

9. Environmental Management

9.1 General

The environmental management measures described herein will be readily adapted for inclusion in the Mining Management Plan, as required under the *Mining Management Act*, following PER approval (see Chapter 2). With respect to environmental management and monitoring, the management plans described in this chapter are generally in principle and strategic, set out the management issues identified during the preparation of this report and, for each, presents Compass' policy position and management intentions. Where possible and appropriate, detailed management measures are also described (as required by the PER guidelines).

9.2 Environmental Management System

Compass is committed to working within the framework of corporate environmental management systems (EMS) in accordance with the international EMS standard, ISO 14001:1996, adapted for use in Australia and New Zealand as AS/NZS ISO 14001:1996. These standards provide Compass with the elements of an effective, project-specific EMS, that is, a procedure for implementing, achieving, reviewing and maintaining the company's environmental policy.

An EMS is a structured approach to managing an environmental program and provides a quality system to guide the:

- Development and implementation of environmental management procedures.
- Monitoring of environmental impacts and performance.
- Review of procedures to ensure continual improvement.

The extent to which the various components of an EMS will be implemented by Compass will reflect the scale of the project. Key elements of the Browns Oxide Project EMS will include:

- Commitment and policy – the corporate environmental policy defines Compass' commitment to conduct business in all operations in an environmentally responsible manner and with full legal compliance.
- Planning – clearly stated project-specific objectives consistent with the policy.
- Implementation and operation – practical procedures to fulfil objectives with personnel responsibilities for environmental management clearly defined through inductions and training, and ongoing consultation with relevant stakeholders.
- Checking and corrective action – involves regular inspection and auditing to assess compliance with environmental management objectives and a system of dealing with incidents and complaints, recording data and reporting.
- Management review – internal review of the EMS with the aim of continual improvement.

Implementation of these EMS elements is outlined in the sections below.

9.3 Commitment and Policy

Compass is committed to managing its activities in an environmentally responsible manner and pursuing environmental excellence. Compass has a corporate environmental policy approved by the Compass Board (Box 9.1) that reflects this commitment. The Environmental Policy is the pinnacle document within the EMS, and environmental performance is measured and reported against this policy.

The Company's environmental policy is based on the recognition that all activities, including resource development and processing, impact on the environment. Since it is not possible to eliminate impact, the Company's policy is to engineer and conduct operations with the objective of achieving best practice so that adverse effects on the environment are either avoided or kept to an acceptable level.

Box 9.1 Compass Resources Environmental Policy

The Company's environmental policy objectives are:

- Assess potential environmental impacts before conducting new activities.
- Comply with applicable State, Territory and Federal laws and regulations.
- Implement, maintain and audit all environmental standards, regulations and good working practices which have applications to our operations and where such do not exist, to adopt the most practical methods available.
- To ensure that our operations do not create a significant hazard to employees, the public and any wildlife and are compatible with the environmental, social and economic aspirations and needs of the community, and to take immediate and positive action where any significant hazard arises.
- To work actively with government agencies to foster and encourage timely development of regulations in respect of our operations as may be needed to achieve both desirable and attainable environmental standards.
- To work in co-operation with outside groups toward a consensus on environmental quality standards which are both desirable and obtainable.
- To ensure public awareness and understanding of the nature of any individual environmental problems which may occur within our operations and of the action being taken by the Company in resolving or minimising such problems.
- To recognise the important roles played by individual employees in the achievement of the Company's environmental conservation goals, and where necessary to assist employees with any orientation of training on particular environmental issues.

9.4 Planning

The planning elements for the Browns Oxide Project are addressed throughout this PER document that identifies the project's regulatory framework (Chapter 2) and potential environmental impacts (Chapter 7). Planning for environmental risk is incorporated into the 'Avoidance, Mitigation and Management Measures' sections in Chapter 7, and is also presented in greater detail in the individual issue-based management plans (see Section 9.8).

9.5 Implementation and Operation

9.5.1 Procedures

The environmental management procedures for the project, as far as they have been developed at this stage of the project, are presented in the management plans (see Section 9.8).

9.5.2 Responsibilities

The project is to be managed by Compass. The General Manager Operations will be responsible for ensuring that all activities associated with the project are undertaken in full compliance with statutory regulations and are consistent with the Compass environmental policy.

Compass will ensure that the environmental approval conditions are accessible to senior management and other personnel on request at all times. All personnel are responsible for ensuring that their work complies with these conditions and the described environmental management measures. Individual accountability will be defined through conditions of contracts of employment.

Planned responsibilities of the various personnel involved in the project are outlined in Table 9.1.

Table 9.1 Environmental management responsibilities

Personnel	Responsibilities
Compass Chairman	• Overall responsibility for the project.
General Manager Operations	• Overall responsibility for site-specific implementation of environment policy, systems and management measures.
Environmental Manager	• Ensures EMS is implemented uniformly, revised and maintained. • Assesses the suitability and effectiveness of the EMS. • Ensures that contractors fulfil their contractual obligations. • Implements induction procedures and appropriate training. • Ensures compliance with licence conditions and company policy via the establishment and maintenance of appropriate reporting systems and databases. • Participates with personnel to improve work practices on site. • Undertakes internal site environmental audits. • Provides advice as required to other project personnel. • Liaises with stakeholders. • Ensures implementation and regular review of environmental management measures.
Other managers	• Ensures implementation and regular review of relevant environmental management measures. • Liaises with Environmental Manager as required.
Contractors	• Fulfil contractual obligations.
Archaeologist on call	• Provides advice and assessment on call in the event that archaeological material is uncovered during construction. • Liaises with the relevant community groups and government agencies.
Independent Environmental Auditor	• Conducts regular independent environmental audits of the operations to ensure compliance with Mining Management Plan (MMP) and statutory regulations.

9.5.3 Inductions and Training

Compass management will ensure that personnel have the appropriate knowledge and skills to achieve environmental policies, objectives and targets. The General Manager Operations will be responsible for organising environmental inductions (linked with safety inductions for efficiency) for employees and contractors to address environmental issues and responsibilities, including:

- Obligations under Compass' environmental policy, other policies and relevant sections of the EMS and permitting conditions.
- Site layout and areas of particular environmental or social significance.
- Community attitudes to the project and measures that could enhance the positive aspects of these attitudes.
- Site environmental guidelines.
- Specific procedures as detailed in the MMP concerning key environmental management aspects of the operation, including fire control, minimisation of impacts on flora/fauna, weed and pathogen management, recognition of potential heritage sites, segregation of rock types, water management, waste management, and hazard prevention.

An appropriately qualified person will conduct the environmental inductions. All personnel will be required to undertake and pass a knowledge questionnaire based on the induction presentation. Records will be retained of all persons being inducted. Weekly 'tool box' meetings will identify environmental issues that may arise from time to time.

Additional specific environmental training will be provided to personnel involved in:

- Maintaining and operating pollution control equipment/structures.
- Storing and handling hazardous materials.
- Responding to environmental incidents, e.g., fuel spills.

Additional training will be undertaken on an as-needs basis and, if required, key personnel will be provided with support to explain management procedures to their staff. All personnel will have access to hard copies of the MMP, to be located in the site office.

9.5.4 Consultation

The General Manager Operations (or his delegate) will maintain on-going consultation with stakeholders, including (see Section 6.2):

- DPIFM.
- DNRETA.
- Coomalie Community Government Council.
- Batchelor community.
- Nearby residents/landowners.
- Project personnel.
- Northern Land Council and traditional owners.
- Other stakeholders as relevant.

Matters for consultation will include construction progress, potential impacts of the project on other parties and their management, and safety or environmental incidents. Consultation may be required on an ad-hoc basis for some stakeholders (in terms of issues to be covered and timing of communications), while for others a structured program may be required. Depending on the stakeholder involved, consultation may take the form of telephone communications, formal written correspondence, one-on-one informal meetings or formal gatherings. Significant stakeholder consultation will be recorded in a stakeholder database and kept in the site office.

Compass was operating in the region prior to development of the Browns Oxide Project and had established relationships with the majority of the key stakeholders (see sections 6.3 and 6.4).

9.6 Checking and Corrective Action

9.6.1 Supervision and Inspection

The General Manager Operations (or his delegate) will undertake regular supervision and inspections of activities to ensure that environmental management procedures are being implemented satisfactorily. The frequency of inspection will depend on the magnitude of risk associated with the particular hazard. Inspection results will be maintained by the General Manager Operations and reported to Compass periodically.

9.6.2 Compliance Audits

Audits will be undertaken by an appropriately qualified person on a regular basis to ensure compliance with the environmental management procedures. Auditing will be conducted twice during the construction phase and yearly during operations [C].

9.6.3 Incidents

Environmental incidents that occur either as a result of an emergency, accident or equipment malfunction and which cause or threaten serious or material environmental harm will be reported to DPIFM within 24 hours of the event. In addition, the Compass Board will be made aware of any such incident within the same timeframe. Incidents can include (but are not limited to):

- Fire outbreak from the project area.
- Motor vehicle accident.
- Hydrocarbon or reagent spill.
- Contamination of a waterway.
- Injury to wildlife.

The incident will be recorded in a Non-compliance Report (NCR) which any employee, contractor or consultant can issue when policy breaches (or incidents) are noted and investigation is required. These reports will be submitted to the General Manager Operations, who will generate a Corrective Action Request (CAR) specifying the required rectification action as soon as practicable after submission of the NCR.

The incident will be registered in a record system and investigated and a report prepared. In addition to statutory reporting requirements, the report will detail any deficiencies in the MMP, with such deficiencies resulting in revision of the MMP and

notification to DPIFM. Personnel will be reminded of environmental incidents or near-miss incidents through tool-box meetings.

The Incident Register will be maintained throughout construction and operations. An incident summary will be included in regular compliance reports (see Section 9.6.5).

9.6.4 Complaints

A Complaints Register will be established to:

- Record complaints received from stakeholders.
- Identify the party/person responsible for dealing with the complaint.
- Record the action(s) taken to resolve the complaint.
- Record communication with the complainant (including feedback).

Compass will aim to resolve complaints received from stakeholders as soon as possible, although the nature of the complaint will determine the timeframe and actions to be taken. Table 9.2 sets out indicative timeframes for resolving typical complaints that might be received. Response time is the time taken to secure initial attendance by the General Manager Operations (or delegate) at site after first being made aware of an incident or complaint. Containment time is the time taken to contain the incident after first being made aware of its occurrence.

Table 9.2 Indicative timeframes for response and containment of typical complaints

Type of Complaint	Initial Response Time	Containment Time
Chemical, petrol or oil spill	Within 2 hours of notification	Within 24 hours of notification
Inappropriate vegetation clearing	Within 2 hours of notification	During initial response
Weed/pathogen hygiene not observed	Within 2 hours of notification	During initial response
Dust nuisance	Within 2 hours of notification	Within 24 hours of notification
Noise nuisance	Within 2 hours of notification	Within 24 hours of notification
Damage to land or property not in MLA	Within 24 hours of notification	Depends on nature of damage
Unacceptable behaviour or abuse of personnel	Within 24 hours of notification	N/A
Request for further information	Initial acknowledgement letter within 24 hours with further follow-up within 5 working days	N/A

The concept of 'response time' will also apply to requests for further information, but in this case will allow for an initial acknowledgment letter and subsequent investigation of the issue, with a final response in writing.

9.6.5 Recording

The EMS will become part of an auditable record system maintained by Compass that will also include the following:

- PER and associated documents.
- MMP.

- Compliance inspection and audit reports.
- Non-compliance reports (NCRs).
- Corrective action requests (CARs).
- Incidents register.
- Complaints register.
- Consultation records including meeting notes.

In accordance with the principles of AS/NZS ISO 14001:1996, the above EMS documentation will be:

- Easily located and logically filed in hard copy and electronic copy form, including date of issue.
- Available for all Compass personnel, contractors and consultants.
- Periodically reviewed and revised as necessary (and clearly dated) by authorised personnel.
- Removed from all points of issue when obsolete.

The General Manager Operations will be responsible for ensuring that feedback is assessed and implications for the EMS are acted upon.

9.6.6 Reporting

Routine Reporting Systems

Compass will employ the following environmental and social reporting systems:

- Results from environmental monitoring and investigation programs will be reported formally to DPIFM on a quarterly basis.
- A report dealing specifically with environmental issues will be submitted to Compass's Board on a quarterly basis. This will include a summary of non-compliance reports, corrective actions, and major issues arising from daily supervision and inspection and compliance audits.
- Updates of the Mining Management Plan (annually or as otherwise agreed).
- Annual NPI report.

Databases

Compass will maintain a computerised database for monitoring data and other relevant information. The primary functions of the system will include:

- Recording water quality data, including details such as:
 - Location code, description (including elevation) and map reference.
 - Sampling interval.
 - Sampling date.
 - Variable.
 - Unit of measure.
 - Method of analysis.

- Result.
 - Last monitored date.
- Recording relevant regulatory documents, e.g., acts of parliament, government policies, permits and dangerous goods or other licences.
- Recording additional information such as training records and the results of environmental audits and reviews.
- Providing other information, e.g., waste rock net acid-generation (NAG) and net acid-producing potential (NAPP) test results.
- Recording hydrocarbon usage.

9.7 Management Review

Continual improvement is the implicit aim of any EMS. The EMS will therefore be subject to review and modification to reflect issues that arise as the project is developed.

9.8 Issue-based Management Plans

This section provides issue-based management plans for the key environmental aspects identified within the PER as relevant to the proposed project (and taking into account the requirements of the MMP (DBIRD, 2002)). The management plans are:

- Emergency Response Plan.
- Fire Management Plan.
- Biological and Land Management Plan (which includes flora and fauna management, weed control, feral animal control and biting insects management).
- Water Management Plan (which addresses both surface and groundwater).
- Air Quality Management Plan.
- Noise and Vibration Management Plan.
- Hazardous Materials and Waste Management Plan (which includes both hazardous and non-hazardous wastes).
- Cultural Heritage Management Plan.

The management plans consist of four components:

- Issue(s).
- Objective(s).
- Performance standard(s).
- Implementation strategies and selected specific measures.

The management plans will be refined after approval has been obtained and the detailed design phase of the project has been completed. These revised plans will form the basis of a detailed MMP that will be completed prior to construction, and will expand on the

information contained herein, including implementation measures, schedules and responsibilities [C].

This approach has the following advantages:

- The PER report contains sufficient information to allow an assessment to be made of the strategic approaches that will be reflected in the detailed plans.
- The MMP will incorporate detailed project-related information as it becomes available and at the appropriate stage of project development.

9.8.1 Emergency Response Plan

Issue

Accidents and incidents can occur during mining, processing and transport activities. The risk of certain events having significant consequences requires the preparation of an Emergency Response Plan (ERP).

Objective

The objective of the ERP is to ensure that a prompt and appropriate response is made to unplanned incidents where life, property or significant environmental or social values are threatened during construction and operations.

Performance Standards

To ensure that this management plan complements the emergency response procedures of DPIFM and other relevant agencies, Compass will consult with relevant authorities regarding:

- On-site emergency procedures.
- Special risks and appropriate procedures to minimise those risks.
- Commercial ambulance and medical services.

The Emergency Response Plan will consider the relevant aspects of 'Small Mine Occupational Health and Safety Management System', which is published by DPIFM and is designed to help develop information for use at a mining site before and during emergencies.

Implementation Strategies and Measures

Strategies and measures that will be implemented to ensure that the objective is achieved include:

- Demonstrate clear commitment and leadership by management through policy, participation, communication and allocation of resources (personnel, time, facilities and finances).
- Provide a current, written, project-specific plan, i.e., a detailed operating emergency response plan that addresses, among other matters, communication to employees, contractors and the public and, where appropriate, the recovery needs of the community after an emergency.

- Foster employee ownership in the processes of emergency management and response.
- Identify all hazards and risks of an unplanned incident (detailed hazard and risk analysis). Develop an assessment process, periodically reviewed and updated, of potential risks from an accidental release or other emergencies to employees, contractors and local communities, and initiate actions to reduce significant risks. Review quarterly and update as necessary, and display in the site office. Credible emergencies that could potentially occur at the project site include (see Chapter 8):
 - Accidental spill of hydrocarbons or chemicals while being transported, stored or used.
 - Accidental detonation of explosives while being transported, stored or used.
 - Gale-force wind or rainfall, including cyclones, or a flood event in the East Finniss River, that causes extreme flooding or destruction of facilities.
 - Lightning or fire that damages facilities or the surrounding environment.
 - Injury to personnel.
 - Vehicle accident.
 - Pit wall collapse or rock fall.
- Develop a cyclone response plan.
- Ensure that facilities allocated to emergency response are maintained in working order (e.g., phone, facsimile, CB radios, satellite phone, fire tanks).
- Ensure that all personnel wear personal protective equipment (PPE) at all times while on site, as required. The level of PPE equipment for each person is dependent on the location and nature of the activity being undertaken.
- Induct all personnel in emergency response procedures during environmental and safety induction (nobody will be allowed on site (other than to the administration/reception area) unless inducted).
- Develop, conduct and maintain a training program, addressing operating procedures, emergency and safety procedures, regulatory compliance requirements and communication responsibilities, designed to improve the proficiency of emergency response of all employees and contractors.
- Identify emergency authorities and, where relevant, provide tours of the project area for them to promote emergency preparedness, by having current knowledge of facility operation and relevant emergency response planning information.
- Conduct emergency exercise sessions with emergency authorities and others where appropriate, to test the workability of the emergency response plan.
- Share information and experience with other nearby facilities in the community relating to emergency response planning, exercises and incident handling.

- Clearly define roles and responsibilities for personnel involved in the emergency response.
- In the event of an emergency, immediately contact the General Manager Operations and other relevant personnel as provided for in the detailed emergency response plan, and provide details of the emergency such as:
 - Nature of the emergency (e.g., injury, fire, fall).
 - Location.
 - How it may have occurred.
 - Current status (e.g., who is injured, where the fire has spread to).
 - What may be needed to stop/control the emergency.
- In the event of fire, accident, environmental hazard, personal injury, flood or similar, the response will be in accordance with the detailed operating emergency response plan. Emergency response will be prioritised according to the following hierarchy:
 - Protection and rescue of human life.
 - Minimisation of the area impacted by the incident.
 - Protection of the environment, plant and property.
 - Rendering the area safe in which the emergency has occurred.
 - Restoration of all disrupted services.
 - Decontamination and rehabilitation of the incident scene and surrounding area.

9.8.2 Fire Management Plan

Issues

Project development activities may lead to fire ignition within the project area or the surrounding vegetation. Sources of fire ignition include:

- Sparks from chainsaws.
- 'Hot work' (e.g., metal grinding or welding).
- Vehicles.
- Inappropriate handling or storage of combustible substances.
- Discarding lit tobacco products, matches or other burning material.
- Mechanical malfunction in project facilities, vehicles or machinery, or explosion of the magazine.
- Vegetation coming into contact with overhead powerlines.
- Sparks caused by lightning.

The project also needs to be protected from bushfire that originates from surrounding vegetation, regardless of source.

Objectives

The objectives of the Fire Management Plan are to:

- Minimise fire risk.
- Protect the public and personnel.
- Protect property and minimise property damage or loss.
- Protect flora and fauna and minimise damage or loss.
- Prevent the spread of fire in the event of ignition.
- Provide adequate response in the event of an ignition.

Performance Standards

The Fire Management Plan has been prepared under the following legislation, guidelines and codes:

- *Northern Territory Bushfires Act.*
- Northern Territory Bushfire Regulations.

Implementation Strategies and Measures

Strategies and measures that will be implemented to ensure that the objectives are achieved include:

- Induct personnel in fire prevention and response.
- Enforce a total fire ban within the project area, unless prescribed burning is deemed necessary, in which case it will occur in a controlled regulated environment in consultation with traditional owners, pastoralists and organisations such as the Bushfires Council Northern Territory.
- Implement a controlled burn regime to maintain a mosaic of vegetation and habitats, including structural and spatial diversity and development.
- Monitor and record fire danger ratings on a weekly basis during the fire season and comply with all relevant statutory requirements and permits.
- Liaise with the Bushfires Council Northern Territory during the fire season regarding fire risk, danger ratings, preparedness and fire control.
- Establish fire evacuation procedures and an emergency assembly area.
- Provide emergency contact numbers in the site office in an easily accessible area (i.e., noticeboard). Contacts should include the local fire brigade, local police station, medical centre, SES).
- Report all uncontrolled fire to the General Manager Operations, who will report it to the relevant authorities.
- In the event of a fire during a fire danger period, ensure that at least one employee stays with the fire (without endangering themselves) until it is completely extinguished or the relevant authorities take over responsibility.
- Provide relevant information on project development and operating practices to fire authorities.
- Ensure particular diligence when transporting, storing or using flammable materials such as solvent extraction reagents.
- Implement specific measures such as:
 - Maintain a full trailer-mounted fire-fighting tanker on site at all times.
 - Provide and maintain appropriate fire-fighting equipment, including fire extinguishers, water knapsacks and rake hoes at strategic project locations. Fire

extinguishers will be provided in all project-related vehicles. All equipment will be compatible with that of local fire authorities.

- Do not undertake 'hot work' (e.g., welding) on days of declared Total Fire Ban without a permit.
- When undertaking 'hot work', ensure that spark guards are used, the immediate area is clear of flammable materials (excepting vegetation) and fire extinguishers are on hand. Develop a 'hot work' procedure and ensure compliance.
- Construct 50-m-radius fire breaks around sensitive areas, such as the explosives magazine.
- Park vehicles in a cleared car park on site and not over tall groundcover vegetation.
- Keep vehicles clean, e.g., clear grasses from belly-plates.
- Fit chainsaws used for vegetation clearance with spark arresters.
- Ensure all flammable materials are clearly marked and stored appropriately with fire-fighting equipment.
- Use diesel-fuelled vehicles when practicable.
- Do not discard any lit tobacco products, matches or any other burning material into vegetated areas.
- Clear and maintain vegetation under overhead power lines to a height considered safe (for the continued operation of the power line in the event of a fire).

The measures listed above will provide a basis for a detailed fire management plan, where this will be developed in consultation with key stakeholders such as traditional owners, the NLC and local fire authorities (fire brigade and Bushfires Council Northern Territory) [C].

9.8.3 Biological and Land Management Plan

The Biological and Land Management Plan addresses flora and fauna management, weed control, feral animal control and biting insects management.

Issues

Biological and land management issues associated with the project include:

- Clearing of vegetation and associated impact on native flora and fauna values. This may result in:
 - Loss of feeding, breeding and nesting habitat.
 - Loss of distribution, dispersion and genetic diversity of populations in the region.
 - Habitat fragmentation.
- Loss of fauna due to increased traffic.

- Fire management and associated impacts on vegetation, flora and fauna biodiversity and habitats.
- Effects on vegetation and fauna habitat surrounding the proposed mine due to mine dewatering and other hydrological changes.
- Effects on aquatic flora and fauna due to disturbance of soils from construction activities resulting in increased soil erosion and transport of soils to local waterways with consequent adverse impacts.
- Introduction and/or spread of weed species by project-related vehicles and equipment (especially earth-moving equipment).
- Feral animals.
- Spread of diseases due to biting insects such as mosquitoes.

Objectives

The objectives of the Biological and Land Management Plan are to:

- Promote and maintain stable vegetation cover.
- Minimise soil disturbance and soil erosion.
- Minimise impacts to flora and fauna.
- Prevent and minimise impacts of bushfires (see Section 9.8.2 for corresponding performance standards and implementation strategies and measures).
- Prevent and control pest animal invasion.
- Prevent and control weed invasion.
- Prevent the occurrence of biting insects build-up.

Performance Standards

The Biological and Land Management Plan has been prepared under the following legislation, guidelines and codes:

- Northern Territory *Weeds Management Act*.
- Territory *Parks and Wildlife Conservation Act*.
- Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*.
- Guidelines for preventing mosquito breeding sites associated with mining sites (MEB, 1997).
- The prevention of mosquito breeding in sewage treatment facilities (Whelan, 1997).
- Recommendations for design details of sewage pond effluent reuse or disposal facilities to prevent mosquito breeding (Whelan, 1998).

- Personal protection from mosquitoes and biting midges in Northern Territory (Whelan, 2004).

Implementation Strategies and Measures

Strategies and measures that will be implemented to ensure that the objectives are achieved include:

Flora and Fauna Management/Vegetation Clearing

- The project will be designed to minimise vegetation loss due to project infrastructure layout.
- Where possible, previously disturbed and modified areas will be used in preference to undisturbed areas.
- The project will be designed to minimise and, where possible, avoid unintended changes in the structure and condition of areas which contain flora and fauna of significance (as outlined in sections 7.1.4 and 7.2.5). For example, clearing of vine forest vegetation in the north of the project area will be minimised.
- No land disturbance activities will take place without written authority in the form of a Land Clearance Certificate or similar.
- The project area will be maintained in accordance with good industry housekeeping practices to discourage vermin.
- Specific measures such as:
 - Cleared vegetation will be used as erosion control (to dissipate rainfall) where appropriate. Cleared vegetation will not be stockpiled against retained vegetation nor will it be pushed into retained vegetation along creeks or into creeks.
 - Stripped topsoil will be stockpiled separately and used for revegetation.
 - Construction equipment, material stockpiles and other infrastructure will be placed on cleared land rather than in areas of native vegetation.
 - Where practicable, trees will be retained within the project area.
 - Access to the site will be restricted (by security fencing and security gate) to minimise entry of non-project vehicles to the area.
 - All vehicles will stay on designated tracks/roads and avoid creating new tracks.
 - Soil disturbance outside the nominated construction zones will be minimised.
 - No trapping or killing of native wildlife within the project area will be permitted.
 - No firearms or domestic pets, such as cats and dogs, will be brought into the project area.
 - Native wildlife or introduced species (especially cats) will not be intentionally fed.

- No food will be discarded within the project area. All waste materials (particularly food scraps) will be stored in lidded containers.

Weed Control

- A detailed weed management plan will be developed in accordance with the Northern Territory *Weeds Management Act* [C]. This will incorporate the following management measures:
 - All personnel will be inducted in weed management procedures.
 - Monitoring for weed outbreaks during project development will take place and such outbreaks will be eradicated at the appropriate time using the most efficient means, preferably with target-specific, non-persistent (i.e., biodegradable) herbicides.
 - Heavy vehicles and equipment that work in areas off formed roads, e.g., TSF construction and initial clearing of the hard-stand area for the process plant, will be visually inspected for clumps of soil or vegetative material before leaving the project area. If present, material will be removed by using a high-pressure/low-volume water spray unit.
- A 'clean vehicles' policy will be maintained whereby heavy vehicles and equipment will be cleaned prior to entry into the project area. Other vehicles will be cleaned if they leave designated access tracks.
- Hard-stand material at the process plant will consist of NAF waste rock sourced from the project area. Material sourced from outside the project area will be generally avoided but, if necessary, will be from a known source (which will also be a DPIFM or Council-approved site).

Biting Insects

- All personnel will be inducted on the risks associated with biting insects, how to prevent bites and how to treat them.
- The site will be managed to minimise pooling of water so as to prevent the formation of mosquito breeding sites.
- Disposal of wastes will occur in a manner that does not increase biting insect populations.
- Sewage treatment will be managed in accordance with the guidelines outlined in Whelan (1997) and Whelan (1998). Treated water will be returned to the process water pond.
- Advice will be sought from Northern Territory authorities if problematic mosquito breeding is detected within the project area or biting insects become pests.
- Specific measures such as:
 - Any container capable of holding water, e.g., tyres, drums and tanks, will be either stored under cover, provided with drainage holes, emptied on a weekly

basis or disposed of in an appropriate landfill site to prevent the formation of mosquito breeding sites.

- Insect repellent, appropriate clothing and other personal protective equipment will be made readily available to all personnel.
- All buildings will either be fitted with mosquito-proof insect screening or, if sealed, will be air-conditioned.

9.8.4 Water Management Plan

Issues

Project development may potentially impact on surface waters in the project area due to changes in water flows, degraded water quality or sedimentation in streams. This may result from:

- Stormwater runoff.
- Discharge of excess water from the main sedimentation trap.
- Seepage from the TSF and TSF embankment (containing encapsulated PAF material).
- Intercepted groundwater/pit water (during operations and post-closure).

Advance dewatering and/or in-pit pumping to prevent groundwater from accumulating in the pit will also create a cone of groundwater depression around the pit that may:

- Reduce groundwater availability for other users.
- Reduce baseflows to surface waters.
- Reduce the water level in Rum Jungle Mine pits, thereby exposing sulfide material in pit walls to oxidation and generating ARD.
- Remove water from the root zone of surrounding vegetation.

Possible impacts of a TSF-derived groundwater mound, and acidification of groundwater on recharge of the drawdown cone, also require consideration.

Objective

As described in Section 7.8.2, water quality management is based on identification of environmental values to be protected and setting objectives to maintain these agreed values. However, a number of factors, including the current degraded nature of the East Finniss River and the possibility that water quality may further deteriorate due to influences from the Rum Jungle Mine site, need to be considered in terms of setting targets for surface waters in the project area. Compass therefore proposes that requirements be established in terms of works to be implemented and practices to be adopted, based on Best Practice Environmental Management. The management target for surface water quality would be to maintain, and allow improvement of, the existing ecosystem, consistent with the approach recommended by ANZECC/ARMCANZ (2000) for Condition 3 (highly disturbed) ecosystems.

It is also a water management objective for the operation to be self-sustaining in terms of water use requirements.

Performance Standards

This Water Management Plan will consider the relevant aspects of the following legislation, policies, guidelines and codes:

- Northern Territory *Water Act* – the Water Act legislates the extent to which surface water and groundwater can be used and for what purpose. Discharges to natural waters are prohibited unless licensed under the act. Discharge licences are only available in waters for which beneficial uses (environmental values) have been declared.
- National Environment Protection Measure for National Pollutant Inventory (NEPC, 2000) – provides lists of contaminants that must be reported if they are emitted to water above a certain annual mass threshold. It is not expected that these thresholds will be exceeded and therefore it is unlikely that reporting under the inventory will be required.
- Australian and New Zealand guidelines for fresh and marine water quality (ANZECC/ARMCANZ, 2000) – provide a guide for setting ambient water quality objectives required to sustain current, or likely future, environmental values for natural and semi-natural water resources in Australia and New Zealand. The water quality guidelines and the beneficial use process set out in this document are used by DNRETA for water quality management in the Northern Territory.
- Best practice environmental management in mining: Water management (DEH, 1999) – booklet that describes best practice approaches for minesite water management in Australia.
- Minesite water management handbook (MCA, 1997) – provides practical guidance, based on scientific principles and leading industry practice, on how to investigate and manage surface water and groundwater during exploration, mining and mineral processing.

Implementation Strategies and Measures

Strategies and measures that will be implemented to achieve the objectives include:

- Construct and maintain clean water diversion drains around disturbed areas.
- Capture runoff from disturbed areas in collection drains and direct to one of three sedimentation traps. Pump water from the two smaller sedimentation traps to the main sedimentation trap as required to maintain sufficient holding volumes in the smaller traps.
- Monitor water quality within the main sedimentation trap and ensure controlled release to East Finniss River when flow conditions are appropriate.
- If necessary, treat excess water discharged from the main sedimentation trap to the East Finniss River.

- Flag vegetation clearing boundaries to minimise clearing, minimise clearing areas with highly erodible soils and steep slopes, and revegetate disturbed areas as soon as is practical.
- Undertake regular maintenance of road drainage.
- Minimise continuous slopes where scouring can occur, line drainage lines with crushed rock or geotextile fabric or install baffles to reduce water-flow velocities and, if necessary, install sediment control structures, e.g., sediment fences.

Protection of Water Quality

The water management implementation strategy that will minimise impacts on water quality is summarised in Table 9.3. It should be noted that, concerning ARD, management measures will be reviewed and refined on the basis of information obtained from column leach tests (established using waste rock samples during November 2005) and operational monitoring data.

Minimisation of Abstraction and Discharges

- Dewater tailing and return water to process plant.
- Recycle treated sewage and wastewater to the process water dam for use in the process plant.
- Pump mine water from the pit to the main sedimentation trap for use in the process plant.
- Use water from groundwater interception bores to provide fresh water for amenities (kitchen, toilets, showers), vehicle wash down and dust suppression, and raw water for the process plant.

The water use hierarchy adopted to meet process water requirements for the project involves recycling process water and inputs from the following sources (listed in order of preference):

1. TSF decant.
2. Sewage effluent.
3. Sedimentation trap water (comprising mine water and site runoff).
4. Groundwater (e.g., from interception bores).

Table 9.3 Management strategies to minimise impacts on surface water quality

Source	Potential Contaminants/Stressors	Mitigation/Treatment	Receiving Environment	See Section
<i>Runoff</i>				
Runoff from process plant	SPM Oil and grease/solvents Metals	Runoff will be collected, recycled internally or pumped to the process water dam for use in the process plant.	-	4.14.4
Runoff from site catchment	SPM Metals	Directed to sediment trap. Excess water in two smaller sedimentation traps will be pumped to the main sedimentation trap for use in the process plant, as required. Water in this trap will be monitored and excess water discharged to East Finniss River when quality and river flow regime are appropriate; further treatment will be provided if necessary.	East Finniss River	4.14.2
Runoff from main access road	SPM	Table drain diverting runoff to standing vegetation. Silt fences will be installed if required.	Standing vegetation	-
Runoff from undisturbed areas	-	Directed away from areas of disturbance and allowed to drain naturally.	Standing vegetation	4.14.2
<i>Tailing Decant</i>				
Water from TSF	Metals Process reagents	TSF decant will be returned to the process circuit via the process water dam. The TSF is designed to retain sufficient volume for runoff from major rainfall events and no excess discharge is expected. In an extreme rainfall event, excess water would drain via a spillway to the main sedimentation trap.	-	4.14.4
<i>Process Water</i>				
Water from process plant	Metals Process reagents	Water from the plant will be returned to the process circuit via the process water dam.	-	4.14.4

Table 9.3 Management strategy to minimise impacts on surface water quality (cont'd)

Source	Potential Contaminants/Stressors	Mitigation/Treatment	Receiving Environment	See Section
<i>Seepage from TSF</i>				
Water seeping through TSF embankment and basement during operations	Metals Process reagents	During operations, 'shallow' seepage through the embankment will be collected in a toe drain and recycled. 'Deep' seepage will be captured by either bores or the groundwater drawdown cone resulting from the pit dewatering.	-	4.10.3
Post-closure seepage from TSF embankment (containing encapsulated PAF material) and TSF	SPM Low pH water Metals	Management and mitigation measures are to be incorporated into the construction and operation of the TSF to ameliorate the volume and/or quality of ARD. Improved estimates of ARD will be obtained during project development and TSF runoff and drainage closely monitored. Additional management and mitigation measures will be investigated as required, including options for ongoing collection and treatment of ARD prior to discharge should this prove to be warranted.	East Finniss River	4.9.2, 4.10.3, 7.8.4
<i>Mine Water</i>				
Water produced from mine dewatering	Oil and grease SPM Metals	Mine water will be monitored to test for the development of ARD within the pit (and treated as required). Water will be pumped to the main sedimentation trap for use in the process plant, as required. Water in this trap will be monitored and excess water discharged to East Finniss River when quality and river flow regime is appropriate; further treatment will be provided if necessary.	East Finniss River	4.14.1, 4.14.2
<i>Interception Bores</i>				
Groundwater extracted to assist mine dewatering	Low pH water Metals	Water excess to amenity, dust suppression and raw water requirements is to be discharged to East Finniss River, if of suitable quality. Alternative strategies to be developed in consultation with DPIFM if water is contaminated due to historical legacy of Rum Jungle mine.	East Finniss River	4.14.4, 7.8.4

Table 9.3 Management strategy to minimise impacts on surface water quality (cont'd)

Source	Potential Contaminants/Stressors	Mitigation/Treatment	Receiving Environment	See Section
<i>Grey Water and Sewage</i>				
Grey water and sewage from ablutions buildings	Surfactants Nutrients Organic matter Pathogens	Treated in package sewage treatment plant to required standards and recycled to process water dam for use in the plant.	-	4.14.5
<i>Post-closure Pit Water</i>				
Water in the disused open pit	Low pH water Metals	The potential for development of ARD from pit walls will be monitored during development of the mine. If necessary, various management strategies will be investigated to control ARD, such as application of layers of Virotech Terra B® and shotcrete to PAF material in the pit walls to inhibit oxidation. On closure, the pit may also be rapidly filled by diverting the flow of the East Finniss River, thereby limiting exposure of sulfide materials to the atmosphere. Pit water quality will be monitored post-closure.	East Finniss River (if the pit overflows)	7.8.3

9.8.5 Air Quality Management Plan

Issues

Air quality issues associated with the project are dust generation from vehicle travel on unsealed roads, particulate matter from the handling and transport of ore and waste (from wind erosion) and, to a lesser extent, dust generated from earthworks associated with vegetation clearing, construction of the access road, stockpiles and tailing beaches.

Exhaust fumes from vehicles, plant, mill and the portable electricity generators will also contribute to localised temporary changes in air quality. In practice, the sources of gas emissions are too small and too widely dispersed to justify special attention.

Objectives

The objectives of the Air Quality Management Plan¹ are to minimise:

- Atmospheric emissions, including dust and odour.
- Greenhouse gas emissions.
- Creation of safety hazards from air emissions.
- Disturbance to the community.

Performance Standards

The Air Quality Management Plan has been prepared under the following policies, guidelines and codes:

- National Environment Protection Measure for Diesel Vehicle Emissions (NEPC, 2001) – relevant in terms of maintaining diesel-operated vehicles in good working order.
- National Greenhouse Strategy; Strategic Framework for Advancing Australia's Greenhouse Response (AGO, 1998) – specifically states that the minerals and mineral processing industries should pursue best practice environmental management to reduce greenhouse gas emissions.
- Final Impact Statement for Ambient Air Quality National Environment Protection Measure. National Environment Protection Council Service Corporation (NEPC, 1998).

Implementation Strategies and Measures

Strategies and measures that will be implemented to ensure that the objectives are achieved include:

- Identify dust sources and ensure that the project is suitably resourced and equipped to address these sources.

¹ This encompasses the requirements of the Fugitive Dust Control Plan as requested by the PER guidelines (OEH, 2005).

- Site topsoil stockpiles in areas sheltered from strong winds if possible. Allow plant material to colonise stockpiles.
- Minimise the extent of exposed surfaces and the length of time for which they occur, e.g., apply rock screenings to cleared surfaces at infrastructure sites, promote conditions for prompt vegetation regeneration to stabilise soils along road verges and other exposed areas, and revegetate progressively.
- Ensure vehicles and plant are mechanically sound and well tuned, and fitted with appropriate emission control equipment.
- Minimise the likelihood of fire by implementing the Fire Management Plan (see Section 9.8.2).
- Implement specific measures such as:
 - Apply dust suppression measures, such as spraying the road surface (access road), topsoil stockpiles, low grade ore stockpile and lead ore stockpile with water if dust starts causing unacceptable nuisance/hazard.
 - Apply dust suppression measures on drill equipment if dust causes unacceptable nuisance/hazards. Dust monitoring of personnel working with drills will be undertaken in accordance with the project's Occupational Health and Safety policy.
 - Apply water sprays in the crusher and conveying system, including transfer points.
 - Maintain unsealed roads to a high standard.
 - Restrict vehicle speed on the access road to 40 km/hr.
 - Drive vehicles only on designated roads, unless otherwise unavoidable.

9.8.6 Noise and Vibration Management Plan

During project operations, noise and vibration emissions may be generated by vehicles (including reversing alarms), machinery, the plant, and blasting. Due to the remoteness of the project from residential areas and individual residences, noise nuisance will not be a significant issue for the project.

Issues

The issues in relation to noise and vibration are:

- Disturbance to local residents.
- Disturbance to wildlife.

Objectives

The objectives of the Noise and Vibration Management Procedures are to:

- Minimise operational noise and vibration impacts to local residents.
- Minimise operational noise and vibration impacts to wildlife.

Performance Standards

The Noise and Vibration Management Plan has been prepared under the following policies, guidelines and codes:

- Australian Standard for Explosives – Storage, Transport and Use (Standards Australia, 1993).
- Australian Standard for the Guide to Noise Control on Construction, Maintenance and Demolition sites (Standards Australia, 1981).
- Industrial Noise Policy. Environment Protection Authority. New South Wales. (EPA, 2000).

Implementation Strategies and Measures

Strategies and measures that will be implemented to ensure that the objectives are achieved include:

- Maintain construction plant, machinery and vehicles regularly.
- Install standard noise abatement devices (e.g., mufflers) on construction machinery and vehicles.
- Keep blasting and crushing to regular daylight hours.
- Provide nearby residents with appropriate contact details so they can alert Compass to any noise or vibration issues.
- Use smart alarms on items of mobile plant that are required to use alarms for safety reasons.
- Acoustic treatment or acoustic shielding of the process plant may be implemented if required.
- Vibrations will be managed in accordance with the Australian Standard (Standards Australia, 1993).

9.8.7 Hazardous Materials and Waste Management Plan

During the project, domestic and industrial wastes such as waste oils, packaging, drums and general refuse will be generated. Hazardous materials (mainly hydrocarbons, reagents and explosives) require specific transport, storage, handling and disposal procedures. Waste material and hazardous materials can pose significant health, environmental and aesthetic risks if not appropriately managed.

Issues

The environmental issues in relation to waste and hazardous materials management are:

- Contamination of soil and water (including groundwater).
- Health risks to project personnel and the public.
- Adverse effects on flora and fauna.

- Reduction in visual amenity.
- Inefficient resource use.

Objectives

The objectives of the Hazardous Materials and Waste Management Plan are to:

- Avoid the contamination of soil and water (including groundwater).
- Minimise potential risks to operations personnel and the public.
- Minimise adverse effects on flora and fauna.
- Minimise impacts to visual amenity.
- Ensure that all wastes, including hazardous material, solid putrescibles and biodegradable and inert wastes, are managed safely and in an environmentally appropriate manner.
- Promote efficient use and conservation of resources, reduce the need for waste treatment facilities and reduce the requirement of raw materials.

Performance Standards

The Hazardous Materials and Waste Management Plan is consistent with the following standard waste minimisation principles (listed in order of preference):

1. Avoid.
2. Minimise.
3. Reuse.
4. Recycle/reclaim.
5. Treat.
6. Dispose.

The Hazardous Materials and Waste Management Plan has been prepared under the following legislation, guidelines and codes:

- *Dangerous Goods Act* (and regulations and amendments) – main aim is to reduce as far as practicable the risks of personal injury, property damage and environmental harm arising from the manufacture, storage and other handling of dangerous goods and the use of dangerous goods
- Northern Territory *Waste Management and Pollution Control Act*, guidelines and regulations.

Implementation Strategies and Measures

Strategies and measures that will be implemented to ensure that the objectives are achieved include:

General Waste

- Adopt waste minimisation principles as summarised above.

- Ensure a high level of staff employee and contractor awareness of the Hazardous Materials and Waste Management Plan.
- Incorporate waste and hazardous materials management into site induction programs and training.
- Ensure that all employees and contractors operate in accordance with Compass' procedures for waste and hazardous materials management.
- Promote a high standard of housekeeping, thereby minimising litter and vermin infestation.
- Develop and implement a recycling and waste minimisation program that will be regularly (e.g., quarterly) reviewed during the lifetime of the operation [C]. This will include consideration of the following:
 - Ordering supplies in bulk and selecting suppliers who have return policies in place for unused goods.
 - Minimising waste generation.
 - Segregating main waste types into dedicated receptacles for disposal, reuse or recycling (e.g., food waste, plastics, aluminium, timber, paper).
 - Reusing materials or equipment where feasible.
 - Taking recyclable material to a suitable waste transfer station.
 - Taking non-recyclable waste to a suitable landfill.
- Maintain records of all wastes managed on site or sent to an off-site treatment, recycling, storage and disposal facility. Concerning the latter, the following information is required:
 - Waste generator facility name and address.
 - Date of shipment for recycling, treatment or disposal.
 - Type of waste.
 - Quantities of waste.
 - Method of recycle, treatment or disposal.
 - Description of waste, including restricted characteristics.
 - Transporter name and address.
 - Name of recycling, treatment, storage or disposal facility accepting waste.
 - Where available, record receipt of waste from waste facility.
- Implement additional specific measures such as:
 - Ensuring that waste storage areas are well signed and delineated.
 - Ensuring that licensed contractors dispose of waste off site when suppliers cannot remove waste.

In addition to the measures described above, Compass will implement a range of management measures for the various solid wastes that will be generated on site (Table 9.4).

Table 9.4 Solid waste management procedures

Waste Type	Minimise	Reuse/ Recycle	Treatment/ Destruction	Comments
Putrescible/ biodegradable litter	Minimise over- ordering	-	Collect in lidded 200-L drums located at designated points, transfer to the holding point, then remove off site by licensed contractor.	Lidded drums will prevent ingress of water and deny access to animals and birds. Drums will be colour-coded to differentiate contents.
Packaging, paper, plastic, recyclable cans, containers, glass	Purchase in bulk	Separate white paper and PET – HPDE, glass, plastic, cans	Collect in lidded 200-L drums located at designated points, transfer to process plant then remove off site by licensed contractor.	Drums will be colour-coded to differentiate contents.
Scrap steel	Minimise over- ordering	Collect for recycling	Store at designated site.	-
Tyres	Maintain vehicles and equipment	Collect for recycling (no tyres will be disposed of on site)	Store at workshop.	Small quantities expected.

Hazardous Materials

- Develop a waste minimisation program that includes alternatives and front-end purchasing decisions.
- Identify the needs and storage requirements for emergency containment of materials.
- Ensure that operators and contractors are suitably trained with respect to transport, handling, storage, spill and disposal requirements.
- Implement a recording system to:
 - Reconcile hydrocarbon and reagent usage against stock and minimum/maximum storage requirements.
 - Maintain records of wastes managed on site or sent to an off-site treatment, recycling, storage and disposal facility. For off-site recycling, treatment, storage and disposal, record the same information as described above for general waste.

- Ensure that all contractors operate in accordance with Compass' procedures for:
 - Transportation.
 - Storage and handling.
 - Recycling and disposal.
 - Incident reporting for all spills.
- Implement other specific measures such as:
 - Take waste oil directly to a central storage tank for off-site disposal by a registered contractor.
 - Collect other hydrocarbon wastes, engine coolants, grease and used absorbent materials within separate receptacles and transfer to a central on-site bunded storage facility for off-site disposal by a registered contractor.
 - Wherever possible, return all hazardous wastes and packaging to the supplier for recycling or disposal. Where this cannot occur, dispose of used containers and drums, and batteries, off site by a registered contractor.
 - Place hydrocarbon-contaminated soils in a centrally located, lined or bunded (impervious to hydrocarbons) area for collection and disposal by a registered contractor.
 - Locate MSDSs for all materials used in the project on site and in a readily accessible location.
 - Ensure that containers/tanks to be used for storage are suitably labelled, compatible with the material to be stored, and tested/inspected for leakages prior to use and periodically during use.
 - Construct bunding to meet appropriate Australian standards (AS 1940:1993 and AS 4452:1997) and regularly inspect bunds to ensure their good condition.
 - Locate vessels containing controlled wastes or dangerous goods in excess of 250 L in a bunded facility. Hold vessels containing controlled wastes or dangerous goods of 250 L or less that are not located in a bunded facility on spill trays of appropriate capacity to contain and recover spills.
 - Store hazardous material more than 50 m from a waterway.
 - Undertake fuel transfers in designated area that have appropriate collection drainage.
 - Supply portable spill kits and a supply of absorbent material at key areas on site (e.g., workshops, storehouse) and place trays containing absorbent material under local work areas when an oil spill is unavoidable, e.g., removing hydraulic hoses, replacing filters.

- In the event of a hazardous material spill, implement the following spill response plan:
 - Stop work and contain the spill.
 - Implement clean-up and remediation procedures. Treat and dispose of spilt substance, contaminated materials and debris in accordance with MSDS requirements, relevant guidelines and waste management procedures.
 - Ensure that the General Manager Operations reports the spill containment to DNRETA in accordance with legislative requirements.
 - If necessary, implement the Emergency Response Plan (Section 9.8.1).

9.8.8 Cultural Heritage Management Plan

Four sites and seven areas of background scatter of Aboriginal archaeological and three sites of heritage significance were identified during a survey completed in August 2005 (see Section 7.12).

Issues

The environmental issues in relation to cultural heritage management during operations concern the potential to disturb known sites, and to uncover new Aboriginal archaeological or heritage sites during construction.

Objectives

The objectives of the Cultural Heritage Management Plan are to:

- Avoid impacts to known sites on or near the project facilities.
- Conserve cultural heritage sites or artefacts that may be uncovered during project development.

Performance Standards

The Cultural Heritage Management Plan has been prepared under the following policies, guidelines and codes:

- Northern Territory *Heritage Conservation Act*.
- Northern Territory *Aboriginal Sacred Sites Act*.
- *Aboriginal Lands Rights (Northern Territory) Act 1976*.
- *Environment Protection and Biodiversity Conservation Act 1999*.
- *Environment and Heritage Legislation Amendment Act (No 1) 2003*.

Implementation Strategies and Measures

Strategies and measures that will be implemented to ensure that the objectives are achieved include:

- Maintain the existing relationships between Compass and the NLC and traditional owners, which have resulted in the successful management of advised 'no-go' areas in surrounding tenements¹.
- Through induction, instruct construction personnel in recognition of cultural heritage features for avoidance and reporting processes in the event that new cultural heritage features are uncovered during construction.
- Protect known sites (see Section 7.12) identified during the archaeological survey from disturbance by the establishment of exclusion zones or by the removal of artefacts in accordance to the Northern Territory *Heritage Conservation Act*, prior to construction.
- If the northeast section of the proposed development near the hill adjacent to the East Finniss River (as outlined in Appendix 6) is to be disturbed, the area will first be burnt under conditions outlined in Section 9.8.2 – Fire Management, and then a heritage survey will be undertaken in accordance with the Northern Territory *Heritage Conservation Act*.
- Aboriginal and historical archaeologists will be on call during project construction in the event that ground surface visibility is poor or archaeological material is detected.
- If a potential heritage site/artefact is found, the construction contractor and General Manager Operations will be notified, and the latter will contact the on-call archaeologist. The following measures will then be implemented:
 - Construction activities at the potential heritage site will be discontinued until the on-call archaeologist advises on further action.
 - Flag potential heritage site as a temporary no-go zone until, and during, site assessment by the archaeologist (if deemed necessary by the archaeologist).
 - Archaeologist will assess, record and register the site in accordance with statutory requirements and state heritage policy if deemed significant under relevant legislation.
 - For an Aboriginal heritage site, the archaeologist will consult with the Northern Land Council and local Aboriginal communities to determine appropriate actions.
 - Where required, application will be made for a permit under Northern Territory *Heritage Conservation Act* and options to avoid impacts will be explored.
 - For a non-Aboriginal heritage site, the archaeologist will consult with Northern Territory Heritage Office to determine appropriate action.

¹ No such areas have been advised within the project area.

- If the site is believed to contain human skeletal remains, stop all works in the vicinity, secure the site from interference and treat as a crime scene. Notify police, AAPA and OEH.
- Await further instructions from police. If/when police have no further need for the remains, contact the archaeologist and arrange for an on-site assessment, if the archaeologist deems it necessary.

Compass will seek to liaise with the traditional owners to develop a detailed cultural heritage management plan.

9.9 Monitoring Program

9.9.1 Approach

The primary objectives of an environmental and social monitoring program are to:

- Provide information that will determine the adequacy of environmental and, where relevant, social management practices and allow improved practices and procedures to be developed.
- Detect and measure trends or environmental/social changes, and enable analysis of their causes.
- Confirm environmental and social impacts of particular activities (as described in Chapter 7 of this PER) and identify unforeseen effects and the need for additional remedial measures.

The proposed environmental monitoring program is based on a conventional three-phase surveillance system, incorporating operations, discharge (or emission) and ambient monitoring. These are discussed below.

The proposed social monitoring program is based on data that, more often than not, would be collected in any case, but would not otherwise be assessed from a social impact perspective.

In situ measurements will be collected using an appropriate field meter while all laboratory analyses will be undertaken by a NATA-registered (or otherwise approved) laboratory.

9.9.2 Monitoring

Compass will maintain comprehensive routine records for cost control, technical efficiency and safety reasons, as well as for environmental purposes. General monitoring of the operation, which will take place on a routine (and frequent) basis, will include the following:

- Waste rock production (including discrimination between NAF and PAF material).
- Water balance.
- Diesel and other consumables usage rates.
- Potable water quality.
- Rehabilitation progress.

- Inspection of drainage and sediment controls.
- Waste production and recycling rates.

9.9.3 Discharge (Emission) Monitoring

Discharge or emission monitoring records the passage of contaminants at points outside the perimeter of activity. Discharge monitoring provides direct information concerning the concentrations and loads of contaminants being discharged from the operation, and also serves as a link between ambient monitoring results and the operation itself.

NPI reporting requirements will be determined during detailed design and will be incorporated into the final monitoring program.

Water discharge from the site will occur primarily via the main sedimentation dam. Monitoring will therefore be undertaken (based on fortnightly sampling intervals during the wet season) to characterise the nature of the water contained within this dam. Variables to be determined will include:

- pH, conductivity, turbidity (and TSS on selected samples).
- Oil and grease (on selected samples).
- Al, As, Cd, Co, Cr, Cu, Fe, Mn, Hg, Ni, Pb, Se, Ag, Zn (unfiltered and filtered [$<0.45 \mu\text{m}$]) (on selected samples).

The volume of water discharged from the main sedimentation dam will also be recorded.

Pit Water and TSF Embankment Runoff/Seepage. The possibility of acid formation due to exposed sulfides in the pit walls cannot be discounted, while the encapsulation of PAF waste rock within the TSF embankment means that monitoring is required to ensure that formation of ARD has been minimised. Monitoring of pit water and TSF embankment runoff and seepage will therefore be undertaken on a monthly basis for the following:

- pH, conductivity, alkalinity, sulfate.
- Al, As, Cd, Co, Cr, Cu, Fe, Mn, Hg, Ni, Pb, Se, Ag, Zn (unfiltered and filtered [$<0.45 \mu\text{m}$]) (selected samples).

9.9.4 Ambient Monitoring

While operational and discharge monitoring should determine if environmentally significant releases have occurred, effects on the ultimate receptors within the receiving environment can be determined only by ambient monitoring.

River Water

Key factors to be considered in the design of the ambient stream water quality monitoring program include:

- Physico-chemical and biological indicators.
- Statistical design.
- Spatial design and sampling frequency.
- Sampling site access.

- Possible mixing zone(s) downstream of project inputs.
- Procedural details, e.g., detection limits for trace metal determinations and sampling methods, and the availability of appropriately experienced laboratories to undertake the analyses.

The goal of the ambient water quality monitoring program is to determine the status of the aquatic ecosystems in the catchments that potentially can be affected by the project, and to detect improvements or deterioration over time.

A range of factors has been examined to allow selection of monitoring indicators that would:

- Be changed by the mine.
- Are significant in terms of the quality of the receiving aquatic ecosystems.

Physico-chemical Indicators. From a water quality perspective, the primary mine-derived stressors are metals and TSS. The active and passive management features of the project mean that, in effect, the impact from metals is expected to be negligible, particularly within the context of the already-degraded East Finniss River. These considerations have been reflected in the program's subsequent emphasis on the following variables:

- Physical characteristics (e.g., TSS, turbidity, conductivity, temperature).
- Water chemistry (e.g., pH, sulfate, trace metals, total nitrogen, total phosphorus, chlorophyll-a, dissolved organic carbon (which ameliorates toxicity due to metals)).
- Stream flow rate.

Water sampling will include both routine and opportunistic event sampling where the latter is focused on obtaining samples from the river during a flood event, thereby taking into account flow-related variations in water quality. Sampling sites will coincide with selected stream gauging stations, i.e., GS 8150200, GS 8150097 and GS 8150204 (see Figure 7.7).

Bed sediment samples will be sampled annually (in conjunction with the biological monitoring described below) from river water quality sampling sites. Analyses will be undertaken for total metals in the <2000 μm fraction and particle size distribution (PSD).

Biological Monitoring. Benthic macroinvertebrate surveys of the East Finniss and Finniss rivers will be undertaken to determine indices of stream health and identify temporal changes in the river system. Macroinvertebrates will be sampled annually using standard methods outlined by AUSRIVAS (Australian River Assessment Scheme) or other appropriate sampling protocols.

Given the interest of a number of parties in determining the ongoing water quality and ecological status of the East Finniss and Finniss rivers due to the impacts from the Rum Jungle Mine site, Compass intends to discuss the proposed sampling program with the relevant Northern Territory and Commonwealth authorities with a view to ensuring that a cost-effective, integrated program is implemented. Details of the monitoring program will therefore be determined during these discussions [C].

Groundwater

Groundwater monitoring will be undertaken at nine bores as follows (Figure 9.1):

- Five bores located around the perimeter of the TSF. These will detect seepage and, if necessary, will provide a focus for collection and recycling of seepage plumes, should this prove necessary.
- Three interception bores located north of the pit. These will provide make-up water for the process and, in addition to recording volumes of water extracted, will be monitored for water quality.
- One monitoring bore located between the Browns pit and the Rum Jungle pits and waste rock dumps.

Samples will be taken at quarterly intervals and the following variables determined:

- Physical characteristics (e.g., conductivity, temperature).
- Water chemistry (e.g., pH, sulfate, trace metals).
- Water level.

Compass will also undertake monitoring at a number of existing bores in the surrounding area.

Noise, Blasting and Air Quality

No formal nuisance noise, blasting or air quality monitoring is proposed; monitoring will be by complaint.

Noise and air quality for staff and contractors will be performed as part of the project's Occupational Health and Safety system.

Biological and Land Monitoring

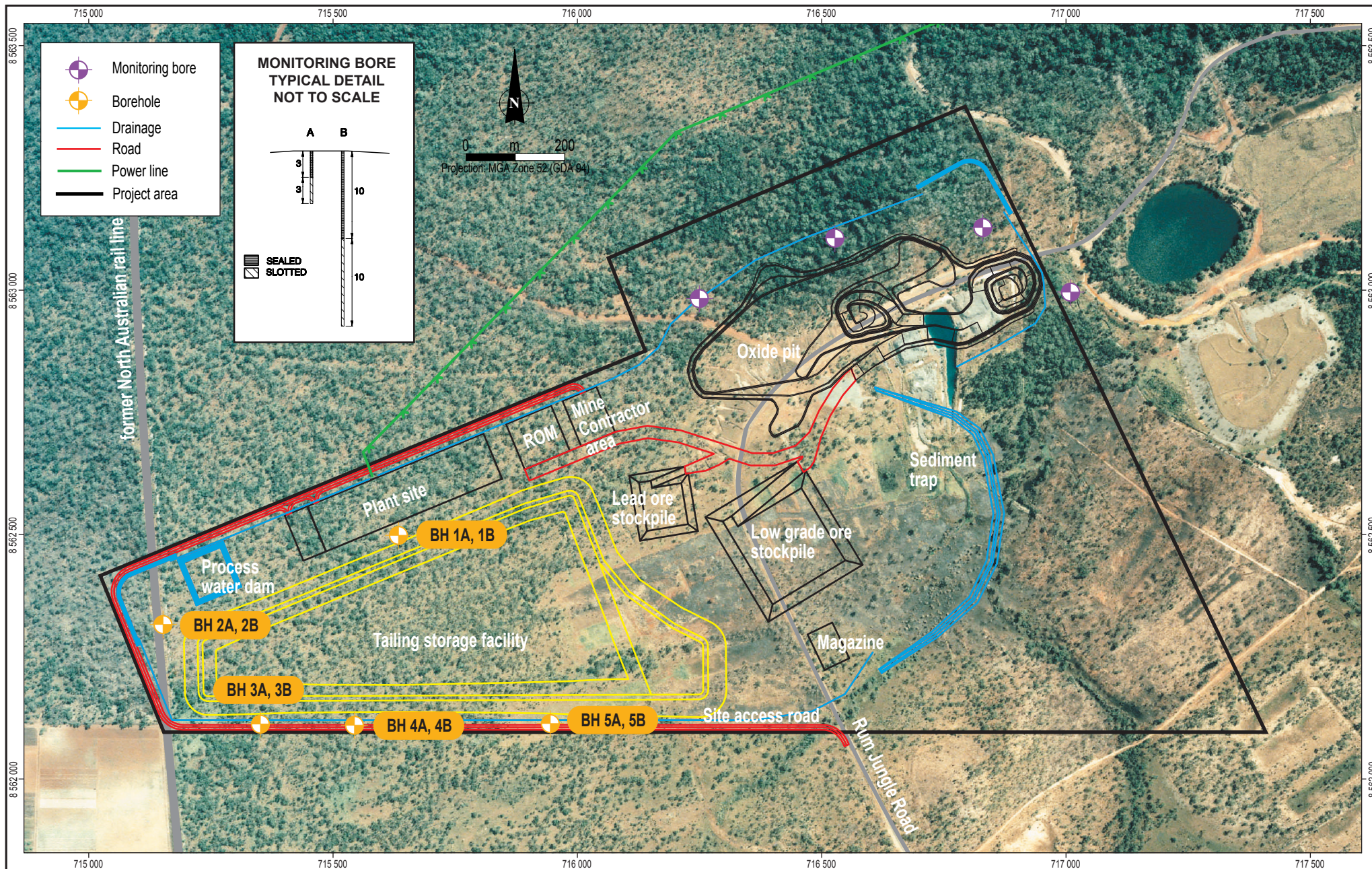
Visual monitoring will be undertaken for pest animal species that may become established (or further established) on site and control measures will be implemented as appropriate.

To prevent and control weed infestation, visual monitoring will be undertaken of occurrence of weed outbreaks during project development and operations (in addition to those already evident).

The effectiveness of erosion and sedimentation controls will be monitored on a regular basis and these controls will be repaired or replaced when necessary (i.e., when sediment is not being contained).

Visual monitoring will also be undertaken to determine the presence of other fauna not observed during the initial surveys. If relevant, the impacts associated with the project on these fauna will be assessed and the appropriate management plans reviewed and, if necessary, modified.

Unless otherwise specified, the frequency of visual monitoring activities will be regular and constant (and incorporated into daily or weekly work routines), rather than at specified times.



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836

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Compass Resources NL

Browns Oxide Project

Proposed monitoring bore locations

Figure No:
9.1

Monitoring of adult mosquitoes will occur once a month prior to and during construction to establish a baseline mosquito monitoring program. This program will provide an indication of the seasonal distribution of the mosquito species present and allow refinement of the likely risk of mosquito-borne disease to mine personnel.

Fire

Fire danger ratings issued by the local fire authority will be monitored on a weekly basis during the fire season to ensure that personnel are fully prepared for fire prevention or control during high fire danger periods.

Radiological Monitoring

The following radiological monitoring will be undertaken (as recommended in Appendix 7):

- Collections of background radioactivity data and operations monitoring:
 - Gamma survey.
 - Dust monitoring, including radionuclides.
 - Radon monitoring.
 - Analysis of radionuclides in surface water and groundwater samples.
 - Analysis of radionuclides in green tissue¹.
- A site radiological survey (e.g., radon and dust in the pit and around the TSF) after the plant has been in continuous operation for a year and, if required, in subsequent years.

As with the river monitoring program, Compass intends to discuss the proposed radiological monitoring program with the relevant Northern Territory and Commonwealth authorities. Again, details of the sampling program will be determined during these discussions [C].

Rehabilitation. Rehabilitation progress will be monitored at seven 360°-photo-monitoring points located throughout the project area on an annual basis.

The success rate of seedling emergence and survival, weed invasion, browsing levels (i.e., insect and animal attack of regenerating vegetation) and erosion will be monitored at the same time annually, comparing photos taken each year from the 360°-monitoring points. This will be supported by vegetation surveys to determine species diversity, density and canopy cover at and around the photo monitoring points to enable the evaluation of rehabilitation success between sites and over time. Compass will review these results and, should they indicate poor rehabilitation success, remedial rehabilitation works will be undertaken.

Post-decommissioning Monitoring. This is addressed in Section 9.10.7.

¹ The data provided from green tissue analyses will allow any changes in radionuclide concentrations in local crops to be determined.

9.9.5 Social Monitoring

The following indicators will be monitored on an ongoing basis:

- Workforce statistics, including:
 - Gender and age.
 - The number of project-related people moving to the Batchelor–Adelaide River–Darwin region.
 - Specific training provided by Compass (with a particular focus on employment and training opportunities for the traditional owners).
- Service and goods supply statistics. These will include details regarding:
 - Type and quantity of goods/service.
 - Value.
 - Location of supplier.
- Local and regional business opportunities provided by the project.
- Local attitudes towards the project.
- The number of complaints documented in the complaints register.
- The impact of the project on the local health centre at Batchelor.
- Compass sponsorship of events in the Batchelor–Adelaide River–Darwin region or other contributions made by Compass to the local communities.

9.9.6 Investigations

Cavities and Karsts Terrain Testing

Cavities and karsts will be further examined during detailed site investigations to ensure the suitability of the TSF site. [C]

TSF Closure Trials

The objective of these trials will be to examine the technical feasibility of dry cover system designs for the tailing that will be placed in the TSF [C]. The work programme will include:

- Tailing material and potential cover material characterisation.
- Review of other covers used in the Northern Territory (e.g., Rum Jungle, Woodcutters).
- Soil-atmosphere cover design modelling to evaluate the performance of several cover design alternatives.
- Small-scale field trials to develop the preferred cover system design.

9.10 Rehabilitation and Mine Closure

9.10.1 Introduction

This section of the report outlines a strategic rehabilitation and mine closure plan for the Browns Oxide Project. Mine closure planning is a continuous process and this strategic plan is the first step. The mine closure plan will be refined as inputs from detailed project design, stakeholder consultation on end land uses and completion criteria, and various investigations/studies become available [C].

Socio-economic impacts of mine closure are often significant, particularly where the mine operates in a small community such as Batchelor. As part of Compass' mine closure planning, redundancy provisions and consideration of training schemes with long-term benefits will be considered [C].

9.10.2 Performance Standards

This closure plan considers the relevant aspects of the following codes and best practice guidelines:

- Environmental risk management–Principles and process (Standards Australia, 2004) – presents an integrated framework of principles, practices and criteria for implementing best practice in environmental risk management.
- National Environment Protection Measure of Assessment of Site Contamination (NEPC, 1999) – aimed at establishing a nationally consistent approach to site contamination assessment and provides a recommended general process for assessment of site contamination.
- Strategic Framework for Mine Closure (ANZMEC and MCA, 2000) – provides a framework for mine closure in Australia without prescriptive measures, and outlines strategies for stakeholder involvement, planning, financial provisions and closure implementation.
- Best Practice Environmental Management in Mining: Rehabilitation and Revegetation (EPA, 1995).
- Best Practice Environmental Management in Mining: Mine Decommissioning (Environment Australia, 2002) – provides an overview of the principles of mine decommissioning illustrated by case studies representing current best practice in Australia.

9.10.3 Objectives

The objectives of the plan are to:

- Leave the site in a physically and geochemically stable condition with low maintenance requirements.
- Leave the site in a safe condition, including securing of the pit void, so as to minimise risks to public safety.
- Prevent excessive erosion and ensure that the site does not become a source of water or wind-borne sediment.

- Revegetate the project area to the point where a self-sustaining community comprised largely of native species characteristic of the surrounding country is established (i.e., a modified natural habitat).
- Minimise the visual impact of the project.

9.10.4 Responsibilities

Closure planning and management of rehabilitation activities through the operations phase of the project will be the responsibility of the General Manager Operations, who will be assisted in this function by the Environmental Manager. Post-closure, mine decommissioning and rehabilitation activities will be the responsibility of the Compass board.

9.10.5 End Land Use

Subject to discussion with stakeholders, which will be ongoing throughout project development, operation and closure planning, Compass proposes that the end land uses for the area are to be such that the public amenity and the conservation value are improved where practicable, or maintained where not. The proposed end uses (assuming no further mining) shown in Table 9.5 will be documented in the mine closure plan. Working towards this plan will be part of daily operations, with final detailed closure design prepared before cessation of operations (see Section 7.7 for further details on land use).

Table 9.5 Proposed end use for project components

Component	Final Landform	End Land Use
Mine pit	Walls left in stable condition, perimeter secured by fence. Final void left to naturally fill with groundwater/rainfall unless ARD is a significant issue, in which case the final void may be rapidly filled by diverting the East Finniss River through the pit.	Partially-filled void with possible value as aquatic habitat.
TSF	Tailing material capped with a 'store and release' type cover (see Figure 4.10), spread with topsoil and revegetated with shallow rooted species. Excavation of a long-term spillway notionally in the location of the existing decant tower to prevent ponding of large amounts of excess water and overtopping. Possible additional flattening of external slopes of the embankments. See Appendix 8 for further details.	Modified natural habitat.
Ore stockpiles	Ore removed for processing or returned to pit, area ripped, topsoiled and revegetated.	Modified natural habitat.
Processing plant, mine contractor area and site offices	Plant and material salvaged, structures removed, area ripped, topsoiled and revegetated.	Modified natural habitat.
Magazine	Material salvaged, structures removed, area ripped, topsoiled and revegetated.	Modified natural habitat.

Table 9.5 Proposed end use for project components (cont'd)

Component	Final Landform	End Land Use
Topsoil stockpiles	Topsoil removed for rehabilitation of other project components and base revegetated.	Modified natural habitat.
Sediment traps	Cleaned out, stabilised and left. The main sedimentation trap will remain with its emergency spillway.	Sediment traps.
Runoff drainage	Cleaned out, stabilised and left.	Runoff drainage.
Haul and site roads	Ripped and revegetated.	Modified natural habitat.
Rum Jungle Road	Ripped and revegetated (unless consultation outcomes suggest otherwise).	Modified natural habitat.

Upon the relinquishment of the MLs, the project area will be returned to use as Aboriginal freehold.

9.10.6 Implementation Strategies and Measures

Consultation

- Identify and engage key stakeholders in a consultation program whereby their concerns and interests can be addressed during mine closure planning. Key stakeholders are listed in Section 6.2.
- Allocate adequate resources to the consultation process to enable effective and open communication (the local community will require the necessary information and resources to participate in the consultation process).
- Initiate the mine closure consultation process during the planning phase, with a key focus being the proposed end land uses for the area (as currently described above in Section 9.10.5).

Planning

- Allocate sufficient personnel, physical and monetary resources for closure planning, implementation and monitoring. A dedicated team may be required with clearly delineated roles and responsibilities.
- Determine legal and other obligations relating to mine closure.
- Identify and assess risks associated with closure, including the feasibility of removing surface infrastructure.
- Determine closure completion criteria in consultation with stakeholders; relevant discussions will commence after detailed design and project approval.
- Following approval of the project, prepare and periodically review (taking into account progressive rehabilitation and changing community standards and expectations) a detailed Mining Management Plan (MMP).

- Develop a cost estimate for closure from the detailed MMP.
- Review the mine closure cost estimate regularly, e.g., annually, to reflect changing circumstances.
- Ensure that, at the end of mine life when income has ceased, there is sufficient accounting provision to cover both mine closure and ongoing (post-closure) expenditure.

Contamination Assessment and Treatment.

- Remove contaminants such as hydrocarbons (e.g., oil and grease) at the process plant site and remove residual soil contaminated by spills.
- Prepare a separate plan (as part of the detailed mine closure and rehabilitation plan for implementation) for the assessment, treatment and removal of hydrocarbon and other contamination in accordance with the NEPC (NEPC, 1999).

Land Stabilisation

Key aspects of land stabilisation include the following:

- Minimising Disturbance – A key element to successful land stabilisation is minimising the area of land disturbed. Compass has reduced the potential area disturbed by project infrastructure by locating the facilities close together, and committing to clear land only when required. When clearing, the vegetation will be stored (where practicable) for future use in the rehabilitation program.
- Topsoil Management – The topsoil from all areas to be developed will be stripped and used for subsequent rehabilitation. Details of topsoil management are described in Section 4.5.2.
- Erosion Control – The two natural elements that disturbed areas need to be protected from are wind and water. Prior to establishment of vegetation cover, wind erosion will be controlled by protecting the soil surface with mulch or other materials and maintaining the soil surface in an erosion-resistant condition (e.g., moist, or with a cloddy structure). Runoff management will include diverting clean runoff away from disturbed areas, collecting turbid runoff (dirty water) from disturbed areas and reducing the velocity of runoff on disturbed areas by appropriate landforming. Section 4.5.2 describes the methods by which runoff will be managed for the site.
- Landforming – This involves shaping slopes and contours, and ripping and scarifying the soil so as to reduce runoff velocity, promote infiltration and minimise erosion. Ripping/scarifying also provides protection for germinating seeds and assists root penetration. The final landforms created will be compatible with the surrounding landscape.

Rehabilitation

Rehabilitation will be undertaken progressively where possible. However, due to the nature of the operations, most rehabilitation will be undertaken upon cessation of mining operations. This will include removal of site infrastructure, stabilisation of land, and

ripping and revegetating of disturbed areas as described below. General rehabilitation procedures include the following:

- Revegetation of disturbed areas will occur progressively throughout the operation, where practicable.
- Topsoil stockpiled during the mining process will be replaced as the final landforms are achieved. Ideally the topsoil stockpiles will retain their seed resources allowing revegetation to occur naturally. If this does not occur to a sufficient degree, the area will be seeded and fertilised, with the application of seeds and fertilisers being timed to take best advantage of moisture and seasonal conditions.
- To reduce susceptibility to erosion, complete sections will not remain void of vegetative cover for any length of time.
- In general, site revegetation will occur in two stages, i.e., primary revegetation and secondary revegetation. The aim of the primary revegetation stage is to establish good vegetative cover on the disturbed area as soon as possible (thereby reducing potential for erosion). The secondary stage of revegetation aims to establish a more long-term cover of low maintenance vegetation that will eventually be self-sustaining. The two vegetation stages require different plant species:
 - Primary revegetation: includes selection of a suitable mixture of grass species to adequately control erosion until indigenous tree and shrub species become fully established. Primary vegetation will normally be invaded by indigenous species from adjacent undisturbed areas.
 - Secondary revegetation: includes the establishment of indigenous tree and shrub species.
- Where possible, native grass species will be used. Specialist advice on vegetation species and fertiliser requirements will be sought.

Steps involved in vegetation maintenance will include:

- A vegetation maintenance program to ensure revegetated areas maintain effectiveness. This will include the development of a long-term maintenance strategy detailing the permanent control measures to be employed.
- Correct maintenance of all areas of vegetation cover to ensure a persistent and uniform protective sward. Topdressing revegetated areas with fertiliser and supplementary seed will be undertaken after the first growing season if required. Weed control, insect and pest control will also be undertaken as necessary.

Following mine closure, all other disturbed areas will be contoured, respread with topsoil and revegetated as described. Apart from the pit, no batter will exceed a grade greater than 1:3 (v:h) and will be generally rounded to conform to the landforms of the area.

Surface Water Management

Surface drainage, including sediment traps, established during operations will be retained post-closure. The reasons for this are that:

- Surface drainage established during operations will be complete and stable.
- Clean water will remain separated from water draining areas of disturbance.
- Although vegetation will be allowed to establish, sediment traps will continue to provide a final filter for runoff from the rehabilitated site.
- These areas may have been colonised by fauna, thereby creating new habitat areas.
- Re-contouring to return runoff to pre-existing drainage would damage vegetation established during progressive rehabilitation activities.

Upon mine closure, the final void will be allowed to naturally fill with groundwater, direct rainfall and surface runoff. As described in Section 7.8.3, an option for final void closure, should ARD be considered a significant issue, is to divert the East Finniss River through the pit to rapidly fill the void. Maintaining good quality water in the final void is considered important since it represents a valuable resource and facilitates dewatering the pit at a later date to access further reserves (without the need for expensive water treatment).

9.10.7 Post-closure Monitoring and Maintenance

Water Quality

Ongoing sampling and monitoring of groundwater bores (water level and quality), selected surface water sampling locations and final void water will continue for a period of not less than three years from the cessation of operations [C]. The responsibility for ongoing monitoring, if required, will be negotiated with the government once stable conditions have been reached and water quality reflects the agreed closure criteria.

TSF

The TSF will be monitored and audited regularly to assess whether closure objectives have been achieved [C]. In addition to water quality monitoring described above, visual monitoring will include checking for:

- Slumping.
- Erosion.
- Excessive seepage.
- Revegetation success.
- Ponding.

Dam safety inspections will be carried out on a regular basis in accordance with ANCOLD guidelines.

Revegetation Works across the Site

Methods to monitor and maintain rehabilitated and revegetated areas will include:

- Establishing 360°-photo-monitoring points throughout the project area.
- Conducting post-closure follow-up visits to the project area on a regular and frequent basis (frequency decreasing with time) to monitor the success rate of seedling

emergence and survival, weed invasion, browsing levels (i.e., insect and animal attack of regenerating vegetation) and erosion, using the photo-monitoring points to track progress.

- Establishing water quality monitoring locations to monitor the success of rehabilitation works.
- Ensuring that the monitoring program reflects the agreed closure criteria established through consultation with stakeholders.
- Where monitoring has identified erosion, weed invasion, failure of revegetation (to any material degree) or excessive browser damage to regenerating vegetation, maintenance activities will be implemented to ensure regeneration progresses successfully and rapidly. These may include:
 - Repairing eroded areas.
 - Weed control.
 - Pest control.
 - Enrichment planting.
 - Spot sowing.
 - Reseeding.
 - Watering.
 - Fertilising.

9.10.8 Final Decommissioning

As part of the closure process a final decommissioning plan will be developed in consultation with regulatory authorities during operations. This plan will detail completion criteria and establish the timeline for decommissioning and determination of compliance with regulatory authority requirements.

9.11 Summary of Commitments

In planning for the project, Compass has made a number of commitments with respect to the management of potential and residual environmental and social impacts. These are provided throughout this PER (specifically chapters 4, 7 and 9). The commitments outlined in Table 9.6 are generally broader and do not include specific on-site mitigation and management measures that have been incorporated into the design of the project.

Table 9.6 Commitments

No.	Section	Commitments	Performance Indicators
1	4.7.3	Low grade ore and lead ore stockpile material that is considered uneconomic to process at the end of the project life will be returned to the mined-out pit.	Final Mine Closure Plan detailing the fate of this material.
2	4.9.1	Column leach test results for selected waste rock samples will be reported in the Mining Management Plan, with ongoing reporting as required.	MMP containing waste rock column leach test results.
3	4.9.2	Compass will ensure direct supervision by a qualified person during construction of the TSF and, upon completion, sign off by that qualified person on submission of the 'as constructed' designs and plans.	Sign-off on 'as constructed' designs and plans.
4	4.9.2	The implementation of selective handling of PAF material requires integration with the mine plan, with identification of material types involving continuous in-pit sampling, logging, mapping and testing during mining.	Records of monitoring results. Records of volumes and placement of waste material.
5	4.10.1/ 7.8.4	Further geochemical testwork will be undertaken to address inconsistencies in tailing testwork results. This testwork will also include column leach tests and tailing liquor characterisation.	Report containing results of further geochemical testwork.
6	4.12.4	Compass will ensure that haulage contracts stipulate that loads are properly secured and in compliance with appropriate road vehicle axis limits.	Compliance with transport requirements. Vehicle log books. On-site records of transport volumes and transportation vehicle details.
7	6.5.2	A particular focus of the ongoing consultation program will be the involvement of indigenous people in the project.	Consultation records.
8	7.8.3	Compass will further develop during detailed engineering the water treatment system for treating water from the main sedimentation trap that is to be discharged to the East Finniss River.	A design for the water treatment system.
9	7.8.4	Compass will obtain improved estimates of ARD during project development and will closely monitor TSF runoff and drainage.	Monitoring records of TSF runoff and drainage. Reporting of geochemical testwork.
10	7.8.4	Additional management and mitigation measures for ARD will be investigated as required (incorporating information obtained as the mine is developed), including options for ongoing collection and treatment of ARD prior to discharge if warranted.	Records of investigations included in annual reporting to DPIFM.
11	7.9.3	Should adverse impacts occur to groundwater users, mitigation measures may involve sourcing suitable alternative water.	Groundwater monitoring data.
12	7.10.3	Compass will implement a preferential employment policy focussing on traditional owners and the local community.	Project employment policy. Employment records.
13	7.10.3	Compass will provide employment and training opportunities for the traditional owners and will develop specific procedures for the administration and implementation of these opportunities.	Employment and training records.

Table 9.6 Commitments (cont'd)

No.	Section	Commitments	Performance Indicators
14	8.1	Compass will undertake a detailed hazard identification and risk assessment prior to commencement of construction and operations.	Submission of report detailing outcomes of the assessment.
15	9.6.2	Audits will be undertaken by an appropriately qualified person on a regular basis to ensure compliance with the environmental management procedures. Auditing will be conducted twice during the construction phase and yearly during operations.	Audit records.
16	9.8	The issue-based management plans will be refined and will form the basis of a detailed MMP that will be completed prior to construction. The detailed MMP will expand on the information contained herein, including implementation measures, schedules and responsibilities.	Submission of MMP.
17	9.8.2	A detailed Fire Management Plan will be developed in consultation with key stakeholders such as traditional owners, the NLC and local fire authorities (fire brigade and Bushfires Council NT).	Consultation records and submission of detailed fire management plan as part of the MMP.
18	9.8.3	A detailed weed management plan will be developed in accordance with the Northern Territory <i>Weeds Management Act</i>	Submission of the detailed weed management plan as part of the MMP.
19	9.8.7	A recycling and waste minimisation program will be implemented and regularly (e.g., quarterly) reviewed during the lifetime of the operation.	Maintenance of waste inventory. Record of revisions to program.
20	9.9.4	Detailed radiological and river (water quality and macroinvertebrates) monitoring programs will be developed after discussion with relevant authorities to ensure a cost-effective, integrated program.	Detailed monitoring program.
21	9.9.6	Cavities and karsts will be further examined during detailed site investigations to ensure the suitability of the TSF site.	TSF site geotechnical report and final design.
22	9.9.6	A TSF closure study will examine the technical feasibility of dry cover system designs.	TSF closure study report.
23	9.10.1	The mine closure plan will be refined as inputs from detailed project design, stakeholder consultation on end land uses and completion criteria, and investigations/studies become available.	Consultation records, investigation/study reports. Updates of the Mine Closure Plan as reported in the MMP.
24	9.10.1	As part of Compass' mine closure planning redundancy provisions and consideration of training schemes with long-term benefits will be considered.	Updates of Mine Closure Plan.
25	9.10.7	Ongoing sampling and monitoring of groundwater boreholes (water level and quality), selected surface water sampling locations and mine water will continue for a period of not less than three years from the cessation of operations.	Monitoring records.
26	9.10.7	The TSF will be monitored and audited regularly to assess whether closure objectives have been achieved.	Monitoring records.