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19. Management Plans

This component of the EIS addresses the Management Plans which comprises of the Environmental Management Plan (EMP) and the Emergency Response Plan (ERP).

19.1 Environmental Management Plan

19.1.1 Purpose

The objective of the draft EMP is to ensure that all potential environmental impacts that could reasonably be expected to occur during the Project are minimised and fall within acceptable and agreed limits. This will be achieved through pro-active environmental management and therefore is dynamic. Accordingly, emphasis is placed upon integrating the environmental management planning with design, construction methods and operation planning.

The requirements of this plan are applicable to all on-site work carried out. All subcontractors and suppliers will be bound to comply with the requirements of this plan, in so far as they are applicable to the nature and scope of their work.

The scope of this plan embraces the short-term impacts that the work will create during the construction and any long-term impacts that are influenced by the operation methods.

In particular, it will:

- establish procedures that will minimise adverse environmental, social and economic impacts;
- facilitate compliance with the relevant Legislation;
- provide evidence of practical and achievable plans for managing the Project to ensure that environmental requirements are complied with, buy providing an integrated planning framework for comprehensive monitoring and control of construction and operational impacts; and
- provide documented evidence that the Project is being managed in an environmentally acceptable manner.

19.1.2 Project Overview

The Hinze Dam Alliance (Gold Coast City Council (GCCC), Thiess, URS and Sinclair Knight Merz (SKM)) will raise Hinze Dam to Stage 3 (HDS3). Hinze Dam is the major water supply source for the Gold Coast region, and is located approximately 15 km southwest of Nerang, in the Gold Coast hinterland, Queensland.

The project involves raising the dam wall crest height from 93.5 m AHD to 106 m AHD and to increase the Full Supply Level from 82.2 m AHD to 94.5 m AHD. The dam currently covers an area of 974 hectares (ha) and this would increase to 1,472 ha with the raising of the dam.

The project includes the following activities:

- Spillway construction
- Rockfill dam construction
- Saddle dam construction
- Cut off wall construction
- Construction of fishway
- Lower & Upper Intake tower construction
- Construction of the western and eastern boat ramps
- Rock quarry
- Borrow pit areas
- Crushing and screening
- Stockpile Area
- Concrete batching plant
- Inundation Clearing
- Roads upgrade
- Haulage road construction
- Site office establishment and operation
- Vehicle/plant operations and road use
- Recreational site construction

- Crushing and screening
- Rock quarry
- Borrow pit areas
- Removal of buildings
- Services relocation
- Workshop fixed & mobile

EIS Terms of Reference

The Hinze Dam Raising Stage 3 Project (HDS3) was declared a "Significant Project" requiring an EIS by the Coordinator-General (CoG) pursuant to the *State Development and Public Works Organisation Act 1971* (SDA) on 20 October 2006. Terms of Reference (ToR) for the Project, finalised by the Coordinator-General in February 2007, identify matters that should be addressed in the EIS, including the preparation of a draft EMP for the construction and operation/ maintenance phases of the project.

The ToR identifies the following items to be addressed by the draft EMP:

- detail environmental aspects or values requiring management consideration and commit to their management, enhancement or protection;
- identify potential impacts on the described environmental aspects;
- propose performance objectives as a target or strategy to be achieved through management;
- describe management actions to be undertaken to achieve the performance objective, including any necessary approvals, applications and consultation;
- designate performance indicators in the form of criteria and numerical targets or values for the indicator, against which the implementation of the actions and the level of achievement of the performance objectives will be measured;
- describe monitoring, auditing and reporting processes to measure and track performances;
- assign responsibility for carrying out and reporting actions and results to a relevant person/organisation;
- detail corrective action to be implemented in the case of non-compliance and the person/organisation responsible for the action;
- outline strategies for staff training, communication and continuous improvement; and
- provide a decommissioning programme for land disturbed where appropriate.

19.1.3 Responsibility and Implementation

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:

- Gold Coast City Council:
  - Proponent of the project;
  - regulates the performance of the works according to local laws, including City Plan and delegated State laws under GCCC jurisdiction;
  - acts to facilitate the expression of community views; and
  - owner of the land required for the inundation area.
- The Proponent:
  - administrator of the head agreement or contract to ensure that the contact conditions are met;

  - liaise with and coordinate relevant agencies within the Queensland Government and GCCC to provide timely advice to the Contractor for the smooth and efficient delivery of the project;
  - ensure that prior to commencement of any work the Contractor has obtained all necessary approvals, established and properly briefed community consultative committees and agreed to a schedule of regular meetings with each committee; and
  - ensure that the Contractor is operating in accordance with the Construction Environmental Management Plans and in compliance with all applicable approvals and licensing.
- Contractor (Hinze Dam Alliance):
  - prepares detailed engineering designs, Construction Environmental Management Plan (CEMP) within the Environmental Management System;
  - obtains all necessary approvals, including development approvals, environmental licenses, workplace health and safety and all other construction-related approvals;
  - ensures all designs and construction works are prepared and conducted in accordance with approvals, with the contract, with relevant legislation and regulations, and with local laws;
  - 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; and
  - where applicable conducts the safe and efficient operation of Hinze Dam upon completion of the construction phase, in accordance with approvals, contract conditions, relevant legislation and regulations, and local laws.
- Community Advisory Committee:
  - established to provide a representative forum considering aspects of the project that are of interest to the community the draft CEMP and draft Operation Environmental Management Plan (OEMP);
  - facilitates effective and appropriate community and stakeholder input into the project and provides recommendations to Council on technical and policy issues related to the project, as required. (Refer to Attachment);
  - is bound by its own Terms of Reference as outlined in **Appendix D**;
  - examines issues such as climate change in planning for the dam upgrade; spillway design; traffic and road networks; recreational facilities at the dam; environmental impacts of the project; and the community consultation process.
  - provide advice to the Contractor during the construction phase in relation to mitigating the construction impacts in the local area; and
  - provide information to the wider community in relation to construction programming, the nature of construction work, and impact mitigation measures.

  The role of Community Advisory Committee will be reviewed at the end of 2007 and a determination will be made as to whether the Committee is maintained in its current form or modified to meet the needs of the community as the project progresses.

Environmental Management System

During construction, environmental aspects of the project will be managed in recognition of environmental risks, stakeholder and regulatory requirements and GCCC, Thiess, URS and SKM policies using the Alliance Environmental Management System (EMS). The EMS is part of the Thiess Management System (TMS) which has been certified as being consistent with AS/NZS ISO14001 *Environmental Management Systems* since 1998. This means the methodology is based upon the following:

- Plan: establish the objectives and processes necessary to deliver results in accordance with the organization's environmental policy;
- Do: implement the processes;

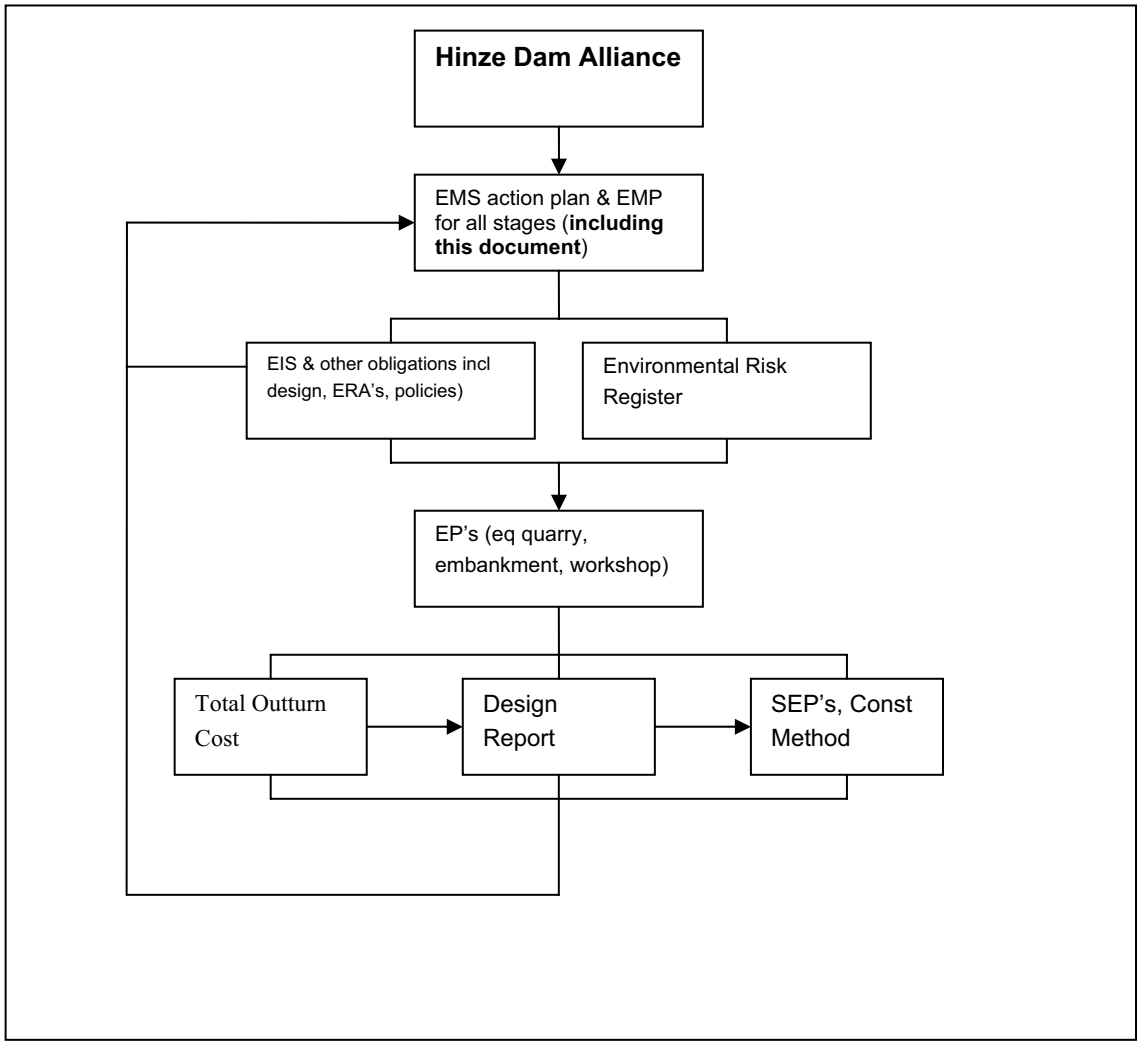
- Check: monitor and measure processes against environmental policy, objectives, targets, legal and other requirements, and report the results; and
- Act: take actions to continually improve performance of the environmental management system.

The detailed Construction Environmental Management Plan (CEMP) and Operational Environmental Management Plan (OEMP) will be prepared from this document. As represented below in **Figure 19-1** the CEMP will be supported by a series of Environmental Programs (EP's) and Site Environmental Plans (SEP's).

The construction EP's deal with such matters as soil erosion and sedimentation, dust, noise and vibration management, surface water quality, hours of work and work practices on worksites, safety hazard and risk management and community liaison and communications. Like the EP's the SEP's will be prepared for specific activities (e.g. quarry) and will include plans/drawings of controls and areas of interest.

The operation EP's will deal with such matters as surface water quality and community liaison and communication.

- **Figure 19-1 Hinze Dam Environmental Management Document Map (Construction)**



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 19-1**) and operation (

Table 19-2) stages. The hierarchy of responsibilities during the construction stage is shown in the flowchart (**Figure 19-2**).

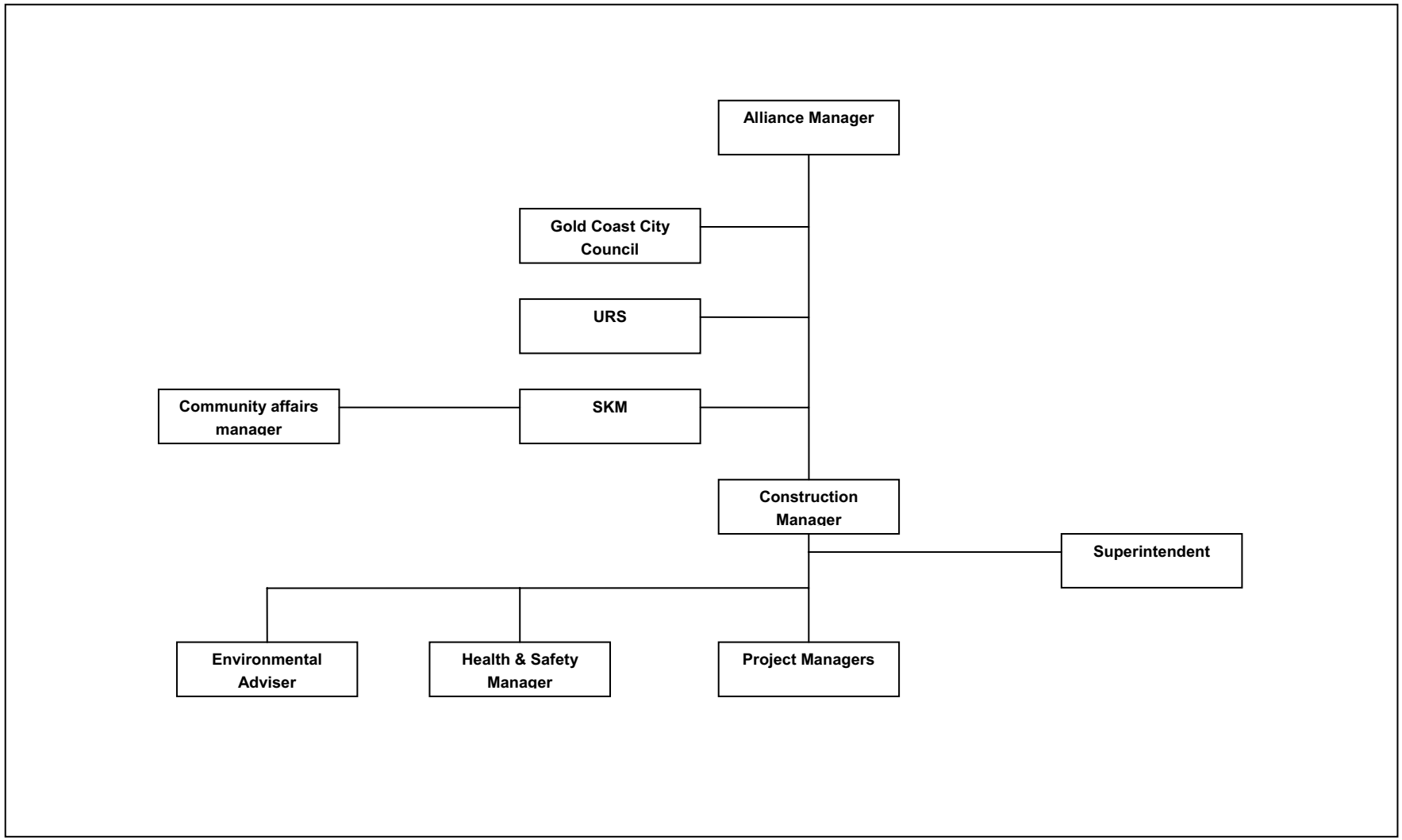
Table 19-1 Project Responsibilities - Construction

Project Responsibilities – Construction	
The Proponent (GCCC)	Manage the construction process as the project proponent. Provide readily available expertise for the construction project as required. Receive progress reports on performance by the Contractor for the purpose of acknowledging compliance with contract conditions Review the CEMP submitted by the Contractor. Ensure that the requirements of the Conditions of Contract (Environmental Management) and approved CEMP are included in the contract documentation are implemented. Review any revisions to the CEMP as required. Maintain a current copy of the contract and the CEMP containing a record of the completion of planned actions, monitoring records and reports, supplied by the Contractor. Initiate audits of environmental performance.
Contractor (Hinze Dam Alliance)	Develop CEMP in accordance with the approved Draft EMP submitted with the EIS. Maintain a master copy of the CEMP containing a record of the completion of planned actions, monitoring records, and reports which are made available during audits. Appoint independent facilitators to convene the community consultative committees, establish the committee terms of reference, facilitate meetings and pro-actively work to ensure efficient but comprehensive communication between the committee and other parties takes place. Obtain all necessary statutory approvals and licences and ensure that conditions of licences/approvals/permits are met. Provide copies of the CEMP to the relevant project staff having responsibilities defined in the CEMP. Provide training to all relevant project staff; Maintain a record of all training undertaken by all project staff, detailing the type and purpose of the training. Undertake regular monitoring in relation to environmental management issues and ensure that monitoring results are made available to the Proponent ad the community consultative committees. Ensure corrective actions arising from self-assessments and external audits are completed and in accordance with the CEMP. Notify the Proponent and any relevant State agency of any environmental incidents and maintain a record of events relating to the environmental incidents including any remedial action taken. Ensure there is adequate and accurate identification and reporting of any non-conformances and any other environmental issues that may arise during construction. Provide relevant and timely information about construction activities that may impact on the relevant stakeholders and consult with individuals that may be directly impacted by construction activities, as required, to ensure direct project impacts are being managed. Ensure that environmental protection measures are implemented in accordance with CEMP.
Community Advisory Committee (CAC)	Hold independent facilitated meetings at appropriate intervals (which may be monthly during the initial period of local construction) to consider and provide advice about construction activities and views received from the greater communities, and provide information and recommendations to the Contractor. Provide timely comment/feedback on monthly reports, monitoring results and any other data made available by the Contractor in accordance with the contract. Provide information to the wider community as required.

Table 19-2 Project Responsibilities - Operation

Project Responsibilities – Operation	
The Proponent (GCCC)	Review the OEMP prepared by the Contractor. Undertake periodic reviews and audits of the operator's performance where required.
Operator (Gold Coast Water (GCW) – part of GCCC)	Prepare an OEMP for the project consistent with the conditions of any applicable approvals and requirements. 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.
Community Advisory Committee (CAC)	For the first 12 months of operation only: Comment and provide feedback on environmental reports prepared by the Operator in a timely manner. Provide other community-based inputs as required.

Figure 19-2 Construction Staff Flowchart



Environmental Responsibilities

There are a number of general project responsibilities for all entities involved in the Project with respect to the *Environmental Protection Act 1994* (the Act). All project staff have a general environmental duty under Section 319 of the Act, and must not carryout 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 should then report the matter, under Section 320 of the Act.

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

- Contractor's environmental policy and EMS;
- relevant legislation, with particular attention to environmental legislation under this Draft EMP;
- environmental management requirements for construction and operation;
- project training requirements; and
- all approvals, including the Coordinator-General's conditions.

19.1.4 Communication

Documentation and Environmental Records

Adequate records must be maintained to demonstrate compliance with the environmental management system. These records should 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 to personnel carry out the activities associated with the project:

- a copy of the EMP;
- copies of environmental checklists and forms required by the environmental management system;
- copies of relevant work instructions;
- MSDS for any chemicals stored or used on the site; and
- copies of permits or approvals and attached conditions.

Modifications to the records keeping system shall be done to ensure it is effective and efficient for all levels of employees involved to ensure compliance with the requirements of the EMP.

Internal Communication

Environmental protection should 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 should also provide for follow-up on specific or corrective actions raised during previous audits to ensure responses are complete.

The EMP 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 will submit the following as part of their Monthly Report to the Proponent containing a summary of:

- works undertaken;
- monitoring results;
- compliance with approvals, licences and the EMP;
- 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. The Alliance will be using the following databases as part of their reporting process:

- incident reporting – Thiess HSE reporting tool; and
- complaints & community interaction – SKM Enguage ©.

In addition to the internal communication processes outlined in the CEMP, **Figure 19-3** below illustrates how information is passed through the Alliance. This process of gathering, collating and sharing information is ongoing and will continue for the life of the project (2006-2010). The Community Consultation section in **Appendix D** provides a detailed breakdown of the Hinze Dam Alliance Information Cycle.

- **Figure 19-3 Hinze Dam Information Cycle**

External Communication

To ensure external communication is timely and transparent, only nominated Alliance personnel should be involved in consultation with external bodies on environmental issues. The Alliance Manager is responsible for nominating all staff members responsible for external communication. The Alliance 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 Dam will be reported to EPA as soon as possible (as per S37 of the *Environmental Protection Act 1994*).

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

19.1.5 Monitoring, Auditing and Reporting Strategies

Monitoring Responsibilities and Standards

To ensure the mitigation measures are implemented or adhered to, monitoring of each element in the various project stages will be the responsibility of the Contractor. The specific monitoring actions for each environmental element will be finalised in the CEMP and OEMP.

The contractor will be required to undertake the monitoring of the environmental elements specified in the EMP to conform with the project's quality procedures. Monitoring will be undertaken as a regular scheduled activity as frequently as specified in the EMPs. The EMPs, together with suggested amendments, should be reviewed by The Proponent.

Project staff responsible for any monitoring should ensure that all monitoring is in accordance with the relevant agency guidelines or Australian Standards. All analytical testing performed should use National Association of Testing Authorities (NATA) approved procedures or if this is unavailable, be performed to the best relevant standard.

Auditing

Auditing of the implementation of this EMP will be ensured by the Alliance Manager (**Table 19-3**). External environmental audits will be undertaken as well. An audit schedule will be prepared and should be completed with a balanced series of internal (more frequent) and external (independent) audits.

Table 19-3 Contractor (Internal) Audits

Type	Scope	Frequency	Responsibility	Form used	Reporting Procedure
Internal compliance check	EMS action plan review to check status of actions including inspections	Monthly	Environmental Adviser	EMS action plan	None
Design	ESD compliance verification with designers	ongoing	Design Manager	ESD Compliance Control Doc	CDR
Construction	EP & procedure compliance verification	Monthly	Supervisor / managers / Environmental Adviser	MRS or EPs	Actions closed-out Compliance confirmed in HSE monthly report
Legislation audit	Compliance to legislative requirements	Risk-based	External technical expert	Compliance protocol – project specific	Actions closed-out Compliance confirmed in HSE monthly report
Environmental Leadership audit	Workplace EMS (includes EMP implementation, impacts, interviews)	Risk-based	BUEM / Senior BU managers	HSE reporting system – Env Audit	Actions closed-out Audit results reported in HSE Monthly Report
Process audit	Specific activities and services	As required	Environmental Adviser / managers	As above	Actions closed-out
Subcontractor Pre-start audit	Compliance with workplace EMP / subby EMS	Start <2 weeks	Environmental Adviser	Subcontractor audit Performa	Actions closed-out Audit results reported in HSE Monthly Report
Subcontractor audit	Specific activities and services mainly processes (repeat above) or in the field	Risk-based & compliance	Environmental Adviser	As above	Site Instruction / Actions closed-out

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 and EMPs, and should specify methods for recording and reporting non-conformances and ensuring that corrective actions are implemented to rectify the problem.

Complaints and Responses

The environmental management process managed by the Contractor is to include a procedure for receiving and acting upon complaints. Attention to complaints should be carefully managed, prompt and effective, and should form a key part of the environmental reporting mechanism. Responsibility for maintaining the complaints procedure would rest with the Contractor, as a contractual requirement.

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

- a procedure for receiving and responding to complaints which is acceptable to the Proponent, the Coordinator-General and the Environmental Protection Agency (EPA);
- the Contractor maintaining, during the construction and operational phases, a complaints telephone service operated via GCW's (24 hr 7 days a week Customer Contact Centre number 1300 366 692); please note that all emergency calls outside the hours of 7am to 5pm route through to this number and will be answered by Council personnel;
- a process for registering and handling all complaints received in terms of:
  - time and date of complaint;
  - the identify 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 the Proponent and the Contractor;
  - feedback to the complainant and the Proponent, the Coordinator-General as required and the EPA within a specified time period;
  - any subsequent remedial action required to avoid cause for future complaints if relevant;
  - regular reporting to the Coordinator-General, the EPA and the Proponent on complaints and corrective actions; and
  - monitoring and auditing of the complaint handling system.

The Contractor currently utilises an on-line content management system entitled *Engauge* © 2006 Sinclair Knight Merz. The on-line software product developed by SKM enables users to record, track, manage and report on community consultation interactions. It includes recording and reporting functions for all incoming and outgoing forms of correspondence including:

- face-to-face meetings;
- phone calls;
- letters;
- e-mails;
- minutes;
- newsletters;
- maps;
- workshops;
- information sessions; and
- presentation material.

Other informative resources are also accessible by external stakeholders via the Proponents dedicated project website that also offers on-line feedback forms for complaints and grievances.

Reporting

Reporting and documentation including each of the EMPs are intended to be subject to change and will be amended to incorporate necessary variations. Control of all project reporting for each of the EMPs, EP's and other

documents or plans will be the responsibility of the Contractor in accordance with standard document control procedures.

19.1.6 Training and Awareness

Training and Awareness

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

Specific training and awareness requirements are outlined in **Table 19-4** below. Site specific environmental training for on-site staff would be performed during the site induction. Any further environmental training would be performed on an ongoing or periodic basis as required.

Records of the environmental inductions and awareness training undertaken by staff and contractors must be recorded appropriately. Site audits must include reviewing staff records for training sign-off.

Table 19-4 Training and Awareness Requirements

Project Responsibilities – Training and Awareness Requirements	
Contractor (Hinze Dam Alliance)	General environmental duties under the Environmental Protection Act 1994 and other relevant legislation. Due diligence, environmental stewardship and liability. General responsibilities in relation to the design of the Project. The existence of the EMS, EMPs and associated plans. Specific environmental objectives, areas of environmental risk and mitigation measures. The significant environmental impacts, actual or potential, of work activities and the environmental benefits of improved performance. The roles and responsibilities in achieving conformance with the environmental policy and procedures and with the requirements of the environmental management system, including mitigation measures, monitoring, reporting, implementing corrective actions. The consequences of not implementing mitigation measures or departure from specified operating conditions. Emergency preparedness and response requirements. Reporting structure and internal and external communication processes. Community perspectives and expectations. Document control.

19.1.7 Draft EMP Outline

Overview

The Draft EMP is presented within the EIS, on the understanding that detailed EMPs for construction and operation, as well as relevant EP's are to be prepared by the Contractor and reviewed by the Proponent and either the EPA or State agency exercising its powers under legislation. The detailed EMPs for construction and operation will need to include, but not be limited to, mitigation measures which address the Environmental Objectives and Performance Criteria of this Draft EMP and any conditions imposed either by the Coordinator-General evaluation report 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 Supplementary Report as expressed by the Community Advisory Committee and relevant stakeholders as outlined in **Appendix D**.

The purpose of the Draft EMP is to set out the project commitments to avoid or minimise potential impacts of the project as identified in the EIS, including identification of environmental aspects to be managed and how environmental values maybe protected and enhanced.

The CEMP and the OEMP are dynamic documents as they incorporate continuous improvement. Each 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. Each EMP will be supported by sub-plans as outlined in **Section 19.1.3**.

Planning for Ecologically Sustainable Development

The Project will pursue the achievement of the following overall objectives for Ecologically Sustainable Development during the design, construction and operational stages:

- 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
  - seek to achieve community benefits (e.g. re-establishment of recreational areas).
- comply with all 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;
- provide project employees and Contractors with adequate and contemporary training in safety, hazard and risk management and environmental procedures; and
- support the role and function of the project's Community Advisory Committee.

Implementation

The Draft EMP demonstrates how potential impacts can be addressed during the construction and operation stages. The preparation of specified actions, strategies and recommendations implemented through the Draft EMP includes:

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

An outline of how each Draft EMP element is considered and presented is shown in **Table 19-5**.

Table 19-5 Outline of EMP Tables

EMP Component	Description	Example
Environmental Element	The aspect of the environment requiring targeted environmental management	Terrestrial Flora – Construction
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 maximise the re-use of native vegetation and minimise environmental harm.
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 development area.
Management	The management actions to be undertaken to	Identify clearing exclusion zones

EMP Component	Description	Example
Strategies and Mitigation Measures	achieve the objectives of the plan. Mitigation measures may include a wide range of 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.	Minimise damage to retained vegetation Implement sediment and erosion control
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 and frequency of reporting to demonstrate achievement of the environmental objectives and satisfaction of the performance criteria. The distribution of reports when generated.	Monthly Construction Report
Responsibility	The responsible entity for undertaking the activities and actions that have to be implemented.	The Contractor
Corrective Action / Contingency Plan	This section 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

19.1.8 Environmental Requirements and Obligations

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

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

Commonwealth Legislation

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

- *Environment Protection and Biodiversity Conservation Act 1999;* and
- *Native Title Act 1993.*

Queensland Legislation

Environmental Protection Act 1994

The *Environmental Protection Act 1994* (EP Act) is the umbrella legislation for the regulatory management of the environment in Queensland. The EP Act is based on self-regulation and duty of care that places the responsibility for protection of the environment on all persons during the conduct of all activities.

The Act provides for the licensing of Environmentally Relevant Activities (ERAs) and the granting of development approvals and registration certificates for the operation of regulated activities. The 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 Act.

The EP Act is the primary legislative environmental tool in Queensland. This Act also allows for the preparation of Environmental Protection Policies (EPPs). The following EPPs have been proclaimed:

- *Environmental Protection (Water) Policy 1997;*
- *Environmental Protection (Noise) Policy 1997;*
- *Environmental Protection (Air) Policy 1997;* and
- *Environmental Protection (Waste Management) Policy 2000.*

Other State Legislation

The EIS has been prepared under the provisions of the *State Development and Public Works Organisation Act 1971* (SDPOW Act). Relevant information in the EIS is then used to support applications for permits, licenses and approvals as outlined in Chapter 4. In addition to the *Environmental Protection Act 1994*, other major legislation relevant to the HDS3 Project includes:

- *Aboriginal Cultural Heritage Act 2003;*
- *Coastal Protection and Management Act 1995;*
- *Dangerous Goods Safety Management Act 2001;*
- *Fisheries Act 1994;*
- *Health Regulations under the Health Act;*
- *Integrated Planning Act 1997;*
- *Land Act 1994;*
- *Nature Conservation Act 1994;*
- *Nature Conservation (Wildlife) Regulation 1994);*
- *Queensland Heritage Act 1992*
- *Soil Conservation Act 1986;*
- *Transport Infrastructure Act 1994;*
- *Vegetation Management Act 1999;*
- *Water Act 2000; and*
- *Workplace Health and Safety Act 1995.*

Approvals, Permit and Licence Requirements

A summary of the approvals, permits and licences that may be required for the Project is provided in **Table 19-6**. For more detail see **Section 1**.

- **Table 19-6 Summary of Approvals**

Legislation	Authority	Trigger	Approval/Permit	Timing
Environment Protection and Biodiversity Conservation Act 1999	Department of the Environment and Water Resources	Project is likely to be a controlled action therefore requiring Commonwealth Approval	Referral to the Department of the Environment and Water Resources	Prior to construction
State Development and Public Works Organisation Act 1971	Coordinator General	Project declared as 'State Significant Project' requiring preparation of EIS	Declaration as State Significant Project Environmental Impact Statement (EIS)	Prior to construction
Integrated Planning Act 1997 *Water Act 2000*	Department of Natural Resources and Water	Evidence of an allocation or entitlement to the 'resource' (water) required	Water Entitlement Licence	Prior to construction
Integrated Planning Act 1997 *Water Act 2000*	Department of Natural Resources and Water	Increase of the storage capacity by more than 10%.	Operational Works – Referable Dam	Prior to construction
Integrated Planning Act 1997 *Water Act 2000*	Department of Primary Industries and Fisheries	Construction or raising of a barrier across a waterway	Operational Works – Constructing or raising a Waterway Barrier	Prior to construction
Integrated Planning Act 1997	Department of Natural Resources	Works in a watercourse	Operational Works – Taking or Interfering with water	Prior to construction

Legislation	Authority	Trigger	Approval/Permit	Timing
Water Act 2000	and Water			
Land Act 1994 *Integrated Planning Act 1997*	Department of Natural Resources and Water	Owners consent required for State Resources for works on Unallocated State Land	Resource Entitlement	Prior to submission of IPA applications
Integrated Planning Act 1997 *Vegetation Management Act 1999.* *Land Act 1994*	Department of Natural Resources and Water	Clearing of remnant vegetation	Operational Works – Clearing of Remnant Vegetation	Prior to clearing remnant vegetation
Integrated Planning Act 1997 *Water Act 2000*	Department of Natural Resources and Water	Evidence required of an allocation or entitlement to a 'resource' (quarry material	Allocation of Quarry Material	Prior to construction
Integrated Planning Act 1997 *Environmental Protection Act 1994*	Environmental Protection Agency	ERA activities proposed to take place on site	Development application Material Change of Use (MCU) for the following Environmentally Relevant Activities: ERA 7 – Chemical Storage ERA 11 - Petroleum Storage ERA 19 - Dredging if proposing to remove material from the bed of any tidal or Non-tidal waterway ERA 20 – Extracting Rock or other material ERA 22 – Screening Materials ERA 62 – Concrete Batching ERA 84 – Regulated Waste Storage	Prior to construction
Integrated Planning Act 1997 *Environmental Protection Act 1994*	Environmental Protection Agency	Registration Certificates required to be obtained by the prior to undertaking ERAs.	Registration Certificate to conduct ERAs	Prior to construction
Water Act 2000	Department of Natural Resources and Water	Works taking place in watercourse	Riverine Protection Permit	Prior to construction
Integrated Planning Act 1997	Gold Coast City Council	Extractive industry taking place outside the Community Infrastructure Designation	Material Change of Use – Extractive Industry	Prior to construction
Integrated Planning Act 1997	Gold Coast City Council	Replacement of kiosk	Material Change of Use – Replacement of Kiosk/ Restaurant	Prior to construction of kiosk
Maritime Safety Queensland Act 2002	Queensland Transport – Maritime Safety Qld	Notice to All Mariners required for exclusion zones	Harbour Master Notification/ Approval	Prior to construction
Nature Conservation Act 1992	Queensland Parks & Wildlife Service	Disturbance, harm or destruction of listed species	Approval to disturb, harm or destroy listed species	Prior to construction
Integrated Planning Act 1997	Gold Coast City Council	Construction of new roads and upgrades	Operational Works for Local Government Roads	Prior to construction
Integrated Planning Act 1997 *Standard Building*	Gold Coast City Council	Locating offices outside Community Infrastructure Designation area	Material Change of Use – Public Utility	Prior to construction

Legislation	Authority	Trigger	Approval/Permit	Timing
Regulation 1993				

19.1.9 Decommissioning Programme

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

As outlined in Section 3.8, following the completion of the site construction works the site will be rehabilitated, materials cleared, and all site construction infrastructure removed. 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 **Section 9**.

19.1.10 Draft EMP (Construction)

There are a number of activities taking place during the construction phase of the raising of the Hinze Dam which have the potential to impact on environmental values. These are:

- vegetation clearing within new inundation level;
- construction of embankments and spillway;
- construction of fishway;
- raising of intake towers;
- operation of workshop (fixed and mobile);
- relocation of boat ramps and recreational areas;
- operation of site office;
- use of vehicles and equipment on site;
- operation of quarry, borrow pit and screening areas;
- operation of concrete batching plant;
- construction and use of haulage roads; and
- upgrade of roads and associated infrastructure.

The environmental elements addressed in this Draft Construction EMP are:

- Geology and Soils
- Water Quality
- Groundwater
- Terrestrial Flora
- Terrestrial Fauna
- Rehabilitation Management
- Weed Management
- Pest Management
- Aquatic Ecology
- Air Quality
- Noise and Vibration
- Transport and Roads
- Waste Minimisation and Management of Hazardous Substances
- Socio-Economic
- Visual Amenity

The CEMP will incorporate these elements in the sub-plans ensuring that they comply with the relevant industry standards for environmental management while being consistent with construction methodology.

Geology and Soils

The construction of the proposed project will involving the clearing of vegetation, disturbance of soils and the movement of spoils and other materials across the site. The activities that may have potential impacts with regard to the terrain, soils or geology include quarrying, development of borrow areas, raising of the main dam embankment, construction of the saddle dam, construction of the fishway, construction and operation of access/haul roads, establishment of site offices and worksites, clearing of trees for the new inundation level, raising existing road heights and the construction of boat ramps and other recreational facilities.

As described in **Section 4**, during the construction phase, the risk of erosion and sedimentation is considered high due to the level of soil exposure, vegetation removal, steepness of the terrain and erodibility levels of the soils occurring in the area and rainfall events. Environmental management measures to control and minimise this risk are to be implemented in all areas of construction activity.

The use of good practice for erosion and sediment control measures include but not limited to minimum disturbance of existing ground cover and vegetation, stockpiling and replacing topsoil, cutoff drains around stockpiles and borrow areas, hydroseeding and hydromulching, geofabric, restoration of surface conditions, sediment traps / basins and mesh fences.

Further detail relating to the management of soils is outlined in the Erosion and Sediment Control Plan in **Appendix F.4.2**.

Geology and Soils - Construction	
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 retainment areas. Manage and mitigate the risks of soil erosion impacts from all work areas where vegetation is removed or the soil disturbed during construction works.
Mitigation Measures	Utilisation of basic erosion and sedimentation control techniques such as: • 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 roads; • compacting high traffic areas; and • excavations backfilled and covered with topsoil. • Work scheduled to ensure that temporary erosion control works are in place by the end of work each day, especially before weekends, if rain is imminent or when permanent erosion control works are not in place. • Construction activity scheduled so that work in sensitive areas can be completed and rehabilitated as quickly as feasible. • Mitigation measures developed and implemented to manage the risk of erosion during construction to minimise: • potential surface water quality impacts from sediment and contaminants entrained in surface runoff; • loss of topsoil material during site preparation and from stripping and stockpiling for extended periods; • erosion due to vegetation clearing and soil disturbance; and • erosion of exposed vulnerable soils by wind or water action. • Construction of access roads with suitable scour protected and drainage for heavy vehicles such as trucks and excavators. • Sedimentation basins designed for a 24 hour storm event of a return period of 1 year for sediment retention and a hour storm event of a return period of 100 years for flow. They are to be cleaned out regularly and managed to ensure the required retention capacity is maintained. • Minimisation of impact on dam water quality during clearing of vegetation to the new FSL by

	avoiding the use of blading and grubbing clearing methods, staging of works to reduce the impact on water quality at any one time, and the scheduling of clearing outside summer months when high intensity storms are more prevalent. • Control over the generation of dust during construction using dust suppression methods (eg water trucks) for all construction sites and access / haul roads, covers (such as plastic sheeting) and revegetation or hydromulching of stockpiles (depending on the length of time the stockpile will be pin place and the risk of the material being susceptible to wind erosion). • Planning of construction works to provide for the progressive and timely stabilisation and rehabilitation of disturbed areas. • Undertaking of erosion risk assessment to identify flow paths, suitable stockpile locations, soil cover type, and soil stability. • Undertaking of finishing and landscaping requirements for on-going sediment and erosion control around the worksites following construction. • Consider the use of Gypsum, in sodic soils and lime in acidic soils if used as planting media.
Monitoring	Regular inspection of sediment and erosion control structures and measures. In wet weather or when using large quantities of water in construction works more frequent monitoring may be necessary. Auditing of EMP conducted quarterly (internally) and annually (externally).
Reporting	Monthly Report prepared and submitted to Proponent to include details of monitoring results, audits, training and incidents. Immediate reporting to Supervisor and Environmental Adviser 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
Contingency Plan / Corrective Action	Timely rehabilitation as outlined in Section 19.1.9. Appropriate control measures implemented where unacceptable sediment or erosion is occurring or may occur. The Contractor will ensure that the appropriate personnel undertake adequate environmental awareness and training covering the requirements of the EMP regarding soil management and erosion control. 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.

Water Quality

Construction activities associated with raising of the Hinze Dam, have the potential to adversely impact water quality both upstream and downstream of the Dam, as well as within the Dam as outlined in **Section 7**. Monitoring and mitigation measures have been proposed to maintain water quality conditions within the Nerang River catchment during construction. The Water Quality Monitoring Programme for the construction phase is attached as **Appendix F.19.1**.

Water Quality – Construction	
Environmental Objective	To preserve water quality within incoming and the Nerang Catchment and maintain the Environmental Values (EVs), including compliance with local Water Quality Objectives (WQOs), in particular the drinking water guidelines during the construction phase,
Performance Criteria	■ Drinking water quality objectives as per the *Environmental Protection (water) Policy 1997*, Nerang River Environmental Values and Water Quality Objectives. ■ Aquatic ecosystem environmental values as per the *Environmental Protection (water) Policy 1997*, Nerang River Environmental Values and Water Quality Objectives. ■ Primary and secondary contact recreation as per the *Environmental Protection (water) Policy 1997*, Nerang River Environmental Values and Water Quality Objectives. ■ The overarching performance criterion is to maintain existing ecosystem attributes and water quality within Hinze Dam and the Nerang River Catchment.
Mitigation Measures	**Suspended solids and turbidity** ■ Diversion bunds and/or drains to limit off-site stormwater flowing across construction areas. Clean stormwater diverted around the construction sites; ■ Stormwater collected within the construction site, and where applicable, diverted into holding/ settlement ponds (e.g. in the former quarry site) for treatment and reuse; ■ Exposed soils stabilized by using materials such as mulch, biodegradable matting, and geotextile fabrics;

	■ Revegetation of areas impacted by construction activities; ■ Rate of stormwater flow within the construction area reduced by using energy dissipation techniques; ■ Measures implemented to minimise sediment taken offsite by construction vehicles, via the use of wash down bays. ■ A number of procedures shall be implemented to treat sediment laden water including: Filtering runoff from the site, using geotextile fabrics, vegetation and silt curtains (once the sediments are introduced into the waterway). Use of sedimentation basins (i.e. settlement ponds) where sediment settles prior to discharge. Chemical flocculants can also be used to hasten settlement, especially when fine sediments are present. The use of flocculants (i.e. aluminium sulphate) will be managed in accordance with operating procedures including MSDS. ■ Sediment basins may require regular maintenance to maintain effective capacity. Sediment removed from sediment basins will be dewatered on site and used as construction fill material. **Chemicals** ■ Bunding and appropriate storage of fuels and other hazardous/ flammable materials. Spill containment kits available on site. ■ Oil containment booms and oil spill recovery equipment available when working on water. **Catchment Management** ■ Water Quality Monitoring performed by qualified personnel.
Monitoring	**Targeted Event-Based Water Quality Monitoring** ■ Wastewaters discharged from the settlement ponds (due to flooding and excess water discharge) monitored for a range of physico-chemical parameters within the Dam and in the Nerang River. **General Water Quality Monitoring** ■ A routine water quality monitoring program will be implemented throughout the Dam, which includes the following parameters: turbidity, SS, colour, organic carbon; nuisance algae, chlorophyll 'a'; and DO, Secchi Disc depth, algal composition, P, N and Fe and Mn. **Fixed Site Monitoring** ■ Fixed site loggers will be installed at the lower intake and downstream of the Dam wall, to prevent any impacts to water discharged into the Nerang River and at the upper intake, to ensure that water sourced by the Molendinar Water Treatment Plant is of a satisfactory quality. The approach will involve the installation of fixed site data loggers with telemetry capability for real-time monitoring. The indicative sites for installation of loggers and the parameters to be monitored have been discussed in the Water Quality Monitoring Program – Construction in **Appendix F.19.1.** **Auditing** ■ Auditing of EMP conducted quarterly (internally) and annually (externally).
Reporting	■ During and after rainfall, a visual inspection of the construction site undertaken during and after rainfall to ensure that mitigation measures are in place and no major erosion is occurring. Additional monitoring may be required to determine the extent of stormwater runoff after pulse events. ■ Monthly water quality reports prepared which report on water quality conditions within the Hinze Dam and Nerang River, including data collected as part of the existing program, as well as weekly and monthly data reported by GCCC and GCW. Monthly reports to include any action to be implemented in the case of non-compliance and the person/ organisation responsible for action to be highlighted. ■ Immediate reporting to Supervisor 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.
Responsibilities	Contractor On-site Alliance personnel (environmental team) will be required to undertake the routine water quality monitoring and reporting. Separate Alliance personnel (suitably trained environmental scientists) shall independently audit the program on a quarterly basis.
Corrective Action / Contingency Plan	■ Contaminated waters (elevated turbidity, suspended solids etc) observed flowing from the construction site into Hinze Dam or the Nerang River, will be identified and the appropriate action taken by the Site Environmental Adviser. ■ Adverse impacts to downstream water quality shall be reported to the EPA and any impacts to the potable water supply detected at the upper intake, reported to the Molendinar Water Treatment Plant. ■ Rehabilitation will be conducted on areas where unacceptable sedimentation has occurred. ■ The GCW Blue Green Algae Response Plan should be followed in the event of a blue algal bloom. ■ The Contractor will ensure that the appropriate personnel undertake adequate environmental awareness and training covering the requirements of the EMP regarding water quality management, sediment and erosion control and spill management procedures. ■ 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.

Groundwater

Findings from the desktop groundwater investigation (see **Section 8**) have been analysed to identify the need for mitigation measures due to the project. Due to the absence of the groundwater resource of significance within the project area, potential impacts to groundwater as a result of the project are considered negligible. As such, only "caretaker" type management measures are considered necessary for groundwater during construction and operation of the project.

Ongoing groundwater level monitoring will be undertaken in the immediate vicinity of the dam as part of geotechnical requirements for the project. This is considered sufficient to monitor for potential changes in groundwater level that may result and will provide ongoing evaluation of the environmental performance of the project. No further management, remedial or monitoring measures are considered necessary beyond those described in the EMP.

Groundwater - Construction	
Environmental Objective	■ Maintain groundwater levels as close as possible to pre-construction levels during the construction and operational phases of the project. ■ Ensure preservation of groundwater quality during and after construction.
Performance Criteria	■ Minimisation of impacts on groundwater quality by ensuring all practical measures have been taken to prevent contamination as a result of construction activities. ■ Adequate monitoring and management of groundwater levels.
Mitigation Measures	■ Ensure Groundwater Monitoring Programme is developed prior to construction to monitor groundwater levels as part of geotechnical program. ■ Storage, handling, transport and spill clean up of any chemicals, hazardous substances or any materials capable of effecting groundwater quality is carried out in accordance with measures outlined in Waste Minimisation and Management of Hazardous Substances (**Section 19.1.9.11**) and the Emergency Response Plan (**Section 19.2**).
Monitoring	■ Groundwater monitoring programme carried out to assess any changes in groundwater levels. ■ Auditing of EMP conducted quarterly (internally) and annually (externally).
Reporting	■ Monthly Report prepared and submitted to Proponent to include details of monitoring results, audits, training and incidents. ■ Immediate reporting to Supervisor 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.
Responsibilities	Contractor
Corrective Action / Contingency Plan	■ Changes to groundwater levels investigated and the appropriate action taken by the Construction Manager. ■ Groundwater Quality Monitoring Programme introduced in the event that any significant spill may affect the groundwater. ■ Appropriate remediation if required. ■ The Contractor will ensure that the appropriate personnel undertake adequate environmental awareness and training covering the requirements of the EMP regarding groundwater monitoring and storage and handling of hazardous substances. ■ The Construction Manager can request the cessation of works at any time should a breach of performance criteria of the EMP be occurring or at risk of occurring.

Terrestrial Flora

Construction activities for the embankment, spillway, saddle dam, and associated facilities and road infrastructure as well as tree removal in inundation areas will require the clearing of both non-remnant and remnant vegetation which is a direct impact on terrestrial flora.

Terrestrial Flora – Construction	
Environmental Objective	Implementation of vegetation clearance, stockpiling, recycling or disposal practices that maximise the re-use of native vegetation and minimise environmental harm.
Performance Criteria	■ Felled vegetation re-used on site wherever possible. ■ 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.

Terrestrial Flora – Construction	
	■ Weed invasion is prevented both within the construction site and in surrounding areas. ■ Harm to fauna is minimised.
Mitigation Measures	**Supply of Relevant Site Plans** ■ Relevant plans detailing the staging of works, areas to be retained, significant areas of exclusion and other relevant issues shall be provided to the Construction Manager, Environmental Adviser and clearing contractor prior to any site preparation activities within the proposed construction area. ■ Prior to the commencement of any vegetation clearance, the clearing contractor, in consultation with the Construction Manager and Environmental Adviser, to discuss all areas to be cleared on construction plans and in the field. ■ All areas to be cleared shall be clearly identified on the ground by the Construction Manager prior to the commencement of any site preparation activities. Areas to be retained will therefore be clearly identified and no unauthorised access shall be allowed.
	Identification of Exclusion Zones ■ Those trees considered suitable for retention identified. Within these zones the following activities shall not be permitted: storage and mixing of materials; vehicle parking; liquid disposal; machinery repairs and/or refuelling; construction site office or shed; combustion of any material; stockpiling of soil, rubble or debris; - any filling or excavation including trench line, topsoil skimming and/or surface excavation, unless otherwise approved by the Project Manager; and - unauthorised pesticide, herbicide or chemical applications.
	Minimising damage to retained vegetation ■ All activities in areas adjacent to any vegetation to be retained carried out in such a manner as to minimise damage to the vegetation. ■ Vegetation to be retained clearly identified. Each tree or groups of trees to be retained investigated at the appropriate time by an Ecologist/Arborist. ■ Trees managed according to Tree Retention Guidelines.
	Sediment and Erosion Control As construction activities may impact on retained vegetation it is important to ensure sediment fencing is in place before site preparation and other earthworks commence. Prior to any site preparation operations the Project Manager (or other suitably qualified personnel) to undertake an inspection of all sediment fencing.
	Weed Management ■ 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 shall be treated separately and not used on site for regeneration/ revegetation works. ■ Soil disturbance within retained vegetation kept to a minimum to avoid weed recruitment. Areas to be regenerated (weed control) or revegetated completed under strict supervision to avoid unnecessary soil disturbance. ■ Disturbed areas are inspected monthly for weed growth, with appropriate weed control measures implemented when warranted. ■ Further weed management measures outlined in Section 19.1.
	Protection of Trees within Construction Zones ■ Contractor provide fences and/or trunk girdles to prevent unintended physical damage to the root system, trunk or canopy of native vegetation identified for retention, which may be impacted upon by clearing works. ■ All works carried out on either foliage or root systems of trees in consultation with a qualified arboriculturist or horticulturist. ■ All works to adhere to the Australian Standards (AS) 4373 – 1996 (Pruning of Amenity Trees). The subject trees are not to be topped nor lopped. Spur climbing of any tree to be pruned to be avoided.
Monitoring	■ Monitoring by Contractor of vegetation clearance, earthworks components and the above Performance Objectives of the proposed works on a continual basis to confirm that specific controls have been implemented and appropriate work practices are being adopted to achieve the specified performance objectives. ■ Periodic condition monitoring by Contractor of all retained vegetation, with a maximum interval between inspections of one month, addressing the health and vigour of all retained vegetation for one year after the commencement of operational works. ■ Regular inspection of cleared areas and contractor's methods during clearing to ensure compliance with EMP. ■ Auditing of EMP conducted quarterly (internally) and annually (externally).
Reporting	■ Monthly Report prepared and submitted to Proponent to include details of monitoring results,

Terrestrial Flora – Construction	
	audits, training and incidents. ■ Immediate reporting to Supervisor and Environmental Adviser 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
Contingency Plan / Corrective Action	■ Appropriate control measures implemented where unacceptable sediment or erosion is occurring or may occur. ■ The Contractor will ensure that the appropriate personnel undertake adequate environmental awareness and training covering the requirements of the EMP regarding vegetation clearing and weed management. ■ The Construction Manager can request the cessation of works at any time should a breach of performance criteria of the EMP be occurring or at risk of occurring.

Terrestrial Fauna

The removal of vegetation from clearing and inundation will cause the loss of habitat for fauna species including birds, reptiles and mammals. This will both reduce the size of habitat area for wildlife and cause further fragmentation of habitat upstream of the dam leading to the restricted movement of fauna across Nerang River and Little Nerang Creek. Measures need to be taken to control the clearing to minimise risk of fauna being injured or killed during vegetation clearing, and allow movement across the landscape to safer refuges.

Terrestrial Fauna – Construction	
Environmental Objective	Ensure that tree clearing operations are completed in a manner that provides maximum protection of the health and livelihood of native fauna.
Performance Criteria	■ The risk (of injury and death) to fauna is managed and minimised during site clearing works. ■ Retained habitat is not compromised by site clearing works, gross mechanical disturbance or impacts associated with sedimentation and/or pollutant export from the construction area. ■ Fauna species continue to utilise the retained habitat area post-development.
Mitigation Measures	**Compliance with the Code of Practice** The program undertaken in compliance 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).
	Identification of Habitat Trees ■ Habitat trees identified prior to the selective clearing operations. (Habitat trees are defined as those trees that provide suitable foraging, refuge and nesting resources for arboreal and avian fauna and microbats. These include hollow-bearing trees, trees with fissures, trees with food resources (e.g. pollen, nectar, foliage, arthropods). Larger, old growth trees are also considered to be habitat trees as they are likely to provide greater amounts of foraging resources, cover, and a high number of potential hollows. Dead (stag) trees are also regarded as important habitat trees as they provide roosting and nesting resources.) ■ Once this has been completed, clearing conducted using a staged approach where the smaller non-habitat trees are removed in the first stage with the larger remaining habitat trees removed three to five days after the initial clearing. (This staged method provides a disturbance stimulus and provides fauna with time to leave the site thus maximizing the chances of fauna survival while reducing the need for human intervention for translocation or rescue purposes).
	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 shall 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 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 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 conducted in a manner that will maximize the chances of survival for any fauna remaining within the tree hollows. This involves pushing

Terrestrial Fauna – Construction	
	rather than cutting, and cushioning the tree fall with other felled timber and foliage.
	Care of Injured Fauna ■ All injured animals immediately removed and taken to an appropriately qualified veterinary surgeon. Any orphaned or injured native fauna discovered at a later stage during operational works immediately reported to the QPWS.
	Retention and Re-use of Hollow Logs ■ Hollow logs not mulched until inspected by a qualified Ecologist. ■ As many hollow logs as possible relocated to areas within the approved Conservation Open Space Area as habitat features.
Monitoring	■ Monitoring of vegetation clearance, earthwork components and requirements of this EMP on a continual basis to confirm that specific controls have been implemented and appropriate work practices are being adopted to achieve the specified Environmental Objectives. ■ Auditing of EMP conducted quarterly (internally) and annually (externally).
Reporting	■ Monthly Report prepared and submitted to Proponent to include details of monitoring results, audits, training and incidents. ■ Immediate reporting to Supervisor and Environmental Adviser 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
Contingency Plan / Corrective Action	■ Ensure that the appropriate personnel undertake adequate environmental awareness and training covering the requirements of the EMP regarding fauna management. ■ The Construction Manager can request the cessation of works at any time should a breach of performance criteria of the EMP be occurring or at risk of occurring.

Rehabilitation Management

As part of reducing the impact of disturbance of soils and vegetation, the timely implementation of rehabilitation management is necessary to stabilise the land and encourage the regeneration of a viable native ecosystem.

Rehabilitation Management - Construction	
Environmental Objective	Rehabilitation of disturbed sites carried out in a timely, cost effective and ecologically sound fashion.
Performance Criteria	■ Successful engagement of Revegetation Team. ■ Propagation of Revegetation plants from endemic populations. ■ Weed invasion prevented in rehabilitation areas. ■ Revegetation of disturbed areas where applicable into self-sustaining, native communities.
Mitigation Measures	**Engagement of a Revegetation Team** ■ A suitably qualified nursery (Horticulturist) and Revegetation Team will be engaged via a tender process. The site Environmental Officer will consult with the appointed Nursery/Revegetation Team to finalise the list of species to be planted in relevant locations. The final list will depend upon the availability of species at the time required. If certain species are not available provision will be made to secure and plant these species at a later stage. If certain species contained in this document are not considered suitable then a justification should be recorded by the Site Environmental Officer.
	Seed Collection ■ Seed collected for propagation will come from the site and immediate surrounds as well as local provenance. The following details will be collected from each source plant: location (GPS position); date of collection; name of collector; soil type; health of plant; and collection method. ■ Whenever possible, seed removed directly from plants by shaking or cutting branches over a tarpaulin. Secateurs sterilised between each use. Seed placed in small envelopes with the collection details clearly marked. If the seed is extremely small it will be stored in glass or plastic vials to avoid undue loss. ■ It is expected that during the seed collection program, a site will be visited on several occasions to ensure optimum seed ripeness. The program will be prepared by the Nursery/Revegetation team in consultation with the Environmental Adviser. ■ The amount of seed collected not exceeding 5% per plant. Seeds not collected from isolated populations or rare plants. ■ Seed cleaned, its viability checked and prepared for storage. Seed that has lost viability will not be

Rehabilitation Management - Construction	
	used in the revegetation works due to the dangers of genetic aberration. ■ If seed collection proves difficult or impossible, other forms of propagation, such as cuttings, may be attempted.
	Weed Control ■ Weed eradication undertaken on a progressive basis through localised treatment of grass species via mechanical removal (hoe/rake, hand pulling and/or slashing) or with Glyphosate or other suitable herbicide. ■ All chemical users should be experienced and licensed in accordance with the *Queensland Agricultural Chemical Distribution Act 1966*. ■ Further weed management measures outlined in Section 19.1
	Ongoing Maintenance After planting, and regeneration works, the following is required from the Revegetation Team: ■ General maintenance of the revegetation areas (including the health of seedlings) on a monthly basis to ensure success of the works. ■ Removal of weed regrowth and replacement of dead seedlings on a monthly basis for a period of two years.
Monitoring	■ The regeneration and revegetation areas formally inspected by the Revegetation Team at the following points of establishment: immediately after the regeneration works/planting; three months after the regeneration works/planting; six months after the regeneration works/planting; twelve months after the regeneration works/planting; and up to two years after the regeneration works/planting. ■ Inspections carried out to assess the health of the seedlings (growth rates, foliage status and survival rates) within revegetation areas to ensure that maintenance of planted individuals has occurred. Within both regeneration and revegetation areas, weed abundance, chemical usage, any significant problems and status of protective fences are to be monitored. ■ The Revegetation Team report to site management within a fortnight from each inspection period. ■ Two years after regeneration works/planting, site management will determine if the stated objectives of this management plan have been achieved. If not, a report will need to be prepared by site management identifying the works and the time frames required to ensure that the regeneration and revegetation plan meets the stated objectives and that, most importantly, a self sustaining population is established within revegetation areas. ■ Auditing of EMP conducted quarterly (internally) and annually (externally).
Reporting	■ Monthly Report prepared and submitted to Proponent to include details of monitoring results, audits, training and incidents. ■ Immediate reporting to Supervisor and Environmental Adviser 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
Contingency Plan / Corrective Action	■ Implement contingencies where propagation or plantings are failing. ■ The Contractor will ensure that the appropriate personnel undertake adequate environmental awareness and training covering the requirements of the EMP regarding rehabilitation. ■ The Construction Manager can request the cessation of works at any time should a breach of performance criteria of the EMP be occurring or at risk of occurring.

Weed Management

Weeds impact on the ability for native vegetation to proliferate and need to be control to ensure the risk of spread is minimised. There are a number of declared weeds present in area which will need to be managed to avoid being carried on and off site.

Weed Management - Construction	
Environmental Objective	■ Declared weeds and introduced flora not present in study area are not introduced. ■ Declared weeds already present in the study area are not spread as a result of project activities.
Performance Criteria	■ Obligations under the *Land Protection (Pest and Stock Route Management) Act 2002* are met. ■ All vehicles working off road have “clean” certificates. ■ Documentation available showing quarry sites inspected for weeds prior to extraction. ■ Infestation of weed and pest species reduced. ■ No additional weed and pest infestations or increase in distribution as a consequence of the construction activities. ■ All employees working on site attend induction training sessions to identify weeds.

Weed Management - Construction	
Mitigation Measures	**Weed Removal** ■ Priorities given to species of greatest environmental threat. Generally these species are prioritised by the classification allocated by the *Rural Lands Protection Act 1985*; the higher the category the greater the concern, however, in some cases, locally threatening species must have higher priorities.
	Wash-down Facilities and "Clean" Plant ■ Provision of wash-down facilities. Vehicles and plant to be used for clearing sourced from "clean" areas, or carry certification for weed clearance.
	Movement of Vehicles/Plant from Weed Infested Areas ■ Movement protocol developed and implemented for vehicles and plant to ensure declared weeds are not spread. This protocol will trigger the need for a "washdown".
Monitoring	■ The distribution known declared weeds monitored and, where feasible, made to eradicate or contain these infestations in accordance with the *Land Protection (Pest and Stock Route Management) Act 2002*. ■ Employees/contractors working on site to report presence of declared weeds to the supervisor by the end of the working day.
	■ Areas downstream from the Dam will be inspected regularly and particularly after rain/flow events. Any new germination or infestations of declared weed species reported and where feasible, destroyed. ■ Auditing of EMP conducted quarterly (internally) and annually (externally).
Reporting	■ Notification to Site Environmental Adviser by personnel of weed outbreaks or potential contamination. ■ Monthly Report prepared and submitted to Proponent to include details of monitoring results, audits, training and incidents. ■ Immediate reporting to Supervisor and Environmental Adviser 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
Contingency Plan / Corrective Action	■ The Contractor will ensure that the appropriate personnel undertake adequate environmental awareness and training covering the requirements of the EMP regarding vegetation clearing and weed management. ■ 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.

Pest Management

Vertebrate pests, including rats, cats, foxes, cane toads and rodents, and invertebrate pests such as mosquitoes and flies are present in the project area. These pests have the capacity to impact on the project by interfering with waste and construction materials and containment devices, and can also become a disease vector in some circumstances. Pests are not considered to become a significant issue on the Project construction site as there is not a large quantity of putrescible waste and food sources available, and controls will be put in place to limit pest access to food, water, refuge and breeding sites.

Pest Management – Construction	
Environmental Objective	Pest infestations do not increase as a consequence of the project and existing populations of introduced fauna are controlled.
Performance Criteria	No additional pest infestations or increase in distribution as a consequence of the construction activities.
Mitigation Measures	**Site Management** Ensure construction personnel do not create environments favourable to pest species, including: ■ ensure waste is managed appropriately; ■ where practicable, ensure water is not left to lie on sites for longer than 7 days (i.e. avoid ponds of standing water; and ■ ensure stormwater treatment and sediment control devices are designed and managed as to not create breeding habitat for mosquitoes and cane toads (*Bufo marinus*).
	Active Pest Control ■ Pest animal control measures, where necessary, completed using suitable and appropriate strategies as employed elsewhere within Gold Coast area.
	Waste Disposal ■ All food scraps and other waste materials covered and removed off site regularly to reduce attraction

Pest Management – Construction	
	to feral animals.
Monitoring	■ Presence of pests monitored as part of weekly site inspections. ■ Employees / contractors working on site to report presence of feral animals to the Site Environmental Adviser. ■ Auditing of EMP conducted quarterly (internally) and annually (externally).
Reporting	■ Monthly Report prepared and submitted to Proponent to include details of monitoring results, audits, training and incidents. ■ Immediate reporting to Supervisor and Environmental Adviser 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
Contingency Plan / 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 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.

Aquatic Ecology

Hinze Dam represents an impediment to the natural flow, and has had an impact on the hydrological, biological and ecological processes in the Nerang River and other associated waterways. Raising the wall of Hinze Dam will result in the loss of in stream habitat upstream of the dam in the Nerang River and Little Nerang Creek. The project will also create a further obstacle to fish movement. The proposed augmentation of Hinze Dam has the potential to impact further upon the natural processes of the river system. Freshwater aquatic flora and fauna may be affected by changes in flows caused by the increased dam storage capacity.

This EMP aims to provide mitigation and monitoring measures to limit the impact of the project on the surrounding aquatic ecology during construction.

Aquatic Ecology - Construction	
Environmental Objective	■ Minimise and mitigate, as far as is practicable, the adverse impacts on aquatic fauna and flora, both freshwater and estuarine, during construction of the project. ■ Where unavoidable impacts will occur, developed and implement strategies to mitigate these impacts to an acceptable level, this may include rehabilitation of offset areas. ■ Minimise the opportunity for aquatic weed growth and increases in abundance or diversity of other pest species.
Performance Criteria	■ No discharge of materials through stormwater runoff from construction and operational areas, with particular regard to suspended sediments, fuels, chemicals, and oils. ■ No waste materials (general and construction rubbish etc) entering waterways from construction and operational areas. ■ Programme implemented to monitor and treat aquatic weeds and other pest species that may enter the dam from a work site. ■ No uncontrolled or untreated release of water or sediment from a work site.
Mitigation Measures	**Sediment and Erosion Control** ■ Implementation and maintenance of the Water Quality EMP, with particular reference to the management of stormwater and exposed soils. **Chemicals, Fuels, and Oils** ■ Implementation and maintenance of the Water Quality EMP with particular reference to the appropriate storage measures of hazardous materials. **Waste Materials** ■ Implementation and maintenance of the Waste Minimisation and Management EMP. **Aquatic Weed Control** ■ Implement and maintain a program to monitor and control aquatic weed growth including ■ Those found in water bodies that will become inundated by the dam. This program will include a survey to determine the distribution and abundance of declared weeds within the project area (including the inundation zone). **Movement of Vehicles/Plant from Weed Infested Areas** ■ Implement and maintain the EMP for Weed Management. This plan will include protocols for management of vehicle and machinery movement protocol to reduce the likelihood that weeds are spread as a consequence of this project.

	Impact on Aquatic Flora and Fauna Species ■ Implement and maintain a program for the rehabilitation of habitat within the neighbouring Mudgeeraba Creek, to offset the lost habitat.
Monitoring	**Aquatic Weeds** ■ Implement and maintain the Weed Management EMP, to determine the distribution of known declared weeds and, where practicable, control these infestations, in accordance with the "Land Protection (Pest and Stock Route Management) Act 2002". **Pest Species** ■ Implement and maintain a program to monitoring and control pest species in waterways (both flora and fauna); ■ Control measures for other pest species (flora or fauna) will be implemented. When it can be identified that the abundance of a priority pest species is discernibly higher in the vicinity of the operations than in regional areas and a discernable actual or potential impact is detected. **Aquatic Invertebrates** ■ A survey of aquatic invertebrates during spring 2007 undertaken to capture seasonal variability that is required for the AusRivAs models. **Fish** ■ A survey of fish species to capture seasonal variability will be undertaken preferably during spring to coincide with aquatic invertebrate surveys. ■ If feasible, design and implement a program that compares fish populations between Nerang River and Mudgeeraba Creek to identify the feasibility of using Mudgeeraba Creek as an offset to lost habitat. **Auditing** ■ Auditing of EMP conducted quarterly (internally) and annually (externally).
Reporting	■ Monthly Report prepared and submitted to Proponent to include details of monitoring results, audits, training and incidents. ■ Incidents, complaints and any significant environmental harm to aquatic environment reported to regulatory body/ies where required. ■ Assessment of performance against the identified indicators will be determined by auditing and reporting on a monthly (internally) and three monthly (externally) basis during construction.
Responsibilities	Contractor
Contingency Plan /Corrective Action	■ Measures undertaken to protect the aquatic environment where unacceptable impacts or risk of environmental harm becomes apparent. ■ Immediate reporting to Supervisor and Environmental Adviser of any incident which contravenes the objectives of the EMP. ■ 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.

Air Quality

As discussed in **Section 11**, the Project has the potential to generate air quality impacts during construction at sensitive receivers as a result of construction works and minor road relocation. This impact is mainly in the form of suspended and deposited particles, which will vary according to the amount of dust produced by construction activities, and the prevailing meteorological conditions.

There will be no change in air emissions as a result of operation after raising the dam wall, apart from occasional vehicle emissions associated with the fish transfer system.

Air Quality - Construction	
Environmental Objective	To minimise the potential to generate air quality impacts at residences near construction site and maintain safety on site.
Performance Criteria	Aim to achieve ■ PM_{10} (24 hr average) - 50 µg/m^3 Not to be exceeded: ■ PM_{10} (24 hr average) - 150 µg/m^3 ■ PM_{10} (annual average) - 50 µg/m^3 ■ Dust Deposition - 120 mg/m^2/day
Mitigation Measures	**Construction Dust** ■ Haul roads watered regularly using truck water carts to reduce emissions of wheel generated dust with particular focus on haul roads located near residents to the north and northeast of the construction site. Recycled water used preferentially for dust suppression purposes (refer to Section 7 of the EIS).

Air Quality - Construction	
	■ The size of cleared areas kept to a minimum to limit exposed areas available for dust emissions by wind erosion. ■ Surface excavation works and blasting activities incorporate consideration of prevailing meteorological conditions wind speed and direction, with works potentially ceasing if high winds are blowing in the direction towards sensitive receivers. This is particularly important when dust emissions are close to residences. ■ Haul trucks speed limited to control wheel-generated dust from haul roads, if visual inspection indicates that significant quantities of dust are being generated and transported off-site. ■ Regular monitoring of PM_{10} and dust deposition levels at nearest sensitive places to provide a basis for compliance with appropriate criteria. ■ Newly established stockpiles in the construction site seeded and stabilised as soon as practical. Water sprays used on stockpiles and could be activated during dry and windy conditions. ■ Hydromulch, mulch or hydroseed applied to batters adjacent to haul roads to stabilise these areas and minimise wind-blown dust. ■ Retention of existing vegetation, where practical, between construction activities and sensitive receivers to reduce particulate concentrations and dust deposition rates at receivers. ■ Construction of an enclosure around the crushing area to be considered if dust impacts from crushing operations become problematic. ■ Electrostatic precipitation installed on the hopper vent for the concrete batching plant to minimise particulate emissions. ■ Burning of cleared vegetation only undertaken in quarry area and if other options are not feasible. ■ Prevailing meteorological conditions considered before undertaking any burn event to minimise potential air quality impacts from this activity. These events to be undertaken in consultation with the Gold Coast Rangers, Queensland Rural Fire Service and Queensland Parks and Wildlife Service. ■ Trucks transporting material to or from and the construction site on public roads to cover loads to prevent wind-blown dust during transport. ■ Sealed access roads to the worksite sheds kept relatively dust free by regular sweeping and washing if needed. At certain times of the year, natural rainfall should keep this surface washed.
Monitoring	■ Visual inspections throughout workday. ■ Continuous PM_{10} concentrations at 2 locations. ■ Hourly Meteorological Data. ■ Dust deposition gauges. ■ Auditing of EMP conducted quarterly (internally) and annually (externally).
Reporting	■ Monthly Report prepared and submitted to Proponent to include details of air quality monitoring results, audits, training and incidents. ■ Immediate reporting to Supervisor 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
Contingency Plan / 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 and training covering the requirements of the EMP regarding air quality management and monitoring. ■ 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.

Noise and Vibration

19.1.1 Construction Noise and Vibration

The assessment presented in **Section 12** of the EIS highlights the potential for construction noise and vibration impacts at residences near the dam wall and proposed haul route. The Alliance recognises that management of noise from the construction works is a critical component of the project and will require ongoing consideration and community engagement throughout the duration of the Project.

In order to protect the acoustic amenity of the local community and assist with construction noise management a voluntary project specific noise goal has been developed to assist with compliance monitoring and impact assessment. This section of the EMP outlines noise management procedures and commitments to practical and reasonable controls which have already been adopted by the Project and would be further implemented as construction proceeds.

In determining the optimal noise mitigation solutions a step wise monitoring and evaluation approach would be adopted. The outcomes of monitoring and investigations would be used to modify the EMP and noise management commitments, as required, throughout the duration of construction.

Noise and Vibration Construction	
Environmental Objective	To minimise noise and vibration impacts from construction activities at residential locations near the dam.
Potential Impacts	Potential impacts identified in the EIS include noise impacts from mobile construction equipment, quarrying and materials handling activities and, airblast overpressure and ground vibration impacts from blasting.
Performance Goals	**Aim to achieve** ▪ Noise from construction activities would aim to achieve a level of $L_{Aeq\ 12hr}$ 58dB(A) **Must be achieved** ■ 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. ■ Airblast 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	**Hierarchy of Control** Reasonable a feasible mitigation of noise impacts is to be achieved by addressing the mechanisms of noise transmission. These mechanisms are identified as the source, path and receiver and should be approached in that order. Ameliorative measures would be implemented based on a hierarchy of control firstly by elimination then substitution and finally modification of the noise source. Where these methods cannot produce the desired result, secondary measures would include blocking the path of the sound transmission between the receiver and the source. When all of the above methods of reducing noise impacts are exhausted then noise control at the receiver location must be considered. Identification of noise impacts and subsequent remedial actions are to be based on consultation with the relevant members of the community.
	Controls at Receivers Due to the mobile nature of the proposed construction works effective source noise controls may not be possible. Where the extent of noise mitigation which can practically be implemented at the site cannot achieve acceptable noise levels at nearest sensitive places, noise mitigation at receivers can then be considered to assist with minimising the impact to acoustic amenity. The implementation of noise controls at a receiver location would be based on several factors including the construction of the residence and must be considered in light of the project noise goal. Where mitigation measures at the source or in the path of the noise emission has reduced noise levels to be within 3 dB(A) of the Project specific noise goal, additional treatment would not generally be considered based on the additional cost to provide only a marginal benefit. A dilapidation survey inspection of nearby dwellings will be conducted prior to the Project commencement and details of activities undertaken in the residence may be gathered to provide additional information when identifying noise controls. Reference may also be made to acceptable internal noise levels for various types of occupancy, as outlined in AS2107 (2000), which could be used to identify the requirements of noise controls and mitigation measures implemented as part of the project.
	Operating Times As far as practicable general construction activities are scheduled for 5 days a week. Construction would occur over a 5 day rotating roster from Monday to Friday 3 weeks out of 4 and Tuesday to Saturday during every fourth week. On some occasions the roster may include works from Monday to Saturday inclusive for the below working hours: ■ 6.30 am – 6.30 pm ■ No work will take place on Sundays or public holidays No night-time construction works are proposed. Some maintenance activities may be undertaken within the site maintenance shed during night-time hours, however these works would be inaudible at nearest residences.
	General work practices and scheduling of activities ■ In general, construction works and consideration of quite work practices would be carried out in

	accordance with Australian Standard 2436-1981, *Guide to noise control on construction, maintenance and demolition sites* (Standards Australia, 1981) ■ Prior to the commencement o works the community would be informed of the upcoming activities and likely duration (refer ***Consultation*** below) ■ The construction programme would continue to be developed in consultation with the local community to schedule noisier activities (such as blasting) during least sensitive times of the day (refer ***Community Notification and Complaints Procedure*** below); ■ Rock breaking, rock hammering, sheet piling, blasting (refer below) and any other activities which result in impulsive or tonal noise generation would only to be conducted during normal operational hours. ■ Appropriate selection of construction processes / methodologies and equipment which minimise the generation of noise would be further considered during the development of the project schedule; ■ 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 (or dust) complaints.
	Worker Education ■ Regularly train workers and contractors (such as during tool box meetings) to maximise awareness of project noise goals and nuisance noise generating activities and encourage minimisation of these activities, including: ■ Unnecessary or overuse of PA devices, horns ■ Use of compression air brakes adjacent to sensitive areas; ■ Shouting, swearing, laughing at shift start/end; and ■ Efficient material handling procedures to reduce unnecessary loud banging sounds.
	Maximise Shielding and Distance to Receivers ■ Maximise the offset distance between noisy plant and continuous operations (generators, compressors, crushers etc) and nearby noise sensitive receivers or ensure plant are screened utilising: ■ Purpose built barriers; ■ Materials stockpiles; ■ Site sheds, buildings or other structures; or ■ Natural topographical barriers. ■ Where possible, carry out loading and unloading of materials and equipment in areas as far away from noise sensitive areas as possible.
	Plant and Equipment ■ Equipment having directional noise characteristics (emits noise strongly in a particular direction) would be oriented such that noise is directed away from sensitive areas; ■ Avoid the coincidence of noisy plant working at the same time close together adjacent to sensitive receivers; ■ Acoustic enclosures or localised noise screens could be incorporated around fixed plant or over individual pieces of equipment as appropriate based on acoustic assessment for: ■ Crusher and screening plant; ■ Concrete batch plant; ■ Maintenance area/shed. ■ All mechanical plant would be silenced by best practical means using current control technology; ■ Plant with the lowest noise rating which meets the requirement of the task should be selected; ■ Where possible for works in close proximity to sensitive receivers, use electric motors in preference to diesel motors; ■ Where enclosures are fitted to equipment, ensure doors and seals are in good working order and that doors can be closed properly against the seals; ■ If piling is required, use bored piles which are cast in-situ or screened drop hammers rather than untreated drop-hammer driven piles; ■ Ensure that internal combustion engines (all mobile and stationary equipment) are fitted with a suitable muffler in good repair; ■ Where reversing alarms are to be used for mobile equipment such as dozers, scrapers, cranes, graders, excavators, trucks, loaders etc, their acoustic range would be limited to the immediate danger area. Alternatives to traditional reverse beepers could include the use of: ■ “smart alarms” which adjust their volume depending on the ambient level of noise, ■ low frequency “quacker” alarms ■ spotters, CCTV camera and audio notification ■ In all cases, the requirements of Occupational Health and Safety Regulations must be addressed. levels vary with changing background noise levels) on plant and where practicable; ■ Where practicable, metal surfaces subject to impacts from heavy objects (such as rock dropping into empty truck trays, or metal grates on road ramps etc) should be lined with rubber impact protection to minimise impact noise; ■ 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 ; ■ Conduct regular inspections and effective maintenance of both stationary and mobile plant and equipment (including mufflers, enclosures etc); and ■ Equipment not being utilised as part of the work would not be left standing with engines running for extended periods.
	Traffic Noise Management Reduce the potential for impacts from construction traffic by: ■ Establishing designated access routes to the site and informing drivers of these routes, parking lots and acceptable delivery times; ■ Undertaking regular site road maintenance (and inspections) to minimise impact noises from trucks travelling over irregularities in the road surface (such as pot-holes, washouts or ruts); ■ Limiting vehicle speeds in critical areas both on and off site; ■ Allowing for one-way traffic flow through the site to minimise the use of reversing alarms as much as possible and minimise traffic delays; ■ The use of 'smart', reversing alarms (as above); ■ Limiting excessive acceleration from site exits; ■ Ensure that vehicles required within compounds do not "queue" outside the worksite close to residential areas. This particularly applies in the commencement of shift during morning hours, where sleep disturbance issues may arise; ■ Entry and departure of heavy vehicles to and from the site are restricted to the standard daytime construction times; and ■ Best available controls over engine noise emissions by maintaining the vehicle fleet in compliance with Australian Design Rule 28/01 for engine noise emissions, tested in accordance with the National Road Transport Commission document Stationary Exhaust Noise Test Procedures for In-Service Motor Vehicles.
	Blasting overpressure and vibration Blasting would be restricted to one blast per day at a single regular time of day during afternoon hours (the time would be determined based on outcomes of consultation with the community). Blasting would 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 Australian Standard 2187 – 2006 Explosives—Storage and use Part 2: Use of explosives, and would include the following types of measures to minimise impacts: ■ Reducing maximum instantaneous charge of each blast; ■ Changing drilling patterns, burden, blasthole diameter, deck loading, location, spacing and orientation of blastholes 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 airblast to surrounding areas). Consultation with the adjacent community will be a key component of blast overpressure and vibration management, as outlined in the Construction Communication Program **(Appendix D)**.
Community Notification and Complaints Procedure	The four-year communication strategy (2007-2010) includes a Construction Communication Program as outlined in **Appendix D** of the draft EIS. Deliverables for the Construction Program include procedures for notifying the community of the works and keeping them updated regarding any impacts that may affect them as construction progresses. For any work that is identified as potentially having a significant community impact, local residents will be notified about proposed at least fourteen (14) days prior to the commencement of these activities. Time efficient project updates will be available to the community via: ■ the On-site community liaison officer ■ 24 hr 7 days a week GCW Customer Contact Center 1300 number ■ dedicated website and on-line feedback forms for complaints and grievances ■ SMS notifications (database of mobile phone numbers and email addresses) ■ Heavy Vehicle Management Plan ■ Road signage ■ Newsletters; and ■ Print advertisements. Unforeseen circumstances may require some additional activities or night-time works. Where possible a minimum of 5 days notice would be given to receivers should this occur and specific management measures would be developed for these works to minimise the potential for impacts. As outlined in Section 19, the complaint handling and management procedures during construction and operational phases will involve a complaints telephone service operated via Gold Coast Water's (24 hr 7 days a week Customer Contact Center number 1300 366 692). During office hours if a noise complaint is received via the 1300 telephone number or project email

	address, the following investigation procedure would apply:
	■ The HD Alliance would collect the complainants contact details and information on the time of alleged noisy or nuisance generating activities, the type of noise event and duration;
	■ Within one hour of receiving the complaint the HD Alliance Site Superintendent and a member of the Community Engagement Team would be notified
	■ An investigation response would then follow involving:
	  ■ The HD Alliance representative visiting the location (or general vicinity) of the complainant location to identify noise generating activities audible at the location of the complainant and confirm whether the source of noise complaint could be due to HD Alliance operations;
	  ■ HD Alliance reviewing the site activity log, noise and meteorological monitoring data recorded at the time of the complaint;
	  ■ If the probable cause of the complaint is likely to be project construction works the Alliance would immediately commence investigations into further noise mitigation options for the activity (activities) identified as the probable cause of complaint;
	  ■ mitigation measures (either site controls or measures which could be implemented at the complainant's dwelling) would be identified and implemented as soon as practical after receipt of the complaint;
	■ the Alliance Community Engagement Team would follow up the noise contact/complaint within 72 hours to inform the complainant of the actions being taken by the alliance and assist in managing resolution;
	■ A database entry will be uploaded to the on-line content management system entitled Engauge © 2006 Sinclair Knight Merz (this software enables the Alliance to record, track, manage and report on all incoming and outgoing forms of correspondence).
	
	This complaints management procedure will enable proactive noise management measures to be taken almost immediately following receipt of a complaint.
	Emergency calls outside the hours of 7.00 am to 5.00 pm Monday to Friday will be answered by Gold Coast Water's (24 hour, 7 days a week Customer Contact Centre number). GCW Contact Centre Personnel will also route emergency calls relating to noise disturbances to the Site Superintendent. The on-site community liaison officer will be notified the next working day and follow-up the complaint will occur within 72 hours.

Monitoring	**Environmental Noise Monitoring** Due to the varying nature of the construction activities to be undertaken throughout the project the effectiveness of the construction noise mitigation measures and management procedures would be reviewed regularly. 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. The HD Alliance will: ■ Measure ambient noise levels on a continuous basis at two permanent monitoring locations, to be sited near the northern CID boundary, adjacent to nearest off-site sensitive receivers; ■ Measure meteorological conditions on a continuous basis (including wind speed and wind direction) to assist with the investigation of complaints. The noise monitoring sites will provide long term monitoring information for overall Project noise level compliance and also provide information on noisy activities that may occur under certain weather conditions. Ad hoc noise monitoring would also be undertaken in response to noise complaints or where new activities are initiated, as required. Were noise monitoring is required in response to valid community complaints investigations it would be performed at a location representative of the nearest affected sensitive receiver to the site or a location representative of the complainant(s) dwelling. The L_{Amax}, L_{A10}, L_{A1}, L_{A90}, L_{Aeq} noise levels would be reported and construction noise levels would be compared with the project noise level goals. **Blast Overpressure Monitoring** Blast overpressure and vibration monitoring is to initially 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.
Reporting	General monitoring information is for the use of the Alliance Environmental Officers however, the results of noise level measurements and investigations undertaken in response to community complaints would be summarised and included with other environmental reporting documentation (as required) and provided to the EPA on request. Reporting would note: ■ 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). Where site activities are identified as the probable cause of concern or complaint, action would be taken to minimise future events by revising noise management procedures (involving modification to work practices or further controls at source or at receiver) for the activities identified as contributing to the nuisance or high noise event. Management measures outlined above would be revised and the updated commitments implemented to reduce potential for future impacts as a result of similar activities
Roles & Responsibilities	Alliance environmental officers would be responsible for compliance monitoring and complaint investigation.
Corrective Action / Contingency Plan	If complaints are received in relation to a short-term unavoidable event or emergency the community engagement and awareness of the possibility of such future activities would be improved. Where construction noise level investigations in response to community complaints show unacceptable project noise levels, revision to the noise mitigation measures and management commitments would be undertaken to further control noise impacts. The project noise level goals would be used to assist with determining the need for further corrective actions. ■ Where further source noise controls or mitigation in the sound transmission path are not possible or ineffective in further controlling noise levels, controls at the receiver would be investigated. Detailed investigation of façade attenuation would be required as part of these investigations.

Transport and Roads

Construction activities will impact on the normal use of roads around the Project work areas through restricted access, road upgrades, increase in heavy vehicle use on roads and vehicles from the commuting workforce. **Section 13** of the EIS outlines mitigation measures to for these impacts which are summarised below.

Transport and Roads - Construction	
Environmental Objectives	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 the worksites, including the recreational 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. ■ Maintenance of safe access near all project work areas for road users, including pedestrians, cyclists and tourists to recreational areas. In particular, development of local access strategies in consultation with stakeholders groups to maintain safe, convenient and efficient access to the tourist and recreational facilities. ■ Implementation of traffic management measures near worksite to avoid conflicts between construction traffic and local traffic, including pedestrians and cyclists around the recreational areas. ■ Local and broader communities kept informed about the time and scale of changes in the traffic conditions on roads in the vicinity of the worksite. ■ Traffic flows near construction works monitored. ■ Corrective measures implemented in response to traffic impacts subsequent to construction works.
Mitigation Measures	**Truck Routes and Construction Site Access** ■ In consultation with Queensland Transport, department of Main roads and Gold Coast City Council, development and implementation of a Construction Traffic Management Plan to address the following issues: ■ use of the established truck routes and arterial roads for the haulage of construction materials and spoil in order to minimise truck traffic on local roads;

	■ avoidance of haulage tasks during peak traffic periods and during the school drop-off and pick-up times. Where haulage in peak hours in unavoidable, such activities managed in accordance with specific traffic management plans provided to the relevant agencies and Gold Coast City Council in advance; and ■ control of heavy vehicle movements to avoid interference with major events (e.g. competitions at Gold Coast Regatta Centre, Gold Coast Regatta Centre, Scout Association, Model Flying Club and Numinbah Flying Field and Environmental Education Centre). ■ Investigation of possible bus services for employees running from Nerang Train Station. **Local Traffic** ■ Notification to the local communities where practicable about proposed changes to local traffic access due to construction activities and provision of clear signage of changed traffic conditions. **Parking** ■ Provision of sufficient parking to accommodate employees' vehicles and instructions given to the commuting employee to use the providing parking facilities in order to avoid traffic disruption due to road side parking. **Emergency vehicles** ■ Wherever safe and practicable, maintain one lane open for traffic near the construction site. **Tourists to Recreational Areas** ■ Maintenance of safe vehicular, pedestrian and cycling movements near the construction site and access to the recreational areas where applicable. ■ Notification or signage in place regarding changes in the traffic arrangements during the construction phase which affect access to the local recreational facilities. ■ Provision of traffic control measures designed for the safe movement of vehicles, pedestrians and cyclists accessing the recreation facilities.
Monitoring	■ Monitoring of traffic flows and road network performance on a continual basis to confirm that specific controls have been implemented and appropriate work practices are being adopted to achieve the specified performance objectives.. ■ Review of Construction Traffic Management Plan if necessary. ■ Auditing of EMP conducted quarterly (internally) and annually (externally).
Reporting	■ Monthly report on local traffic conditions, including any accidents involving construction traffic ■ Monthly Report prepared and submitted to Proponent to include details of local traffic conditions, including any accidents involving construction traffic, any monitoring results, audits, training and incidents. ■ Immediate reporting to Supervisor and Environmental Adviser of any incident which contravenes the objectives of the EMP. ■ Incidents, complaints and any significant environmental harm reported to regulatory body/ies where required.
Responsibilities	Contractor
Corrective Action / Contingency Plan	■ 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 can request the cessation of works at any time should they feel that the performance criteria of the EMP have been breached.

Waste Minimisation and Management of Hazardous Substances

It is the objective of this EMP to minimise the environmental impact by minimising waste generation and disposing of waste in the most appropriate manner.

As outlined in **Section 15** of the EIS, a number of sources of waste exist during the construction phase of the Project. These include streams from demolition, workshop and maintenance, concrete batching, vegetation clearing, infrastructure relocation, extraction and stockpiling of spoil, ablution and domestic water requirements and office activities.

Chemicals and fuels such as paints, some cleaning agents and diesel stored at the construction site constitute hazardous materials. A hazardous material is an item or agent (biological, chemical, physical) which has the potential to cause harm to humans, animals, or the environment, either by itself or through interaction with other factors. If not handled, stored or used appropriately contamination of land or water could occur from hazardous

materials. The management of these potential impacts is addressed below as well as in the Emergency Response Plan.

Waste Minimisation and Management of Hazardous Substances - Construction	
Environmental Objective	■ Minimisation of the production of waste and amount of waste requiring disposal. ■ Minimisation of the impact to the environment from waste. ■ Maximisation of the opportunities to reuse waste on-site. ■ Correct disposal of all waste produced. ■ Construction and storage sites are clean and tidy at the close of each working day. ■ Management of the purchase, quantities, storage, use and disposal of hazardous materials any substances that may cause environmental harm at the site. ■ Prevention of spills from occurring at work sites. ■ Contain, clean up and, if necessary, remediation of any spills that do occur.
Performance Criteria	■ Implementation of waste management principles (reduce, re-use recycle) and effective and sustainable disposal strategies. ■ Minimisation of the impacts of handling and disposal of construction waste. ■ Reduction of waste generated on site through re-use and recycling. ■ All waste disposed of lawfully. ■ Construction and storage areas clean and tidy. ■ 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. ■ Requirements of the Flammable and Combustible Liquids Regulations and the relevant codes published by Australian Standards met. ■ Containment of all spills involving materials that may cause environmental and effective cleaned up and measures taken to prevent the incident from recurring. ■ Recording and reporting of incidents accurately and describing the extent of spill that occurred. ■ Correctly sized bunds intact and free from materials. ■ Water quality in the dam not impacted as a result of spills at the construction site or on access routes within the catchment.
Mitigation Measures	**Waste Minimisation** ■ Preparation and implementation of site-specific Waste Management Plan prior to commencement of construction activities addressing issues such as location and methods of storage, transport and disposal. ■ All reasonable efforts made to avoid and minimise waste and to reuse or recycle where possible. ■ Purchase agreements to include the requirement for suppliers to take back packaging there practicable. ■ Implementation of training for employees in the waste management plan and recycling opportunities. ■ On-site waste management practices highlighted during employee inductions. **Disposal** ■ Waste minimisation encouraged and training provided in correct identification and disposal of waste. ■ Bins provided that are suitable for the type of waste that will be produced, of the correct size and strategically placed to receive the waste that will be disposed. ■ Disposal bin not overfilled and waste compacted as much as possible before disposal. ■ Waste bins on-site monitored and arrangement for their replacement to occur on a regular basis and/or when full. ■ Prevention of animals from accessing the bins using specially designed lids and strategic placement where necessary. ■ Housekeeping procedures, (including spillage control, litter pick up and tidying up of site areas) implemented to minimise the generation of waste. ■ All empty containers not suitable for reuse rinsed and punctured prior to disposal and landfill. ■ All domestic and industrial waste generated at the construction site removed from the site and disposed of at the nearest licensed disposal facility, as required. ■ Empty drums stored as per Australian Standards and collected by licensed transporter and dispatched to a licensed facility for recycling. ■ Wastewater treated through septic system as per site water quality regime. ■ Sewage sludge from portable ablution facilities pumped out by licensed contractor and transported to GCCC's Sewage Treatment Plant. ■ Recycling bins provided for glass, plastic and metal transported to the local GCCC facility. ■ Disposal of waste that is unable to be reused or recycled in a certified land fill site. ■ Records maintained of any waste generated and removed from the premises. ■ All waste construction material removed from the work site upon completion. ■ Transport of regulated wastes and contaminated soils or other materials conducted by licensed Contractors for disposal at licensed facilities, in accordance with legislative requirements.

Waste Minimisation and Management of Hazardous Substances - Construction	
	Waste Transport ■ Restriction of site works and surface truck movements for transport of waste material to designated hours. ■ 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 the EPA and the GCCC. **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 to Supervisor and Environmental Adviser any incident where harmful waste material is accidentally released to the environment. ■ In the event of an environmental incident, corrective or remedial action as is required to render the area safe and avoid or minimise environmental harm. **Hazardous Materials or Dangerous Goods** ■ Undertaking of storage and transport of materials according to relevant Australian Standards. ■ Transport and storage of dangerous goods for construction purposes in accordance with dangerous goods standards and guidelines. ■ Storage area for chemicals, fuels, lubricants, oils, wastes and hazardous materials covered and bunded, with an impervious floor and appropriate signage to meet the requirements of AS1940 Storage and Handling of Flammable and Combustible Liquids. The location of these areas should not be in close proximity to drainage lines. ■ Containment areas designed so that spills can be recovered, and containment areas will be kept clean and free of other wastes. ■ Appropriate signage provided using HAZCHEM coders which are to be visible at all times. Signage also listing contact details for the Environmental Adviser and Safety Officer in case of an emergency. ■ Fire Fighting equipment checked and maintained at all times. ■ Refuelling and maintenance activities carried out in designated bunded areas to minimise potential for soil and water contamination to result from these activities. Refuelling of equipment around the site carried out using mobile bunding and following the procedure developed for in situ refuelling. ■ Containers clearly labelled. ■ Chemicals which may react with each other stored separately in clearly marked containers as per Australian Standards. ■ All fuel, lubricant and hydraulic fluid spills including drips cleaned up immediately. ■ Fuels and other flammable liquids store away from sources of ignition. ■ All waste fuels/oils/grease/chemicals stored in appropriate storage facilities and collected by licensed contractor for recycling, treatment or disposal. ■ Storage areas inspected daily for any defects with bunding, floor, cover, structure, hoses, valves etc. ■ Equipment operators to regularly check equipment for evidence of leak and fitness of hydraulic hoses and seals, and conduct maintenance or repairs as necessary to prevent drips, leaks or likely equipment failures. ■ MSDS's readily available for all employees and contractors and personnel made aware of the environmental and safety requirements of these materials. ■ Maintenance of list by HSE staff giving full details of the hazardous materials, oils, chemicals and petroleum products used on site. ■ Emergency spill kits containing absorbent materials, neutralising chemicals and other spill containment equipment strategically located around the site and on board equipment and machinery for the types of spills likely to be encountered. ■ Appropriate protective clothing and wash down areas for personnel kept on site and their location made known to personnel. ■ All personnel provided with Environmental Awareness training during induction sessions and taught spill control and containment procedures. ■ All plant operations and maintenance personnel instructed in the range of materials, methods of storage, location and the handling procedures in the event of spills, toxicity and fire control requirements. ■ Any visible or reasonably suspected fuel, lubricant or hydraulic fluid loss treated as an "incident" and handled accordingly. ■ Signs erected on roadways within the catchment stating that the route is within a drinking water catchment and that all spills are to be reported to the nearest emergency services, with contact details for emergency providers listed on the sign. ■ Preparation and implementation of spill response measures in accordance with the Emergency Response Plan in Section 19.2.

Waste Minimisation and Management of Hazardous Substances - Construction	
	Contaminated Soil ■ Obtain an approval and a disposal permit by the EPA Contaminated Land Unit for the removal of contaminated soil, in accordance with the *Environmental Protection Act 1994.* ■ Remove contaminated soils in accordance with an EPA approved Remediation Action Plan (RAP). ■ Prepare and implement procedures for the remediation of contaminated soil spills that may occur during transport.
Monitoring	■ Regular inspection of on-site facilities to ensure waste is being generated, stored, handled, disposed and transported in accordance with this EMP. ■ Registers and manifests maintained to track waste material. This documentation subject to internal or external audit, especially for any regulated waste material. ■ Any discharges from site that could impact on the environment monitored in accordance with EPA's requirements. ■ Records kept of any regulated waste removed from the site, including name and licence number of waste transporter, volume and description of waste transported, destination of waste and licence number of the waste treatment operator. ■ Waste contractors to provide certification (licence) records verifying their registrations and points of discharge of waste. ■ Chemical and fuel storage areas and equipment inspected daily 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. ■ Inspections against this EMP conducted weekly (internally) and monthly (externally).
Reporting	■ Monthly Report prepared and submitted to Proponent to include details of monitoring results, audits, training and incidents. ■ 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 Environmental Adviser of any large spills or potential risk of spills. ■ Incidents, complaints and any significant environmental harm reported to regulatory body/ies where required.
Responsibilities	Contractor
Corrective Action / Contingency Plan	■ Ensure that the appropriate personnel undertake adequate environmental awareness and training covering the requirements of the EMP regarding waste management, spill procedures and the storage and handling of hazardous substances and materials with the potential to cause environmental harm. ■ 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.

Socio-Economic

Changes to environmental conditions during construction will be managed by the Hinze Dam Alliance so as to ensure that any impacts experienced are avoided, reduced or mitigated to the extent which is possible and may be reasonably expected.

This section outlines environmental objectives, performance criteria and mitigation measures required to address potential social and economic impacts, as discussed in **Section 16**.

Social and Economic - Construction	
Environmental Objective	Protect the amenity and sense of security of residential properties
Performance Criteria	■ Residents in adjacent properties aware in advance of construction activities, including blasting schedules and safety procedures. ■ Residents believe the construction team respond promptly to identified issues and impacts. ■ Potential impacts relating to vegetation removal which may impact on visual amenity are reduced
Mitigation Measures	■ Communication program implemented to targeted to residents in Advancetown and Gilston, and including: regular construction updates; advice on blasting and construction schedules; and the results of monitoring required by the EMP. ■ Complaints response system followed including promotion and provision of phone contact with construction management staff during hours of construction, and a follow up procedure which

Social and Economic - Construction	
	notifies complainants within 24 hours of the intended response to the issue raised. ■ Site design minimises the removal of vegetation, and tree planting conducted at the earliest practicable opportunity to restore the existing visual qualities attributed to existing vegetation on the site.
Monitoring	■ Follow up enquiries and complaints as per procedures to assist in gauging community's perceived impacts from project on socio and economic values and amenity. ■ Surveys undertaken with residents in residential streets within 2 kilometres of the construction site on an annual basis to ascertain satisfaction with environmental management and complaint management procedures. ■ Auditing of EMP conducted minimum quarterly (internally) and annually (externally).
Reporting	■ Monthly Report prepared and submitted to Proponent to include details of monitoring results, audits, training and incidents. ■ Communications register to include communication activities, residents' complaints and resolution of complaints. Regular reviews required. ■ The results of annual monitoring of community satisfaction with environmental and complaints management collated into report for submission to Proponent. ■ Significant complaints and community issues reported to regulatory body/ies where required.
Responsibility	Contractor
Contingency Plan / Corrective Action	■ Appropriate actions implemented where community or residents report complaints or comments during construction as per communications procedures. Ensure all complaints are followed up and logged. ■ Ensure that the appropriate personnel undertake adequate environmental awareness and training covering the requirements of the EMP regarding community liaison, incidents and complaints. ■ 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.

Visual Amenity

The project has the potential to impact on the visual amenity and landscape of the area during the construction period due to activities such as vegetation clearing, quarrying, extraction of clay and construction of the haul roads and embankment. These impacts are largely from a change in the appearance of the site and its immediate surrounds from such activities. The extent of this impact will vary depending on the location of the view point and the position of the sensitive receivers.

Visual Amenity - Construction	
Environmental Objective	Protect the visual amenity from sensitive receivers and significant view points
Performance Criteria	■ Residents in adjacent properties aware in advance of construction activities, including land clearing, blasting schedules and embankment and saddle dam construction works. ■ Residents believe the construction team respond promptly to identified issues and impacts. ■ Potential impacts relating to vegetation removal which may impact on visual amenity are reduced.
Mitigation Measures	■ Communication program implemented to targeted to residents of Gilston, Tallai, Lower Beechmont, and Advancetown that have a view over the dam and/or associated infrastructure, and including: regular construction updates; and vegetation clearing program. ■ Retention of vegetation buffers adjacent to properties and road reserves where possible to assist in the retention of existing views and outlooks ■ Locate night lights as required for safety and security, but ensure lights are focussed on the areas required, with shields around the globes to limit extraneous light where necessary. Lighting of the site should conform to the following Australian standards: AS1158 – Road lighting; and AS 4282 – Control of the obtrusive effects of outdoor lighting ■ Complaints 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 minimises the removal of vegetation, staging of the removal of vegetation, and tree planting conducted at the earliest practicable opportunity to restore the existing visual qualities attributed to existing vegetation on the site.
Monitoring	■ Follow up enquiries and complaints as per procedures to assist in gauging community's perceived impacts on the visual landscape ■ Surveys undertaken with residents in residential streets within 2 kilometres of the construction

	site on an annual basis to ascertain satisfaction with environmental management and complaint management procedures. ■ Auditing of EMP conducted minimum quarterly (internally) and annually (externally).
Reporting	■ Monthly Report prepared and submitted to Proponent to include details of monitoring results, audits, training and incidents. ■ Communications register to include communication activities, residents' complaints and resolution of complaints. Regular reviews required. ■ The results of annual monitoring of community satisfaction with environmental and complaints management collated into report for submission to Proponent. ■ Significant complaints and community issues reported to regulatory bodies where required.
Responsibility	Contractor
Contingency Plan / Corrective Action	■ Appropriate actions implemented where community or residents report complaints or comments during construction as per communications procedures. Ensure all complaints are followed up and logged. ■ Ensure that the appropriate personnel undertake adequate environmental awareness and training covering the requirements of the EMP regarding dealing with community liaison, incidents and complaints. ■ 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.

19.1.11 Draft EMP (Operation)

The Operation of the dam will be undertaken as per the Resource Operations Plan which will be modified by the Proponent to address the new operating regime.

The environmental elements addressed in this Draft Construction EMP are:

- Management of Water Storage;
- Geology and Soils;
- Water Quality;
- Aquatic Ecology;
- Transport and Roads;
- Waste Minimisation and Management of Hazardous Substances;
- Socio-Economic; and
- Visual Amenity.

Management of Water Storage

Hydrology management is crucial to reduce the impacts of altered hydrologic conditions from the presence of the dam in the catchment area.

Management of Water Storage - Operation	
Environmental Objective	Operation of the dam to : ■ Conform with flow requirements of the Gold Coast Water Resource Plan. ■ Maintain downstream environmental and compensation release. ■ Avoid excessive rises in reservoir levels during passage of flood flows. ■ Avoid adverse impact on flood levels upstream of the dam.
Performance Criteria	■ Compliance with the environmental flow requirements of the Gold Coast City Council Water Resources Plan. ■ Annual volumes of flow and seasonal distributions of flow downstream of the dam are consistent with the operational performance predicted during feasibility and design of the project. ■ No increase of flood discharge downstream due to operation of the dam. ■ Increases in dam levels during the passage of floods which are consistent with operational performance predicted during project design. ■ Flood levels upstream of the dam which are consistent with estimates made during project design. ■ Absence of excessive accumulation of deposited sediment in the upper reaches of the dam. ■ Staff trained in procedures associated with monitoring required by the EMP. ■ Gold Coast City Council Water Resources Plan recommendations to minimise environmental harm to flora, fauna and water quality.
Mitigation Measures	■ Gold Coast City Council to refine current operating procedures in Resources Operations Plan to

Management of Water Storage - Operation	
	reflect the new regime following the raising of the dam wall.
Monitoring	■ Dam levels near the embankment to be observed on a daily basis. ■ Precipitation of the immediate and upstream area of the dam to be recorded continually. ■ River levels to be continuously recorded at upstream sites. A field programme of discharge measurement to be undertaken adequate for purposes of maintaining a rating of river stage versus discharge. ■ Water quality monitoring in accordance with the Water Quality EMP. ■ Regular auditing undertaken to ensure compliance with objectives of the EMP.
Reporting	Operator (GCW) to report to GCCC on dam operations as per Resource Operations Plan.
Responsibility	Operator
Contingency Plan / Corrective Action	■ Appropriate action will be taken if impacts are found to be unacceptable in terms of adjoining land use, ecology or erosion. Depending on the circumstances, appropriate action could include: removal of accumulated sediment; measures to entrap sediment upstream at a site more accessible for sediment removal; measures to improve stream bank stability upstream; or catchment management measures to minimise erosion from sediment sources.

Geology and Soils

There will be limited disturbance in the site area during operation of the dam after construction ceases on Stage 3. Maintenance of the stability of sediment and erosion control structures and monitoring around the site will be necessary to ensure minimisation of impacts.

Geology and Soils - Operation	
Environmental Objective	Permanent facilities and project property maintained post-construction and during normal operation to avoid any impacts associated with soil erosion (ie decrease in land condition or increase in water turbidity or increase in sedimentation).
Performance Criteria	Maintenance soil and water control devices for long-term surface stability and protection against erosion.
Mitigation Measures	**Soil erosion** ■ Maintenance of permanent soil and water control devices for long-term surface stability and protection against erosion by wind or water. ■ Rehabilitation Plan for the borrow area developed that considers mountain biking as an end use. ■ A Topsoil Management Plan implemented for the borrow area to assist with re-establishment of the area and ongoing stability. ■ Quarry Rehabilitation Plan implemented that reduces the impacts identified in the visual amenity section and facilitates use consistent with the Recreation Master Plan. ■ Landscaping Plan for the new recreation area implemented to accommodate the recreation activities described in the Recreation Master Plan.
Monitoring	**Soil erosion** ■ Regular monitoring of permanent soil and water control devices installed during operational phase for evidence of soil erosion and sedimentation; and ■ 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	Operator (GCW) to report to GCCC on dam operations as per Resource Operations Plan.
Responsibility	Operator
Contingency Plan / 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 could 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; or ■ catchment management measures to minimise erosion from sediment sources.

Water Quality

Water quality is an important aspect of dam operation as discussed in **Section 7**. Water quality during the operation of the dam will be carried out in as per the Water Quality Monitoring Programme for operation. This programme is attached in **Appendix F.19.1**. The objectives for water quality are outlined below.

Water Quality – Operation	
Environmental Objective	During operation, water quality within incoming and receiving waters is to preserve Environmental Values (EVs) and comply with local Water Quality Objectives (WQOs), particularly drinking water guidelines.
Performance Criteria	■ Drinking water quality objectives as per the Environmental Protection (water) Policy 1997, Nerang River Environmental Values and Water Quality Objectives. ■ Aquatic ecosystem environmental values as per the Environmental Protection (water) Policy 1997, Nerang River Environmental Values and Water Quality Objectives. ■ Primary and secondary contact recreation as per the Environmental Protection (water) Policy 1997, Nerang River Environmental Values and Water Quality Objectives. ■ The overarching performance criterion is to maintain existing ecosystem attributes and water quality within Hinze Dam and the Nerang River Catchment.
Mitigation Measures	■ Management measures to be identified and implemented to limit sediment and contaminants within surface runoff. ■ Management measures to be identified and implemented to ensure accidental spills (particularly hydrocarbon and chemical spills) are isolated, cleaned and remediated to minimize groundwater contamination.

Monitoring	**General Water Quality Monitoring**
	■ A routine water quality monitoring program, implemented during the construction phase, will continue to monitor:
	  ■ turbidity, SS, colour, organic carbon;
	  ■ nuisance algae, chlorophyll 'a'; and
	  ■ DO, Secchi Disc depth, algal composition, P, N and Fe and Mn.
	■ Vertical profiling will monitor the thermocline extent within Hinze Dam and provide an assessment of destratification.
	
	Fixed Site Monitoring
	■ Fixed site loggers, installed during the construction phase at the upper and lower intakes, will monitor water quality to ensure that water sourced by the Molendinar Water Treatment Plant is of a satisfactory quality. The approach will involve the installation of fixed site data loggers with telemetry capability for real-time monitoring. The indicative sites for installation of loggers and the parameters to be monitored have been discussed in the Water Quality Monitoring Program (**Appendix F.19.1**).
	■ Aquatic plants will be monitored and identified and removed from around the sensors
	■ Any dead and decaying matter reported on the bed and banks removed.
	■ Review of monitoring program to be undertaken every 6 months and qualitative assessment undertaken using digital imagery.
	■ Regular auditing undertaken to ensure compliance with objectives of the EMP.

Reporting	■ 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. ■ Quarterly water quality reports prepared by GCW personnel which report on water quality conditions within the Hinze Dam and Nerang River catchment, including data collected as part of the existing program, as well as weekly and monthly data reported by GCCC and GCW. ■ 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 (GCW) to report to GCCC on dam operations as per Resource Operations Plan.
Responsibilities	Operator On-site GCW personnel will be required to undertake the routine water quality monitoring and reporting. Separate personnel (suitably trained environmental scientists) shall independently audit the program as per the Resource Operations Plan.
Corrective Action / Contingency Plan	■ Any elevated physico-chemical parameters, or nutrient or metal concentrations, observed within the upper catchment, Hinze Dam or in the Nerang River, will be identified and the appropriate action taken by the Operator. ■ Any impacts to downstream water quality shall be reported to the EPA and any impacts to the potable water supply detected at the upper intake, reported to the Molendinar Water Treatment Plant.

Aquatic Ecology

Monitoring of aquatic ecology is an important factor to ensure the project is not adversely impacting the environment. Measures have been proposed in **Section 10** and below to manage the health of the aquatic ecosystem.

Aquatic Ecology - Operation	
Environmental Objective	■ Minimise and mitigate as far as is practicable the adverse impacts on aquatic fauna and flora, both freshwater and estuarine, during operation of the project. ■ Where unavoidable impacts will occur, developed and implemented strategies to mitigate these impacts to an acceptable level. ■ Minimise the opportunity for aquatic weed growth and increases in abundance or diversity of any other pest species.
Performance Criteria	■ No discharge of materials, including sediment, within stormwater from operational areas. ■ No waste materials (general rubbish etc) entering waterways from operational areas; ■ A program in place to monitor and control aquatic weeds and other pest species on the recreational values and water quality of the dam.
Mitigation Measures	**Aquatic Biota** ■ Controlled gradual inundation toward the proposed FSL to ease the transition from a lotic to a bentic habitat; ■ Development of a program to identify and control declared and aggressive aquatic weeds, such as Salvina and Water Hyacinth, particularly in the upstream reaches where these are currently found only infrequently. ■ A program to identify operational activities that could aid in the management of habitat diversity.
Monitoring	**Aquatic Fauna** ■ A programme to monitor migratory species in the upstream reaches, including the Long-finned and Short-finned eels and the Ornate Rainbow Fish will be implemented as soon as practical ■ A program to monitor protected species will be developed and implemented as soon as practical. Should any such species be found, individual Species Management Plans will be developed; ■ An program to monitor levels of methyl mercury in recreationally significant fish within Hinze Dam for comparison against levels that are suitable for human consumption once the proposed FSL is operational, will be implemented annually until the impact has been ruled out by scientific research; ■ Monitoring of recreational fish catches to ensure appropriate stocking rates. **Aquatic Vegetation** ■ Develop a programme to assess and control the spread and distribution of aquatic weed growth within the new impoundment will be completed on a quarterly basis for a minimum two years following operation. **Auditing** ■ Regular auditing undertaken to ensure compliance with objectives of the EMP.
Reporting	■ Operator (GCW) to report to GCCC on dam operations as per Resource Operations Plan. ■ A report describing performance against the described measures and including results of monitoring will be submitted to the Proponent on an annual basis.
Responsibilities	Operator
Corrective Action / Contingency Plan	■ Additional investigations or monitoring where necessary after fish kills, aquatic vegetation die off, uncontrolled releases or spills to waterways to assess health of aquatic biota. ■ Implementation of measures to protect aquatic biota if impacts from operation are effecting the viability of the ecosystem.

Transport and Roads

The new operational regime is not expected to generate impacts post-construction that differ from the current status quo. Controls have been set in the EMP to ensure safe operation of roads, particularly during events where traffic flow is increased.

Transport and Roads - Operation	
Environmental Objective	Maintain the current level road safety and transport efficiency in the road network and intersections surrounding the Project area.
Performance Criteria	Manage traffic flows in order to achieve safe and efficient movement throughout the Project area, with a focus on access to the recreational facilities
Mitigation Measures	■ Prepare and implement local area traffic management measures where necessary in order to maintain the role and the function of the roads.

Transport and Roads - Operation	
Monitoring	■ Monitor local area traffic impacts during the peak periods (weekends and during the important competitions). ■ Regular auditing undertaken to ensure compliance with objectives of the EMP.
Reporting	Operator (GCW) to report to GCCC on dam operations as per Resource Operations Plan.
Responsibilities	Operator
Corrective Action / Contingency Plan	Plan and implement traffic control measures in advance of forecasted increased traffic events if required, such as major maintenance or recreational events on the dam.

Waste Minimisation and Management of Hazardous Substances

The operation of the dam will have considerably less waste emissions than during construction and will not differ significantly from waste produced during the current Stage 2 dam operations. There will be very minor impacts on the environment, consisting of the disposal of waste generated from maintenance activities, wastewater, recreation and office functions. There will be no storage of large quantities of hydrocarbons or other hazardous materials.

Waste Minimisation and Management of Hazardous Substances - Operation	
Environmental Objective	■ Minimisation of the production of waste and amount of waste requiring disposal. ■ Minimisation of the impact to the environment from waste. ■ Maximisation of the opportunities to reuse waste on-site. ■ Correct disposal of waste produced. ■ Management of the purchase, quantities, storage, use and disposal of hazardous materials any substances that may cause environmental harm at the site and. ■ Prevent spills from occurring at work sites. ■ Contain, clean up and, if necessary, remediate any spills that do occur.
Performance Criteria	■ Implementation of waste management principles (reduce, re-use recycle) and effective and sustainable disposal strategies. ■ Minimisation of the impacts of handling and disposal of operation waste. ■ Reduction of waste generated on site through re-use and recycling. ■ All waste disposed of lawfully. ■ Storage areas clean and tidy. ■ 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. ■ Requirements of the Flammable and Combustible Liquids Regulations and the relevant codes published by Australian Standards met. ■ 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. ■ Recording and reporting of incidents accurately and describing the extent of spill that occurred. ■ Correctly sized bunds intact and free from materials. ■ Water quality in the dam not impacted as a result of spills within the catchment.
Mitigation Measures	**Waste Minimisation** ■ Prepare and implement site-specific Waste Management Plan prior to re-commencement of the standard operation of the dam addressing issues such as location and methods of storage, transport and disposal. ■ All reasonable efforts made to avoid and minimise waste and to reuse or recycle where possible. ■ Purchase agreements to include the requirement for suppliers to take back packaging there practicable. ■ Implementation of training for employees in the waste management plan and recycling opportunities. ■ On-site waste management practices highlighted during employee inductions. **Disposal** ■ Waste minimisation encouraged and training provided in correct identification and disposal of waste. ■ Bins provided that are suitable for the type of waste that will be produced, of the correct size and strategically placed to receive the waste that will be disposed. ■ Disposal bin not overfilled and waste compacted as much as possible before disposal. ■ Waste bins on-site monitored and arrangement for their replacement to occur on a regular basis and/or when full. ■ Prevent animals from accessing the bins using specially designed lids and strategic placement where necessary.

Waste Minimisation and Management of Hazardous Substances - Operation	
	■ Housekeeping procedures, (including spillage control, litter pick up and tidying up of site areas) implemented to minimise the generation of waste. ■ All empty containers not suitable fro reuse to be rinsed and punctured prior to disposal and landfill. ■ All domestic and industrial waste generated at the construction site removed from the site and disposed of at the nearest licensed disposal facility, as required. ■ Wastewater treated through septic system as per site water quality regime. ■ Recycling bins for glass, plastic and metal transported to the local GCCC facility. ■ Dispose of waste that is unable to be reused or recycled in a certified land fill site. ■ Records maintained of any waste generated and removed from the premises. ■ Ensure the transport of regulated wastes and contaminated soils or other materials is conducted by licensed Contractors for disposal at licensed facilities, in accordance with legislative requirements. **Waste Transport** ■ Waste only removed from the premises and disposed of in a lawful manner in accordance with the requirements of the EPA and the GCCC. **Incidents** ■ Preparation of waste management procedures to deal with any potential incident during operation in which waste material with the potential to cause environmental harm is released to the environment. ■ In the event of an environmental incident, take such corrective or remedial action as is required to render the area safe and avoid or minimise environmental harm. **Hazardous Materials or Dangerous Goods** ■ Undertake storage and transport of materials according to relevant Australian Standards. ■ Ensure transport and storage of dangerous goods for construction purposes are in accordance with dangerous goods standards and guidelines. ■ Storage area for chemicals, fuels, lubricants, oils, wastes and hazardous materials covered and bunded/appropriately sized drip trays, have an impervious floor and appropriate signage to meet the requirements of AS1940 Storage and Handling of Flammable and Combustible Liquids. The location of these areas should not be in close proximity to drainage lines. ■ Containment areas to be set up so that spills can be recovered, and containment areas will be kept clean and free from other wastes. ■ Fire Fighting equipment to be checked and maintained at all times. ■ Containers clearly labelled. ■ Chemicals which may react with each other stored separately in clearly marked containers as per Australian Standards. ■ All fuel, lubricant and hydraulic fluid spills including drips cleaned up immediately. ■ Fuels and other flammable liquids store away from sources of ignition. ■ All waste fuels/oils/grease/chemicals stored in appropriate storage facilities and collected by licensed contractor for recycling, treatment or disposal. ■ Storage areas inspected regularly for any defects with bunding, floor, cover, structure, hoses, valves etc. ■ Operators of vehicles, boats and other equipment and machinery to regularly check equipment for evidence of leak and fitness of hydraulic hoses and seals, and conduct maintenance or repairs as necessary to prevent drips, leaks or likely equipment failures. ■ MSDS's readily available for all employees and contractors and personnel made aware of the environmental and safety requirements of these materials. ■ Maintenance of list by Site EHS Officer that gives full details of any hazardous materials, oils, chemicals and petroleum products used on site. ■ Emergency spill kits containing absorbent materials, neutralising chemicals and other spill containment equipment will be strategically located around the site and on board equipment and in vehicles for the types of spills likely to be encountered. ■ All personnel provided with Environmental Awareness training during induction sessions and taught spill control and containment procedures. ■ All plant operations and maintenance personnel instructed in the range of materials, methods of storage, location and the handling procedures in the event of spills, toxicity and fire control requirements. ■ Any visible or reasonably suspected fuel, lubricant or hydraulic fluid loss treated as an "incident" and handled accordingly. ■ Signs erected on roadways within the catchment stating that the route is within a drinking water catchment and that all spills are to be reported to the nearest emergency services, with contact details for emergency providers listed on the sign. ■ Prepare and implement spill response measures in accordance with the Emergency Management Response Plan in Section 19.2.
Monitoring	■ Regular inspection of on-site facilities to ensure waste is being generated, stored, handled, disposed and transported in accordance with this EMP. ■ Registers and manifests maintained of hazardous substances and regulated waste. This documentation is subject to internal or external audit, especially for any regulated waste material.

Waste Minimisation and Management of Hazardous Substances - Operation	
	■ Records kept of any regulated waste removed from the site, including name and licence number of waste transporter, volume and description of waste transported, destination of waste and licence number of the waste treatment operator. ■ Waste contractors to provide certification (licence) records verifying their registrations and points of discharge of waste. ■ 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 (GCW) to report to GCCC on dam operations as per Resource Operations Plan.
Responsibilities	Operator
Corrective Action / Contingency Plan	Ensure that the construction personnel are reminded of the requirements regarding waste and shall endeavour to ensure that the situation is improved by the allocation of staff and other resources to rectify any non-conformance.

Socio-Economic

The operation of the dam will allow the reestablishment of recreational activities and business possibilities. **Section 16** discussed the socio-economic implications during operation phase. The management of those is outlined below.

Socio-Economic - Operation	
Environmental Objective	Maximise business activity and amenity values once dam site is reopened (revenues and recreational amenity may take a while to return to per-upgrade levels due to reduced visitor numbers immediately after site reopens).
Performance Criteria	Visitor numbers approaching and exceeding pre-construction numbers.
Mitigation Measures	■ Effective promotion, PR and advertising towards the end of the construction period indicating when it will be reopened to the public and what new facilities will be available. ■ Develop an information and interpretive centre as part of new facility development to enhance recreational access and values at Hinze Dam.
Monitoring	**Visitor numbers** ■ Capture and record total visitation and amend marketing strategy as required to facilitate use of site and new facilities. **Auditing** ■ Regular auditing undertaken to ensure compliance with objectives of the EMP.
Reporting	Operator (GCW) to report to GCCC on dam operations as per Resource Operations Plan.
Responsibility	Operator
Contingency Plan / Corrective Action	■ Implement improved communication with public if deemed necessary. ■ Investigate encouragement of business opportunities or public awareness of recreational capacity of dam if deemed necessary.

Visual Amenity

The completion of the construction works establishes the visual appearance of the infrastructure elements of the dam. The rehabilitation works undertaken in the disturbed areas of the site will undergo a change process providing a change to the visual landscape as the vegetation establishes. The visual landscape is addressed in **Section 18** with the implications on the visual amenity of the area during operation phase outlined below.

Visual Amenity - Operation	
Environmental Objective	Ensure that site rehabilitation works are undertaken and landscaping completed to assist in the restoration of the visual environment of the dam and its surrounds
Performance	■ Disturbed areas are rehabilitated with native endemic vegetation.

Criteria	■ Recreation facilities are established and completed prior to opening of the site for public access and use. ■ Areas cleared around the full supply level of the dam are maintained clear of dying vegetation.
Mitigation Measures	■ Waste generated during operation is collected and stored neatly on-site and removed as soon as possible. ■ Rehabilitation of the quarry and clay borrow area should be completed as site works are completed. Rehabilitation should incorporate a selection of indigenous and fast growing plant species that are endemic to the site. ■ Location night lights as required for safety and security, but ensure lights are focussed on the areas required, with shields around the globes to limit extraneous light where necessary. Lighting of the site to conform with the following Australian standards: ■ AS1158 – Road lighting; and ■ AS 4282 – Control of the obtrusive effects of outdoor lighting
Monitoring	■ The regeneration and revegetation areas regularly inspected by the Revegetation Team as detailed in the Rehabilitation Management EMP. ■ Inspections carried out to assess the health of the seedlings (growth rates, foliage status and survival rates) within revegetation areas to ensure that maintenance of planted individuals has occurred. Within both regeneration and revegetation areas, weed abundance, chemical usage, any significant problems and status of protective fences to be monitored. ■ The Revegetation Team report to site management within a fortnight from each inspection period. ■ Two years after regeneration works/planting, site management will determine if the stated objectives of this management plan have been achieved. If not, a report will need to be prepared by site management identifying the works and the time frames required to ensure that the regeneration and revegetation plan meets the stated objectives and that, most importantly, a self sustaining population is established within revegetation areas. ■ Undertake waste management in accordance with the Waste Minimisation and Management of Hazardous Substances EMP. ■ Regular auditing undertaken to ensure compliance with objectives of the EMP.
Reporting	Operator (GCW) to report to GCCC on dam operations as per Resource Operations Plan.
Responsibility	Operator
Contingency Plan / Corrective Action	■ Implement contingencies where propagation or plantings are failing.

19.2 Emergency Response Plan

19.2.1 Purpose

The purpose of this document is to provide an explanation of the Hinze Dam Alliance Emergency Response Plan.

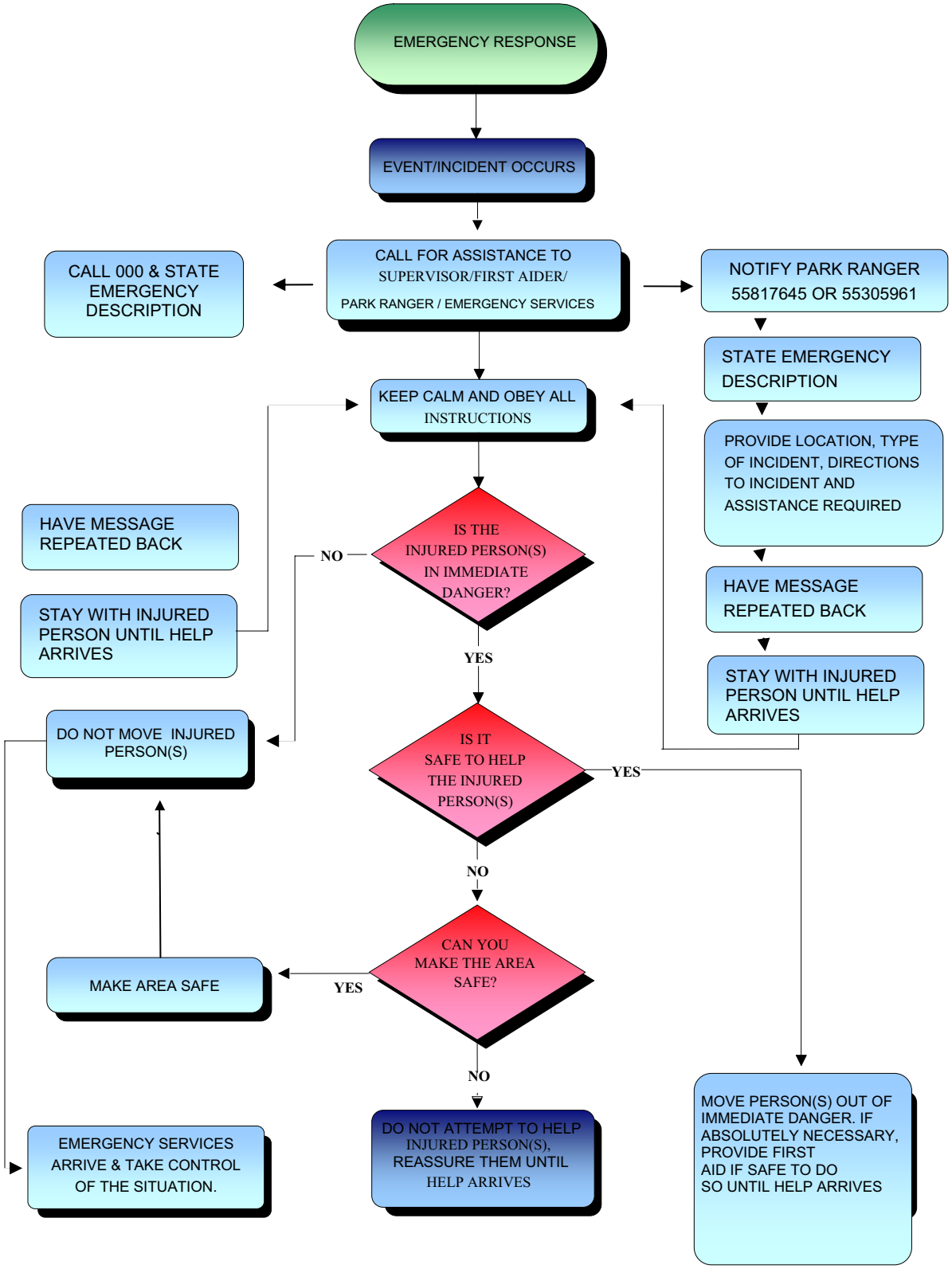
19.2.2 Definitions

Emergency	Any abnormal and dangerous and/or environmentally threatening situation needing prompt action to control, correct and return to a safe condition. Types of Emergencies include: ■ Personal Injury ■ Fire ■ Security ■ Explosion ■ Fuel, Oil & Chemical spills ■ Gas leak (toxic or flammable) ■ Natural events ■ Impact events Significant discharge/spillage (eg silt & sediment discharges running offsite during storms)
Warden / Co-ordinator	A person who is responsible for the management of an emergency situation under control.

19.2.3 Injury Response

Figure 19-4 shows a flowchart of the emergency response to an incident where an injury has occur

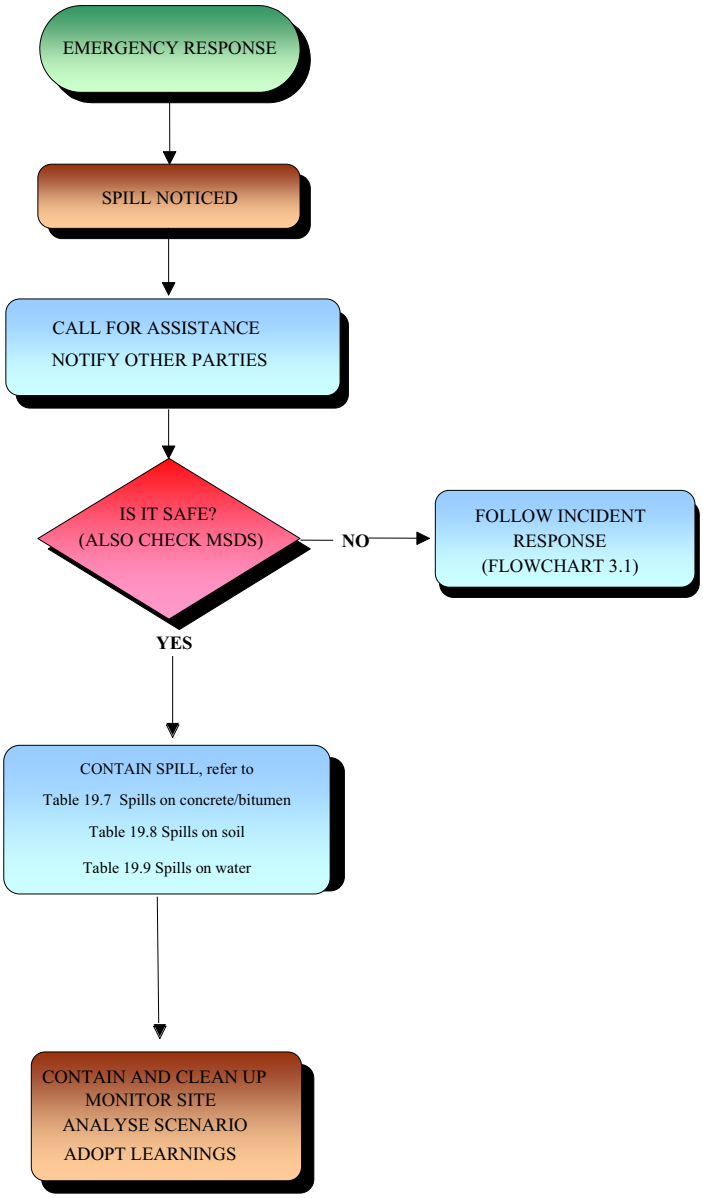
- **Figure 19-4 Emergency Response**



19.2.4 Spill Response

Figure 19-5 shows a flowchart of the emergency response to an incident where a spill has occurred.

- **Figure 19-5 Emergency Spill Response**



Note: All incidents must be reported to all Alliance partners within 2 hours.

Spill Response Procedures

Table 19-7, **Table 19-8**, and **Table 19-9** outline the emergency response to an incident where a spill has occurred on concrete/bitumen, on soils, and in water respectively.

Table 19-7 Spill Response Procedure for Spills on Concrete/Bitumen

#	Action	Description
1	Notice spill	
2	Notify Personnel	Person who noticed spill to inform supervisor. Person who noticed spill to advise staff in area and request assistance if necessary. Supervisor to notify Construction Manager and Environmental Adviser.
3	Trace source of spill	Find source of leak or spill. Check if spill is still occurring.
4	Stop discharge	If safe stop leak/spill (by closing valve, plugging leak). If not safe, do not attempt to stop leak. If necessary and available in spill kit, seal non-pressurised leaks with premix putty.
5	Assess risk	If spill contains liquid fuel, Supervisor to: Terminate all equipment and sources of heat or ignition in the area. Assess the risk to personnel and evacuate area if necessary. If workplace personnel cannot safely clean up spill, contact emergency services (000) and follow their instructions. Proceed with remaining actions as safe or as instructed by emergency services. If spill does not contain liquid fuel, Supervisor to: If spill is greater than 500 L, contact State pollution hotline (1300 130 372) or emergency services (000) and proceed with remaining actions as safe or as instructed by authorities. If spill is less than 500 L and can be safely managed by workplace personnel, proceed with remaining actions.
6	Contain spill	Do not spread or dilute spills with degreasers, detergents or water. Put on appropriate personnel protective equipment. If necessary, Construction Manager to request additional spill response equipment. Position absorbent material or other spill control equipment to restrict movement of spilled material.
7	Restore site to original condition	Clean spill site with absorbent material eg. Mop, pads, pillows. Dispose used absorbents to oily waste bins. Wash down non-disposable equipment in vehicle wash down area.
8	Replace used equipment	Supervisor to replace spill kit or other equipment used.
9	Post spill monitoring	Construction Manager to insect spill site and ensure is satisfactory. Supervisor to monitor source or activity that caused leak and equipment or process to prevent future occurrence of leak.

Table 19-8 Spill Response Procedure for Spills on Soils

#	Action	Description
1	Notice spill	
2	Notify Personnel	Person who noticed spill to inform supervisor Person who noticed spill to advise staff in area and request assistance if necessary. Supervisor to notify Construction Manager, Environmental Adviser, Senior Gold Coast Ranger (04XX XXX XXX) and Gold Coast Water (5582 8003)
3	Trace source of spill	Find source of leak or spill. Check if spill is still occurring.
4	Stop discharge	If safe stop leak/spill (by closing valve, plugging leak). If not safe, do not attempt to stop leak. If necessary and available in spill kit, seal non-pressurised leaks with premix putty.
5	Assess risk	If spill contains liquid fuel, Supervisor to: Terminate all equipment and sources of heat or ignition in the area. Assess the risk to personnel and evacuate area if necessary. If workplace personnel cannot safely clean up spill, contact emergency services and follow their instructions. Proceed with remaining actions as safe or as instructed by emergency services. If spill does not contain liquid fuel, Supervisor to: If spill is greater than 500 L, contact State pollution hotline (1300 130 372) or emergency services (000) and proceed with remaining actions as safe or as instructed by authorities. If spill is less than 500 L and can be safely managed by workplace personnel, proceed with remaining actions.
6	Contain spill	Do not spread or dilute spills with degreasers, detergents or water. Put on appropriate personnel protective equipment. If necessary, Construction Manager to request additional spill response equipment. Position absorbent material or other spill control equipment to restrict movement of spilled material.
7	Restore site to Original condition	If spill less than 100 L: Clean spill site with absorbent material eg. Mop, pad, pillows. Dispose used absorbents to oily waste bins. Remove contaminated soil together with any oily sludge and dispose to oily waste bin. Wash down non-disposable equipment in vehicle wash down area. If spill greater than 100 L, Construction manager to determine whether workplace personnel can manage spill: If it is deemed workplace personnel can manage spill, follow instructions above for spill less than 100 L. If additional assistance is required, engage the services of a contaminated land specialist following the Construction Manager's approval.
8	Replace used equipment	Supervisor to replace spill kit or other equipment used.
9	Post spill monitoring	Construction Manager to inspect spill site and ensure cleanup is satisfactory. Construction Manager to initiate post cleanup monitoring as directed by contaminated land specialist. Supervisor to monitor source or activity that caused leak to improve equipment or process to prevent future occurrence of leak.

Table 19-9 Spill Response Procedure for Spills in Water

#	Action	Description
1	Notice spill	
2	Notify Personnel	Person who noticed spill to inform supervisor. Person who noticed spill to advise staff in area and request assistance if necessary. Supervisor to notify Construction Manager, Environmental Adviser, Senior Gold Coast Ranger (04XX XXX XXX) and Gold Coast Water (5582 8003)
3	Trace source of spill	Find source of leak or spill. Check if spill is still occurring.
4	Stop discharge	If safe stop leak/spill (by closing valve, plugging leak). If not safe, do not attempt to stop leak. If necessary and available in spill kit, seal non-pressurised leaks with premix putty.
5	Assess risk	If spill contains liquid fuel, Supervisor to: Terminate all equipment and sources of heat or ignition in the area. Assess the risk to personnel and evacuate area if necessary. If workplace personnel cannot safely clean up spill, contact emergency services and follow their instructions. Proceed with remaining actions as safe or as instructed by emergency services. If spill does not contain liquid fuel, Supervisor to: If spill is greater than 25 L, contact State pollution hotline (1300 130 372) or emergency services and proceed with remaining actions as safe or as instructed by authorities. If spill is less than 25 L and can be safely managed by workplace personnel, proceed with remaining actions.
6	Contain spill	Do not spread or dilute spills with degreasers, detergents or water. Put on appropriate personnel protective equipment. If necessary, Construction Manager to request additional spill response equipment. Position spill control equipment/absorbent material eg. Roll, boom or as a last resort, soil to contain or divert flow from entering water body.
7	Restore site to Original condition	Use absorbent boom or other apparatus to remove diesel floating on water. Use absorbent material eg. Mop, pillows to clean diesel from banks of water body. Dispose used absorbents to oily waste bins. If contaminated soil involved (eg. Sides of bank), remove and dispose to oily waste bin. Wash down non-disposable equipment in vehicle wash down area.
8	Replace used equipment	Supervisor to replace spill kit or other equipment used.
9	Post spill monitoring	Construction Manager to inspect spill site and ensure cleanup is satisfactory. Construction Manager to initiate post cleanup monitoring as directed by contaminated land specialist. Supervisor to monitor source or activity that caused leak to improve equipment or process to prevent future occurrence of leak.

19.2.5 Procedural Text

In the Event of an Incident

Follow **Figure 19-4** and **Figure 19-5**.

Immediate Reaction

1) **IMMEDIATELY** call for assistance, giving nature and location of incident.
2) **REMAIN CALM** and assess the situation. **DO NOT PLACE YOURSELF IN DANGER**.
3) **PROVIDE FIRST AID** (incident) or **CONTAINMENT** (spill) if required and/or report requirements using the two-way radio.

Emergency Communication

1) Notify Site Works Supervisor or Senior Ranger of emergency.
2) State nature of emergency.
3) Give location of incident, type of incident, number of injured, directions to incident and assistance required
4) Have message repeated back to you.
5) Stay with injured person until help arrives. Stay by phone if you are not required at the incident.

Call Taker

1) Advise all personnel that incident is under the control of the Call Taker
2) Follow Attachment A "Emergency Procedure Checklist" (located at Office) and obtain all required information
3) Immediately telephone emergency services as required. Use "Emergency Contact Numbers" attached as Appendix B
4) Contact Alliance Manager to make him aware of the emergency.
5) Provide "Site Plans" to emergency services as required

Site Works Supervisor

The Site Works Supervisor is responsible for controlling the emergency situation, including organising passage of emergency service vehicles to the incident, traffic management and allocation of specific responsibilities as required.

Personnel

All personnel are responsible for assisting with the emergency response where instructed and keeping out of the path of emergency vehicles attending the incident.

External Emergency Services

External emergency services are permitted to enter site without complying with the mandatory PPE requirements i.e. hard & glasses etc, and are not required to display an amber flashing light.

Emergency services shall be met at the main entrance to site by a Project representative.

External emergency services shall be escorted at all times to ensure known hazards and risks are identified.

Evacuation Procedure

The site works Supervisor on site is responsible for managing the evacuation. In the event that the site has to be evacuated, the following procedure will be followed:

1) Raise alarm using phone call and evacuation siren/alarm.
2) Proceed to site Muster point in an orderly manner.
3) Personnel wait at the Muster point with their workgroups. No-one is to leave site. First Aid personnel report to the Muster point.
4) The site entrances will be controlled to prevent entry to site
5) The Supervisor or delegate will account for all personnel using Start Cards and/or timesheets.

Post Emergency

The Emergency Situation is to be maintained until instruction is given by Emergency Services on site that the emergency situation is over. After the emergency has ceased, the site works supervisor is to announce that the emergency has ended and activities can continue.

Any further notification required to regulatory authorities will be carried out as soon as practicable after the emergency situation is over. The Alliance Manager is responsible for notification of the incident to GCCC/SKM/URS representatives.

An incident investigation, incident notification, recording, investigation and reporting, shall be carried out as soon as practicable after the Emergency.

It is important that the incident area is not disturbed before the investigation is completed. The Alliance Manager will authorise when the investigation of the incident area is complete.

19.2.6 Emergency Response Planning

Emergency Preparedness Plans (EPP) will be developed prior to construction to cover other specific construction risks not covered in the DSFEP and will be incorporated into the Emergency Response System. The EPP will include:

- Surveillance requirements during construction of existing and new instrumentation;
- Emergency response plans to be activated in the event of one of the issues detailed below occurring including minimum requirements for emergency stockpiles of embankment materials and resources to be available.

The following is a general list of the issues that will be covered in the EPP as a minimum:

- earthquake;
- flooding;
- instability of the embankment evident by cracking and deformation;
- instability of the right abutment evident by cracking and deformation;
- excessive seepage observed from the right abutment;
- excessive seepage observed embankment adjacent to the outlet conduit;
- unexpected loss of bentonite slurry during construction of the cut-off wall;
- unexpected cracking, deformation or instability of the spillway;
- unexpected seepage into the gallery following drilling; and
- vandalism and sabotage.

While the risk of such events occurring during the short construction period will be low, an appropriate response plan needs to be in place prior to construction commencing, to cater for such an occurrence.