

Environmental Management Plan 19



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19 ENVIRONMENTAL MANAGEMENT PLAN

19.1 INTRODUCTION

This section describes the proposed environmental management measures that will be developed and implemented to address the potential environmental impacts associated with the Eastern Leases Project (the project). The proponent's existing environmental management framework is discussed, and an overview is provided of the environmental management and monitoring plans that will be developed and implemented for the project. The management measures described in this section will effectively manage and control the potential environmental impacts that have been identified in Section 4 – Risk Assessment, and that have been discussed throughout this EIS. This section also includes a table summarising all the environmental commitments contained in the EIS.

19.2 PROJECT OVERVIEW

The project involves the development of a number of additional open cut mining areas (termed “quarries”) to the east of the proponent's existing manganese mine on Groote Eylandt. The proposed additional mining areas are located on the Eastern Leases, which are two Exploration Licences in Retention (ELRs). ELR28161 is termed the Northern Eastern Lease (Northern EL), and ELR28162 is termed the Southern Eastern Lease (Southern EL). The project site for the purposes of the EIS is the Northern and Southern ELs and the new section of haul road linking the Eastern Leases to the existing GEMCO mine (Figure 19-1).

The project site covers an area of approximately 4,600 ha. The total disturbance footprint (i.e. the area of direct impact) is 1,525 ha and includes clearing for the quarries, and associated infrastructure.

19.2.1 Mining Interests

The mineral tenements for the project comprise ELR28161 and ELR28162. GEMCO, which has two shareholders, South32 Pty Ltd (60%) and Anglo Operations (Australia) Pty Ltd (40%), holds a 100% stake in both ELRs. GEMCO will apply to convert these ELRs to Mineral Leases (MLs).

Table 19-1 Mining Interests

TENEMENT NUMBER	STATUS	EFFECTIVE DATE	HOLDER
ELR28161	Granted	17/11/2010	GEMCO (100%)
ELR28162	Granted	25/11/2010	GEMCO (100%)

19.3 ENVIRONMENTAL MANAGEMENT

19.3.1 Environmental Management Structure

The proponent has a dedicated Health, Safety, Environment and Community (HSEC) Department which oversees the environmental management of the existing mine. The structure of this department includes an on-site HSEC Lead, who is supported by a team of environmental professionals both on-site, and within the proponent's head office. This environmental management structure will remain in place for the project, and will oversee HSEC matters for the project.

19.3.2 Environmental Policy and Standards

The proponent places the highest value on being a responsible operator and is committed to minimising the impact of its business on the environment. The proponent adheres to strict internal environmental management standards, and has an environmental management system in place that is consistent with the requirements of *ISO 14001 Environmental Management Systems – Requirements with Guidance for Use*.

The proponent has internal documentation which specifies the minimum mandatory environmental standards and performance requirements for its operations. These standards and procedures will apply to all project activities, and are relevant to the management of land, biodiversity, water, air, greenhouse gas, hydrocarbons and waste. Various internal targets and key performance indicators (KPIs) are routinely set by management for site operations and departments. Monitoring and internal reporting of results relative to these KPIs occurs monthly in order to review the effectiveness of management and mitigation strategies. In the event that a non-compliance (or notifiable incident occurs), the proponent reports these incidents to the Anindilyakwa Land Council (ALC) and to the NT Department of Mines and Energy (DME) consistent with Section 29 of the *Mining Management Act*.

19.3.3 Environmental Record

The proponent has been undertaking exploration activities on the project site since 2001. These exploration activities are conducted in accordance with the environmental standards described above, requirements under the *Mining Management Act*, and with the requirements of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) approvals granted for these activities (refer to EPBC Act referrals 2008/4563 and 2013/6848). Section 2 – Regulatory Framework outlines the existing mining-related approvals relevant to the Eastern Leases Project.

The proponent has not been prosecuted for any breaches under any relevant environmental Commonwealth or Territory laws for the protection of the environment or the conservation and sustainable use of natural resources during the previous ten years.

19.3.4 Mining Management Plan

As a part of the proponent's mining authorisation under the *Mining Management Act* for the existing mine, the proponent is required to submit a Mining Management Plan (MMP) to the DME on a four-yearly basis, with an additional requirement to submit an Operational Performance Report (OPR) annually in years 2, 3 and 4 following the approval of the MMP. DME's public environmental reporting obligations are met through the production of an annual Environmental Mining Report (EMR). The EMR is effectively a public version of the MMP.

The MMP contains the environmental management plans and commitments relating to the existing mine, and it documents the proponent's performance against the previous years' MMP to establish performance goals. The MMP also includes details of any environmental incidents, non-conformances and provides corrective actions as appropriate. An MMP will be prepared for the project and will incorporate the environmental plans and commitments specific to the project. The full extent of the project site will be managed in accordance with the project's MMP.

19.3.5 Environmental Incident Reporting

The proponent has well established procedures in place for the existing mine for reporting and investigating environmental non-conformances and hazards. All environmental incidents are recorded on an internal database, risk ranked, and investigated to determine the cause. Corrective actions are then implemented and monitored. Key learnings from the incidents are noted on the internal database, and the learnings are communicated to the workforce and visitors to the site through internal training and site induction processes.

The proponent's 2014 MMP reported a total 28 environmental incidents within the relevant reporting period. The majority of these incidents were rated as having a low to minor impact to environmental values, with only one incident rated as having a moderate consequence to social values. No incidents were rated as high or extreme.

In line with internal policy and procedures, all incidents were investigated to establish potential and actual risk ratings, and to determine appropriate management and mitigation controls. The potential hazard and corrective actions were communicated to personnel and visitors to the mine. These procedures will be fundamental for the environmental management framework that will be created for the project, and will be implemented for all project-related activities.

In accordance with the *Mining Management Act*, environmental incidents must be reported to the DME as soon as possible.

19.3.6 Community Complaints

The proponent encourages community members to submit any complaints or issues so they may be investigated and resolved as appropriate. Where necessary, this may include monitoring or changes to environmental management plans and procedures.

The proponent also liaises closely with the ALC regarding community issues, and undertakes monthly forums with the ALC to raise, discuss and communicate any environmental issues.

The complaints reporting procedure and community consultation processes will continue to operate for the life of the project.

19.3.7 Review and Auditing

The environmental management framework for the project will encourage continual improvement in environmental performance through the review and, if necessary, revision of environmental management plans or procedures.

In line with current review and auditing procedures of the existing mine, internal and external compliance audits of the project's environmental management framework will be conducted to ensure compliance with the proponent's mandatory environmental standards and regulatory requirements. These audits will be undertaken periodically to enable the proponent to adapt to the changes in the predicted and actual environmental impacts that may arise as project activities progress.

19.3.8 Environmental Training and Education

The proponent is committed to educating all employees about their individual responsibilities regarding HSEC management, through specific induction, training and education programs. These programs will also be implemented for all project-related staff. An important component of the existing site induction program covers targeted environmental issues, including:

- Key environmental legislation and other requirements, and the consequences of non-compliance;
- Potential environmental impacts across the site and at each work area, and how the proponent controls these impacts;
- Groote Eylandt's threatened species and the importance of the island's bio-security (cane toads, weeds etc);
- Energy and greenhouse gas (GHG) performance and targets, main energy users and GHG emission sources, and the importance of energy efficiency;
- The importance of water efficiency;
- The importance of managing dust;
- Where to dispose of waste appropriately and the proponent's land based spill response procedure; and
- The importance of, and how to, report environmental incidents/hazards.

The induction program will be updated as necessary to reflect important HSEC matters relevant to the Eastern Leases.

19.4 PROJECT ENVIRONMENTAL MANAGEMENT

19.4.1 Overview

The following sections discuss the environmental management framework to be adopted for the project, as well as the various management measures that will be implemented for specific environmental aspects. An outline of the objectives and performance criteria, control strategies and monitoring requirements for each environmental aspect is also discussed.

19.4.2 Environmental Management Framework

The environmental management framework that will be implemented for the project will comprise a series of environmental management plans and operating procedures designed to manage and control the environmental impacts of the project. The framework will be designed to ensure that all regulatory requirements are met and it will be consistent with the proponent's environmental standards and performance requirements.

Management Plans

The environmental management plans and procedures for the project will be based on the environmental management framework currently in place for the existing mine, and will be updated to incorporate project-specific management measures as appropriate. However, several site-specific management plans will also be required to be developed. These new plans will, where appropriate, follow a similar structure to current plans for the existing mine, and will include the following key components as a minimum:

- Scope and objectives of the plan;
- Brief outline of the potential impacts that have been identified for the relevant issue;
- Details of the specific mitigation and management measures that will be implemented, including an implementation strategy and the performance criteria (as measurable outcomes) to be adopted;
- Roles and responsibilities of management, employees and contractors (as applicable) for the implementation of the plan;
- Monitoring requirements;
- Reporting protocols and requirements, including to regulatory agencies; and
- Process for review and evaluation of the effectiveness of the plan including the process for implementation of corrective actions.

Table 19-2 lists the key environmental management plans or procedures that have been identified in the EIS as being required for the project, and the appropriate timing for each plan in relation to project phase (i.e. construction, operations and decommissioning).

The proponent will engage with relevant stakeholders, as necessary, as part of the development of these plans.

The resourcing of, and responsibility for, each environmental plan is undertaken in accordance with the proponent's environmental management structure as discussed in Section 19.3.

The Biodiversity Offsets Strategy will be approved by the Federal Department of the Environment, prior to its implementation.

Table 19-2 Environmental Management Plans or Procedures Required for the Project

ENVIRONMENTAL ASPECT	MANAGEMENT PLAN / PROCEDURE	PROJECT PHASE ¹		
		CON	OPS	DCM
Mine Rehabilitation and Closure	Rehabilitation Standard ²		✓	✓
	Rehabilitation Planning Manual ²		✓	✓
	Mine Closure Plan ²			✓
Biodiversity	Land and Biodiversity Management Plan ²	✓	✓	✓
	Cane Toad Management Plan ²	✓	✓	✓
	Biodiversity Offsets Strategy	✓	✓	✓
Water Resources	Water Management Plan ²	✓	✓	✓
	Erosion and Sediment Control Plan	✓	✓	✓
Air Quality	Air Emissions Management Plan ²	✓	✓	✓
Noise and Vibration	Blast Management Plan		✓	
Archaeology	Cultural Heritage Management Plan	✓	✓	✓
Health and Safety	Risk Management Plan (including Incident Management Plans) ²	✓	✓	✓

¹ Con – Construction Phase; Ops – Operations Phase; Dcm – Decommissioning Phase

² Indicates an existing plan, which will be amended, as necessary, to address the project

Monitoring Approach

The proponent has a detailed environmental monitoring manual in place which encompasses the requirements for the monitoring of each environmental aspect of the existing mine. The manual clearly specifies the following details for the monitoring of each environmental aspect, as appropriate:

- Sampling pattern and density;
- Monitoring parameters;
- Monitoring locations;
- Monitoring / sampling frequency;
- Sampling procedures – including the specifications for sample containers, handling and preservation techniques, devices and equipment, equipment decontamination procedures, data recording procedures, laboratory techniques, appropriate data analysis methods, equipment calibration intervals, validation reporting, and appropriate quality assurance and control procedures; and
- Contingency and emergency procedures.

The manual will be updated as appropriate to incorporate project-specific monitoring details.

19.4.3 Mine Rehabilitation and Closure

The proposed rehabilitation and decommissioning strategies to be undertaken for the project, and the relevant legislation and standards, are discussed in Section 6 – Mine Rehabilitation and Closure. An assessment of the geochemistry of overburden is included in the *Geochemistry Report* (Appendix A), and an assessment of soil resources on the site is included in the *Soils Report* (Appendix B).

Environmental Objectives and Performance Criteria

The overarching environmental protection objective is to return land disturbed by the project to a post mining landform that is safe to humans and wildlife, non-polluting, stable and able to sustain an agreed post-mining land use.

The project site will be rehabilitated progressively throughout the mine life. Rehabilitation will be undertaken in accordance with the rehabilitation objectives and guiding principles outlined in Table 19-3. These objectives and principles are guided by legislation, the Mining Agreement for the existing mine, and internal company policies and procedures.

Table 19-3 General Rehabilitation Objectives

OBJECTIVE	GUIDING PRINCIPLES
Safe for humans and wildlife	■ Mine voids will be backfilled to the most practicable and cost effective extent during operations. ■ Areas of unstable ground will be stabilised as appropriate to ensure that there is no risk to humans or animals. ■ Hazardous materials will be removed or treated.
Non-polluting	■ Leachate will be managed to prevent mobilisation from sources of potential contaminants such as tailings. ■ Contaminated land will be remediated to prevent runoff and seepage.
Stable	■ All residual slopes will be stable, where possible. ■ Slopes will have vegetative cover preventing erosion.
Able to sustain an agreed post-mining land-use	■ The post mining landform (areas previously mined, excavated, dumped over or topsoil stripped) will be reseeded with local native tree and shrub species.

Source: Rehabilitation Standard: GEM–STA–22700 GEMCO (2014)

Mine Closure Objectives

Detailed closure objectives for the project will be guided by the proponent's closure plan for the existing mine, and will be developed through a consultative process with stakeholders, particularly the ALC.

The high level objectives for mine closure, based on the closure plan for the existing mine, are:

- To leave the site in a safe condition;
- To create stable, non-polluting and functioning landforms that are, as far as practically achievable, consistent with the surrounding landscape and other environmental values; and
- To undertake rehabilitation that seeks to minimise environmental impacts resulting from permanent changes to ecosystems.

Control Strategies and Corrective Actions

The proponent has the following existing plans and procedures that guide rehabilitation, and these will be updated as necessary to reflect project activities:

- Rehabilitation Standard;
- Rehabilitation Planning Manual;
- Land and Biodiversity Management Plan; and
- Closure Plan.

The proponent also has individual procedures relating to specific rehabilitation activities including vegetation clearing; topsoil management; topsoil ripping; seed collection; aerial seeding; sowing seed by hand; and weed management.

The following strategies will be implemented for mine rehabilitation and closure for the project, and will be documented in the above listed plans and procedures.

Rehabilitation Techniques

Progressive rehabilitation will be undertaken for the project, as shown in the indicative mine layouts provided in Section 3 – Project Description (Figures 3-12 to 3-14). It will be guided by the rehabilitation procedures currently in place for the existing mine, and will include the following activities:

- Backfilling quarries with overburden. In areas that have been rehabilitated, the post-mining landform will broadly replicate the pre-mining topography, with no elevated overburden emplacement areas or final voids at the end of the mine life. It is much more common in the mining industry to have final landforms that include elevated overburden emplacements (i.e. free standing emplacements/stockpiles that may be tens of metres high) and final voids (i.e. deep quarries that are not backfilled and consequently accumulate water over time). The project has avoided the need for elevated overburden emplacements and final voids through careful mine planning and scheduling.
- There will be times over the operating life of the mine where it is not feasible to place overburden directly in quarries, given a lack of available capacity at the time. In these instances, temporary overburden emplacements will be constructed and the overburden will be progressively relocated to quarries when they are available. No rehabilitation of these temporary emplacements will be undertaken, given their temporary nature. All temporary emplacements will be located in future mining areas, meaning that there is also no need to rehabilitate the footprint of the emplacements.
- The post-mining landform will be contoured to allow for adequate drainage of surface water, and any necessary erosion control works will be installed.
- Topsoil will be spread generally at a depth of 0.3 m.
- Ripping the topsoil, with the aim of:
 - Minimising the impact of compaction from machinery;
 - Promoting root, water and nutrient penetration;
 - Reducing the risk of erosion over the surface of ripped topsoil; and
 - Preventing runoff from the site and the loss of seeds.
- Undertaking revegetation following topsoil spreading and ripping. Revegetation practices include:
 - Use of local, native species in revegetation. Based on the diversity, abundance and distribution of vegetation on Groote Eylandt, the proponent, in collaboration with Traditional Owners and the NT government, has identified and categorised the native flora species on the island as either “key”, “primary”, “acacia” or “other”. The proponent’s rehabilitation strategies focus on key and primary species, including *Eucalyptus miniata* (Darwin Woollybutt) and *Eucalyptus tetradonta* (Darwin Stringybark), as acacia and other species tend to be short-lived and typically do not form part of the dominant vegetation on the island.
 - Sourcing seed material from within the proponent’s Mineral Leases. The proponent will collect, dry, clean and store seed in accordance with procedures that are designed to ensure that the seed will remain viable for rehabilitation.
 - Use of aerial seeding as the primary seeding technique. Aerial seeding will be undertaken as close as possible to the start of the wet season (early-mid December). Seed may also be sown by hand in some circumstances.

- Seeding rehabilitated areas at a high rate to establish a dense native vegetation cover and reduce the ability for weeds to establish.
- Undertaking any necessary weed control using selective herbicides or physical removal of weeds.

As part of the *Biodiversity Offsets Strategy* (Appendix E), the proponent will fund and coordinate a research program designed to identify ways that rehabilitation could be improved in order to provide habitat for threatened fauna species, particularly the Northern Hopping-mouse and the Brush-tailed Rabbit-rat. The rehabilitation techniques for the project may be adjusted in the future to reflect the findings of this research.

Topsoil Stripping and Stockpiling Management Measures

A soil assessment was undertaken as part of the EIS (refer to the *Soils Report*, Appendix B). It confirmed that there is sufficient topsoil for rehabilitation activities and that no specific topsoil amelioration measures are required.

Topsoil management, including techniques for the stripping, handling and storing of topsoil resources, are outlined below:

- Topsoil stripping depths will be guided by the depths stated in Table 19-4 with the final stripping depth determined following an inspection by mine environmental personnel.
- Topsoil will be stripped when dry in order to avoid physical damage such as loss of structure, compaction and the creation of anaerobic conditions.
- In order to minimise damage to soil structure, root material and seeds, topsoil will be stripped in depths of at least 150 mm.
- Where possible, stripped material will be placed directly onto the area to be rehabilitated and spread immediately (if mining sequences, equipment scheduling and weather conditions permit) to avoid the requirement for stockpiling.
- Detailed scheduling will be undertaken as part of operations to optimise the reuse of fresh topsoil and determine stockpile locations.
- If stockpiling is required, the topsoil will be stockpiled within the ultimate footprint of the open cut mining areas in order to limit the disturbance footprint of the project.
- Topsoil stockpiles will be placed in open areas, away from areas subject to inundation and airborne weed seed.
- Where possible, a typical topsoil stockpile height of 4 m will be maintained.
- Stockpiles will be direct seeded with local, native species at a high density to assist in weed and erosion control, and to maintain biological and chemical processes within the soil.
- Any necessary weed control will be undertaken on the stockpiles.
- All stockpiles will be clearly identified with signs.
- An inventory of available material, including soil types, will be maintained to ensure adequate materials are available for planned rehabilitation activities.

Table 19-4 Depth of Available Topsoil

SOIL TYPE AND DESCRIPTION		DEPTH OF AVAILABLE TOPSOIL (mbgl)
B1	Dark brown to reddish brown loamy sands on undulating plains	0.40
B1v	Light brownish grey to yellow brown loamy sands on undulating plains	0.20
B2	Brownish black loamy sands on level to undulating plains	0.15

SOIL TYPE AND DESCRIPTION		DEPTH OF AVAILABLE TOPSOIL (mbgl)
V1	Very dense rocky undulating plain with dense vegetation	0.00
Q1	Rugged uplands on quartz sandstone with minor leptic rudosols	0.00
A1	Alluvial floodplains and gully areas in level to gently undulating plains	0.15

Erosion and Sediment Control Plan

An Erosion and Sediment Control Plan will be prepared prior to commencement of the project. An outline of the plan is provided in Section 19.4.6.

Overburden Handling Management Measures

There will be specific management measures for the handling and placing of overburden from the small area in the Southern EL which has been identified as containing potentially acid forming (PAF) material (refer to Section 6 – Mine Rehabilitation and Closure). Management measures for this area include:

- Undertaking geochemical sampling ahead of mining in areas located within 500 m of bores EL-S-MB06 and EL-S-MB05 (refer to Figure 19-2) in order to identify the potential for any additional PAF material.
- Selectively handling and burying any PAF material within the centre of overburden emplacement areas away from final outer surfaces. PAF material will be placed directly within in-pit overburden emplacements, and will not be stored within temporary overburden emplacements.
- Registering any PAF material within the proponent's geological database.

In addition, samples will be collected at random from overburden emplacements and analysed on-site using net acid generation (NAG) tests as a rapid screening tool.

In the event that dispersive materials are encountered during earthworks, these materials will be managed by selectively handling and placing materials as backfill within the final void, thereby minimising the potential for erosion and water quality impacts.

Mine Closure Planning

The proponent has a mine closure plan for the existing mine, which forms a part of the MMP for the mine. The overarching objective of the closure plan is to describe how the mine will be successfully closed and rehabilitated to achieve the agreed post-closure land-use, and the performance criteria that will be used to measure successful closure and rehabilitation. The closure plan details the rehabilitation and closure completion criteria, stakeholder interactions and strategies, closure design criteria and domains. It also outlines legal requirements, responsibilities, and closure scheduling.

A mine closure plan specific to the project site will be developed in line with the existing closure plan, and it will form a part of the MMP that will be developed for the project. The closure objectives for the project will be achieved by undertaking progressive rehabilitation of mining areas, as well as by decommissioning infrastructure on the project site (such as haul roads, crib huts and laydown yards). At mine closure, all physical infrastructure will be removed from the project site, and hardstand areas will be ripped, before being spread with topsoil and seeded. Exploration drill holes will be capped and drill sites progressively rehabilitated over the mine life.

The entire project site will be rehabilitated to a sustainable ecosystem that will support traditional Aboriginal land practices, such as hunting, gathering, and recreation.

Mine closure planning includes consideration of social and economic legacy planning. The proponent is currently engaging with the ALC in relation to these issues. Further detail is provided in the *Socio-economics Report* (Appendix K).

Unplanned closure (or sudden closure) may occur when mining suddenly ceases due to financial constraints or if the operation is forced to close by regulatory agencies due to non-compliance with regulatory requirements. Given that rehabilitation will be undertaken progressively, and the project does not involve the use of levees or river diversions, there are no significant additional requirements for unplanned closure over and above those specified for planned closure. In the event of unplanned closure, mine rehabilitation would be completed and any overburden in temporary overburden emplacement areas would be used to backfill quarries.

Monitoring and Reporting Requirements

Rehabilitation Monitoring

The proponent has developed detailed completion criteria for rehabilitated areas and undertakes annual monitoring of rehabilitation against the completion criteria. The existing rehabilitation monitoring program (which is documented in its existing rehabilitation procedures) includes a network of analogue sites (i.e. undisturbed areas representative of the landform and vegetation prior to mining) and rehabilitation sites. The rehabilitation monitoring program will be extended to include rehabilitation within the project site. This will include monitoring of rehabilitation sites within the project site, as well as establishing any necessary additional analogue sites. The completion criteria will also be reviewed to confirm their adequacy for the project site, and amended as necessary.

Data recorded as a part of the rehabilitation monitoring program includes:

- Soil profile, chemistry and geochemistry;
- Ground cover (i.e. proportion of litter, grass and bare ground);
- Species composition and abundance, with a focus on woody species that have been nominated as key and primary species;
- Diameter of trees and shrubs;
- Canopy cover;
- Fauna activity (including the presence or absence of ants and termites; bird counts; general signs of fauna activity such as tracks, scats, burrows and nests; observations of fauna species in the rehabilitation sites; and assessment of habitat condition); and
- Presence of weeds.

Photo-point monitoring of monitoring plots will be undertaken annually to provide a visual reference and qualitative indicator of vegetation growth over time. A record of the impact of fire on each monitoring plot will also be made.

The data from each monitoring plot will be used to determine whether the rehabilitated area is on the expected trajectory for its age and to classify the rehabilitated area into the completion criteria classification codes listed in Table 19-5. In the event that monitoring indicates that rehabilitation is not on trajectory to meet the closure criteria, the rehabilitation is subject to remedial works such as supplementary planting or extra weed control procedures. In extreme cases the remedial work can extend to a complete renovation of the rehabilitation site.

Table 19-5 Completion Criteria Classification Codes

CODE	CLASS	AGE (YEARS)	MONITORING FREQUENCY	DESCRIPTION
GIS1	Under review – for remediation	0-1	Annually	Does not currently meet completion criteria or trajectory for age and requires remediation or intense replanting.

CODE	CLASS	AGE (YEARS)	MONITORING FREQUENCY	DESCRIPTION
GIS2	Under review – juvenile	2-3	Annually	Rehabilitation that is under 3 years of age. Must meet the minimum density range for both key and primary species of seedlings and saplings that have regenerated. Rehabilitation is acknowledged to lack resilience.
GIS3	Under review – pre-maturity	3-5	Annually	Rehabilitation that is between 3-5 years of age. Must meet the minimum density range for both key and primary species of seedlings and saplings that have regenerated. Rehabilitation is acknowledged to lack resilience.
GIS4	Established rehabilitation, incomplete criteria	5-10	Annually	Rehabilitation that is between 5-10 years of age and is considered on track to meet an overall level of 60% of internal completion criteria ¹ . Rehabilitation is acknowledged to be of a low level of resilience and may require additional work e.g. planting key and primary species, fire protection or weed management.
GIS5	Established rehabilitation, near success	10-15	Every three years	Rehabilitation that is between 10-15 years of age and is considered to meet an overall level of 75% of internal completion criteria ¹ . The rehabilitation meets the minimum range for key and primary tree species diversity as well as standing tree basal area. It is considered resilient to natural disturbance factors and may only require additional time or protection from fire or weeds.
GIS6	Successful rehabilitation	>16	Every three years	Rehabilitation that is older than 16 years and meets 80% to 100% of internal completion criteria ¹ and is considered suitable for handing back to the Traditional Owners. It can be demonstrated that both key and primary tree species diversity along with standing tree basal area fall within the upper range and are reflective of successful rehabilitation.

¹ Internal completion criteria include extent of ground cover, seedling regeneration, sapling regeneration, woody species (for both key and primary species), basal area, canopy cover and weeds.

19.4.4 Biodiversity

Potential impacts from the project on biodiversity, and the relevant legislation and standards, are summarised in Section 7 – Terrestrial Ecology and Section 8 – Aquatic Ecology, and are discussed in detail in the *Terrestrial Ecology Report* (Appendix C) and the *Aquatic Ecology Report* (Appendix D). The proposed *Biodiversity Offsets Strategy* is included in Appendix E.

Environmental Objectives and Performance Criteria

The key environmental protection objective relating to biodiversity is to minimise and mitigate adverse impacts on terrestrial and aquatic flora and fauna. The environmental values to be enhanced or protected are:

- The life, health and wellbeing of terrestrial and aquatic flora and fauna; and
- The diversity of ecological processes and associated ecosystems within the project site.

Control Strategies and Corrective Actions

The following procedures, plans and strategies will be implemented to mitigate or control impacts on flora and fauna. Undertaking mine rehabilitation to a high standard is a key mitigation measure for potential impacts on biodiversity. Rehabilitation is discussed further in Section 19.5.

Land Management

The entire project site, including the sections that will not be disturbed as part of the project, will be managed to conserve its conservation value. Land management measures for the project site will include weed and feral animal control (including feral cat control), and fire management. Fire management will include developing and implementing a fire regime on the project site to optimise biodiversity values, whilst also ensuring the risks to human safety and property are managed. The proponent will continue to work with the Traditional Owners in relation to land management, particularly with respect to fire management.

The proponent has an existing Land and Biodiversity Management Plan, which provides an overall framework for land management and managing potential impacts to land and biodiversity. This plan will be updated to include the construction and operation of the project, and will include the measures described above.

The workforce will also be provided with information about threatened species, as part of their induction or through general environmental awareness programs.

Feral Animal and Weed Management Controls

The proponent has existing procedures in relation to weed management, which will be reviewed and applied to project activities, and to the overall management of the project site. Weed management procedures will include measures for the control of existing weeds (which are very limited on the project site at present) and measures to prevent the introduction of weeds. Current mine procedures include weed mapping and spraying, and vehicle washdown procedures to prevent the spread of weeds. These procedures will be applied to the project. Given the low density of weeds within the project site, specific measures will be adopted to prevent the spread of weeds from the existing mine to the project site.

The proponent also has a Cane Toad Management Plan and an associated quarantine procedure in place. The management plan includes monitoring, and reporting and disposal procedures in the event of a Cane Toad being found. This plan will be reviewed and revised to ensure that it is applicable to all project activities.

The proponent will extend its procedures to include feral animal control within the project site, specifically feral cat trapping.

Pre-Clearing Procedures

Clearing will be undertaken in accordance with the proponent's Permit to Clear process. As described below, this process includes specifications designed to limit the impact of the clearing activity itself. In addition to these specifications, the clearing process will be considered as an integral part of long term mine planning to allow clearing to be appropriately planned and staged. Undertaking the clearing progressively in a staged manner will:

- Maximise the potential for mobile species to move to adjacent areas;
- Provide an opportunity for the collection of seeds for use in rehabilitation. Seeds will be collected and stored in accordance with existing procedures; and
- Allow for a pre-clearing survey to be undertaken to identify any noxious weeds in the area so that clearing can be undertaken in a manner that avoids the spread of weeds as far as possible.

Clearing Procedures

The following procedures will be implemented in order to minimise clearing impacts and unnecessary disturbance to native vegetation and aquatic habitat. The procedures will be implemented as part of the proponent's Permit to Clear process:

- The limits of clearing will be delineated prior to the commencement of any clearing and marked clearly on plans and on the ground;
- Clearing will be confined to the smallest practicable area required to safely perform the task;
- Clearing work will be planned in a manner that causes minimum disturbance to natural drainage patterns;

- Vegetation removal will be carried out using appropriate earthmoving equipment; and
- Disturbance of the topsoil will be kept to a minimum.

Biodiversity Offsets Strategy

Environmental offsets are actions taken to counterbalance significant residual impacts. Offsets are required for Matters of National Environmental Significance (MNES) protected under the EPBC Act (i.e. threatened species and communities and migratory species) in the event that an action is predicted to give rise to significant residual impacts, even after the application of management measures.

Clearing activities associated with the project were assessed as potentially having a significant, residual impact on the Northern Hopping-mouse and the Brush-tailed Rabbit-rat. In accordance with the *EPBC Act Environmental Offsets Policy 2012*, environmental offsets are proposed for the predicted impacts on these two species.

The proponent has developed a Biodiversity Offset Strategy to provide these offsets, and this strategy is included in Appendix E. The Biodiversity Offset Strategy proposes the use of indirect offsets for the Northern Hopping-mouse and the Brush-tailed Rabbit-rat through sponsoring research on the threats to these species and/or the research priorities identified in the conservation advice for these species.

Detailed plans for the offset programs will be developed prior to the commencement of the project, and provided to the Department of the Environment (DotE).

Research programs undertaken as part of the Biodiversity Offset Strategy could include research into feral cat control (particularly using baits); research into the ecology of the Brush-tailed Rabbit-rat; and research into improving the value of mine rehabilitation as habitat for the Northern Hopping-mouse and Brush-tailed Rabbit-rat. These programs have the potential to provide an evidence base that will allow for more effective management of these species and their threats. In this way the proposed offsets have the potential to provide wider benefits to the species, and potentially to a number of other native fauna species that are subject to the same threats. Further detail is provided in the *Biodiversity Offset Strategy* (Appendix E).

Monitoring and Reporting Requirements

Monitoring will be incorporated, as necessary, into the management plans to be developed for the project to mitigate and manage biodiversity impacts. In particular, monitoring will be undertaken in relation to:

- The presence and abundance of exotic species recorded from the project site and those with potential to occur. The monitoring program will allow for early recognition of any weed or feral animal that may pose a threat to biodiversity, and will enable the timely implementation of control measures. Key indicators to be used for monitoring weeds and feral animals will be included in the feral animal and weed management control procedures discussed above.
- Reporting will be undertaken in relation to biodiversity offsets. The Biodiversity Offset Strategy describes the process that will be adopted for reporting on the status and findings of the proposed research programs.
- A rehabilitation monitoring program will be undertaken as described in Section 19.5.

19.4.5 Groundwater

Potential impacts to groundwater resources from the project, and the relevant legislation and standards, are summarised in Section 9 – Groundwater, and are discussed in detail in the *Groundwater Report* (Appendix F).

Environmental Objectives and Performance Criteria

The environmental protection objectives relevant to groundwater resources are as follows:

- To minimise any adverse impacts on groundwater resources due to mining and mine dewatering;
- To prevent any contamination of groundwater quality; and

- To identify and effectively manage any potential impacts on natural features or water supplies dependent on groundwater.

The groundwater resources in the vicinity of the project site currently support a range of environmental values including aquatic ecosystems and human uses. The environmental values relevant to groundwater are:

- Groundwater dependent ecosystems;
- Human consumption (i.e. drinking water); and
- Cultural values.

These environmental values and cultural sensitivities have been considered in determining the groundwater management strategies for the project.

Control Strategies and Corrective Actions

No significant adverse impacts on the groundwater regime are predicted as a result of the project. The mine design is a key factor that has contributed to this lack of predicted impacts. In particular, as detailed in Section 19.4.6, the project's final landform will not include final voids (i.e. deep quarries that are not backfilled and consequently accumulate water over time). This lack of final voids will allow for a complete recovery of groundwater levels. Groundwater monitoring will be conducted over the life of the mine to confirm the actual extent of groundwater impacts and validate the conservative drawdown predictions. The groundwater monitoring program is described in the following section.

Hydrocarbon and chemical storage will be managed in accordance with the measures described in Section 18 – Health and Safety. These measures are standard practice at mine sites and are designed to prevent the contamination of groundwater.

Monitoring and Reporting

The established groundwater monitoring network comprises 19 monitoring bores at ten locations across the project site to establish baseline groundwater levels and quality (Figure 19-2). The details of the proposed groundwater monitoring network are provided in Table 19-6.

The groundwater monitoring network established as part of EIS groundwater investigations will continue to be utilised throughout the life of the project. Any monitoring bores that are removed by mining during the life of the project will be replaced, where necessary.

Recording of groundwater levels from existing monitoring bores will continue and will enable natural groundwater level fluctuations (such as responses to rainfall) to be distinguished from potential water level impacts due to depressurisation resulting from mining activities.

Groundwater quality monitoring will continue until 24 contiguous months of baseline data is collected. This will establish a robust, long-term groundwater quality baseline that can be used to detect any changes in groundwater quality during and post mining.

Once 24 months of baseline data has been collected, groundwater quality monitoring frequency will revert to quarterly intervals for physical parameters (pH, electrical conductivity, total dissolved solids, salinity, temperature, dissolved oxygen), hardness and alkalinity, major ions (Ca, Mg, Na, K, CO₃, HCO₃, Cl, SO₄) and metals and metalloids (Al, As, B, Ba, Be, Cd, Cr, Co, Cu, Fe, Hg, Mn, Ni, Pb, Se, U, V, Zn), with annual monitoring of nutrients (ammonia, nitrite, nitrate, total phosphorus) and total hydrocarbons.

The groundwater monitoring data will be reviewed annually, and the groundwater monitoring program revised as necessary.

Table 19-6 Groundwater Monitoring Program

MONITORING POINT REFERENCE	EASTING (GDA94)	NORTHING (GDA94)	GEOLOGICAL UNIT
EL-N-MB01S	664017	8447502	Laterite / Lateritic Clay
EL-N-MB01D	664017	8447502	Reworked Basement / Marine Sandstone
EL-N-MB02S	664120	8448622	Laterite / Manganese Ore / Marine Claystone
EL-N-MB02D	664120	8448622	Marine Sandstone
EL-N-MB03S	664986	8447701	Laterite / Manganese Ore / Marine Claystone
EL-N-MB03D	664986	8447701	Reworked Basement
EL-N-MB04S	665744	8449493	Lateritic Clay
EL-N-MB04D	665744	8449493	Reworked Basement
EL-S-MB05	664495	8442763	Marine Claystone
EL-S-MB06S	663563	8442620	Quaternary Sediments / Laterite
EL-S-MB06D	663563	8442620	Reworked Basement
EL-S-MB07S	665215	8441005	Laterite / Manganese Ore
EL-S-MB07D	665215	8441005	Reworked Basement / Marine Sandstone
EL-S-MB08S	667488	8440496	Laterite / Lateritic Clay
EL-S-MB08D	667488	8440496	Marine Claystone
EL-S-MB09S	665875	8440131	Marine Claystone / Manganese Ore
EL-S-MB09D	665875	8440131	Reworked Basement
EL-S-MB10S	668233	8441997	Laterite / Lateritic Clay
EL-S-MB10D	668233	8441997	Marine Claystone

Monitoring Point Reference nomenclature describes the bore and its location as follows:

EL-N – Northern EL
 EL-S – Southern EL
 MB01 – Monitoring Bore 01
 S or D – Shallow or Deep Bore

19.4.6 Surface Water

Potential impacts to surface water resources from the project, and the relevant legislation and standards, are discussed in detail in Section 10 – Surface Water, and are supported by the *Surface Water Drainage Report* (Appendix G) and the *Baseline Surface Water Monitoring Report* (Appendix H).

Environmental Objectives and Performance Criteria

The environmental protection objectives relevant to water resources are as follows:

- To maximise the reuse of quarry water for water supply;
- To ensure a reliable supply of water for the operations, whilst minimising the demand for external supply;
- To prevent contamination of downstream surface water resources by achieving containment by minimising the risk of discharge of any quarry water;
- To minimise the generation of water that has been in contact with areas disturbed by mining activities; and
- To minimise impacts from project activities on the hydrology of watercourses (such as adverse increases or decreases in extent of flooding and quantity, duration, rate or timing of stream flows).

Performance criteria related to surface water will include operation in accordance with the project's water management plan.

The water resources in the vicinity of the project site currently support a range of environmental values including aquatic ecosystems and human uses. The environmental values relevant to surface water are:

- High conservation value aquatic ecosystems;
- Recreational use, including swimming and aesthetic values;
- Human consumption (i.e. drinking water); and
- Cultural values.

These environmental values and cultural sensitivities have been considered in determining the water management strategies for the project.

Control Strategies and Corrective Actions

Mine Planning Design Principles

Mine planning, integrated with environmental impact assessment, was conducted to ensure the key watercourses traversing the project site will not be significantly impacted by the project. The proposed mine plan is designed to avoid any significant disturbance of the key watercourses, whilst still enabling efficient and economic access to the resource. Features specifically incorporated into the mine design to manage potential impacts are as follows:

- The project has been designed to ensure that mining will not encroach on any of the significant watercourses traversing the project site. Buffers have been defined around the main channels of the Emerald River, Amagula River and their tributaries. The mine plan and quarry extents were then designed to ensure no encroachment on the buffers, and to restrict mining to areas beyond the defined drainage channels and associated buffers. The buffers were delineated by the predicted extent of the 1% Annual Exceedance Probability (AEP) (1 in 100 year) flood extents. The *Surface Water Drainage Report* (Appendix G) provides detail on the flood modelling that was undertaken to delineate the buffers.
- The project has been designed to ensure that a stable free-draining post-mining landform will be established with no final voids. The final landform design will ensure that there is no long-term reduction in downstream catchment yield.

Water Management Strategies

The project will require the management of the following waters:

- Quarry water comprising:
 - Groundwater inflow to the quarries; and
 - Runoff from the quarry catchment.
- Runoff from areas disturbed by project activities including overburden emplacement areas and mine infrastructure areas; and
- Runoff from areas undisturbed by project activities.

The water management strategies for each of these waters are as follows:

- Where possible, divert clean runoff from undisturbed areas around areas disturbed by mining activities and allow to drain from the site;
- Control suspended sediment in site drainage water in accordance with an Erosion and Sediment Control Plan (discussed later in this section). Sediment-affected water will be collected and directed through sediment control structures to limit any potential downstream sedimentation; and

- Contain quarry water in on-site water storages for reuse as a water supply to the mine (i.e. mine water supply).

Drainage Management

The staged site drainage plans and design principles are described in the following sections, and illustrated in Section 10 – Surface Water (Figures 10-6 to 10-10).

Quarry Water

Temporary and permanent diversion drains will be constructed to isolate the contained catchments of the quarries and to divert runoff from undisturbed areas through the mining areas.

Diversion drains will typically be contour drains constructed with sufficient capacity to convey runoff from the 1% AEP (1 in 100 year) critical storm event. The specific design capacity of each drain will be determined at the detailed design stage depending upon the contributing catchment, design life of the drain and overtopping risk.

Runoff from Overburden Emplacement Areas

Runoff from these areas will be captured in collection drains and directed through sediment traps and sediment dams for control of suspended sediment prior to discharge from site. Collection drains will typically have sufficient capacity to convey runoff from 10% AEP (1 in 10 year) critical storm event. The collection drains will typically be contour drains. Longitudinal grades will be typically 1% and cross-section batters will be constructed to stable slopes and revegetated to minimise erosion. Any steeper sections will be constructed with velocity control structures or scour protection. Discharge points to natural drainage lines will be designed with energy dissipation measures, where necessary, to prevent any scouring and ensure stability.

Collected runoff will generally be directed to one or more sediment dams prior to draining from the site. In addition to sediment dams, a network of smaller sediment traps will also be installed close to any significant sources of sediment. This will effectively achieve a staged approach to removal of suspended sediment from site drainage water with coarser sediments being trapped close to the source and finer sediments trapped in the larger sediment dams. Sediment traps will be installed progressively over the life of the mine immediately downstream of any exposed overburden. They will generally be constructed as excavated pits at a size readily desilted by an excavator. The precise number and location of sediment traps will be determined during preparation of the detailed Erosion and Sediment Control Plan. Sediment dams will be designed and constructed generally in accordance with relevant engineering guidelines including the International Erosion Control Association *Best Practice Erosion and Sediment Control* guidelines. The detailed design of each dam will be dependent on specific site conditions and the design life of the dam, but will typically be designed to manage inputs from the 10% AEP (1 in 10 year) critical storm event. All sediment traps and sediment dams will be regularly desilted to ensure their continued effective operation.

Runoff from Mine Infrastructure Areas

Runoff from these areas will be intercepted by collection drains and directed through sediment traps and sediment dams for control of suspended sediment prior to discharge from site. Collection drains will typically be table drains with sufficient capacity to convey runoff from 10% AEP (1 in 10 year) critical storm event. These works will be designed and constructed in accordance with an Erosion and Sediment Control Plan.

During construction, runoff from all disturbed mine infrastructure areas may contain elevated levels of suspended sediment. Runoff from these areas will be collected, allowed to settle and passively discharged as outlined for operational infrastructure areas. These works will be designed and constructed in accordance with a construction phase Erosion and Sediment Control Plan.

Haul Road Watercourse Crossings

Haul road crossings will be installed with low flow drainage culverts in the road formation. Culverts have been designed to allow unimpeded drainage of the 50% AEP (1 in 2 year) flood flow. Floods larger than the design event will be allowed to flow over the culvert to maintain drainage within these watercourses. These crossings will be constructed progressively as the operations expand over the life of the mine and once constructed will remain operational for the life of the mine. The crossings will be removed at the end of the mine life at the discretion of the ALC and Traditional Owners.

Water Management System

The project is an additional mining area that will be operated as part of the existing mine, rather than an independent mine. The proposed water management system for the project is straightforward and limited to the containment and reuse of quarry water for mine water supply (i.e. dust suppression) and the use of an external water supply to meet any shortfall in the site water balance. Diagram 19-1 shows the conceptual water management system.

Diagram 19-1 Conceptual Water Management System for the Project



Mine water dams will be constructed on the project site to collect and contain quarry water. Quarry water will be pumped to these dams via a pipeline from the adjacent quarries. These dams will be a primary source of dust suppression water supply. These dams will have nil external catchment and will be operated with a freeboard to ensure they do not overflow. In order to minimise the accumulation of runoff in the quarries during extended wet periods, quarry water will be transferred to these dams as a high priority.

The location of these dams is shown in Section 10 – Surface Water (Figures 10-6 and 10-10). All dams will be designed and constructed in accordance with relevant engineering design standards and licence requirements. Designs will adequately address the structural integrity of containment walls during climatic extremes, including drought and flood. The need for a liner will be determined during detailed design phase.

An operational simulation model has been used to assess the project water balance across a range of climatic conditions over the life of the project. The water balance model was used to assess appropriate sizing of dams; availability of quarry water for dust suppression; and frequency and volumes of any necessary controlled releases of quarry water.

Modelling of the proposed water management system indicates that there would be no requirement to discharge quarry water based on the 124 years of modelled climate data, including all extreme wet periods. However, it is possible, with a very low likelihood, that a sequence of prolonged rainfall could occur that is more extreme than any within the modelled 124 years of rainfall data. The proponent will therefore request authorisation for discharge of quarry water, as a contingency measure. The nominated discharge criteria have been calculated using the method contained in the National Water Quality Management Strategy Paper 4: *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* (2000) (ANZECC Guidelines) for pristine, high conservation value settings. Discharge criteria calculated using this method are based on monitored baseline water quality and are designed to ensure there is no detectable change in the ecosystem, beyond natural variability. The proposed discharge limits are presented in Table 19-7.

Table 19-7 Contingency Discharge Water Quality Limits

PARAMETER	UNITS	DISCHARGE LIMITS	
		AMAGULA RIVER	EMERALD RIVER
Physical and Chemical Parameters			
Suspended Solids	mg/L	5.9	7.1
pH	pH units	4.7 (lower limit); 5.8 (upper limit)	5.4 (lower limit); 6.5 (upper limit)
Redox Potential	mV	198	204
Electrical Conductivity	μS/cm	68.1	81.9

PARAMETER	UNITS	DISCHARGE LIMITS	
		AMAGULA RIVER	EMERALD RIVER
Total Dissolved Solids	g/L	0.04	0.05
Dissolved Oxygen	% sat	38.4	45.5
Turbidity	NTU	4	8
Total Hardness	mg/L	1.0	2.4
Bicarbonate Alkalinity	mg/L	3.4	11.4
Carbonate Alkalinity	mg/L	1.0	1.0
Hydroxide Alkalinity	mg/L	1.0	1.0
Total Alkalinity	mg/L	3.4	11.4
Major Ions			
Total Anions	mg/L	0.39	0.42
Total Cations	mg/L	0.3	0.3
Sulfate	mg/L	1.4	1.5
Chloride	mg/L	10.8	11.4
Calcium	mg/L	1.0	1.0
Magnesium	mg/L	1.0	1.0
Potassium	mg/L	1.0	1.0
Sodium	mg/L	6.7	7.8
Metals and Metalloids			
Aluminium	mg/L	0.01	0.01
Arsenic	mg/L	0.001	0.001
Barium	mg/L	0.004	0.008
Beryllium	mg/L	0.001	0.001
Boron	mg/L	0.05	0.05
Cadmium	mg/L	0.0001	0.0001
Chromium	mg/L	0.001	0.001
Cobalt	mg/L	0.001	0.001
Copper	mg/L	0.001	0.001
Iron	mg/L	0.07	0.07
Lead	mg/L	0.001	0.001
Manganese	mg/L	0.003	0.003
Mercury	mg/L	0.0001	0.0001
Nickel	mg/L	0.001	0.001
Selenium	mg/L	0.01	0.01
Uranium	mg/L	0.001	0.001
Vanadium	mg/L	0.01	0.01
Zinc	mg/L	0.005	0.005

The proposed discharge limits are based on 12 continuous months of water quality monitoring data. All proposed discharge limits will be updated once 24 continuous months of data are available, and will be presented as part of the Mining Management Plan for the project.

Water Management Plan

As a part of the proponent's mining authorisation under the *Mining Management Act* for the existing mine, the proponent is required to submit a Water Management Plan (WMP) to the regulator.

Similar to the existing operations, a WMP will be prepared for the project which will address water management for all stages of the project, including construction, operations and closure, as well as long-term post-mining water management requirements. This plan will contain information derived from the EIS (including the management measures described in this section), and will include the following:

- A description of the existing setting including the surface water catchment and drainage setting, hydrogeology, and an overview of the existing surface and groundwater values, users and water quality.
- A description of the regulatory setting of the project.
- The water management objectives for the project.
- A description of potential project impacts on water.
- Control strategies including a description of the surface water drainage arrangements, water management system and water balance. This will include a discussion of options and alternatives for meeting the proposed water management objectives.
- A detailed description of the water management and monitoring measures to address each of the project impacts and maintain the effective operation of the control strategies.
- A description of the review process and remedial measures to address any impacts or potential water management issues identified through monitoring.

Erosion and Sediment Control Plan

An Erosion and Sediment Control Plan will be prepared prior to commencement of the project. The Erosion and Sediment Control Plan will be developed in accordance with the Department of Land Resource Management (DLRM) Fact Sheets *Erosion and Sediment Control Plans for Rural Development* and *Model Erosion and Sediment Control Plans for Rural Development*. The plan will be closely linked to (but distinct from) the WMP.

The EIS (including this EM Plan) have provided the principles of erosion and sediment control that will be applied to the project. These principles will form the basis for an Erosion and Sediment Control Plan that will be prepared at the detailed design stage of the project. The plan will include the following:

- A detailed description of the existing catchment and drainage setting in terms of the potential for erosion and sources of sediment.
- A description of the proposed drainage control measures for managing stormwater runoff and preventing gully and rill erosion. This will include design volumes, dimensions and grades for any drainage structures such as bunding and collection drains.
- A description of the erosion control measures proposed for protection of exposed soils and surfaces. This will include any engineered groundcover intended to stabilise haul road watercourse crossings and reduce the potential for channel erosion or instability in these areas.
- A description of the proposed sediment control measures for containing and settling any entrained sediments in stormwater runoff or site drainage. This will include design volumes, dimensions and sediment retention parameters for any sediment control structures such as sediment ponds and traps.

- Figures showing the pre-mining setting, areas of proposed disturbance and clearing, and an appropriate set of engineering plans for all erosion and sediment control measures.

All erosion and sediment control works will be constructed in accordance with the relevant NT *Erosion and Sediment Control Guidelines Technical Notes*.

Monitoring and Reporting

Site Water Management System Monitoring

Water management system monitoring for the project will include quarterly monitoring of water levels and quality in mine water dams. Parameters to be included in the monitoring program include pH, EC and turbidity. The monitoring program will include annual monitoring of a comprehensive suite of water quality parameters, including metals and metalloids.

Any controlled releases of quarry water will be monitored, as well as the receiving waters.

The site water balance including water transfers, consumption and dam storage volumes will be monitored monthly. The water management system will be monitored and managed in accordance with the Water Management Plan. The site water balance will be reviewed annually and the review will trigger modifications to the water management system, where necessary, to ensure the optimum operation of the system.

Sediment control structures will be managed in accordance with an Erosion and Sediment Control Plan. The Erosion and Sediment Control Plan will include an inspection plan for sediment control structures to ensure they are maintained and remain effective.

Haul road crossings (culverts) of watercourses will be inspected throughout the construction period and as part of the operations phase, ensuring that any external batter slopes are stable and revegetated. The inspections will confirm that appropriate erosion and sediment controls are in place. Periodic inspections (i.e. monthly during the wet season) will be undertaken following construction to confirm that all culverts are operating effectively and not causing sedimentation of watercourses.

Receiving Environment Monitoring Program

The proponent has established a site-specific surface water monitoring program for the project. The surface water quality monitoring program is described in detail in the *Baseline Surface Water Monitoring Report* (Appendix H). The location of these monitoring sites is shown in Figure 19-3.

The existing baseline surface water quality monitoring program will continue on a monthly basis until at least 24 contiguous months of baseline data is available. The monitoring program will include field testing and sample analysis for the current range of physico-chemical parameters including EC, pH, suspended solids, turbidity, ions, nutrients, total and dissolved metals and metalloids and total petroleum hydrocarbons.

Upon completion of the baseline monitoring program, monitoring will continue on a quarterly basis. The data will be reviewed annually and will trigger modifications to the monitoring program to ensure that adequate data is collected for relevant parameters. In addition, the proponent is conducting a review of regional stream gauging data with the intent of upgrading or installing additional downstream gauging.

19.4.7 Air Quality

Potential impacts from the project on air quality are summarised in Section 12 – Air Quality, and discussed in detail in the *Air Quality Report* (Appendix I).

Environmental Objectives and Performance Criteria

The environmental protection objectives for air quality are:

- To comply with the relevant ambient air quality objectives at sensitive receptors; and

- To implement energy efficiency and GHG emission reduction strategies to minimise the project's impact on the atmosphere.

The applicable air quality objectives for the project are shown in Table 19-8.

Table 19-8 Applicable Ambient Air Quality Objectives

PARAMETER	AVERAGING PERIOD	VALUE
PM ₁₀	24-hour	50 µg/m ³ <i>(with five exceedances per annum permitted)</i>
Total Suspended Particulates (TSP)	1-year	90 µg/m ³
Dust Deposition (incremental) ¹	1-year	2 g/m ² /month

¹ This is not an absolute objective, but rather the permissible additional dust deposition permitted for a project.

These objectives and guidelines are applicable to dust levels at sensitive locations, such as residences. The nearest sensitive receptors to the project site are presented in Table 19-9 and are shown on Figure 19-1.

Table 19-9 Sensitive Receptors

RECEPTOR		TYPE	EASTING	NORTHING	NEAREST DISTANCE TO PROJECT
R1	Angurugu	Township	658061	8453390	6.5 km to the north-west of the Northern EL
R2	Yedikba	Outstation	657336	8443030	2.2 km to the west of the Southern EL
R3	Wurrumenbumanja	Outstation	663633	8436591	3.5 km to the south of the Southern EL
R4	Leske Pools Swimming Hole	Recreation Area	665871	8437377	2.4 km to the south of the Southern EL

Coordinates in GDA94 MGA53

Control Strategies and Corrective Actions

Dust Controls

The existing mine operates in accordance with an Air Emissions Management Plan. This plan will be revised to include the construction and operation of the project. The following key measures to control and manage dust emissions and minimise the potential air quality impacts of the project are proposed:

- Haul roads will be watered to minimise dust emissions;
- Haul roads will be constructed with a compacted base and regularly maintained so as to prevent erosion and the build-up of fine material;
- Trucks will be limited to a maximum speed of 30 km/hr; and
- The area of disturbed land will be minimised as far as practicable, and disturbed areas will be progressively rehabilitated.

Greenhouse Gas Controls

The following initiatives are proposed for the project to mitigate, reduce, control or manage GHG emissions through energy efficiency:

- Regular assessment, review and evaluation of GHG reduction opportunities;
- Procurement policies that require the selection of energy efficient equipment and vehicles;
- Monitoring and maintenance of equipment in accordance with manufacturer recommendations; and

- Optimisation of diesel consumption through logistics analysis and planning.

Monitoring and Reporting

Dust will be monitored on an ongoing basis in accordance with the proponent's existing Air Emissions Management Plan and existing air monitoring network. Dust monitoring for the project will include monitoring PM₁₀ at Angurugu (R1) and Yedikba (R2).

If monitoring indicates any exceedances of air quality objectives, an investigation will be conducted by the proponent, and additional dust controls will be applied as necessary.

Meteorological data is available from the Bureau of Meteorology's Groote Eylandt Airport weather station, located near Angurugu. This station collects ambient data such as rainfall, temperature, relative humidity, wind speeds and wind direction. Data from this station will provide suitable meteorological data for the project.

In addition to maintaining the monitoring program described above, the proponent will continue the operation of its complaints handling procedure. Matters relating to dust emissions from the mine are routinely discussed between the proponent and the ALC.

The proponent conducts regular internal reviews of reported GHG data, and audits of National Greenhouse and Energy Reporting data are conducted by an external party. This data is then used to measure performance against internal policies, objectives and targets. Through this review process, corrective actions are raised and implemented as part of the annual budget planning cycle. GHG initiatives are reported through the proponent's Mining Management Plan.

19.4.8 Noise and Vibration

Potential noise and vibration impacts from the project, and the relevant legislation and standards, are summarised in Section 13 – Noise and Vibration, and are discussed in detail in the *Noise and Vibration Report* (Appendix J).

Environmental Objectives and Performance Criteria

The environmental protection objective is to prevent any nuisance noise or vibration impacts on surrounding sensitive receptors. The sensitive receptors located in proximity of the project site are presented in Table 19-9 and are shown on Figure 19-1.

The environmental values to be enhanced or protected are the qualities of the acoustic environment that are conducive to:

- The wellbeing of the community, including its social and economic amenity; and
- The wellbeing of an individual, including the individual's opportunity to sleep, relax and converse without unreasonable interference from intrusive noise.

In addition, there are cultural values that relate to the protection of the significant archaeological sites containing rock shelters with art from potential impacts due to vibration from blasting.

Criteria for Noise and Vibration

The applicable noise criteria for the project are shown in Table 19-10. The adopted project noise criteria are only relevant to permanent residences, and aim to achieve an acceptable level of acoustic amenity at sensitive receptors.

Table 19-10 Noise Criteria at Nearest Sensitive Receptors

RECEPTOR		RECEPTOR CATEGORY	INTRUSIVE CRITERIA ¹ (LAeq,15min)			AMENITY CRITERIA ² (LAeq)		
			Day	Evening	Night	Day	Evening	Night
R1	Angurugu Township	Suburban Residence	35	35	35	55	45	40
R2	Yedikba Outstation	Rural Residence	35	35	35	50	45	40
R3	Wurrumenbumanja Outstation	Rural Residence	35	36	35	50	45	40
R4	Leske Pools Swimming Hole	Passive Recreation Area	-	-	-	50	50	50

Note: Day (7 am to 6 pm), Evening (6 pm to 10 pm), Night (10 pm to 7 am), with night ending and day beginning at 8 am on Sundays and public holidays.

1 Intrusive criteria are applicable to noise from the project alone.

2 Amenity criteria are for cumulative noise from the project plus other industrial noise sources.

A sleep disturbance criterion of 45 L_{Amax} has been adopted for the project.

A low frequency criterion of 50 dBL for frequencies up to 200 Hz has been adopted to minimise the potential for impacts on noise sensitive receptors. The criterion applies inside a dwelling with the windows and doors closed and would be approximately equivalent to a criterion of 60 dBL outside a dwelling.

The following criteria for ground vibration and overpressure from blasting were sourced from the *Technical basis for guidelines to minimise annoyance due to blasting overpressure and ground vibration* (ANZEC, 1990):

- Noise limit (overpressure): 115 dBL peak for 95% of blast events in a 12 month period, with an absolute limit of 120 dBL peak for all blasts; and
- Ground vibration limits: 5 mm/s Peak Particle Velocity (PPV) for 95% of blast events in a 12 month period, with an absolute limit of 10 mm/s PPV.

Control Strategies and Corrective Actions

The noise impact assessment predicts that noise levels from the project will comply with relevant noise criteria, with the exception of a predicted exceedance of the intrusive criteria at Wurrumenbumanja Outstation. The exceedance at this receptor is predicted to occur intermittently for periods of a few weeks in the years when mining activities are closest to this receptor, and when dozers are stripping overburden. The exceedance is predicted to occur during evening and night periods, during worst case noise enhancing conditions. The proponent will undertake discussions with the ALC, as representatives of the Traditional Owners, to resolve any issues that may arise from the predicted noise levels at Wurrumenbumanja Outstation.

The project is predicted to achieve compliance at all receptors, at all times, with the criteria for:

- Cumulative noise (i.e. amenity criteria);
- Sleep disturbance;
- Low frequency noise; and
- Overpressure and ground vibration due to blasting.

No specific management measures are therefore required for these impacts.

No blast management measures are required for residential receptors, given that overpressure and ground vibration from blasting are predicted to be well within the criteria at sensitive receptors.

Blast Management Plan

A Blast Management Plan will be prepared for the project to address the issue of potential impacts of ground vibration from blasting on rock shelters that contain archaeological sites. The Blast Management Plan will be prepared prior to the commencement of blasting. The plan will encompass the following management strategy:

- A geotechnical survey of the rock shelters that contain archaeological sites will be undertaken prior to blasting in the project site. The purpose of the survey is to determine a ground vibration limit for the individual sites that would minimise the risk of damage to the sites.
- The survey will be conducted by a suitably qualified and experienced person such as a geotechnical engineer.
- Blasting in close proximity to the rock shelters will be undertaken in a manner that ensures that ground vibration levels from blasting will be within the nominated limits at the archaeological sites. The following techniques would be effective in reducing the maximum instantaneous charge of the blasts, and hence reducing the ground vibration levels:
 - Detonating shots on a daily basis, rather than accumulating charged holes over multiple days and detonating the accumulated holes;
 - Dividing the blast holes into groups and introducing detonation delays between groups of blast holes;
 - Initiating blasts in the direction away from the closest rock shelter; and
 - Scheduling blasts in the open pit quarries so they do not occur simultaneously.

Monitoring and Reporting

Any noise and blasting issues that may arise from the project will be managed by via a complaints handling procedure. The procedure will include a considered response to any noise or blasting complaints including an investigation into the complaint and adoption of any noise control measures identified as necessary during the investigation.

As part of the Blast Management Plan, rock shelters that contain archaeological sites will be periodically monitored to confirm the integrity of the sites.

19.4.9 Visual Amenity

Potential impacts from the project on visual amenity, and the relevant legislation and standards, are discussed in Section 14 – Visual Amenity.

Environmental Objectives and Performance Criteria

The environmental protection objective for visual amenity is to ensure that scenic values are retained to the greatest practical extent.

Control Strategies and Corrective Actions

Due to the intervening topography and vegetation between the project site and sensitive receptors, the project is not anticipated to be visible from any of the viewing locations. No specific mitigation measures are therefore required for visual amenity. There are, however, a number of factors intrinsic to the project design which limit potential impacts on visual amenity. These include:

- There will be no elevated overburden emplacements or final voids post-mining; and
- Mined areas will be progressively rehabilitated to create open woodland, similar to the surrounding undisturbed bushland.

Further detail on these design elements is provided in Section 19.4.3.

At the completion of mining, the project site will be completely rehabilitated. The haul roads will similarly be decommissioned and any associated infrastructure, such as bridges and culverts, will be decommissioned unless advised otherwise by the ALC.

Monitoring

Any visual amenity issues that may arise from the project will be managed by via a complaints handling procedure.

19.4.10 Socio-economics

Potential impacts from the project on socio-economics, and the relevant legislation and standards, are summarised in Section 15 – Socio-economics, and are discussed in detail in the *Socio-economic Report* (Appendix K).

Objectives and Performance Criteria

The objectives for socio-economic impact management are:

- To enhance the positive impacts of the project to ensure the greatest benefits from the project are achieved at a local, Territory and Federal level;
- To ensure negative impacts of the project are minimised to the extent possible by developing and implementing a range of management strategies; and
- To work cooperatively with relevant stakeholders including the ALC and Traditional Owners, in the development and implementation of appropriate management strategies.

Control Strategies

The socio-economic assessment considered potential negative and positive impacts associated with the project. Negative impacts include loss of access to land; impacts on social amenity; anxiety and uncertainty surrounding new mining areas; and impacts on spirituality and sacred sites. The Mining Agreement that will be negotiated between the proponent and the ALC for the project is the primary vehicle for addressing a number of these impacts.

Monitoring and Reporting

The proponent has a range of existing strategies in place designed to avoid, manage or enhance socio-economic impacts, and these strategies will remain in place for the project. In addition, the proponent is required to address internal corporate requirements relating to community engagement, community development and human rights at each stage of the project lifecycle. Relevant corporate requirements include the:

- Conduct of human rights monitoring;
- Conduct of a social baseline study and impact assessment for key quality of life indicators;
- Preparation of a Community Development Management Plan (CDMP); and
- Conduct of community perceptions surveys.

Human Rights Monitoring

The proponent's corporate procedures require an assessment of the impacts of its operations against the Universal Declaration of Human Rights and the Global Compact. A Human Rights Impact Assessment (HRIA) is required to be conducted every three years and reviewed annually. A HRIA Management Plan is required to be developed, implemented and reviewed annually where material impacts are identified in the HRIA. The proponent will continue to conduct HRIAs and implement the findings as necessary.

Social Baseline Study

The proponent is also required to complete a social baseline study, assess key quality of life indicators and conduct a social impact and opportunity assessment during the project development phase in order to address

relevant corporate requirements. The Socio-economic Impact Assessment prepared as a part of the EIS (refer to Appendix K) constitutes the social baseline study and impact and opportunities assessment for the project. Key quality of life indicators identified through social baseline studies and community perceptions surveys, and agreed with the proponent, will continue to be monitored during the project life of operations. Community development projects that respond to the key quality of life indicators are required to be identified and implemented during project operations.

Community Development Management Plan

The CDMP for the existing mine comprises the proponent's social investment framework, and includes:

- A register of community development projects and donations, commitments and approvals; and
- A register of the employee matched giving program.

The CDMP will be reviewed and its effectiveness evaluated on an annual basis.

Community Perceptions Survey

The proponent conducts a Community Perceptions Survey in the three communities on Groote Eylandt every three years, in accordance with corporate requirements. The Community Perceptions Survey includes questions in relation to local perceptions of the proponent's performance in environmental and social management, as well as the effectiveness of the proponent's communications channels. The proponent will continue to conduct Community Perception Surveys and will include consideration of the project in future surveys.

19.4.11 Archaeology

Potential impacts from the project on archaeology, and the relevant legislation and standards, are summarised in Section 16 – Archaeology, and are discussed in detail in the *Archaeology Report* (Appendix L).

Environmental Objectives and Performance Criteria

The environmental protection objectives relevant to cultural heritage are to ensure that:

- Activities undertaken within the project site are conducted in a manner that avoids any damage to identified sites of archaeological significance;
- The ALC is actively consulted and involved in discussions surrounding the appropriate management of Aboriginal cultural heritage sites within the project site;
- Unexpected archaeological finds are protected; and
- Appropriate permits and approvals are obtained in relation to archaeological sites.

Control Strategies and Corrective Actions

Relocation of the Manuport

One site of archaeological significance (the manuport – site ELS14) is located within the project disturbance footprint, and will therefore be directly impacted by the project. Figure 19-4 shows the location of this site. A proposed management approach for this site involves relocating the manuport beyond the mine disturbance footprint. Given the social value of this site, agreement with the ALC would need to be sought in order to relocate the manuport. Under the NT *Heritage Act*, relocation of this site would be considered to be disturbing or destroying a site. The proponent will therefore need to obtain approval under Section 72 of this Act prior to disturbing the site.

Restricted Visitor Access

The proponent will place restrictions on access during mining operations to the areas where archaeological sites occur. Regular monitoring of the art sites to assess compliance with access restrictions will be undertaken.

Potential Dust Impacts

Dust caused by mining may settle on the rock art and add to existing natural factors leading to its deterioration (such as exfoliation of the art surface). The following two-stage process will be adopted in relation to these potential impacts:

- Stage 1 is the establishment of a record of the art, including a baseline assessment of the colour and condition of the art. This would establish a detailed database of the rock art at each of the sites located to date, with specific attention to the state of preservation, visibility, vibrancy and colour of the art (which can be measured using electronic colour measurement devices). This baseline will be established prior to the commencement of construction activities.
- Stage 2 involves documenting any discernible rate of change or dust deposition through an annual monitoring program, assessing the visibility, vibrancy and colour of a set of art datums representative to the art as a whole. Monitoring data will be reviewed annually and additional dust control measures will be implemented if found to be necessary based on the results of this monitoring work. This may include additional dust control measures within the project site, or measures at the art site/s (e.g. cleaning using a suitable method such as a puffer brush). Any work at the arts site/s would be undertaken in consultation with the ALC, and in accordance with any necessary permits under the *Heritage Act*.

Further Site Surveys

Two locations were identified during the field surveys, where sites were found to be clustered (i.e., sites ELS06 to ELS13 and ELS15 in the Southern EL, and ELN04 to ELN06 and ELN08 to ELN13 in the Northern EL). The location of these sites is shown in Figure 19-4. The sites in these clusters were surveyed and recorded in line with the requirements of the EIS Terms of Reference for the project. However, the area in which the clustered sites are located is an extensive cavernous landscape, containing a high density of archaeological material. It is therefore possible that not all of the archaeological features in the vicinity of these clusters were recorded during the EIS survey. In order to ensure that mitigation measures conserve all of the archaeological resources in the vicinity of the clusters, further archaeological surveys of these two clusters will be undertaken prior to project commencement.

Cultural Heritage Management Plan

A Cultural Heritage Management Plan (CHMP) will be prepared that will:

- Document the restrictions that are to be placed on access to archaeological sites;
- Document a program of awareness training, including employee inductions, to ensure all of the mine employees and contractors are informed of their obligations in relation to archaeological items. These obligations include complying with the access restrictions described above, as well as the procedures to be adopted in relation to any unexpected finds (discussed below);
- Prepare a detailed record of the characteristics of the art (including any additional art located during the further survey, described above). The baseline characteristics to be recorded include vibrancy, visibility and colour; and
- Outline a program of annual monitoring of the art for changes that may be due to mine related dust.

Blast Management Plan

Blasting activities may potentially impact nearby archaeological sites occurring in rock shelters. A Blast Management Plan will be prepared to address this issue (described in Section 19.4.7).

Unexpected Finds Procedure

In the event that any of the mine employees or contractors suspect that they have uncovered an archaeological find, the following procedures will apply:

- Immediately cease disturbance of any areas surrounding the find;

- If it is considered that the find is at risk of being inadvertently damaged by mining activities, a temporary fence/barricade will be erected around the find;
- The ALC will be notified of the discovery of areas of potential archaeological significance immediately following the discovery and prior to any disturbance;
- The ALC, and if necessary, a suitably qualified archaeologist, will be requested to inspect the find and determine its significance;
- The confirmed site will be registered and referenced in the proponent's CHMP; and
- Should the find be of archaeological significance, the NT Heritage Branch will be notified, and appropriate mitigation strategies will be developed in consultation with the ALC and the NT Heritage Branch.

These measures will help mitigate impacts in the unlikely event that previously unrecorded sites of cultural heritage significance are located during disturbance associated with the project.

Monitoring and Reporting

Monitoring will be incorporated, as necessary, into the management plans to be developed for the project to mitigate and manage impacts to archaeological sites that are located on the project site. In particular, monitoring will be undertaken in relation to:

- Assessing compliance with access restrictions of the art sites;
- Assessing any rate of change or deterioration to art sites that may be due to dust deposition; and
- Confirming the integrity of the rock shelters with art, following blasting activities on the project site.

Management of archaeological sites will be undertaken in consultation with the ALC, as appropriate.

19.4.12 Non-mining Waste

Potential impacts relating to waste management and land contamination from the project, and the relevant legislation and standards, are discussed in Section 17 – Non-mining Waste.

Environmental Objectives and Performance Criteria

The environmental protection objectives relevant to non-mining wastes and land contamination are as follows:

- To reduce the quantity of wastes through the application of the waste management hierarchy; and
- To ensure that waste materials are handled, stored and disposed of in a manner that minimises impacts on air, water and land resources and protects the health of people working on the project and in the surrounding community.

Environmental values to be or enhanced in regards to waste and contaminated land include:

- The life, health and wellbeing of people; and
- The diversity of ecological processes and associated ecosystems.

Control Strategies

Waste

The proponent has a waste management system in place for the existing mine and wastes generated by the project will be managed in accordance with this system. The waste management system is based on the regulatory requirements, values and principles of the NT's *Waste Management and Pollution Control Act*, *Waste Management and Pollution Control (Administration) Regulations*, and the *Draft Waste Management Strategy for the Northern Territory*.

The waste management system adopts the principles of the waste management hierarchy as far as practicable. Key features of the system include segregation and secure containment of all wastes for appropriate reuse, recycling or disposal at licensed facilities; employee awareness of waste management practices; regular environmental auditing; and regular inspections and ongoing monitoring.

The proponent operates several waste management facilities on Groote Eylandt for the reuse, recycling or disposal of the various waste streams. A proportion of the wastes collected are transported to the mainland for repair, reuse, recycling or disposal by licensed contractors.

Table 19-11 describes the waste streams that will be generated by the project and their proposed management. All wastes will be managed in accordance with the existing waste management system.

Table 19-11 Wastes Predicted to be Generated on the Project Site

WASTE CATEGORY & GENERAL COMPOSITION	SOURCE	MANAGEMENT STRATEGIES (WASTE MANAGEMENT HIERARCHY LEVEL) *
General and Recyclable Wastes		
General waste: ■ Food scraps ■ Non-class 1, 2, 5 plastics	Crib hut	General waste will be stored on the project site in designated bins and regularly collected for transport to the Integrated Waste Facility (IWF) for disposal (6).
Recyclable waste: ■ Aluminium and steel cans ■ Class 1, 2, 5 plastics	Crib hut	Recyclable waste will be stored on the project site in designated bins and regularly collected for transport to the Hazard Waste Management Facility (HWMF) for recycling (4).
Green waste: ■ Cleared vegetation	Clearing of vegetation	Following clearing, the vegetation will be stockpiled and burnt on the project site (6).
Personal Protective Equipment and small items: ■ Gloves ■ Hardhats ■ Safety glasses ■ Gumboots ■ Water coolers	Crib hut	Waste items will be collected in designated bins for regular transport to the IWF for disposal (6).
Engine air filters	Basic on-site maintenance of light and heavy vehicles	Used air filters will be collected, cleaned and tested for reuse (3) if possible, or transported to the IWF for disposal (6).
Wooden pallets	For the transport of materials required for construction activities	Used wooden pallets will be collected and temporarily stored at the Waste Transfer Facility (WTF) for reuse (3). If the pallets are unable to be reused, they will be transported to the IWF for recycling (4) or disposal (6).
Scrap metals: ■ Steel ■ Light and Heavy gauge steels	Construction activities – formwork	Scrap metals will be temporarily stored at the WTF, prior to shipping to Darwin for reuse (3) or recycling (4) if possible, or for disposal (6) by licensed contractors.

WASTE CATEGORY & GENERAL COMPOSITION	SOURCE	MANAGEMENT STRATEGIES (WASTE MANAGEMENT HIERARCHY LEVEL) *
Concrete	Construction activities	Unwanted concrete blocks will be broken up into transportable-sized pieces and taken to the IWF for disposal (6).
Listed Wastes		
Sewage waste / effluent	Crib hut portable toilet facilities	Sewage waste will be collected and transported to the sewage treatment facilities at the existing mine for treatment and disposal (6).
Waste oils, grease, oily water, engine oil and fuel filters	Basic on-site maintenance of light and heavy vehicles and equipment	Waste oils, grease, sludge, oily water, oil filters and fuel filters will be collected and stored in separate designated containers, and transported to the existing mine for reuse (3) and recycling (4) if possible, or taken to the HWMF for shipping to Darwin for repair, reuse (3) or recycling (4) if possible, or for disposal (6) by licensed contractors.
Miscellaneous hydrocarbon wastes: ■ Oily rags ■ Absorbent and other oil spill cleanup products	Basic on-site maintenance of light and heavy vehicles, and mobile equipment	Oily rags and oil spill kit materials will be collected in designated regulated waste bins, and transported to the HWMF for shipping to Darwin for reuse (3) or recycling (4) if possible, or for disposal (6) by licensed contractors.
Tyres	Basic on-site maintenance of light and heavy vehicles, and mobile equipment	Used tyres will be collected and transported to the used tyre bay at the existing mine for retreading and reuse if possible (3) or disposal (6).
Spent vehicle batteries	Basic on-site maintenance of light and heavy vehicles	Spent batteries will be collected and transported to the HWMF for shipping to Darwin for reuse (3) or recycling (4) if possible, or for disposal (6) by licensed contractors.

* Waste Management Hierarchy: (1) Avoid; (2) Reduce; (3) Reuse; (4) Recycle; (5) Recover; (6) Dispose

Monitoring and Reporting

The proponent will maintain an inventory of all waste types and quantities produced on the project site and their applicable disposal method in accordance with relevant legislation.

The proponent will also submit annual National Pollution Inventory reports in accordance with the *National Pollutant Inventory Guide* (SEWPaC 2012) and associated manuals (e.g. *Emission Estimation Technique Manual for Mining*, SEWPaC 2012) as required.

19.4.13 Health and Safety

Potential hazards and risks to human health and safety arising from the development of the project on surrounding land and sensitive receptors, and the relevant legislation and standards, are discussed in Section 18 – Health and Safety.

Environmental Objectives and Performance Criteria

The environmental protection objectives relevant to health and safety are:

- To ensure that project activities are conducted in a manner that places the utmost importance on the safety and health of employees, contractors and the wider community; and
- To ensure the project has been designed and will be developed and operated in consideration of credible hazards including unplanned or unmanaged discharges from site, explosions, transport incidents and natural hazards.

Control Strategies

The following procedures, plans and strategies will be implemented to mitigate or control hazards.

Risk Management Plan

The proponent has extensive health, safety and risk management systems and procedures in place for the existing mine, and risks associated with the project will be managed in accordance with these systems and procedures. In particular, the proponent has a detailed Risk Management Plan (RMP) which is the company's overarching plan designed to manage HSEC risks associated with the operation of the existing mine. The RMP provides a framework for achieving the proponent's objectives in relation to health and safety and ensuring compliance with all applicable legislation. It is supported by an extensive number of associated internal plans, procedures and manuals.

The RMP complies with relevant legislation, and Australian and corporate standards and is comparable to best practice systems used at mining operations within Australia. All project personnel are expected to comply with the requirements of the RMP.

Under the RMP framework, the proponent has developed a series of management plans, policies and procedures to manage specific hazards at the site. These include Incident Management Plans (IMPs) which are in place for foreseeable emergency scenarios (such as a building fire, or cyclonic weather conditions, etc.), and which define resources and responses, and specify the risk assessment procedures, including specifications for drills, evacuations and emergency preparedness.

Risk Register

Prior to the commencement of the project, a detailed risk register will be created to identify hazards and management controls to reduce risks during the construction, operation and decommissioning phases of the project. The register will list potential risk issues and events so as to facilitate the recognition and subsequent management of these potential risks. The risk register will be based on the preliminary hazard analysis (PHA) conducted for this EIS. Development of the risk register will include a rigorous reappraisal of the risks based on detailed design and operating plans.

Hazardous Materials

Any chemicals or proprietary substances that may be required for the project will carry a Material Safety Data Sheet (MSDS) which will clearly state whether the substance is hazardous or non-hazardous. Where an MSDS shows a substance to be hazardous, the appropriate risk and safety procedures will be adopted to ensure best practice management measures are applied.

The only significant hazardous material / substance required for the project is diesel fuel, which will be stored at the fuel storage facilities located at the existing mine site. Any on-site storage of diesel will be limited to small, portable containers.

Diesel will be transported to the project site via the dedicated internal haul road network, using mobile refuelling trucks. The on-site equipment that will require refuelling includes the small diesel generators used for night-lighting, pit dewatering, and the powering of the crib hut facilities, and for on-site mining vehicles and equipment that remain permanently on the project site, such as dozers. The proponent has refuelling procedures in place to prevent and control any spills that may occur during vehicle refuelling. In addition, the proponent will ensure spill

cleanup kits are available on-site and located at strategic and easily accessible locations, and that all staff are adequately trained in the use of these emergency kits.

There will be routine servicing and maintenance of the construction mobile equipment fleet in the vicinity of the crib hut and parking area of the project site. Servicing and maintenance work may include replacing batteries, tyres, filters or other such maintenance works. Any spills that may occur during equipment servicing and maintenance procedures will be contained within the temporary facility, and spill cleanup kits will be readily available.

Should other hazardous substances (or dangerous goods) be required during the life of the project, transport, use and disposal issues will be planned and managed prior to arrival on site and appropriate measures implemented in accordance with the requirements of the Risk Management Plan and relevant guidelines and legislation.

Dangerous Goods

The project will periodically utilise explosives during the operations phase of the project for blasting associated with open cut mining activities. Explosives are stored at the dedicated, licensed explosives storage facility located on the existing mine, and will be transported to the project site by a licensed explosives contractor. The explosives storage facility is operated in accordance with the *Australian Dangerous Goods Code* and Regulations.

The proponent has stringent guidelines and procedures regarding the storage, transport and handling of explosives, and all personnel are required to adhere to these procedures at all times. The proponent's current site processes for the management of explosives and blasting include:

- Risk assessment and management procedures;
- Explosives vehicle approvals and compliance check forms;
- Procedures addressing explosives transport, storage and use;
- Training and assessment addressing explosives transport, storage and use;
- 24 hours notification of blasting events and designated public road closures (where applicable); and
- Designated firing times and re-entry procedures.

These procedures will be implemented for the project.

Manganese Exposure

The proponent currently undertakes occupational health and safety (OH&S) surveillance and monitoring of the workforce at the existing mine, which includes monitoring manganese levels. This OH&S monitoring program will continue for the life of the project.

Malicious Acts

Access to the operating mine site will be restricted and appropriate signage will be erected to help prevent malicious acts.

Natural Hazards

Climatic Extremes

The proponent has well established emergency preparedness and response plans in place for natural hazards such as cyclones and flooding, given these events are common in the region. Personnel are evacuated from the island in the event of a severe cyclone (Category 4 or 5). Routine drills for all emergency response scenarios are conducted by designated emergency service officers, and key learnings and corrective actions are incorporated into the emergency response plans. These plans will be implemented for the project.

All mine water dams on the project site will be designed by a suitably qualified engineer, and constructed in accordance with relevant design standards and licence requirements. Dam design will adequately address the structural integrity of containment walls during climatic extremes, including cyclone, flood and drought.

Bushfire

The proponent will work with the Traditional Owners to develop and implement a fire management regime for the project site to optimise biodiversity values, whilst also ensuring the risks to human safety and property are managed. This regime will be in line with the NT *Bushfires Act*. The proponent will continue to work with the Traditional Owners in relation to land management, particularly with respect to fire management.

Mosquito Monitoring and Management Program

The proponent will implement regular mosquito monitoring and management program, which will be conducted in collaboration with the Medical Entomology Group of the NT Department of Health. This will include regular mosquito trapping, and the mosquitoes caught will be identified to check for mosquito species known to be disease vectors. The proponent will implement mosquito management procedures as required, which may involve dispersing mosquito insecticide pellets in an effort to eradicate mosquitoes and reduce the public health nuisance caused by mosquitoes, in line with the *Public and Environmental Health Act*.

There are several features of the project's design and management which will reduce the risk of mosquitoes breeding on the project site, such as:

- The mine water dams that will be constructed on the project site will be deep, with steep sides to discourage macrophyte growth which typically provides suitable habitat for mosquito breeding;
- Waterway crossings for the project will be culverts that will not impede the flow of water in the watercourses, or cause water to back up and pond behind the crossings;
- Areas that will be rehabilitated following mining will be designed to ensure they are free draining; and
- Used tyres that may be generated on site, that could contain pooled water and act as a breeding ground for mosquitoes, will be transported to the used tyre bay on the existing mine site for disposal, and not left on the project site.

In addition, project personnel are required to wear long-sleeved shirts and long trousers which will prevent mosquito bites.

Checking and Corrective Action

The proponent has established procedures for reporting and investigating systematic and event based non-conformances. Corrective actions reports and close out statistics are generated on a weekly and a monthly basis, to allow departmental managers to assess department, section and individual performance. In addition, all incidents that cause environmental harm will be reported to the DME as soon as practicable, in accordance with Section 29 of the *Mining Management Act*.

Monitoring and Reporting

The RMP framework forms the basis of an iterative cycle of continual improvement in the RMP and its associated procedures. The RMP is a working document and is therefore subject to ongoing review as part of a process to continually monitor and, where necessary, improve safety management. The RMP has been developed in accordance with relevant legislation and standards, including AS/NZS ISO 31000:2009, and utilises a detailed risk assessment procedure.

Auditing forms a key part of the existing RMP and internal auditing of the RMP and its associated procedures is undertaken against corporate standards by an external party in order to measure performance against policy, objectives and targets.

19.5 PROJECT ENVIRONMENTAL COMMITMENTS

This section provides a summary of the key commitments detailed throughout the EIS. The management commitments, and the relevant sections of the EIS in which they are found, are compiled in Table 19-12.

19.5.1 Commitments Register

Table 19-12 Statement of Commitments for the Eastern Leases Project

EIS SECTION ¹	COMMITMENT	PROJECT PHASE ²		
		CON	OPS	DCM
GENERAL				
Section 3 – Project Description (Subsection 3.2)	The project will not increase GEMCO's existing production rate of 5 Million tonnes per annum of manganese ore.		✓	
Section 3 – Project Description (Subsection 3.2)	No upgrades of infrastructure at the existing mine or port will be required as a result of the project. The project workforce will be housed in existing workforce accommodation.	✓	✓	✓
Section 3 – Project Description (Subsection 3.7.1)	Project landform design will ensure that all quarries will be backfilled with overburden, creating a free draining landform that broadly replicates the pre-mining topography. Backfilling the quarries in this way will ensure that there will be no elevated overburden emplacements (i.e. free standing emplacements/stockpiles that may be tens of metres high) or final voids (deep quarries that are not backfilled and consequently accumulate water over time) at the end of the mine life.		✓	✓
Section 3 – Project Description (Subsection 3.7.1)	Any temporary overburden emplacements will be designed to have a maximum height of 15 m and an external batter slope of 10% (equivalent to 6°).		✓	
Section 3 – Project Description (Subsection 3.7.1)	Temporary overburden emplacement areas will be located in the footprint of future mining areas.		✓	
Section 3 – Project Description (Subsection 3.7.6)	Buffers have been defined around the Emerald River, Amagula River and their tributaries and there will be no mining within the defined buffers. The buffers were delineated by the 1% Annual Exceedence Probability (AEP) (1 in 100 year) flood extents.		✓	
Section 3 – Project Description (Subsection 3.7.6)	No river diversions or levees are required for the project.	✓	✓	✓
Section 3 – Project Description (Subsection 3.7.8)	All borrow pits required for the project will be located within the disturbance footprint of the project.	✓	✓	
Section 3 – Project Description (Subsection 3.7.4)	The current system for managing tailings and middlings will be extended to include tailings and middlings from the project.		✓	
Section 3 – Project Description (Subsection 3.9.5)	The 4WD track to Dalumba Bay that traverses the project site will be relocated to avoid the mine. The proponent will consult with the East Arnhem Regional Council (EARC) and the ALC in relation to the proposed relocation.	✓		

EIS SECTION ¹	COMMITMENT	PROJECT PHASE ²		
		CON	OPS	DCM
Section 3 – Project Description (Subsection 3.9.6)	The project haul road will be constructed as an overpass at the intersection with the Emerald River Road. The proponent will consult with the EARC and the ALC in relation to the design of the overpass, and will obtain any necessary approvals from these agencies prior to its construction.	✓		
Section 4 – Environmental Risk Assessment	Design of haul roads will include sediment traps.	✓		
Section 7 – Terrestrial Ecology (Subsection 7.7.2)	A site traffic management plan will be developed for the project, which will include requirements for speed limits, safe driving practices and the installation of signage.	✓	✓	✓
Section 4 – Environmental Risk Assessment	The proponent will implement procedures and driver training in relation to road safety.	✓	✓	✓
Section 4 – Environmental Risk Assessment	Vehicles transporting over-dimensional loads will be escorted.	✓	✓	✓
Section 4 – Environmental Risk Assessment	The proponent will circulate routine alerts and communications with the ALC in relation to the transport of heavy loads.	✓	✓	✓
Section 4 – Environmental Risk Assessment	Although access to working areas of the project site will be restricted over the life of the project, Traditional Owners will be permitted continued access to the remainder of the project site to the extent that safe access can be provided.	✓	✓	✓
Section 2 – Regulatory Framework	The project will comply with all applicable legislation, policies and Australian Standards as discussed in Section 2 – Regulatory Framework.	✓	✓	✓
REHABILITATION				
Section 6 – Mine Rehabilitation and Closure (Subsection 6.3.4)	The project site will be progressively rehabilitated to create a self-sustaining open woodland, similar to the pre-mining environment. Rehabilitation will be in accordance with the procedures described in Section 6 – Mine Rehabilitation and Closure.	✓	✓	✓
Section 6 – Mine Rehabilitation and Closure (Subsection 6.3.4)	As part of the <i>Biodiversity Offsets Strategy</i> (Appendix E), the proponent will fund and coordinate a research program designed to identify ways that rehabilitation could be improved in order to provide habitat for threatened fauna species, particularly the Northern Hopping-mouse and the Brush-tailed Rabbit-rat. The rehabilitation techniques for the project may be adjusted in the future to reflect the findings of this research.	✓	✓	✓
Section 6 – Mine Rehabilitation and Closure (Subsection 6.3.2)	There will be specific management measures for the handling and placing of overburden from the small area in the Southern EL which has been identified as containing Potentially Acid Forming (PAF) material. This will involve monitoring for PAF material and selectively handling and burying any PAF material. In addition, samples will be collected at random from overburden emplacements and analysed on-site using net acid generation tests as a rapid screening tool.		✓	

EIS SECTION ¹	COMMITMENT	PROJECT PHASE ²		
		CON	OPS	DCM
ECOLOGY				
Section 7 – Terrestrial Ecology (Subsections 7.6.3 and 7.7.2)	The proponent has existing management plans and manuals that address pests and weeds on its tenements. These will be applied to the project.	✓	✓	✓
Section 7 – Terrestrial Ecology (Subsection 7.7.2)	Clearing will be undertaken in accordance with the proponent's Permit to Clear process.	✓	✓	
Section 7 – Terrestrial Ecology (Subsection 7.7.2)	The project site will be managed to conserve its conservation value, with management measures including weed and feral animal control and fire management (undertaken in consultation with the Traditional Owners). Land management measures will be documented in the proponent's existing Land and Biodiversity Management Plan, which will be updated to address the project.	✓	✓	✓
Section 7 – Terrestrial Ecology (Subsection 7.7.2)	The workforce will also be provided with information about threatened species, as part of their induction or through general environmental awareness programs.	✓	✓	✓
Section 7 – Terrestrial Ecology (Subsection 7.7.2)	Lighting will be designed to ensure that lighting is directed away from animal habitat areas, as far as possible.	✓	✓	✓
Section 7 – Terrestrial Ecology (Subsection 7.7.3)	A Biodiversity Offsets Strategy will be implemented for the project.	✓	✓	✓
GROUNDWATER				
Section 9 – Groundwater (Subsection 9.5)	The groundwater monitoring network established as part of EIS groundwater investigations will continue to be utilised throughout the life of the project. Section 9 – Groundwater describes monitoring frequency and parameters.	✓	✓	✓
SURFACE WATER				
Section 10 – Surface Water (Subsection 10.8.2)	An Erosion and Sediment Control Plan will be developed prior to the commencement of construction to address erosion and the control of suspended sediment. Monitoring will be undertaken to confirm the success of these measures and to identify any necessary remedial actions.	✓	✓	✓
Section 10 – Surface Water (Subsection 10.4.2)	Low flow drainage culverts will be installed at roadway crossings. Culverts will be designed to allow drainage of the 2 year average recurrence interval (ARI) flood flow. The culverts will not impede fish passage. Erosion and sediment controls will be installed at watercourse crossings and inspected to confirm their effectiveness.	✓	✓	
Section 10 – Surface Water (Subsections 10.4.2 and 10.5.5)	The project has been designed with sufficient storage capacity for mine-affected water to ensure that no routine discharges of mine-affected water will be required.	✓	✓	✓

EIS SECTION ¹	COMMITMENT	PROJECT PHASE ²		
		CON	OPS	DCM
Section 10 – Surface Water (Subsection 10.5.5)	The proponent will request authorisation for discharge of quarry water, as a contingency measure. The proposed contingency discharge conditions will be developed using the method described in <i>Australian and New Zealand Guidelines for Fresh and Marine Water Quality</i> (2000) (ANZECC Guidelines) for high conservation aquatic ecosystems.	✓	✓	✓
Section 10 – Surface Water (Subsections 10.4.2 and 10.5.5)	Discharge points to natural drainage lines will be designed with energy dissipation measures, where necessary, to prevent any scouring and ensure stability.	✓	✓	✓
Section 10 – Surface Water (Subsection 10.4.1)	Temporary and permanent diversion drains will be constructed to isolate the contained catchments of the quarries and to divert runoff from undisturbed areas through the mining areas.	✓	✓	✓
Section 10 – Surface Water (Subsections 10.5.3 and 10.5.5)	Mine water storage dams will be constructed to have nil external catchment and will be operated with a freeboard to ensure they do not overflow. All dams will be designed and constructed in accordance with relevant engineering design standards and licence requirements.	✓	✓	✓
Section 10 – Surface Water (Subsection 10.8.1)	A Water Management Plan will be prepared prior to commencement of the project. The plan will address water management for all stages of the project construction, operations and closure, as well as long-term post-mining water management requirements and monitoring.	✓	✓	✓
Section 10 – Surface Water (Subsections 10.6 and 10.3.4)	Monitoring will be undertaken in accordance with a Water Management Plan. Monitoring will include: ■ Project water balance including water transfers, consumption and quarry water volumes; ■ Surface water quality monitoring and reporting; ■ Storage water quality monitoring and reporting; and ■ Discharge monitoring and reporting.	✓	✓	✓
Section 10 – Surface Water (Subsection 10.7.2)	The proponent is conducting a review of regional stream gauging data with the intent of upgrading or installing additional downstream gauging.	✓		
AIR QUALITY				
Section 12 – Air Quality (Subsection 12.9)	The proponent's existing Air Emissions Management Plan will be revised to include the construction and operation of the project, and the project will be operated in accordance with the requirements of the plan.	✓	✓	✓
Section 12 – Air Quality (Subsection 12.9)	A number of controls have been included in the project design to limit dust emissions from the project (e.g. dust suppression watering). These are described in Section 12.9.	✓	✓	✓
Section 12 – Air Quality (Subsection 12.9)	PM ₁₀ will be monitored at Angurugu and Yedikba.	✓	✓	✓
Section 12 – Air Quality (Subsection 12.9)	If dust monitoring indicates any exceedances of air quality objectives, an investigation will be conducted by the proponent, and additional dust controls will be applied as necessary.	✓	✓	✓

EIS SECTION ¹	COMMITMENT	PROJECT PHASE ²		
		CON	OPS	DCM
Section 12 – Air Quality (Subsection 12.9)	The proponent will continue the operation of its complaints handling procedure.	✓	✓	✓
Section 12 – Air Quality (Subsection 12.10)	Greenhouse gas emissions and energy use/production associated with the project will be accounted for in ongoing annual National Greenhouse and Energy Reporting (NGER) in accordance with the <i>National Greenhouse and Energy Reporting Act 2007</i> and supporting legislation.	✓	✓	✓
Section 12 – Air Quality (Subsection 12.10)	The project will adopt the initiatives in place at the existing mine to reduce and manage greenhouse gas emissions. These initiatives are described in Section 12.10.	✓	✓	✓
NOISE AND VIBRATION				
Section 13 – Noise and Vibration (Subsection 13.6.1)	The proponent will undertake discussions with the ALC, as the representative of the Traditional Owners of Wurumbunmanja Outstation, to resolve any issues that may arise from predicted noise levels at this outstation.	✓	✓	
Section 13 – Noise and Vibration (Subsection 13.7.2)	The proponent will prepare and implement a Blast Management Plan that describes the approach that will be adopted to prevent damage from blasting to rock shelters containing archaeological sites. A description of this plan is described in Section 13.6.2.	✓	✓	
Section 4 – Environmental Risk Assessment	The ALC will be notified of proposed blasting. Safety measures for blasting may include road closures and use of signage and sentries on roads in close proximity to blasting.	✓	✓	
SOCIO-ECONOMICS				
Section 15 – Socio-economics (Subsection 15.8.1)	The proponent has an established framework for the management of socio-economic impacts and benefits relevant to the existing operations (Section 15.6.5). All existing procedures operating within this framework will be applicable to the project. These include periodically undertaking: ■ Human Rights Impact Assessment; ■ Social Baseline Study; and ■ Community Perception Survey.	✓	✓	✓
Section 15 – Socio-economics (Subsection 15.8.1)	The Community Development Management Plan, which has been prepared for the existing mine, will be extended to include the project. It includes a register of community development projects and donations, commitments and approvals and a register of the employee matched-giving program.	✓	✓	✓
Section 15 – Socio-economics (Subsection 15.8)	The proponent is updating the current Indigenous Employment Strategy for the existing mine. The updated strategy will be applicable to the project.	✓	✓	✓

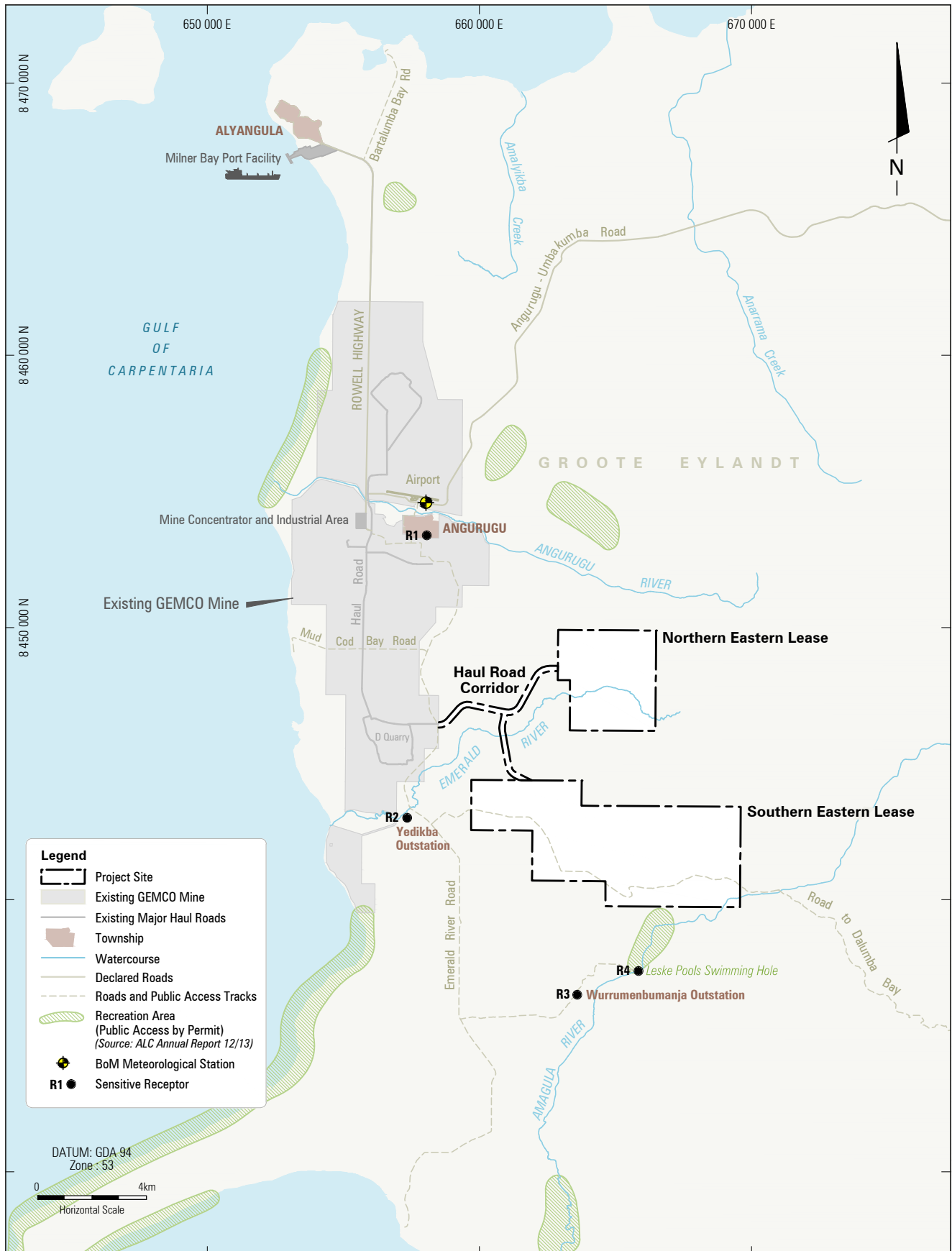
EIS SECTION ¹	COMMITMENT	PROJECT PHASE ²		
		CON	OPS	DCM
ARCHAEOLOGY				
Section 16 – Archaeology (Subsection 16.5.1)	The proponent will consult with the ALC in relation to a suitable management approach for the single archaeological site (i.e. the manuport), which is located within the mine disturbance footprint. A potential approach involves relocating the manuport beyond the mine disturbance footprint. Under the Northern Territory <i>Heritage Act</i> , relocation of this site would be considered to be disturbing or destroying a site. The proponent will therefore obtain approval under Section 72 of this Act prior to disturbing the site.	✓	✓	
Section 16 – Archaeology (Subsection 16.5.2)	The proponent will place access restrictions on areas where archaeological sites occur, in order to prevent the mine workforce from entering these areas.	✓	✓	✓
Section 16 – Archaeology (Subsection 16.5.2)	Potential impacts of dust on archaeological sites containing art will be managed in accordance with the approach described in Section 16.5.2.	✓	✓	✓
Section 16 – Archaeology (Subsection 16.6.2)	Further archaeological surveys of the two clustered sites (i.e. sites ELS06 to ELS13 and ELS15 in the Southern EL, and ELN04 to ELN06 and ELN08 to ELN13 in the Northern EL) will be undertaken to ensure that all individual sites within these areas have been identified.	✓		
Section 16 – Archaeology (Subsection 16.6.3)	A Cultural Heritage Management Plan will be prepared.	✓	✓	✓
Section 16 – Archaeology (Subsection 16.6.4)	A procedure (as described in Section 16.6.4) will be adopted to mitigate impacts in the event that unexpected archaeological sites are located during ground disturbance activities associated with the project.	✓	✓	✓
NON-MINING WASTE				
Section 17 – Non-mining Waste (Subsection 17.2.4)	Project wastes will be disposed of in accordance with current practices, and no changes to the existing waste disposal facilities are required as a result of the project.	✓	✓	✓
HEALTH AND SAFETY				
Section 18 – Health and Safety (Subsection 18.2.1)	The proponent has extensive health, safety and risk management systems and procedures currently in place for the existing mine. Risks to human health and safety associated with the project will be managed in accordance with these systems and procedures. These include a Risk Management Plan, and a series of management plans, policies and procedures to manage specific hazards at the site.	✓	✓	✓
Section 18 – Health and Safety (Subsection 18.2.1)	Prior to the commencement of the project, a detailed risk register will be created to identify hazards and management controls to reduce risks during the construction, operation and decommissioning phases of the project.	✓		
Section 18 –Health and Safety (Subsection 18.3.1)	A rigorous re-appraisal of hazards associated with the project will be undertaken as part of the RMP prior to the commencement of the construction, operations and decommissioning phases of the project, based on detailed design and operating plans.	✓	✓	✓

EIS SECTION ¹	COMMITMENT	PROJECT PHASE ²		
		CON	OPS	DCM
Section 18 – Health and Safety (Subsection 18.2.1)	All incidents that cause environmental harm will be reported to the Department of Mines and Energy as soon as practicable, in accordance with Section 29 of the <i>Mining Management Act</i> .	✓	✓	✓
Section 18 – Health and Safety (Subsection 18.3.3)	Any chemicals or proprietary substances that may be required for the project will carry a Material Safety Data Sheet (MSDS) which will clearly state whether the substance is hazardous or non-hazardous. Where an MSDS shows a substance to be hazardous, the appropriate risk and safety procedures will be adopted to ensure best practice management measures are applied.	✓	✓	✓
Section 18 – Health and Safety (Subsection 18.3.3)	No permanent bulk storages for diesel are proposed to be constructed for the project, and any on-site storage of diesel will be limited to small scale portable containers.	✓	✓	✓
Section 18 – Health and Safety (Subsection 18.3.3)	The proponent's existing refuelling procedures will be adopted to prevent and control any spills that may occur during vehicle and equipment refuelling. Spill cleanup kits will be located at strategic locations and all staff will be trained in their use.	✓	✓	✓
Section 18 – Health and Safety (Subsection 18.3.3)	Explosives will be transported to the project site by a licensed explosives contractor. The proponent has stringent guidelines and procedures regarding the storage, transport and handling of explosives, and all personnel are required to adhere to these procedures at all times. These procedures will be implemented for the project.	✓	✓	
Section 18 – Health and Safety (Subsection 18.3.3)	The proponent undertakes occupational health and safety (OH&S) surveillance and monitoring of the workforce at the existing mine, which includes monitoring manganese levels. This OH&S monitoring program will continue for the life of the project.	✓	✓	✓
Section 18 – Health and Safety (Subsection 18.3.3)	Access to the operating mine site will be restricted and appropriate signage will be erected.	✓	✓	✓
Section 18 – Health and Safety (Subsection 18.3.4)	The proponent's existing emergency preparedness and response plans will be implemented for the project.	✓	✓	✓
Section 18 – Health and Safety (Subsection 18.3.4)	The proponent will implement regular mosquito monitoring and management program, which will be conducted in collaboration with the Medical Entomology Group of the NT Department of Health.	✓	✓	✓
Section 4 – Environmental Risk Assessment	The proponent will maintain the existing system of alerts for employees in relation to the presence of crocodiles, and will continue the general awareness program that is in place for the workforce in relation to crocodiles.	✓	✓	✓

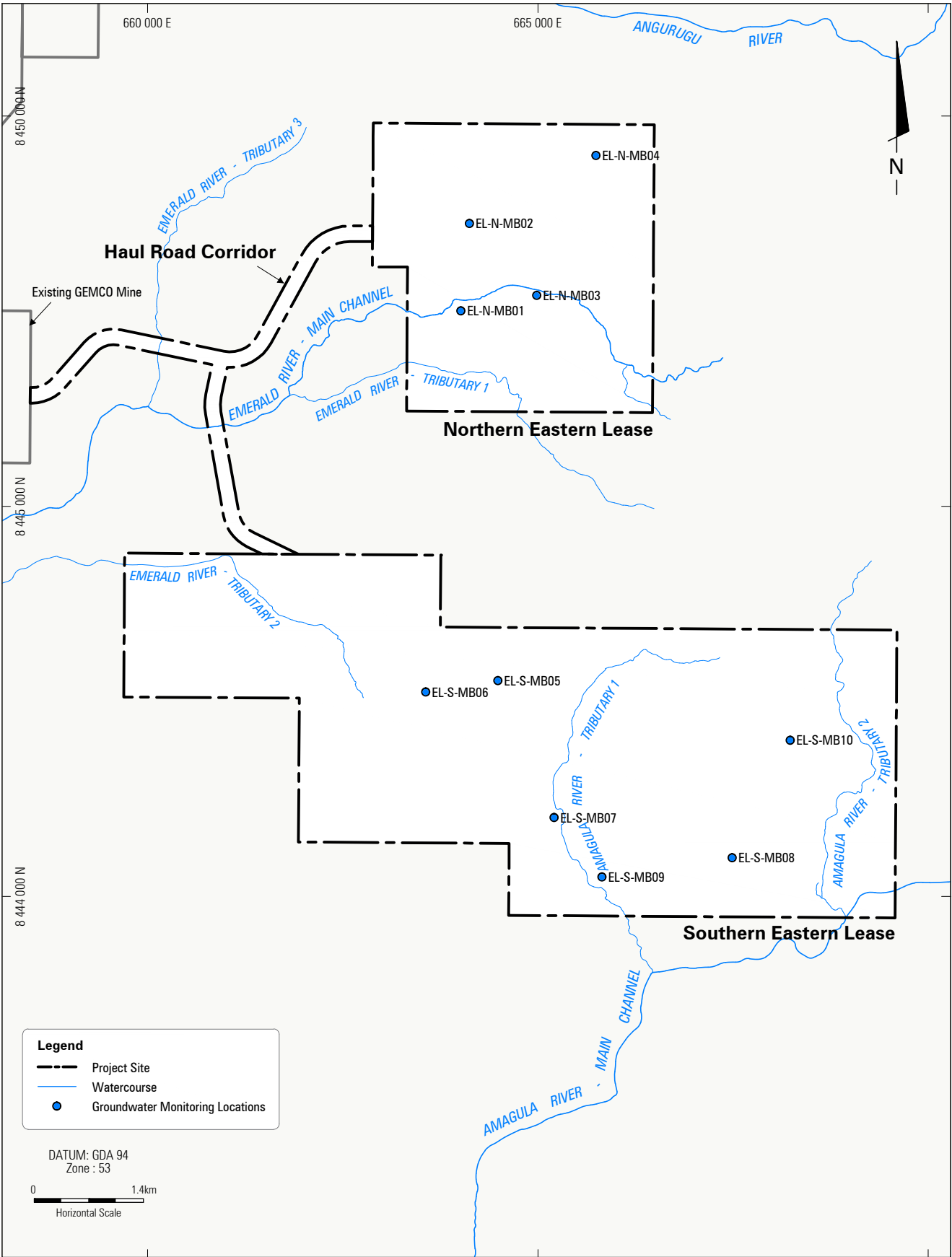
¹ The EIS section reference refers to the primary section describing the commitment, although it is noted that in some instances a commitment is made in several EIS sections.

² Con – Construction Phase; Ops – Operations Phase; Dcm – Decommissioning Phase

FIGURES



EASTERN LEASES PROJECT



EASTERN LEASES PROJECT

Groundwater Monitoring Locations

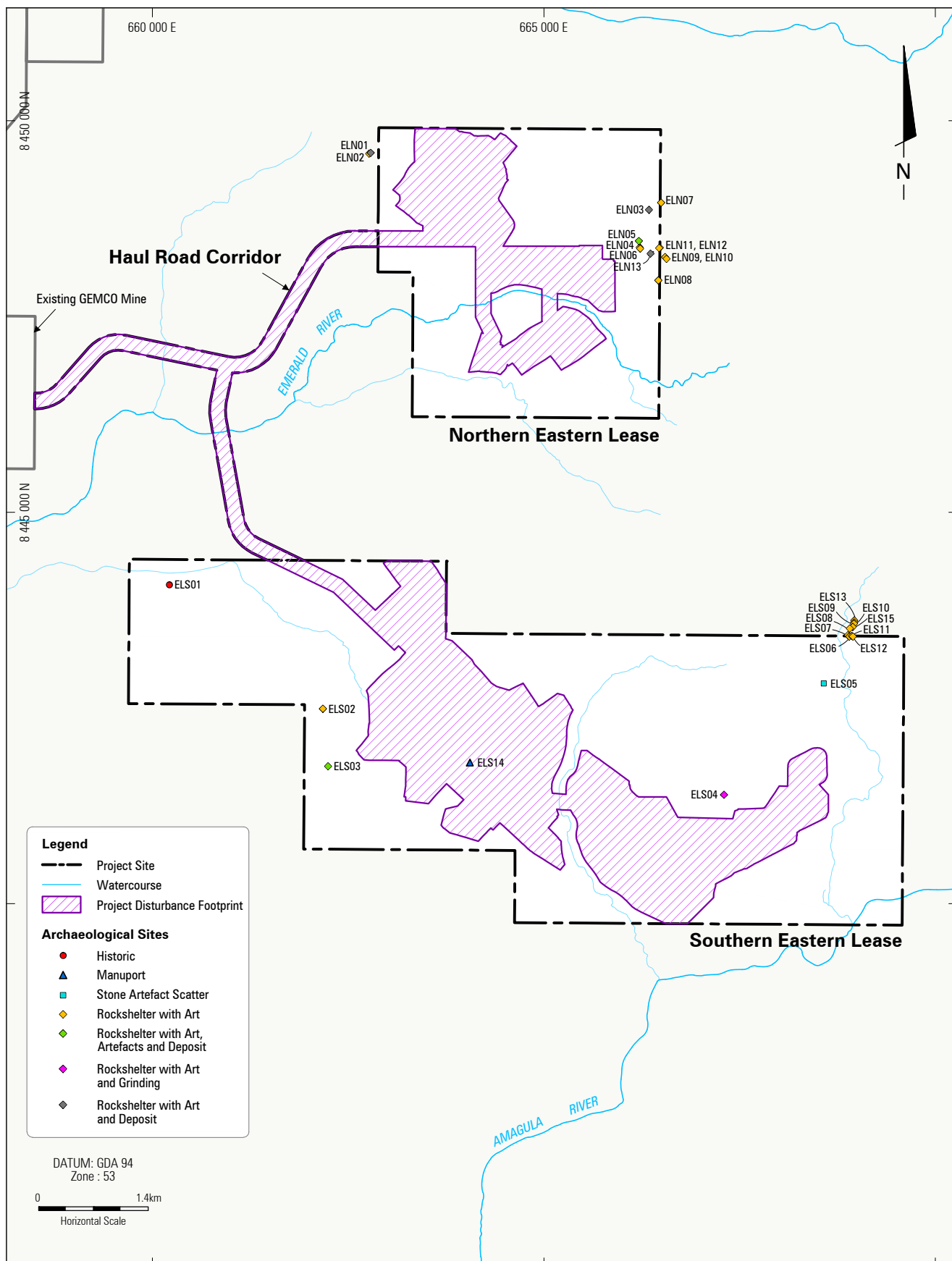
FIGURE 19-2



EASTERN LEASES PROJECT

Project Surface Water Monitoring Sites

FIGURE 19-3



EASTERN LEASES PROJECT

Location of Archaeological Sites

FIGURE 19-4