

Appendix H Marine Supply Base Construction Environment Management Plan

H



MACMAHON

Project Construction Environmental Management Plan

Darwin Marine Supply Base

Client Contract No.:

Macmahon Project No.:

Macmahon Business Unit: Construction

Macmahon Division: NT

Quality Information

The latest version of this plan will be available on the Macmahon Document Library for all Project personnel. Distribution of the plan will be by 'hard copy' or electronically using document control software process. Superseded copies of the document should either be destroyed or marked as superseded.

When amendments occur, the entire document and its appendices will be reissued with a corresponding revision number. Document annexures may be treated separately although these would require individual document control. The Document History Table should be completed electronically.

Document History Table

Date	Revision Details	Typist	Reviewer	Approver	Client Approval

© Macmahon 2011. The information contained in this document produced by Macmahon is solely for the use by Macmahon and approved contractors for the purpose for which it has been prepared and Macmahon undertakes no duty to or accepts any responsibility to any third party who may rely upon this document. All rights reserved. No section or element of this document may be removed from this document, reproduced, electronically stored or transmitted in any form without the written permission of Macmahon.

Table of Contents

1	INTRODUCTION	6
1.1	Background	6
1.2	Project Construction Environmental Management Plan	6
1.3	Purpose of the Project Construction Environmental Management Plan	7
1.4	Environmental Objectives and Targets	7
1.5	Scope of the PCEMP	7
1.6	Environmental Management System (EMS)	7
1.7	PCEMP Relationship with other Plans and Structure	8
2	PROJECT DETAILS	9
2.1	Location of the Project	9
2.2	Scope of Work	9
2.3	Work Times	9
3	PLANNING	10
3.1	Legal and Other Requirements	10
3.2	Approvals, Permits, Licences	10
3.3	Environmental Due Diligence	10
4	IMPLEMENTATION OF THE PCEMP	11
4.1	Leadership	11
4.2	Structure and Responsibility	11
4.3	Project Team Structure and Responsibilities	11
4.4	Resources	14
5	ENVIRONMENTAL ASPECTS AND IMPACTS	16
5.1	Risk Assessment	16
6	ENVIRONMENTAL MANAGEMENT FRAMEWORK	17
6.1	Environmental Impacts and Control Measures	17
6.2	Environmental Management Sub-Plans	17
6.3	Job Safety and Environmental Analysis	18
6.4	Work Method Statements / Work Instructions	18
6.5	Environmental Procedures and Guidelines	18
7	TRAINING, AWARENESS AND COMPETENCE	19
7.1	Approach to Environmental Training, Awareness and Competence	19
7.2	Environmental Inductions	19
7.3	Environmental Awareness Training	20
7.4	Task-Specific Training	20
8	COMMUNICATION	21
8.1	Community and Stakeholder Management	21
9	DOCUMENT AND RECORDS MANAGEMENT	22
9.1	Correspondence & Filing	22

9.2	Controlled Documents	22
9.3	Superseded Documents	22
9.4	Archiving of Records	22
10	EMERGENCY PREPAREDNESS AND RESPONSE	23
11	CHECKING & CORRECTIVE ACTION	24
11.1	Monitoring	24
11.2	Measurement	24
11.3	Non-conformance, Corrective & Preventative Action	24
11.4	Complaints	25
11.5	Environmental Incident Reporting	25
11.6	Reporting and Notification	26
11.7	Internal Audits	26
11.8	External Audits and Inspections	26
12	PROCUREMENT AND SUBCONTRACT MANAGEMENT	28
12.1	Procurement	28
12.2	Management of Subcontractors	28
12.3	Plant and Equipment	29
13	REVIEW & IMPROVEMENT	30
13.1	Toolbox Meetings	30
13.2	Customer Satisfaction	30
13.3	Group Management System Review	30
13.4	Project Construction Environmental Management Plan Review	30
14	REFERENCES	32

APPENDICES

- Appendix 1 - Macmahon Environmental Policy
- Appendix 2 - Summary of Legal and Other Requirements
- Appendix 3 - PCEMP Sub-Plans

ACRONYMS

AHD	Australian Height Datum
ANZECC	Australian and New Zealand Environment and Conservation Council
PCEMP	Project Construction Environmental Management Plan
EMP	Environmental Management Plan
EMS	Environmental Management System
ESD	Ecologically Sustainable Development
EWI	Environmental Work Instructions
IFC	Issued For Construction (Construction Drawings)
KPI	Key Performance Indicator
MDL	Macmahon Document Library
MSDS	Material Safety Data Sheet
QA	Quality Assurance
SA	Standards Australia
WI	Work Instruction
WMS	Work Method Statement

1 INTRODUCTION

1.1 Background

The Northern Territory Government (Territory) has decided to establish a master planned international standard Marine Supply Base (MSB) in Darwin of up to 6 berths.

This project will involve the construction of Stage 1 which will include the construction of a minimum of 3 berths and services that will support the full range of marine supply and service capabilities required by the Offshore Industry, during the exploration, construction and operational phases of projects conducted by proponents in the Offshore Industry.

The Darwin MSB is to be of an international standard and capable of supporting the Offshore Industry in the region surrounding Darwin, in locations ranging from the Browse Basin to Papua New Guinea.

The Darwin MSB will be a focal point for businesses supporting the Offshore Industry.

Macmahon will be acting as the Design and Construct (D&C) Contractor for the ShoreASCO – SPV consortium (Developer) who will be operate the MSB following the construction of the MSB.

The Darwin MSB requires a formal environmental impact study (**EIS**) under the Territory's *Environmental Assessment Act* (NT), and the Commonwealth's *Environmental Protection and Biodiversity Conservation Act* (Cwlth) (**EPBC Act**). The Territory and the Commonwealth have a bilateral agreement for the management of an environmental assessment where there is a requirement for formal assessment under each Government's respective environmental legislation. This agreement allows an environmental assessment undertaken by the Territory to fulfil the requirements of the EPBC Act. Under the bilateral agreement the Territory's Minister for the Environment provides a copy of the assessment report to the responsible Territory Minister, and a copy to the Commonwealth Minister for Sustainability, Environment, Water, Population and Communities. The latter uses the Territory's assessment report in finalising his/her determination.

The Territory has commenced work on and will be responsible for the finalisation of this formal environmental assessment process prior to financial close. This will include archaeological and heritage assessments. Any obligations or commitments that flow from this process will be incorporated by the Territory into the contractual arrangements for the Project.

The Territory provided the first draft of the EIS for the Project in May 2011 as an addendum to the RFP.

Following completion of the negotiations with the Developer, the Territory will co-ordinate the transfer of any relevant environmental approvals the result of the EIS to the Developer at financial close as required by the DMSBP Development Agreement. After the transfer of the relevant environmental approvals to the Developer, any attached obligations and responsibilities regarding the environmental approvals will be the obligations and responsibilities of the Developer. The Developer shall be expected to comply with all the requirements of the EIS.

1.2 Project Construction Environmental Management Plan

This Project Construction Environmental Management Plan (PCEMP) for the Darwin Marine Supply Base (the Project) provides a system and procedures in a suitable framework to ensure the establishment and maintenance of best practice controls to manage potential environmental impacts associated with project activities in accordance with contract requirements, relevant legislation and project objectives.

Macmahon is committed to providing the services it offers in a manner that conforms to the contractual requirements and to all relevant regulatory and legislative requirements. To achieve this Macmahon's integrated management system will facilitate the management of the environmental aspects of the Project.

Macmahon will ensure that controls are properly implemented and regularly monitored and audited to assess their effectiveness. Changes to the controls will be instigated if they are not achieving their objectives.

1.3 Purpose of the Project Construction Environmental Management Plan

The primary purpose of the PCEMP is to provide an easily interpreted reference document that ensures that the project environmental commitments, safeguards and mitigation measures are being implemented, monitored, audited and improved. To achieve the purpose of the PCEMP will:

- specify all potential environmental impacts and issues associated with the construction of the project;
- establish and implement environmental mitigation measures to minimise the potential impacts together with relevant monitoring and reporting procedures associated with the construction phase of the project;
- provide a consistent and uniform approach that assures the required standards and environmental protection are attained and maintained for the operation project works; and
- specify regulatory compliance requirements relevant to this the project.

The purpose is also to document the hazard and risk identification and management process for the construction techniques to be adopted by Macmahon, and to document the systematic process of implementing controls to minimise the impacts of Macmahon's construction methods on the environment.

1.4 Environmental Objectives and Targets

The objectives of Macmahon encompass compliance with legislation and other requirements including minimising pollution and waste generation and minimising environmental impacts. The following objectives and key performance targets have been established for the Project (as described in the Contract):

- compliance with approval, consent and licence conditions (KPI 100%);
- compliance with PCEMP (KPI 100%);
- water pollution incident ie. dirty/untreated water, spill, rock, debris) (KPI <0);
- environmental incidents that are notifiable to the Regulator (KPI <0);
- environmental incidents are reported and investigated (KPI 100%); and
- site inspections (KPI daily informal inspections >1 formal documented inspection per week).

1.5 Scope of the PCEMP

This PCEMP has been prepared in accordance with contract documentation and relevant legal and other requirements as well as the relevant provisions of Macmahon's Environmental Management System which is accredited to AS/NZS ISO 14001.

In particular this PCEMP has been based on the project contract documents including the associated review of environmental factors reports which set the overall environmental management objectives behind the design, construction and maintenance of the project. Specifically, the key documents which relate to the PCEMP include:

- The East Arm Wharf Expansion Project Draft EIS prepared by the Territory.

1.6 Environmental Management System (EMS)

The Macmahon Environmental Management System (EMS) is certified by NCS International as complying with the requirements of AS/NZS ISO 14001:2004 for Construction projects and operations. A central document is the **Environmental Management Manual (G-097)** which

provides an overview document of the EMS and describes the application and key features of the management system including commitment, objectives and procedures to achieve compliance with its obligations and performance.

The environmental policy has been formally approved by the Macmahon Chief Executive Officer and forms a basis for environmental management across the company. The policy commits to establishing and maintaining an EMS that meets the requirements of ISO 14001 Environmental Management Systems and is included in **Appendix 1 - Environmental Policy**.

The EMS provides framework for environmental management including the provision for the development of Project specific environmental management including Environmental Management Plans and Project-Specific Procedures. ISO 14001 details an environmental management methodology based around planning, undertaking and checking works and acting on the relevant outcomes.

1.7 PCEMP Relationship with other Plans and Structure

This Plan incorporates contract and statutory requirements as well as applicable elements of AS/NZS ISO 14001:2004. The plans used on this project include the following:

- Safety Management Plan
- Traffic Management Plan
- Quality Management Plan
- Employee Relationship Management Plan
- Stakeholder Management Plan
- Local Industry Participation Plan
- Dredging Management Plan
- Construction Business Unit Serious Incident Management Plan
- Macmahon Emergency Crisis Management Plan

The PCEMP includes environmental sub-plans in **Appendix 3** which take into account environmental actions and measures identified in environmental reports and contract documentation specific to construction activities.

2 PROJECT DETAILS

2.1 Location of the Project

Darwin Marine Supply Base, East Arm Wharf, NT.

2.2 Scope of Work

The full scope of work can only be determined by reference to all contractual documentation, including Specification and Drawings. In broad terms, the Work under the Contract comprises the following activities, as detailed in the Drawings and Specifications:

- Provision of traffic management measures to control the impact of the construction works;
- Implementation of environmental management measure to control the impact of the construction works;
- Dredging;
- Bulk Earthworks;
- Wharf Construction – Piling, Structural Steelwork and Reinforced Concrete Works;
- Ground Improvements;
- Pavement Construction including Bituminous Surfacing;
- Building & Miscellaneous Structures Construction;
- Service Installations – HV & LV Power, Street & Flood Lighting, Communications, Potable & Fire Water, Fuel Line and Mud Plant Ducts;
- Security/CCTV System;
- Drainage Works;
- Fencing;
- Landscaping

2.3 Work Times

The main construction works will commence in December 2011 and the project will be completed in September 2011.

Typical working hours will be:

- Normal Construction: Monday to Saturday between 0630hrs and 1830hrs; No work on Sundays or Public Holidays;
- Dredging Works: 24 hour operation and 7 days per week including Public Holidays.

However, Macmahon reserve the right to work outside of the above hours and days for any of the construction activities where required to suit programme or subcontractor availability or preferred roster.

3 PLANNING

3.1 Legal and Other Requirements

Compliance with legal obligations is an integral component to successfully manage environmental issues. The Macmahon procedure **G-395 Legal and Other Requirements** describes how relevant legislation is identified, accessed and controlled.

A register of legislative requirements, policies, guidelines and standards relevant to the Project is provided in **Appendix 2**. The register provides key requirements of relevant legislation and regulation, relevance to the project and mechanisms for compliance. The register will be reviewed and updated annually by the PEMR, using the Lawlex proprietary legal database. This database is a continually updated register of legislation, regulations and planning requirements. Macmahon uses the database to ensure awareness of changes in legal requirements.

The Project Manager or delegate shall monitor changes in legislation by using the Macmahon subscription to Lawlex available to all personnel on the company's intranet as well as ensuring access to industry and government communication channels such as internet, newsletters, legal advisers etc.

Changes may occur to some existing legislation prior to completion of the Project. If this occurs it will be necessary for the PCEMP to be reviewed and amended as appropriate. The project PEMR is responsible for collecting and disseminating information on legislative changes, codes of practice and environmental best practice initiatives, as applicable to the project, through maintaining contacts with information sources from such organisations as local Councils, State and Federal governments, construction related industry bodies. Information will be communicated through project meetings and submissions to the Project Manager for action.

3.2 Approvals, Permits, Licences

A number of approvals, permits and licences are required for the Project. Licences and approvals required for the Project are described in the **Appendix 2**. The PEMR is responsible for the maintenance of this register, renewal and surrendering of licences and permits where relevant. Status of approvals, permits and licences, and compliance with each condition, will be monitored on a monthly basis and results included in monthly reports.

Some licenses or permits may not be required depending on activities undertaken and the construction methodology. Should particular approvals/licenses/permits be required, sufficient time should be allowed for the obtaining of licences and permits prior to undertaking works.

3.3 Environmental Due Diligence

Environmental due diligence is the systematic identification of the environmental risks and liabilities associated with an organisation's sites and operations. The principles of environmental due diligence are to be applied throughout Project and the preparation of all relevant construction documents.

4 IMPLEMENTATION OF THE PCEMP

Construction activities will be implemented in a manner that achieves a result consistent with legislative and approval requirements as well as client requirements for reliability, safety and protection of the environment.

4.1 Leadership

Management and supervisory personnel lead environmental management by example, through provision of suitable resources to implement and monitor environmental measures, identification and correction of any non-conforming conditions or behaviours, and active promotion of environmental awareness and individual environmental responsibility.

4.2 Structure and Responsibility

Macmahon operates from its head office located in Perth, Western Australia. The company is divided into three Business Units: Construction, Mining and Support Services. Within the Construction Business Unit the Quality and Environmental Manager has overall responsibility for quality and environmental functions of Business Unit, is independent of the projects and reports to the Executive General Manager - Construction. The Executive General Managers (Construction, Mining and Support Services) report to the Chief Executive Officer of Macmahon Holdings Limited.

The Construction Business Unit has established Divisions generally based on state boundaries. The NT Division is managed by the General Manager. The General Manager reports to the Executive General Manager Construction and is supported by a Construction Manager as shown on the Division Organisation Chart. At Business Unit level, the Construction Business Unit General Manager Quality & Environment has overall responsibility for quality and environmental functions, is independent of the projects and reports to the Executive General HSEQ.

The responsibility and authority pertaining to environmental performance of key Macmahon personnel, environmental specialists and sub-contractors is described below. These responsibilities are categorised in relation to relevant positions and will be issued as part of the site induction.

At operational level, the assigned Project Environmental Management Representative (PEMR) who has a line responsibility to the Project Manager and a reporting function to the Quality and Environmental Manager - Construction.

4.3 Project Team Structure and Responsibilities

Resources for this project have been identified by the Project Manager and detailed in the Project Organisation Chart. The responsibilities and authorities of Macmahon personnel are defined in position descriptions. The specific responsibilities of staff in relation to Environmental matters are detailed below:

4.3.1 Project Manager

The Project Manager has overall authority in the determination of all matters affecting the implementation and operation of environmental practices on the project. The Project Manager reports to the NT Construction Manager, and is responsible for:

- identifying resources and equipment for environmental purposes;
- ensuring training is provided to improve awareness of environmental issues and responsibilities;
- review of the project risk register, on a quarterly basis, with other members of the project senior management team, the superintendent, senior engineer(s) and safety advisor;
- incorporating environmental management aspects in project planning;

- has the authority to shut down site activities or implement control measures as required in the event of environmental emergency;
- is available as an emergency contact 24 hours a day;
- ensures that any work outside normal hours is approved, and community consultation undertaken;
- controlling further construction activities until environmental deficiencies are rectified;
- participates as head of the project's senior management team in the quarterly risk review of the site risk register, including environmental risks and emergency response requirements;
- ensuring project operations are performed in accordance with legal and other requirements;
- approving for implementation, process procedures developed by project engineers, which include information, instructions and controls for environmental aspects and risks, related to activities managed by Macmahon and carried out by staff and subcontractors;
- identifying resources and equipment for environmental purposes;
- ensuring training is provided to improve awareness of environmental issues and responsibilities;
- incorporating environmental management aspects in project planning;
- ensuring project operations are performed in accordance with legal and other requirements; and
- reviewing the effectiveness of the system for continual improvement.

4.3.2 Quality & Environmental Manager / Coordinator

The Business Unit Quality & Environment Manager / Coordinator (QEM / QEC) is responsible for:

- developing procedures specific to address applicable legal and other requirements;
- providing advice for project training and awareness programs;
- informing Office Managers, Project Managers and Project Environmental Management Representatives of any changes to legal and other requirements
- auditing the Quality and Environment Systems; and
- providing support to the PEMR for the duration of the project.

4.3.3 Project Environmental Management Representative (PEMR)

The PEMR has a functional reporting link to the Quality & Environmental Manager and is responsible for the following:

- monitoring and reporting on environmental system performance;
- ensuring data collected/reported and associated records maintained (e.g. delivery/waste dockets) to meet the requirements of the greenhouse challenge plus program;
- consulting with the project manager on environmental matters;
- assisting with site inspections and audits;
- liaising with employees on environmental matters;
- facilitate the implementation of environmental improvements and initiatives where practicable;
- ensuring the PCEMP and associated plans are implemented to meet the requirements for the project;
- assigning project staff to perform verification duties;
- ensuring non-conformances and environmental incidents are identified, reported and suitable corrective actions are determined and completed;
- reviewing inspection reports and ensuring any actions required are executed;

- ensuring subcontractors fulfil their environmental obligations;
- attending meetings to discuss environmental issues;
- holding specific authority to stop work on any activity where PEMR deems it necessary to prevent environmental non-conformances;
- gathering, analysing and disseminating information on environmental legislation and other requirements relevant to the project;
- assisting with the updating of project plans; and
- liaising with environmental client representatives, government authorities and community groups.

4.3.4 Supervisors

Fundamental checking by site supervisory staff and subcontractors will also be a feature of the management system. Placing responsibility for the achievement of company objectives at the workplace will lead to greater accountability at this level. Supervisors are responsible for:

- implement the PCEMP on the project site including the relevant control measures as outlined in the environmental management Sub-Plans;
- utilise appropriate resources for the implementation of the environmental management sub-plans;
- complete daily “prestart” checks of specific works areas including plant, fuelling, servicing, dust and noise. Daily inspections shall be documented in the relevant supervisors daily diaries;
- identify areas of non-conformance with PCEMP requirements;
- report to the immediate manager on environmental issues, breaches;
- ensure that site personnel and contractors are aware of their environmental obligations, are implementing environmental controls on site as directed and described in contractual documents and procedures issued to them in advance. This includes the requirement to have washed down all equipment prior to arrival on site to remove any existing traces of dirt or plant material which might lead to weed infestation as well as oils and grease;
- take action to resolve and document non-conformance;
- ensure that any JHAs effectively manage environmental risks associated with work activities; and
- liaise and direct with subcontractors to ensure environmental requirements are implemented as defined in their scope of work and contract documents.

4.3.5 Superintendents/Foremen

Foremen report to the Superintendents, who report to the General Superintendent or the Construction Managers and will have a direct role in the compliance with identified environmental procedures and controls. They will also be responsible for checking the site on a regular basis and ensuring that regular maintenance is undertaken to minimise environmental impacts and that personnel are provided with appropriate environmental “toolbox” training.

4.3.6 Engineers

Site and Project Engineers are responsible to the Project Manager for the environmental performance of the site(s) or construction activities for which they are in charge, including:

- develop contract documents describing how works is to be carried out, quality requirements and incorporate information on environmental requirements, necessary controls, maintenance to achieve program and manage risks;

- responsible for selecting plant, equipment, materials used for onsite activities, taking into consideration process activities, environmental, safety and quality issues;
- develop JHA and other management plans to plan and coordinate activities in their sequence;
- plan and update project activities, under direction of the project manager, superintendent and senior engineer;
- assess contractor supplied activity specific management plans where the subcontractor is certified, rather than implement Macmahon requirements; and
- assess subcontractor performance including management of activity related environmental issues.

4.3.7 Safety Advisor

The Safety Advisor reports to the Project Manager and is responsible for:

- the delivery of the site induction programs encompassing awareness of environmental and other stakeholder issues on site, to Macmahon site personnel, subcontractors and visitors as required;
- approving Job Hazard Analyses (JHA), ensuring they include appropriate activities' risks, hazard ranking, and description of controls;
- participation as part of the project's senior management team in the quarterly risk review of the site risk register, including environmental risks and emergency response requirements;
- development and maintenance of the Training Needs Register; and
- assessing with the PEMR, information on goods used on site and related material data sheets (MSDS).

4.3.8 General Responsibilities of all Project Personnel

All project personnel including sub-contractors have a general environmental duty. Project staff must not carry out any activity that causes, or is likely to cause, environmental harm unless the person takes all reasonable and practicable measures to prevent or minimise the harm. All Project personnel will:

- comply with the relevant acts, regulations, standards and contractual requirements;
- comply with the environmental policy and procedures;
- comply with management / supervisory directions;
- promptly report to management on any non-conformance and/or breaches of the system;
- undergo induction and training in environmental awareness as directed by management;
- must be aware of environmental risks associated with work activities as identified on JHA's for those activities;
- submit work related programs and management plans to Macmahon where the subcontractors is certified; and
- must manage environmental hazards as detailed in their WMS or JHA to Macmahon standards.

4.4 Resources

The resources required to implement the control measures and obligations identified in the environmental documents are detailed in the respective Management Plans. Resources will include:

- general labour to install and maintain controls during construction activities and following storm/wet weather events;
- specialist input from consultants including: fauna spotter-catcher/ecologist/botanist to identify significant flora and fauna, oversee translocation activities and advise on habitat restoration;

soil conservationist to inspect erosion and sediment controls and provide on-site advice on the selection and maintenance of controls;

- heavy plant and equipment such as bulldozers and excavators;
- hand tools;
- fencing and flagging tape to secure protected areas or trees;
- erosion and sediment equipment including sand bags and sediment fence; and
- emergency response equipment including booms and absorbent materials.

The Project Manager, Superintendent and PEMR will be responsible for ensuring sufficient resources are allocated to install, inspect, maintain and repair environmental controls particularly after wet weather.

5 ENVIRONMENTAL ASPECTS AND IMPACTS

5.1 Risk Assessment

Environmental aspects as referred to in this document are those activities associated that have the potential to cause, or result in, adverse environmental impacts as part of construction related activities. The process of identifying impacts is one of progressively breaking down each activity into its environmental aspects. Aspects and impacts will be identified by Macmahon for all construction activities that have the potential to cause and significant impacts to the environment or sensitive receivers. Due to the complexity of the project, it is conceivable that various aspects of the project would carry a varying degree of environmental risk which needs to be managed accordingly.

The identification of the significant environmental aspects and impacts that could eventuate during construction of the Project is central to the selection of appropriate environmental safeguards. Environmental activities and their corresponding aspects and impacts are recorded in a **Risk Register – Environmental (G-397)**. The level of risk associated with each environmental factor is determined using **Hazard Identification, Assessment and Control Guideline (G-426)**. For each environmental aspect, within the 'Environmental Risk Register' there is a stated:

- legal or other obligation including legislation, standards and contractual requirements;
- environmental impact;
- risk analysis of an environmental hazard or impact occurring in the absence of any control measures;
- objective and targets to be achieved;
- control measures to be implemented to meet management objectives; and
- risk analysis of residual risk of an environmental hazard or impact occurring following the implementation of control measures.

The **Risk Register – Environmental (G-397)** addresses the risks including: dredging and water quality; air quality; stormwater and discharge water quality; noise control; piling including vibrations, odour; traffic control; fire prevention; flora and fauna; waste management and reuse; vibration from plant; erosion and sediment control; control of wind-blown construction debris; fuel storage and use of site, including spill cleanup procedures; use and control of hazardous substances on site; and any other environmental risks that may occur.

Environmental risk assessment of construction activities should be undertaken by a workshop with the Project Manager, PEMR, QEM/ QEC and senior project construction management personnel. The objectives of risk assessment are to:

- identify activities, aspects, events or outcomes that have the potential to adversely affect the local environment;
- qualitatively evaluate and categorise each risk item;
- assess whether risk issues can be managed by environmental protection measures; and
- qualitatively evaluate residual risk with implementation of measures.

Risk assessment will be undertaken for all major activities, new works and activities in environmentally sensitive areas. The PEMR is responsible for facilitating risk assessment in consultation with construction teams and specific subcontractors.

6 ENVIRONMENTAL MANAGEMENT FRAMEWORK

6.1 Environmental Impacts and Control Measures

Integrating environment protection at the project planning stage ensures that measures to avoid and minimise pollution can be built into the project programme and work schedule. In accordance with the **Project Planning Procedure (G-492)** and the **Project Planning Phase Flowchart (G-380)** project related plans including PCEMP is developed based on project specific requirements. EMPs shall be prepared in accordance with contract documentation and relevant legal and other requirements as well as the relevant provisions of the Macmahon Environmental Management System which is accredited to AS/NZS ISO 14001. Where appropriate, discipline specific sub-plans (or similar) may be developed to meet specific contractual or other requirements.

The CEMP is the key management tool and lead environmental management document in relation to the environmental performance during the design and construction phases. In addition to this plan, there are a number of other documents and sub-plans that provide more specific environmental management detail.

Construction activities and associated impacts occur progressively and change over time as different works are carried out and different locations impacted. Due to the staged construction approach, environmental protection measures are progressively implemented. This plan identifies upfront the desired environmental outcomes and the systems and processes in place to achieve these outcomes. Sub-plans and work instructions / method statements provide direction on implementation of measures to mitigate impacts.

6.2 Environmental Management Sub-Plans

Sub-plans take into account environmental actions and measures identified in environmental reports and contract documentation specific to construction activities. The purpose of the sub-plans is to guide construction activity in a concise manner, by specifying measures to manage impact on the environment. These measures have been developed from analysis of aspects and impacts in the environmental risk assessment process.

Information in sub-plans is used to generate work instructions / method statements that detail relevant environmental controls to be implemented. These plans are aimed specifically for use by construction Superintendents, Foremen and Workers. Each sub-plan should address management of their respective impact with the following minimum content:

- goals and intended outcomes;
- legal and environmental obligations, guidelines and licence, permit and notification requirements;
- environmental aspects, impacts and risks;
- environmental control measures for all parties involved;
- procedures and systems for all parties involved;
- responsibilities for implementation of the sub-plan for all parties involved;
- resources (materials/labour) needed to implement and maintain environmental control measures for all parties involved;
- communication and consultation;
- monitoring procedures and requirements; and
- incident planning and response.

6.3 Job Safety and Environmental Analysis

The Job Safety and Environmental Analysis process is the day to day process through which environmental risk is managed. JSEAs are prepared by the Site or Project Engineer, and are the primary method for the assessment and reduction of environmental risk during construction. JSEAs are used to assess safety and environmental risks associated with a specific activity and provide measures to reduce risk and ensure ongoing environmental compliance.

JSEAs are reviewed by each member of the work team before they commence work. This review provides an opportunity for the work team to contribute to environmental controls and to ensure that the work team is trained in environmental methods. Changes to the JSEA are documented and communicated to workers prior to commencing the changed methods.

6.4 Work Method Statements / Work Instructions

Following from the Environmental Risk Assessment process, environmental controls and procedures would be specifically incorporated into Work Instructions / Work Method Statements (WMS) for construction activities that have 'high' or 'extreme' risks (also known as critical construction activities).

The Work Instruction / WMS identified would be developed in advance of the operations to which they relate. WMS address the environmental issues that are specific to that method and/or site.

6.5 Environmental Procedures and Guidelines

Environmental procedures that have been developed as part of the Macmahon Environmental Management System and are relevant to the Project. These guidelines and procedures have been developed to cover and/or align with relevant requirements, standards, legislation and/or best practice.

Macmahon personnel or Subcontractors may generate project specific procedures. Project specific procedures generated by project staff are to be reviewed by the PEMR for inclusion of project title/description, procedure title and procedure reference. Approved Process Procedures are to be recorded on the MDL or the **Document Control Register (G-406)** (or equivalent).

Where procedures are developed, these should not dilute requirements outlined in Macmahon management system procedures. Upon completion of the review and resolution of any discrepancies with the originator, the PEMR or Project Manager signs for approval.

Subcontractor generated procedures, addressing performance of a specific work process/system, are to be reviewed by the Project Manager / PEMR for suitability and adequacy of meeting specified contract requirements. Where changes are required, the comments are to be communicated to the subcontractor. The Project Manger / PEMR ensure that suitable amendment action is performed by the subcontractor prior to commencement of work.

7 TRAINING, AWARENESS AND COMPETENCE

7.1 Approach to Environmental Training, Awareness and Competence

It is the policy of Macmahon to ensure adequate training and instruction is provided to all personnel to allow them to perform their duties whilst ensuring the environmental impacts associated with the Project are minimal. The main forms of training will be provided on site:

- induction;
- environmental awareness training;
- toolbox talks; and
- task-specific training.

Records of induction and training will be kept on a database including the topic of the training carried out, dates, names and trainer details. Inductees will be required to sign-off that they have been informed of the environmental issues and that they understand responsibilities. As part of training processes, awareness and educational material, such as posters and flyers, may be developed for and distributed among the personnel, highlighting the environmental issues and obligations under relevant legislation including 'due diligence' and 'duty of care' responsibilities.

7.2 Environmental Inductions

The Project Manager is to ensure all Macmahon and subcontractor personnel attend a Macmahon induction, prior to commencement of work, in accordance with **Induction Procedure (G-464)**. There may be two levels of induction. One for visitors, irregular delivery drivers and others who will remain in the company of a fully inducted Macmahon employee and the second induction will be required for all permanent employees and subcontractors working on the site.

There will be two levels of induction. Level one will be for visitors, irregular delivery drivers and others who will remain in the company of a fully inducted Macmahon employee. The level two inductions will be required for all permanent employees and subcontractors working on the site. The level two inductions will include but will not be limited to the following topics:

- the PCEMP (purpose, objectives and key issues);
- legal requirements including applicable legislation, conditions of environmental licences, permits and approvals, due diligence, general environmental duty, and duty to notify and potential consequences of infringements;
- the Macmahon Environmental Policy;
- environmental management strategies such as refuelling, waste disposal and litter collection;
- promoting awareness of significant environmental issues and personnel responsibilities (as outlined in environmental control plans or risk register such as environmentally sensitive specifically the following topics must be included - fauna traffic hazards and 'animal warning' signs, noise and vibration impacts to surrounding residences and to stop activities if a potential heritage artefact is uncovered;
- reporting of environmental incidents - which will include the type of events to be reported, how an event is reported and to whom the event is reported;
- emergency procedures - which will cover the procedure for an emergency and for evacuation of the site in the event of a catastrophic situation arising;
- contingency plans - e.g. for 'hydrocarbon/chemical spills' and the 'discovery of previously unidentified aboriginal heritage sites'; and
- questions pertaining to environment and heritage will be included in the site induction questionnaire to validate employees' understanding of the induction content.

7.3 Environmental Awareness Training

Staff and sub-contractors working on site will be provided with environmental training to achieve a level of awareness and competence appropriate to their assigned activities.

Targeted environmental awareness training will be provided to individuals or groups of workers with a specific authority or responsibility for environmental management or those undertaking an activity with a high risk of environmental impact. This training will generally be prepared and delivered by the PEMR. The target groups and suggested topics for this training are shown in the table below.

Table: Possible Training Topics and Target Groups (example)

Target Audience	Training Module									
	Induction	Supervisor Awareness	Spill Response & Clean-up	Erosion and Sediment	Waste Management	Bushfire Management	Environmental Monitoring	Water Management	Incident Response	Cultural Heritage Management
All personnel	x								x	
Senior management / Engineers	x	x	x	x	x	x	x	x	x	x
Supervisors / Foremen	x	x	x	x	x	x	x	x	x	x
PEMR	x	x	x	x	x	x	x	x	x	x
Earthworks crew	x		x	x	x				x	x
Fuel Suppliers / Maintenance	x		x			x			x	
Heavy vehicle/equip operators	x		x	x					x	x

7.3.1 Toolbox Training

A set of toolbox topics has been devised as training tool for presentation at toolbox meetings to raise awareness of environmental aspects and issues associated with the project. Each package consists of a five minute Microsoft PowerPoint presentation, discussion session, and information poster. “Toolbox” training will help to ensure that relevant information is communicated to the workforce and that feedback can be provided on issues of interest or concern. “Toolbox” training will generally be prepared and delivered by the Project Engineers or Site Foreman. Topics covered include dust, waste management, hydrocarbons, flora/fauna, and any other project-specific issues such as the efficient use of plant and materials; noise and vibration minimisation; protecting waterways and riparian zones; wastewater control; work methods; management of contaminated soil; and general site issues.

The Project Environmental Management Representative and other key personnel (e.g. Supervisors) also undergo training in the Macmahon Project Environmental Management Representative Training Package.

7.4 Task-Specific Training

Task-specific training is required before staff and sub-contractors can commence high risk activities, or work in environmentally sensitive areas. The PEMR determines activities and personnel required to have specific instruction, when this training will take place, how it will be delivered and if there is a need to retrain personnel, this includes for example:

- training for staff installing and maintaining erosion and sediment controls;
- spill response Workshop / Service Truck Personnel;
- training on noise minimisation for staff working at night (if required); and
- any other subjects listed in environmental sub-plans.

8 COMMUNICATION

8.1 Community and Stakeholder Management

Macmahon will ensure that all relevant stakeholders are consulted at appropriate times during implementation of the Project. A list of relevant contact names, telephone numbers and facsimile numbers for the project will be provided, including the two nominated contacts, which are: PEMR; and the Project Manager. The nominated contacts have the authority to shut activities down on site, or implement any measures deemed appropriate to fix any reported incidents, and in the event of an emergency are contactable 24 hours a day.

The works on site include a number of activities that may cause disruption to the local community. These may include: temporary roads; work outside customary working hours; alterations to property access; progress of work; and construction activities. In these cases, before any disrupting activity can begin, there will be some form of community liaison to inform the public of the impending disturbance, or changes to construction activities. If consultation is required this will be undertaken in consultation with Client & Territory.

9 DOCUMENT AND RECORDS MANAGEMENT

9.1 Correspondence & Filing

A filing index and correspondence register system is to be set up at the commencement of a project, which is appropriate to control all correspondence and project records in accordance with procedure **G-072 Project Correspondence & Filing**.

The Document Controller, in liaison with the Project Manager, establishes a hard-copy project filing index to ensure that records are indexed and filed in a manner to facilitate easy retrieval of information.

Project Manager informs suppliers, subcontractors, etc., of where project-related correspondence is to be addressed.

All inward correspondence is to be stamped with a 'Received' stamp showing the receipt date, registered and then distributed to relevant staff as directed by the Project Manager. Correspondence is to be filed in chronological order.

9.2 Controlled Documents

The following documents, as a minimum, shall be subject to control as detailed in procedure **G-073 Document Control**.

- procedures & forms;
- standards/codes/acts/regulations;
- project plans;
- project procedures and forms; and
- Drawings.

Where changes are required to project documentation, the Project Manager or delegate shall coordinate all amendments/revisions to the documents and implement the necessary changes required.

Unless otherwise specified by the Project Manager contract/shop drawings are to be transmitted to external parties using a Document Transmittal. All other documents may be transmitted using suitable correspondence. Transmittal records shall be maintained.

9.3 Superseded Documents

Where superseded versions of controlled documents are retained for any purposes, such documents are to be identified 'Superseded' to prevent the unintended use of obsolete information.

9.4 Archiving of Records

Project environmental records shall be in archived for a minimum period of seven (7) years in accordance with procedure **G-075 Archiving of Records**.

The Originator is to complete an Archive Record Form identifying contents of records in each box. A destroy by date is to be included on the form taking account of the minimum retention periods stated in the procedure.

10 EMERGENCY PREPAREDNESS AND RESPONSE

The Safety Representative is to establish suitable emergency procedures to ensure effective response in the event of an emergency (including environmental emergencies such as fire and large fuel spills) in accordance with procedure **G-540 Emergency Preparedness and Response**.

Contingency plans to deal with environmental emergency situations / incidents that may arise during the Work under the Contract are provided within the sub-plans of the PCEMP, and these plans are covered in the Site Induction Training, which all employees, subcontractors and staff must attend.

An Emergency Procedure (Poster) is to be completed and posted at specific work areas, specifying the steps to be taken and the parties to contact in the event of an emergency. Details of emergency services (e.g. ambulance, fire, brigade, spill clean-up services) are to be posted in key locations throughout the project such as crib rooms, workshops and offices.

The '**Emergency Procedure**' shall be tested on a nominal six (6) monthly basis. Records are to be maintained of all site emergencies and results of any emergency practice drills conducted, by the Site Safety Advisor, equally, where practicable the Senior Management Team will:

- identify the most likely emergencies, its scale using the quarterly review of the risk register;
- define appropriate method(s) of response and necessary resources;
- lines of communication on site and with external parties, to manage accidents and emergency situations;
- need to have input from and how to respond to emergency services organisations outside the site; and
- develop actions to minimise anticipated environmental and human damage.

A complete copy of Material Safety Data Sheets (MSDS's) and associated register will be maintained on the project in the following locations:

- within or adjacent to hazardous substance storage cabinets;
- site project office and at first aid facility if not at the same location as the project office; and
- at each location while construction works is being undertaken.

11 CHECKING & CORRECTIVE ACTION

11.1 Monitoring

Monitoring of each key environmental factor is as described in the Environmental Control Plan. Further, a **C-068 Project Environmental Inspection Checklist** will be completed by the PEMR (or other person acceptable to the Superintendent) for document daily site inspections for the purpose of verifying compliance with the PCEMP, licences, permits and approvals and the other environmental performance requirements specified within the contract. Inspection records shall be submitted to the Superintendent on a monthly basis.

Where required to undertake environmental monitoring, Macmahon shall report monitoring results, analysis and any corrective actions to the Superintendent on a monthly basis except where there environmental harm.

NTG may carry out periodic and ad-hoc inspections in conjunction with Macmahon site staff and also utilising specialist staff from other Divisions, along with representatives from DCI, Darwin Ports Corporation and Land Development Corporation, to assess site conditions and management of operations in line with agreed requirements. Adverse inspection findings will be recorded in the Macmahon Non-conformance and Corrective Action process detailed above, and actioned in accordance with procedure **G-450 Non-conformance and Corrective Action Procedure**. Any subsequent requirements of such inspections will be responded to Macmahon, with an outline of actions to be implemented in order to address issues raised at the time.

11.2 Measurement

Any inspection, measuring and testing equipment (including newly acquired test equipment) used for conformance measuring purposes, whether owned by Macmahon or Subcontractor, shall be controlled and calibrated. For Macmahon equipment a register is to be maintained in accordance with procedure **G-499 Monitoring and Measurement**. Current NATA registration of testing laboratories shall be accepted as evidence that measuring and test equipment meets calibration requirements of AS/NZS ISO 9001.

Only equipment capable of measuring or testing to the necessary accuracy and precision for the intended application (In accordance with Contract and manufacturer specifications) will be selected.

All conformance testing undertaken shall be performed in accordance with contract requirements and the calibration of equipment used must be traceable to national or international standards. Where no such standard exists or is inappropriate, the basis of calibration will be recorded. Calibration and test records shall be reviewed and initialled by a Macmahon representative to signify review and acceptance.

11.3 Non-conformance, Corrective & Preventative Action

Any environmental non-conformance (e.g. breach of legal or contract requirements or audit-related non-conformance) is to be reported in accordance with procedure **G-450 Non-conformance and Corrective Action**.

Concessions or waivers shall be sought from the Client Representative for the proposed remediation and corrective action for any non-conformance which varies the requirements of the Specification or Contract. The action taken shall be to a degree appropriate to mitigate any impacts caused and risks encountered.

Within seven (7) days after a Corrective Action Request is given to Macmahon by the Client Representative, Macmahon will rectify any non-conformance or environmental risk, initiate and implement corrective/preventative action to prevent recurrence of the non-conformance or remove the identified environmental risk and return the completed Corrective Action Request to Client Representative.

A **Non-conformance Register** shall be maintained to monitor the status of the Non-conformance raised.

A **G-484 Corrective Action Report** will be established for the project. This register is designed to ensure effective tracking and give closure of all action items. Action items may be generated from audit findings, inspections, non-conformances, incidents, and hazard near miss reports.

The Corrective Action Report will detail:

- action required (and the success level of those measures) to mitigate problems should they occur;
- date that the action is to be completed; and
- person(s) responsible for completing the action.

The Project Manager shall be responsible for the management of the corrective action report. Any item that has been entered onto the action register will remain an action item until it has been addressed to the satisfaction of the Project Manager.

11.4 Complaints

Complaints from any source (e.g. public, government authorities) must be registered using a **Complaint Record**, the complaint investigated by the PEMR in consultation with the Project Manager and action taken to enable satisfactory closeout.

These complaints will be undertaken in association or consultation with SWC. A complaints management system and register will be established and maintained by the Environmental Management Representative who will receive, log, track and respond to complaints within specified timeframes. The following details will be recorded in the register:

- date; time;
- type of communication (telephone, letter, meeting);
- name, address, contact number of complainant;
- nature of complaint;
- details;
- action taken in response including who the complaint was referred to (if not resolved immediately); and
- details of any monitoring undertaken to confirm that the complaint has been satisfactorily resolved.

11.5 Environmental Incident Reporting

All project and subcontractor personnel shall report all actual and potential (i.e. near miss) environmental incidents as soon as practical to the PEMR and Project Manager. The Client will be notified immediately of any environmental incidents which relate to potential or actual breaches of licence or legal requirements.

Macmahon will immediately notify the Client of any pollution incident that may cause material harm to the environment, providing evidence that notification requirements of relevant legislation have been met, where applicable. Macmahon will also report immediately the details of any waste removed from the Site and not disposed of at a lawful facility.

It is the responsibility of the PEMR or nominated person(s) to fully investigate the occurrence with personnel involved in accordance with procedure **G-421 Accident Investigation and Reporting**. In the event of an environmental incident on site, the Project Manager shall complete and then send by fax or email the following documentation to the Construction Quality & Environmental Manager within 24 hours: **G-051 Environmental Incident Details Form**; and **G-261 Incident Statement Form**.

When requested, Macmahon will provide an incident investigation report to SWC, including identification of the cause of the incident and corrective actions taken, in the form directed.

11.6 Reporting and Notification

PEMR is to complete a **G-245 Project HSEQ Performance Monthly Report** and forward to the Quality & Environmental Manager, reporting on the preceding month's performance covering the following: external audits completed; non-conformances raised; complaints reported; environmental incidents reported; waste minimisation statistics; and improvements/initiatives implemented at site.

The Table below summaries the key environmental reporting and notification requirements required during the project. Submission of environmental reporting documentation to Client Representative is as specified in contract.

Table 1: Summary of Environmental Reporting and Notification

Report or Notification	Frequency	Details (Submission / Form / Record)	Reference
HSEQ Performance Report	Monthly	Monthly report to the Macmahon Quality and Environmental Manager by email. Any injury or death of fauna within the construction zone shall be included in the monthly report. Known cause of death of fauna should also be reported.	Project HSEQ Performance Monthly Report (G-245)
Environmental Monitoring Results	Monthly (or Environmental harm or breach in licence condition)	Environmental results submitted to the Macmahon Quality and Environmental Manager.	Incident Reporting and Investigation Procedure (G-421)
Material harm to the environment is caused or threatened	As required	Notification to the relevant environmental authority as per legislative requirements. Telephone Conversation Record. Notification to the Client Representative (Principal).	Incident Reporting and Investigation Procedure (G-421)
Environmental complaints	Daily (Monthly Report)	Report to Construction Project Manager within one working day. Monitoring results, analysis and any corrective actions to the Client Representative on a monthly basis.	PCEMP
Non-conformance and corrective actions		All non-conformances will be recorded.	Non-conformance and Corrective Action Procedure (G-450)

11.7 Internal Audits

Internal audits aimed at evaluating the conformance of the system, process or product, as appropriate, shall be carried out as detailed in procedure **G-505 Auditing** by the Quality & Environmental Manager or Coordinator, who is independent of the project.

The Quality and Environmental Manager will establish an Internal Audit Plan. An internal audit will be completed within the first three months of start-up and thereafter every 12 months (as a minimum).

Audit report will be issued to Macmahon and the Environmental Representative within two weeks of completion of the audit.

Any non-conformance identified during the audit shall be actioned in accordance with procedure **G-450 Non-conformance and Corrective Action**. Management personnel responsible for the area shall take timely corrective action on the deficiencies found.

11.8 External Audits and Inspections

Results from second party (client) and third party audits (i.e. administering authority, NCSI, etc) are to be reviewed by the Project Manager and any necessary corrective actions assigned to ensure appropriate and timely closeout.

The Project Manager shall notify the Client Representative of meetings with, inspections or visits from representatives of any administering authority within twenty four (24) hours of being advised.

The Client may, at any time and for any reason, conduct a site audit for the purposes of ensuring the Contractor's compliance with its obligations with respect to environmental risk management systems and processes under the Management Plans and the Contract (Site Audit).

12 PROCUREMENT AND SUBCONTRACT MANAGEMENT

12.1 Procurement

All purchasing is to be completed in accordance with procedure **G-619 Mainet Supply Procedure** and the **G-510 Procurement Policy**. For Purchasing by Macmahon, Purchase Requisitions are to be approved by staff with sufficient expenditure authority prior to release. Employees responsible for purchasing items for use on site are to ensure that quality, environmental and safety requirements (as applicable) are stated in the Purchase Requisition prior to issue. 'Purchase Authority Approval Limits' forms detail staff purchasing authority limit. The key requirements of the procedure are:

- procurement and contract documentation include environmental management requirements as applicable to the product or service - where relevant, product or service guarantees are obtained; and
- products, suppliers and sub-contractors are evaluated as to their capability to meet specified environmental requirements for the project.

12.2 Management of Subcontractors

Suppliers/Subcontractors will be evaluated in accordance with **Construction HSEQ Management of Subcontractors and Suppliers Procedure (C-108)**. Only Subcontractors who have been evaluated by Macmahon will be engaged to perform subcontract works.

Where a subcontractor is unable to provide Macmahon with an acceptable environmental management system, the Project Manager or nominated representative will ensure that the Subcontractor undertakes the works in accordance with the Macmahon environmental management system requirements.

Prior to commencement of works, Subcontractors will be required to submit details of their proposed system (e.g. Project plans, inspection and test plans and/or process procedures) to Macmahon for review and acceptance. For completed works, Subcontractors shall submit conformance documentation, in accordance with contract specifications, to Macmahon for review and acceptance.

Appropriate references to environmental management and control reflecting the Project requirements will be included in subcontract documentation. Subcontractor personnel will be included in the on-site induction process.

Subcontractors working on the Project will be required to:

- observe subcontract and statutory requirements relating to environmental protection and other environmental legislation and to follow instructions issued by the Project management and supervisory personnel;
- nominate site representatives to liaise with the Project representatives with respect to, and take responsibility for, environmental requirements for the site activities;
- adhere to the environmental management system as it applies to their operations on the site;
- co-operate fully with site emergency incident procedures and consultative arrangements; and
- follow procedures incorporated in the PCEMP.

Macmahon will ensure that the work of subcontractors is monitored through the site inspection process. Observations will be made by relevant personnel to assess the effectiveness of the environmental protection measures being used on site by Macmahon and to determine compliance with the requirements of the PCEMP.

12.3 Plant and Equipment

A planned program/schedule for the maintenance of Macmahon plant and equipment shall be established. Plant and equipment shall be maintained in accordance with procedure **Plant Servicing Procedure (P-298)**. The program facilitates the efficient operation of plant/equipment and hence ensures exhaust emissions are minimised.

All plant and equipment (including site vehicles) are to undergo daily pre-start inspections in accordance with procedure **Pre Start Check Procedure (P-279)** and records of inspections maintained.

All plant brought to site, including floating of vehicles, will be cleaned of contaminating soil, plant materials and be confirmed as clean by plant suppliers. On arrival plant, vehicles will be inspected to assess cleanliness.

The Site engineers, Superintendent are responsible for selecting and hiring plant and equipment for site activities, as carried out by Macmahon and subcontractors. Efficiency, work quality, safety and environmental considerations will be used to decide on the plant and equipment used for activities on site.

Site conditions such as temperature, precipitation, wind and direction will be considered in assessing site works conditions prior to commencement. The engineers and superintendent will assess conditions on site and of plant and equipment to be brought on site. Dust suppression measures will be implemented such as use of water cart, changing operations if conditions are unsuitable and if plant is considered to emit visible particles, alternate equipment may be hired.

13 REVIEW & IMPROVEMENT

The identification of non-conformances may be a result of checks/audits and monitoring of operations. The PCEMP will undergo continual review and update to ensure that a number of the following mechanisms will be implemented to review performance and identify opportunities for improvement:

13.1 Toolbox Meetings

Toolbox meetings will include 'environment' as an agenda item. Issues raised are to be recorded, and responsibilities assigned to ensure satisfactory close-out of issues raised.

13.2 Customer Satisfaction

In accordance with procedure **G-424 Customer Satisfaction**, the Quality & Environmental Manager / Coordinator arrange to contact the client representative during the project to gather formal feedback on Macmahon's project performance, using the '**Customer Feedback Questionnaire**' form. Following receipt of completed feedback, any category that is rated 'average' or below will be treated as an opportunity for improvement and necessary corrective action taken.

13.3 Group Management System Review

In accordance with procedure **G-493 Continual Improvement**, the Quality & Environmental Manager organises a meeting with the key personnel on a quarterly basis to review the management system to determine its continuing suitability, adequacy and effectiveness and to assess and identify opportunities for improvement.

Group Management System Review reports and meeting minutes are accessible to Macmahon employees via the document library on the Macmahon intranet (MDL).

13.4 Project Construction Environmental Management Plan Review

The PCEMP is a dynamic document will be reviewed at least once within the term of the project as a minimum and will also be reviewed in response to incidents, changes in legislation, change in project scope, findings of inspections and audits and management reviews. A register of issues will be maintained to ensure that any issue raised by internal and external personnel associated with the Project is recorded.

The purpose of the review is to ensure that the PCEMP is meeting the requirements of the standards, policies and objectives and if not to amend the PCEMP to meet the 'short falls'. A report will be provided to the Project Manager with any recommendations for change to the system. The Project Manager will review and approve changes to the system. The review will consider:

- client's comments;
- site personnel comments;
- agency comments;
- audit findings;
- minutes of meetings;
- environmental monitoring records;
- complaints;
- inspections;
- details of corrective and preventative actions taken;
- environmental non-conformances;
- incident reports;

- changes in organisation structures and responsibilities;
- the extent of compliance with objectives and targets; and
- the effect of changes in Standards and legislation.

The PEMR will review the various policies and objectives and approve any changes. Any mid to major level changes will be carried out in consultation with relevant agencies.

14 REFERENCES

Territory's East Arm Wharf Expansion Project Draft Environmental Impact Statement

APPENDIX 1 - MACMAHON ENVIRONMENTAL POLICY



To work effectively in a diverse range of environments and social settings, Macmahon recognises the importance of integral environmental management into how we do business. Our environmental policy objective is to minimise the adverse impact on the environment as a result of our business activities.

To achieve this objective we will:

- Establish and maintain an environmental Management system in accordance with AS/NZS ISO 14001.
- Comply with contract conditions, relevant legislation and other criteria to which the company subscribes.
- Regularly review business operations, identify and implement opportunities for improvement.
- Educate our work force on key environmental issues, management controls and associated responsibilities.
- Establish defined environmental objectives and targets to measure our performance and identify opportunities for improvement.
- Strive to prevent pollution, reduce waste and commit to recovery and recycling where feasible.



Nick Bowen
Chief Executive Officer

November 2010

APPENDIX 2 – SUMMARY OF LEGAL AND OTHER REQUIREMENTS

Summary of Relevant Legislation

Legislation	Application	Responsible Department
Acts & Regulations		
Dangerous Goods Act 2008 and Regulations	Provide for the safe storage, handling and transport of certain dangerous goods	Department of Justice
Environmental Assessment Act 1982 and Administrative Procedures 1994	Provide for the assessment of the environmental effects of development proposals and for the protection of the environment	NRETAS
Environmental Offences and Penalties Act 1997	Establishes penalties for certain offences relating to the protection of the environment, and for related purposes	NRETAS
Environmental Protection and Biodiversity Conservation Act 1999 (Federal)	Provides a national framework for environment protection through a focus on protecting matters of national environmental significance and on the conservation of Australia's biodiversity.	Federal Department of the Environment and Heritage
Fire and Emergency Act 2007 and Regulation	Provides for the establishment of the Northern Territory Fire and Rescue Service, the operational and emergency response activities of the Service, the protection of life, property and the environment against fires and other emergencies.	Northern Territory Fire and Rescue Service
Fisheries Act 2007	Provides for the regulation, conservation and management of fisheries and fishery resources so as to maintain their sustainable utilisation, and to regulate the sale and processing of fish and aquatic life.	Department of Regional Development, Primary Industry, Fisheries and Resources
Heritage Conservation Act 2000 and Regulations	Relates to the natural and cultural heritage of the Northern Territory – to identify, conserve and where appropriate enhance those places within the Northern Territory which are of significance to the culture	NRETAS
Litter Act 2008	An Act relating to Litter	NRETAS
Planning Act 2007	To provide for appropriate and orderly planning and control of the use and development of land (in this case, no planning permit is required because under the Act road reserves are exempt).	DCI
Public Health Act 2005 and Regulations	Provides a framework for the management of public health issues.	Department of Health and Families
Soil Conservation and Land Utilisation Act 2008	Makes provision for the prevention of soil erosion and for the conservation and reclamation of soil.	DCI

Legislation	Application	Responsible Department
Territory Parks and Wildlife Conservation Act, Regs and By-Laws 2007	Provides a framework for parks & reserves, and management of wildlife and protected species	NRETAS
Waste Management and Pollution Control Act 2007 and Regulations	An Act to provide for the protection of the environment through encouragement of effective waste management and pollution prevention and control practices and for related purposes	NRETAS
Water Act 2004 and Water Regulations 2002	Provides the framework for controlling and regulating the discharge of pollutants in to all waters and the issuing and management of Waste Discharge Licences.	NRETAS
Weed Management Act 2001 and Regulations	An Act to protect the Territory's economy, community, industry and environment from the adverse impact of weeds	NRETAS
Workplace Health and Safety Act 2008 and Regulations	To promote occupational health and safety in the Territory to prevent workplace injuries and diseases, to protect the health and safety of the public in relation to work activities, to promote the rehabilitation and maximum recovery from incapacity of injured workers, to provide financial compensation to workers incapacitated from workplace injuries or diseases and to the dependants of workers who die as the results of such injuries or disease.	NT Worksafe (within the Department of Justice)

Summary of Relevant Guidelines, Policies and Other Requirements

Requirement	Description / Application	Responsible Administrator
AS 1005.1/2 - Acoustics – description and management of environmental noise	This Standard sets out general procedures for the description and measurement of environmental noise including repetitive impulsive noise.	Standards Australia
AS 1216 Classification, Hazard Identification and Information Systems	This Standard sets out details of the design and selection of labels appropriate to the classes, divisions and subsidiary risks of dangerous goods as designated in the Australian Dangerous Goods Code (ADG Code).	Standards Australia
AS 1678 Emergency Procedures Guides	Emergency procedure guides for the transport of hazardous materials.	Standards Australia
AS 1940 – 2004 – Storage and Handling of Flammable and Combustible Liquids	Sets out requirements for design, construction and operations of installations for the storage and handling of flammable and combustible liquids.	Standards Australia
AS 1940 Storage and Handling of Flammable and Combustible Liquids	This Standard sets out requirements and recommendations for the safe storage and handling of flammable liquids of dangerous goods Class 3, as classified in the UN Recommendations for the Transport of Dangerous Goods— Model Regulations and listed in the ADG Code.	Standards Australia
AS 2436 – Guide to noise control on construction, maintenance and demolition sites	This standard provides guidance in noise control in respect of engineering construction, maintenance and demolition works, including guidance in investigation and identification of noise sources, measurement of sound, and its assessment, with a view to the planning of measures for noise control.	Standards Australia
AS 3580 – Methods for sampling and analysis of ambient air	This Standard sets out general guidelines for the siting of ambient air monitoring equipment and specifies a number of siting parameters for individual air pollutants.	Standards Australia
AS/ NZS ISO 14001:2004	ISO 14001:2004 specifies requirements for an environmental management system (EMS) to enable an organization to develop and implement a policy and objectives which take into account legal requirements and other requirements to which the organization subscribes, and information about significant environmental aspects.	Standards Australia/Standards New Zealand
Australian Water Quality Guidelines for Fresh and Marine Waters, 2000	This document updates the Australian water quality guidelines for fresh and marine waters released in 1992 (ANZECC 1992). The guidelines provides a summary of the water quality guidelines proposed to protect and manage the environmental values supported by the water resources and provides advice on designing and implementing water quality monitoring and assessment programs.	ANZECC
Greenhouse Challenge Plus	Partnership between Australian Government and Industry to improve greenhouse performance.	Australian Greenhouse Office

Summary of Licenses, Approvals and Permits for the Project

Requirement	Responsibility	Administering Authority	Trigger / Comment	Reference No Commencement and Expiry Date
TBC				

APPENDIX 3 – PCEMP SUB-PLANS

The following Sub Plans will be developed for the works:

1. Dredging Management Plan
2. PASS Management Plan
3. Earthworks Management Plan
4. Erosion and Sediment Control Management Plan
5. Stormwater Management Plan
6. Noise Management Plan
7. Air Quality Management Plan
8. Hazardous Substances Management Plan
9. Waste Management Plan
10. Aboriginal and Cultural Heritage Protection Management Plan
11. Pest Animals Management Plan
12. Biting Insects Management Plan