APPENDIX B29 DRAFT ENVIRONMENTAL MANAGEMENT PLAN

CONTENTS

1. Introduction

A number of recommendations have been made in the Environmental Impact Statement (EIS) in relation to the management of environmental impacts during the construction and operation of the Project. These recommendations will require actions to be taken during the design, construction and operational life of the Project.

In order to ensure that these recommendations are implemented, a Draft Environmental Management Plan (EMP) has been developed.

An outline of the Draft EMP is provided below to demonstrate the commitment of SunWater to ensure that the recommendations of this EIS are implemented. Environmental management practices and strategies for individual project elements are described within Section 9 and Section 10.

2. Purpose

An EMP is a management tool used to assist in avoiding or minimising impact to the environment. The EMP is a dynamic document. It will be regularly updated to incorporate changes in environmental management procedures and practices in light of ongoing monitoring results, new techniques, legislation, conditions of approval and environmental policies of the Proponent in consultation with the relevant authorities.

The implementation of the EMP will ensure that concepts and commitments given in the EIS are applied so that the potential impacts of the construction and operation of the proposed infrastructure on the environment are minimised.

The EMP provides for ongoing environmental performance review and compliance monitoring.

2.1. Environmental requirements and obligations

The EMP is devised to ensure that identified environmental impacts relating to the Project construction and operation are avoided or minimised. In this regard, the EMP may refer to environmental legislation, controls, conditions of approvals, standards and guidelines relevant to impact mitigation and avoidance. The EMP also requires that, wherever possible, works related to site development meet environmental expectations of the local and broader community.

A list of applicable legislation is identified in this section. The Project environmental management representative will hold copies of approvals and associated conditions, relevant policies, guidelines and standards on site during construction.

2.1.1. Commonwealth legislation

Commonwealth legislation relevant to the Project and the Draft EMP includes:

- *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act);
- *Native Title Act 1993* (NT Act)*;* and
- *National Greenhouse and Energy Reporting Act 2007* (NGER Act).

2.1.2. Queensland legislation

Queensland legislation relevant to the Project and the Draft EMP includes:

- *Environmental Protection Act 1994 (EP Act)*

The EP Act is based on self-regulation and duty of care that places the responsibility for protection of the environment on all persons conducting any activities associated with the Project.

The EP Act provides for the licensing of Environmentally Relevant Activities (ERAs) and the granting of development approvals and registration certificates for conducting regulated activities. The EP Act also provides the power to administering authorities to order actions be taken to improve environmental management performance, conduct audits and environmental evaluations of activities, approval of environmental management programs and impose penalties or prosecute persons for non-compliance within the requirements of the EP Act.

The EP Act also allows for the preparation of Environmental Protection Policies (EPPs). The following EPPs have been proclaimed:

- *Environmental Protection (Water) Policy 2009;*
- *Environmental Protection (Noise) Policy 2008;*
- *Environmental Protection (Air) Policy 2008; and*
- *Environmental Protection (Waste Management) Policy 2000.*

The EIS has been prepared under the provisions of the *State Development and Public Works Organisation Act 1971* (SDPWO Act). Relevant information in the EIS is then used to support applications for permits, licenses and approvals as outlined in Appendix B1-A of the Additional Information to the EIS. In addition to the EP Act other major legislation (with associated regulations and policies) relevant to the Project includes:

- *Aboriginal Cultural Heritage Act 2003;*
- *Biosecurity Act 2014*
- *Dangerous Goods Safety Management Act 2001;*
- *Environmental Offsets Act 2014;*
- *Explosives Act 1999*
- *Fisheries Act 1994;*
- *Forestry Act 1959;*
- *Health Regulations under the Health Act;*
- *Land Act 1994;*
- *Nature Conservation Act 1992;*
- *Soil Conservation Act 1986;*
- *State Development and Public Works Organisation Act 1971;*
- *Stock Route Management Act 2002;*
- *Sustainable Planning Act 2009;*
- *Transport Infrastructure Act 1994;*
- *Vegetation Management Act 1999;*
- *Water Act 2000*;
- *Water Supply (Safety and Reliability) Act 2008;*
- *Workplace Health and Safety Act 1995;*

- *Nature Conservation (Wildlife) Regulation 2006;*
- *Queensland Heritage Act 1992;*
- Relevant planning schemes for Banana Shire Council and Western Downs Regional Council; and
- Various legislation governing Public Utility Providers.

2.1.3. Planning for Ecologically Sustainable Development

The Project will pursue the following overall objectives for Ecologically Sustainable Development (ESD) during the design, construction and operational stages including to:

- adopt and integrate good management practices for design, construction and operation of all aspects of the Project including:
  - energy efficient measures (e.g. power demand management during construction, natural lighting and ventilation in appropriate locations);
  - waste minimisation, management and recycling;
  - wise use and re-use of natural resources (e.g. building materials, rock and other spoil);
  - avoidance or minimisation and mitigation of impacts on ecological processes and habitat values adjacent to construction works (e.g. waterways and forests); and
  - seeking to achieve community benefits (e.g. re-establishment of recreational areas).
- comply with all conditions of approval, applicable laws, regulations, standards and guidelines for protection of the environment;
- adopt best management means available to prevent or minimise adverse environmental impact;
- describe incident response protocols and procedures; and
- provide project employees and contractors with adequate and contemporary training in safety, hazard and risk management and environmental procedures.

2.2. Objectives and principles

The objectives of the EMP are those embodied in the Intergovernmental Agreement on the Environment (IGAE) and the Principals of ESD.

The core objectives are:

- to enhance individual and community well-being and welfare by following a path of economic development that safeguards the welfare of future generations;
- to provide for equity within and between generations; and
- to protect biological diversity and maintain essential ecological processes and life support systems.

The guiding principles are:

- where there are threats of serious or irreversible damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation;
- the global dimensions of environmental impacts should be recognised and considered; and
- decisions and actions should provide for community involvement regarding issues that affect them.

No objective or principle should dominate others. A balanced approach which takes into account all of these objectives and principles is required to pursue the goal of ESD.

3. Responsibilities and implementation

3.1. Management structure

To achieve the over-arching objective of sound environmental management and deliver the Project with the least possible impact on the local community, a clear implementation and management structure is required.

The proposed structure, regardless of the contractual delivery mechanism adopted for the Project, includes the following roles.

- The Proponent (SunWater):
  - administrator of the head agreement or contract to ensure that the contract and approval conditions are met;
  - liaise with and coordinate relevant agencies within the Queensland Government to provide timely advice to the Contractor for the smooth and efficient delivery of the Project;
  - prepares detailed engineering designs;
  - obtain or oblige the obtaining by the contractor, of all necessary approvals, including development approvals, environmental licenses, WH&S and all other construction-related approvals;
  - ensure that prior to commencement of any work the Contractor/s have properly briefed community consultative committees and agreed to a schedule of regular meetings with each committee;
  - ensure that the Contractor is operating in accordance with the Construction Environmental Management Plan (CEMP) and in compliance with all applicable approvals and requirements for licensing; and
  - prepares the Operations Environmental Management Plan (OEMP) and ensures that the Operator implements the OEMP operations and complies with all applicable approvals and requirements for licensing.
- The Operator (SunWater):
  - ensures that operations are undertaken in accordance with approvals, legislation and regulations, local laws, and the OEMP requirements.
- Contractor:
  - prepares the CEMP (to be reviewed and approved by the Proponent prior to implementation);

- ensures all designs and construction works are prepared and conducted in accordance with approvals, with the contract, with relevant legislation and regulations, with local laws, and the CEMP requirements;
- participates in regional working groups whose activities relate to the impacts of the Project and for which such a commitment is made in the EIS; and
- maintains for the duration of the construction phase, open and effective communications with the communities in the vicinity of the works areas about the construction program, scale, duration and nature of the proposed work, and details of proposed impact mitigation measures.

3.2. Overall responsibilities

The following tables provide a summary of the likely responsibilities and accountabilities of various parties who have active roles in the environmental management of the Project. The responsibilities have been divided into the construction (Table 3-1) and operation (Table 3-2) stages.

Table 3-1 Project responsibilities - construction

Role	Responsibilities	Activities
Project Manager (PM)	SunWater	■ Responsible for the design phase, appointment of contractor and contract supervision. ■ Responsible for overall planning of the Project to ensure operations are conducted safely and in accordance with statutory requirements. ■ Reports on performance of the system and certifies that the work is continuing in accordance with the EMP.
Construction Manager (CM)	Contractor	■ Responsible for overall construction work to ensure construction is conducted safely and in accordance with statutory requirements. ■ Directs construction activities according to the CEMP. ■ Reports to Project Manager. ■ Instructs subcontractors to comply with specified control measures. ■ Directs site activities according to the CEMP. ■ Ensures all site personnel are aware of any changes to the EMP and any revised procedures.
Site Supervisor (SS-C)	Contractor	■ Responsible to Contractor for project construction and ancillary works. ■ Attends site induction and ensures that adequate environmental procedures are followed. ■ Reports to the EC or PM on any breaches of plans or statements, sightings of Endangered, Vulnerable or Near Threatened (EVNT) plants or animals, archaeological or heritage items, or environmental incidents (e.g. spills).
Environmental Coordinator (EC-C)	Contractor	■ Ensures that the CEMP is prepared in accordance with this Draft EMP and the conditions of any approvals and requirements that are applicable to construction. ■ Monitors implementation of the CEMP and recommends any necessary changes to the SS and EC-S. ■ Provides advice, assistance and direction to the SS and EC-S to ensure operations are conducted in a safe and environmentally sound manner. ■ Maintains regular contact with personnel to ensure a safe working environment. ■ Notifies the SS and EC-S of environmental incidents or contravention of environmental requirements (e.g. development conditions) and once identified, records, investigates the cause and ensures measures are adopted to promptly secure compliance. ■ Ensures that the work crew is inducted with regard to environmental procedures.

Role	Responsibilities	Activities
Environmental Coordinator (EC-S)	SunWater	■ Ensures that the system for the environmental management is planned, documented, implemented and maintained in accordance with contract/tender documents. ■ Monitors implementation of the CEMP and recommends any necessary changes to the EC-C and PM. ■ Audits the works for compliance and reports to PM.

Table 3-2 Project responsibilities - operation

Responsibility	Activity
The Proponent (SunWater)	■ Develop the OEMP in accordance with this Draft EMP, SunWater's Environmental Management System (EMS), and conditions of any approvals or licences and requirements that are applicable to operations. ■ Undertake periodic reviews and audits of the operator's performance where required.
Operator (SunWater)	■ Implement the OEMP during operations. ■ Continuously monitor the environmental performance of the Project during operation and provide regular reports on performance to the Proponent. ■ Report to the Proponent on incidents of non-compliance. ■ Ensure the Project is operated safely and with good environmental management practices at all times.

3.3. Environmental responsibilities

There are a number of general project responsibilities for all entities involved in the Project with respect to the EP Act. All project staff have a general environmental duty under section 319 of the EP Act, and must not carry out any activities that cause, or are likely to cause, environmental harm, unless all reasonable and practical measures are taken to prevent or minimise harm. If Project staff while performing their work notice that serious or material environmental harm is being caused or threatened by their actions, or the actions of someone else, they must then report the matter, under Section 320 of the EP Act.

Additionally, Project staff are required to comply with the following items at all times:

- Proponent's and Contractor's environmental policy and Environmental Management System (EMS);
- relevant legislation, with particular attention to environmental legislation under this Draft EMP;
- environmental management requirements for construction and operation as specified in the CEMP and OEMP;
- project training requirements; and
- all approvals and the Coordinator-General's conditions.

4. Documentation, communication and complaints

4.1. Documentation and environmental records

Adequate records must be maintained to demonstrate compliance with the both the CEMP and OEMP. These records will be available at all times and readily accessible for independent inspection and audit. This includes:

- contract documents;
- statutory permits and licences;
- reports;
- monitoring data results;
- environmental audits and reviews;
- environmental training records;
- details of non-conformance reports;
- complaints register;
- inspection, calibration and maintenance activity; and
- corrective action reports.

The following documents must be readily accessible for personnel to carry out the activities associated with the Project:

- a copy of the CEMP (or OEMP during operations);
- copies of environmental checklists and forms required by the CEMP (or OEMP during operations);
- copies of relevant work instructions and procedures;
- Material Safety Data Sheets (MSDS) for any chemicals stored or used on the site; and
- copies of permits, approvals and attached conditions.

As required, modifications to the records keeping system will be done to ensure it is effective and efficient for all levels of employees involved to ensure compliance with the requirements of the CEMP and OEMP.

4.2. Internal communication

Environmental protection will be achieved through clear and concise internal communications, which will be subject to periodic audits to ensure that the communication structure is performing adequately and all actions are performed and recorded. The audits will also provide for follow-up on specific or corrective actions raised during previous audits to ensure responses are complete.

The CEMP and OEMP will be held in a prominent location and will include at the start of the document a list of the names, affiliations, phone numbers and fax numbers (including after hours numbers where necessary) of the people within the designated environmental management reporting structure.

The Contractor (or Operator during operations) will submit the following summary information as part of their monthly report to the Proponent:

- works undertaken;

- monitoring results;
- compliance with approvals, licences and the CEMP (or OEMP during operations);
- complaints; and
- corrective actions and contingency, and success of implemented measures.

Significant communications, including all reports, incident forms and complaints will be documented and kept up to date.

4.3. External communication

To ensure external communication is timely and transparent, only nominated personnel will be involved in consultation with external bodies on environmental issues. The Construction Manager is responsible for nominating all staff members responsible for external communication during construction. The Construction Manager may also invite personnel to attend meetings with agencies and the community consultative committees.

Any incidents and environmental harm during construction works or operation of the Project will be reported to the Department of Environment and Heritage Protection (DEHP) as soon as possible (as per Section 320 of the EP Act).

External communication responsibilities and training should be detailed in the CEMP and OEMP.

4.4. Complaints and responses

The environmental management process managed by the Contractor (or Sunwater during operations) is to include a procedure for receiving and acting upon complaints. Complaints will be carefully managed, prompt and effective, and will form a key part of the environmental reporting mechanism. Responsibility for maintaining the complaints procedure will rest with the Contractor (or SunWater during operations), however, all complaints during construction will be brought to the attention of a person with authority to take the appropriate action within 24 hours of receipt.

While the CEMP and OEMP will establish the procedure for complaints, basic requirements will include:

- a procedure for receiving and responding to complaints which is acceptable to SunWater and DEHP;
- the Contractor maintaining, during the construction phase, a complaints telephone service;
- complaints during operation will be received through SunWater's existing telephone and online inquiries service;
- a process for registering and handling all complaints received in terms of:
  - time and date of complaint;
  - the identity of the complainant and the recorder of the complaint;
  - the specific action or activity causing the complaint;
  - whether environmental compliance requirements are being met;
  - the action taken to address the complaint if necessary;

- a database for tracking of complaints and actions taken in response;
- immediate communication of the complaint to the contractor;
- details on how the action taken is to be communicated to the complainant and SunWater and the Contractor;
- feedback to the complainant and SunWater, the Coordinator-General as required and DEHP within a specified time period;
- any subsequent remedial action required to avoid cause for future complaints if relevant;
- regular reporting to the Coordinator-General, DEHP and SS-C on complaints and corrective actions; and
- monitoring and auditing of the complaint handling system.

Other informative resources are also to be accessible by external stakeholders via the SS-C website that will also offer feedback forms for complaints and grievances.

5. Monitoring, auditing and reporting strategies

5.1. Monitoring

Measuring, monitoring and evaluating will be key activities of each element within the EMP. Monitoring will mean the setting in place and operation of various procedures to monitor, measure and record the level of impact on the environment during the construction and operation of the Project.

The monitoring of environmental impacts will be carried out in accordance with the monitoring requirements for each element throughout the EMP, relevant legislation and the conditions of any permit, where relevant.

Monitoring procedures will be developed in accordance with standard protocols and the requirements of the Department of the Environment (DoE; Australian Government) and Queensland departments including DEHP, Department of Natural Resources and Mines (DNRM), Department of Agriculture and Fisheries (DAF), and other relevant agencies as appropriate. All equipment used for environmental monitoring will be calibrated and maintained to the standards recommended by the supplier/manufacturer. Records of calibration and maintenance for each piece of monitoring equipment will be held on site.

Environmental monitoring samples, if taken, will be sent for analysis to a National Association of Testing Authorities (NATA) registered laboratory where applicable. All records of laboratory analysis results and quality assurance will auditable and available for inspection, on request, by regulatory agency officials or their representatives.

Environmental monitoring requirements for each phase of the development are detailed within Section 9 and Section 10.

5.2. Auditing

Aspects of the Project with a potential for environmental impact will be subject to periodic environmental audits. The audit objectives will be to verify compliance with applicable Commonwealth, State and local government environmental

permits, approvals and regulations issued for the Project. The audit will also seek to verify the suitability of and compliance with the CEMP and OEMP requirements.

Each audit will be internally reviewed by the Contractor and/or SunWater and all recommendations / actions raised will be addressed. Copies of audit reports and details of corrective actions will be made available for regulatory inspection, on request.

5.3. Reporting

Monthly environmental summary reports will be produced and included in the monthly project reports for the duration of construction works and operation. Copies of the reports will be held on site and will be available for regulatory agency inspection, on request. The report will include, but is not limited to, the following:

- record of inspections;
- a list of any performance criteria that have not been met, the corrective action taken and a description of the magnitude of any possible environmental impact;
- a register of complaints detailing:
  - origin of the complaint;
  - complaint investigation (personnel, date and summary of action/s taken); and
  - response to actions and suggested changes to practices or procedures.
- results of any surveys carried out;
- annual environmental reporting will be prepared in accordance with SunWater's EMS and legislative requirements containing, in part, the following information:
  - summary of the monthly environmental reports;
  - fluctuations in water storage levels;
  - releases;
  - water quality monitoring; and
  - operation of fish lift / lift and turtle way.

5.4. Non-compliance and corrective actions

The monitoring and reporting will incorporate continual improvement in requirements identified through a non-compliance and corrective action procedure. These will be nominated in the Project's quality procedures, CEMP and OEMP, and will specify methods for recording and reporting non-conformances and ensuring that corrective actions are implemented to rectify the problem.

6. Competence, training and awareness

Environmental awareness training must be carried out to ensure that all personnel performing activities related to environmental management practices are trained, qualified and competent.

Staff involved in environmental monitoring will be trained and competent in the operation, calibration and maintenance of the equipment. Sampling staff will also be trained and competent in sample collection, handling, storage and transport methodologies and techniques.

Records of staff training will be auditable and available for inspection, on request.

7. Decommissioning program

A decommissioning program will be developed prior to construction cessation for land disturbed by Project activities that will not be continued in the operational phase. The program will be developed in conjunction with the relevant regulatory authority and will comply with contemporary legislative requirements and best practice.

As outlined in Chapter 2 of the EIS, following the completion of the site construction works, all site construction infrastructure will be removed, all materials cleared and the site will be rehabilitated. The landform will be left in a stable and safe condition and in an appropriate standard as agreed. Ongoing rehabilitation will also be progressively undertaken during construction to re-establish vegetation and stabilise land as proposed in Chapter 10 of the EIS.

8. Overview of draft environmental management plan outline

The Draft EMP outline is presented within the EIS on the understanding that a detailed CEMP will be prepared by the Contractor and reviewed by SunWater and either DEHP or the State agency exercising its power under legislation, and that a detailed OEMP will be prepared by SunWater and also reviewed by either DNRM or the relevant State agency. The CEMP and OEMP will need to include, but not be limited to, mitigation measures that address the Environmental Objectives and Performance Criteria of this Draft EMP and any conditions imposed either by the Coordinator-General, DEHP or other agencies under other approvals. They will also need to refer to expressed community needs and issues as identified in the Draft EIS and any AEIS.

The purpose of the Draft EMP is to set out the Project commitments to avoid or minimise potential environmental impacts as identified in the EIS, including identification of environmental aspects to be managed and how environmental values may be protected and enhanced. The CEMP and OEMP will be developed in conjunction with the other project plans such as Communications and Workplace Health and Safety (WH&S). During the development of the CEMP and OEMP there should be communication with the Project team to ensure that these plans do not conflict with any other 'project plans'.

The CEMP and OEMP will be dynamic documents as they incorporate continuous improvement. Each plan will be updated to incorporate further information, approval conditions, and changes in environmental management procedures in the light of ongoing monitoring results, new techniques, and relevant legislative requirements.

9. Draft construction environmental management plan outline

9.1. Overview

There are a number of activities taking place during the construction phase of the Project which have the potential to impact on environmental values in the area. These include:

- vegetation clearing;
- on-site earthworks and construction activities at the dam, pipeline and associated infrastructure work sites
- operation of site project / administration office;
- operation of construction camps; and
- construction traffic.

The construction phase environmental elements addressed in this Draft EMP outline are:

- Geology and soils
- Land contamination
- Surface water hydrology
- Groundwater
- Surface water quality
- Terrestrial flora
- Terrestrial fauna
- Aquatic flora & fauna
- Weeds
- Animal pests
- Air quality and greenhouse gas
- Noise and vibration
- Waste
- Hazard and risk
- Transport and roads
- Indigenous and non-indigenous cultural heritage
- Social and economic environment
- Landscape and Visual Amenity

The CEMP to be developed by the Contractor is to incorporate sub-plans that comply with the relevant industry standards for environmental management and must include at least a:

- sediment and erosion control plan for each worksite and for spoil placement areas;
- project water quality management plan;
- groundwater monitoring and management plan
- dust management plan;
- noise and vibration management plan;
- traffic management plan;
- flood management plan;

- emergency action plan;
- fire management plan;
- contaminated Land Management Procedure ;
- vegetation clearing strategy; and
- other management plans necessary to achieve the environmental objectives and performance criteria.

9.2. Implementation

This Draft EMP outline demonstrates how potential impacts may be addressed during the construction and operational phases of the Project. The preparation of specified actions, strategies and recommendations implemented through each Draft EMP subplan includes:

- recommendations made in the EIS to minimise identified environmental impacts;
- good practice environmental management;
- general content requirements of international standard ISO 14001; and
- management and responsibility for performance.

An outline of how each Draft EMP subplan is considered and presented is shown in Table 9-1.

Table 9-1 Outline of Draft EMP subplan tables

EMP Subplan Component	Description	Example
Environmental Element	The aspect of the environment requiring targeted environmental management.	Terrestrial Flora
Environmental Objective	A short description of the high level aim of the Project with respect to this environmental element.	Implementation of vegetation clearance, stockpiling, recycling or disposal practices that minimise clearing and maximise the re-use of native vegetation.
Performance Criteria	The performance criteria are results contributing to the overall objectives. This provides a benchmark against which management performance can be evaluated. Where possible these criteria should be measurable and monitored to assess level of achievement.	Retained vegetation is not compromised by site clearing works, gross mechanical disturbance or impacts associated with sedimentation and/or pollutant export from the dam construction area.
Implementation Strategy	The management actions to be undertaken to achieve the objectives of the subplan. Implementation strategy may include a wide range of mitigation measures such as, but not limited to, changes in work procedures and practices, physical interventions to separate or buffer from predicted construction impacts, physical containment measures, and plans/procedures to minimise impacts. Such measures must be directed to achieving the Environmental Objectives and Performance Criteria, the statutory requirements, and must be consistent with the conditions of an approval from the Coordinator-General.	■ Identify clearing exclusion zones. ■ Implement sediment and erosion control measures.
Monitoring	Establishes the parameter to be monitored, the type and frequency of monitoring.	Contractor to monitor vegetation clearance and earthworks and periodic monitoring of vegetation and sediment and erosion control devices.
Reporting	Purpose, frequency and distribution of reporting to demonstrate achievement of the environmental objectives and satisfaction of the performance criteria.	■ Monthly Report prepared and submitted to SunWater to include details of monitoring results, audits, training and incidents. ■ Immediate reporting to Site Supervisor and Environmental Coordinator of any incident which contravenes the objectives of the EMP subplan. ■ Incidents, complaints and any significant environmental harm reported to regulatory body/ies where required
Responsibility	The responsible entity for undertaking the activities and actions that has to be implemented.	Contractor
Corrective Action	Establishes the corrective action that must be implemented if performance indicators are not achieved. It also provides guidance for contingency actions.	Rehabilitate areas if cleared within the exclusion zones

Specific subplans details follow.

9.3. Landscape character and visual amenity

Environmental Objectives	Minimise the potential visual impacts associated with the construction of the Project.
Performance Criteria	Sensitive receptors are not unreasonably visually impacted by activities associated with

	the construction of the Project.
Mitigation Measures	Visual impacts are to be managed through: ■ management of night lighting to ensure lights are focused on the affected construction areas, limiting extraneous light; ■ protection and management of native vegetation within and adjacent to the construction area (but outside the water storage area) with particular emphasis on conserving vegetation which would surround the finished infrastructure; ■ landscaping and re-vegetation of areas impacted by construction outside the water storage area and that do not require ongoing clearing for access purposes; ■ minimise the width of the pipeline construction corridor thus limiting the area to be disturbed or cleared; and ■ vegetative screening around visually prominent structures, such as the balancing storage.
Monitoring	■ Monitoring of lighting and landscaping implementation to ensure that works are being undertaken in accordance with landscaping and lighting plans. ■ Any complaints, non-compliances or ineffective landscaping (i.e. vegetation fails to establish) are to be recorded, investigated and addressed.
Reporting	Monthly landscaping report prepared and submitted to SunWater with details of landscaping activities undertaken, audits, complaints, non-compliances and corrective actions taken.
Responsibility	Contractor
Corrective Action	The Construction Manager may request the cessation of works at any time should a breach of performance criteria be occurring or at risk of occurring.

9.4. Geology and soils

Environmental Objective	■ Minimise environmental impact by preventing soil loss and erosion. ■ Seek to maximise the recovery of construction spoil for re-use in the Project works.
Performance Criteria	■ Manage and mitigate the impacts of spoil removal, haulage and placement in spoil containment areas. ■ No uncontrolled release of untreated runoff water to the environment. ■ Compliance with Project water quality objectives. ■ Manage and mitigate the risks of soil erosion impacts from all work areas where vegetation is removed or the soil disturbed during construction works in accordance with IECA Best Practice Erosion and Sediment Control (2008) or updates thereof.
Mitigation Measures	Apply the Soil Management Protocols as described in **Appendix B6**. In preparing the Final Sediment and Erosion Control Plan the Draft Sediment and Erosion Control Plan presented below should be considered: ■ Soil Management Protocols (**Appendix B6**). ■ undertake an erosion risk assessment to identify flow paths, suitable stockpile locations, soil cover type, and soil stability. ■ utilisation of erosion and sedimentation control techniques in accordance with guidelines such as IECA 2008 and to include as appropriate: – use of materials such as rip rap, geotextiles, mulch, silt sausages, silt fences, sand bag check dams and coir logs; – removal of loose, surplus excavated sand, gravel and clays; – rapid revegetation of disturbed areas; – minimising time areas left exposed; – diverting run on from the site; – controlling run-off through drains and disposing to stable drainage lines; – bunding stockpiled material; – confining traffic to defined routes; and – compacting high traffic areas. ■ plan to carry out construction during periods of low average monthly rainfall to minimise the potential for high intensity rainfall and flooding. Rainfall and climatic records and historic flood frequency data suggest lower rainfall occurs between April

and November;

- floating booms downstream of the diversion channel supporting silt curtains weighted to the river bed to be installed prior to any disturbances to the river banks and maintained on a daily basis;
- divert surface water runoff away from steep cuts and benches, dam excavations, road construction sites and cleared slopes using cut-off and interceptor drains;
- ensure road drainage design can accommodate the projected volume and rate of discharge during and post construction without causing significant scour issues;
- shape/contour the land surface and batters to minimise slope changes and angles;
- on sloping ground, earth banks should be established on contours at appropriate intervals for the soil type and gradient, usually between 10 m and 70 m;
- rehabilitate disturbed areas as soon as practicable after completion of works by backfilling, covering with topsoil and revegetating, hydroseeding or hydromulching. As far as practical rehabilitation work should be undertaken to coincide with vegetation growth periods and involve the use of appropriate native or sterile species;
- as a means of reducing surface runoff in a rain event, areas of disturbance will be isolated with silt fencing that is supported by a defined maintenance system for the duration of construction;
- all stockpiles should be similarly protected and areas of disturbance stabilised by grassing where appropriate;
- clay subsoil materials should not be left exposed because most are sodic and likely to disperse under rainfall – where stockpiles or excavated surfaces must be left exposed, temporary erosion protection, sediment traps and sedimentation ponds should be in place;
- runoff from water used in road maintenance and dust control is to be similarly retarded / prevented from leaving the site by purpose built silt traps and check dams;
- riparian vegetation will not be interfered with unless absolutely necessary;
- at pipeline stream crossings, earth banks should be constructed across slopes into streams to minimise sediment transport into the trench and into the stream channel;
- if the watercourse has a bed of cobbles or coarse gravel this must be reinstated after construction to prevent establishing a new erosion head and downcutting of the channel;
- topsoil should be stripped only to the top of any clay subsoil or to an appreciable colour change including any bleached layer (pale grey or white when dry);
- the topsoil should be stockpiled separately from the subsoil and kept separate at all times;
- topsoil should be stockpiled for the minimum practical time before it is used for rehabilitation to minimise loss of biota – where topsoil has been stockpiled for more than eight weeks, a layer of material from a more recent stockpile about 5 cm thick should be used at the immediate surface if available;
- topsoil should be returned to the area from which it was stripped (if above FSL) when used for rehabilitation wherever practicable to maximise return of plant propagules to their area of origin;
- provision should be made in planning the width of the pipeline easement to maintain separate stockpiles especially during rain events;
- soil should not be placed within 10 m of any drainage line and should not be placed against live trees;
- stockpiles of soil near drainage lines should be bounded on their downslope margin with silt fencing to prevent transport during rain events;
- where the pipeline easement traverses sloping land, soil should only be stockpiled on the upslope side of the easement to a maximum height of two metres and in discontinuous lines (gaps at least every 50 m) to facilitate drainage and faunal movement;
- topsoil will not to be backfilled around the pipe but will be spread over the surface after the trench has been filled, except in laser-levelled areas where a separate plan will be developed in consultation with landholders;
- the topsoil should only be spread evenly over the pipeline easement after all the subsoil has been spread, a crown developed on the trench to accommodate future subsidence, deep ripping of compacted areas (such as access tracks) has been

	undertaken, and contour banks have been developed on steep slopes and above the banks at watercourse crossings; ■ topsoil should not be compacted and should be left rough as a seed bed; and ■ rehabilitation works involving revegetation should have plantings in place, with adequate temporary erosion protection, by the end of September so that spring and summer rainfall will aid establishment. ■ A specific plan will be developed for handling of backfill, topsoil and erosion control in laser-levelled areas. **Fossils** ■ If fossil specimens such as plant buds, seeds or insects are encountered during construction, these will be sent to the Queensland Museum Geoscience unit for identification. ■ If more unusual and potentially significant fossils such as bones of vertebrate fauna are encountered, work in the immediate area will cease and the Queensland Museum Geoscience unit will be notified.
Monitoring	■ Regular visual inspection of sediment and erosion control structures to determine their effective function in accordance with appropriate standards. In wet weather or when using large quantities of water in construction works more frequent monitoring may be necessary. ■ Auditing of this EMP subplan conducted bi-annually (internally) and annually (externally). ■ Water quality monitoring in accordance with Project Water Quality Management Plan.
Reporting	■ Monthly report prepared and submitted to SunWater to include details of monitoring results, audits, training and incidents. ■ Immediate reporting to Site Supervisor and Environmental Coordinator of any incident, spill or release to the environment. ■ Incidents, complaints and any significant environmental harm reported to regulatory body/ies where required.
Responsibility	Contractor
Corrective Action	■ The Construction Manager may request the cessation of works at any time should a breach (as defined in the contractor EMP) of performance criteria be occurring or at risk of occurring. ■ Appropriate control measures implemented where unacceptable sediment or erosion is occurring or may occur.

9.5. Land contamination

Environmental Objective	■ Appropriately manage existing potentially contaminated materials or sites. ■ Prevent spills from occurring at project sites. ■ Contain, clean up and, if necessary, remediate any spills that do occur.
Performance Criteria	■ If additional contamination is identified as part of pre-construction site inspections, properties will be listed on the Environmental Management Register (EMR) in accordance with the EP Act. ■ Undertake a Staged Contaminated Land assessment in accordance with the DEHP 'Queensland Auditor Handbook for Contaminated Land' (where required). ■ No unauthorised movement of contaminated materials. ■ All fill used on site is 'inert' and must be free from contaminants. ■ Containment of all spills involving materials that may cause environmental harm and effective remediation measures taken to prevent the incident from recurring.
Mitigation Measures	**Contaminated Land** ■ A Contaminated Land Management Procedure will be developed prior to the commencement of construction which includes, but is not limited to: – identification of the potential forms of contamination that could occur during the Project (fuels, oils, paints etc.) – procedures for appropriate storage of hazardous materials in compliance with relevant standards; – the prevention of land contamination during construction;

	– the identification, investigation and management of unforeseen contamination; – spill response and remediation; – the management, remediation and disposal of contaminated soil and/or spoil generated from properties listed on the EMR or the Contaminated Land Register (CLR); – post construction management and/or monitoring requirements; and – as required, disposal permits will be obtained from DEHP for the removal and disposal of contaminated soil in accordance with the EP Act. ■ Sites identified as potentially contaminated, or encountered during Project construction, will be investigated, managed and remediated in accordance with the requirements of the contaminated land provisions of the EP Act and the DEHP Guidelines. Remediation may not include removal of the sites from the EMR. ■ Prepare a Construction WH&S Plan which includes measures to manage exposure of construction workers to potential contaminants in soil and/or water. For example through the wearing of personal protective equipment and the control of dust during construction. ■ Obtain auditor certification and DEHP approval of Site Management Plans or obtain disposal permits for contaminated soil from DEHP (as appropriate) for the treatment of contaminated soil if required, in accordance with the *Environmental Protection Act 1994* which outlines: – Preparation of a contaminated land investigation document (CLID) (if required) and liaison with an approved auditor for contaminated land for certification of the CLID – do nothing if the site investigation and assessment of risk determines that no action is necessary; – on-site treatment/remediation to reduce contamination; – capping of contaminated sites. – excavation and off-site disposal to landfill; and – excavation and on-site disposal to a suitable location within the Project area, with appropriate engineered controls (e.g. liner, cap). **Spills** ■ Chemical storage will comply with MSDS requirements. MSDS for products kept on site will be readily available. ■ Hazardous materials must be stored appropriately: – Smaller quantities of chemicals, fuels and oils will be stored in self bunded pallets, within a bunded area in the workshop, or in a bunded container on the site. – Bulk quantities of fuel should be stored in double skinned tanks (self bunding).Waste products (e.g. oil/water separator waste, sludges and residues), should be contained within weatherproof, sealed and bunded areas to ensure stability of the waste containment receptacles and prevent any leakages or spills causing environmental harm to soils, surface water or groundwater. ■ Regular inspections will be carried out of the tanks, bunds and storage areas to ensure integrity. ■ Standard procedures for the storage, handling, disposal and spill response for potentially hazardous waste materials should be described in an Emergency Management Plan (developed under the subplan detailed in **Section 9.17**). ■ In the event of a large spill, sites will be investigated, managed and remediated in accordance with the requirements of the contaminated land provisions of the EP Act and the DEHP Guidelines. ■ Treat contaminated soils in accordance with an auditor certified and DEHP approved CLID. ■ Obtain a disposal permit for contaminated soil from DEHP for the removal of contaminated soil, in accordance with the *Environmental Protection Act 1994*. ■ Prepare and implement procedures for the remediation of contaminated soil spills that may occur during transport.
Monitoring	■ Prior to any construction activity, locate and quantify the extent, amount and type of existing contamination for all sites to be impacted by the Project. ■ Any spills that occur will be recorded as an incident along with the associated follow

	up actions which may include appropriate monitoring. ■ Auditing of this EMP conducted bi-annually (internally) and annually (externally).
Reporting	■ CLID (including Site Management Plans) (as necessary) for sites to be impacted by the Project are to be completed, certified by an approved auditor for contaminated land and approved by DEHP prior to the commencement of any construction activity or inundation of the water storage. ■ Any environmental incidents involving spills are recorded including time of incident, persons involved, details of incident, mitigation measures and actions taken to minimise the probability of recurrence. Immediate reporting to the Environmental Coordinator of any significant spills or potential risk of spills. ■ The Environmental Coordinator is to report to DEHP the extent and nature of any spills or leaks and the proposed clean-up operations. ■ DEHP is to be immediately alerted in the event of any significant environmental harm.
Responsibility	Contractor
Corrective Action	■ Review adequacy of existing response procedures ■ Retraining as detailed within Section 6. ■ The Construction Manager can request the cessation of works at any time should a breach of performance criteria of the EMP be occurring or is at risk of occurring.

9.6. Surface water hydrology

Environmental Objective	Maintain flows in waterways during construction in accordance with the Water Resource Plan (WRP).
Performance Criteria	■ No existing water users are to be adversely affected by construction. ■ Compliance with the WRP.
Mitigation Measures	Dam and Surrounds ■ Downstream flows in the Dawson River will be maintained throughout the construction process. A diversion channel will be constructed to divert minor flows around the works. ■ As far as practical, work within a watercourse will be planned to take place in the drier months of the year. ■ Prepare flood management plans. ■ All construction activities will be scheduled in such a way that the impacts of flooding on the works will be minimised. Pipeline ■ As far as practical, construction work in creeks will be undertaken during periods of relatively dry weather and conditions of minimal or no flow. ■ In the event that construction becomes necessary through a water body other than when dry, the water body will be contained by bunds, the trench dug, the pipe laid and the area rehabilitated in the shortest practical time. ■ The construction of temporary waterway barriers when waterways are flowing will include the provision to transfer flows from upstream of the works to the downstream channel without passing though the disturbed construction site. ■ All construction works within the bed and banks will be undertaken in accordance with relevant management requirements as detailed in the following: – Sediment and Erosion Control Plan (**Section 9.4**); – Project Water Quality Monitoring Plan (PWQMP) (**Section 9.8**); and – Vegetation clearing strategy (**Section 9.9).** ■ The pipeline trench will be open for a minimal period of time during construction (**Section 9.10**). ■ Materials reinstated will be placed in the original profile as far as practical and compacted. ■ Disturbed vegetation will be rehabilitated to reflect the original species complement other than in the area required for operational purposes.
Monitoring	■ Monitoring of flows in affected watercourses to ensure that flows are maintained as far as reasonable and practical. ■ Regular visual inspection of sediment and erosion control structures to ensure

	effective operation. In wet weather or when using large quantities of water in construction works more frequent monitoring may be necessary. ■ Monitoring of water quality in accordance with the Project Water Quality Monitoring Program (PWQMP). ■ Geomorphic monitoring (including cross sections) established pre-construction at sites upstream and downstream of the water storage area (a sub-set of those listed in **Table 14-57** of the EIS) and at additional sites along the 2 km section of river immediately downstream of the dam wall and within the reach immediately downstream of Orange Creek Weir. ■ Assessments should include both visual and proforma-based assessment (as per **Figure 14.43** of the EIS) of geomorphic stability to assess impact on both channel integrity and sediment entrainment. ■ Auditing of this EMP subplan conducted bi-annually (internally) and annually (externally).
Reporting	■ Immediate reporting to Site Supervisor and Environmental Coordinator of any incident which contravenes the objectives or performance criteria of this subplan. ■ In the event that flows are significantly impeded by construction works, the following organisations are to be notified immediately: – DNRM; – Banana Shire Council; and – SunWater ■ Regular compliance reporting on flow monitoring during construction if required by DNRM.
Responsibility	Contractor
Corrective Action	■ The Construction Manager may request the cessation of works at any time should a breach of performance criteria be occurring or at risk of occurring. ■ Rehabilitation will be conducted on areas where unacceptable flow conditions have occurred resulting in non-compliance with Water Act.

9.7. Groundwater

Environmental Objective	To minimise adverse impacts to groundwater quality, levels and associated GDEs.
Performance Criteria	■ Project construction activities will not affect compliance with water quality objectives listed under Schedule 1 of the EPP (Water). ■ Boggomoss spring vegetation and other GDEs are not compromised by lowered groundwater levels as a result of construction activities. ■ Existing groundwater users are not compromised by lowered groundwater levels as a result of construction activities. ■ Decommissioning of existing bores within the inundation or construction area will be completed in accordance with appropriate guidelines.
Mitigation Measures	■ Existence of bores within the inundation or construction area will be confirmed. They, and construction related bores, will be decommissioned prior to completion of construction as per the Minimum Construction Requirements for Water Bores in Australia (Land and Water Biodiversity Committee, 2003). ■ The groundwater discharge from dewatering bores will be pumped to a sedimentation pond (likely on the left bank of the river). ■ The water retained in sedimentation ponds is to be re-used on the construction site where possible, or progressively released into the river under a PWQMP. ■ Prior to construction, a Groundwater Monitoring and Management Program will be developed and implemented (for the purpose of pre-emptively managing possible later operations phase impacts) which will include the following (as a minimum): – an initial survey of bores determined to be within the radius of influence of at least a 2 metre increase in groundwater pressure as modelled in the EIS from which suitable long term monitoring bores will be selected; – ranking of existing groundwater users in terms of their risk of bore casing failure or catastrophic collapse; – CCTV of high risk bores to detect areas of heavy corrosion and hence potential for failure;

- review of class strength or collapse strength of medium risk bores; and
- in consultation with landholders establish a program to rehabilitate or replace bores identified at high risk of catastrophic collapse.

- The baseline will also allow the prediction of no impact on groundwater users as a result of dewatering to be monitored.
- Construction work at creek crossings will be undertaken during the dry season. Any groundwater intersected during such works will be returned to the creek, with allowance for settlement if necessary, to facilitate return to the groundwater system.
- Storage, handling, transport and spill clean-up of any materials capable of effecting groundwater quality will be undertaken in a manner that prevents and minimises impacts to groundwater (**Sections 9.5, 9.16** and **9.17**).
- In the event that contamination occurs, a site specific environmental investigation will be undertaken to determine the extent of impact, including whether migration of contaminants to the underlying aquifer has occurred (**Section 9.5**).

Monitoring

- Following the initial bore survey a spring and groundwater monitoring and management program for the construction phase will be developed. Monitoring will be implemented at least 12 months prior to commencement of Dam construction. The table below summarises proposed parameters to be monitored and the frequency of monitoring.
- The objectives of monitoring are as follows:
  - development of background conditions against which potential impacts can be assessed;
  - pro-active identification and mitigation of potential (dewatering) impacts.
- The monitoring parameters will act as indicators for hydrologic change within the potentially affected springs.

Summary of proposed monitoring parameters and frequencies

Phase	Asset Type	Parameter	Monitoring Frequency
Baseline (12 months prior to construction) and during construction	Groundwater	■ EC, pH, hardness, alkalinity and temperature ■ Groundwater Level (mAHD and mBGL)	Monthly
	Springs	■ EC, pH, hardness, alkalinity ■ Spring attributes (as per Table A-1 of Appendix A within **Appendix B15** Groundwater Technical Report) including area of discharge and saturation of targeted springs	
	Groundwater and Springs	■ Cations, anions and metals as per Table 14 of Dawson River Sub-basin Environmental Values and Water Quality Objectives (DEHP 2011)	6 monthly

- Locations to be monitored will be finalised following the bore survey and include existing suitable private or DNRM monitoring bores within 2km of dewatering activities and bores installed at the following locations:

  Spring - Boggomoss South, and nested bores

  25°25'59.747"S 150°01'36.542"E (Evergreen formation at 30 m depth)

  25°26'00.061"S 150°01'36.545"E (Precipice formation at 60 m depth)

  Spring - Boggomoss North and bore

  25°24'56.418"S 150°01'23.852"E (Precipice formation at 60 m depth)

  Spring - Cockatoo Creek and bore

	Refurbished bore RN627229 (Precipice formation at 20 m depth) **Spring - Dawson 8 and nested bore** 25°33'06.354"S 149°48'25.311"E (Birkhead formation at 30 m depth) 25°33'06.846"S 149°48'25.452"E (Hutton formation at 60 m depth) **Spring Creek** PB1 (Precipice) DD21 (Precipice) ■ Monitoring will also incorporate bores in the area to the south of the dam where groundwater pressures are predicted to change from sub artesian to artesian. Suitable bores will be identified during the bore survey. ■ In the event that an unplanned spill or incident occurs as part of activities associated with the Project and has the potential to impact on groundwater, targeted groundwater quality monitoring will be carried out to determine impacts from the contamination. ■ Auditing of this EMP subplan conducted 14 days into dewatering (internally), as well as bi-annually (internally) and annually (externally).
Reporting	■ Results of any groundwater and GDE monitoring and water quality testing are to be recorded and made available to relevant authorities on request. ■ Report any non-compliance with groundwater objectives as defined by the Groundwater Monitoring and Management Plan in accordance with conditions of approval. ■ Report prepared and submitted to SunWater, DNRM and DoE at the conclusion of dewatering. ■ Any environmental incidents involving spills are recorded and reported in accordance with notification procedures under the EP Act. Immediate reporting to Site Supervisor of any incident, spill or release of materials to the environment. ■ Incidents, complaints and any environmental harm reported to regulatory authority, as required under the EP Act and EPBC Act.
Responsibility	Contractor
Corrective Action	■ If a decrease in the area of discharge or saturation of Boggomoss springs is observed to the extent that surrounding vegetation may be stressed and this is as a result of dewatering activities, irrigation of specific vegetation/spring region will be undertaken. Dewatered groundwater will be preferentially used if the water quality is suitable, otherwise a mix of surface water and groundwater which achieves a suitable standard. ■ Adverse impacts to the supply or quality of groundwater to existing users as a result of dewatering activities will be remedied through water carting or alternative means of supply. ■ In the event that an unplanned spill or incident occurs and results in impact, site specific remediation options will be developed based on findings from the environmental investigation. ■ The Construction Manager may request the cessation of works at any time should a breach of performance criteria be occurring or at risk of occurring.

9.8. Surface water quality

Environmental Objective	■ To maintain water quality within the Dawson, Fitzroy and Condamine River Catchments. ■ To minimise environmental impact by maintaining water quality discharging from Project sites during construction.
Performance Criteria	Compliance with water quality objectives for the Project as outlined in a Project Water Quality Monitoring Program (PWQMP). The water quality objectives in the PWQMP will be informed by background water quality conditions recorded upstream of Project activities or in receiving waters determined in accordance with the Queensland Water Quality Guidelines (2009) and where applicable as described in Schedule 1 of the Environmental Protection Policy (Water) 2009 including Dawson River Sub-basin Environmental Values and Water Quality Objectives, Basin No. 130 (DEHP 2011).

Mitigation Measures	Suspended solids and turbidity ■ Implement Sediment and Erosion Control Plan (**Section 9.4**). ■ Implement Groundwater Monitoring and Management Program (**Section 9.7**) Chemicals ■ Fuel, oil and chemicals will be stored in accordance with Australian Standard 1940, the Storage and Handling of Flammable and Combustible Liquids, and the *Dangerous Goods Act 1975* and the *Pesticides Act 1999*. ■ Spill containment kits will be available on site and staff trained in their use. ■ Oil containment booms and oil spill recovery equipment available when working on water. ■ Any contaminated soil will be managed in accordance with the Contaminated Land Management Procedure (**Section 9.5**). ■ Emergency Management Plan will be developed in accordance with **Section 9.17**.
Monitoring	■ A PWQMP will be developed and implemented. Sites will be identified upstream and downstream of priority Project activities with the potential to impact upon water quality. Parameters to be tested will be determined relative to the activity and the potential for contamination. They may include but not be limited to: – temperature, conductivity, dissolved oxygen, pH, turbidity (meter-based); – nuisance algae and chlorophyll-a; – hydrocarbons; and – total phosphorus, total nitrogen. ■ The PWQMP will include weekly visual and spot-monitoring of meter-based water quality (including parameters identified above) and monthly WQ monitoring including nutrients and algae. ■ During and after rainfall, a visual inspection of the construction site will be undertaken to ensure that mitigation measures are in place and no major erosion is occurring. ■ In the event that an unplanned spill or incident occurs within the construction area or as part of associated activities of the Project, targeted water quality monitoring will be carried out up and downstream to determine potential impacts from the event, in accordance with PWQMP. ■ Auditing of this EMP subplan conducted bi-annually (internally) and annually (externally).
Reporting	■ Report any non-compliance with water quality objectives as defined by PWQMP. ■ Immediate reporting to Site Supervisor of any incident, spill or elevated release of materials contaminated by the Project into the environment. ■ Results of any water testing are to be recorded and made available to relevant authorities if requested. ■ Incidents, complaints and any environmental harm reported to regulatory authority, as required under the EP Act.
Responsibility	Contractor
Corrective Action	■ If contaminated waters (e.g. elevated turbidity, suspended solids) are observed flowing from the construction site into the catchment, the Environmental Coordinator will determine the cause of the contamination and where necessary issue a stop work order until such a time that the source of the contamination is secured. ■ Where an impact is attributable to the Project, rehabilitation or remediation will be conducted on areas where contaminant levels exceed that guideline value established in the PWQMP. ■ The Construction Manager may request the cessation of works at any time should a breach of performance criteria be occurring or at risk of occurring.

9.9. Terrestrial flora (not including weeds)

Environmental Objective	■ To minimise the extent of vegetation clearing related to the Project. ■ To minimise the impacts on, and provide protection to, identified EVNT flora species. ■ To minimise the impacts on, and provide protection to, EVNT ecological

	communities. ■ Successfully implement vegetation management initiatives and offsets.
Performance Criteria	■ Only vegetation approved for clearing or exempt from approval is cleared. ■ Vegetation approved for clearing or exempt from approval is cleared in accordance with conditions stipulated in any relevant approval document. ■ An Environmental Offset Strategy that satisfies legislation and is agreed with state and federal authorities. ■ Retained vegetation is not compromised by site clearing works, gross mechanical disturbance or impacts associated with sedimentation and/or pollutant export from the development area. ■ Weed invasion is prevented both within the construction site and in surrounding areas in accordance with the Weed Management Plan (**Section 9.11**). ■ Works areas are successfully rehabilitated in accordance with the Rehabilitation and Revegetation Plan.
Mitigation Measures	General ■ A vegetation clearing strategy will be developed for the Project to manage clearing and the impact to vegetation. Strategies include: – vegetation clearing will be staged. For example at the dam site, only the area required for dam construction works will initially be cleared then the remainder of the water storage area will be cleared progressively so that it is only fully cleared immediately prior to dam closure. – limit the clearing of vegetation within the riparian zone of the water storage to within 1.5 m (vertical) of the new FSL; – no clearing of known Boggomoss Snail locations until all remaining individuals have been removed from the site; – areas that are to be cleared and / or retained will be identified on Construction Drawings. This includes the proposed northern wildlife corridor and environmentally important areas within the water storage buffer; – boundaries of vegetation to be retained will be clearly marked by tape and / or pegs and conform to limits shown on drawings; – impact on vegetation outside the water storage area will be avoided by clearly identifying the FSL, and directing staff contractors and others working on the construction of the Project to avoid these areas; – the area of vegetation cleared within the road corridors will be the minimum required for safe and effective construction; – clearing of the pipeline easement will be limited to a width of 30 m and further reduced where practicable in sensitive areas such as riparian zones or where significant vegetation is encountered. ■ Implement mitigation recommendations in the design of final pipeline route to minimise impacts on significant vegetation communities, including ensuring the maximum possible width of existing cleared easements is utilised for construction, avoiding large habitat trees and locating the pipeline route and ancillary areas (stockpiles etc) within cleared / disturbed areas wherever possible. ■ Cleared timber suited to use as aquatic or terrestrial fauna habitat will be salvaged and placed in strategic locations. ■ As much of the remaining suitable material as practicable will be mulched for use in construction site stabilisation, rehabilitation or landscaping. ■ On completion of construction, progressive rehabilitation of the construction sites in areas that will not be used for permanent infrastructure (i.e. house, parking, tracks to recreation area etc) will be undertaken, by replacement of topsoil, contouring of the landform and revegetation as soon as possible after disturbance. ■ Disturbed areas that will eventually be inundated will be re-contoured and grassed. ■ A qualified botanist will be on-site prior to any vegetation clearing works to inspect the area for significant flora. If any species of conservation significance are confirmed as present, suitable management measures will be implemented, such as development of translocation programs, and associated management plans. ■ Species Management Plans will be developed for all EVNT species known or with a high likelihood of occurring within construction areas. ■ Develop and implement a Sediment and Erosion Control Plan as outlined in

Section 9.4.

- Develop a weed management plan as outlined in **Section 9.11**.

Rehabilitation and Revegetation

- Prepare and implement a rehabilitation and revegetation plan that includes the following measures:
  - Mapping, clear delineation and specific rehabilitation and revegetation plans for the northern wildlife corridor and environmentally important areas within the water storage area buffer;
  - Areas of existing erosion within the immediate water storage catchment will be included within the plan.
  - The species of native vegetation to be used in the revegetation will be species recorded in or near the area from studies undertaken for the EIS;
  - For the pipeline easement, the operational easement and the residual construction easement will be treated separately;
  - The residual construction easement (the 15 m of construction easement no longer required during operations) will be rehabilitated to re-establish the pre-construction environment (be it native forest, improved pasture or cropping land)
  - The operational easement will be grassed to match the local species mix or in accord with local cropping procedures as applicable
  - Where available and of suitable quality, branches from cleared vegetation will be retained to be spread over cleared areas to assist with the distribution of seeds;
  - Exotic species may only be used where a pasture cover is to be re-established;
  - The plan will contain the following information:
  - method and species to be utilised in revegetation including topsoil stabilisation;
  - spatial configuration of plantings (if tubestock are used), seed mixes for direct seeding and hydromulching and watering requirements; and
  - benchmark criteria for rehabilitation including requirements for final landform (slope, aspect), vegetation cover, vegetation species composition and depth of topsoil (amongst other parameters).
  - The plan should consider options for translocation via propagation or physical removal of any native species from impacted springs to be used to rehabilitated degraded springs proposed for protection within secure tenured management (see Offsets)
  - Particular attention will be paid to land shaping in areas where the pipeline and / or access track run down slope and are likely to concentrate or divert flows;
  - Topsoil should be managed in accordance with **Section 9.4** (including the Soil Management Protocols and Sediment and Erosion Control Plan).

Offsets

- Offsets will be provided as part of the Environmental Offsets Strategy for the Project (approach provided as **Appendix B1-B**). The Strategy will be finalised through negotiation with DoE and the Coordinator-General.
- A management plan will be developed for each offset to ensure long term success of the offset which will include measures for planting maintenance, weed and pest management and a monitoring program.
- As part of the offset program a number of springs outside the inundation area are to be protected against future threatening processes through establishment of secure tenures. A management plan will be developed which identifies the springs to be protected and details the ongoing management requirements.
- The northern wildlife corridor and environmentally important areas of the water storage area buffer will be similarly treated, acknowledging that some components may be regarded as mitigation and others as offset.

Monitoring	■ Monitoring by Contractor of vegetation clearance on a continual basis to confirm that specific controls have been implemented and appropriate work practices are being adopted. ■ Monitoring of the health of nearby Great Artesian Basin (GAB) discharge springs as per the Groundwater Monitoring Program. ■ Inspection in accordance with Rehabilitation and Revegetation Plan. ■ Monitoring as developed through the Project Environmental Offset Strategy. ■ Auditing of this EMP subplan conducted bi-annually (internally) and annually (externally).
Reporting	■ Monthly Report prepared and submitted to SunWater to include details of monitoring results, audits, training and incidents. ■ Immediate reporting to Site Supervisor and Environmental Coordinator of any incident which contravenes the objectives of the EMP subplan. ■ Incidents, complaints and any significant environmental harm reported to regulatory body/ies where required.
Responsibility	Contractor and SunWater
Corrective Action	■ The Construction Manager may request the cessation of works at any time should a breach of performance criteria be occurring or at risk of occurring. ■ Measures undertaken to protect native flora where unacceptable impacts or risk of environmental harm becomes apparent. ■ Measures undertaken to ensure success of the offset strategy.

9.10. Terrestrial fauna (not including pest species)

Environmental Objective	■ Ensure that construction activities are completed in a manner that provides significant protection of the health and livelihood of native fauna. ■ Successfully implement fauna habitat management initiatives and offsets.
Performance Criteria	■ The risk (of injury and death) to fauna is managed and minimised during site clearing and construction works. ■ Retained habitat is not compromised by site clearing works, gross mechanical disturbance or impacts associated with sedimentation and/or pollutant export from construction areas. ■ Fauna continue to utilise the retained habitat area post-development.
Mitigation Measures	Compliance with the Code of Practice ■ The Project will be undertaken in accordance with Queensland Parks and Wildlife Service (QPWS) guidelines and the Draft Queensland Code of Practice for the welfare and management of wild animals affected by land-clearing and the modification or destruction of wildlife habitats and wildlife spotter/catchers (Hanger 2006). Clearing and rehabilitation ■ Clearing will be conducted in accordance with the Clearing Strategy **(Section 9.9**). ■ Rehabilitation / revegetation will be performed in accordance with the Rehabilitation / revegetation Plan **(Section 9.9**). Species Management Plans ■ Species Management Plans will be developed for all EVNT species known or with a high likelihood of having a breeding place within construction areas. Identification of Habitat Trees ■ Habitat trees will be identified prior to the selective clearing operations. Removal of Tree Hollows ■ If any denning, roosting or nesting animals are observed within hollow limbs, but cannot be readily removed by an ecologist, it is recommended that, where appropriate, the hollow end of the limb be blocked with porous material and a chainsaw be used to remove the limb. The limb should then be relocated to a suitable place, determined in consultation with QPWS and the hollow end unblocked at an appropriate time of day to minimise fauna predation. In the case that a colony of microchiropteran bats are located, then the roost will either be felled at night (once bats have vacated) or the entry points will be blocked, and the roost will be moved to an appropriate area of vegetation to be retained on or

	adjacent to the site. Flushing of Denning Fauna ■ Prior to tree removal, an appropriately qualified ecologist will attempt to "flush out" any denning or nesting animals not observed during the initial hollow inspection. This may involve hitting target trees with a sledgehammer or another similar technique. Following felling, a second inspection of the relevant trees will be carried out to relocate fauna disturbed by the clearing process or remaining within the felled timber to a suitable location determined in consultation with QPWS. ■ Where possible, the actual felling of the habitat trees will be conducted in a manner that will maximize the chances of survival for any fauna remaining within the tree hollows. This involves pushing rather than cutting, and cushioning the tree fall with other felled timber and foliage. Trenching ■ The pipeline will be constructed progressively and the open trench will be limited to the minimum practicable length at any time; ■ The open pipeline will be plugged at the completion of each work day and backfilled consistent with recommendations in Australian Pipeline Industry Association Code of Environmental Practice (APIA, 2013); and ■ A Spotter-catcher will be employed to clear the open trench every morning and will be on call to remove trapped fauna during work times. Care of Injured Fauna ■ A Spotter-catcher will be employed on-site during clearing to provide fauna rescue services; ■ Installation of speed limits along haul roads to minimise vehicle strikes with fauna; and ■ All injured animals will be immediately removed and taken to an appropriately qualified veterinary surgeon. Any orphaned or injured native fauna discovered at a later stage during works will be immediately reported to the QPWS or approved local carer group. Habitat Fragmentation ■ Progressive rehabilitation will occur on the pipeline easement and at all construction sites. ■ A Pest Management Plan will be prepared (**Sections 9.11 and 9.12**). Loss of Fauna Habitat ■ The habitat loss will be mitigated through protection and management of environmentally important areas within the water storage area buffer; through establishment and protection of the northern wildlife corridor and through the offset strategy. Lighting ■ All external lighting of the site will conform to the following Australian standards: – AS 1158 – Road lighting; and – AS 4282 – Control of the obtrusive effects of outdoor lighting. Boggomoss Snail Translocation Plan ■ A Translocation Plan will be developed and implemented for the Boggomoss Snail. This will include removing as many snails as possible from the Mt Rose site to an approved research institute. ■ Species Management Plans will be developed for all EVNT species known or with a high likelihood of occurring within construction areas. Offsets ■ Offsets will be provided as part of the Environmental Offsets Strategy for the Project (approach provided as **Appendix B1-B**) and as described in **Section 9.9**. The Strategy will be finalised through negotiation with DoE and the Coordinator-General.
Monitoring	■ Monitoring by Contractor of vegetation clearance on a continual basis to confirm that specific controls have been implemented and appropriate work practices are being adopted. ■ Inspection of areas during and post clearing and contractor's methods during clearing to ensure compliance with the EMP subplan.

	■ Auditing of this EMP subplan conducted bi-annually (internally) and annually (externally). Other monitoring including: ■ Detailed records of injured and/or wildlife fatalities. ■ Long-term monitoring of offset areas.
Reporting	■ Monthly Report prepared and submitted to SunWater to include details of monitoring results, audits, training and incidents. ■ Immediate reporting to Site Supervisor and Environmental Coordinator of any incident, spill or release of materials to the environment. ■ Incidents, complaints and any significant environmental harm reported to regulatory body/ies where required.
Responsibility	Contractor
Corrective Action	■ The Construction Manager may request the cessation of works at any time should a breach of performance criteria be occurring or at risk of occurring. ■ Measures undertaken to protect native fauna where unacceptable impacts or risk of environmental harm becomes apparent.

9.11. Weeds

Environmental Objective	■ Declared weeds and introduced flora (both terrestrial and aquatic) not presently in the study area are not introduced. ■ Declared and other weeds already present in the study area are not spread as a result of project activities.
Performance Criteria	■ Obligations under the Biosecurity Act 2014 are met. ■ All vehicles working off road have “clean” certificates. ■ Documentation available showing quarry sites inspected for weeds prior to extraction. ■ Infestation of weeds and pest species (including aquatic species) reduced within the Project footprint. ■ All employees working on site attend induction training sessions to identify weeds.
Mitigation Measures	In preparing the weed management plan, the Western Downs Regional Council Pest Management Plan will be considered, as will information available from Biosecurity Queensland. Consultation will be undertaken with Banana Shire, Western Downs Region Council, Biosecurity Queensland and local landholders as appropriate. The weed management plan should include the following measures: ■ All mulch produced on site from cleared vegetation and trees specifically exclude material from weed species. Vegetation mulching suitably controlled to avoid contamination. Mulch containing weed species material will be treated separately and not used on site. ■ Soil disturbance within retained vegetation will be kept to a minimum to avoid weed recruitment. Rehabilitation (including through weed control) and revegetation will be completed under strict supervision to avoid unnecessary soil disturbance. ■ Soil and landscaping material brought onto the site will be from a source that is clean and weed free. ■ Management methods for declared weeds will be consistent with recommendations in Biosecurity Queensland Pest Fact sheets. Weed Removal ■ Priority will be given to species of greatest environmental threat either as allocated by the *Biosecurity Act 2014* or local government. ■ Movement protocol developed and implemented for vehicles and plant (including boats and booms) to ensure declared weeds are not spread. This protocol will trigger the need for a “washdown”. Construction phase mitigation ■ Undertake a risk assessment to identify those species which are likely to be an issue and that need to be addressed in the weed management plan. The risk assessment will include declared species recorded during the field surveys, as well as additional declared species considered possible to occur from Biosecurity Queensland’s Annual Pest Distribution Maps;

	■ Develop threat abatement plans for any high risk weed species; ■ Use of wash-down facilities for vehicles and equipment entering and leaving the construction site and those areas proposed for vegetation clearance; ■ All machinery, equipment and vehicles will be certified as "clean" prior to entering the construction site; ■ Avoid the removal of vegetation, which is not salvaged for timber resource or environmental purposes, from the vegetation clearance areas; ■ Declared weeds will not be used as mulch for landscape and will be disposed of at a landfill that accepts green waste, or pit burnt and buried to prevent reseeding; ■ Soil and landscaping material brought onto the site must be from a source that is clean and weed free; ■ Weed inspection of construction site footprints and waterways / dams within or near the proposed water storage area to identify existing weed infestations; ■ Weed monitoring of construction and waterway footprints to identify new infestations; ■ Weed control of new and existing weed infestations identified; ■ Should chemical control be utilised in the management of weeds, this will be undertaken in compliance with the *Chemical Usage (Agricultural and Veterinary) Control Act 1988* (use controls) and *Agricultural Chemicals Distribution Controls Act 1966* (licensing controls).
Monitoring	■ The distribution of known declared weeds will be monitored. ■ If control procedures are implemented, their success and any unintended side effects must be monitored. ■ Employees/contractors working on site to report presence of declared weeds to the Site Supervisor by the end of the working day. ■ Auditing of this EMP subplan conducted bi-annually (internally) and annually (externally).
Reporting	■ Notification to the Environmental Coordinator by personnel of weed outbreaks or potential contamination. ■ Monthly Report prepared and submitted to SunWater to include details of monitoring results, audits, training and incidents. ■ Immediate reporting to Site Supervisor and Environmental Coordinator of any incident which contravenes the objectives of the EMP. ■ Incidents, complaints and any significant environmental harm reported to regulatory body/ies where required.
Responsibility	Contractor
Corrective Action	■ The Contractor will ensure that the appropriate personnel undertake adequate environmental awareness training covering the requirements of the EMP regarding vegetation clearing and weed management. ■ The Construction Manager may request the cessation of works at any time should a breach of performance criteria of the subplan be occurring or is at risk of occurring.

9.12. Animal pests

Environmental Objective	Pest infestations (terrestrial or aquatic) do not increase as a consequence of the Project.
Performance Criteria	No increase in distribution or abundance of pest infestations as a consequence of the construction activities.
Mitigation Measures	Site Management ■ Ensure construction personnel do not create environments favourable to pest species, including: – store and handle waste appropriately to prevent animal scavenging, breeding or habitation; – where practicable, ensure water is not left to lie on sites for longer than 4 days (i.e. avoid ponds of standing water except within areas designed for the purpose); and – prepare and implement a biting insect management plan consistent with the

	Queensland Health Guidelines to minimise mosquito and biting midge problems in any new development areas. – Workforce to be trained in the use of insect repellents Active Pest Control ■ Pest control measures, where necessary, completed using best practice strategies (such as those endorsed by Biosecurity Queensland). If required, in consultation with landholders measures to be implemented include: – mosquito and biting insect control exercised in and around workforce facilities. – cooperative management of vertebrate pests; – encouraging Project workers to report pest sightings; – deployment of traps for pigs; – destruction of rabbit warrens, where practicable; and – placement of poisoned bait, where practicable and agreed with relevant agencies.
Monitoring	■ Presence of pests monitored as part of weekly site inspections. ■ Employees / contractors working on site to report presence of pest animals to the Environmental Coordinator. ■ If control procedures are implemented, their success and any unintended side effects must be monitored. ■ All monitoring of waste will be carried out in accordance with the waste EMP suplan (**Section 9.16**). ■ Auditing of this EMP subplan conducted bi-annually (internally) and annually (externally).
Reporting	■ Monthly Report prepared and submitted to SunWater to include details of monitoring results, audits, training and incidents. ■ Immediate reporting to Site Supervisor and Environmental Coordinator of any incident which contravenes the objectives of the EMP. ■ Incidents, complaints and any significant environmental harm reported to regulatory body/ies where required.
Responsibility	Contractor
Corrective Action	■ Appropriate control measures implemented where infestations occurring. ■ The Contractor will ensure that the appropriate personnel undertake adequate environmental awareness and training covering the requirements of the EMP regarding pest management. ■ The Construction Manager may request the cessation of works at any time should a breach of performance criteria of the subplan be occurring or is at risk of occurring.

9.13. Aquatic flora and fauna

Environmental Objective	■ Minimise and mitigate, as far as is practicable, the adverse impacts on native aquatic fauna and flora during construction of the Project. ■ Minimise the opportunity for aquatic weed or pest fish introduction as a result of construction activities.
Performance Criteria	■ Successful capture and release of a significant proportion of the native aquatic macro-fauna found within impact areas. ■ Aquatic weed species within the water storage area controlled prior to first filling. ■ No discharge of contaminated materials through stormwater runoff from construction areas, with particular regard to fuels, chemicals and oils. ■ Minimise discharge of suspended sediments. ■ No waste materials entering waterways from construction areas. ■ No uncontrolled or untreated release of water or sediment from a work site.
Mitigation Measures	Other relevant subplans within this EMP including: ■ Sediment and Erosion Control Plan (**Section 9.4**) ■ Surface water quality (**Section 9.8**) ■ Vegetation clearing strategy (**Section 9.9**) ■ Weeds (**Section 9.11**)

	■ Animal pests (**Section 9.12**) ■ Waste Management subplan (**Section 9.16**) ■ Hazard and Risk subplan (**Section 9.17**) ■ Aquatic Fauna Passage ■ Culverts designed in accordance with the DAF (formally DPI) guidelines to allow fauna passage. ■ Fishway and turtleway for the dam wall designed through collaboration with Fisheries Qld, DEHP and Fitzroy Basin Association NRM Group. Recommendations made within the EIS regarding design elements will be considered. Aquatic Fauna Translocation ■ Larger native aquatic fauna (fish, turtles, platypus) inhabiting areas likely to be affected by direct physical disturbance during construction will be translocated to alternative areas of suitable habitat. A translocation strategy will be developed. ■ Translocation strategies for fish will be as per the DAF guidelines (currently under review) to ensure minimal harm. ■ Specialist advice will be sought for translocation strategies involving turtles and platypus. All conservation significant turtles will be pit tagged. ■ Pest species captured at this time will be treated in accordance with procedures recommended by Biosecurity Queensland. Extraction of construction water ■ Extract water from the largest pool possible. ■ Extract water at a slow and steady rate. ■ Fit floating booms to the water supply inlet pipe with a protective cage to minimise the risk of turtle entrapment. The creation of mosquito breeding habitat will be minimised through: ■ Minimising the area of standing water and ensuring drainage within 4 days where practical. ■ Surface profiling to ensure sufficient drainage. ■ Routinely filling incidental depressions and holes that may hold standing water. ■ Regularly clearing drainage lines to ensure that water continues to flow. ■ Constructing dams and water storages intended to contain stormwater and wastewater with steep edges, to minimise the extent of shallow water that could provide breeding habitat. The following measures will be undertaken to minimise detrimental impacts during water storage first filling: ■ Physical removal of vegetation from within the footprint before filling. ■ Identifying and prioritising areas of erosion in the dam's immediate catchment and rehabilitating these areas by replanting and restoring vegetation.
Monitoring	■ As detailed within relevant subplans. ■ Specific program to monitor translocation procedures. ■ Survey to identify turtle nesting areas within and near the water storage area prior to construction. ■ Visual observation of key indicators e.g. fish kills / strandings. ■ Auditing of this EMP conducted bi-annually (internally) and annually (externally).
Reporting	■ Monthly Report prepared and submitted to SunWater to include details of monitoring results, audits, training and incidents. ■ Immediate reporting to Site Supervisor and Environmental Coordinator of any incident which contravenes the objectives of the EMP. ■ Incidents, complaints and any significant environmental harm reported to regulatory body/ies where required.
Responsibility	Contractor
Corrective Action	■ Measures undertaken to protect the aquatic environment where unacceptable impacts or risk of environmental harm becomes apparent (e.g. fish kills). ■ Immediate reporting to Site Supervisor and Environmental Coordinator of any incident which contravenes the objectives or performance criteria of this subplan. ■ The Construction Manager may request the cessation of works at any time should

	a breach of performance criteria be occurring or at risk of occurring.

9.14. Air quality and greenhouse gas

Environmental Objective	To minimise the potential to generate air quality impacts at sensitive receivers near the Project construction areas.
Performance Criteria	■ PM10 (24 hr average) - 50 µg/m^3 (5 exceedances/year allowed) ■ TSP (annual average) – 90 µg/m^3 ■ Dust Deposition (30 day average) - 120 mg/m^2/day insoluble solids
Mitigation Measures	Crushing and Concrete Batching ■ Regular watering of aggregate stockpiles where necessary to control visible dust. ■ Minimise drop heights for material deliveries / conveyor transfers etc. ■ Enclosures and water sprays to be installed on conveying systems where necessary to control visible dust. ■ Regular clean-up of spills beneath conveyors, handling areas and on sealed areas. ■ Ensure appropriate dust controls and enclosures are incorporated, including semi enclosing the crushing plant and batching plants and including dry collection systems (fabric filters etc). ■ Use bag filters when cement loading into concrete batching plant to reduce fine dust emissions. Transportation and Wheel Generated Dust ■ Regularly inform truck drivers (including contractors) and machinery operators of designated vehicle access routes and other relevant practices applied for the Project such as: – minimise vehicle speeds on unsealed road areas (60 km/hr); – use posts / kerbs to discourage vehicle movement on unsealed areas (short-cuts); – watering of unpaved roads and trafficked areas as required to prevent visible dust emissions travelling offsite from these areas; – use dust suppressants such as compacted road base, aggregate or chemical binding agents (subject to acceptability in water quality management practices); – install truck cleaning stations at site egress points to ensure dust and mud is removed from vehicle chassis and wheels prior to travelling along the public road network; – regularly clean (sweep) mud and soil material tracked onto public roads at site egress; – ensuring truck loads transported around the site are no taller than the vehicle side walls as required to control visible dust; and – haul trucks should always be covered and while unloading, care should be taken that the drop height is as low as reasonably practical to minimise dust cloud build up. Excavation and Stockpiling ■ Minimise the extent of clearing which bares earth. ■ Water sprays (hand held hoses or sprinklers) should be used during excavation activities where necessary to control visible dust. ■ Stockpiles or material stores should be kept damp by water sprays and/or covered and should be located as far from residences as possible where necessary to control visible dust. ■ Any stockpiles would be stored in sheltered locations where possible, with the slope of the upwind surface minimised. Drilling and Blasting ■ Dry and fine material within the blasted area from drilling should be wetted down to suppress dust evolution. ■ Blasting should be restricted when strong winds are blowing (particularly during dry weather) and when winds are blowing towards sensitive areas. ■ Blast design should consider restricting blast size to minimise dust emissions.

	General Work Practices ■ Minimise the extent of the pipeline laying work front near towns and villages. ■ Place stockpile sites such that repeated transport through the towns or villages is not required. ■ Worked areas would be stabilised as soon as possible after earthworks have been completed; for example, by re-vegetation, paving, gravel, mulch. ■ Restrict areas in which mobile plant and haulage vehicles can operate. ■ Adopt high level watering (>2 L/m^2/h) wherever there is a potential for high emissions such as during high winds. ■ Water trucks should be summoned based on visual dust inspection. ■ Regular inspection of site dust controls and their effectiveness. ■ Adopt public consultation processes that inform residents of the potential duration and extent of impacts, thereby allowing them to take appropriate action (such as not hanging out their washing on those days). Greenhouse Gas Emissions ■ design a construction works program to source construction materials from as close to the Project areas reasonably practicable to reduce fuel use from transporting materials; ■ source natural sand, where available, to minimise greenhouse gas emissions associated with crushing; ■ maximise beneficial use of cleared material; ■ maintain construction equipment and haul trucks in good working order so fuel efficiency of equipment is maximised; ■ use appropriately sized equipment for construction activities; ■ raise awareness of energy efficiency and greenhouse gas emissions through workshops or toolbox talks; ■ minimise waste from construction; and ■ greenhouse reduction initiatives at construction camps and construction sites. The continued implementation of SunWater's Energy Management Standard will minimise greenhouse gas emissions from the Project by: ■ identifying opportunities to improve energy efficiency for operation of the Project and to reduce greenhouse gas emissions; and ■ providing education and training to increase the level of energy management skills and competencies of SunWater staff.
Monitoring	Monitoring ■ Visual inspections throughout workday, incidents requiring corrective action to be noted in site diary. ■ Continuous PM10 concentrations at 2 locations. ■ Monitor Meteorological Data (wind, weather forecast). ■ Dust deposition gauges. ■ Auditing of this EMP conducted bi-annually (internally) and annually (externally). Complaint Handling ■ Incident records, and actions taken to address air quality issues, would be used to further modify work or environmental management practices on site. ■ Findings from review of the complaints register, monitoring and site inspections would be discussed in monthly meetings.
Reporting	■ Monthly Report prepared and submitted to SunWater to include details of air quality monitoring results, audits, training and the occurrence of any complaints. ■ Immediate reporting to Site Supervisor and Environmental Coordinator of significant dust event that will require mitigation measures to be implemented. ■ Incidents, complaints and any significant environmental harm reported to regulatory body/ies where required.
Responsibility	Contractor
Corrective Action	■ Air quality mitigation measures implemented immediately or as soon as practicable where air quality objectives are not being met. ■ Ensure that the appropriate personnel undertake adequate environmental awareness training regarding air quality management and the environmental management commitments relating to dust generation.

	■ The Contractor can request the cessation of works at any time should a breach of performance criteria of the EMP be occurring or is at risk of occurring.

9.15. Noise and vibration

Environmental Objective	To minimise noise and vibration impacts from construction activities at sensitive receiver locations.
Performance Criteria	Noise: ■ The EPP Noise dwelling (outdoors) acoustic quality objective of 50 dB(A) LAeq,1hr has been applied as the noise criteria (for construction noise) in lieu of any specific guidelines for construction noise. Vibration: ■ Ground vibration from blasting must not exceed: – peak particle velocity of 5 mm per second for nine out of any ten consecutive blasts initiated, regardless of the interval between blasts; and – peak particle velocity of 10 mm per second for any blast. ■ Air blast overpressure levels from blasting must not exceed: – 115 dB(linear) peak for nine out of any ten consecutive blasts, regardless of the interval between blasts; and – 120 dB(linear) peak for any blast.
Mitigation Measures	Construction hours ■ As far as practicable, general construction activities will be in accordance with the EPP (Noise) and Environmental Protection Regulation 2008. General Noise Management Practices and Scheduling of Activities ■ In general, construction works and consideration of quiet work practices will be carried out in accordance with AS 2436:2010 'Guide to noise and vibration control on construction, demolition and maintenance sites'. ■ Prior to the commencement of site works, the community will be informed of the upcoming activities and likely duration. ■ The construction programme will continue to be developed in consultation with the local community to schedule noisier activities during least sensitive times of the day. ■ Employ respite periods for particularly noisy activities where possible. ■ Maintain a site activity log, recording the type of activities occurring during various times of the day to assist with the retrospective investigation of community complaints relating to noise complaints. Plant and Equipment ■ Maintain appropriate buffer distances from sensitive receivers as identified in Chapter 19 of the EIS. ■ Equipment having directional noise characteristics would be oriented such that noise is directed away from sensitive areas. ■ Avoid the coincidence of noisy plant working at the same time adjacent to sensitive receivers. ■ All mechanical plant should be silenced by best practical means using current control technology and in accordance with manufacturers' specifications, and maintained appropriately. ■ Plant with the lowest noise rating which meets the requirements of the task should be preferred. ■ Where possible for works in close proximity to sensitive receivers, use electric motors in preference to diesel motors. ■ Maximise forward movements of mobile plant or use spotters and visual alarms as an alternative to reverse beepers. Where reversing alarms are to be used in the vicinity of sensitive receptors, their acoustic range should be limited to the immediate danger area. Traditional 'beeper' alarms for mobile equipment could be replaced with "Smart alarms" or "Broadband" or "quacker" alarms. ■ Ensure that tailgates on trucks are securely fitted to avoid unnecessary "clanging" noise, particularly during movement of empty trucks. ■ Where using pneumatic equipment, select silenced compressors or use quieter

hydraulic equipment.

- Machine use management to eliminate unnecessary noise generations (e.g. minimise the use of engine brakes and no extended periods of engine idling).
- Conduct regular inspections and effective maintenance of both stationary and mobile plant and equipment (including mufflers, enclosures etc).
- Equipment not being utilised as part of the work should not be left standing with engines running for extended periods.

Blasting

- Blasting will be designed and managed by a blasting contractor, who would control blast overpressure and vibration in accordance with the Project limits, through a detailed management plan. The plan must address AS 2187 (2006) 'Explosives-Storage and Use Part 2: Use of explosives', and would include the following types of measures to minimise impacts:

  Airblast overpressure and ground vibration can be reduced by:

  - reducing maximum instantaneous charge of each blast;
  - changing drilling patterns, burden, blast hole diameter, deck loading, location, spacing and orientation of blast holes or using a combination of appropriate delays; and
  - where possible, orienting faces so that they do not face directly towards residences and keeping face heights to a minimum.
- Consider weather forecasts in the ongoing management of blast impacts (allowing for the effects of adverse wind on the propagation of air blast to surrounding areas).
- Conduct trial blasts to determine the site constants and actual noise levels at the closest sensitive receiver.
- Notify residents prior to the blasting activities to reduce the risk of complaint.

Construction Traffic Noise

- Establish designated access route/s to the site and inform drivers of these routes, parking lots and acceptable delivery times.
- Undertake regular site road inspection and maintenance to minimise impact noises from trucks travelling over irregularities in the road surface.
- Limit vehicle speeds in critical areas both on and off site.
- Allow for one-way traffic flow through the site to minimise the use of reversing alarms as much as possible and minimise traffic delays.
- Limiting excessive acceleration from site exits.
- Entry and departure of heavy vehicles to and from the site are restricted to the standard daytime construction times.

Monitoring	Site activity log. Noise Monitoring ■ Ongoing monitoring and review of the site noise management practices would be undertaken: – at the commencement of construction activities; – in response to a valid community complaint regarding construction noise; or – where review of upcoming construction schedule indicates a high likelihood for impact at nearest sensitive receiver locations. ■ The purpose of monitoring is as a proactive management tool to assist with: – investigating the likely sources of construction noise impact; – quantifying the extent of likely impact (through comparison with the Project noise level goals); – identifying the need for further controls or modified site noise management practices; and – establishing the effectiveness of noise mitigation implemented. Blast Overpressure Monitoring ■ Blast overpressure and vibration monitoring is initially to be undertaken for trial blasts at several key residential locations to identify site specific details and make adjustments to the blasting parameters and programme. ■ This monitoring should also be undertaken on a monthly basis under changing temperature and meteorological conditions to ensure blasting levels remain within the criteria. ■ Auditing of this EMP conducted bi-annually (internally) and annually (externally).
Reporting	■ In the event of a complaint associated with the generation of excessive noise, a report will be prepared detailing the results of noise level measurements and investigations undertaken. Where the activity is ongoing, the report will detail: – the time of monitoring; – the type and location of activities occurring on site at the time of monitoring; – the location of monitoring positions with respect to site noise sources (also marked on a plan); – noise generating activities audible at the monitoring location; – other extraneous noise sources which could influence the noise level measurements; and – weather conditions prior to and during the monitoring (or complaint). ■ Circumstances in which the activity (generating excessive noise) is completed: – Investigation into cause and procedures to ensure the occurrence does not happen again.
Responsibility	Contractor
Corrective Action	Where construction noise level investigations in response to community complaints show unacceptable project noise levels, revision of the noise mitigation measures and management commitments will be undertaken to further control noise impacts.

9.16. Waste

Environmental Objective	To prevent or minimise the generation of wastes, where practicable and to appropriately contain, control and re-use or dispose of all waste generated.
Performance Criteria	■ Implementation of the waste minimisation hierarchy to undertake the following in preference to waste disposal: – waste avoidance; – waste re-use; and – waste recycling. ■ Water conservation, treatment and re-use. ■ Efficient energy usage. ■ Compliance with national and state waste management policies, the EP Act and associated regulatory instruments as a minimum. ■ Effective and lawful waste disposal.

	■ Construction and storage areas clean and tidy.
Mitigation Measures	Waste Management Plan ■ Preparation and implementation of a site-specific Waste Management Plan prior to commencement of construction activities addressing issues such as location and methods of storage, transport and disposal. Waste Minimisation, Re-use and Recycling ■ All reasonable efforts will be made to avoid and minimise waste and to re-use or recycle where possible. Waste will be minimised by producing / procuring only the amount of raw materials necessary. ■ Waste minimisation will be integrated into the design and construction planning process. ■ Purchase agreements will include the requirement for suppliers to take back packaging where practicable. ■ Training will be provided for employees in waste minimisation, re-use and recycling opportunities relevant to their work area. ■ Housekeeping procedures, (including spillage control, litter pick up and tidying up of site areas) implemented to minimise the generation of waste. ■ Concrete waste will be crushed and re-used in the batching plant or used as fill. ■ Building materials, timber and metal off-cuts and plastics from construction and demolition will be collected and stored in segregated areas for re-use on site where practicable. ■ Empty drums stored as per Australian Standards and collected by licensed transporter and dispatched to a licensed facility for recycling. ■ During construction, colour-coded, signed bins will be used to segregate wastes for recycling or disposal. The bins will be located throughout offices and workshop areas to maximise economic waste recovery. Disposal ■ On-site waste management practices will be highlighted during employee inductions. ■ Awareness will be provided to employees and signage provided to minimise contamination between recycling and disposal bins. ■ Bin management will include: – regular transport by licensed contractors to local approved waste facilities or recycling centres – no overfilling – compaction before disposal, and – prevention of animal access. ■ All waste construction material removed from the work site upon completion. ■ Records maintained of any waste generated and removed from the premises. Wastewater and Liquid Waste ■ Sewage from the construction site will be pumped out and disposed of at a licensed facility. ■ Portable toilets used along the pipeline route will be collected or pumped out by a contractor for off-site disposal to a licensed facility. ■ Sewage from accommodation camps will directly connect to the town system if the final location is close enough to town services and with agreement from Council. ■ Water for dust suppression, haul roads and rehabilitation is proposed to be sourced from retention ponds or drawn directly from the Dawson River. ■ Accumulated silt will be removed and used as topsoil where possible, or incorporated into fill. ■ All liquid waste from workshops will be disposed of by a licensed liquid waste contractor. Waste Transport ■ Transport of regulated wastes and contaminated soils or other materials conducted by licensed contractors for disposal at licensed facilities, in accordance with legislative requirements. ■ Trackable' wastes will be tracked in accordance with the Environmental Protection (Waste Management) Regulation 2000. Interstate transport of 'controlled' wastes

	will be tracked in accordance with the National Environmental Protection (Movement of Controlled Waste between States and Territories) Measure. The tracking may use either an electronic tracking system approved by DEHP, or use DEHP waste tracking certificates. A Consignment Authorisation will be obtained for any interstate transfers of 'controlled' wastes, ■ Movement of hazardous materials and regulated wastes at non-peak times to minimise the possibility of traffic conflicts and associated risks. ■ Waste only removed from the premises and disposed of in a lawful manner in accordance with the requirements of DEHP and Banana and Western Downs Councils. Regulated Waste ■ The regulated wastes generated during the construction of the dam will be reduced and/or recycled where possible. ■ The management of regulated wastes (collection, transport, tracking, treatment and disposal) will be in accordance with the EP Act and Regulations, including appropriate licensing of the contractor, transport vehicles and facilities. ■ Should a significant spill occur which potentially causes or threatens environmental harm, DEHP will be notified, and the site will be investigated, managed and remediated in accordance with the requirements of the contaminated land provisions of the EP Act. ■ Implement the Land contamination and Hazard and risk EMP subplans. Incidents ■ Preparation of waste management procedures to deal with any potential incident in which waste material with the potential to cause environmental harm is released to the environment. ■ Immediate reporting of the incident to Site Supervisor and Environmental Coordinator. ■ Corrective or remedial action as is required to render the area safe and avoid or minimise environmental harm. Contaminated Soil ■ Implement the Land contamination EMP subplan (**Section 9.5**).
Monitoring	■ Regular inspection of on-site facilities to ensure waste is being generated, stored, handled, transported and disposed of in accordance with this EMP subplan. ■ Any waste discharges from site that could impact on the environment monitored in accordance with conditions of approval. ■ Registers and manifests maintained to track waste material. This documentation subject to internal or external audit, especially for any regulated waste material. ■ Waste contractors to provide certification (licence) records verifying their registrations and points of discharge of waste. ■ Recording of any spills that occur as an incident, as well as the follow up actions, any results and reporting to authorities. ■ Inspections against the EMP subplan conducted weekly (internally). ■ Auditing of this EMP subplan conducted bi-annually (internally) and annually (externally).
Reporting	■ Monthly Report prepared and submitted to SunWater to include details of monitoring results, audits, training and incidents. ■ Any environmental incidents recorded including time of incident, persons involved, details of incident, mitigation measures and actions taken to minimise the probability of recurrence. Immediate reporting to Environmental Coordinator of any large spills or potential risk of spills. ■ Incidents, complaints and any significant environmental harm reported to regulatory body/ies where required.
Responsibility	Contractor
Corrective Action	■ In the event of a spill of hazardous or liquid wastes, necessary work procedures and operational controls will be reviewed to ensure they are fit for purpose and revised where necessary. ■ The Construction Manager may request the cessation of works at any time should a breach of performance criteria of this EMP subplan be occurring or is at risk of occurring.

9.17. Hazard and risk

Environmental Objective	Safely manage the risks to the workforce, public and existing environmental values, including surrounding land uses associated with the Project.
Performance Criteria	■ Compliance with relevant Standards, guidelines and legislation. ■ Number of incidents. ■ Emergency procedures implemented during incidents. ■ All incidents reported as required.
Mitigation Measures	General ■ Undertake and maintain a site based risk assessment to identify the requirements for control measures for risks including those potentially not identified within the EIS and Draft EMP outline. ■ Comply with AS4801 and AS4804 in developing and operating the safety management system. ■ Develop an Emergency Management Plan (including via discussions with emergency services groups). Hazardous Materials or Dangerous Goods ■ Undertake storage and transport of materials according to relevant Australian standards, guidelines and legislation, including: – AS4452 The Storage and Handling of Toxic Substances; – AS1940 The Storage and Handling of Flammable and Combustible Liquids; – AS3780 The Storage and Handling of Corrosive Substances; – The Australian Code for the Transport of Dangerous Good by Road and Rail – *Dangerous Goods Safety Management Act 2001*; and – Local council requirements. ■ Spill kits for contaminated material and protective clothing will be provided at each transfer and storage location for use in the event of any spillages or leaks. ■ Copy of up to date MSDS for each chemical / product used on site, will be available on site at the storage location and readily available to all site personnel. ■ Appropriate signage provided using Dangerous Goods classes which are to be visible at all times. Signage also listing contact details for the Environmental Coordinator and Safety Officer in case of an emergency. ■ Fire fighting equipment must be checked and maintained at all times. ■ Records will be kept on the existing inventory, storage location, personnel training and disposal of waste for all chemicals, fuel and dangerous goods used on site. ■ All relevant staff must be trained in appropriate handling, storage and containment practices for chemicals, fuel and dangerous goods. ■ Liquid chemicals and fuels storage in above ground tanks and chemicals and fuels stored in drums will be bunded in accordance with the relevant Australian Standards. ■ In the event that Asbestos is located on site, develop and implement an Asbestos management plan. Flooding ■ Construction activities staged to minimise potential 'wash out' impacts. ■ Cease in-stream works and remove all construction personnel and equipment to higher ground in the likelihood of a flood event. ■ Cease civil works (as far as practical) well before flood event to reduce risk. ■ Constructing coffer dams and diversion conduit of capacity sufficient to pass a flood event with an AEP that will adequately limit the commercial risk of damage to the partly completed dam. Emergency Response ■ Designated first aid and emergency rescue facilities and equipment will be available. ■ Stores, workshops and offices will be fitted with approved and certified fire detection (smoke detectors) and fire fighting systems. ■ First aid and fire fighting equipment (hand held extinguishers and fire hoses) will be installed at strategic points within each building.

	■ Develop a spill response and fire management plan for the site for construction – noting this plan may require updating as construction progresses into new areas. ■ Fire fighting equipment and exit locations will be suitably signed and all work areas will be within the required distance to reach emergency exits. ■ Appropriately trained personnel will be available throughout the life of the Project to provide first aid and emergency response to on site emergencies. Vehicle Collision and Driving Conditions ■ Construction workers operating vehicles on-site will be trained and licensed, so that these vehicles are driven in a safe and appropriate manner. ■ Speed control (signage), driving to conditions, and prescribed driving etiquette on the site will be used to control the risk. ■ All vehicles will be fitted with radios for two-way communication. ■ Watering of roads and access areas will be undertaken regularly to suppress dust and improve visibility. ■ Adequate night lighting through the provision of lighting towers and vehicle headlights will be provided to ensure night operating and driving conditions are safe. Explosives and Blasting ■ Where used, a specialist explosives company will provide the ammonium nitrate, emulsion, detonators and boosters to be used during blasting operations. The Contractor's personnel will be licensed and trained in the transport, handling, mixing and use of explosive materials. ■ Blasting operations will comply with the Explosive *Act 1999*. Security ■ Safe Working Procedures for working at height and falling objects will be employed. ■ Mandatory PPE on a construction site that protects against objects falling from height includes steel capped boots and hard hats (both are worn at all times). ■ Falling hazards will be controlled through appropriate elevated work platforms and the proper use of harnesses. ■ Fencing will protect selected areas with high risk of a security breach or unauthorised public access. Induction ■ Prior to being given access to the Project site, visitors will complete mandatory registration and an environmental, health and safety induction. The scope of induction will reflect those areas of the Project site that the visitor will be permitted access.
Monitoring	■ Any defects of storage areas observed during daily operations e.g. bunding, floor, cover, structure, hoses, valves and pumps or associated infrastructure are to be reported to the Site Supervisor or Environmental Coordinator. ■ Equipment operators to regularly check equipment for evidence of leak and fitness of hydraulic hoses and seals. ■ Maintenance or repairs are undertaken as necessary to prevent drips, leaks or likely equipment failures. ■ Monitor rainfall and weather warnings (issued by the Bureau of Meteorology) to anticipate and reduce the potential risk of flood impacts. ■ Monitoring will be undertaken in accordance with WH&S Plan to assess whether Project health and safety measures are being implemented and effective. Monitoring will involve the compilation and assessment of data relating to health and safety issues, such as reported near misses, accident reports and any health surveillance data (sickness data). Outcomes from this monitoring may trigger the need for additional safety and health risk control actions. ■ In accordance with the WH&S Plan, accident and near miss data will be monitored to identify where: – common themes occur – PPE is being incorrectly used/abused – corrective actions have not been strictly implemented – corrective actions are ineffective – procedures/practices need to be reviewed and retraining may be required

	– health surveillance data will be monitored to identify common themes. ■ Auditing of this EMP subplan conducted bi-annually (internally) and annually (externally).
Reporting	■ Opportunities for improvement and / or non-compliance with CEMP captured in regular audits to be reported and feedback to Environmental Coordinator. ■ Any environmental incidents involving spills recorded including time of incident, persons involved, details of incident, mitigation measures and actions taken to minimise the probability of recurrence. Immediate reporting to the Environmental Coordinator of any large spills or potential risk of spills. ■ Health and safety incidents are to be reported and investigated to prevent a reoccurrence in accordance with the WH&S Plan. ■ Incidents, complaints and any significant environmental harm reported to regulatory authorities where required.
Responsibility	Contractor
Corrective Action	■ In the event of a spill of hazardous substances, necessary work procedures and operational controls will be reviewed to ensure they are fit for purpose and revised where necessary. ■ The Construction Manager may request the cessation of works at any time should a breach of performance criteria of this EMP subplan be occurring or is at risk of occurring.

9.18. Transport and roads

Environmental Objective	Manage construction traffic and transport issues to minimise potential impact on the community and the operation of the road network.
Performance Criteria	■ Avoidance, mitigation and management of the potential construction traffic impacts on communities near worksites within the dam and surrounds, pipeline and associated infrastructure areas. ■ Minimisation, as much as possible, of potential traffic disruptions to the operation of the road network and the public transport (school buses) due to construction works. ■ Exclusion from project work areas of road users, including pedestrians, cyclists and tourists. ■ Implementation of traffic management measures near each worksite to avoid conflicts between construction traffic and local traffic. ■ Local and broader communities kept informed about the time and scale of changes in the traffic conditions on roads in the vicinity. ■ Traffic flows near construction works monitored, as required. ■ Corrective measures implemented in response to traffic impacts subsequent to construction and operational works.
Mitigation Measures	Planning ■ Undertaking of a transport logistics study and agreement negotiated with the relevant authority on any necessary works required prior to or during construction. ■ Liaison with the parties involved in rail projects, if the projects are under development / construction at the time. ■ Detailed traffic management plans (TMPs) complementing the Project road use management plans (RUMPs) are to be developed in consultation with Department of Transport and Main Roads (TMR), Western Downs Regional Council, Banana Shire Council and Queensland Police Service (QPS). Subsequent to TMR and Council approvals, the proposed controls will be implemented in consultation with TMR, QPS, Queensland Fire and Rescue Service (QFRS), Queensland Health and the Councils as appropriate prior to the commencement of the construction and/or operational works. Development of the RUMP and TMP will include consideration of cumulative traffic movements associated with other developments active at the time. The plans would address the safety and convenience of all road users and consider the following: – locations of haulage routes;

- maintenance of satisfactory and safe property access and construction site access;
- maintenance of local road connectivity to minimise impact on the local community;
- temporary road closures and traffic detours;
- traffic signage and intersection controls;
- traffic barriers and lighting;
- road deviations;
- speed controls through and in the vicinity of work sites;
- provisions for pedestrians and cyclists;
- installation of proper signage to make drivers aware of road works;
- use of safety vehicle signs and qualified flagmen where works impinge on any road reserve;
- wet weather specific operational requirements including any contingent and emergency planning, as well as management measures necessary to address any potential environmental impacts of wet weather operations; and
- truck routes and construction site access.

Approvals, permits and notifications

- Any construction occurring near, or encroaching on, a road reserve will be in a manner agreed to by the relevant authority and/or regulatory body and conform to statutory requirements. Where there is anticipated to be vehicular conflicts with traffic associated with the Project and general traffic, TMPs and RUMPs will be implemented as required. If the road is state controlled, an application for an ancillary works and encroachment permit will be made to TMR.
- Consultation, negotiation and permitting will be conducted with TMR on the movement of any oversized loads and/or dangerous goods identified during detailed design. The responsible authority (including Police) will be notified and the necessary permits obtained.
- Equipment and material transport routes and storage areas will be planned in consultation with local and state authorities to minimise disruption to residents and other road users.
- Local communities will be notified where practicable about proposed changes to local traffic access due to construction activities and clear signage will be provided of changed traffic conditions.

Implementation of mitigation measures

- The approved RUMPs and TMPs will be implemented.
- Haulage tasks during peak traffic periods and during the school drop-off and pick-up times will be avoided. Where haulage in peak hours is unavoidable, such activities will be managed in accordance with specific TMPs provided to the relevant agencies and the relevant Council in advance.
- Brief TMR, school bus committees and operators of any pending traffic changes that may impact on bus operations. Inform haulage and construction plant operators of bus times and routes.
- Consult with the QPS in relation to traffic impacts and mitigation measures throughout construction.
- Pipeline construction at road crossings will be scheduled outside peak periods to minimise disruption.
- The use of multi-person vehicles for travel to and from worksites will be encouraged, with staggering of personnel movements to minimise the number of vehicle movements during peak periods, where practical.
- Personnel will be transported via buses between camp sites and construction sites where practical.
- Access to construction sites for emergency vehicles will be maintained at all times.
- The delivery of bulk construction materials will be scheduled over several months prior to construction commencing in order to spread the transport load.
- Transport distances and distances travelled on public roads and unsealed roads will be minimised through delivery scheduling and the locating of areas and sites (such as camp sites, stockpile and lay-by).
- Providing suitable, or upgrading existing, access and egress points between the

	public road network and the pipeline construction easement or the access track. ■ Implementation of Fatigue Management Program for workers. ■ The number of site accesses to be allowed along the Leichardt and Warrego Highways will be minimised. Access points to be located and placed with adequate sight distances and advance warning signs as per TMR's manual of Uniform Traffic Control Devices. ■ Using the construction easement for delivery of materials and transport of workers, and dedicated and trained personnel, where appropriate, to coordinate traffic on the easement. ■ Using resource extraction suppliers and stockpile sites as near as possible to the easement to minimise transport distances and distances travelled on public roads. ■ Where practical, sharing maintenance tracks with adjoining easement owners to ensure that slow moving vehicles are not on the highway. ■ Implementation of dust management measures, such as the watering of pavement and speed controls, during high dust risk (windy) periods. ■ Implementation of standard spill management procedures (Chapter 26 of the EIS). ■ Undertake condition assessment survey prior to construction. ■ Reinstatement to the satisfaction of local authorities for damage to local roads that can be shown to be as a result of Project activities. ■ Reinstatement to the satisfaction of TMR for damage to State Controlled Roads that is a result of Project activities.
Monitoring	■ Monitoring of accidents, complaints regarding incidents, impacts on traffic flows and road network performance. ■ Review of RUMPs and TMPs if necessary. ■ Auditing of this EMP subplan conducted bi-annually (internally) and annually (externally).
Reporting	■ Monthly report prepared and submitted to SunWater to include details of local traffic conditions, including any accidents involving construction traffic, any monitoring results, audits, training and incidents. ■ Immediate reporting to Site Supervisor and Environmental Coordinator of any incident which contravenes the objectives of the subplan. ■ Incidents, complaints and any significant environmental harm reported to regulatory body/ies where required.
Responsibility	Contractor
Corrective Action	■ Investigation and implementation of additional traffic management and transport options where required. ■ Ensure that the appropriate personnel undertake adequate environmental awareness and training covering the requirements of the EMP regarding traffic management. ■ The Construction Manager may request the cessation of works at any time should a breach of performance criteria be occurring or at risk of occurring.

9.19. Indigenous and non-indigenous cultural heritage

Environmental Objective	Conduct of all activities in a manner that minimises the effect on heritage items including protection of indigenous and non-indigenous cultural heritage sites, artefacts and areas of high cultural and heritage value.
Performance Criteria	All known indigenous cultural heritage objects and areas, as identified by the Aboriginal Parties for the Project area and documented in the cultural heritage survey and assessment reports for the Project, are preserved and not impacted upon by the Project or managed as specified in the Project Cultural Heritage Management Plans (CHMPs) or agreed recommendations for New Infrastructure Areas as defined in the Project CHMPs. ■ All known non-indigenous cultural heritage objects and areas are preserved and not impacted upon by the Project or managed as specified in Appendix 23A of the EIS, including the development and implementation of project specific Archaeological Management Plans for the Glebe Homestead and the Taroom Aboriginal Reserve (consistent with the CHMP), and if required for the Juandah Heritage Site.

	■ All unknown indigenous and non-indigenous cultural heritage items found during the course of the Project are managed in accordance with the relevant legislation as summarised in Chapters 22 and 23 of the EIS, and with the New Discoveries section of the Project CHMPs as relevant.
Mitigation Measures	General ■ All site operations are to be carried out in accordance with the Project CHMPs as agreed between SunWater and the Aboriginal Parties for the area. ■ All site operations are to be carried out in accordance with project specific Archaeological Management Plans where developed. Induction ■ Cultural heritage awareness training will be conducted for all relevant on-site personnel to enable them to identify areas and items of cultural heritage significance, and implement agreed management strategies as documented in the Project CHMPs and the relevant legislation. Discovery of Artefacts ■ In the event that any indigenous cultural heritage items are uncovered during the course of the construction of the Project, work in the immediate area should cease and the finds immediately be reported to the relevant Aboriginal Party contact officer (as per the Project CHMPs) and SunWater. ■ In the event that any non-indigenous cultural heritage items are uncovered during the course of the construction of the Project, work in the immediate area will cease and the finds immediately be reported to the Project archaeologist (available on-call) to determine the significance of discovered items and if formal reporting is required submit a report to DEHP.
Monitoring	■ Ongoing monitoring implemented as per the Project CHMPs for indigenous cultural heritage discoveries and following direction from DEHP with respect to discovered non-indigenous items. ■ Auditing of this EMP conducted bi-annually (internally) and annually (externally).
Reporting	■ Report any findings of indigenous and non-indigenous cultural heritage items to the Site Supervisor immediately, then follow the requirements of the CHMP/DEHP. ■ Report any findings of indigenous cultural heritage items to the relevant Aboriginal Party contact officer (as per the Project CHMPs) and SunWater. ■ Report any findings of non-indigenous cultural heritage items to DEHP and SunWater. ■ DEHP contacts are as follows: – Indigenous – Cultural Heritage Unit (DATSIP), Ph 3247 6212 – Non-indigenous – Heritage Branch (DEHP), Ph 137468
Responsibility	Environmental Coordinator (Contractor)
Corrective Action	Any non-compliances to be rectified in consultation with the appropriate parties (Aboriginal Parties or DEHP).

9.20. Social and economic

Environmental Objective	■ Minimise impacts of the Project's construction for affected communities and workers. ■ Maximise benefits of construction phase, including employment and procurement.
Performance Criteria	■ Residents of properties adjacent to construction activities are informed of construction works. ■ Local communities impacted by the proposed construction works, including through increased traffic or changes to water management, are informed in advance of construction activities and potential impacts. ■ Community complaints are responded to in a timely manner.
Mitigation Measures	– Communication program implemented within local and regional communities, regarding: – construction activities, including timing, duration and likely impacts; – management and mitigation measures; and – details of complaint management system. ■ Complaint response system followed including promotion and provision of phone

	contact with construction management staff during hours of construction, and a follow up procedure which notifies complainants within 24 hours of the intended response to the issue raised. ■ Site design and construction activities (including watercourse crossings) minimises the removal of vegetation with rehabilitation conducted at the earliest practicable opportunity to restore previous visual qualities attributed to vegetation on the site. ■ Establish and implement a community sponsorship program focussing on those local communities most affected by the Project. ■ In partnership with relevant government agencies, implement employment and training strategies to maximise employment opportunities for local communities. ■ Implement local business procurement strategies to maximise opportunities for local businesses in the supply of goods and services. ■ Ongoing consultation and communication with construction employees by SunWater and Contractor. ■ Implementation of transition programs, including provision of information and support for workers and their families on local services and facilities (e.g. SunWater's Employee Assistance Program). ■ Implement Transport Management-plan. ■ Finalisation of a Social Impact Management Plan (SIMP) based on the preliminary framework outlined in Section 24.9 of the EIS.
Monitoring	■ Follow up enquiries and complaints to assist in gauging community's perceived project impacts on social and economic values and amenity. ■ Auditing of the SIMP to be undertaken annually (internally) and every two years (externally).
Reporting	■ Monthly Report prepared and submitted to SunWater to include details of monitoring results, audits, training and incidents. ■ Communications register to include communication activities, stakeholders' complaints and resolution of complaints. ■ SunWater will conduct annual progress reporting against the SIMP during construction. ■ Significant complaints and community issues reported to regulatory body/ies where required.
Responsibility	Contractor
Corrective Action	■ Appropriate actions implemented where complaints or comments reported during construction as per communications procedures. Ensure all complaints are followed up and logged. ■ The Construction Manager may request the cessation of works at any time should a breach of performance criteria be occurring or is at risk of occurring.

10. Draft operation environmental management plan outline

10.1. Overview

This section describes the proposed objectives, performance criteria and identified mitigation measures for the operational phase of the Project. It should be noted that most operational issues are addressed at the design and construction phase, so only brief details are provided here.

SunWater has considerable experience in the operation of dams, pipelines and water supply systems and has established Standard Operating Procedures for many aspects of operation, including stakeholder communications and weed control.

Some of the environmental elements suggest specific monitoring requirements and / or statutory requirements and these are described in the following sections. Dam safety is regulated for referable dams so that the community is protected from dam failure. As a referable dam, conditions for dam safety management will be required to be met under

Queensland Legislation. These requirements are likely to be those defined in the *Queensland Dam Safety Management Guidelines* (DNRW, 2002a) and consistent with the comparable ANCOLD guidelines.

The operational environmental element topics for this Draft EMP outline are:

- management of water storage and pipeline
- geology and soils
- water quality
- greenhouse gases
- ecological rehabilitation, restoration and monitoring
- dam safety
- groundwater
- aquatic weeds
- hazardous substances
- social and economic

10.2. Management of water storage and pipeline

Environmental Objective	Nathan Dam and water storage and water releases must be managed and scheduled to: ■ Optimise the distribution of water from Nathan Dam ■ Conform to flow requirements of the WRP ■ Comply with the Resource Operations Plan (ROP)
Performance Criteria	■ Compliance with the WRP, ROP and Resource Operating Licence (ROL) ■ Staff trained in procedures associated with the monitoring required in the Operations and Maintenance Manual.
Mitigation Measures	■ Once the dam is commissioned the operator will be required to implement operating procedures as stated in a ROL. ■ Develop an Operation and Maintenance Manual for Nathan Dam and pipeline which will consider: – the risk of impacts to existing users and the environment through changed river flows to be managed through the dam operational strategy and compensation strategy; – the flood risk to the dam during operation to be managed through a combination of a flood management plan and the land purchase strategy; – maintenance of fauna passage through a fishway and turtleway at the dam through appropriate design, operation, maintenance and monitoring of these structures, through collaboration with Fisheries Qld, DEHP and Fitzroy Basin Association NRM Group; – maintenance schedule for the pipeline, frequency of traverse and notification procedures.
Monitoring	■ Carry out monitoring in accordance with SunWater's Standard Operating Procedures (SOPs). ■ Regular auditing undertaken to ensure compliance with objectives of the EMP. ■ Establish and maintain new gauging stations at the headwater and tailwater of the dam and at major tributaries upstream of the dam (including rainfall gauges strategically located throughout the catchment area). ■ Establish and implement a monitoring plan in accordance with the process agreed between Fisheries Qld, DEHP and Fitzroy Basin Association NRM Group and SunWater for the Fishway and Turtleway. ■ Monitoring of geomorphic assessment sites for potential change that adheres to the assessment guidelines outlined in Section 14.6.2.3 of the EIS. Sites were established pre-construction as outlined in the Surface water hydrology sub-EMP (**Section 9.6**). ■ Electronic surveillance of pipeline pressure and balance storage depth. ■ Visual inspection of pipeline easement, above ground infrastructure and offtakes.
Reporting	Operator to report on operations as per the ROL (detailed below).

	A holder of a ROL must: ■ Undertake an ongoing water quantity monitoring program measuring a variety of flows and volumes. ■ Undertake an ongoing water quality monitoring program (**Section 10.6**). ■ Report all relevant water management activities to the chief executive as detailed in the ROL.
Responsibility	Operator
Corrective Action	Appropriate action will be taken if impacts are found to be unacceptable in terms of water supply, flows, adjoining land use, ecology or erosion. Depending on the circumstances, appropriate action could include: ■ review of operation and maintenance procedures; ■ measures to entrap sediment upstream at a site more accessible for sediment removal and possible placement downstream; ■ measures to improve stream bank stability; or ■ catchment management measures to minimise erosion from sediment sources.

10.3. Dam safety

Environmental Objective	Safely manage the risks to the existing environmental values, including surrounding land uses associated with the Project
Performance Criteria	Compliance with relevant Standards, guidelines and legislation.
Mitigation Measures	Public Safety ■ Provide adequate signage to warn public of any dangers. ■ A safety risk assessment will be undertaken of the Project operations to identify areas of high risk to public safety. Exclusion zones will be developed to prevent public access to high risk areas, with fences and signs erected to delineate such areas. Security ■ Fencing will protect selected areas with high risk of a security breach or unauthorised public access. ■ Prior to being given access to the restricted areas, visitors will complete mandatory registration and an environmental, health and safety induction. The scope of induction will reflect those areas of the Project site that the visitor will be permitted access. Dam Failure ■ Regular maintenance. ■ Develop Emergency Action Plan (EAP). ■ Remote monitoring by maintenance crew. ■ An Operations and Maintenance manual will be prepared for the dam. The manual must be written such that persons unfamiliar with the dam can operate it properly. This should include procedures for the following: – operating the dam under normal conditions; – coordination with other flow regulating structures within the catchment; – maintaining environmental flows; – coordinating with emergency response and counter disaster agencies; – flood warning; – maintaining the dam, associated structures and associated equipment in accordance with the designer's operating criteria; – a program for surveillance and monitoring of the dam and all associated structures and equipment to allow for early detection of faults, deficiencies and potential environmental issues; – recording and reporting of routine and non-routine surveillance; – remedial action in the event of faults or deficiencies being identified by surveillance; and – periodic review, at regular intervals or when changes or other circumstances dictate.

Monitoring	■ Undertake monitoring in accordance with the Operations and Maintenance Manual. ■ The operator must monitor the dam for signs of stress and/or damage, keep records of all inspections, and promptly report all events or findings that concern dam safety. ■ Queensland Dam Safety Guidelines require that a Dam Log Book be kept to record major and exceptional events and to confirm compliance with dam safety requirements. ■ The operator must record and report all dam instrument readings, using the forms supplied by the Dam Safety Manager. ■ Auditing of the EMP conducted bi-annually (internally) and annually (externally).
Reporting	Record and report all routine and non-routine surveillance in accordance with the Operations and Maintenance Manual.
Responsibility	Operator
Corrective Actions	Appropriate action will be undertaken promptly should a breach of the performance criteria be occurring or be at risk of occurring. This may include a safety investigation, review of procedures and/or remedial or upgrade works to facilities.

10.4. Geology and soils

Environmental Objective	Minimise environmental impact by preventing soil loss and erosion. No impact to occur to any significant geological features in the Project area.
Performance Criteria	Maintain soil and water control devices for long-term surface stability and protection against erosion.
Mitigation Measures	■ Maintenance of permanent soil and water control devices. ■ Replanting of vegetation if rehabilitation fails in revegetated areas.
Monitoring	■ Regular monitoring of permanent soil and water control devices installed during construction phase for evidence of soil erosion and sedimentation. ■ Regular inspections by qualified person of structures to ensure compliance with the design specifications. ■ Regular auditing undertaken to ensure compliance with objectives of the EMP.
Reporting	Regular compliance with objectives of the EMP.
Responsibility	Operator
Corrective Action	Appropriate action will be taken if impacts are found to be unacceptable in terms of adjoining stability, sedimentation or erosion. Depending on the circumstances, appropriate action may include: ■ structural maintenance; ■ removal of accumulated sediment; ■ measures to entrap sediment upstream at a site more accessible for sediment removal; ■ measures to improve stream bank stability upstream; ■ reforming of pipeline trench or cover; ■ replant vegetation in areas where revegetation has failed; or ■ catchment management measures to minimise erosion from sediment sources.

10.5. Groundwater

Environmental Objective	To minimise adverse impacts to groundwater quality, levels, associated GDEs and groundwater users throughout the operation period of the Project.
Performance Criteria	■ Actively implement aspects of EMP to reduce the potential for the Project to negatively impact groundwater quality. ■ Maintain agreed offsets regarding spring ecosystems. ■ Any increased discharge and saturation associated with nearby springs and other GDEs is recorded and managed to enhance spring related or relevant environmental values. ■ Groundwater users are not compromised by increased groundwater levels or

	pressure as a result of dam inundation.
Mitigation Measures	■ Implement the Groundwater Monitoring and Management Program – Operations Phase at locations finalised in accordance with **Section 9.7**. ■ Regular maintenance and monitoring of the pipeline to reduce the likelihood of pipeline failure. ■ Storage, handling, transport and spill cleanup of any chemicals, hazardous substances, wastes or any other materials capable of effecting groundwater quality will be undertaken (**Section 10.9**). ■ Monitoring for pressure related impacts on springs and a program of fieldwork to identify new springs will be undertaken. Where possible, areas of increased discharge or saturation will be managed via appropriate land management, if required. For example this might include the fencing-out of areas of increase discharge to provide stock control and allow natural establishment of flora. ■ The Bore Monitoring and Management Program established in the construction phase will assess, rehabilitate or replace bores at high risk of catastrophic collapse Therefore, during the operation phase, if a groundwater user reports an issue with their bore, the bore will need to be investigated to ascertain whether the issue is related to dam derived pressure changes or not.
Monitoring	The spring and groundwater monitoring and management program developed for the construction phase will be reviewed (and revised as necessary), and continued for monitoring during dam operation with the following objectives: ■ analysis of water level trends; ■ detection of groundwater quality effects; ■ analysis of effect on groundwater pressure. The table below summarises the parameters to be monitored for groundwater and springs and the frequency of monitoring. **Summary of monitoring parameters and frequencies during the Operation Phase**

Phase	Asset Type	Parameter	Monitoring Frequency
Operation	Groundwater and springs	■ As per baseline ■ Ground survey to find new vents	6 monthly

■ Recently installed groundwater bores and adjacent springs at the following locations (located to the north, east, south of the FSL) will likely to be included as part of the future monitoring program:

Spring - Boggomoss South, and nested bores

25°25'59.747"S 150°01'36.542"E (Evergreen formation at 30 m depth)

25°26'00.061"S 150°01'36.545"E (Precipice formation at 60 m depth)

Spring - Boggomoss North and bore

25°24'56.418"S 150°01'23.852"E (Precipice formation at 60 m depth)

Spring - Cockatoo Creek and bore

Refurbished bore RN627229 (Precipice formation at 20 m depth)

Spring - Dawson 8 and nested bore

25°33'06.354"S 149°48'25.311"E (Birkhead formation at 30 m depth)

25°33'06.846"S 149°48'25.452"E (Hutton formation at 60 m depth)

■ It is likely that the final monitoring program will be supplemented by including additional Government owned monitoring bores.

■ In the event that an unplanned spill or incident occurs during operations and groundwater could be impacted, targeted groundwater quality monitoring will be carried out to determine potential impacts from the contamination.

■ Auditing of this EMP subplan will be conducted and reported annually as part of ROP reporting.

	■ Operational phase monitoring will be reviewed periodically and revised as appropriate subject to stakeholder agreement.
Reporting	■ Results of groundwater or spring monitoring and water quality testing are to be recorded and made available to relevant authorities upon request. ■ Report any non-compliance with groundwater quality objectives as defined by the Groundwater Monitoring and Management Program. ■ Report any non-compliance with objectives defined by the Bore Monitoring and Management Program. ■ Immediate reporting to Proponent of any incident, spill or release of materials to the environment. ■ Incidents, complaints and any environmental harm will be reported to regulatory authority, as required under the EP Act.
Responsibility	Operator
Corrective Action	■ If there an increase in spring area is attributable to the Project, they will be managed via appropriate land management targeting threats identified in the Recovery Plan, if required. For example this might include the fencing-out of areas of increase discharge to provide stock control and allow natural establishment of flora. (Note that rehabilitation of degraded springs as part of the Projects Offset Strategy is covered by that Strategy). ■ If an adverse impact to groundwater users is attributable to the Project, bore rehabilitation or replacement will be undertaken to mitigate the impact. ■ Sufficient shut down and/or isolation mechanisms for the pipeline will be created during the detailed design phase and will be implemented during the unlikely event of a pipeline rupture to prevent continued spillage of water. ■ In the event that an unplanned spill or incident occurs and has the potential to impact groundwater, targeted groundwater quality monitoring will be carried out to determine potential impacts from the contamination. Site specific remediation options will be developed based on findings from the environmental investigation.

10.6. Surface water quality

Environmental Objective	To preserve water quality within the Dawson River Catchment and downstream and maintain the Environmental Values (EVs) outlined in Table 16-4 (downstream of the dam) and Table 16-5 (within the water storage) of the EIS and described in the Dawson River Sub-basin EV's and WQOs Basin No. 130 (DEHP 2011).
Performance Criteria	The overarching performance criterion is to maintain existing ecosystem attributes and water quality within Dawson River Catchment throughout the operation period.
Mitigation Measures	Turbidity ■ Ensure water storage buffer area is well vegetated, particularly areas that contain dispersive soils. ■ Maintain permanent sediment and erosion control structures Nutrients ■ Ensure buffer zone is well vegetated, to act as a sink for nutrients. Blue Green Algae Blooms ■ Management of nutrient concentrations within the dam as outlined above. ■ Warning system implemented as per other SunWater storages. Water Use ■ The dam will utilize a multilevel offtake to source the most appropriate water for release.
Monitoring	Prior to commissioning, develop an appropriate monitoring program similar to other SunWater storages in Central Queensland which include cyanobacteria sampling. Water quality monitoring may include: ■ nutrients, physicochemical parameters at a variety of depths and locations (at least headwater, tailwater and inflow); ■ metals, herbicides and pesticides in surface water at least quarterly for at least for the first two years of operation; ■ algal biomass, including cyanobacterial count (when relevant); and

	■ the recording of ambient air temperatures, wind speed and direction, rainfall and inflow (via a local weather station and gauging stations). Event base monitoring ■ During and after rainfall, a visual inspection of rehabilitated areas undertaken to ensure no major erosion is occurring. Additional monitoring may be required to determine the extent of stormwater runoff after pulse events. First release strategy ■ Develop a first release strategy to minimise the risk of poor quality water impacting on environmental values downstream of the dam. This is likely to include monitoring water quality in the water storage and in the receiving environment downstream.
Reporting	■ Monitoring results should be compared to the local relevant WQOs, ■ Quarterly water quality reports. ■ Reports issued as per the Resource Operations Plan to include any action to be implemented in the case of non-compliance and the person/ organisation responsible for action to be highlighted. ■ Operator to report on dam operations as per Resource Operations Plan.
Responsibility	The dam operator will be required to undertake routine water quality monitoring and reporting as described in the ROP and this EMP.
Corrective Actions	Where WQOs and EVs are not met and levels exceed background levels as a result of the Project, management action should be taken to ensure objectives are met. This could be undertaken by initiatives such as (but not limited to): ■ Buffer zone management; ■ Use of multi-level offtake; and ■ Flow release options.

10.7. Aquatic weeds and pests

Environmental Objective	■ Within the water storage, minimise the opportunity for and occurrence of aquatic weed infestations and mosquito breeding. ■ For the pipeline, prevent the transfer of aquatic plant or animal pests.
Performance Criteria	A program in place to monitor and control aquatic weeds and mosquito's to monitor transfer via the pipeline.
Mitigation Measures	Development of a program to identify and control declared and aggressive aquatic weeds, such as Salvinia and Water Hyacinth that includes: ■ Provide signage at the water storage to assist with public awareness of aquatic weed species identification and translocation. ■ Train dam and pipeline monitoring staff in aquatic weed identification. ■ Regular monitoring for exotic weed species to detect possible infestations. Monitoring should occur after flow events, during flowering times, high growth periods and in bird feeding areas of the water storage and at the balancing storage and discharge locations along the pipeline. ■ Prepare a mosquito management plan using "Guidelines to minimise mosquito and biting midge problems in new development areas" (Qld Health 2002) and the "Mosquito management code of practice" (LGAQ 2002) or updates thereof. Consult with local authorities, Queensland Health and other stakeholders in preparation of the plan.
Monitoring	■ Monitoring as part of regular dam and pipeline inspections ■ Annual inspection by a specialist.
Reporting	Annual
Responsibility	Operator
Corrective Action	■ Implementing appropriate physical, mechanical, biological or chemical control if aquatic weed or animal pest species are detected. Control mechanisms to be based on current Biosecurity Queensland, Queensland Health or local authority advice as applicable. ■ Additional investigations or monitoring where necessary.

10.8. Greenhouse gas

Environmental Objective	Maximise energy efficiency and minimise greenhouse emissions during operations.
Performance Criteria	Report against the National Greenhouse and Energy Reporting System (NGERS).
Mitigation Measures	The continued implementation of SunWater's Energy Management Standard will minimise greenhouse gas emissions from the Project by: ■ identifying opportunities to improve energy efficiency for operation of the Project and to reduce greenhouse gas emissions; and ■ providing education and training to increase the level of energy management skills and competencies of SunWater staff.
Monitoring	SunWater is required to estimate annual greenhouse gas emissions under NGERS.
Reporting	SunWater is required to report estimated annual greenhouse gas emissions under NGERS. The development of consistent data capture and reporting processes will assist with the ongoing management of SunWater's greenhouse and energy management programs.
Responsibility	Dam Operator
Corrective Action	None identified.

10.9. Hazardous substances

Environmental Objective	■ Management of the purchase, quantities, storage, use and disposal of hazardous substances that may cause environmental harm. ■ Prevent spills from occurring, and contain, clean up and, if necessary, remediate any spills that do occur.
Performance Criteria	Requirements of the Flammable and Combustible Liquids Regulations and the relevant Australian Standards are met, such as: ■ AS4452 The Storage and Handling of Toxic Substances; ■ AS1940 The Storage and Handling of Flammable and Combustible Liquids; and ■ AS3780 The Storage and handling of Corrosive Substances. All hydrocarbons will be stored and handled in accordance with: ■ AS 1940-2004; and ■ AS 4897-2008; The design, installation and operation of underground petroleum storage systems. ■ Storage areas clean and tidy. ■ Recording and reporting of incidents accurately and describing the extent of spill that occurred. ■ Correctly sized bunds that are structurally sound and free from materials. ■ Water quality in the dam not impacted as a result of spills within the catchment.
Mitigation Measures	■ Chemical storage areas will be suitably bunded and constructed to minimise the potential for leaks to cause environmental harm. ■ All chemicals will be stored, handled and used according to provisions in their MSDS. The health risk presented by these chemicals is relatively low. ■ Storage, use and disposal of any chemicals, fuels, solvents or other hazardous materials or substances which may cause pollution, done so in such a way as to not cause environmental harm. ■ All spills involving materials that may cause environmental harm to be contained and effectively cleaned up and measures taken to prevent the incident from recurring.
Monitoring	■ Chemical and fuel storage areas and equipment inspected regularly to ensure the structures, containers and components are not faulty or pose any threat from loss or leakage, and to ensure cleanliness and security. ■ Recording of any spills that occur as an incident, as well as the follow up actions, any results and reporting to authorities. ■ Regular auditing undertaken to ensure compliance with objectives of the EMP.
Reporting	Operator to report on operations as required.

Responsibility	Operator
Corrective Actions	Ensure that all dam personnel are reminded of the requirements regarding hazardous substance transport, storage and management, and ensure that the situation is improved by the allocation of staff and other resources to rectify any non-conformance.

10.10. Ecological rehabilitation, restoration and monitoring

Environmental Objective	Successfully implement vegetation and fauna habitat (terrestrial and aquatic) management initiatives and offsets.
Performance Criteria	■ Successful establishment of northern wildlife corridor and environmental management initiatives within the water storage buffer zone and along the pipeline route. ■ Completion of Environmental Offsets Strategy (including securing tenures for identified springs to be protected). ■ Successful completion of all ecology related EMP elements including habitat establishment initiatives within and buffering the water storage and weed control.
Mitigation Measures	As outlined in: ■ Environmental Offset Strategy ■ Applicable EMP elements
Monitoring	Monitoring will include: ■ annual inspections of integrity of the northern wildlife corridor, water storage buffer zone and pipeline easement to determine success of plant species growth, rehabilitation, weed and pest management; ■ inspection (at timeframes specified in the Environmental Offset Strategy) of areas selected for vegetation and biodiversity offsets to determine success of plant species growth, rehabilitation and use by fauna; ■ ongoing monitoring of protected springs in accordance with the required management plan ■ monitoring of the health of nearby Great Artesian Basin (GAB) discharge spring communities outside the FSL as per the methods in Appendix B9 of the Additional Information. Monitoring should include records of any physical changes or changes in species composition. If monitoring shows no or acceptable change after 10 years, the program can be terminated if agreed with DoE. ■ annual population surveys of EVNT turtle species will be undertaken during the respective nesting seasons in areas upstream of the water storage area which supports suitable habitat, within the water storage and downstream as far as Theodore Weir to assess the population and the likelihood of nesting (using non-invasive ultrasound techniques). All individuals captured will be pit tagged. Results will be assessed with respect to the monitored flow regime, dam water levels, fishway and turtleway evaluations and changes over time; ■ if nesting is observed within the dam catchment, the nests will be protected from predators using mesh cages (as used in the Fitzroy Barrage and Mary River) and the site will be inspected for evidence of hatching at the appropriate time; ■ use of the fishway and turtleway will be monitored and reported; and ■ offtakes, outlet structures and the spillway will be inspected for evidence of injury or death caused to turtles and any such observations will be reported to DEHP and Queensland Fisheries. If evidence suggests that design of the screens, stilling basin or outlet structures can be improved to avoid or minimise such instances, feasible and practical modifications will be undertaken as a corrective action.
Reporting	Annual
Responsibility	Operator
Corrective Actions	As specified in respective plans/strategies, and: ■ replanting of species or implementation of alternative remediation techniques for plant species showing insufficient growth; ■ treatment of weeds/invasive species potentially impacting plant growth (as necessary); and ■ maintenance of fishway and turtleway as required (determined via monitoring).

10.11. Social and economic

Environmental Objective	Potential impacts for local communities are minimised and benefits of the Project are maximised or enhanced.
Performance Criteria	Compliance with SIMP requirements.
Mitigation Measures	SIMP revised to incorporate only long term risks and issues which require ongoing management
Monitoring	As outlined in finalised SIMP
Reporting	Reporting timeframes during operations would be agreed in consultation with the Queensland Government's SIA Unit and will be outlined in finalised SIMP
Responsibility	Operator to communicate with local community Recreation area to be managed by Council similar to other local recreation areas.
Corrective Actions	None required

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