

22.0 Environmental Management Plan

22.1 Environmental Management

22.1.1 Management Systems

MRM currently has a Safety Management System (SMS) and Environmental Management System (EMS) that applies at the site. The SMS is based largely on the SiteSafe system, a risk-based system (Section 18.0). The EMS was prepared as an operational tool to assist with the site's environmental management.

The SMS and EMS are currently being restructured to be compliant with Xstrata's Health, Safety, Environment and Community (HSEC) Management Policy and Standards as well as ISO 14001 (International Environmental Management Standard) and AS 4801 (Australian Standard for Health and Safety Management) requirements.

It is also proposed that further rigour will be developed in the area of community management and this will become part of the MRM management systems. The aim is to develop an integrated health, safety, environment and community management system that can be internally audited by Xstrata and externally audited for compliance with the requirements of ISO 14001 and AS 4801 by an independent certification body.

22.1.2 Resource Conservation Program

MRM has implemented various resource management programs which include the following components. These programs will be updated as necessary to incorporate the open cut project.

- Detailed baseline information is obtained prior to new projects;
- Comprehensive assessment of new projects is undertaken;
- A permit system is implemented to clear and dig, to ensure land is not disturbed unless authorised;
- Key performance indicators and targets are set for resource consumption and efficiency; and
- A waste management plan is implemented and reviewed annually.

22.1.3 Environmental Impact Management

MRM has implemented various environmental impact management programs which include the following components. These programs will be updated as necessary to incorporate the open cut project.

- Annual internal reviews of environmental management;
- Facilitation of external annual Government reviews of environmental performance;

- Environmental monitoring program with results reviewed at monthly intervals;
- Submission to DBIRD of an annual environmental monitoring report; and
- Monthly review of site environmental compliance for relevant MRM sections and personnel.

22.1.4 Environmental Incident Management

MRM has implemented an environmental incident management procedure which includes the following components. These procedures will be updated as necessary to incorporate the open cut project.

- An incident reporting system for reporting all incidents and hazards;
- A follow up system for actions and outcomes from incident investigations;
- Initial induction and ongoing training of employees and contractors in the incident reporting process; and
- Communication of the outcomes and learning experiences of environmental incident investigations with employees and contractors.

22.1.5 Environmental Training

MRM has implemented the following environmental training programs. They will be updated as necessary to incorporate the open cut project

- For each key environmental position, develop job role descriptions which are reviewed annually;
- Include an environmental component in inductions for all employees, contractors and visitors; and
- Provide specific environmental training at the department level as required.

22.1.6 Environmental Communication

MRM has implemented the following environmental communication program. It will continue with the open cut project.

- Environmental information is communicated to employees and contractors via notice boards, the MRM web page, and bi-annual General Manager presentations;
- The Environmental Policy is displayed throughout the operation;
- Standards and guidelines are electronically available;
- An MRM Environmental Committee has been established; and
- MRM representatives, where required, are on industry and legislative committees and groups.

22.1.7 Environmental Management Program

MRM has the following environmental management programs to control various activities, materials or services that can cause environmental harm. They will be updated as necessary to incorporate the open cut project.

- Tailings storage and management
- Mine site water management
- Waste rock and topsoil management
- Concentrate handling
- Fuel and oil handling
- Waste management and disposal
- Dust and noise
- Biological management
- Fire management

22.2 Draft Environmental Management Plan

22.2.1 Purpose

The purpose of the following draft environmental management plan (EMP) for the open cut project is to identify potential environmental issues and mitigation measures together with corrective actions if an undesirable impact or unforeseen level of impact occurs.

22.2.2 Objectives

The objectives of the EMP are:

- To provide evidence of practical and achievable plans for the management of the open cut project to ensure that environmental requirements are complied with.
- To provide MRM as well as the Northern Territory and Commonwealth authorities with a framework to confirm compliance with relevant policies and requirements.
- To provide the community with evidence of the management of the project in an environmentally acceptable manner.

The EMP will be reviewed and periodically updated, if necessary, to reflect knowledge gained during the course of operations. Changes to the EMP will be implemented in consultation with the relevant authorities where necessary via the MRM's Mining Management Plan.

22.2.3 Components

Each of the EMPs in the following sections has been prepared based on the recommended structure provided in the Terms of Reference for the EIS.

The draft EMPs have been prepared at a strategic level describing a framework for environmental management for the open cut project. It is expected that a final EMP will be prepared at the conclusion of the assessment process taking into consideration comments on the draft EIS, the Supplement, and incorporating the Assessment Report recommendations.

22.3 Construction Environmental Management Plan

MRM will retain overall responsibility for the environmental management during the construction phase. Proven environment, health and safety (EHS) performance will be a key criterion in the selection of the construction contractor. Achievement of agreed EHS standards during construction will be a contract requirement and penalties will apply for serious breaches.

The construction contractor will be responsible for the preparation and implementation of the construction phase EMP. The contractor will identify responsibilities and organisation required to implement the accountabilities of the construction phase EMP. The requirements of the EMP will apply to the principal contractor and all sub-contractors.

The contractor will also be responsible for developing and implementing a site-specific induction program for all construction workers to complement the current MRM induction program. This program will include all EHS hazards and aspects and their control measures. The contractor will ensure that all construction workers are trained and competent and hold the appropriate certification for the tasks that they will be undertaking.

In the event of a non-compliance with the EMP, it will be the responsibility of the construction contractor to investigate and report and implement appropriate corrective actions in accordance with MRM procedures.

22.3.1 Waste Management Plan

Objective	Efficient use of resources and minimisation of waste generation and disposal.
Target	<p>Achieving cost effective waste management by:</p> <ul style="list-style-type: none"> • Minimising waste generation. • Maximising waste re-use and materials re-use. • Maximising recycling. • Safely treating and disposing of all non-reusable and non-recyclable materials.
Actions	<p>Waste Management</p> <p>The construction contractor will prepare a waste management plan which will incorporate the elements outlined below:</p> <ul style="list-style-type: none"> • Incorporation of the waste management commitments contained in the Australian Minerals Industry for Code of Environmental Management 2000. • Alignment with MRM's existing waste management strategies. • The scope and objective of the plan. • Opportunities and actions to be taken to implement the waste management hierarchy. • Quantitative estimates of the expected waste streams and emissions. • Agreement with suppliers to accept the return of unused materials. • Agreement with and license details of companies accepting wastes for off-site disposal. • Agreement with and license details of companies to be used for the off-site transport of wastes. • Workforce training programs in waste minimisation practices. • Monitoring program. • Emergency response procedures. • Reporting program. <p>Examples of the actions to be undertaken include the following:</p> <ul style="list-style-type: none"> • Topsoil will be stripped and reused or stockpiled for use in rehabilitation. • Where possible trees from site clearing will be chipped and stockpiled for use on site landscaping and rehabilitation. • Where practical, any excess materials and used chemical containers will be returned to the supplier. • Waste streams will be separated into various components at the point at which they are produced. Waste separation at source will be achieved by providing bins for re-useable and recyclable materials. An area on-site will be allocated for the collection of re-useable and recyclable materials. • Waste oil will be collected for transport and off-site disposal. • Any contaminated wastes will be disposed of at the tailings storage facility. • Packaging and office waste will be buried at the existing on-site refuse facility. • Recyclable building wastes will be collected separately and re-used or recycled, for example: <ul style="list-style-type: none"> – Timber from concrete formwork will be recovered and reused – Scrap steel and offcuts will be recycled – Plastics will be recycled.

Monitoring	<p>The waste management plan will require the following waste streams will be measured and reported:</p> <ul style="list-style-type: none"> • Waste generation. • Waste re-use. • Waste recycling. • Waste disposal.
Reporting	<p>During construction, the EPCM Contractor will report at monthly intervals to MRM General Manager on the results of the waste monitoring program and other relevant waste management issues.</p>
Corrective Actions	<p>The following constitute incidences or failures to comply in relation to waste management policies:</p> <ul style="list-style-type: none"> • Wastes being disposed of rather than reused or recycled where possible. • Uncontrolled waste disposal. • Other non-compliances with the waste management plan. <p>Should an incident or failure to comply occur, the contractor's environmental representative will take the necessary actions to identify the causes of non-conformance with the waste management plan performance requirements and implement actions necessary to ensure compliance.</p>
Relevant Legislation and Standards	<ul style="list-style-type: none"> • MRM's Environmental Policy and Procedures. • Waste Management and Pollution Control Act 2003. • Environmental Protection (National Pollution Inventory) Objective 2004. • Australian Minerals Industry Code for Environmental Management 2000.

22.3.2 Air Quality Management Plan

Objective	To minimise the release of fugitive emissions to air from areas where construction activities are occurring.
Target	No fugitive emissions to air causing, or likely to cause, an environmental nuisance at the accommodation village or beyond the lease boundaries. These include odour, dust, smoke and fumes.
Actions	<p>Actions to be undertaken to control air quality during construction include the following:</p> <ul style="list-style-type: none"> • Reschedule vegetation clearing activities or earthworks during periods of high wind if visible dust is blowing over the accommodation village or off-lease • Regular watering or other treatment of haul roads and exposed construction areas subject to vehicle and machinery movements • Ensuring that vehicles and equipment are appropriately maintained or covered to minimise air emissions. • Vehicle speeds in construction areas will be limited to a maximum of 30 km/h. • Revegetate disturbed areas as soon as possible. • No open burning of wastes to be undertaken without permission. • Topsoil stockpiles will be stabilised with an appropriate surface cover.
Monitoring	<p>Visual inspections will be undertaken by the construction contractor to check for evidence of excessive dust generation.</p> <p>If necessary, the existing dust monitoring network will be used to determine whether dust controls are being applied effectively.</p>
Reporting	Reports of the results of any dust monitoring of construction activities will be prepared by the construction contractor documenting and assessing the significance of the results. The reports will be submitted to the MRM General Manager.
Corrective Actions	<p>The following would constitute an incident or failure to comply in regards to air quality management:</p> <ul style="list-style-type: none"> • Receipt of a justifiable complaint about fugitive emissions or dust. • Observation of excessive dust levels generated on site. <p>The construction contractor will investigate all complaints and will assess site operations to determine the source of the emissions and identify any significant modifications to activities and processes that can be made to reduce emissions.</p>
Relevant Legislation and Standards	<ul style="list-style-type: none"> • MRM's Environmental Policy and Procedures. • Australian Minerals Industry Code for Environmental Management 2000. • National Environmental Protection Measure for Ambient Air Quality. • NSW EPA (2001).

22.3.3 Noise Management Plan

Objective	To minimise the generation of noise emissions during the construction phase and to mitigate any potential noise impacts.
Target	Noise levels from construction activities not to exceed 60 dB(A) at the accommodation village.
Action	The following strategies will be implemented during the construction phase of the project: <ul style="list-style-type: none"> • Best available work practices will be employed on-site to minimise occupational noise levels. • All construction equipment will be regularly inspected and maintained in good working condition. • The construction laydown area will be located away from noise sensitive locations.
Monitoring	Should a justifiable noise complaint be received, an appropriately designed monitoring program will be implemented by the construction contractor. Any monitoring conducted will be in accordance with the draft Waste Management and Pollution Control (Environmental Noise) Regulation and Australian Standard 1055 Acoustics - Description and Measurement of Environmental Noise AS 1055.1 - 1997.
Reporting	Any noise complaints will be documented in the complaints register, investigated and reported by the construction contractor to the MRM General Manager. The results of any monitoring undertaken by the construction contractor will also be reported to the MRM General Manager.
Corrective Actions	The following represents an incident or failure to comply: <ul style="list-style-type: none"> • noise complaint received; • noise levels exceed 60 dB(A) at the accommodation village; or • non-compliance with the above control actions. Should a failure to comply occur, the following steps will be taken: <ul style="list-style-type: none"> • construction activities will be investigated to determine the cause of the problem; • control measures will be reviewed to prevent recurrences and, where necessary, additional control and mitigation measures will be investigated and installed; or • a noise monitoring program will be considered.
Relevant Legislation and Standards	<ul style="list-style-type: none"> • MRM's Environmental Policy and Procedures. • Waste Management and Pollution Control (Environmental Noise) Regulation. • AS 2436-1981 "Guide to Noise Control on Construction, Maintenance and Demolition Sites". • AS 1055.1 1997 " Acoustics: Description and Measurement of Environmental Noise; Part 1:General Procedures."

22.3.4 Surface Water Management Plan

Objective	Minimise erosion and the discharge of contaminated surface water generated from construction activities to the surrounding environment.
Target	<p>To prevent the direct or indirect release of contaminated runoff resulting from construction operations to surface waters.</p> <p>To prevent incidences of accelerated erosion as a result of the construction activities.</p>
Actions	<p>Provide bunded storage areas for fuels and dangerous goods required for construction equipment with spill cleanup kits in accordance with the requirements of AS 1940:1993 and AS 3780:1994.</p> <p>Implement controls to ensure all transfer of fuels and chemicals is managed to prevent spillage and occurs inside bunded areas.</p> <p>Construction contractor to prepare and implement a site-specific construction erosion and sediment control plan in accordance with the Institution of Engineers Australia – Erosion and Sediment Control Guidelines (1996) and the NT Conservation Commission (Applegate, 1983).</p> <p>Diversion bunds, silt fences and/or sediment traps to be installed downstream of all work areas draining to the natural drainage system. Where practicable, procedures for the construction and maintenance of the sediment traps will include the following:</p> <ul style="list-style-type: none"> • Sediment traps will be preferably excavated below the natural ground surface. Where it is necessary to construct embankments to form a sediment trap, embankments will be adequately compacted with batter slopes commensurate with the available materials. • Sediment traps will include a high flow 'spillway' outlet to safely pass floods without breaching the basin. Spillways will be sized for 10 year Average Recurrence Interval events. • Sediment traps will include adequate provisions for access for regular monitoring and maintenance to clean out captured sediments. • Subject to constraints of available space and topography, sediment traps will be constructed with a plan shape aspect ratio of at least 3 to 1 (length measured from inlet to outlet in relation to width). • Sediment traps will be sized with sufficient sediment storage capacity to match the combination of the rate of sediment 'supply' and planned frequency of sediment removal from the basin. • Clean water diversion drains will be installed to divert clean stormwater flow from undisturbed areas away from the sediment traps. Diversion drains will also be installed as necessary to direct sediment-laden stormwater flow to the sediment traps. <p>Measures to be taken to minimise the impact of erosion and sediment movement include the following:</p> <p><i>Infrastructure and Development Areas</i></p> <ul style="list-style-type: none"> • Limit the disturbed area and clearing progressively, immediately prior to construction activities commencing. • Safeguarding the surface layer by stripping and stockpiling useable topsoil prior to construction. • Using temporary soil diversion mounds to control runoff within and divert water away from the construction site. • Minimise the period that bare soil is left exposed to erosion. • Use sediment traps/silt fences etc, to minimise off-site effects of erosion. • Provision of rapid vegetation cover, including, where required, erosion control matting. • Reuse of stored topsoil in the revegetation and landscaping activities.

	<p><i>Construction Roads and Temporary Access Tracks</i></p> <ul style="list-style-type: none"> Grade roads to a crown and provided efficient surface drainage to prevent runoff eroding either the road surface or the adjacent land. Where necessary, low mounds angled across the track will be constructed to divert runoff (at a non erosive velocity) into adjacent areas. Create cut and fill batters (associated with service tracks) to a safe slope and stabilised by vegetation where practicable. Where table drains need to be established, they will be designed to a broad dish shape, grassed or lined appropriately, to prevent erosion. All temporary construction tracks and laydown areas will be removed and rehabilitated when construction is completed. <p><i>Vegetation Clearing</i></p> <ul style="list-style-type: none"> Limit the disturbance of vegetation in construction areas to a practical minimum.
Monitoring	The construction contractor shall conduct regular inspections of construction areas and assess the condition and operability of site drains and erosion mitigation measures. Inspections shall be conducted on a weekly basis during the wet season as well as after each significant rainfall event.
Reporting	The construction contractor will report monthly to MRM's General Manager on the following: <ul style="list-style-type: none"> Compliance with approved erosion and sediment control plan. Incidents of erosion Incidents of any discharge of contaminated runoff. Results of weekly inspections. Results of any corrective actions.
Corrective Actions	<p>The following is to be classified as an incident or failure to comply in relation to surface water management:</p> <ul style="list-style-type: none"> Breach in integrity of ponds, bunds or drains. Discharge of contaminated runoff. Spilled fuel or wastes enter the stormwater drainage system. Sedimentation ponds demonstrating significant reduced available volume. Insufficient general housekeeping to prevent general rubbish and contaminants entering the stormwater runoff from the site. <p>Should an incident or failure to comply occur in relation to stormwater management, a selection of the following corrective actions will be considered where relevant:</p> <ul style="list-style-type: none"> Repair stormwater controls (eg. ponds, bunds and drains). Contain and remediate or dispose of contaminated material/contaminants. Treat or dispose of contaminated stormwater. Clean out the sedimentation ponds. Undertake additional general housekeeping to minimise rubbish and contaminants entering the stormwater. Review the erosion and sediment control plan.
Relevant Legislation and Standards	<ul style="list-style-type: none"> MRM's Environmental Policy and Procedures Waste Discharge Licence pursuant to Section 74 of the Water Act ANZECC Guidelines for Fresh and Marine Water Quality 2000.

22.3.5 Vegetation Management Plan

Objective	To minimise the impact of construction activities on vegetation adjacent to construction areas. To prevent the spread of weeds.
Target	No disturbance of flora outside of designated construction activity areas.
Actions	<p>All clearing will be conducted in accordance with MRM's "Permit to Clear" procedure.</p> <p>The construction contractor will prepare a vegetation clearing plan.</p> <p>Construction activities will be limited to designated construction areas unless approved by MRM's General Manager.</p> <p>The total area to be cleared for construction will be restricted to the minimal area required.</p> <p>Prior to clearing, the boundary of the area authorised to be cleared will be identified and clearly marked to ensure construction vehicles do not impact on adjacent undisturbed vegetation.</p> <p>Prior to clearing, a clearing pattern will be determined that will allow fauna adequate opportunity for dispersal into adjacent habitat.</p> <p>Cleared vegetation will be pushed into a series of windrows within the disturbed area and either chipped for reuse in the rehabilitation or burnt.</p> <p>Vegetation will be burnt only after receipt of a "Permit to Burn". This ensures that all appropriate parties are notified of the date, time and location of the controlled burn. Appropriate parties include National Jet Systems, NT Bushfire Council, Community Relations/traditional owners, and the McArthur River Pastoral Lease Manager.</p> <p>Vegetation identified as potentially valuable habitat (e.g. hollow logs) may be stockpiled for use in erosion and sediment control works or in site rehabilitation.</p> <p>The current weed control program will be continued. It will involve the periodic (monthly) inspection of the construction sites and downstream areas and control of any infestations of declared environmental weeds. The source of any infestation will be investigated and the most appropriate control technique will be implemented.</p>
Monitoring	<p>Monitoring of vegetation health adjacent to the construction activity area will be undertaken during and after construction.</p> <p>Monthly inspection for weed infestation of the construction site and/or downstream areas.</p>
Reporting	The construction contractor will report any incidents of vegetation disturbance outside of designated areas or weed infestation to MRM's General Manager.
Corrective Actions	<p>The following constitute an incident or failure to comply:</p> <ul style="list-style-type: none"> • Unauthorised disturbance of vegetation outside of the designated area. • Evidence of weed infestation. <p>In the event of a failure to comply, investigations will be undertaken into the cause of the incident or failure to comply and the appropriate action taken to overcome the problem.</p>
Relevant Legislation and Standards	<ul style="list-style-type: none"> • MRM's Environmental Policy and Procedures • Weeds Management Act

22.3.6 Mosquito Management Plan

Objectives	To prevent the occurrence of potential mosquito breeding sites and the presence of adult mosquitos.
Targets	No mosquito breeding sites created by construction activities.
Actions	<p>Any depressions created in the ground surface will be filled or drained to prevent the ponding of water.</p> <p>Stockpiles will be placed in areas that will not impede natural drainage and will be shaped to prevent ponding.</p> <p>Storage containers capable of ponding water will be either discarded after use or stored in an inverted position (care will be taken to ensure that ponding does not occur in rubbish storage areas).</p> <p>Any ponds and on-site excavations filled with water will be inspected for the presence of mosquito larvae at a frequency to be determined through agreement with the NT Department of Health. If larvae are detected, the Medical Entomology Branch of NT Health will be contacted for assistance in choosing a suitable method of lavaciding. If required, an adulticiding program will also be undertaken.</p> <p>Erosion and washdown practices will be controlled to prevent sediment and debris forming standing water pools in natural watercourses adjacent to the site.</p> <p>All drainage channels/spoon drains will be kept as shallow as possible to prevent ponding.</p> <p>Runoff sedimentation ponds will be emptied as soon as possible following storm events to prevent long-term ponding.</p> <p>All construction workers will be educated to be especially vigilant during the high mosquito borne disease risk periods (late dry to post wet) through the use of long sleeved shirts and trousers, avoidance of going outside at sundown, and the regular use of insect repellent. Insect repellent will be provided at work sites.</p> <p>Workers will be educated about the early symptoms associated with exposure to mosquito borne arbovirus and will be instructed on the need to report any symptoms to a medical officer.</p> <p>All construction accommodation facilities will be screened and air conditioned and external street lighting will be fitted with yellow bulbs to discourage mosquitos.</p>
Monitoring	The construction contractor will monitor the mosquito activity within the construction accommodation and work areas to identify if mitigation measures are not successful and to determine whether larval and adult eradication programs should be implemented.
Reporting	Any significant mosquito activity will be reported to MRM's General Manager and/or the Medical Entomology Branch.
Corrective Actions	<p>The following represent an incident or failure to comply:</p> <ul style="list-style-type: none"> • Mosquito breeding sites are created by construction activities. • Excessive numbers of larvae and/or mature mosquitoes are evident on-site. • Significant incidences of mosquito bites are reported. <p>Should an incident or failure to comply occur, a selection of the following actions will be taken:</p> <ul style="list-style-type: none"> • An investigation will be undertaken into why directives are not being carried out. • Employees will be re-educated on desired practices. • Work policies and procedures will be changed to improve the situation.
Relevant legislation and Standards	<ul style="list-style-type: none"> • MRM's Environmental Policy and Procedures.

22.3.7 Chemicals and Dangerous Goods Management Plan

Objectives	To safely manage, purchase, store, handle and dispose of fuels and chemicals and prevent the uncontrolled release of chemicals to the environment.
Targets	<p>Compliance with relevant Australian Standards (e.g. for the storage and handling of flammable and combustible liquids and dangerous goods) including:</p> <ul style="list-style-type: none"> AS 4452 The Storage and Handling of Toxic Substances; AS 1940 The Storage and Handling of Flammable and Combustible Liquids; and AS 3740 The Storage and Handling of Corrosive Substances. <p>No spills of chemicals or release of chemicals to the environment.</p>
Actions	<ul style="list-style-type: none"> Material Safety Data Sheets (MSDSs) of all chemicals used during construction will be kept in a register by the construction contractor. The construction contractor to have procedures in place regarding emergencies relating to chemicals and dangerous goods consistent with MRM's Safety Management System. Records will be kept on the existing inventory, storage location, personnel training and disposal of waste for all chemical and dangerous goods used on-site. All relevant construction workers will be trained in appropriate handling, storage and containment practices for chemicals and dangerous goods as is relevant to their position. All fuels and chemicals will be stored in accordance with the requirements of the relevant Australian Standard. Provide bunded storage areas for fuels and dangerous goods required for construction equipment with spill cleanup kits. Implement controls to ensure all transfer of fuels and chemicals is managed to prevent spillage and occurs inside bunded areas. Any spills to be cleaned up immediately. Contaminated runoff and contaminated soil will be collected and remediated or disposed of in the tailings storage facility.
Monitoring	Inspections of storages tanks and bulk containers and the integrity of bunded areas, pavement and associated containment systems will be conducted on a monthly basis.
Reporting	<p>The construction contractor will record and sign off on monthly inspections of containers, bund integrity, valves and storage and handling areas.</p> <p>Spills will be reported to MRM's General Manager including actions taken to minimise the impacts.</p>
Corrective Actions	<p>The following constitute an incident or failure to comply in relation to fuels and dangerous goods management:</p> <ul style="list-style-type: none"> A fuel or chemical spill. Storage areas not meeting Australian Standards. Storage areas not containing suitable bunding. Release of fuel or chemicals to the environment. <p>Should an incident occur, a selection of the following corrective actions will be undertaken as appropriate:</p> <ul style="list-style-type: none"> Contain and clean up spilt material immediately and remediate or appropriately dispose of contaminated material. Repair containments systems. Relocate fuel or chemicals to appropriately bunded or approved storage areas.
Relevant Legislation and Standards	<p>MRM's Environmental Policy and Procedures</p> <p>Relevant Australian Standards</p>

22.3.8 Incidents and Complaints Management Plan

Objective	To manage environmental or social incidents and complaints.
Target	Immediate action undertaken as soon as possible and within 24 hours of receipt of a complaint. Investigations completed within 7 days of receipt of a complaint. All corrective actions implemented by the due date.
Actions	All incidents or complaints about either environmental or social issues will be managed in accordance with MRM's procedure. This procedure requires the following actions to be undertaken: <ul style="list-style-type: none"> • Take any necessary immediate action. • Report the incident or complaint (including to Government if necessary). • Undertake an investigation. • Determine root causes. • Undertake any necessary corrective or preventative actions. • Monitor action implementation. • Audit effectiveness of action.
Monitoring	The construction contractor shall monitor compliance against the targets
Reporting	All incidents and complaints will be recorded in the construction contractor's incident reporting system. Reports of all incidents and complaints will be submitted to MRM's General Manager. The complainant will be advised of what action, if any, is taken as a result of the complaint.
Corrective Actions	Should further incidents occur or complaints be received in relation to previous occurrences, an appropriate selection of the following corrective actions will be undertaken: <ul style="list-style-type: none"> • Additional environmental awareness training of the workforce with respect to the procedures to be followed for environmental incidents or complaints. • Investigation into why the incident/complaint was not addressed within the specified time frame. • Undertake incident/complaint follow-up according to the results of the investigation.
Relevant Legislation and Standards	MRM's Environmental Policy and Procedures.

22.4 Operations Environment Management Plan

The existing environmental management procedures will apply to the operational phase of the open cut project. The EMP will be progressively updated to include changes associated with the mine as they occur.

MRM's General Manager will have overall responsibility for ensuring that all environmental commitments are met. All employees will be responsible for day-to-day implementation of the requirements of the EMP. Area Superintendents will report on the implementation and performance of the EMP within their areas of responsibility.

In the event of a non-compliance with the EMP, it will be the responsibility of the Area Superintendents to ensure appropriate investigation, reporting and implementation of corrective actions in accordance with MRM procedures.

22.4.1 Waste Management Plan

Objective	Efficient use of resources and minimisation of waste generation and disposal.
Target	<p>Achieving cost effective waste management by:</p> <ul style="list-style-type: none"> • minimising waste generation • maximising waste re-use • maximising recycling • safely treating and disposing of all non-reusable and non-recyclable materials.
Action	<p>MRM will modify its existing waste management plan on the basis of a risk assessment to incorporate the wastes to be generated by the open cut project. The objectives of the waste management plan are to:</p> <ul style="list-style-type: none"> • Identify and categorise all wastes produced across all leases. • Identify and characterise disposal and storage areas for each waste category produced. • Perform risk assessments on all storage, transport and disposal of all waste produced. • Ensure appropriate maintenance of disposal areas. • Ensure appropriate re-use and recycling of specific appropriate wastes. • Identify and implement feasible waste reduction strategies. <p><i>General Waste</i></p> <p>MRM's existing waste management strategies will apply to the open cut project. These strategies include the following:</p> <ul style="list-style-type: none"> • Contaminated waste from both the mine site and Bing Bong port and sludge from the sewerage treatment plant will be disposed of in the tailings storage facility. • Any waste asbestos requiring disposal will be handled and disposed of in an approved manner according to the Asbestos Code of Practice Safe Removal of Asbestos. • Laboratory waste will continue to be discharged to the concentrator runoff pond. • Putrescible (kitchen) wastes will be incinerated at the on-site refuse facility. • Packaging and office waste will be buried at the on-site refuse facility. • Medical waste will be transported to Darwin Hospital for disposal in accordance with AS 3816:1998. • Waste oil will be collected for transport and disposal off-site. • Aluminium cans will be given to the Borroloola Community Government Council for recycling. • Scrap metal will be transported off-site for recycling. • Waste Jet A1 fuel will be re-used in the on-site workshop as a cleaning fluid. • Waste mill lubricant will be disposed of at the tailings storage facility. • Batteries will be transported off-site for disposal. • Tyres will be stockpiled pending the development of an appropriate disposal strategy. <p><i>Tailings</i></p> <ul style="list-style-type: none"> • Tailings will be disposed of in an extension to the existing tailings storage facility. • The facility will be designed to contain the tailings within a bunded area and prevent surface water runoff to the surrounding environment and seepage to the underlying groundwater system. • Tailings water plus stormwater runoff will be pumped from the tailings cell to the water management dam for reuse in the process plant.

	<p><i>Overburden</i></p> <ul style="list-style-type: none"> • Overburden generated by the mining operation will be disposed of at an engineered overburden emplacement facility (OEF). • The OEF will be divided into two zones: one containing potentially acid forming (PAF) material, and the other containing only non-acid forming material (NAF). • PAF overburden will be encapsulated within clay cells and layers of NAF/AC waste to ensure that there is no acidic seepage generated by the facility. • The PAF pond will contain runoff from the PAF section of the OEF. Water from the PAF pond will be pumped to the water management dam for reuse in the process plant. • Runoff from the NAF section of the OEF will pass through sediment ponds before being discharged. • The final surface of the OEF will be protected against erosion and drainage systems will be constructed to ensure non-erosive surface water runoff.
<p>Monitoring</p>	<p>The following waste streams will be measured and reported:</p> <ul style="list-style-type: none"> • Waste generation. • Waste re-use. • Waste recycling. • Waste treatment and disposal. <p>Regular surveying of the OEF and analysis of overburden materials will be undertaken to confirm that the various material types (PAF, NAF, AC etc.) are placed in accordance with the mining plan and OEF design.</p> <p>Water monitoring will be undertaken for both surface water and groundwater around the overburden emplacement facility and the tailings storage facility.</p>
<p>Reporting</p>	<p>MRM's waste management performance will continue to be reported in the annual report sent to DBIRD on the site's environmental performance.</p>
<p>Corrective Actions</p>	<p>The following constitute incidences or failures to comply in relation to waste management policies:</p> <ul style="list-style-type: none"> • Unnecessary volumes of waste being sent for disposal. • Wastes being disposed of rather than reused or recycled where possible. • Uncontrolled waste disposal. • Other non-compliances with the waste management plan. • Surface water or groundwater contamination from tailings or overburden storage indicated by the monitoring program <p>Should an incident or failure to comply occur, the MRM will:</p> <ul style="list-style-type: none"> • Take the necessary actions to identify the causes of non-conformance with the waste management plan performance requirements. • Implement all actions necessary to ensure compliance.
<p>Relevant Legislation and Standards</p>	<ul style="list-style-type: none"> • MRM's Environmental Policy and Procedures. • Waste Management and Pollution Control Act 2003. • Environmental Protection (National Pollution Inventory) Objective 2004. • Australian Minerals Industry for Code for Environmental Management 2000.

22.4.2 Air Quality Management Plan

Objective	To minimise emissions to air from MRM operations.
Target	To achieve compliance with the relevant ambient standards developed by the New South Wales Environment Protection Authority (2001) as detailed in Table 8.7.
Action	<p>Dust control equipment will be installed on all major plant and equipment generating significant point sources of dust. The conveyor belts will be covered to minimise dust emissions.</p> <p>Water sprays will be used (as required) across work zones and unsealed areas to suppress dust. The water will be applied by water cart across ground surfaces whenever the surface has the potential to generate excessive levels of dust. Ore and rock, after firing, will be watered down.</p> <p>Other exposed surfaces and stockpiles will also be watered or sprayed as required.</p> <p>Any long-term stockpiles will be stabilised using fast-seeding, locally common grass. Exposed areas will be minimised through progressive rehabilitation as soon as practicable.</p> <p>All major haul roads will be regularly watered and vehicle speeds on unsealed roads will be controlled to minimise dust.</p> <p>Spray systems will be installed at the new primary crusher and crushed ore stockpile.</p> <p>Haul trucks to Bing Bong will pass through a wheel wash before they leave the mine site.</p> <p>Haul trucks to Bing Bong will have their loads covered to prevent dust generation.</p> <p>MRM will become a signatory to the Greenhouse Challenge Program.</p> <p>Natural gas will continue to be used as the energy source for electricity generation.</p> <p>Energy efficiency will be a major consideration in the design and selection of equipment for the open cut operation.</p> <p>Consideration will be given to opportunities for ongoing energy efficiency program in the existing plant.</p>
Monitoring	<p>The existing dust deposition monitoring program will be reviewed prior to the commencement of the open cut operations to determine appropriate monitoring locations in light of the proposed changes in site activities. The dust collected will continue to be analysed for lead and zinc concentrations.</p> <p>A PM₁₀ monitor will be installed at the eastern side of the accommodation village to monitor for ambient concentrations of suspended particulates. The dust will be analysed for PM₁₀ concentrations as well as lead and zinc.</p> <p>Monitoring of wind speed, wind direction, rainfall and temperature will continue to be undertaken at the airfield. The anemometer will be regularly calibrated and maintained to ensure acceptable data quality.</p>

Reporting	<p>MRM's air quality performance will continue to be reported in the annual report sent to DBIRD on the site's environmental performance.</p> <p>MRM will quantify greenhouse gas emissions and submit annual reports to the Australian Greenhouse Office on performance against emission management targets.</p>
Corrective Actions	<p>The following would constitute an incident or failure to comply in regards to air quality management:</p> <ul style="list-style-type: none"> • Proposed dust mitigation strategies not being implemented. • Emission concentrations exceed guideline levels. • Receipt of an air quality complaint. • MRM is not a signatory to the Greenhouse Challenge Program. <p>Should an incident or failure to comply occur, the MRM will:</p> <ul style="list-style-type: none"> • Take the necessary actions to identify the causes of the non-conformance. • Implement all actions necessary to ensure compliance
Relevant Legislation and Standards	<ul style="list-style-type: none"> • MRM's Environmental Policy and Procedures. • Environmental Protection (National Pollution Inventory) Objective 2004. • Australian Minerals Industry Code for Environmental Management 2000. • National Environmental Protection Measure for Ambient Air Quality • NSW EPA (2001) • Greenhouse Challenge Program.

22.4.3 Noise Management Plan

Objective	To minimise the generation of noise emissions during the construction phase and to mitigate any potential noise impacts.
Target	Noise levels from construction activities not to exceed 60 dB(A) at the accommodation village.
Actions	All items of mobile equipment will be fitted with high performance mufflers. All new equipment will be selected so as to reduce occupational noise exposure to a minimum. Every effort will be made to limit noise exposure to 85 dB(A) within 1 m of operating equipment.
Monitoring	A blast noise monitoring program will be implemented to determine if there is any possibility of sleep disturbance as a result of blasting.
Reporting	The results of the blast noise monitoring will be reported to MRM's General Manager. Any complaints will be documented in the complaints register, investigated and reported to MRM's General Manager.
Corrective Actions	The following would constitute an incident or failure to comply in regards to noise management: <ul style="list-style-type: none"> Complaints received about excessive noise at the accommodation village or at sites off lease. Should an incident or failure to comply occur, the MRM will: <ul style="list-style-type: none"> Identify the source of the noise. If appropriate, implement a noise monitoring program. If monitoring indicates that blasting noise could cause sleep disturbance, then a maximum allowable blast size will be determined based on the noise levels recorded. Other control measures could include restricting blasting to certain times of day (eg. shift changes) when sleep disturbance is likely to be minimal, or only blasting when winds are from the south-western quadrant or when wind or rain noise is likely to mask the noise from blasting. If monitoring indicates that operational noise could cause sleep disturbance, appropriate noise mitigation strategies will be identified and implemented.
Relevant Legislation and Standards	<ul style="list-style-type: none"> MRM's Environmental Policy and Procedures. Waste Management and Pollution Control (Environmental Noise) Regulation. AS 1055.1 1997 "Acoustics: Description and Measurement of Environmental Noise; Part 1:General Procedures."

22.4.4 Surface Water Management Plan

Objective	Minimise the discharge of contaminated surface water to the surrounding environment.
Target	<p>Compliance with the Waste Discharge Licence under the provisions of the NT Water Act.</p> <p>Ambient water quality monitoring assessed in accordance with ANZECC Guidelines for Fresh and Marine Water Quality (2000) until site-specific trigger levels agreed with DBIRD.</p> <p>No erosion or deposition of sediment within the realigned channels beyond natural fluctuations.</p> <p>No disruption to fish movements along the McArthur River.</p>
Actions	<p><i>Water Management System Objectives</i></p> <p>Continue the existing surface water management system based on the following objectives:</p> <ul style="list-style-type: none"> • Minimise raw water consumption; • Maximise the reuse of process water; • Reuse contaminated runoff water as process water; • Provide adequate storage in the surface water management system; • Minimise the generation and release of contaminants, with an emphasis on source control; • Minimise the retention of 'clean' water; • Maximise the efficiency of the mine and process water use; and • Maintain a non-release system for 'dirty' mine waters, except under extreme conditions, as approved. <p><i>New Water Storages</i></p> <p>Implement the following changes to the mine's surface water management system to cater for the open cut project:</p> <ul style="list-style-type: none"> • Utilisation of the former underground mine voids as a major water storage facility. • Construction of a bund wall runoff pond, to collect surface water runoff between the flood protection bund and the edge of the open pit. • Construction of ponds (to be known as stage storage ponds) to replace the plant settling ponds that will be removed as part of the Test Pit project. • Construction of a NAF sediment pond to remove sediment and reduce turbidity in runoff from the non-acid forming (NAF) zone of the overburden emplacement facility. • Construction of a PAF containment pond to capture and contain runoff from the potentially acid forming (PAF) zone of the overburden emplacement facility. • Construction a water management dam at the tailings storage facility in place of the clean water and dirty water dams. <p><i>Pit Dewatering</i></p> <p>Dewatering of the open-cut pit will be directed to following available storages in priority order:</p> <ul style="list-style-type: none"> • First – Stage storage pond for reuse in process plant and for dust suppression; • Second – TSF water management dam to maximise evaporative losses, and allow transfer back to the stage storage pond for reuse in process plant; and • Third – Underground void storage

	<p><i>OPSIM Modelling</i></p> <p>The existing OPSIM water management model will be modified to incorporate the changes from the open cut project and will be used to determine system performance. The following management strategies will be implemented:</p> <ul style="list-style-type: none"> • OPSIM modelling will be updated regularly to ensure reliable representation of: <ul style="list-style-type: none"> – the structure and operating rules of the water management system; – actual storage and transfer capacity of system components (confirmed by surveys); – mine production rates and associated concentrator process water balance; – rates of groundwater inflows into the open pit and total pit dewatering requirements (confirmed by flow monitoring); – varying catchment areas and ‘type’ over the mine life (e.g. staged construction of OEF and its runoff contribution to the OEF ponds); – varying water reuse demands and improved knowledge of demand influencing factors (e.g. seasonal variation, relationship to production rates, etc.) – improved knowledge of catchment runoff characteristics (confirmed by flow monitoring as required); and – variation of modelled climatic data with monitoring data (to confirm system performance in response to climate variation). • Pump water from the underground void storage to the TSF water management dam, when the underground void storage exceeds 2,100ML. • Establish a trigger level of 2,300 ML for the underground void storage, at which time the optimum upgrade for the water management system will be evaluated and implemented. Measures could include construction of additional containment/evaporation storages and/or implementation of additional works/strategies to maximise evaporative losses from the system. • On-going seepage management of new and existing storage ponds, review, assessment and implementation of interception strategies and mitigation works where necessary. • Review of the potential consequences from containment storage overflows as site water monitoring data are obtained, and where necessary, revise the target overflow probability used to size containment storages. • Upgrading water management infrastructure (pond storage capacity, pumps and pipeline capacity) as required to maintain acceptable overflow criteria (spill risk) as determined from the OPSIM modelling. • Practice continual improvement by using the OPSIM modelling on adaptive management basis to accommodate actual groundwater inflow rates into the open cut, to reassess the risk of discharge to the environment, to review system performance, and to minimise reliance on external raw water supplies <p><i>Realigned Drainage Channels</i></p> <p>The realigned channels of McArthur River and Barney/Surprise Creeks have been designed to replicate existing conditions and to minimise erosion of the new beds and banks. This has included limiting design flow velocities, provision of scour protection in critical areas, and revegetation of banks and batters.</p> <p>Make provision for fish movement by matching existing flow velocities to avoid hydraulic barriers, providing micro-habitats along channel bed, and providing resting pools where tributaries join the realigned river channel.</p> <p>Protection strategies such as rock armouring will be used for the banks of the realigned channel at critical locations such as the start and finish points, alluvial areas, and in dispersive clays to minimise erosion potential.</p> <p><i>Drainage Control</i></p> <p>Sediment traps to be provided as necessary downstream of disturbed areas outside of the flood</p>
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	<p>protection bund to control sediment load in site runoff.</p> <p>Clean water diversion drains will be installed to divert clean stormwater flow from undisturbed areas away from the sediment traps. Diversion drains will also be installed as necessary to direct sediment-laden stormwater flow to the sediment traps.</p> <p>Provide bunded storage areas for fuels and dangerous goods with spill cleanup kits in accordance with the requirements of AS 1940:1993 and AS 3780:1994.</p> <p>Implement controls to ensure all transfer of fuels and chemicals is undertaken within bunded areas.</p>
Monitoring	<p>The existing surface water monitoring program will continue.</p> <p>The existing surface water monitoring program will be extended to incorporate the new runoff and containment ponds.</p> <p>The effectiveness of the site's surface water management system will be regularly assessed and the OPSIM modelling updated as necessary.</p> <p>Regular engineering safety/audit assessments will be undertaken of the integrity of water storages where there is potential for spill to receiving waters in the event of a storage breach.</p> <p>Implement a sedimentation monitoring and management strategy within the realigned channels and downstream to the Bukalara Range.</p>
Reporting	<p>The results of MRM's water quality monitoring program will continue to be reported in the annual report sent to DBIRD on the site's environmental performance.</p>
Corrective Actions	<p>The following will be classified as an incident or failure to comply in relation to surface water management:</p> <ul style="list-style-type: none"> • breach in integrity of ponds, pipes or drains; • overflow from water management system; • sedimentation ponds demonstrating significant reduced available volume; • discharge in contravention of the site's waste water discharge licence; or • erosion or deposition is occurring within the realigned channel in excess of natural fluctuations. <p>Should an incident or failure to comply occur in relation to surface water management, a selection of the following corrective actions will be considered where relevant:</p> <ul style="list-style-type: none"> • repair water management controls (eg. ponds, pipes or drains); • contain and remediate or dispose of contaminated material/contaminants; • modify the operating strategies for the surface water management system; • clean out the sedimentation ponds; • modify channel cross sections; • implement additional revegetation; or • provide other rectification measures as appropriate.
Legislative Requirements and Standards	<ul style="list-style-type: none"> • MRM's Environmental Policy and Procedures. • Waste Discharge Licence pursuant to Section 74 of the <i>Water Act</i>. • ANZECC Guidelines for Fresh and Marine Water Quality 2000.

22.4.5 Groundwater Management Plan

Objective	To protect the quality of the existing groundwater resource. To use groundwater as a source of water supply.
Target	No deterioration in groundwater quality. No unacceptable effects due to groundwater drawdown.
Actions	<p><i>Open Cut</i></p> <ul style="list-style-type: none"> • The open cut is to be dewatered by perimeter bores. • Groundwater seepage into the pit to drain to a pit sump for pumping to surface water management system. <p><i>Surface Water Management System</i></p> <ul style="list-style-type: none"> • All new water management ponds will be constructed with low permeability bases to minimise seepage. <p><i>Industrial Area</i></p> <ul style="list-style-type: none"> • New ROM and stockpile area will be built with a low permeability base to minimise the potential for seepage. <p><i>Tailings Storage Facility</i></p> <ul style="list-style-type: none"> • Continue the installation of the geopolymer barrier around the perimeter of the existing tailings storage facility to prevent seepage. • Once the new tailings storage cells have been constructed the existing tailings impoundment will be decommissioned and rehabilitated. • The embankments of the new cells to be constructed for the open cut project will have an earth fill core zone (clay/silt fraction greater than 20%) with a cut-off key extending into competent basement material to minimise seepage. • To minimise the contamination of any potential seepage, an appropriate tailings deposition regime will be maintained so that the potential for tailings to oxidise and release oxidation products will be limited. • A series of recovery bores will be installed downgradient of the expanded tailings storage facility to intercept any seepage through the surficial sandy clay or sandy gravel layers and the underlying dolomitic sandstone layer. <p><i>Overburden Emplacement Facility</i></p> <ul style="list-style-type: none"> • All PAF material within the overburden emplacement facility (OEF) will be encapsulated by NAF and AC materials to prevent the generation of acidic seepage. • The black soil and clays underlying the OEF will be contoured and compacted to direct seepage towards the perimeter drains. • The PAF pond wall will be constructed of compacted clay to minimise the potential for seepage to groundwater.
Monitoring	The existing groundwater quality and level monitoring program will be expanded to incorporate additional monitoring bores around the OEF and the open cut. Monitor drawdown levels to assess the efficiency of the open cut dewatering program and to confirm the predicted drawdown effects. Implement a groundwater level monitoring program in the vicinity of Djirrinmini Waterhole on the McArthur River.
Reporting	The results of MRM's groundwater monitoring program will continue to be reported in the annual report sent to DBIRD on the site's environmental performance.

Corrective Actions	<p>Detection of contaminated groundwater by the monitoring program would be classified as an incident or failure to comply in relation to groundwater management.</p> <p>Should an incident or failure to comply occur in relation to groundwater management, a selection of the following corrective actions will be considered where relevant:</p> <ul style="list-style-type: none">• Identify the source of the seepage and effect remedial action to the seepage control system; and• Recover contaminated groundwater for reuse in the processing plant. <p>Should the monitoring program indicates that the drawdown at Djirrinmini Waterhole is greater than predicted, implement mitigation measures such a sustaining upstream river flows from suitable bores.</p>
Legislative Requirements	<ul style="list-style-type: none">• MRM's Environmental Policy and Procedures.• ANZECC Guidelines for Fresh and Marine Water Quality 2000.

22.4.6 Biology

Objective	To minimise the impacts on flora and fauna around operational areas.
Target	No disturbance to flora and fauna outside the designated operational area. To prevent spread of weeds and feral pests.
Actions	<p><i>Clearing</i></p> <ul style="list-style-type: none"> • All vegetation clearing will be conducted in accordance with MRM's "Permit to Clear" procedure. • Prior to any clearing required, the boundary of the area authorised to be cleared will be identified and clearly marked tape to ensure construction vehicles do not impact on adjacent undisturbed vegetation. • Vegetation will be burnt only after receipt of a "Permit to Burn". This ensures that all appropriate parties are notified of the date, time and location of the controlled burn. Appropriate parties include National Jet Systems, NT Bushfire Council, Community Relations/traditional owners, and the McArthur River Pastoral Lease Manager. <p><i>Weed Management</i></p> <ul style="list-style-type: none"> • The current weed control program will be continued. It will involve the periodic (monthly) inspection of the construction sites and downstream areas and control of any infestations of declared environmental weeds. The source of any infestation will be investigated and the most appropriate control technique will be implemented. <p><i>Realigned Drainage Channels</i></p> <ul style="list-style-type: none"> • The realigned channels will be revegetated to assist in stabilising the banks and batters and to provide fauna habitat. • Design flow velocities within the realigned McArthur River have been adopted to ensure there is no velocity impediment to fish movement. • The realigned channel will be designed to mimic the existing physical characteristics of the river, so that flow regimes, including depths, widths and currents will be similar to the existing situation. • Within the realigned channel, a variety of micro-habitats will be provided in the form of logs, rocks, sandy substrate etc. to provide some protection and resting areas for fish. • Some drainage lines will be modified as they enter the realigned McArthur River to serve as refuge stopovers for aquatic fauna, and these will also allow terrestrial fauna easier access to the river.
Monitoring	<p>The existing vegetation monitoring program will be reviewed and updated with regards to monitoring parameters, site selection and monitoring frequency, and will be expanded to include new sites along the river realignments and in upstream and downstream areas. It will be designed to monitor any mine-related effects such as groundwater drawdown, water and air quality, erosion or weed infestation.</p> <p>To monitor effects of the changed conditions, regular bird counts will be undertaken at points upstream and downstream of the mine site and at points along the realigned channel.</p> <p>An aquatic monitoring program will be implemented to assess populations of species in permanent pools above the river realignment and to assess movements of species through the realigned channel.</p> <p>Due to the current lack of data on the Endangered freshwater sawfish in the region of the mine, a specific survey for this species will be undertaken and, based on the survey findings, a management and monitoring plan for this species will be developed.</p> <p>The success of the revegetation within the realigned channels will be monitored quarterly including before and after each wet season until the vegetation matures and bank stability is attained.</p>

Reporting	The results of MRM's biology management program will continue to be reported in the annual report sent to DBIRD on the site's environmental performance.
Corrective Actions	<p>The following constitute an incident or failure to comply:</p> <ul style="list-style-type: none">• Unauthorised disturbance of vegetation or habitats outside of the designated operational area.• Evidence of weed infestation or feral pest presence.• Fire management program not prepared or implemented.• Revegetation not established along realigned drainage channels or is not growing healthily or at the design densities.• Disruption to fish movement through realigned drainage channels. <p>In the event of a failure to comply, investigations will be undertaken into the cause of the incident or failure to comply and the appropriate action taken to overcome the problem.</p>
Relevant Legislation and Standards	<ul style="list-style-type: none">• MRM's Environmental Policy and Procedures.• Territory Parks and Wildlife Conservation Act 2000

22.4.7 Mosquito Management Plan

Objectives	To prevent the occurrence of potential mosquito breeding sites and the presence of adult mosquitos.
Targets	No mosquito breeding sites created by operational activities.
Actions	<p>Any depressions created in the ground surface will be filled or drained to prevent the ponding of water.</p> <p>Storage containers capable of ponding water will be either discarded after use or stored in an inverted position (care will be taken to ensure that ponding does not occur in rubbish storage areas).</p> <p>Any ponds and on-site excavations filled with water will be inspected for the presence of mosquito larvae at a frequency to be determined through agreement with the NT Department of Health. If larvae are detected, the Medical Entomology Branch of NT Health will be contacted for assistance in choosing a suitable method of lavaciding. If required, an adulticiding program will also be undertaken.</p> <p>Erosion and washdown practices will be controlled to prevent sediment and debris forming standing water pools in natural watercourses adjacent to the site.</p> <p>All drainage channels/spoon drains will be kept as shallow as possible to prevent ponding.</p> <p>All operational workers will be educated to be especially vigilant during the high mosquito borne disease risk periods (late dry to post wet) through the use of long sleeved shirts and trousers, avoidance of going outside at sundown, and the regular use of insect repellent. Insect repellent will be provided at work sites.</p> <p>Workers will be educated about the early symptoms associated with exposure to mosquito borne arbovirus and will be instructed on the need to report any symptoms to a medical officer.</p> <p>All on-site accommodation facilities will be screened and air conditioned and external street lighting will be fitted with yellow bulbs to discourage mosquitos.</p>
Monitoring	MRM will monitor the mosquito activity within the accommodation and work areas to identify if mitigation measures are not successful and to determine whether larval and adult eradication programs should be implemented.
Reporting	Any significant mosquito activity will be reported to the Medical Entomology Branch.
Corrective Actions	<p>The following represent an incident or failure to comply:</p> <ul style="list-style-type: none"> • Excessive numbers of potential mosquito breeding sites exist on-site. • Excessive numbers of larvae and/or mature mosquitoes are evident on-site. • Significant incidences of mosquito bites are reported. <p>Should an incident or failure to comply occur, a selection of the following actions will be taken:</p> <ul style="list-style-type: none"> • An investigation will be undertaken into why directives are not being carried out. • Employees will be re-educated on desired practices. • Work policies and procedures will be changed to improve the situation.
Relevant Legislation and Standards	<ul style="list-style-type: none"> • MRM's Environmental Policy and Procedures.

22.4.8 Cultural Heritage Management Plan

Objectives	To ensure that there are no detrimental effects on the region's cultural heritage values.
Targets	Cultural heritage values understood and protected by MRM.
Actions	<p>No unauthorised disturbance of sites of cultural heritage significance by the operation of the open cut project.</p> <p>Comply with all conditions attached to the site's AAPA certificates. The conditions include the following requirements:</p> <ul style="list-style-type: none"> • Prevention of entry to sacred sites. • Prevention of ground-disturbing works at sacred sites. • Prevention of damage to vegetation at sacred sites other than for purposes specified in the condition. • Prevention of storage of material and parking of machinery within areas of sacred sites, or within a certain radius of sites. • Erection of highly visible temporary protective fences in specified areas (e.g. along the outer perimeter of work areas in the vicinity of sacred sites) and maintenance of fences while works are in progress. • Notification of the Aboriginal custodians of the sacred sites and providing them with the opportunity to supervise any restoration works carried out on the site. <p>Provide cross-cultural inductions for all new open cut project employees.</p> <p>Continue to support selected local indigenous cultural activities.</p> <p>Continue to consult with the indigenous community.</p> <p>Undertake a predictive archaeological survey of the areas to be disturbed by the open cut project before construction begins and obtain permission to manage any sites identified in accordance with the requirements of the Heritage Conservation Act 2000.</p> <p>Ensure that the services of a suitably qualified archaeologist are available when clearing and earthworks activities are undertaken in areas identified in the predictive survey as being highly likely to contain significant artefacts.</p>
Monitoring	<p>Visual inspection of sacred sites.</p> <p>Review feedback from the traditional owners.</p> <p>Undertake predictive archaeological survey</p>
Reporting	<p>Cultural heritage issues will be reported in the annual report sent to DBIRD on the site's environmental performance.</p> <p>The results of the predictive survey will be reported to the Minister for Environment and Heritage.</p>
Corrective Actions	<p>The following constitute an incident or failure to comply:</p> <ul style="list-style-type: none"> • Unauthorised disturbance of sacred sites. • Non compliance with AAPA certificate conditions. • Lack of cross-cultural inductions for new open cut project employees. • Archaeological sites are destroyed without permission. <p>In the event of a failure to comply, investigations will be undertaken into the cause of the incident or failure to comply and the appropriate action taken to overcome the problem.</p>
Relevant Legislation and Standards	<p>MRM's Environmental Policies and Procedures.</p> <p>Aboriginal Land Rights Act 1976.</p> <p>Heritage Conservation Act 2000.</p> <p>Northern Territory Aboriginal Sacred Sites Act 1989.</p>

22.4.9 Social and Community Management Plan

Objectives	Maximise beneficial social and/or community effects from the operations.
Targets	No complaints about social or community impacts.
Actions	<p>Continue to pursue partnerships and agreements with community and government counterparts on matters of community development.</p> <p>Continue to participate in community development projects.</p> <p>All employees will be subject to a code of conduct which will include controls on access to, and use of, regional recreational areas.</p> <p>Continue to provide training and employment opportunities for local residents.</p> <p>Continue to use a range of communication tools to ensure that the local community is kept informed of MRM's operations.</p> <p>Continue the role of MRM's Community Development Officer as an active member of a number of local community organisations.</p>
Monitoring	Review feedback from the local community.
Reporting	Community issues will be reported in the annual report sent to DBIRD on the site's environmental performance.
Corrective Actions	<p>The following constitute an incident or failure to comply:</p> <ul style="list-style-type: none"> • Justified complaints from about social and community issues. • Non involvement of MRM in local community activities. • Cessation of training and employment opportunities for local residents. <p>In the event of a failure to comply, investigations will be undertaken into the cause of the incident or failure to comply and the appropriate action taken to overcome the problem.</p>
Relevant Legislation and Standards	MRM's Environmental Policies and Procedures.

22.4.10 Health and Safety Management Plan

Objective	To ensure that the operation does not adversely affect the health of the employees, contractors or the general public.
Target	Zero reportable injuries and work-related illnesses.
Actions	<p>The site's existing safety management system will be modified to incorporate the requirements of the open pit project.</p> <p>The site's existing behavioural safety management program will be modified to incorporate the requirements of the open pit project.</p> <p>Safety training will be implemented through both general site safety induction as well as area specific inductions.</p> <p>Job Safety Analysis will be undertaken as required for specific tasks associated with the open cut project and used to develop Standard Operating Procedures to ensure compliance with the MRM standards.</p> <p>The site's existing risk register will be reviewed to incorporate all high level business, safety and environmental risks associated with the open cut project.</p> <p>Existing workplace hazards and procedures will be modified to incorporate the open cut project. These procedures will include:</p> <ul style="list-style-type: none"> • Hazardous substances/dangerous goods • Noise • Isolation and tagging • Manual handling • Personal protection equipment • Confined spaces • Height safety • Health and Hygiene Programs • Illness and Injury Management System
Monitoring	MRM is committed to continuous improvement through the regular auditing of the site's health and safety health systems both internally and externally through an AS/NZS 4801:2001 certification body.
Reporting	<p>The OHS representative reports to the Executive Management Team on a weekly basis on any health and safety issues that need to be addressed.</p> <p>The results of all health and safety audits will be reported to the General Manager.</p> <p>MRM's existing electronic incident reporting process (Sitesafe) will be used to report all health and safety incidents.</p>
Corrective Actions	MRM will investigate, respond to and take appropriate corrective action and preventive action following health and safety incident.
Relevant Legislation and Standards	<ul style="list-style-type: none"> • MRM's Occupational, Health and Safety Policy. • Work Health Act 2005. • Work Health Regulation 2004. • Work Health (Occupational Health and Safety) Regulation 2003. • AS/NZS 4801:2001

22.4.11 Rehabilitation Management Plan

Objective	To ensure that rehabilitation will be sustainable and, where operationally practicable, is undertaken progressively.
Target	Rehabilitation works will, at the completion of mining, result in a stable vegetated landscape and stable realigned drainage channels having minimal impact on the surrounding environment.
Actions	<p>The site's rehabilitation program, which is presented in the MRM Life of Mine Plan, will be updated to incorporate the open cut project.</p> <p>The rehabilitation strategy will remain flexible and will be amended as new rehabilitation techniques emerge and as environmental investigations progress, or when the mine plan is modified.</p> <p>Rehabilitation programs will be development on a ongoing basis and will be implemented at the appropriate sites.</p> <p>Materials will be placed in a strategic manner to facilitate progressive rehabilitation and to minimise material handling costs.</p> <p>Trials and studies will be undertaken to enable effective techniques to be implemented when carrying out rehabilitation.</p> <p>Rehabilitation requirements, plans and timelines will be reviewed annually.</p> <p>Development of revegetation strategies will be an ongoing component of rehabilitation activities.</p> <p><i>Realigned Drainage Channels</i></p> <ul style="list-style-type: none"> • The banks of the realigned river and creek channels will be revegetated. In the alluvial sections the channel will be fully revegetated and in the rocky sections the high parts of the realigned banks (alluvial soils) will be fully revegetated with strategic revegetation of the lower rocky banks. • Revegetation will be achieved by a combination of direct and hand seeding, and planting of seedlings. • Seeds will be collected from the surrounding riverine habitats at the time of seeding fro each of the relevant species. • Seedlings will be grown in an on-site nursery from the locally collected seeds. • Species to be used in the revegetation program will be a mixture of endemic including woody, herbaceous and grassy species in a ratio of approximately 3:4:5 that reflects the existing natural species density. • The proposed seeding rate will be 2-5 kg/ha and will be undertaken after the first rains of the 2006/07 wet season. • The proposed seedling rate will be 300-400 (woody species) per hectare and will be undertaken before the onset of the 2006/07 wet season. • The realigned river channel will be fenced to exclude cattle. • A weed management and monitoring plan will be prepared for the realigned channels. <p><i>Overburden Emplacement Facility</i></p> <ul style="list-style-type: none"> • The top of the OEF and the intermediate berms will be rehabilitated progressively as sections of the OEF are completed. • Rehabilitation trials will be undertaken on various landform profiles, outer batter material types, revegetation strategies, and surface water management systems. • The final rehabilitation strategy will depend on the outcomes of the trials but conceptually could include: <ul style="list-style-type: none"> – Placement of a nominal 0.5 m thickness of topsoil across the profiled surface. – Contour ripping, seeding and fertilizing to establish grass cover. <p><i>Tailings Storage Facility</i></p> <p>At the completion of mining activities, the TSF will be decommissioned and rehabilitated using a strategy that will include:</p> <ul style="list-style-type: none"> • Re-profiling the surface to ensure incident rainfall runs off the TSF rather than seeps into the tailings.

	<ul style="list-style-type: none"> • Placement of a capillary layer over the re-profiled surface to limit the capillary rise of salts into the cover layer. • Placement of a low permeability cover over the capillary layer to prevent the oxidation of tailings, to minimise the potential for seepage into the tailings, to stabilise the surface, and to provide a medium for vegetation growth. • Revegetating the surface of the cover with native grasses and shallow rooted tree species to stabilise the cover surface and to assist in the removal of water stored within the cover following extended wet periods. • Continue the operation of the interception bores at the toe of the perimeter wall for a period of at least 15 years and possibly longer to ensure that the risks of future seepage to Surprise Creek are limited. <p><i>Open Pit</i></p> <ul style="list-style-type: none"> • Breach sections of the flood protection bund and allow flood events in the McArthur River to fill the open pit. • Remediate pit edges to ensure stable and safe conditions. • Stabilise cleared operational areas by regarding to control drainage, replace topsoil and revegetate.
Monitoring	<p>MRM will undertake regular audits of the extent and success of rehabilitation activities.</p> <p>The realigned drainage channels will be monitoring for vegetation health and growth success at quarterly intervals including before and after each wet season until the vegetation matures and bank stability is attained.</p> <p>Weeds along the realigned channels will be monitored in accordance with the requirements of the weed management and monitoring plan.</p>
Reporting	<p>The results of MRM's rehabilitation program will continue to be reported in the annual report sent to DBIRD on the site's environmental performance.</p>
Corrective Actions	<p>The following constitute an incident or failure to comply:</p> <ul style="list-style-type: none"> • Failure to implement the rehabilitation program. • Unsuccessful rehabilitation. • Weed infestation within rehabilitated areas. <p>In the event of an incident of failure to comply, investigations will be undertaken into the cause of the incident or failure to comply and the appropriate action taken to overcome the problem.</p>
Relevant Legislation and Standards	<p>MRM's Environmental Policies and Procedures.</p> <p>MRM's mining leases.</p> <p>Mining Management Act 2001.</p> <p>Mining Act 2004.</p>

22.4.12 Closure Management Plan

Objective	After the site is closed it will be left in a condition that reflects government and community expectations.
Target	To meet the site closure criteria set out in MRM's Unplanned and Life of Mine Completion Plan.
Actions	Update in MRM's Unplanned and Life of Mine Completion Plan to incorporate the open cut project.
Monitoring	MRM's Unplanned and Life of Mine Completion Plan will be reviewed on an annual basis.
Reporting	The site's closure strategy will be reported in MRM's Unplanned and Life of Mine Completion Plan.
Corrective Actions	<p>The following constitute an incident or failure to comply:</p> <ul style="list-style-type: none"> • Failure to update the Unplanned and Life of Mine Completion Plan to incorporate the open cut project. • Failure to review the Unplanned and Life of Mine Completion Plan. <p>In the event of a failure to comply, investigations will be undertaken into the cause of the incident or failure to comply and the appropriate action taken to overcome the problem.</p>
Relevant Legislation and Standards	<p>MRM's Environmental Policies and Procedures.</p> <p>MRM's mining leases.</p> <p>Mining Management Act 2001.</p> <p>Mining Act 2004.</p>

22.4.13 Biodiversity Offset Management Plan

Objectives	To implement a biodiversity offset program for the open cut project.
Targets	Develop and implement a management plan for the agreed offset option.
Actions	<p>Identify the relevant stakeholders.</p> <p>Engage in stakeholder discussions to determine which of the offset options is most prospective for all interested parties.</p> <p>Undertake additional environmental studies as appropriate.</p> <p>In consultation with all stakeholders, develop a management plan for the preferred option including agreement on site boundaries and tenure arrangements.</p> <p>Implement the management plan.</p>
Monitoring	<p>Review feedback from the stakeholder discussions.</p> <p>Implement monitoring component of the management plan.</p>
Reporting	Report progress to stakeholders at appropriate intervals.
Corrective Actions	<p>The following constitute a failure to comply:</p> <ul style="list-style-type: none"> • All stakeholders not engaged; • Preferred offset option not identified; • Management plan not developed; or • Management plan not implemented. <p>In the event of a failure to comply, investigations will be undertaken into the cause of the failure to comply and the appropriate action taken to overcome the problem.</p>
Relevant Legislation and Standards	<p>MRM's Environmental Policies and Procedures.</p> <p>Territory Parks and Wildlife Conservation Act 2000.</p>

22.4.14 Incidents and Complaints Management Program

Objective	To manage environmental or social incidents and complaints.
Target	Immediate action undertaken as soon as possible. Investigations completed within a timely fashion. All corrective actions implemented by the due date.
Actions	All incidents and complaints about either environmental or social incidents or complaints will be managed in accordance with MRM's procedures. This procedure requires the following actions to be undertaken: <ul style="list-style-type: none"> • Take any necessary immediate action. • Report the incident or complaint (including to Government if necessary). • Undertake an investigation. • Determine root causes. • Undertake any necessary corrective or preventative actions. • Monitor action implementation. • Audit effectiveness of action
Monitoring	Monitor compliance against the targets.
Reporting	Incidents and complaints will be reported to the General Manager. Incident and complaint trends will be reported annually in the Mining Management Plan.
Corrective Actions	The following constitute an incident or failure to comply: <ul style="list-style-type: none"> • Failure to act upon occurrence of an incident or receipt of a complaint. • Failure to investigate an incident or complaint. • Failure to implement any necessary corrective action <p>In the event of a failure to comply, investigations will be undertaken into the cause of the incident or failure to comply and the appropriate action taken to overcome the problem.</p>
Relevant Legislation and Standards	MRM's Environmental Policies and Procedures.