:
- the method of extracting and/or releasing water from the storage
 - any treatment methods proposed
 - details of how water will be sourced e.g. direct pumping from impounded waters; through downstream releases and direct pumping; through downstream releases to another/series of weirs and how this changes natural flow regimes
 - details of the allocation of water from the impoundment including allowances for environmental requirements such as operating fishways during inflows and releases
 - details of maximum drawdown level and likely extraction regime (e.g. when water will be sourced) and the likely water level fluctuations
 - if distribution is by pipe:
 - details on pipeline route, including the location of any stream crossings and disturbance corridor for pipeline and associated access corridors for maintenance
 - 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
- details on proposed pipeline testing in relation to water sourcing and disposal
- design measures to ensure fish are not entrained into the piped water
- design measures to prevent inter-basin transfer of aquatic flora and fauna.

Other project-specific infrastructure

4.5 Describe:

- all other infrastructure required to be constructed, upgraded, relocated or decommissioned for the construction and/or operation of the project, such as resource extraction areas, access roads, power supply, connection to sewerage or water supply
- the existing loch system and its effectiveness and impacts on aquatic life
- the design and construction standards to be met (e.g. waterway crossings should be designed to meet the requirements of the *Fisheries Act 1994* (Qld) and in consultation with the Department of Agriculture, Fisheries and Forestry)
- alternative approaches or the opportunity to obtain materials from alternative sources.

Construction phase

- 4.6 Provide a detailed staging plan and approximate timeframes for the project's construction activities (including seasonal rainfall or flows).
- 4.7 Provide an estimate of the number and roles of persons to be employed during the construction phase of the project.
- 4.8 Provide the following information on the pre-construction, construction and commissioning of the project including detailed plans where appropriate.

Pre-construction activities

4.9 Describe all pre-construction activities, including:

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

- interference or disruption with flows in the waterway, watercourses, stream crossings and floodplain areas, including wetlands
- site establishment requirements for construction facilities, including access restriction measures and expected size, source and control of the construction workforce accommodation, services (water, sewage, communication, power, recreation) and safety requirements
- temporary works
- upgrade, relocation, realignment, deviation of or restricted access to roads and other infrastructure
- equipment to be used.

Construction

4.10 Describe all the construction elements of the project, including:

- an indicative construction timetable, including expected commissioning and start-up dates and hours of operation
- major work programs for the construction phase, including an outline of construction methodologies
- construction inputs, handling and storage, including an outline of potential locations for source of construction materials
- major hazardous materials to be transported, stored and/or used on site, including environmental toxicity data and biodegradability
- clean-up and restoration of areas used during construction, including camp site(s) and storage areas
- compliance with relevant building standards and regulations.

Commissioning

4.11 Describe the commissioning process including the associated environmental impacts.

Operation phase

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

- a description of the project site, including concept and layout plans of buildings, structures, plant and equipment to be employed
- nature and description of all key operational activities, including flow releases and operation of gates and outlet works
- the capacity of the project equipment and operations
- a description of a fish passage maintenance program
- remote operation, administration and staffing (e.g. number of operators, out of business hours operation) .

Associated infrastructure

4.13 Detail, with the aid of concept and layout plans, requirements for new infrastructure or upgrading/relocating existing infrastructure to service the

project including existing and proposed land tenure. Include detail of gauging stations above and below the FSL of the impoundments that will be used to enable accurate gauging of inflows/outflows as they will relate to the fishway (passage and) operation including consideration of fish passages at gauging stations. Consider infrastructure such as transportation, water supply, energy supply, telecommunications, stormwater, waste disposal and sewerage.

Decommissioning and rehabilitation

- 4.14 Describe the options, strategies and methods for progressive and final rehabilitation of the environment disturbed by the project, including:
- developing a preferred rehabilitation strategy with a view to minimising the amount of land disturbed at any one time
 - illustrating the final topography of any excavations, waste areas and dam sites on maps at a suitable scale
 - describing the means of decommissioning the project—in terms of removing equipment, structures and buildings—and the methods proposed for stabilising the affected areas
 - discuss what is the intended operational life of the weirs and what strategies are there to ensure that fish passage is provided at the weir sites and be resourced and maintained subsequent to the operational life of the weirs
 - discussing options and methods for disposing of wastes generated by demolishing project infrastructure, including sufficient detail for their feasibility and suitability to be established
 - discussing future land tenure arrangements post-decommissioning of the project
 - developing a proposed staging plan for rehabilitation.
- 4.15 Include the impacts of the preferred rehabilitation strategy in the appropriate subsections of Part B, Section 5 (page 15).
- 4.16 Refer to infrastructure that is not intended to be decommissioned. In this situation, describe the entity to which the infrastructure is intended to be transferred, and the proposed environmental management regimes.

5. Environmental values and management of impacts

- 5.1 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. Identify and describe preferred measures in more detail than other alternatives.
- 5.2 The objectives of the following subsections are to:
- describe the existing environmental values of the area that may be affected by the project, using background information and/or new studies

- to support statements (include reference to all definitions of environmental values set out in relevant legislation, policies and plans)
 - describe the potential adverse and beneficial impacts of the project on the identified environmental values and the measures taken to avoid, minimise and/or mitigate those impacts
 - describe any cumulative impacts on environmental values caused by the project, either in isolation or in combination with other known existing or planned projects
 - present objectives, standards and measurable indicators that protect the identified environmental values
 - examine viable alternative strategies for managing impacts (present and compare these alternatives in view of the stated objectives and standards to be achieved)
 - discuss the available techniques to control and manage impacts in relation to the nominated objectives.
- 5.3 Where negative impacts of the project cannot be avoided, or adequately minimised or mitigated, present proposals to offset impacts in accordance with the *Environmental Offsets Act 2014*. A desktop analysis providing confidence that the likely required offsets are potentially available in the landscape should be undertaken.
- 5.4 The EIS should follow the format and content outlined in these TOR; however, changes to the structure can be discussed with the EIS project manager. The mitigation measures, monitoring programs etc., identified in this section of the EIS should be used to develop the EMP for the project. Refer to Part B, Section 10 (page 59).

Climate, natural hazards and climate change

- 5.5 Describe the climatic conditions that may affect management of the project. This includes a description of the vulnerability of the project area to seasonal conditions, extremes of climate and natural or induced hazards. Provide a risk assessment and management plan detailing these potential threats to the construction, and operation of the project.
- 5.6 Address the most recent information on potential impacts of climatic factors in the appropriate sections of the EIS.
- 5.7 Include an assessment of climate change risks and possible adaptation strategies, as well as the following:
- a risk assessment of changing climate patterns that may affect the viability and environmental management of the project
 - the preferred and alternative adaptation strategies to be implemented
 - commitments to working cooperatively, where practicable, with government, other industry and other sectors to address adaptation to climate change.

Flood plain management

- 5.8 Due to the location of the site, a comprehensive flood study should be included in the EIS that includes:
- quantification of flood impacts on properties surrounding and external to the project site from redirection or concentration of flows
 - identification of likely increased flood levels, increased flow velocities or increased time of flood inundation as a result of the development
 - quantification of potential flood impacts on transport networks surrounding and external to the project site from redirection or concentration of flows
 - an investigation of the additional impact of the weirs on the frequency and duration and seasonality of floodplain wetland inundation downstream of the weirs in the lower Fitzroy.
- 5.9 The flood study should address any requirements of local or regional planning schemes for flood affected areas. The study report should include details of all calculations along with descriptions of base data, any potential for loss of flood plain storage, and triangulated surface meshes produced in terrain modelling software. Reference must be made to any studies undertaken by the local council in relation to flooding.

Land

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

Scenic amenity and lighting

Description of environmental values

- 5.11 Describe, in general terms, the existing character of the landscape and the general impression that would be obtained while travelling through and around it. Outline existing landscape features, panoramas and views that have, or could be expected to have, value to the community. Include information such as maps and photographs, 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.
- 5.12 At a level of detail appropriate to the scale of the project, describe the relevant geomorphology, supported by illustrative mapping highlighting any significant features and associated environmental values. Include any relevant World Heritage and National Heritage values of the area.

Potential impacts and mitigation measures

- 5.13 Describe the potential beneficial and adverse impacts of the project on landscape character and visual qualities of the site and the surrounding area. Explain what measures will be undertaken to mitigate or avoid the identified impacts.

Lighting

- 5.14 Provide an assessment of all potential impacts of the project's lighting, during all stages, with particular reference to objectives to be achieved and management methods to be implemented to mitigate or avoid, such as:
- the visual impact at night
 - night operations/maintenance and effects of lighting on fauna and residents
 - the potential impact of increased vehicular traffic
 - changed habitat conditions for nocturnal fauna and associated impacts.

Topography, geology and soils

Description of environmental values

- 5.15 Provide maps locating the project in state, regional and local contexts. The topography should be detailed with contours at suitable increments, shown with respect to Australian height datum. Include significant features of the landscape and topography, and accompanying comments on the maps.
- 5.16 Provide a description, map and a series of cross-sections of the geology of the project area relevant to the project components. Describe the geological properties that may influence ground stability, occupational health and safety, or the quality of stormwater leaving any area disturbed by the project. In locations where the age and type of geology is such that significant fossil specimens may be uncovered during construction/operations, address the potential for significant finds.
- 5.17 A soil survey of the sites affected by the project must be conducted at a suitable scale, with particular reference to the physical and chemical properties of the materials that will influence erosion potential, stormwater run-off quality, rehabilitation and agricultural productivity of the land. Provide information on soil stability and suitability for construction of project facilities. Soils should be described and mapped at a scale of 1:10 000 in all areas to be disturbed by earthworks and construction activities around the weir sites, including access roads, borrow areas, stockpile areas and camps.
- 5.18 Describe, map and illustrate soil types and profiles according to the *Australian Soil and Land Survey Field Handbook* (National Committee on Soil and Terrain 2009), *Guidelines for Surveying Soil and Land Resources* (McKenzie et al. 2008) and *Australian Soil Classification* (Isbell & CSIRO 2002).
- 5.19 Undertake an appraisal of the depth and quality of useable soil. Assess each soil's agricultural land suitability in accordance with:

- Guidelines for agricultural land evaluation in Queensland (Department of Primary Industries 1990)
- Planning guidelines: the identification of Good Quality Agricultural Land (Department of Primary Industries & Department of Housing, Local Government and Planning 1993), or
- Draft State Planning Policy Guideline: State interest – agriculture (Department of State Development, Infrastructure and Planning 2013a)
- The State Planning Policy (Department of State Development, Infrastructure and Planning 2013b).

Potential impacts and mitigation measures

- 5.20 Provide details of any potential impacts to the topography or geomorphology 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, and fencing.
- 5.21 Identify the possible soil erosion rate for all permanent and temporary landforms and describe the techniques used to manage the impact. Include an assessment of likely erosion effects, especially those resulting from removing vegetation, and constructing retaining walls both on-site and off-site for all disturbed areas.
- 5.22 Identify all soil types and outline the erosion potential (both wind and water) and erosion management techniques to be used. Provide details of an erosion-monitoring program (including rehabilitation measures for erosion problems identified during construction), and detail acceptable mitigation strategies.
- 5.23 Summarise methods proposed to prevent or control erosion with regard to:
- the Soil Erosion and Sediment Control—Engineering Guidelines for Queensland Construction Sites (Institution of Engineers Australia 1996), or other similar Guidelines
 - Urban Stormwater Quality Planning Guidelines 2010 (Department of Environment and Heritage Protection 2010)
 - preventing soil loss in order to maintain land capability/suitability
 - preventing degradation of local waterways.

Land contamination

Description of environmental values

- 5.24 Include:
- 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 whether or not remediation is required

- a description of the nature and extent of contamination at each site.

Potential impacts and mitigation measures

- 5.25 Discuss the management of any contaminated land and potential for contamination from construction, commissioning and operation, in accordance with the *Draft Guidelines for the Assessment and Management of Contaminated Land in Queensland* (Department of Environment 1998) or the *State Planning Policy Guideline: State interest – emissions and hazardous activities, Guidance on contaminated Land* (Department of State Development, Infrastructure and Planning 2013a) and the National Environment Protection (Assessment of Site Contamination) Measure 1999 (Cwth).
- 5.26 Describe strategies and methods to be used to prevent and manage any land contamination resulting from the project, including the management of any acid generation or management of chemicals and fuels to prevent spills or leaks.
- 5.27 State any intentions concerning the classification of land contamination after project completion.

Land use and tenure

Description of environmental situation

- 5.28 Identify, with the aid of maps:
- land tenure, including reserves, tenure of special interest such as protected areas and forest reserves, existing and proposed gas infrastructure, mining leases, key resource areas, water pipelines, power lines and transport corridors, including local roads, state-controlled roads, rail corridors and stock routes
 - proposed land tenure for all components of the project, including consideration of the *Land Act 1994* requirements to change current *Land Act 1994* tenures
 - existing land uses and facilities surrounding the project
 - areas covered by applications for native title claims or native title determinations, providing boundary descriptions of native title representative body(ies), and whether it is necessary to notify the representative body(ies) or if there is evidence that native title does not exist
 - distance of the project from residential and recreational areas
 - declared water storage catchments
 - location of the project in relation to environmentally sensitive areas.

Potential impacts and mitigation measures

- 5.29 Describe the potential changes to existing and potential land uses due to the construction and operation of the project. In particular, describe the following:

- impacts on project site and adjacent land uses and human activities and strategies for mitigation, such as:
 - The State Planning Policy (Department of State Development, Infrastructure and Planning 2013b)
 - Draft State Planning Policy Guideline: State interest – agriculture (Department of State Development, Infrastructure and Planning 2013a) or
 - *Planning guidelines: The identification of good quality agricultural land* (Department of Primary Industries & Department of Housing, Local Government and Planning 1993)
 - impact and benefits of the availability of water for irrigation for agricultural crops along the river—refer to *Land Suitability for Irrigated Agriculture along the Fitzroy River* (Forster, Sugars & Department of Natural Resources 2000)
 - local government planning schemes
 - mining development licences, mining leases, petroleum leases
 - residential and 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 development area
- management of the immediate environs of the project including construction buffer zones
- the potential native title rights and interests likely to be impacted upon by the project and the potential for managing those impacts by an Indigenous land use agreement or other native title compliance outcomes
- proposed land use changes in any areas of high conservation value and information on how easement widths and vegetation clearance in sensitive environmental areas will be minimised
- potential issues involved in proximity and/or co-location of other current or proposed infrastructure services
- potential impacts on future road upgrades
- potential impacts on existing and future rail corridors
- any land units requiring specific management measures
- effect on existing stock routes in the project area and options to manage impacts (e.g. realignment).

Nature conservation

- 5.30 Detail the existing nature conservation values that may be affected by the proposal. Describe the environmental values in terms of:
- integrity of ecological processes, including habitats of endangered, vulnerable and near threatened (EVNT) species
 - conservation of resources

- biological diversity, including habitats of EVNT species
 - integrity of landscapes and places including wilderness and similar natural places
 - aquatic and terrestrial ecosystems
- 5.31 Survey effort should be sufficient to identify, or adequately extrapolate, the floral and faunal values over the range of seasons, particularly during and following a wet season. The survey should account for the ephemeral nature of watercourses traversing the proposal area, and seasonal variation in fauna populations.
- 5.32 Wherever possible, seek the involvement of the local Indigenous community in conducting field observations and survey activities to identify the traditional and contemporary Indigenous uses of species.
- 5.33 Also outline the proposed strategies to avoid, or minimise and mitigate, impacts on the identified values within the project's footprint.
- 5.34 Identify key flora and fauna indicators for ongoing monitoring.

Sensitive environmental areas

Description of environmental values

- 5.35 Identify areas that are environmentally sensitive in proximity to the project on a map of suitable scale, based on a desktop review of relevant databases of species sightings, species habitat requirements, existing ecosystem and habitat mapping and on field surveys. This should include areas classified as having national, state, regional or local biodiversity significance, or flagged as important for their integrated biodiversity values. Refer to both Queensland and Commonwealth legislation and policies on threatened species and ecological communities.
- 5.36 Areas regarded as sensitive with respect to flora and fauna have one or more of the following features and should be identified and mapped:
- important habitats of species listed under the NC Act and/or EPBC Act as critically endangered, endangered, vulnerable or near threatened
 - regional ecosystems listed as 'endangered' or 'of concern' under state legislation, and/or ecosystems listed as critically endangered, endangered or vulnerable under the EPBC Act
 - good representative examples of remnant regional ecosystems or regional ecosystems that are described as having 'medium' or 'low' representation in the protected area estate as defined in the Regional Ecosystem Description Database (REDD) available at **www.dehp.qld.gov.au**
 - sites listed under international treaties such as Ramsar wetlands and World Heritage areas
 - sites containing near-threatened or bio-regionally significant species or essential, viable habitat for near-threatened or bio-regionally significant species

- sites in, or adjacent to, areas containing important resting, feeding or breeding sites for migratory species of conservation concern listed under the Convention of Migratory Species of Wild Animals, and/or bilateral agreements between Australia and other countries
- sites adjacent to nesting beaches, feeding, resting or calving areas of species of special interest (e.g. marine turtles, dugong and cetaceans)
- sites containing common species that represent a distributional limit and are of scientific value or that contain feeding, breeding, resting areas for populations of echidna, koala, platypus and other species of special cultural significance
- sites of high biodiversity that are of a suitable size or with connectivity to corridors/protected areas to ensure survival in the longer term; such land may contain:
 - natural vegetation in good condition or other habitat in good condition (e.g. wetlands)
 - degraded vegetation or other habitats that still support high levels of biodiversity or act as an important corridor for maintaining high levels of biodiversity in the area
- a site containing other special ecological values (e.g. high habitat diversity and areas of high endemism)
- ecosystems that provide important ecological functions such as:
 - wetlands of national, state and regional significance
 - riparian vegetation
 - important buffer to a protected area or important habitat corridor between areas
- declared fish habitat areas and sites containing protected marine plants under the *Fisheries Act 1994* (Qld)
- sites of palaeontologic significance such as fossil sites
- sites of geomorphological significance, such as lava tubes or karst
- protected areas that have been proclaimed under the NC Act or are under consideration for proclamation
- remnant vegetation listed under the VM Act as containing endangered and of concern regional ecosystem function and biodiversity
- areas of major interest, or critical habitat declared under the NC Act or high nature conservation value areas or areas vulnerable to land degradation under the VM Act.

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

Potential impacts and mitigation measures

5.38 Discuss the impact of the project on species, communities and habitats of local, regional or national significance in sensitive environmental areas as

identified above. Include human impacts and the control of any domestic animals introduced to the area.

- 5.39 Demonstrate how the project would comply with the following hierarchy:
- avoiding impact on areas of remnant vegetation and other areas of conservation value including listed species and their habitat
 - mitigating impacts through rehabilitation and restoration including, where relevant, a discussion of any relevant previous experience or trials of the proposed rehabilitation
 - measures to be taken to replace or offset the loss of conservation values where avoiding and mitigating impacts cannot be achieved.
- 5.40 Explain why the measures above would not apply in areas where loss would occur.
- 5.41 Discuss the boundaries of the areas impacted by the project within or adjacent to an endangered ecological community, including details of footprint width. If the project area will impact upon a threatened community, include reasons for the preferred alignment and the viability of alternatives.
- 5.42 The EIS should provide details about the approvals that will be required under the NC Act and SPA. The overall EMP for the project should address the performance requirements of the relevant policies and regional vegetation management codes (refer to www.dnrm.qld.gov.au/land/vegetation-management).
- 5.43 Where relevant, this section should discuss environmental offset requirements in accordance with the *Environmental Offsets Act 2014*.
- 5.44 Provide detailed information about the offsets required by necessary approvals, having regard to the *Environmental Offsets Act 2014*, including but not limited to:
- an offset proposal or strategy setting out:
 - the values which will be impacted and may require an offset, including confirmation that the project is a Significant Community Project pursuant to section 10(5) of the VM Act
 - how the development has avoided and minimised (mitigated) impacts on values which may require an offset
 - the extent of each value which may require an offset under the *Environmental Offsets Act 2014*
 - the offset delivery mechanism for the proposed offsets e.g. direct offset, offset transfer, indirect offset or offset payment
 - where the offset delivery mechanism involves a land-based offset, an assessment demonstrating that an offset which meets the requirements of the *Environmental Offsets Act 2014*, is available within the landscape. The assessment should include a GIS analysis of the requirements of the *Environmental Offsets Act 2014* and a written synthesis of this information
 - adequate survey information, supported by detailed survey methodology, to support the stated offset requirements.

- 5.45 Describe any departure from no net loss of ecological values (Refer *Environmental Offsets Act 2014*).

Terrestrial flora

Description of environmental values

- 5.46 Provide vegetation mapping for all relevant project sites. Adjacent areas should also be mapped to illustrate interconnectivity. Mapping should also illustrate any larger scale interconnections between areas of remnant or regrowth vegetation where the project site includes a corridor connecting those other areas. Discuss any variances between site mapping and mapping produced by the Queensland Herbarium.
- 5.47 Describe the terrestrial vegetation communities within the affected areas at an appropriate scale (maximum 1:10 000), with mapping produced from aerial photographs and ground-truthing, showing the following:
- location and extent of vegetation types using the regional ecosystem type descriptions in accordance with the REDD
 - location of remnant and regrowth vegetation of conservation significance based on regional ecosystems listed as ‘endangered’ or ‘of concern’ under the VM Act, ecosystems listed as critically endangered, endangered or vulnerable under the EPBC Act, and important habitats of species listed under the NC Act and/or EPBC Act as presumed extinct, endangered, vulnerable or near threatened
 - the current extent (bioregional and catchment) of protected vegetation types of conservation significance within the protected area estate (national parks, conservation parks, resource reserves, nature refuges and conservation reserves under the *Land Act 1994* (Qld))
 - any plant communities of cultural, commercial or recreational significance
 - the location of any horticultural crops in the vicinity of the project area
 - location and abundance of any exotic or weed species.
- 5.48 Highlight sensitive or important vegetation types, including riparian vegetation, and their value as habitat for fauna and conservation of specific rare floral and faunal assemblages or community types. The description should contain a review of published information regarding the assessment of the significance of the vegetation to conservation, recreation, scientific, educational and historical interests.
- 5.49 For each significant natural vegetation community likely to be impacted by the project, vegetation surveys, consistent with the *Methodology for Survey and Mapping of Regional Ecosystems and Vegetation Communities in Queensland*, (Neldner, Wilson, Thompson & Dillewaard 2012) should be undertaken at an appropriate number of sites, allowing for seasonal factors, and satisfying the following:
- the relevant regional vegetation management codes

- site data should be recorded in a form compatible with the Queensland Herbarium CORVEG database
- the minimum site size should be 10 × 50 metres
- a complete list of species present at each site should be recorded
- the surveys to include species structure, assemblage, diversity and abundance
- the relative abundance of plant species present to be recorded
- any plant species of conservation, cultural, commercial or recreational significance to be identified
- specimens of species listed as protected plants under the Nature Conservation (Wildlife) Regulation 2006 (Qld), other than common species, are to be submitted to the Queensland Herbarium for identification.

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

Potential impacts and mitigation measures

5.51 Describe the potential environmental harm to the ecological values of the area arising from the construction, operation and decommissioning of the project including clearing, salvaging or removing vegetation. Discuss the indirect effects on remaining vegetation. Consider short- and long-term effects and comment on whether the impacts are reversible or irreversible.

5.52 With regard to all components of the project, include:

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

- hydrology (including regional ecosystems, essential species habitat, wetland type, stream order of the areas proposed for clearing)
 - details of how the proposed clearing meets the performance requirements of the relevant Regional Vegetation Management Code
 - the location, extent and ecological equivalence assessment of the areas to be cleared for which an offset will be provided, having regard to relevant specific-issue offset policies (or an alternative assessment to support an offset proposal as agreed with EHP)
 - a description of any foreseen impacts which increase the susceptibility of ecological communities and species to the impacts of climate change.
- 5.53 Outline how these measures will be implemented in the overall EMP for the project. Weed management strategies are required for containing existing weed species (e.g. parthenium and other declared plants) and ensuring no new declared plants are introduced to the area. Refer to the local government authority's pest management plan and any strategies and plans recommended for the project area by Biosecurity Queensland. Discuss the strategies in accordance with provisions of the *Land Protection (Pest and Stock Route Management) Act 2002* (Qld) in the main body of the EIS and in the pest management plan within the EMP for the project.

Terrestrial fauna

Description of environmental values

- 5.54 Describe the terrestrial and riparian fauna occurring in the areas affected by the proposal, noting the broad distribution patterns in relation to vegetation, topography and substrate. The description of the fauna present or likely to be present in the area should include:
- species diversity (i.e. a species list) including species lists for each site surveyed
 - species listed as EVNT by EPBC Act or the NC Act, and the location of any siting, estimated abundance, and the extent of habitat for each of these species
 - species listed by the DEHP 'Back on Track' species prioritisation methodology (refer to: www.ehp.qld.gov.au/wildlife/prioritisation-framework/)
 - any species that are poorly known but suspected of being EVNT
 - habitat requirements and sensitivity to changes, including movement corridors and barriers to movement
 - the existence of feral or introduced animals including those of economic or conservation 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)

- an estimate of commonness or rarity for the listed or otherwise significant species
 - use of the area by migratory fauna.
- 5.55 Indicate how well any affected communities are represented and protected elsewhere in the bio-region where the project occurs. Specify the methodology used for fauna surveys. Provide relevant site data to DEHP in a format compatible with the Wildlife Online database for listed threatened species (refer to www.ehp.qld.gov.au/wildlife/wildlife-online/index.html).

Potential impacts and mitigation measures

- 5.56 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 native species, particularly species of conservation significance
 - cumulative effects of direct and indirect impacts
 - threatening processes leading to progressive loss
 - a description of any foreseen impacts which increase the susceptibility of ecological communities and species to the impacts of climate change.
- 5.57 Describe strategies for protecting rare or threatened species, and discuss any obligations imposed by state or Commonwealth endangered species legislation or policy or international obligations (i.e. JAMBA, CAMBA and ROKAMBA).
- 5.58 Address any actions of the project or likely impacts that require an authority under the NC Act. Provide the following information on mitigation strategies:
- measures to avoid and mitigate the identified impacts. Any provision for buffer zones and movement corridors, nature reserves or special provisions for migratory animals should be discussed and coordinated with the outputs of the flora assessment
 - details of the methodologies that would be used to avoid injuries to livestock and native fauna as a result of the project’s construction and operational works, and if accidental injuries should occur, the methodologies to assess and handle injuries
 - strategies for complying with the objectives and management practices of relevant recovery plans.
- 5.59 Outline how these measures will be implemented in the overall EMP for the project. Rehabilitation of disturbed areas should incorporate, where appropriate, provision of nest hollows and ground litter.
- 5.60 Address feral animal management strategies and practices. The study should develop strategies to ensure that the project does not contribute to increased encroachment of a feral animal species. Refer to the local government

authority's pest management plan and any strategies and plans recommended for the project area by Biosecurity Queensland. Discuss the strategies in accordance with the provisions of the *Land Protection (Pest and Stock Route Management) Act 2002* in the main body of the EIS and in the pest management plan within the EMP for the project.

Aquatic ecology

Description of environmental values

General habitat

- 5.61 Describe, map and quantify fish and other aquatic fauna habitats at representative sites upstream of the proposed impoundments, within the impounded areas and downstream as far as the effect of the weirs will extend. This should include features such as:
- distribution of pool and riffle formations
 - presence of snags
 - presence of overhanging vegetation
 - features of riparian vegetation (species, cover, continuity, height, width etc)
 - presence of aquatic macrophytes
 - benthic substrate
 - river profile (bank width and depth)
 - presence of sand and gravel bars
 - water quality.
- 5.62 Quantify the amount of habitat that will be impacted.
- 5.63 Describe habitat downstream of the project or potentially impacted in associated lacustrine and marine environments. Describe estuarine and marine environments at a level of detail commensurate with the risks (including cumulative risks) the project poses to those environments.
- 5.64 Discuss the sensitivity of aquatic habitats to disturbance, at the site and up and downstream of the site, including potential disturbances and changes resulting from the proposed works (e.g. in water quality, flow regimes, water levels, proposed land use).
- 5.65 Provide sufficient baseline data to enable a comparison of before the weirs, during construction and during operation of the weirs that detects changes that may take place in the physical make-up of the river (upstream of the proposed impoundment, within the impounded area and downstream as far as the effect of the dam/weir will be felt) and in the estuary, including:
- flow patterns
 - silt transport and deposition
 - bed and bank profiles and materials.
- 5.66 Evaluate and enable management options and actions to be determined that mitigate those changes.

- 5.67 Provide sufficient baseline data to enable a comparison of before the weirs, during construction and during operation of the weirs that detects changes to fish habitat upstream of the proposed impoundment, within the impounded area and downstream as far as the effect of the dam/weir will be felt (including downstream floodplain fish nursery habitats, estuarine and marine) that may take place, including:
- water quality parameters
 - composition and extent of riparian vegetation
 - composition and extent of aquatic macrophytes
 - description of floodplain habitat, (such as wetlands, floodplain waterbodies) presence of snags, description of pool and riffle features
 - connectivity of wetlands to the river.
- 5.68 Evaluate and enable management options and actions to be determined that mitigate those changes.
- 5.69 Provide details of the aquatic habitat sampling methods, sites, dates and times of sampling and flow conditions at the time(s) of sampling.

General flora and fauna

- 5.70 Describe the aquatic flora and fauna present, or likely to be present, in the areas affected by the proposal, noting the patterns and distribution in the waterways and any associated wetlands. Include:
- mammals, reptiles, amphibians, crustaceans and aquatic invertebrates occurring in the waterways within the affected area and any associated wetlands (as defined under section 5 of the *Fisheries Act 1994*)
 - any rare or threatened marine species
 - a description of the habitat requirements and the sensitivity of aquatic species to changes in flow regime, water levels and water quality in the project areas
 - aquatic plants including native and exotic/weed species
 - habitat downstream of the project or potentially impacted due to currents in associated lacustrine and marine environments
 - aquatic substrate and stream type, including extent of tidal influence and common levels such as highest astronomical tide and mean high water springs.
- 5.71 Describe estuarine and marine environments at a level of detail commensurate with the risks (including cumulative risks) the project poses to those environments.
- 5.72 Describe any wetlands listed by DEHP as areas of national, state or regional significance and detail their values and importance for aquatic flora and fauna species.
- 5.73 Determine the potential for introducing into the impoundment, or facilitating movement of, translocated or exotic or non-indigenous or noxious aquatic fauna (including fish and crustaceans) through the construction and operation of the proposed structure and associated pipeline.

Flora

- 5.74 Define the nature and extent of existing riverine features such as littoral and sub-littoral lands, waterways within the proposed area of development and in the areas adjacent to the project.
- 5.75 Conduct field assessments for plant species, preferably in both pre- and post-wet season conditions, as follows:
- record site data in a form compatible with the Queensland Herbarium *CORVEG* database
 - record a complete list of species present at each site, including those species defined and protected under the *Fisheries Act 1994*
 - record the relative abundance of plant species present
 - identify any plant species of conservation, cultural, commercial or recreational significance
 - submit specimens of species listed as protected plants under the Nature Conservation (Wildlife) Regulation 1994 (Qld) (other than common species) to the Queensland Herbarium for identification and entry into the *HERBRECS* database.

Fauna—turtles

- 5.76 Describe the turtle species that may be using the Fitzroy River (catchment), and its tributaries in proximity to the proposed development area. Monitor turtle nesting along beaches near the proposed project area for the duration of the turtle nesting seasons, for turtle species occurring in the area.
- 5.77 Undertake a desktop review of information on the turtle communities of the study area, particularly the Fitzroy river, broad-shelled, eastern snake-necked, Krefft's river saw-shelled and white-throated snapping turtles, paying specific attention to any anecdotal or recorded information on turtle populations frequenting the port area and any known nesting sites.
- 5.78 Conduct ecological risk assessment modelling for turtles, paying particular attention to the impacts of the flow regime on nesting banks. A complete analysis of the species is required and should include:
- likely historic range including the locations of nesting sites, the types of living/foraging habitats, and total range length
 - analysis of the percentage loss of these components of the historic range
 - measures of habitat fragmentation (length of habitats inundated, number of fragments removed)
 - current population structure (male/female ratios, age classes, female reproductive health), assessment of health status of individuals, nest sites remaining and measures of quality of remaining habitat.
- 5.79 Refer to studies of the turtle populations and consult DEHP on historical data for the area, particularly in relation to previously conducted nesting surveys.
- 5.80 An analysis should include measures to either provide additional suitable nesting sites or upgrade the suitability/security of existing nesting sites.

- 5.81 The proponent shall use this information to establish the basis for recommendations in relation to the most appropriate management measures to be adopted to minimise the risk of turtle injury or death.

Fauna—fish

- 5.82 Document the fish and crustacean species (recreational, commercial and other) at representative sites upstream of the proposed impoundment, within the impounded area and downstream as far as the effect of the dam/weir will extend. This should include distribution, diversity, some population descriptors (e.g. size classes/length frequency) and relative abundance. Historical information (e.g. former distribution, diversities) should be included where available.
- 5.83 Discuss fish habitat requirements and usage at the site and up and downstream of the site, including life cycle, seasonal or flow-related variations in those requirements.
- 5.84 Fish movement requirements through the site need to be determined (including any seasonal changes to those requirements).
- 5.85 Evaluate the recreational and commercial fisheries at the site and up and downstream of the site including estuarine and near coastal fisheries and fish habitat downstream of the proposed works.
- 5.86 Provide sufficient baseline data to enable a comparison of before the weirs, during construction and during operation of the weirs that detects changes that may take place in the aquatic faunal communities (including fish) upstream of the proposed impoundment, within the impounded area and downstream as far as the effect of the dam/weir will be felt (including estuarine and marine where appropriate). Evaluate and enable management options and actions to be determined that mitigate those changes.
- 5.87 Provide details of the aquatic fauna sampling methods, sites, dates and times of sampling and flow conditions and water quality at the time(s) of sampling.

Potential impacts and mitigation measures—general

- 5.88 Discuss the potential impacts of the project on the aquatic ecosystems and describe proposed mitigation actions, including:
- an ecological risk assessment for aquatic ecosystems and habitats using models created by DNRM for the Fitzroy Water Resource Plan review
 - methods to minimise the potential for introducing or spreading weed species, plant disease, algal bloom and pest fish species
 - monitoring aquatic biology health, productivity and biodiversity in areas subject to direct discharge
 - 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.).
- 5.89 Identify the risks to estuarine and marine environments, and, as far as possible, estimate and quantify the impacts associated with significant risks.

- 5.90 Address any actions of the project or likely impacts that require an authority under the relevant legislation including the NC Act and/or the *Fisheries Act 1994*. Outline how these measures will be implemented in the overall EMP for the project.

Potential impacts and mitigation measures—fish and fish habitat

- 5.91 Discuss the potential impacts of the project on the fish and fish habitat and describe proposed mitigation actions, including:
- the potential impacts of the proposal on fish habitat at the site and up and downstream of the site as far as the effect of the weirs will extend, including impacts on features such as:
 - riparian vegetation
 - aquatic flora
 - distribution of pool and riffle environments
 - water quality
 - instream and bank (freshwater) profiles
 - floodplain habitat (e.g. wetlands, downstream floodplain fish nursery habitats, other waterbodies)
 - the potential and cumulative impacts of the proposal on aquatic faunal communities (including fish) at the site and up and downstream of the site as far as the effect of the weirs will extend (including downstream floodplain fish nursery habitats, estuarine and near coastal aquatic communities). These should include impacts on:
 - reproduction
 - different life stages
 - access to and availability of different habitats
 - population and community structure (including overall diversity)
 - conservation status
 - proposed location, type and design of waterway barrier works (both temporary and permanent), with an appropriately scaled map, that would impact on aquatic resources, particularly fish movement
 - the extent to which fish movement opportunities downstream of the weirs (including between river and the lower Fitzroy floodplain wetland fish nursery habitats) are reduced by the proposed dam/weir in terms of:
 - frequency, duration and timing of drownout at downstream instream barriers
 - reduction in:
 - connectivity of the river during lower flows
 - operation of existing fishways
 - spilling frequency of existing weirs
 - lateral movements between floodplain and riverine fish habitat, especially between downstream floodplain fish nursery habitats
 - trigger flows and changes in seasonal flows

- the potential impacts on commercial and recreational fisheries (freshwater, estuarine and near coastal)
- the impact of fringing (aquatic) plant species and floating aquatic plant species to be introduced (including exotic, non-indigenous and noxious plants) at the site during the construction and operation phases
- the potential for introducing into the impoundment, or facilitating movement of, translocated or exotic or non-indigenous or noxious aquatic fauna (including fish and crustaceans) through the construction and operation of the proposed structure and associated pipeline
- cumulative impacts on fish and fish habitat from existing disturbances in the Fitzroy system and other proposed water infrastructure and water extraction in the catchment and the ability of the ecosystem to absorb the additional impact of the proposed weirs
- mitigation provisions to manage the identified potential impacts and effects of each activity or outcome associated with the proposed works (throughout construction and operation) on fish, fish habitat and fisheries resources. Management strategies should aim to minimise and mitigate impacts
- the commitment to initiate and continue the proposed management strategies throughout the construction and operation of the proposed works should be demonstrated
- the likely success of management measures to control excessive plant growth
- potential mechanism and their ability to ensure adequate fish and fauna passage is provided at proposed waterway barriers
- demonstrate capacity for implementing, operating and adequately maintaining the necessary fish passage measures for the life of the waterway barriers (e.g. weirs and stream crossings)
- detail alternatives to waterway crossings where possible
- measures to avoid construction during fish spawning periods, such as seasonal construction of waterway crossings and measures to facilitate fish movements through water crossings
- offsets proposed for residual impacts on fisheries values including fish habitat, connectivity, fish passage and fishing
- the need and effectiveness of artificial stocking fish programs
- details of monitoring programs of impacts of the proposed works (throughout construction and operation) and related changes to the system both in the short-term and in the long-term over the life of the dam/weir
- details of monitoring programs and evaluating the success of proposed management and mitigation strategies that should include; level of monitoring (e.g. number of sites, samples, frequency), evaluation/performance criteria, responsibility and reporting arrangements and corrective action(s) in the event that a strategy is not working

- commitments to monitoring programs for fish passage at the proposed weirs and processes and capacity for ensuring that fish passage provisions can be adjusted structurally or operationally, based on monitoring results, should be outlined
- demonstrate revision of management strategies, in the event that a strategy is shown from monitoring, to be unsuccessful.

Water resources

Description of environmental values

- 5.92 Describe the existing water resources that may be affected by the project in the context of environmental values, as defined in such documents as the EP Act, Environmental Protection (Water) Policy 2009 (EPP (Water)), *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* (Australian and New Zealand Environment and Conservation Council & Agriculture and Resource Management Council of Australia and New Zealand 2000) and the *Queensland Water Quality Guidelines 2009* (Department of Environment and Heritage Protection 2009).
- 5.93 Provide an indication of the quality and quantity of water resources in the vicinity of the project area, describing:
- existing surface and groundwater in terms of physical, chemical and biological characteristics
 - existing surface drainage patterns, flows, history of flooding including extent, levels and frequency and present water uses
 - any surface water modelling must be updated to include the most recent high flows and include pre-development and current development and full-entitlement scenario modelling. The impact of climate change on these scenarios must also be quantified.
- 5.94 Describe the environmental values of the surface waterways and groundwater of the affected area in terms of:
- values identified in the EPP (Water)
 - physical integrity, fluvial processes and morphology, including riparian zone vegetation and form, if relevant
 - any impoundments (e.g. dams, levees, weirs etc.)
 - hydrology of waterways and groundwater
 - sustainability, including both quality and quantity
 - dependent ecosystems
 - existing and other potential surface and groundwater users
 - surface waters and water bodies (including existing weirs and dams) at the site and at catchment (Fitzroy, Dawson and Mackenzie) indicating locations of the proposed works, including flood contours for example, one-in-one-year, one-in-five-year, one-in-fifty-year flood events

- the historical and current flow regime including salinity levels, seasonal flow patterns, flow volumes and flow duration curves for a range of flows at the sites and downstream of the sites
 - surface water quality, at the site and up and downstream of the site, including any seasonal variation in water quality parameters. Parameters should include temperature, dissolved oxygen, chlorophyll, water turbidity, pH, conductivities and nutrient levels
 - sediment transport and deposition patterns, including seasonal/flow related variation
 - current or proposed flow management schemes for the waterway (e.g. water resource plan, resource operations plan and interim resource operations licence) and for the proposed weirs
 - water resource plans relevant to the affected catchments.
- 5.95 The groundwater assessment should also be consistent with relevant guidelines for the assessment of acid sulfate soils, including spatial and temporal monitoring, to accurately characterise baseline groundwater characteristics.

Groundwater

- 5.96 Review the quality, quantity and significance of groundwater in the project area, together with groundwater use in neighbouring areas. Refer to relevant legislation or water resource plans for the region. The review should also provide an assessment of the potential take of water from the aquifer and how current users, the aquifer itself and any connected aquifers will be affected by the take of water.
- 5.97 The review should include a survey of existing groundwater supply facilities (bores, wells, or excavations) to the extent of any environmental harm.
- 5.98 If the project is likely to use or affect local sources of groundwater, describe groundwater resources in the area in terms of:
- location
 - geology/stratigraphy
 - aquifer type—such as confined, unconfined
 - depth to and thickness of the aquifers
 - depth to water level and seasonal changes in levels
 - groundwater flow directions (defined from water level contours)
 - interaction with surface water
 - possible sources of recharge
 - pumping parameters
 - seasonal variations (if records exist) of groundwater levels
 - potential exposure to pollution
 - current access to groundwater resources in the form of bores, springs and ponds (including quantitative yield of water and locations of access).

- 5.99 The groundwater assessment should also be consistent with relevant guidelines for the assessment of acid sulfate soils including spatial and temporal monitoring to accurately characterise baseline groundwater characteristics.
- 5.100 Develop a network of observation points that would satisfactorily monitor groundwater resources both before and after commencement of operations.
- 5.101 The data obtained from the groundwater survey should be sufficient to enable specification of the major ionic species present in the groundwater, pH, electrical conductivity and total dissolved solids.

Potential impacts and mitigation measures

- 5.102 Assess the potential impacts of the project on water resource environmental values identified in the previous section. Also, define and describe the objectives and practical measures for protecting or enhancing water resource environmental values, to describe how nominated quantitative standards and indicators may be achieved, and how the achievement of objectives will be monitored, audited and managed. Include the following:
- potential impacts on the flow and the quality of surface and groundwater from all phases of the project, with reference to their suitability for the current and potential downstream uses and discharge licences
 - potential changes in flow patterns at the site and downstream of the site, including changes in salinity levels, frequency, volumes and duration and changes in flows reaching estuarine waters. These patterns should be compared with current and pre-regulation flows in the system at a meaningful scale and presented using daily and monthly flow data rather than at an annual scale
 - potential changes in flood regimes, including changes to frequency and duration of floodplain/wetland inundation, including the estuarine reaches of the lower Fitzroy River
 - the effects on sediment transport and deposition and potential resulting erosion/scouring and changes in deposition patterns (including deposition in and around estuaries if appropriate)
 - the effects on water quality both during construction and operation at the site, in the impounded area and downstream of the site as far as the effect of the weir will extend
 - the impact of an ecologically relevant inflow-outflow release requirement and water for fishway operational requirements, on the yield of the proposed storage and its viability
 - the likelihood of poor quality water being released after the first filling, how long these water quality issues will last at the site and strategies to prevent or minimise impacts of poor quality releases. An assessment that ecologically acceptable quality water is released and that there are no significant (for fish) differences between the quality of the water released and receiving waters downstream
 - an assessment of all likely impacts on groundwater depletion or recharge regimes

- potential impacts of surface water flow on existing infrastructure, with reference to the EPP (Water) and the *Water Act 2000*
 - provide surface water modelling for full-entitlement scenarios incorporating the most recent high-flow years and the impact of climate change for both water supply management purposes and ecological risk assessment modelling
 - chemical and physical properties of any wastewater (including stormwater at the point of discharge into natural surface waters), and the toxicity of effluent to flora and fauna
 - potential impacts on other downstream receiving environments, if it is proposed to discharge water to a riverine system
 - the results of a risk assessment for uncontrolled releases to water due to system or catastrophic failure, implications of such emissions for human health and natural ecosystems, and list strategies to prevent, minimise and contain impacts
 - an assessment of the potential to contaminate surface and groundwater resources and measures to prevent, mitigate and remediate such contamination.
- 5.103 Strategies should be adequately detailed to demonstrate best practice management and that environmental values of receiving waters will be maintained to nominated water quality objectives. Describe the monitoring programs that will assess the effectiveness of management strategies for protecting water resources during the construction, operation and decommissioning of the project. Outline how these strategies are incorporated into appropriate sections of the EMP.

Surface water and water courses

- 5.104 Assess the hydrological impacts of the proposal on surface water and water courses, particularly with regard to stream diversions, scouring and erosion, and changes to flooding levels and frequencies both upstream and downstream of the project. If flooding levels will be affected, modelling of afflux should be provided and illustrated with maps.
- 5.105 Describe the location, extent and nature of all works in watercourses and wetlands, and the management of impacts associated with these works, to the extent needed for allocation of state resources and assessment for necessary permits and approvals.
- 5.106 Assess impacts of construction and inundation on existing land-based contaminant sources and the potential impacts on surface water and groundwater quality and discuss mitigation and management options.
- 5.107 Determine the extent of changes in flow and water quality in the Fitzroy River's freshwater section, estuarine section and receiving waters of the Great Barrier Reef World Heritage Area. Provide a comprehensive discussion of the implications of the predicted changes in each section.
- 5.108 Discuss the need or otherwise for licensing of any dams (including referable dams) or creek diversions, under the *Water Act 2000*.

- 5.109 Water allocation and water sources, including impacts on existing water entitlements, including water harvesting, should be established in consultation with the Department of Energy and Water Supply and the Department of Natural Resources and Mines.

Wastewater treatment

- 5.110 Reference should be made to the properties of the land disturbed and processing liquid wastes, the technology for settling suspended clays from contaminated water, and the techniques to be employed to ensure that contaminated water is contained and successfully treated on the site.
- 5.111 In relation to water supply and usage, and wastewater disposal, discuss anticipated flows of water to and from the proposal area. For proposed dams, weirs or ponds, investigate the effects of predictable climatic extremes (storm events, floods and droughts) on:
- the capacity of the water storages (dams, weirs, ponds) and the ability of these storages to retain contaminants
 - the structural integrity of the containing walls
 - relevant operating regime
 - the quality of water contained
 - flows and quality of water discharged.
- 5.112 The design of all water storage facilities should follow the technical guidelines on site water management.
- 5.113 Discuss the mitigation options and the effectiveness of mitigation measures, with particular reference to sediment, acidity, salinity and other emissions of a hazardous or toxic nature to human health, flora or fauna.

Groundwater

- 5.114 Include an assessment of the potential environmental impact caused by the project (and its associated project components) to local groundwater resources, including the potential for groundwater-induced salinity.
- 5.115 Describe the response of the groundwater resource to the progression and finally cessation of the proposal.
- 5.116 Assess the impact of the project on the local groundwater regime caused by the altered porosity and permeability of any land disturbance.
- 5.117 Assess and describe any potential for the project to impact on groundwater-dependent vegetation; describe avoidance and mitigation measures.

Air quality

Description of environmental values

- 5.118 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 2008 (EPP (Air)).

- 5.119 Discuss the existing air shed environment, both local and regional, including:
- background levels and sources of particulates, gaseous and odorous compounds and any major constituent
 - pollutants, including greenhouse gases, that may be generated by the project
 - typical baseline levels
 - data on local meteorology and ambient levels of pollutants should be gathered to provide a baseline for later studies or for the modelling of air quality environmental harms.
- 5.120 Parameters should include air temperature, wind speed and direction, atmospheric stability, mixing depth and other parameters necessary for input to the models.

Potential impacts and mitigation measures

- 5.121 Consider the following air quality issues and their mitigation:
- an inventory of air emissions from the project expected during construction and operational activities
 - ‘worst case’ emissions that may occur during operation. If these emissions are significantly higher than those for normal operations, it will be necessary to separately evaluate the worst-case impact to determine whether the planned buffer distance between the facility and neighbouring sensitive receptors will be adequate
 - ground-level predictions should be made at any site that includes the environmental values identified by the EPP (Air), including any sites that could be sensitive to the effects of predicted emissions
 - dust generation from construction activities, especially in areas where construction activities are adjacent to existing road networks or are in close proximity to sensitive receivers
 - climatic patterns that could affect dust generation and movement
 - vehicle emissions and dust generation along major haulage routes both internal and external to the project site
 - human health risk associated with emissions from the facility of all hazardous or toxic pollutants
 - impacts on terrestrial flora and fauna.
- 5.122 Detail the mitigation measures together with proactive and predictive operational and maintenance strategies that could be used to prevent and mitigate impacts.
- 5.123 Discuss potential air quality impacts from emissions, with reference to the National Environment Protection (Ambient Air Quality) Measure 2003 (Cwlth) and the EPP (Air). If an emission is not addressed in these legislative instruments, the emission should be discussed with reference to its risk to human health, including appropriate health-based guidelines/standards.

Greenhouse gas emissions

Description of environmental situation

- 5.124 Provide an inventory of projected annual emissions for each relevant greenhouse gas, with total emissions expressed in 'CO₂ equivalent' terms for the following categories:
- Scope 1 emissions—means direct emissions of greenhouse gases from sources within the boundary of the facility and as a result of the facility's activities
 - Scope 2 emissions—means emissions of greenhouse gases from the production of electricity, heat or steam that the facility will consume, but that are physically produced by another facility
- 5.125 Briefly describe method(s) by which estimates were made.
- 5.126 Use the appropriate *National Greenhouse Accounts (NGA) Factors* (Commonwealth of Australia 2010) as a reference source for emission estimates, supplemented by other sources where practicable and appropriate. As a requirement of the NGA factors, estimates should include the loss of carbon sink capacity of vegetation due to clearing and impoundment.

Potential impacts and mitigation measures

- 5.127 Discuss the potential for greenhouse gas abatement measures, including:
- the proposed measures (alternatives and preferred) to avoid and/or minimise direct greenhouse gas emissions
 - how the preferred measures minimise emissions and achieve energy efficiency
 - any opportunities to further offset greenhouse gas emissions through indirect means including sequestration and carbon trading.

Noise and vibration

Description of environmental values

- 5.128 Describe the existing noise and vibration environment that may be affected by the project in the context of the environmental values defined by the Environmental Protection (Noise) Policy 2008.
- 5.129 Identify sensitive noise receptors adjacent to all project components and estimate typical background noise and vibration levels based on surveys at representative sites. Discuss the potential sensitivity of such receptors and nominate performance indicators and standards.

Potential impacts and mitigation measures

- 5.130 Describe the impacts of noise and vibration generated during the pre-construction, construction, operational and decommissioning phases of the project. Noise and vibration impact analysis should include:

- the levels of noise and vibration generated, including noise contours, assessed against current typical background levels, using modelling where appropriate
- impact of noise, including low frequency noise (noise with components below 200 Hz) and vibration at all potentially sensitive receivers compared with the performance indicators and standards nominated above
- 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
- options for sensitive receivers that are otherwise unable to achieve a satisfactory internal noise level for the preservation of health and wellbeing as identified within the EPP (Noise).

5.131 Refer to the following documents:

- *Noise Measurement Manual* (Department of Environment and Heritage Protection 2013)
- *Guideline: Noise and vibration from blasting* (Environmental Protection Agency 2006)
- *Guideline: Planning for Noise Control* (Environmental Protection Agency 2004)
- *Australian Standard AS 2187.2-2006 Explosives – Storage and Use, Part 2 Use of Explosives* (Standards Australia 2006).

Night-time works

5.132 Provide details of any night-time work that may be undertaken. Specifically include:

- the reasons why night-time work may be undertaken (e.g. to avoid peak traffic periods, or to undertake work in a rail corridor)
- the likely duration of work (if known)
- the proposed hours of the work
- the nature of the work to be undertaken
- the likely impact on residents and the associated mitigation measures to be undertaken by the proponent
- the methods that will be used to communicate with affected residents.

Waste

Waste generation

5.133 Identify and describe all sources, likely volumes and quality (where applicable) of waste associated with pre-construction, construction, operation and decommissioning of all aspects of the project. Refer to regulated waste listed

in Schedule 7 of the Environmental Protection Regulation 2008 (Qld).
Describe:

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

Waste management

5.134 Assess the potential impact of all wastes generated during construction and operation, with regard for best practice waste management strategies, the Waste Reduction and Recycling Act 2011 and the Environmental Protection (Waste Management) Regulation 2000. Provide details of each waste in terms of:

- the options available for avoidance/minimisation
- 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
- measures to minimise attraction of vermin, insects and pests
- options available for using recycled materials
- market demand for recyclable waste (where appropriate)
- decommissioning of the construction site.

Transport

5.135 Present the transport assessment 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.

Existing infrastructure

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

- 5.137 Describe the project's impact on local and state-controlled road networks. Include an overview map(s) that shows the project's relationship with current and future local and state-controlled road networks. Include in the map(s) the location of construction activities and access locations (existing and proposed).

Transport tasks and routes

- 5.138 Describe:
- expected volumes of project inputs and outputs of transported raw materials, wastes, hazardous goods, finished products for all phases of the project
 - how identified project inputs and outputs will be moved through the transport network (volume, composition, trip timing and routes)
 - traffic generated by workforce personnel including visitors (volume, composition, timing and routes)
 - likely heavy and oversize/indivisible loads (volume, composition, timing and routes), highlighting any vulnerable bridges and structures along proposed routes.

Potential impacts and mitigation measures

- 5.139 Impact assessment reports should include:
- details of the adopted assessment methodology (for impacts on roads: the road impact assessment report in general accordance with the *Guidelines for Assessment of Road Impacts of Development* (Department of Main Roads 2006)
 - details of the adopted assessment methodology (for Assessment of Road Impacts of Development – Notes for Contribution Calculations – Main Roads Fitzroy Region (Rockhampton and Emerald Districts) for pavements impacts
 - present indicative schedules for quantities and vehicle type (as determined by the Regulation) for the construction phase of the project (refer to the *Transport Operations (Road Use Management) Act 1995* (Qld).
- 5.140 Assess project impacts on:
- local and state road networks including impacts on rail level crossings on these networks
 - capacity, safety, local amenity, efficiency and condition of transport operations, services and assets (from either transport or project operations)
 - possible interruptions to transport operations
 - the natural environment within the jurisdiction of an affected transport authority (e.g. road and rail corridors)
 - the nature and likelihood of product-spill during transport, if relevant

- driver fatigue for workers (including contractors and sub-contractors) travelling to and from regional centres and key destinations
- any existing or proposed strategies for public passenger transport and active transport and address, where relevant, requirements of Part 2A of the *Transport Planning and Coordination Act 1994* (Qld)
- access to transport for people with a disability.

Infrastructure alterations

5.141 Detail:

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

Transport management strategies

5.142 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 in close consultation with relevant transport authorities and consider those authorities' works programs and forward planning.

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

Road/rail management planning

5.144 Outline:

- procedures for assessing and agreeing on the scope of required mitigation works with road/rail corridor managers, including any associated works, such as sourcing water and gravel
- strategies to minimise the effects of project transport on existing and future public road or rail corridors
- steps to be taken to prevent access from public roads/rail corridors to the project sites
- strategies to maintain safe access to public road/rail reserves to allow road/rail/pipeline maintenance activities
- process for decommissioning any temporary access to road/rail reserves, e.g. stockpile sites

5.145 Findings of studies and transport infrastructure impact assessments should be an input into preparing a draft road-use management plan. Conditions of approval for transport management impacts should also be detailed in the EMP.

Indigenous cultural heritage

- 5.146 Identify areas covered by applications for native title claims or native title determinations, providing boundary descriptions of native title representative body(ies), and whether it is necessary to notify the representative body(ies) or if there is evidence that native title does not exist.

Description of existing Indigenous cultural heritage values

- 5.147 Describe the existing Indigenous cultural heritage values that may be affected by the project and the environmental values of the cultural landscapes of the affected area in terms of the physical and cultural integrity of the landforms.
- 5.148 Also describe how, in conjunction with the appropriate Indigenous people, the cultural heritage values were ascertained. This could include:
- the results of any Aboriginal cultural heritage survey undertaken
 - the DEHP Aboriginal Cultural Heritage Register and Database
 - any existing literature relating to Indigenous cultural heritage in the project area.

Potential impacts and mitigation measures

- 5.149 Define and describe the objectives and practical measures for protecting or enhancing Indigenous cultural heritage environmental values. Describe how nominated quantitative standards and indicators may be achieved for cultural heritage management, and describe how the achievement of the objectives will be monitored, assessed and managed.
- 5.150 To the greatest extent practicable, significant cultural heritage areas should be avoided by the project. The EIS should provide an assessment of likely effects on sites of Indigenous cultural heritage value, including but not limited to the following:
- description of the significance of artefacts, items or places of conservation or cultural heritage values likely to be affected by the project and their values at a local, regional and national level
 - recommended means of mitigating any negative impact on cultural heritage values and enhancing any positive impacts.
- 5.151 As a minimum, impact assessment, management and protection strategies should satisfy statutory responsibilities and duties of care.
- 5.152 During the EIS process, the proponent should initiate a native title agreement (NT agreement), as defined under the ACH Act that includes management and protection strategies for Indigenous cultural heritage or a cultural heritage management plan (CHMP) under the ACH Act. An NT agreement or an approved CHMP, in a form which complies with Part 7 of the ACH Act, will ensure that the project meets the Aboriginal cultural heritage duty of care imposed by the ACH Act.
- 5.153 An NT agreement or CHMP should be negotiated between the proponent and the appropriate native title/Indigenous parties and should address and include the following:

- a process for including Indigenous people associated with the development areas in protection and management of Indigenous cultural heritage
 - processes for mitigating, managing and protecting identified cultural heritage sites and objects in the project areas, including associated infrastructure developments, during both the construction and operational phases of the project
 - provisions for managing the accidental discovery of cultural material, including burials
 - a clear recording process to assist initial management and recording of accidental discoveries
 - a cultural heritage induction for project staff
 - developing a cultural heritage awareness program to be incorporated into the contractor/employee manual and induction manual. This is to be in the form of a plain language, short document that is easy for contractors and staff ‘on the ground’ to understand
 - a conflict resolution process.
- 5.154 If an NT agreement is not finalised or a CHMP has not been approved when the EIS is submitted to the Coordinator-General, the following must be provided:
- 5.155 an outline of the draft CHMP or draft plan within the NT agreement that addresses management and protection strategies for cultural heritage, subject to any confidentiality provisions, outlining the position of the relevant parties
- 5.156 details of the proposed steps and timeframes for finalising the CHMP or NT agreement.

Native title

- 5.157 Identify areas covered by applications for native title claims or native title determinations, providing boundary descriptions of native title representative body(ies), and whether it is necessary to notify the representative body(ies) or if there is evidence that native title does not exist.
- 5.158 Identify the potential for native title rights and interests likely to be impacted upon by the project and the potential for managing those impacts by an Indigenous land use agreement or other native title compliance outcomes.

Non-Indigenous cultural heritage

Description of existing non-Indigenous cultural heritage values

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

- the Queensland Heritage Register and other information regarding places of potential non-Indigenous cultural heritage significance
- any local government heritage register
- any existing literature relating to the heritage of the affected areas
- liaison with relevant community groups/organisations (e.g. local historical societies) concerning:
 - places of non-Indigenous cultural heritage significance
 - opinion regarding significance of any cultural heritage places located or identified
- locations of culturally and historically significant sites, shown on maps, that are likely to be impacted by the project
- a constraints analysis of the proposed development area to identify and record non-Indigenous cultural heritage places.

Potential impacts and mitigation measures

- 5.160 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 conservation or non-Indigenous cultural heritage value likely to be affected by the project and their values at a local, regional, state and national level
 - recommended means of mitigating any negative impacts on non-Indigenous cultural heritage values and enhancing any positive impacts
 - strategies to manage places of historic heritage significance, taking account also of community interests and concerns.
- 5.161 As a minimum, investigation, consultation, impact assessment, management and protection strategies should satisfy statutory responsibilities and duties of care, including those under the EPBC Act and *Queensland Heritage Act 1992*.

6. Social values and management of impacts

Description of existing social values

- 6.1 Conduct a social impact assessment (SIA) in consultation with the Department of State Development, Infrastructure and Planning (DSDIP) Coordinated Project Delivery Branch. Matters to be considered are detailed in the following subsections.

Social and cultural area

- 6.2 Define the project's social and cultural area of influence, including the local, district, regional and state level as relevant, taking into account the:
- potential for social and cultural impacts to occur
 - location of other relevant proposals or projects

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

Community engagement

- 6.3 Consistent with national and international good practice, and with regard to local and regional strategies for community engagement, the proponent should engage at the earliest practical stage with likely affected parties to discuss and explain the project, and to identify and respond to issues and concerns regarding social impacts.
- 6.4 Describe the community engagement processes used to conduct open and transparent dialogue with stakeholders. Include the project's planning and design stages and future operations including affected local and state authorities. Engagement processes will involve consideration of social and cultural factors, customs and values, and relevant consideration of linkages between environmental, economic, and social impact issues.
- 6.5 Discuss engagement strategies and processes, including how complaint resolution will be addressed, for all stages of the project.

Social baseline study

- 6.6 Include a targeted baseline study of the people residing in the project's social and cultural area is required to identify the project's critical social issues, potential adverse and positive social impacts, and strategies and measures developed to address the impacts. The social baseline study should be based on qualitative, quantitative, and participatory methods. It should be supplemented by community engagement processes, and reference relevant data contained in Local and State Government publications, reports, plans, guidelines and documentation, including regional plans and where available, community plans.
- 6.7 The study should describe and analyse a range of demographic and social statistics determined relevant to the project's social and cultural area including:
- demographic characteristics (including the Indigenous population), including age and gender
 - major population trends/changes that may be occurring irrespective of the project
 - total population (the total enumerated population for the social and cultural area and the full-time equivalent transient population), 18 years and older
 - estimates of population growth and population forecasts

- any other indicators determined through the community engagement process as relevant.

6.8 Describe:

- the social infrastructure including community and civic facilities, services and networks—for definition see *South East Queensland Regional Plan 2009–2031* (Department of Infrastructure and Planning 2009)
- settlement patterns including the names, locations, size, history and cultural aspects of settlement in the social and cultural area
- the identity, values, lifestyles, vitality, characteristics and aspirations of communities in the social and cultural area, including Indigenous communities
- land use and land ownership patterns including:
 - rural properties, farms, croplands and grazing areas including on-farm activities near the proposed activities
 - the number of properties directly affected by the project
 - the number of families directly and indirectly affected by the project including Indigenous traditional owners and their families, property owners, and families of workers either living on the property or workers where the property is their primary employment.
- use of the social and cultural area for forestry, fishing, recreation, business and industry, tourism, aquaculture, and Indigenous cultural use of flora and fauna.

Workforce profile

6.9 Include a profile of the workforce that describes the:

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

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

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

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

Workforce demand

- 6.13 The estimated composition of workforce by occupation, project stage and duration (including any planned construction prior to final investment decision) using the template provided at www.training.qld.gov.au

Supply issues and strategies

- Analysis of relevant local, state and national workforce profiles and labour supply
 - strategies and proposed programs for:
 - recruitment and attraction
 - population groups (including Indigenous people, women, secondary school students and unemployed and underemployed)
 - unskilled and semi-skilled labour requirements
 - structured training (apprenticeships, traineeships, graduates)
 - analysis of impact on local community workforce.
- 6.14 Content on the Training Queensland website (www.training.qld.gov.au) provides essential information, contact and relevant program details to develop the workforce management plan.

Potential impacts

- 6.15 Assess and describe the type, level and significance of the project's social impacts (both beneficial and adverse) on the local and cultural area, based on outcomes of community engagement processes and the social baseline study. Furthermore:
- describe and summarise outcomes of community engagement processes including the likely response of the affected communities, including Indigenous people
 - include sufficient data to enable affected local and state authorities to make informed decisions about the project's effect on their business and plan for the provision of social infrastructure in the project's social and cultural area. If the project is likely to result in a significant increase in the population of the area, then the proponent should consult the relevant management units of the state authorities and summarise the results of the consultations
 - address direct, indirect and secondary impacts from any existing projects and the proposed project including an assessment of the size, significance, and likelihood of these impacts at the local and regional level. Consider the following:
 - key population/demographic shifts; disruptions to existing lifestyles, the health and social wellbeing of families and communities; social dysfunction including alcohol and drugs, crime, violence, and social or cultural disruption due to population influx
 - the needs of vulnerable groups including women, children and young people, the aged and people with a disability
 - the needs of the lower socio-economic groups

- Indigenous peoples including cultural property issues
- local, regional and state labour markets, with regard to the source of the workforce. Present this information according to occupational groupings of the workforce. Detail whether the proponent, and/or contractors, is likely to employ locally or through other means and whether there are initiatives for local employment business opportunities
- proposed new skills and training related to the project including the occupational skill groups required and potential skill shortages anticipated
- how much service revenue and work from the project would be likely to flow to the project's social and cultural area
- impacts of construction and operational workforces, their families, and associated contractors on housing and accommodation availability and affordability, land use and land availability. Discuss the capability of the existing housing and rental accommodation, to meet any additional demands created by the project, including direct impacts on Indigenous people.

Cumulative impacts

- 6.16 Evaluate and discuss the potential cumulative social impacts resulting from the project including an estimation of the overall size, significance and likelihood of those impacts. In this context, 'cumulative impacts' is defined as the additional impacts on population, workforce, accommodation, housing, and use of community infrastructure and services, from the project, and other proposals for development projects in the area, which are publicly known or communicated by DSDIP, if they overlap the proposed project in the same timeframe as its construction period.
- 6.17 Discuss the concept of longitudinal cumulative impacts, or 'project fatigue', where the community in the study area has been subjected to a number of large-scale construction projects in recent years.

Mitigation measures and management strategies

- 6.18 For identified social impacts, social impact mitigation strategies and measures should be presented to address the:
- recruitment and training of the construction and operational workforces and the social and cultural implications this may have for the host community, including if any part of the workforce is sourced from outside the social and cultural area
 - housing and accommodation issues, in consultation with relevant local authorities and State Government agencies, with proposals for accommodating the project workforce and their families that avoid, mitigate or offset any short- and medium-term adverse effects on housing affordability and availability, including the rental market, in the social and cultural area

- demographic changes in the profile of the region and the associated sufficiency of current social infrastructure, particularly health and welfare, education, policing and emergency services
 - adequate provision of education, training and employment for women, people with a disability, and Indigenous peoples.
- 6.19 Describe any consultation about acceptance of proposed mitigation strategies and how practical management and monitoring regimes are proposed to be implemented.
- 6.20 Discuss special strategies that might be deployed by the proponent during all stages of the project to mitigate ‘project fatigue’ impacts.

7. Economics and management of impacts

Economics

Description of affected local and regional economies

- 7.1 Describe the existing economy in which the project is located and the economies materially impacted by the project. Include:
- a map illustrating the local and regional economies (local government areas—LGAs) that could be potentially affected by the project
 - gross regional product or other appropriate measure of annual economic production
 - demographic and employment profile of the study area as a whole and disaggregated by LGA. Include:
 - existing population (size, age, distribution)
 - existing community profiles of the LGAs directly affected by the project (household type, size, average income)
 - existing employment statistics (part-time/full-time, by occupation)
 - the regional economy’s key industries and their contribution to regional economic income
 - sufficient baseline economic data to underpin a comprehensive assessment of the direct, indirect, cumulative, costs and impacts of the project
 - the key regional markets relevant to the project:
 - labour market
 - housing and land markets
 - construction services and building inputs market
 - regional competitive advantage and expected future growth.
- 7.2 With regard to the region’s key industries and factor prices, provide information on:
- current input costs (wage rates, building costs, housing rent etc.)
 - land values in the region by type of use.

Potential impacts and mitigation measures

- 7.3 The potential impacts should consider local, regional, state and national perspectives as appropriate to the scale of the project.
- 7.4 The analysis should describe both the potential and direct economic impacts including estimated costs, if material, on industry and the community, assessing the following:
- property value
 - industry output
 - employment
 - the indirect impacts likely to flow to other industries and economies from the development of the project such as potential higher water charges for rural use and urban supply, potential impact on recreational and professional fishery (e.g. downstream, Keppel Bay), loss of strategic riparian grazing, National Resource Management and producer-funded infrastructure. This should also consider the implications of the project for future development
 - the distributional effects of the proposal including proposals to mitigate any negative impact on disadvantaged groups.

Strategies for local participation

- The assessment of economic impacts should outline strategies for local participation, including:
- strategies for assessing the cost effectiveness of sourcing local inputs from the regional economy during the construction, operation and rehabilitation phases of the project
- employment strategies for local residents including members of Indigenous communities and people with a disability, the unemployed, including a skills assessment and recruitment and training programs to be offered
- strategies responding to relevant government policy, relating to:
 - the level of training provided for construction contracts on Queensland Government building and construction contracts, with regard to the Queensland Government Building and Construction Contracts Structured Training Policy—the 10 per cent training policy (Skills Queensland 2008)
 - Indigenous employment opportunities, with regard to the Indigenous Employment Policy for Queensland Government: Building and Civil Construction Projects—the 20 per cent policy (Department of State Development, Infrastructure and Planning 2013c)
 - development of a Local Industry Participation Plan in accordance with the Local Industry Policy (Department of Employment, Economic Development and Innovation 2010) and the *Local Industry Policy Guidelines* (Department of State Development, Infrastructure and Planning 2013d) in consultation with the Office of Advanced

Manufacturing, to embrace the use of locally sourced goods and services.

Sustainable development

- 7.5 Provide a comparative analysis of how the project conforms to the objectives for 'sustainable development'—see the *National Strategy for Ecologically Sustainable Development* (Commonwealth of Australia 1992).
- 7.6 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.
- 7.7 This information is required to demonstrate that sustainable development aspects have been considered and incorporated during the scoping and planning of the project.

8. Hazard and risk

Hazard and risk assessment

- 8.1 Describe the potential hazards and risks to people and property that may be associated with the project, which may include but are not restricted to:
 - identifying potential hazards, accidents, spillages and abnormal events that may occur during all stages of the project, including possible frequency of occurrence
 - identifying all dangerous goods, explosives and hazardous substances to be used, stored, handled, processed or produced and the rate of usage
 - the protection and enhancement of human health during construction and operation of the project
 - potential wildlife hazards, natural events and implications related to climate change
 - terrorist attack (refer to Subsection 0).
- 8.2 Undertake a preliminary risk assessment for all components of the project, as part of the EIS process in accordance with *Australia/New Zealand AS/NZS ISO 31000:2009 Risk management—Principles and guidelines* (Standards Australia & Standards New Zealand 2009). With respect to risk assessment, the EIS should:
 - deal comprehensively with external and on-site risks including transport risks
 - assess risks during the construction, operational and decommissioning phases of the project
 - include an analysis of the consequences of each hazard on safety in the project area, examining the likelihood of both individual and collective consequences, involving injuries and fatalities to workers and to the public

- present quantitative levels of risks from the above analysis.
- 8.3 Provide details on the safeguards that would reduce the likelihood and severity of hazards, consequences and risks to persons, within and adjacent to the project area(s). Provide notification of planned exercises, either practical or desktop, for attendance and participation by Queensland Ambulance Service.
- 8.4 Present a comparison of assessed and mitigated risks with acceptable risk criteria for land uses in and adjacent to the project area(s).
- 8.5 Provide a risk management plan.
- 8.6 Conduct a hazard identification study to identify the nature and scale of hazards that might occur during the construction and operation of the project. This would be expected to include hazards involving:
- construction accidents
 - pipeline, processing unit or storage vessel rupture or loss of containment, and explosions and fires associated with such incidents
 - release to the environment of liquid gaseous or particulate pollutants or any other hazardous material used, produced or stored on the site
 - natural events such as cyclones, earthquakes, bushfires or local flooding.

Cumulative risk

- 8.7 The risk analysis is to address the potential impacts that may occur on the normal on-site, day-to-day activities during the construction and/or operation of the facilities. Furthermore, determine the level of change that may result on the risk contours of other relevant existing or proposed industrial facilities in the area, as a result of the proposed project (where details of such proposed facilities are provided by DSDIP or otherwise published). Individual risk criteria should be used to limit risks to individual workers and members of the public. Societal risk criteria should be used to limit risk to the affected population as a whole.
- 8.8 Identify and adopt, where appropriate, any changes to operating or storage procedures that would reduce the possibility of these events occurring, or reduce the severity of the events should they occur. Present draft risk management plans for the construction and operational phases of the project.

Health and safety

Description of public health and safety community values

- 8.9 Describe the existing health and safety values of the community, workforce, suppliers and other stakeholders in terms of the environmental factors that can affect human health, public safety and quality of life, such as air pollutants, odour, lighting and amenity, dust, noise and water.

Potential impact and mitigation measures

- 8.10 Define and describe the objectives and practical measures for protecting or enhancing health and safety community values. Describe how nominated quantitative standards and indicators may be achieved for social impacts management, and how the achievement of the objectives will be monitored, audited and managed.
- 8.11 Assess the cumulative effects on public health values and occupational health and safety impacts on the community and workforce from project operations and emissions. Recommend any practical monitoring regimes in this section.
- 8.12 Include relevant consultation with the appropriate regional health service providers.

Emergency management plan

- 8.13 Present preliminary information on the design and operation of proposed safety/contingency systems to address significant emergency issues delineated in the risk assessment, together with at least the following areas of emergency:
 - terrorist attack (refer to Subsection 0)
 - fire prevention/protection
 - leak detection/minimisation
 - release of contaminants
 - emergency shutdown systems and procedures
 - emergency response plans detailing mitigation strategies to achieve specific outcomes outlined in the State Planning Policy
- 8.14 In addition, undertake an assessment of businesses that may be affected in the event of an emergency, including strategies to mitigate the impact on these businesses.
- 8.15 Present outlines of emergency planning and response strategies to deal with relevant incidents above, which have been determined in consultation with state and regional emergency service providers (including the Queensland Police Service – Central Region), and which show integration of emergency services into the plans. Any plans should also address extreme weather events and the actions that will be undertaken to reduce the risk to communities or individuals downstream of the project during these events. Formulate and provide a copy of a major emergency incident plan, which should include contact details for key stakeholders in case of an emergency.
- 8.16 Present plans for emergency medical response and transport and first aid matters with involvement of the relevant state agencies (such as the Queensland Ambulance Service, Queensland Fire and Rescue Service and Emergency Management Queensland).

Counter-terrorism and critical infrastructure protection

- 8.17 Provide an assessment of the proposed development and its operation to determine whether these aspects are critical infrastructure as defined by the

Queensland Plan for the Protection of Critical Infrastructure from Terrorism (State of Queensland 2005), that is:

Those physical facilities, supply chains, information technologies and communication networks which, if destroyed, degraded or rendered unavailable for an extended period, would significantly impact on the social or economic well-being of Queensland.

- 8.18 If determined to be critical infrastructure, provide information on the design and operation of proposed safety and contingency systems to address the National and Queensland counter-terrorism and critical infrastructure protection legislation, policies and arrangements, including:
- *National Counter-Terrorism Plan* (National Counter-Terrorism Committee 2012)
 - *Critical Infrastructure Resilience Strategy* (Commonwealth of Australia 2010a)
 - *Critical Infrastructure Resilience Strategy Supplement: An overview of activities to deliver the Strategy* (Commonwealth of Australia 2010b)
 - *Queensland Counter-Terrorism Strategy 2008–2010* (Department of the Premier and Cabinet 2007)
 - *Queensland Infrastructure Protection and Resilience Framework* (Department of the Premier and Cabinet 2005)
 - *Queensland Government Information Security Classification Framework* (Department of Science, Information Technology, Innovation and the Arts 2013)
 - *Transport Security (Counter Terrorism) Act 2008* and Regulations
 - *Australia/New Zealand AS/NZS ISO 31000:2009 Risk management—Principles and guidelines* (Standards Australia & Standards New Zealand 2009)
 - *Handbook: Security Risk Management* (HB 167:2006) (Standards Australia & Standards New Zealand 2006)
 - *Business Continuity Management* (HB 221:2004) (Standards Australia & Standards New Zealand 2004)
 - *A Practitioners Guide to Business Continuity Management* (HB 292-2006) (Standards Australia 2006a)
 - *Executive Guide to Business Continuity Management* (HB 293-2006) (Standards Australia 2006b).
- 8.19 Such information should be provided as a separate confidential document to the Coordinator-General at the time of submission of the EIS. The Queensland Police Service (Counter-Terrorism Strategic Policy Branch and District Counter-Terrorism Liaison Officers) are to be engaged for consultation in preparation of this document.

9. Cumulative impacts

- 9.1 Summarise the project's cumulative impacts and describe these impacts in combination with those of existing or proposed project(s) publicly known or advised by DSDIP to be in the region, to the greatest extent practicable.

Assess cumulative impacts with respect to both geographic location and environmental values. Explain the methodology used to determine the cumulative impacts of the project, detailing the range of variables considered (including relevant baseline or other criteria upon which the cumulative aspects of the project have been assessed, where applicable).

10. Environmental management plan

10.1 Detail the EMPs for both the construction and operation phases of the project. The EMP should be developed from, and be consistent with, the information in the EIS. The EMP must address discrete project elements and provide life-of-proposal control strategies. It must be capable of being read as a stand-alone document without reference to other parts of the EIS.

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

- the proponent’s commitments to acceptable levels of environmental performance, including environmental objectives, performance standards and associated measurable indicators, performance monitoring and reporting
- impact prevention or mitigation actions to implement the commitments
- corrective actions to rectify any deviation from performance standards
- an action program to ensure the environmental protection commitments are achieved and implemented. This will include strategies in relation to:
 - continuous improvement
 - environmental auditing
 - monitoring
 - reporting
 - staff training
 - where relevant, a rehabilitation program for land proposed to be disturbed under each relevant aspect of the proposal.

10.3 The recommended structure of each element of the EMP is shown below:

Element/issue	Aspect of construction or operation to be managed (as it affects environmental values).
Operational policy	The operational policy or management objective that applies to the element.
Performance criteria	Measurable performance criteria (outcomes) for each element of the operation.
Implementation strategy	The strategies, tasks or action program (to nominated operational design standards) that would be implemented to achieve the performance criteria.
Monitoring	The monitoring requirements to measure actual performance (e.g. specified limits to pre-selected indicators of change).
Auditing	The auditing requirements to demonstrate implementation of agreed construction and operation environmental management strategies and compliance with agreed performance criteria.

Reporting	Format, timing and responsibility for reporting and auditing of monitoring results.
Corrective action	The action (options) to be implemented in case a performance requirement is not reached and the person(s) responsible for action (including staff authority and responsibility management structure).

10.4 The proponent's commitments to environmental performance, as described in the EMP, may be included as Coordinator-General's conditions to ensure the commitments are met. Therefore, the EMP is a relevant document for project approvals, environmental authorities and permits, and may be referenced by them.

11. Conclusions and recommendations

11.1 Make conclusions and recommendations with respect to the project, based on the studies presented, the EMP and conformity of the project with legislative and policy requirements.

12. References

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

13. Appendices

- 13.1 Provide the following as appendices to the EIS:
- final TOR for this EIS
 - TOR cross-reference table, which links the requirements of each section/subsection of the TOR with the corresponding section/subsection of the EIS, where those requirements have been addressed
 - a list of the project approvals required by the project.
 - the consultation report, as described in Part B subsections 3.13, 3.14, 3.15, (page 7).
 - a list of the relevant qualifications and experience of the key study team members and specialist sub-consultants
 - a glossary of technical terms
 - a list of abbreviations.
 - all reports generated on specialist studies undertaken as part of the EIS, including, but not limited to:
 - air quality, noise and vibration
 - groundwater and surface water hydrology
 - geology and geomorphology
 - aquatic flora and fauna
 - economic studies and/or cost-benefit analyses
 - transport studies

- cultural heritage
- hazard and risk studies
- land use studies.
- a copy of the proponent's corporate environmental policy and planning framework document.
- a list of all commitments made by the proponent in the EIS, with cross-references to the relevant section in the EIS.

Part C. Matters of national environmental significance

Environmental assessment and approval process

Background

- 1.1 On 7 January 2010, a delegate of the Commonwealth Environment Minister determined that the proposal was a controlled action under the provisions of the EPBC Act. The controlling provisions under the EPBC Act are World Heritage Properties, National Heritage Places, listed threatened species and listed migratory species. On the same day, the delegate also determined that the proposal will be assessed by EIS.

Purpose of Part C

- 1.2 This stand-alone chapter of the EIS is intended to set the scope of environmental, social, and economic studies required in the EIS to allow for an assessment and decision on the appropriateness of the construction and operation of the Lower Fitzroy River Infrastructure Project (LFRIP) in relation to MNES.
- 1.3 The MNES section of the EIS must:
- assess all the relevant impacts that the action has, will or is likely to have, including direct, indirect, facilitated and cumulative impacts
 - provide enough information about the action and its relevant impacts to allow the Commonwealth Minister for the Environment to make an informed decision whether or not to approve the action
 - address the matters set out in Division 5.2 of the Environment Protection and Biodiversity Conservation Regulations 2000 (Cwlth).

Description of the project

- 1.4 The proponents propose to sequentially develop the project. This comprises of the raising of the Eden Bann Weir and construction of a new weir near Rookwood Crossing in the Fitzroy River in Central Queensland. The objective is to secure current demand and meet future demands for water from urban populations, industry and agriculture at Rockhampton, Gladstone and the Capricorn Coast.

The proposed project area

- 1.5 The proposed developments are located on the Fitzroy River, within the lower Fitzroy-Mackenzie Catchment, Central Queensland. The project consists of the development/augmentation of the following water infrastructure:
- the Eden Bann Weir is located on the Fitzroy River at AMTD 141.2 km from the coast

- the proposed Rookwood site which is located on the Fitzroy River at AMTD 265.3 km downstream from the Riverslea Road Crossing.

Description of proposed activities

- 1.6 The LFRIP comprises the potential raising of Eden Bann Weir and/or construction of a new weir at Rookwood on the Fitzroy River in Central Queensland, approximately 80 km west and 85 km south-west of Rockhampton, respectively.
- 1.7 The proponents state that the project is likely to be staged, with staging (development levels) and timing dependant on demand triggers from existing and/or new consumers, drought conditions and/or improved security of supply for urban populations.
- 1.8 The proponents propose to undertake the following staged activities to raise the existing Eden Bann Weir:
- stage 2 of the proposal involves construction to raise the weir to FSL 18.2 m Australian Height Datum (AHD) (from existing Stage 1 of FSL 14.5 m AHD);
 - stage 3 of the project will involve the addition of gates to raise the weir structure to FSL 20.2 m AHD;
 - construction of laydown areas, batching plant areas, maintenance of existing access roads and construction of a new access road; and
 - Management of water storage behind the weir and releases downstream.
- 1.9 The proponents also propose to construct the Rookwood Weir near Rookwood Crossing. The works will be staged and include the following activities:
- Stage 1 involves the construction of a roller compacted concrete gravity weir with a FSL of 45.5 m AHD
 - Stage 2 involves the addition of gates to the Rookwood Weir to raise the structure to FSL 49 m AHD
 - Construction of laydown areas, batching plant areas, maintenance of existing access and construction of a new access road
 - Management of water storage behind the weir and releases downstream.

Timeframe

- 1.10 The Project is expected to be staged, with sequencing and timing dependant on a number of demand triggers including existing and new consumers, drought conditions and security of supply requirements. The Project will be implemented by way of a flexible strategy to allow the rapid delivery of water to meet anticipated future demands, when triggered. Investigations and preparatory works, including the EIS, are currently being carried out to facilitate that this objective is achieved. There is yet to be a decision on the order or composition in which the proposed developments will proceed.

Information and advice related to the preparation of the environmental impact statement

The objectives of an environmental impact statement

- 1.11 Environmental impact assessment depends on adequately defining those elements of the environment that may be affected by a proposed development, and on identifying the significance, risks and consequences of the potential impacts of the proposal at a local, regional and national level. The EIS will be a significant source of information on which the public and government decision makers will assess the potential environmental impacts of the proposal.
- 1.12 It is expected that additional ecological work may have to be undertaken to provide sufficient information for the EIS. The nature and level of investigations should be related to the likely extent and gravity of the potential impacts (including worse case scenarios). All potentially significant impacts of the proposal on the environment are to be investigated and analysed, and commitments to mitigate and offset any adverse impacts are to be detailed in the EIS.
- 1.13 This part provides guidelines (or terms of reference) for the drafting of the stand-alone chapter of the EIS, based on the formal requirements for the contents of an EIS provided in Section 97 of the EPBC Act and Schedule 4 of the EPBC Act Regulations 2000 (the Regulations) (Attachment 1).
- 1.14 The proponent should ensure that the EIS discusses compliance with the objectives of the EPBC Act and the principles of ecologically sustainable development as set out in the Act (Attachment 2).
- 1.15 The EIS prepared by the proponent must be approved for publication by the Minister prior to it being published in accordance with the Regulations. An invitation for anyone to give the proponent comments relating to the draft report within the period specified must also be published. After the period for comment, the proponent must take account of the comments received in finalising the EIS, which is then provided to the Minister. As this assessment is now being conducted under the bilateral arrangements, the Coordinator-General will prepare an assessment report. Following this, in accordance with Part 9, Division 1 of the EPBC Act, the Minister will decide whether to approve the proposal and attach any conditions required. The Minister will take into account any conditions imposed, or likely to be imposed, by the Queensland Government.
- 1.16 It is the responsibility of the proponent preparing the EIS to identify and address, as fully as possible, all matters relevant to this proposal and its potential impacts on MNES.
- 1.17 The EIS should provide a description of the existing environment in the area and any construction and operations proposed. All potentially significant impacts on the environment are to be investigated and analysed. The EIS should present an evaluation of the potential environmental impacts using a thorough risk-based methodology and describe proposed measures to avoid

or minimise the expected, likely, or potential impacts to as low as reasonably practicable. Any prudent and feasible alternatives should be discussed in detail and the reasons for selection of the preferred option should be clearly given.

- 1.18 The guidelines for MNES are not necessarily exhaustive and should not be interpreted as excluding from consideration currently unforeseen matters that emerge as important from environmental studies or otherwise during the course of the preparation of the EIS.

General advice

- 1.19 The MNES chapter of the EIS should be a self-contained document. It should contain sufficient information from any studies or investigations undertaken to avoid the need to search out previous or supplementary reports.
- 1.20 The MNES chapter should enable interested stakeholders and the assessing agency to understand the environmental consequences of the proposed development. Information provided in the EIS should be objective, clear, succinct and, where appropriate, be supported by maps, plans, diagrams or other descriptive detail. The body of the EIS is to be written in a style that is easily understood by the general reader. Technical jargon should be avoided wherever possible and a full glossary included. Cross-referencing should be used to avoid unnecessary duplication of text.
- 1.21 Detailed technical information, studies or investigations necessary to support the main text should be included as appendices issued with the EIS and must be clearly cross referenced, with the key relevant information from that information being distilled in the MNES chapter. Any additional supporting documentation and relevant studies, reports or literature not normally available to the public from which information has been extracted should be made available at appropriate locations during the period of public display of the EIS.
- 1.22 If there is a necessity to make use of material that is considered to be of a confidential nature, for instance information obtained in regard to traditional use or strictly of a commercial nature, the proponent may request that such information remain confidential and not be included in any publicly available document.
- 1.23 The MNES chapter should state the criteria adopted in assessing the proposal and its potential impacts, such as: compliance with relevant legislation, policies and standards; community acceptance; maximisation of environmental benefits (if any); and minimisation of risks and harm.
- 1.24 Any and all unknown variables or assumptions made in the assessment must be clearly stated and discussed. The extent to which the limitations, if any, of available information may influence the conclusions of the environmental assessment should be discussed.
- 1.25 The MNES chapter should comprise three elements:
- the executive summary;
 - the main text of the document, which should be written in a clear and concise manner so as to be readily understood by general readers; and

- appendices containing:
 - a copy of these guidelines
 - detailed technical information or other sensitive commercial or cultural information.
- 1.26 Section 1.28 in Part C of this TOR details the required content of the MNES chapter and has been set out in a manner that may be adopted as the format for the stand-alone chapter. This format need not be followed where the required information can be more effectively presented in an alternative way. However, all requirements set out in the EPBC Act and Regulations must still be addressed.
- 1.27 The MNES chapter of the EIS should be written so that any conclusions reached can be independently assessed. To this end all sources must be appropriately referenced.

Specific content requirements

- 1.28 Schedule 4 of the EPBC Act Regulations 2000, which sets out the matters that must be addressed in an EIS, is provided at Attachment 1. The following content requirements are based on these matters with the addition of directions specific to the proposed action and the receiving environment, and additional advice on presentation and consultation that have proven valuable in communicating with members of the public and specific interest groups.

Executive summary

- 1.29 An executive summary that outlines the key findings of the MNES chapter should be provided. The executive summary should briefly:
 - (1) state the background and the need for the proposal
 - (2) discuss alternative infrastructure configurations to capture the additional unallocated water and the reasons for selecting the preferred option and rejecting the alternatives
 - (3) summarise the pre-operational (construction), operational and post-operational activities associated with putting the proposal into practice
 - (4) state the proposed schedule for key activities and the expected duration of the proposal
 - (5) provide an overview of the existing regional and local environments, summarising the features of the physical, biological, social and economic environment relating to the proposal and associated activities
 - (6) describe the expected, likely and potential impacts of the proposal on the environment during pre-operational, operational and post-operational phases
 - (7) summarise the environmental protection measures and safeguards, offsets and monitoring to be implemented for the proposal
 - (8) provide an outline of the environmental record of each of the proponents.

Description of the action

- 1.30 The MNES chapter is to provide a description of the background of the proposal (or action). This is to include:
- (1) The title of the action
 - (2) The full name and postal address of the designated proponent
 - (3) A clear outline of the objectives of the action
 - (4) The location of the action
 - (5) The background to the development of the action
 - (6) How the action relates to any other actions (of which the proponent should reasonably be aware) that have been, or are being, taken or that have been approved in the region affected by the action
 - (7) The current status of the action
 - (8) The consequences of not proceeding with the action
 - (9) A brief explanation of the scope, structure and legislative basis of the MNES chapter of the EIS
 - (10) The specific EPBC matters affected by the action, and any additional approvals needed under the EPBC Act
 - (11) A description of government planning policies and statutory controls which will influence the Project. All applicable jurisdictions and areas of responsible authorities within the area should be listed and shown on maps at appropriate scales.
- 1.31 In relation to the requirement to describe all components of the action, all construction and operational components of the action should be described in detail. This includes date or time period over which construction will take place, exact dimensions of structures to be built and materials, equipment and machinery to be used as well as construction access requirements, laydown areas and workforce accommodation arrangements. Details of proposed maintenance, monitoring and enforcement programs to help limit the impacts of the ongoing road operations on MNES, along with the resources available to support these programs, should also be addressed.
- 1.32 A discussion of the assumptions underlying the predicted operation of the proposal and associated changes in the activities undertaken in the surrounding environment, including use of supporting facilities such as maintenance and storage yards, must be provided.

Matters of national environmental significance

- 1.33 In relation to MNES addressed in the description of the action, an inventory of surveys, whether office-based or field-based, must be provided. These may be provided as appendices, but must at least be fully referenced and must be made publicly available unless the department is furnished with compelling reasons not to do so. Any anticipated future surveys to be conducted in relation to matters of national environmental significance, whether office-based or field-based, must also be discussed.

- 1.34 Output from the protected matters search tool (accessible from the department's website) must be also included as an appendix. The results, indicating the presence of matters of national environmental significance, must also be provided. Any species or values considered likely or known to occur in areas impacted by the controlled action must be addressed. The description of matters of national environmental significance should focus on, but not be limited to the following controlling provisions:
- Listed threatened species and ecological communities (sections 18 &18A)
 - Listed migratory species (sections 20 &20A)
 - World Heritage Properties (sections 12 &15A)
 - National Heritage Places (sections 15B &15C).
- 1.35 The discussion of impacts on matters of national significance should be structured by controlling provisions.

Consultation

- 1.36 Details of any consultation about the action must be provided. This is to include:
- (1) consultation that has already taken place
 - (2) if there has been consultation about the proposed action — any documented response to, or result of, the consultation
 - (3) any further proposed consultation about potential impacts of the action.

Alternatives to the proposal

- 1.37 This section should describe, to the extent reasonably practicable, any prudent and feasible alternatives to the action, including:
- (1) if relevant, the alternative of taking no action
 - (2) a comparative description of the adverse and beneficial impacts of each alternative infrastructure and location on the matters protected by the controlling provisions for the action
 - (3) sufficient detail should be provided to make clear why any alternative is preferred to another
 - (4) the reasons for choosing the preferred location and option should be explained, including a comparison of the adverse and beneficial effects used as a basis for selection, and compliance with the objectives of the EPBC Act (including the principles of ecologically sustainable development)
 - (5) the advantages and disadvantages of alternatives when considered against relevant matters protected under the EPBC Act must be specifically addressed; and
 - (6) short, medium and long-term advantages and disadvantages of the options should be considered.

The proposal description

- 1.38 This section should describe the proposal in sufficient detail to allow an understanding of all stages and components, and assist in determining potential environmental impacts associated with the proposal. Those elements with potential implications for matters protected under Part 3 of the EPBC Act must be highlighted.
- 1.39 The description should include the use of aerial photographs, maps, figures and diagrams, where appropriate. A general location map should be provided that illustrates the distances of the notional development areas and the locations of any which are consequential to the action. The map should include the location of known potential future expansions or new developments such as the proposed Nathan Dam, Connors River Dam and Gladstone-Fitzroy Pipeline which also occur within the Fitzroy River Catchment. The map should also include the details of any proposed agricultural, residential and or infrastructure which will be facilitated by the project. Reference should be made to detailed technical information in appendices where relevant.

Project details

- 1.40 The description of the action should cover:
- (1) the environmental principles on which the action will be managed;
 - (2) all the components of the action including:
 - (a) site selection
 - (b) site preparation
 - (c) development options
 - (d) associated infrastructure
 - (e) construction
 - (f) commissioning
 - (g) operation
 - (h) related maintenance activities
 - (i) decommissioning time frames and approach.
 - (3) The location of works to be undertaken, structures to be built or other elements of the action that may have relevant impacts. This should include but not be limited to:
 - (a) Eden Bann Weir
 - (b) Rookwood Weir
 - (c) any associated water supply infrastructure and pipelines.
 - (4) How the works are to be undertaken and design parameters for those aspects of the structures or elements of the action that may have relevant impacts. This should include:
 - (a) an explanation of the anticipated timetable for the construction, commissioning, operation and decommissioning
 - (b) details of the construction, commissioning, operational and decommissioning equipment to be used

- (c) a description of the proposed operational regime of the Eden Bann Weir and Rookwood Weir.
- (5) Number and source of staff, and training in relation to environmental management matters for staff involved in all phases of the project.

The existing environment

- 1.41 This section should provide a description of the project area including its existing freshwater physiography, flora and fauna, and all relevant socio-economic considerations. This section should also contain a detailed description of the existing river conditions including seasonal flow regimes. The section should link the existing environment to the proposal's requirements, potential impacts, as well as any proposed mitigation measures throughout construction and operation.

Physical environment

- 1.42 This section must describe the following elements of the environment related to the proposed development:
- (1) Climate and atmospheric characteristics (air quality, seasonal temperatures, humidity, wind, evaporation and annual and monthly rainfall)
 - (2) Include details of the historic and current flow regimes (from the past 10 years) of the Fitzroy River at the following gauging stations:
 - The Gap (Station Number: 033285)
 - Riverslea (Station Number: 039044)
 - Laurel Bank (Station Number: 039347)Include the historic and current flow regimes of the Mackenzie River at the following gauging station:
 - Coolmaringa gauging station (Station Number: 535024)Include the historic and current flow regimes of the Dawson River at the following gauging station:
 - Beckers gauging station monitoring site (site ID 130322A)Information from gauging stations should be displayed in the form of a flow duration curve, hydrograph and total average megalitres per month.
 - (3) Provide information and a detailed map displaying all current land use (industrial, residential, agricultural and vegetated) within the Fitzroy River catchment.
 - (4) Provide up-to-date information on the current sediment loads, herbicides, pesticides and water quality parameters (TN, TP, TSS, DO) entering the Great Barrier Reef from the Fitzroy Catchment. This information must be measured over a range of hydrological events including baseflows and high flow events,
 - (5) Determine extent of changes in flow and water quality in the Fitzroy River estuary and adjacent waters of the GBRMP:
 - (a) If changes to flows and water quality in the Fitzroy River Estuary are considered to be significant, provide baseline information on

the current state of the Fitzroy River estuary, information should include but not be limited to:

- (b) Mapping of the location and extent of seagrass beds at the mouth of the Fitzroy River Estuary
 - (c) Mapping of the location and extent of mangrove communities
 - (d) A description of the current hydrology of the Fitzroy River estuary including information on the limit of saltwater intrusion
 - (e) Provide detailed information on the frequency and limit of floodwaters into the Fitzroy River estuary and Great Barrier Reef from a range of hydrological events.
- (6) Provide a description of the biodiversity and biogeography of the receiving environment. Sensitive environments should be identified along with key ecological relationships and interdependencies (e.g. fish spawning aggregations, flora and fauna relationships etc) with particular attention to the environment within the Fitzroy River, the estuary and the receiving environment in the Great Barrier Reef World and National Heritage Area.
- (7) Include a summary of the location, size and breeding status of threatened species listed under the EPBC Act which are likely to occur in the area surrounding the proposal:
- Information on listed threatened species should include but not be limited to:
- (a) the importance of habitat in a local, regional and national context
 - (b) local and regional representation
 - (c) conservation and biodiversity values
 - (d) economic and cultural values of species
 - (e) the extent (in hectares) of any areas of important or unique habitat.
- (8) Identification of any existing or proposed reserves in or neighbouring the project and their status. Include the reserve characteristics, status, IUCN category, and values and relevant management strategies.

Socio-economic and cultural environment

1.43 Discussion of the socio-economic and cultural environment should provide:

- (1) A description of all existing uses and users of the notional development areas and zones of the Fitzroy catchment. Include a discussion of scientific research, tourism, commercial, traditional and recreational fishing (where relevant).
- (2) A description of government planning policies and statutory controls which will influence the project, surrounding areas of future, planned and current use. All applicable jurisdictions and areas of responsible authorities within the area should be listed and shown on maps at appropriate scales.
- (3) Any places with known or anticipated heritage, social or cultural values, such that they have been recognised with listing or recording under

relevant Commonwealth legislation or are anticipated to be listed under such legislation.

Impacts of the action

- 1.44 This section must include:
- (1) a description of all relevant potential impacts of the action
 - (2) a statement whether any relevant potential impacts are likely to be unknown, unpredictable or irreversible
 - (3) analysis of the significance of the relevant potential impacts
 - (4) any technical data, any sources of authority, and other information used or needed to make a detailed assessment of the relevant potential impacts. Reliability of forecasts and predictions, confidence limits and margins of error should be indicated as appropriate
 - (5) a detailed assessment of the nature and extent of the potential short term and long term relevant impacts including on listed threatened species and ecological communities and listed migratory species and on listed marine species (under part 4 of the EPBC Act).

General impacts

- 1.45 This section must include:
- (1) Discussion of potential impacts to habitat for listed threatened species which are likely to be impacted during construction, inundation and operation.
 - (2) Discussion of potential impacts which may arise through the transportation, storage and use of dangerous goods (if any), fuels and chemicals, such as accidental spills.
 - (3) In discussing potential impacts, consider how the interaction of extreme environmental events and any related safety response may impact on the environment.
 - (4) Consideration of potential impacts throughout the life of the proposal – from construction, commissioning and operation through to decommissioning.

Impacts to threatened species and ecological communities

- 1.46 This section must include:
- (1) Discussion of the potential impacts of the proposal, with particular emphasis to be given to providing details on the potential impacts to the receiving environment's unique flora and fauna as identified and to any protected areas in the vicinity. In particular the stand-alone chapter must include, but not be limited to:
 - (a) details of the extent of threatened ecological communities listed under the EPBC Act which are likely to be inundated during filling and operation of the proposal and

- (b) details of the location and number of listed flora and fauna species which are likely to be inundated during filling and operation of the proposal.
- (2) Provide an assessment of the likely impacts to the Fitzroy River Turtle (*Rheodytes leukops*), the EIS must address all requirements set out in **Attachment 3** of the Guidelines.
- (3) An assessment of all potential and likely impacts to the Yellow Chat (Dawson), during operation of the proposal. In particular the EIS must include, but not be limited to:
 - (a) An assessment of the location of all habitat for the Yellow Chat (Dawson) in the lower Fitzroy River.
 - (b) An assessment of the likely and potential impacts of the LFIP to populations of Yellow Chat (Dawson) in the lower Fitzroy River.
- (4) Provide an assessment of the potential and likely impacts to the vulnerable Black Iron Box (*Eucalyptus raveretiana*) during construction and operation of the LFIP. Information must include, but not be limited to:
 - (a) The location of suitable habitat for the Black Iron Box in the lower Fitzroy River.
 - (b) Information on the size of Black Iron Box populations and likely impacts from construction and operation of the LFIP.
- (5) Provide an assessment of the potential and likely impacts of construction and operation on ecological communities which are listed as threatened under the EPBC Act. Information must include, but not be limited to:
 - (a) The location of suitable habitat for ecological communities in the lower Fitzroy River.
 - (b) Information on the extent and likely impact of construction and operation of the LFIP to listed ecological communities.
- (6) Discuss how the project would be consistent with approved conservation advice for the species or community.

Impacts to listed migratory species

1.47 This section must include:

- (1) The MNES chapter must also consider potential impacts to species listed as migratory such as marine turtles, dugong, snub-fin and Indo-Pacific humpback dolphins which occur or potentially occur in estuarine and marine areas related to the proposal. An evaluation of the significance, occurrence (including conservation status, distribution, population viability and habitat requirements) should also be included in this section.

Impacts to world heritage places

1.48 This section must:

- (1) Provide an assessment of all potential and likely impacts to the World Heritage values of the Great Barrier Reef World Heritage Area during both construction and operation of the proposal.

Impacts to national heritage places

1.49 This section must:

- (1) Provide an assessment of all potential and likely impacts to the National Heritage values of the Great Barrier Reef during both construction and operation of the proposal.

Conclusion

1.50 Include an overall conclusion as to the environmental acceptability of the proposal on each MNES, including:

- (a) a discussion on the consideration with the requirements of the EPBC Act, including the objects of the EPBC Act, the principles of ecologically sustainable development and the precautionary principle
- (b) reasons justifying undertaking the proposal in the manner proposed, including the acceptability of the avoidance and mitigation measures
- (c) if relevant, a discussion of residual impacts and any offsets and compensatory measures proposed or required for significant residual impacts on MNES, and the relative degree of compensation and acceptability.

Physical and biodiversity impacts due to proposed hydrological changes

- (1) Provide an assessment and discussion of how construction, inundation and operation will impact on the morphology of the Fitzroy River. This should also provide an assessment and discussion of the impact that changes to flow regimes will have on the morphology of the Fitzroy River including:
 - (a) Riffles and pools downstream of the proposed Rookwood and Eden Bann Weirs
 - (b) The stream bed including the potential for armouring and clear water impacts.
 - (c) Rates of erosion, sedimentation and deposition between the proposed Rookwood Weir and Eden Bann Weir.
 - (d) A discussion of how the proposed action will affect rates of erosion, sedimentation and deposition below the Eden Bann Weir.
- (2) Consider potential impacts to fauna and flora species (composition and population densities), considering changes to overall communities, community types, propagation of species and potential barriers to movement;
- (3) Consider potential impacts to macrobenthic species, fish and larger marine fauna species (composition and population densities), including

changes to communities, breeding success, habitat, potential barriers or disturbances to migration or migratory patterns and other wildlife movements.

- (4) Consider potential impacts, if any, on rare, threatened, or otherwise valuable flora and fauna, communities (particularly listed threatened species and communities, listed marine species including cetaceans and listed migratory species) and habitat, conservation areas and protected areas, in particular the Great Barrier Reef World Heritage Area.
- (5) Consider potential impacts arising from the introduction and/or spread of exotic pest species.

Cumulative impacts of the action

1.51 The MNES chapter should identify and address cumulative impacts, where potential project impacts are in addition to existing impacts of other activities, (including known potential future expansions or developments by SunWater and other proponents in the vicinity). Where relevant to the potential impact, risk assessment should be conducted and documented. The risk evaluation should include known potential future expansions or developments by GAWB, SunWater and other proponents. Information on cumulative impacts must include, but not be limited to:

- (a) Discussion of the range of developments which will be facilitated by the proposed action.
- (b) Discussion of the developments which are likely to be facilitated by the proposal and how these will influence sediment, nutrients, herbicides, pesticides loads in the Fitzroy River and the Great Barrier Reef.
- (c) Discussion of any potential future changes to flow regimes which are likely to result from any increases to water demand.
- (d) Discussion of the impacts of other water infrastructure projects both directly and indirectly related to the proposal and the LFRIP in a regional context.

Consequential impacts

1.52 The purpose of the proposal is to provide increased water security and facilitate additional agricultural, residential and industrial development in the lower Mackenzie-Fitzroy sub-catchment and the Gladstone State Development Area. Given this the EIS is to address the following:

- (1) Provide a detailed assessment of the likely impacts that facilitating these developments will have on the following:
 - (a) The World Heritage values of the Great Barrier Reef World Heritage Area
 - (b) The National Heritage Values of the Great Barrier Reef World Heritage Area
 - (c) Habitat for listed threatened species and ecological communities
 - (d) Habitat for listed migratory species.

- (2) Provide information on any likely changes to water quality which are from developments (residential, agricultural and/or industrial) facilitated by increased water security, information should include (but not limited to):
 - (a) Sediment loads and turbidity
 - (b) Nutrient loads
 - (c) Agricultural fertilisers, herbicides, pesticides, fertilisers
 - (d) Acidic run-off and leaching from excavated acid sulfate soils
 - (e) Stormwater management in residential areas.
- (3) Provide an assessment and discussion of the likely impacts that any changes to water quality will have on the ecological health of the Fitzroy River estuary and Great Barrier Reef World Heritage Area.

Safeguards, mitigation measures and monitoring, offsets

- 1.53 The EIS is to outline the proposed safeguards and mitigation measures to be put in place for every phase of the proposed action to deal with relevant (potential and anticipated) impacts of the action. This must include:
- (1) A consolidated list of mitigation measures proposed to be undertaken to prevent, minimise or treat the relevant potential impacts of the action (impacts upon matters protected under Part 3 of the EPBC Act and as discussed in Section 6, including any mitigation measures proposed to be taken by State governments, local governments or the proponent.
 - (2) A description and an assessment of the expected or predicted effectiveness of, the mitigation measures.
 - (3) Any statutory or policy basis for the mitigation measures
 - (4) The cost of the mitigation measures.
 - (5) The name of the agency responsible for endorsing or approving each mitigation measure or monitoring program.
- 1.54 Particular focus should be given to:
- (1) Determining factors in the planning of the proposal so as to avoid damage to the environment.
 - (2) Measures to avoid or minimise damage to the Great Barrier Reef World Heritage Area and estuary environment.
 - (3) Measures to avoid or minimise damage to the National Heritage Values of the Great Barrier Reef.
 - (4) Measures to avoid or minimise disturbance to fauna and flora found around and within the proposal area (particularly listed threatened species and listed migratory species).
 - (5) Staff training, including training in relation to environmental issues.
- 1.55 Environmental offsets are broadly understood to mean actions taken outside a development site that compensate for the impacts of that development - including direct, indirect or consequential impacts. Environmental offsets provide an opportunity to achieve long-term conservation outcomes whilst providing flexibility for proponents seeking to undertake development which

will have environmental impacts. Offsets are not intended to replace avoidance and mitigation which are expected to be the primary strategies for managing the potential impacts of development proposals.

- 1.56 This section should outline plans to offset the potential impacts of the action. Environmental offsets may be appropriate when they:
- are necessary or convenient to protect or repair impacts to a protected matter – i.e. a matter of national environmental significance or the environment more broadly
 - relate specifically to the matter (for example, species) being impacted
 - seek to ensure that the health, diversity and productivity of the environment is maintained or enhanced.

Monitoring and reporting

- 1.57 Appropriate baseline data requirements are to be identified as part of the EIS to form the basis for baseline measurement and ongoing monitoring of environmental parameters. It must be demonstrated that the proposed methods for baseline measurements and subsequent monitoring are scientifically and statistically sound. This section should identify parameters to be monitored and their response trigger values and response activities.
- 1.58 This section is to also identify and describe monitoring programs, procedural and compliance audit programs and reporting requirements and arrangements which will demonstrate the effectiveness of management and monitoring (linked to environmental management systems (EMS) / environmental management plan (EMP) procedures – see below).
- 1.59 The proponent must, in addition to outlining proposed programs, clearly identify what is to be monitored and why. Monitoring programs should be designed to provide objective evidence regarding activities associated with the proposal and if these activities are adversely impacting on the environment in the short, medium and long term.
- 1.60 Monitoring programs should demonstrate consideration of:
- (1) Ecosystems and habitats, flora and fauna (particularly listed threatened species/ecological communities and listed migratory species), and water quality issues.
 - (2) Measuring the effectiveness of mitigation and/or rehabilitation measures.
 - (3) Documenting the difference between predicted and actual impacts.
 - (4) Methods for identification of non-predicted impacts and appropriate reporting and remedial measures.
 - (5) Application and effectiveness of emergency and contingency plans.
 - (6) Review of consultation and management arrangements with regulatory authorities and the community.

Environmental management system

- 1.61 The overall environmental management philosophy to be applied to the areas affected by the proposal is to be enunciated. An outline of the proposed EMS

is to be contained in the EIS document. It should include summary details of audit protocols and reporting procedures.

- 1.62 Reference should be made within the outline of the EMS to consultation, relevant legislation, standards adopted, safeguards planned, management practices, monitoring programs and emergency contingency plans. Reference should also be made to EMPs to manage impacts on the World and National Heritage values of the Great Barrier Reef, listed threatened species and communities and listed migratory species.
- 1.63 An outline of the EMP should be presented in this section of EIS. It should, as a minimum, detail:
- (1) monitoring arrangements
 - (2) reporting arrangements
 - (3) feedback of monitoring results into project management.
- 1.64 Details of requirements for the preparation of EMPs under other relevant legislation should also be provided. In an effort to minimise duplication, areas of consistency between separate requirements should also be highlighted.

Other approvals and conditions

- 1.65 The EIS is to include information on other approvals to be obtained and their associated conditions. This must include the following:
- (1) A description of any approval that has been obtained from a State, or Commonwealth agency or authority (other than an approval under the EPBC Act), including any conditions that apply to the action.
 - (2) A statement identifying any additional approval that is required.
 - (3) A description of the monitoring, enforcement and review procedures that apply, or are proposed to apply, to the action.
 - (4) Details of any local or State government planning scheme, or plan or policy under any local or State government planning system (including licensing and permitting requirements) that deals with the proposed action, including:
 - (a) What environmental assessment of the proposed action has been, or is being, carried out under the scheme, plan or policy.
 - (b) How the scheme provides for the prevention, minimisation and management of any relevant potential impacts.

Environmental record

- 1.66 The EIS must include the environmental record of the proponent. This should include details of any proceedings under a Commonwealth, State or Territory law for the protection of the environment or the conservation and sustainable use of natural resources against the person proposing to take the action. If the person proposing to take the action is a corporation, details of the corporation's environmental policy and planning framework must be provided.

- 1.67 Information relating to the persons' environmental record should also include any accreditations (for example ISO 14001), environmental awards, and other recognition for environmental performance.

Conclusion

- 1.68 An overall conclusion as to the environmental acceptability of the proposal should be provided, including discussion on compliance with the objectives and requirements of the EPBC Act including the principles of ESD (see Attachment 2). Reasons justifying undertaking the proposal in the manner proposed should also be outlined. The conclusion should highlight measures proposed or required by way of mitigating any unavoidable impacts on the environment.

Information sources

- 1.69 Information sources used in the formulation of the EIS are to be provided. This section will describe consultations and studies undertaken in the course of proposal formulation and preparation of the draft EIS, and sources of information and technical data. The following must be provided for information given:
- (1) the source of the information
 - (2) how recent the information is
 - (3) how the reliability of the information was tested
 - (4) what uncertainties (if any) are in the information.
- 1.70 Any further or ongoing consultations or studies should be outlined here.

Reference list and bibliography

- 1.71 The reference list and bibliography provided in the EIS is to be accurate and concise and include the address of any internet pages used as data sources.

Appendices and glossary

- 1.72 Detailed technical information studies or investigations necessary to support the main text of the EIS, but not suitable for inclusion in the main text should be included as appendices; for example, detailed technical or statistical information, maps, risk assessment, baseline data, supplementary reports etc. A copy of the TOR should also be included. A glossary defining technical terms and abbreviations used in the text should be included to assist the general reader.

Additional social and economic matters

- 1.73 Section 136(1)(b) of the EPBC Act requires the Minister to consider economic and social matters when deciding whether to grant approval to the proposed action under Part 9 of the EPBC Act. The requirements under s136(1)(b) encompass a broad range of matters that may be considered than those addressed during the assessment of the potential impacts of a controlled action. Accordingly, information should be provided in the EIS on the broad

social and economic impacts (positive or negative) of the proposal for the purposes of the Part 9 decision on approval.

- 1.74 As the matters protected by the controlling provisions for this action include "the environment", there is the potential for an overlap between the information provided in response to this, and the information requested in the main body of the guidelines in relation to social, economic and cultural aspects within the definition of the environment. The latter set of information need not be repeated if it will be contained in the body of the EIS.

Abbreviations and acronyms

Acronym/ abbreviation	Definition
ACH Act	<i>Aboriginal Cultural Heritage Act 2003</i> (Qld)
AS/NZS	Australian standard/New Zealand standard
CAMBA	China–Australia Migratory Bird Agreement
CHMP	cultural heritage management plan
DEEDI	Former Department of Employment, Economic Development and Innovation, Queensland (now DSDIP) ¹
DERM	Former Department of Environment and Resource Management, Queensland ¹
DNRM	Department of Natural Resources and Mines
DSDIP	Department of State Development, Infrastructure and Planning, Queensland (formerly DEEDI) ¹
EIS	environmental impact statement
EMP	environmental management plan
EP Act	<i>Environmental Protection Act 1994</i> (Qld)
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i> (Cwlth)
EPP	Environmental Protection Policy (water, air, waste, noise)
ERA	environmentally relevant activity
EVNT	endangered, vulnerable and near threatened species
FSL	full supply level
GAWB	Gladstone Area Water Board (the proponent)
JAMBA	Japan–Australia Migratory Bird Agreement
ML	megalitres
MNES	matters of national environmental significance (under the EPBC Act)
MRA	<i>Mineral Resources Act 1989</i> (Qld)
NC Act	<i>Nature Conservation Act 1992</i> (Qld)
NGA	National Greenhouse Accounts
NT agreement	native title agreement
REDD	Regional Ecosystem Description Database
RL	Reduced Level
ROKAMBA	Republic of Korea–Australia Migratory Bird Agreement
SDPWO Act	<i>State Development and Public Works Organisation Act 1971</i> (Qld)
DoE	Australian Government Department of the Environment
SIA	social impact assessment
SPA	<i>Sustainable Planning Act 2009</i> (Qld)

¹ Following a change of government in April 2012, the names of some Queensland Government departments changed. Details of the new departments are available in Administrative Arrangements Order (No. 3) 2012, which is available from www.bookshop.qld.gov.au/documents/03.04.12Extra77.pdf

SunWater	SunWater Limited (the proponent)
The proponent	Gladstone Area Water Board (GAWB) and SunWater Limited (SunWater)
TMR	Department of Transport and Main Roads, Queensland
TOR	terms of reference
VM Act	<i>Vegetation Management Act 1999</i> (Qld)

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Appendix 1. Matters that must be addressed in an EIS (Schedule 4 of the EPBC Act Regulations 2000)

1. General information

- (1) The background of the action including:
 - (a) the title of the action
 - (b) the full name and postal address of the designated proponent
 - (c) a clear outline of the objective of the action
 - (d) the location of the action
 - (e) the background to the development of the action
 - (f) how the action relates to any other actions (of which the proponent should reasonably be aware) that have been, or are being, taken or that have been approved in the region affected by the action
 - (g) the current status of the action
 - (h) the consequences of not proceeding with the action.

2. Description

- (2) A description of the action, including:
 - (a) all the components of the action
 - (b) the precise location of any works to be undertaken, structures to be built or elements of the action that may have relevant impacts
 - (c) how the works are to be undertaken and design parameters for those aspects of the structures or elements of the action that may have relevant impacts
 - (d) relevant impacts of the action
 - (e) proposed safeguards and mitigation measures to deal with relevant impacts of the action
 - (f) any other requirements for approval or conditions that apply, or that the proponent reasonably believes are likely to apply, to the proposed action
 - (g) to the extent reasonably practicable, any feasible alternatives to the action, including:
 - (i) if relevant, the alternative of taking no action
 - (ii) a comparative description of the impacts of each alternative on the matters protected by the controlling provisions for the action
 - (iii) sufficient detail to make clear why any alternative is preferred to another
 - (h) any consultation about the action, including:

- (i) any consultation that has already taken place
 - (ii) proposed consultation about relevant impacts of the action
 - (iii) if there has been consultation about the proposed action — any documented response to, or result of, the consultation
- (i) identification of affected parties, including a statement mentioning any communities that may be affected and describing their views.

3. Relevant impacts

- (3) Information given under paragraph (2) (d) must include:
- (a) a description of the relevant impacts of the action
 - (b) a detailed assessment of the nature and extent of the likely short term and long term relevant impacts
 - (c) a statement whether any relevant impacts are likely to be unknown, unpredictable or irreversible
 - (d) analysis of the significance of the relevant impacts
 - (e) any technical data and other information used or needed to make a detailed assessment of the relevant impacts.

4. Proposed safeguards and mitigation measures

- (4) Information given under paragraph (2) (e) must include:
- (a) a description, and an assessment of the expected or predicted effectiveness of, the mitigation measures
 - (b) any statutory or policy basis for the mitigation measures
 - (c) the cost of the mitigation measures
 - (d) an outline of an environmental management plan that sets out the framework for continuing management, mitigation and monitoring programs for the relevant impacts of the action, including any provisions for independent environmental auditing
 - (e) the name of the agency responsible for endorsing or approving each mitigation measure or monitoring program
 - (f) a consolidated list of mitigation measures proposed to be undertaken to prevent, minimise or compensate for the relevant impacts of the action, including mitigation measures proposed to be taken by State governments, local governments or the proponent.

5. Other Approvals and Conditions

- (5) Information given under paragraph (2) (f) must include:

- (a) details of any local or State government planning scheme, or plan or policy under any local or State government planning system that deals with the proposed action, including:
 - (i) what environmental assessment of the proposed action has been, or is being, carried out under the scheme, plan or policy
 - (ii) how the scheme provides for the prevention, minimisation and management of any relevant impacts
- (b) a description of any approval that has been obtained from a State, Territory or Commonwealth agency or authority (other than an approval under the Act), including any conditions that apply to the action
- (c) a statement identifying any additional approval that is required
- (d) a description of the monitoring, enforcement and review procedures that apply, or are proposed to apply, to the action.

6. Environmental record of person proposing to take the action

- (6) Details of any proceedings under a Commonwealth, State or Territory law for the protection of the environment or the conservation and sustainable use of natural resources against:
 - (a) the person proposing to take the action and
 - (b) for an action for which a person has applied for a permit, the person making the application.
 - (c) If the person proposing to take the action is a corporation — details of the corporation's environmental policy and planning framework.

7. Information sources

- (7) For information given the EIS must state:
 - (a) the source of the information, and
 - (b) how recent the information is, and
 - (c) how the reliability of the information was tested, and
 - (d) what uncertainties (if any) are in the information.

Appendix 2. The objects of the *Environment Protection and Biodiversity Conservation Act 1999*

1. Objects of the Act

- (a) to provide for the protection of the environment, especially those aspects of the environment that are matters of national environmental significance
- (b) to promote ecologically sustainable development through the conservation and ecologically sustainable use of natural resources
- (c) to promote the conservation of biodiversity
- (d) to promote a co-operative approach to the protection and management of the environment involving governments, the community, land-holders and indigenous peoples
- (e) to assist in the co-operative implementation of Australia's international environmental responsibilities
- (f) to recognise the role of indigenous people in the conservation and ecologically sustainable use of Australia's biodiversity, and
- (g) to promote the use of indigenous peoples' knowledge of biodiversity with the involvement of, and in co-operation with, the owners of the knowledge.

2. Principles of Ecologically Sustainable Development

The following principles are principles of ecologically sustainable development:

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

Appendix 3. Specific information on the Fitzroy River Turtle which is required to be included in the EIS.

1. Baseline information

Using up to date information, provide the following information on the Fitzroy River Turtle (*Rheodytes leukops*). Information should include but not be limited to:

- (a) A discussion of the current population status of the Fitzroy River Turtle
- (b) A discussion of the life history traits and habitat preferences of the Fitzroy River Turtle in the Fitzroy catchment
- (c) Provide a description of all current and known threats to the Fitzroy River Turtle
- (d) Outline the current population structure of the Fitzroy River Turtle including size-frequency distributions
- (e) Outline the availability and extent of suitable habitat for the Fitzroy River Turtle in the Fitzroy catchment
- (f) Outline the importance of the population of Fitzroy River Turtle in the lower Fitzroy River compared with other areas of the Fitzroy basin
- (g) Discuss and provide an analysis of the connectivity of habitat for the Fitzroy River Turtle in the Fitzroy basin
- (h) Outline the availability of nesting sites for the Fitzroy River Turtle and provide information on the current reproductive success, and
- (i) Discuss and provide evidence of the potential for the Fitzroy River Turtle to persist in impounded waters.

2. Discussion of relevant impacts

Provide an assessment of all potential and likely impacts to the Fitzroy River Turtle (*Rheodytes leukops*) during construction, operation and all stages of the proposed action. Information must include but not be limited to:

- (a) A discussion of the success of recruitment and the long-term persistence of the Fitzroy River Turtle in impounded waters
- (b) Discuss the ability for all age cohorts of the Fitzroy River Turtle to persist in impounded waters
- (c) Detail the likely changes to flow regimes in the Fitzroy River below the proposed Rookwood Weir and the Eden Bann Weir during inundation, operation and all stages of the project

- (d) The total area of nesting and riffle/pool habitat (in hectares) which is likely to be inundated or impacted during filling and operation of all stages of the proposed action
- (e) Discuss the potential for the proposed action to fragment habitat for the Fitzroy River Turtle. The discussion should consider the impact of existing barriers in the catchment to the species.
- (f) Discuss the potential and likely impacts of changes to flow regimes to riffle/pool habitat between the Rookwood and Eden Bann Weirs and below the Eden Bann Weir and how these are likely to impact the Fitzroy River Turtle
- (g) Discuss the impacts of barriers in the Fitzroy basin to the genetic exchange and long term survival of the species
- (h) Include information and discuss the potential for mitigation measures to reduce potential impact on the Fitzroy River Turtle, and
- (i) Discuss using relevant examples, the likelihood that the species will use turtle passage devices over barriers.

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