

# **MINE MANAGEMENT PLAN EAST ARNHEM LAND PROJECT**

Groote Eylandt Mining Company (GEMCO)

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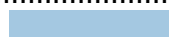
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## VERSION TRACKING

### Version 3

Changes from Previous Version

Section	Amendments
2	Reference Errors
All	Added Detail and Re-Formatting Updated status of leases
Appendices	Added Key Documents Added rehabilitation status data Added disturbance files
2.1	Added detailed location map
4.10	Included details of emergency procedures and Incident Reporting
3.3	Additional detail on threatened species
4.2	Additional commitments against the Territory Parks and Wildlife Conservation Act
4.9	Additional detail on management of threatened flora and fauna

# 1. INTRODUCTION

After the analysis of previous season’s results and observations, Groote Eylandt Mining Company (GEMCO) operated by South32, intends to continue the exploration program over the next two years, including EL24389 which is was granted in June 2016. The focus will be on drill testing, trial geophysical surveys, field mapping and sampling to improve the geological understanding and mineralisation model in the area.

## 1.1 OPERATOR DETAILS

South32 is a globally diversified metals and mining company with a portfolio of high quality, well maintained, cash generative assets producing bauxite, alumina, aluminium, thermal and metallurgical coal, manganese, nickel, silver, lead and zinc. Its GEMCO operation is situated on Groote Eylandt on the western side of the Gulf of Carpentaria, approximately 50 kilometres offshore, forming the eastern border of Arnhem Land. GEMCO mines manganese from leases extending over an area of approximately 50 square kilometres on the western side of the island.

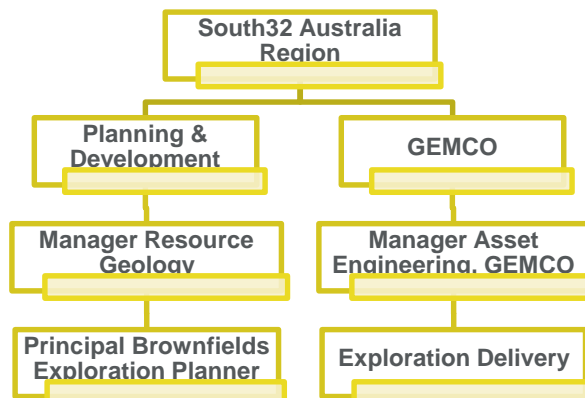
Contact details for South32 and GEMCO are indicated below:

Table 1 Contact Details

Operator contact details		
Operator Name:	Groote Eylandt Mining Company	
Key contact person(s):	Corey Walton	David Hope
Postal Address:	108 St Georges Terrace, Perth, WA 6000	
Street Address:	Rowell Highway, Alyangula Groote Eylandt Northern Territory 0885 Australia	108 St Georges Terrace, Perth, WA 6000
Phone:	T +61 8 8987 4363 M +61 467 810 785	T +61 8 9324 940 M +61 419 983 351
Email:	corey.walton@south32.net	david.hope@south32.net

## 1.2 ORGANISATIONAL CHART

Organisation chart for the key contacts is detailed below.



## INTRODUCTION CONTINUED

### 1.3 WORKFORCE

The workforce for the exploration operations will include GEMCO staff (3 to 4 persons), South32 Australia Region staff (2 to 3) and contractors (5 to 10 persons at the peak of operations) for earthworks, drilling, geophysics and support activities. GEMCO also intends to employ 2 traditional owners to assist during the entire period of field operations. It is expected that no more than 16 persons will be on site at any point of time.

All personnel will have work-related transit and entry permits to the Aboriginal freehold land which will be obtained from the Northern Land Council (NLC) through their Nhulunbuy regional office (NRO).



## 2. PROJECT DETAILS

### 2.1 PROJECT NAME AND LOCATION

The **East Arnhem Project** was held previously under Authorisation 0501-02 through BHP Billiton Minerals Exploration (MinEx). It includes four tenements located within East Arnhem Region of the Arnhem Land Aboriginal Reserve. The tenements are accessible from Nhulunbuy (Gove) via the unsealed Central Arnhem Road ( Figure 1).

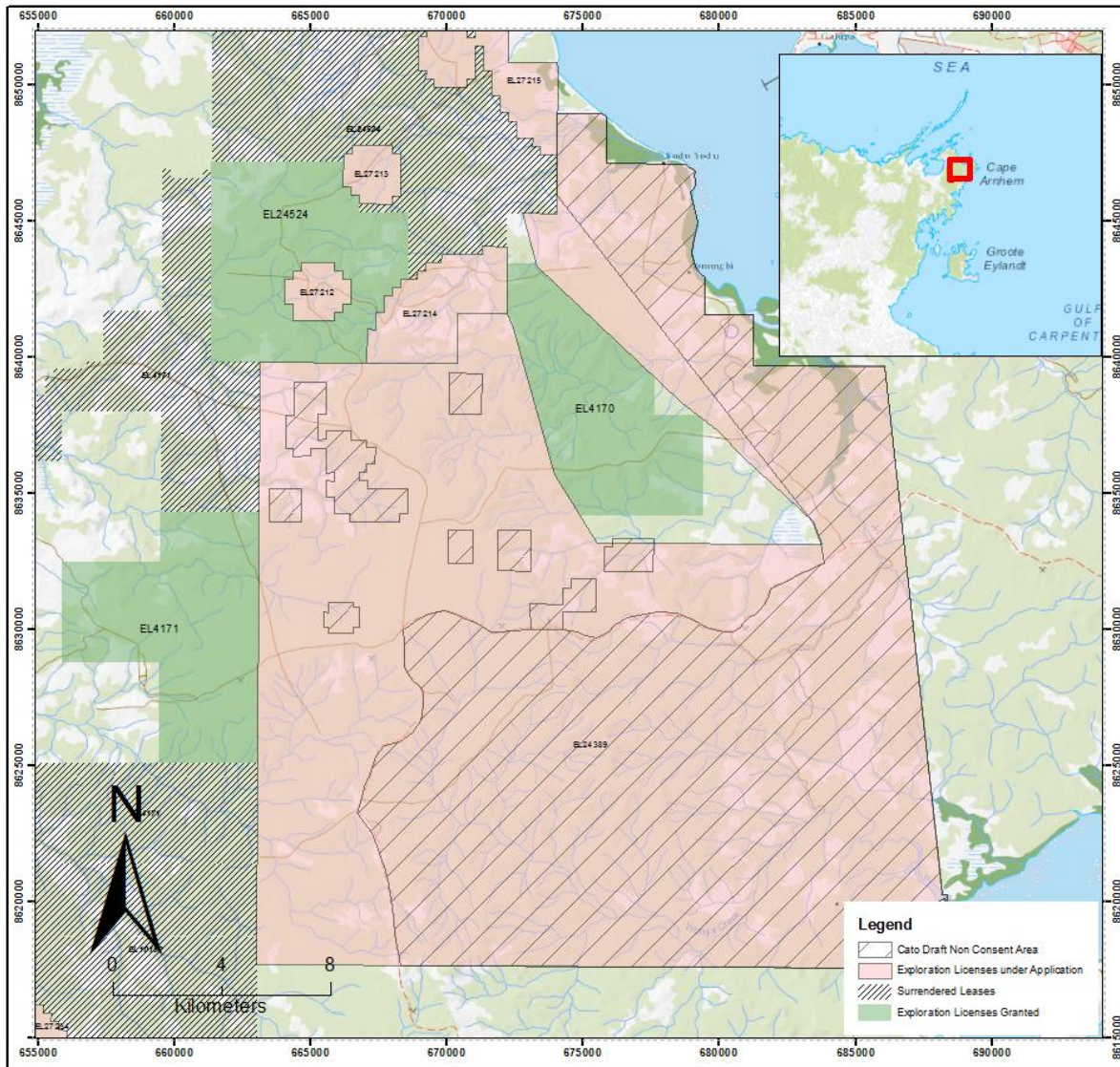


Figure 1 Location Map

On 1 July 2009, BHP Billiton was issued Authorisation 0501-01 for the East Arnhem Project which then included only EL24524 and EL10182. In April 2010, a revised Mining Management Plan was submitted requesting amendments to this authorisation. Therefore a changed Authorisation 0501-02 was issued in May 2010 incorporating the amendments. The amendments were (i) revision of proposed exploration activities on EL10182 and (ii) inclusion of proposed exploration activities on EL27249 and EL398. In 2012, BHP Billiton was granted authorisation to complete planned work on EL10182 (Authorisation 0671-01). This authorisation was later extended in July 2013 to include the work proposed for the 2013 field season on EL398, EL4171, EL24524 and EL27249 (Authorisation 0671-01

## **PROJECT DETAILS CONTINUED**

Variation 1). A review of the results to date in the project area resulted in the surrender of EL398, EL27249, EL10182 and a partial surrender of EL24524 and EL4171. A further ammendment to the MMP (variation 3) was granted in September 2015 for the remaining leases in the project area (EL24524 and EL4171). GEMCO seeks to extend the authorisation and associated securities to EL24389.

### **2.2 TARGET MINERALS**

The target mineral for the program is Manganese. This is an early stage exploration program and is aimed at identifying and characterising any potential manganese mineralisation in the tenements.

### **2.3 EXPLORATION SCHEDULE**

The proposed exploration activities are scheduled to commence in during the dry season 2016 and be completed over two consecutive years. All activities will be resticted to the dry season each year and are expected to conclude by November. Results will dictate further activities and may alter the current schedule.

### **2.4 SITE INFRASTRUCTURE AND LOCATION**

It is anticipated that the bulk of the program will be run out of the town of Nhulunbuy with field crews being transported to and from the worksite daily. A day camp may be established along the Mata Mata road to co-ordinate daily activities in the field and to store equipment. This will be located at the site identified in consultation with the traditional owners through the NLC.

Informal camping may be required during remote mapping exercises. These will be temporary in nature and will consist of tented accommodation and basic cooking and ablution facilities. Locations will be on an as needed basis and permissions will be sought through the NLC before use.

### **2.5 TRANSPORTATION AND SITE ACCESS**

The main access to the project area is from Nhulunbuy via the Central Arnhem Road. All equipment will be mobilised and demobilised either via the Central Arnhem Road from/to Darwin / Katherine / Alice Springs, or by barge via Darwin and Nhulunbuy.

### **2.6 TITLES**

In January 2012 operation and management for the project leases formally transitioned from BHP Billiton Minerals Pty Ltd (MinEx) to the Groote Eylandt Mining Company Pty Ltd (GEMCO). In December 2015 ownership of the tenure formally transitioned to GEMCO, South32 from BHP Billiton Minerals Pty Ltd.

EL24389 has been under application by GEMCO since September 2004 and was granted on the 23 June 2016. The application is falls under the joint venture agreement between GEMCO and RTX, and will be transferred to RTX on grant. The joint venture also includes EL4170 and EL4171.



## PROJECT DETAILS CONTINUED

A review of the East Arnhem leases in 2015 resulted in the partial surrender of EL24524, and the full surrender of EL27249, EL10182 and EL398.

Table 2 lists the tenements in the area.

Table 2 East Arnhem Land Exploration titles for upcoming season

Title No.	Owner	Grant Date	No. of Blocks	Area (sq km)	Expiry date
EL24389	GEMCO	23/06/2016	92	191.4	22/06/2022
EL4170	RTX	14/10/2004	16	38	13/10/2016
EL4171	RTX	12/09/2005	14	45	11/11/2017
EL24524	GEMCO	20/04/2009	15	48	19/04/2017*

\*Partial Surrender

### 2.7 HISTORY OF DEVELOPMENT AND CURRENT STATUS OF EXPLORATION

The erstwhile BHP Ltd had explored part of the northeast Arnhem Land during 1960's for sedimentary manganese and lateritic bauxite. Several tracks were constructed for accessing various parts in EL24524, EL10182 and EL398 as well as some scout drilling and pitting were undertaken to explore for manganese / bauxite. No other historic exploration is known to have occurred in those areas.

Between July and September 2009, BHP Billiton completed a drilling programme in EL24524 and some reconnaissance traversing on EL10182. The programme in EL24524 involved the drilling of 27 shallow Reverse Circulation (RC) holes and establishment of access tracks (~ 27 km) to reach the drill sites. The drilling concluded in August 2009 and all the drill sites and access tracks were rehabilitated in the following month prior to closure of the field camp and withdrawal from the project site.

A second drilling programme was undertaken by BHP Billiton between July and November 2010 with work focused only on EL10182. Although drill holes were planned on both EL27249 and EL398, concerns were raised by the Traditional Owners (TO) during the heritage survey with NLC/TOs. Therefore the proposed drilling on both EL398 and EL27249 was not pursued further in 2010.

During 2010 field season, a total of 58 drill sites and ~73 km of access tracks were cleared on EL10182 in preparation for the drilling programme. However, drilling at only 12 sites could be completed in 2010 due to a series of major rig breakdowns and the early onset of the wet season.

The 12 completed drill sites were rehabilitated however the rest of the drill pads and all the access tracks were left open with only the entrances blocked off from the Central Arnhem Road.

## PROJECT DETAILS CONTINUED

Due to a shift in exploration focus by BHP Billiton, MinEx did not conduct any exploration on the East Arnhem Project during the 2011 dry season.

In the 2012 drill season, the remainder of the planned holes on EL10182 were completed. 60km of track was re-established in order to access and drill the remaining 46 holes. A further 4 Diamond Core holes were drilled in order to build a stratigraphic model of the area.

An additional 3 Diamond Core holes were also drilled on EL24524, again to establish stratigraphic control in the area. The holes were planned along the existing Mata Mata road requiring only drill pad construction.

Focus shifted back to the Peter John Target area (EL24524 and EL4171) in 2013 after results from the stratigraphic drilling and field mapping were interpreted. 45 additional holes were drilled totalling 2060m which included 2 diamond core holes.

Detailed analysis of the results in 2014 resulted in the surrender of EL398, EL27249 and a partial surrender of EL24524 and EL4171.



Figure 2 Exploration activities

## PROJECT DETAILS CONTINUED

Table 3 summarises the exploration activities to date.

Table 3 Previous Exploration activities

Exploration Leases (Titles)	EL24524	EL4171	EL10182*	EL398	EL27249
Number of holes drilled	71	25	59	Nil	Nil
Maximum depth of holes	82m	74m	123m	Nil	Nil
Number of drill pads cleared (Length: 25m x Width: 20 m)	77	34	58	2	Nil
Number of sumps cleared (Length: 3m x Width: 3m x Depth: 1m)	29	30	58	Nil	Nil
Length of line / track cleared (Kilometres: x Width: m)	54.9km x 3m	41km X 3m	73.3km x 3m	3.3km X 3m	Nil
Number of costeans excavated (Length: x Width: x Depth: m)	Nil	Nil	Nil	Nil	Nil
Total bulk sample pits excavated (Length: x Width: x Depth: m)	Nil	Nil	Nil	Nil	Nil
Camp area/s cleared	1 (0.27Ha)	Nil	Nil	Nil	Nil
Total area disturbed (hectares)	18.1 ha	12.9 ha	23ha	1ha	Nil
Drill holes capped / plugged	71	25	59	Nil	Nil
Total area rehabilitated (hectares)	10.3 ha	11.5 ha	23ha	1ha	Nil

### 2.8 PROPOSED EXPLORATION ACTIVITIES

Exploration is a sequential process. The quantum of various exploration activities is dependent on the results of the preceding phase of work and hence can not be precisely planned and quantified at the outset. However based on the current geological knowledge and the results of previous field programs, it is anticipated that the exploration program for the next 24 months will involve exploration drilling on EL24389, potential trial geophysical surveys on EL24524, field mapping and sampling to improve the geological understanding and mineralisation model in the area (Figure 3). Works are dependent on the grant of EL24389.

## PROJECT DETAILS CONTINUED

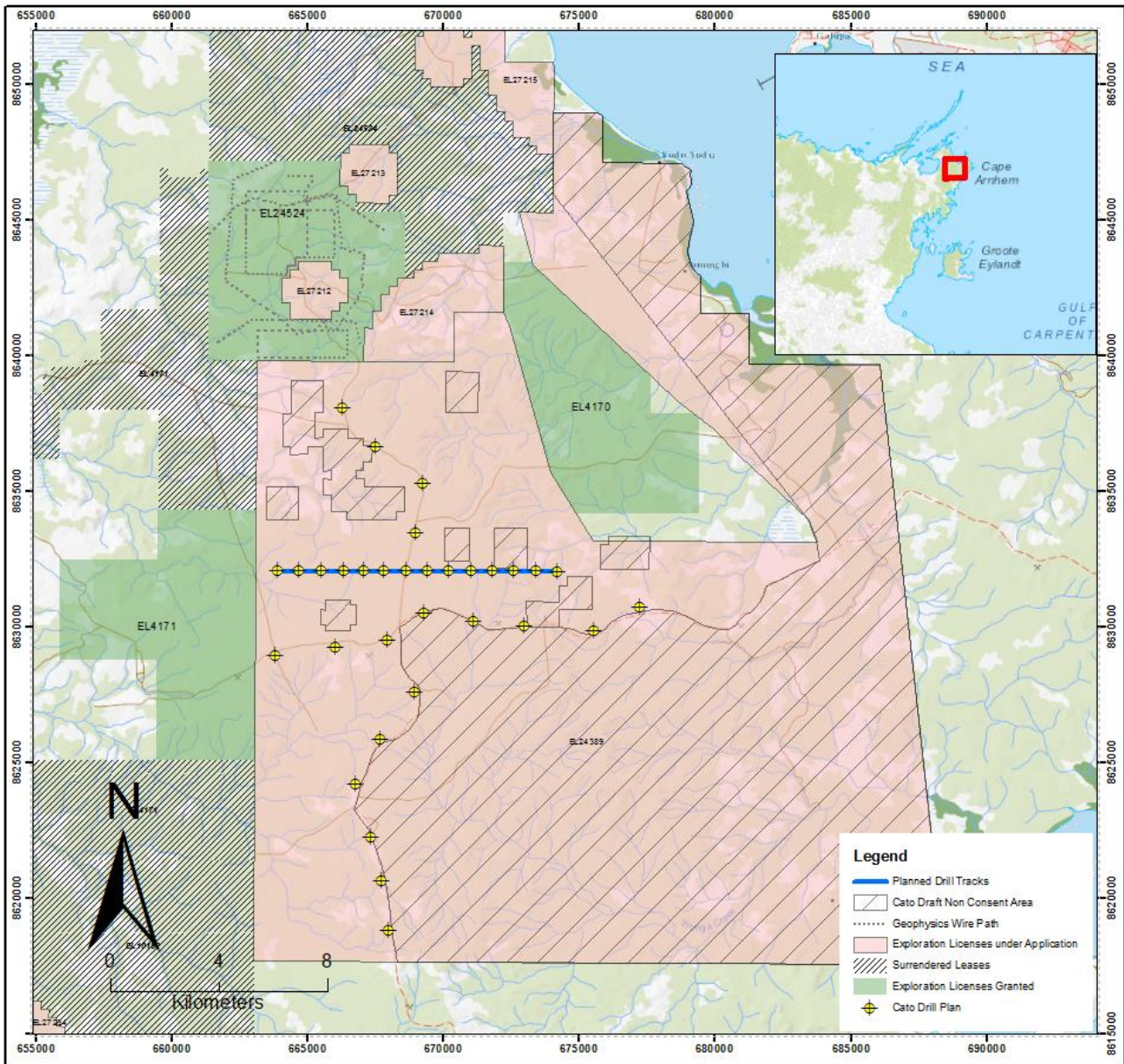


Figure 3 Proposed Cato Work Plan

### 2.8.1 Exploration Drilling

Exploration drilling and sampling will focus on EL24389 in order to continue building a geological framework of the area to assist in determining its manganese potential. Drill samples will be collected for geochemical analysis. Drilling will be completed by a Reverse Circulation (RC) or Air Core (AC) drill rig, with one support truck and one support light vehicle.

The final number of drill holes will ultimately depend on results of work at each stage which in turn will determine the amount of access track creation. Some additional holes may be planned during the course of the exploration program if necessary for geological interpretation. Therefore at this stage there is some considerable uncertainty around the location and amount of clearing required. All clearing work will be surveyed by traditional owners prior to earthworks commencing.

## PROJECT DETAILS CONTINUED

It is proposed to complete up to 40 RC/Air Core holes on EL24389 for exploration purposes. Preliminary locations of the drillholes are shown in Figure 2. However the locations of the proposed holes are tentative, as these may be moved by some distance to a suitable / convenient site based on observations at the time of pegging of holes. 32 hole locations have been identified (Figure 3). The holes are proposed at distances of 1 to 2 km and intended to be drilled to the bottom of the younger sedimentary rocks. The expected maximum thickness of such younger rocks is about 150 metres in this area and hence the holes are likely to be mostly 80 to 150 meters in length. Samples will be collected at least every 1m and sent for chemical analysis.

Holes have been planned predominantly on existing tracks, however it is anticipated that ~15km of tracks will be cleared to access some drillholes. Creation of tracks will be carried out using appropriate earth-moving equipment (dozer, grader etc) and preferably by contracting a local community owned business. The estimated quantities of the proposed exploration activities by tenement are presented in the table below (Table 4).

### 2.8.2 Geophysics

A proposed multi-technique geophysical survey is planned across a portion of EL24524. The aim of the surveys will be to determine the best survey methods to delineate the presence or absence of a targeted Mn rich sandstone layer. Proposed survey methods are SubAudio Magnetism (SAM), and Induced Polarisation (IP).

The proposed survey will involve minor earthworks for track clearing in order to position the wire path, and small survey pits (5m x 5m). Track clearing is estimated at approximately 20km to allow for wire loop positioning during surveying. Existing tracks will be utilised where possible. Figure 3 shows the current planned wirepath, however it is anticipated that these will change after ground truthing of the plan. The current wirepath is included in Appendix 7.

## PROJECT DETAILS CONTINUED

**Table 4 Proposed Exploration activities**

Exploration Leases (Titles)	EL24389	EL24524
What time of the year will exploration occur?	July - Decemeber	July - December
How long is exploration expected to occur?	60 days	30 days
Type of drilling (i.e. RAB, RC, Diamond, aircore)	RC/AC	Nil
Target commodity	Mn	Mn
Is drilling likely to encounter radioactive material?	No	No
Number of proposed drill holes	32	-
Maximum depth of holes	150m	-
Number of drill pads (Length: 25 x Width: 20 m)	32	-
Is drilling likely to encounter groundwater? (Y, N, unsure)	unsure	-
Number of sumps (Length: x Width: x Depth: m)	Nil	?
Length of line / track clearing (Kilometres: x Width: 3 m)	15km	20km
Number of costeans (Length: x Width: x Depth: x m)	Nil	Nil
Total bulk sample (tonnes) (Length: x Width: x Depth: x m)	Nil	
Will topsoil be removed for rehabilitation purposes?	No (Blade Up)	No (Blade Up)
Previous disturbance yet to be rehabilitated on title (ha) if known	Nil	Nil
Camp (Length: x Width: x m)	Nil	Nil
Total area disturbed (hectares)	5.2ha	6ha
Other:		

## 3 CURRENT PROJECT SITE CONDITIONS

### 3.1 LAND AREA TYPE

The area falls in the Arnhem Coast bio-region. It comprises of undifferentiated Cainozoic sand and residual soil, as well as laterite, lateritic soil, and ferruginous cemented detritus. The area is underlain by Cretaceous white and yellow sandy claystone, quartz sandstone, and ferruginous sandstone.

### 3.2 HYDROLOGY

Cato, Gurrumurru, Durabudboi, Wyonga and Peter John River rivers and their tributaries constitutes the surface drainage systems for various parts of the tenement. These rivers flow in to the Arnhem Bay in north and Gulf of Carpentaria in east and south.

### 3.3 FLORA AND FAUNA

The project area is located in the Arnhem Coast Bioregion described in NT Parks and Conservation Master Plan as an area where coastal vegetation includes well developed heath lands, mangroves and saline flats, with some floodplain and wetland areas. Inland from the coast, the dominant vegetation type is eucalypt tall open forest, typically dominated by Darwin woollybutt (*Eucalyptus miniata*) and Darwin stringy bark (*E. tetradonta*), with smaller areas of monsoon rainforest and eucalypt woodlands.

A search of the Environment Protection and Biodiversity Conservation Act (EPBC) website revealed several threatened fauna species that may occur in the project area. GEMCO will ensure that none of the identified species will be negatively affected by the exploration activities. Species that may be encountered are listed in Table 5. A full list is available in Appendix 8.

The search also identified one flora species (the Australian Arenga Palm – *Arenga australasia*) as likely to occur within the work area. This species is listed as vulnerable and will be avoided.

Table 5 Known threatened species in the project area.

Scientific Name	Common Name	Conservation Status
<b>Bird</b>		
<i>Erythrotriorchis radiatus</i>	Red Goshawk	Vulnerable
<i>Erythrura gouldiae</i>	Gouldian Finch	Endangered
<i>Falcunculus frontatus whitei</i>	Crested Shrike-tit (northern),	Vulnerable
<i>Tyto novaehollandiae kimberli</i>	Masked Owl (northern)	Vulnerable
<b>Insect</b>		
<i>Euploea alcatheae enastri</i>	Gove Crow Butterfly	Endangered
<b>Mammals</b>		
<i>Dasyurus hallucatus</i>	Northern Quoll	Endangered

## CURRENT PROJECT SITE CONDITIONS CONTINUED

Scientific Name	Common Name	Conservation Status
<i>Mesembriomys gouldii</i>	Black-footed Tree-rat	Endangered
<i>Notomys aquilo</i>	Northern Hopping-mouse	Vulnerable
<i>Conilurus penicillatus</i>	Brush-tailed Rabbit-rat, Brush-tailed Tree-rat	Vulnerable
<i>Petrogale canescens</i>	Nabarlek (Top End)	Endangered
<i>Phascogale pirata</i>	Northern Brush-tailed Phascogale	Vulnerable
<i>Saccolaimus nudicluniatus</i>	Bare-rumped Sheathtail Bat	Critically Endangered
<i>Xeromys myoides</i>	Water Mouse, False Water Rat	Vulnerable
<i>Macroderma gigas</i>	Ghost Bat	Vulnerable

In addition to these, two flora species have been listed as 'vulnerable' by the NT parks and Wildlife Conservation Act 2012 (Table 6) and Appendix 8.

Table 6 Known threatened species in the project area.

Scientific Name	Common Name	Conservation Status
<i>Pternandra coerulescens</i>	Cursed Shade	Vulnerable
<i>Sticherus flabellatus</i> var. <i>compactus</i>	Shiny Fan Fern	Vulnerable

Both species are noted to be associated with riparian vine forests and drainage systems. The target model for manganese in the area is associated with elevated plateaus and planned clearing activities is therefore at low risk of disturbing these species. GEMCO however conducts pre-clearance surveys by suitably qualified personnel prior to all clearing activities in order to identify and protect threatened and vulnerable species. Cultural and environmental areas are flagged and avoided during the clearing process (see SWI-21257 in Appendix 3). The survey will:

- Identify and assess the potential for state and commonwealth listed threatened species in the area,
- Outline flora and fauna native to the area,
- Identify and mark fauna and flora of cultural significance and
- Update clearing procedures with species management recommendations.

### 3.4 CURRENT LAND USE

The tenements fall under freehold title in the Arnhem Land Aboriginal Land Trust and currently used by local people for hunting, fishing and traditional cultural and ceremonial activities.

### 3.5 HISTORICAL, ABORIGINAL AND HERITAGE SITES

A site survey over the entire application area was completed in September 2015 as part of the consent process. Consultations and field visits were conducted which identified a number of areas of cultural significance. A partial grant of the lease has been endorsed by the NLC and planning of the exploration program has avoided all sensitive areas.



## **CURRENT PROJECT SITE CONDITIONS CONTINUED**

An inspection of the Register maintained by the NT Aboriginal Areas Protection Authority (AAPA) was made in July 2015 by Rio Tinto Exploration. A number of recorded and registered sacred sites exist along the Central Arnhem Road. These areas have been taken into account during planning of the holes.

The Cato Plateau largely lies within the boundaries of the The Dhimurru Indigenous Protected Area (IPA). GEMCO will continue working closely with the Dhimurru Rangers to ensure alignment with the Dhimurru IPA Management Plan (2015-2022).

All work programs will be presented to the Traditional Owners and approved via the NLC before commencement. Any heritage issues will be taken into account through this work approval process. Traditional owners or their representatives will be engaged throughout the operational planning phases and ensure any disturbance has no impact on any sensitive area.

## 4 MANAGEMENT STANDARDS

### 4.1 ENVIRONMENTAL POLICY AND RESPONSIBILITIES

GEMCO's exploration teams operate under South32's environmental standard. The standard commits to a number of factors including:

- Protect the environment in a way that demonstrates our values
- Manage environmental aspects to minimise adverse impacts and promote enduring environmental benefits
- Minimise Greenhouse Gas emissions

The policy is attached in Appendix 2.

GEMCO will manage environmental issues associated with the project in accordance with its Charter, and Health, Safety, Environment and Community (HSEC) Management System. Relevant authorities / groups will be provided with a digital copy of these at their request.

Further, all the Environmental Procedures as laid down in the Exploration Agreement between the NLC and respective tenement holders will be strictly adhered to as a minimum.

### 4.2 STATUTORY REQUIREMENTS

The following list outlines the important legislations, permits and conditions under which the exploration project is being operated and the main obligations of the operator under each.

*Mineral Titles Act (2015)* – To comply with the terms and conditions of the grant of exploration licence, minimum expenditure commitments and reporting among others.

*Mining Management Act (2015)* – To ensure that the environmental impact of mining activities is limited to what is necessary for the establishment, operation and closure of the site and secondly to establish, implement and maintain an appropriate environment protection management system for the mine site.

*Work Health and Safety Act (2011)* – Among other things include (i) employer's general statutory duty of care; (ii) duties in regard to workplace; (iii) duties in regard to workplace infrastructure, equipment and materials; (iv) risk management plans and (v) worker health surveillance.

*NT Aboriginal Sacred Sites Act (2013)* – No person shall (a) carry out work of any sort on, or damage, demolish, destroy, desecrate or alter, a heritage place or heritage object; (b) remove from a heritage place a heritage object or an object associated with the place; or (c) remove a heritage object from the Territory.

## MANAGEMENT STANDARDS CONTINUED

*Heritage Act (2015)* – To protect natural and cultural heritage, including archaeological materials.

*Environment Protection and Biodiversity Conservation Act (1999)* – To protect important flora, fauna, ecological communities and heritage places.

*Aboriginal Land Rights (Northern Territory) Act (1976)* - The project site is located within the Arnhem Land Aboriginal Reserve and as such exploration companies are required to enter into an Exploration Agreement with the respective land council under the Aboriginal Land Rights (Northern Territory) Act. The Agreement provides a detailed framework for undertaking exploration activities which includes conditions of land access, sacred sites, work programmes, environmental protection and rehabilitation among others.

*Weeds Management Act (2013)* – To prevent introduction of new plant species with weed potential and to reduce spread of weeds into new areas.

*Bushfires Act (2014)*– Among other things include (i) not to set fire to any bush or other flammable material on land within a fire protection zone, (ii) not to light or use a fire in the open for the purpose of camping, cooking etc within a distance of less than 4 metres from the nearest flammable matter to the fire and (iii) not to leave a fire in the open which he has lit or used unless he has thoroughly extinguished it.

*Territory Parks and Wildlife Conservation Act (2006)* – To take all measures possible to identify and protect threatened and vulnerable species in the area. GEMCO will conduct pre-clearance surveys and establish buffer zones around identified culturally or environmentally sensitive areas.

### 4.3 NON-STATUTORY REQUIREMENTS

All South32 Exploration deeds and agreements with the NLC under the ALRA and joint venture agreements with Rio Tinto Exploration.

### 4.4 ENVIRONMENTAL ASPECTS/RISKS

GEMCO maintains a risk register which includes risks related to safety, health and community. The register contains measures to mitigate or minimise risk and is updated annually. The risk register will be updated before commencement of the program to include site specific environmental risks.

Drill specific safety and environmental procedures are used to minimise the risk of incident. Procedures that are in place cover aspects such as ground disturbance, drill rig safety, weed management and working close to culturally sensitive areas. The procedures are included in Appendix 3.

#### 4.4.1 Water Management

Previous drilling in the area has encountered minimal water down the holes. RC/Aircore drilling may require small amounts of water for dust suppression. The requirement of water during this exploration phase is expected to be small. Non-potable water may be required

## **MANAGEMENT STANDARDS CONTINUED**

to aid coupling of geophysical instruments, while potable water will be brought from Gove. Suitable local source(s) for the non-potable water will be identified after due consultation with the NLC/TOs.

### **4.4.2 Invasive Species Management**

In accordance with the *Weed Management Act*, GEMCO will ensure that quarantine procedures are implemented at all times. These include ensuring that only clean (free of any declared plant material) vehicles / machinery and equipment enter and leave any site at any time.

GEMCO will continue to implement the following to prevent the spread of the Yellow Crazy Ant:

- Notify the Dhimurru Rangers prior to mobilisation to the site and seek their advice on identification and management of the Yellow Crazy Ant;
- Record the locations to avoid the nests during the program;
- Report any sightings of Yellow Crazy Ant during the program to the Dhimurru Rangers; and
- Ensure all equipment/clothing and vehicles are free of the Yellow Crazy Ant before departure from the tenement. If the Yellow Crazy Ants are found on vehicles or equipment/clothing, insecticide spray will be used to kill the ants.

### **4.4.3 Flora and Fauna Management**

Access tracks will be designed and planned to utilise as much clear ground as possible so as to avoid disturbance of flora and fauna. All efforts will be made to avoid the removal of established trees by trimming or cutting back overhanging branches rather than removing the whole tree. Additionally 'raised blade' clearing techniques will be employed where terrain and access considerations allow.

### **4.4.4 Waste Management**

All hard refuse will be removed from site and disposed of in a recognised waste facility managed by the Nhulunbuy Corporation at Nhulunbuy.

### **4.4.5 Noise and Air Quality Management**

The main source of noise and dust during the exploration programme is expected from earthworks, generators and drilling. Exclusion zones will be placed around generators to minimise impact. Noise and dust monitoring around clearing equipment may be conducted during the programme.

## MANAGEMENT STANDARDS CONTINUED

### 4.4.6 Culture and Heritage Management

Culture and heritage management will be conducted in accordance with the Exploration Agreements with the NLC under the *Aboriginal Land Rights Act (ALRA)*. GEMCO will liaise with NLC for the training of project staff on aboriginal culture and heritage by an NLC nominated group. GEMCO seeks the assistance of cultural monitors during the duration of drill programs to ensure any culturally sensitive areas are avoided.

### 4.4.7 Hazardous Materials and Hydrocarbon Management

Hydrocarbons on site will be stored in bunded tanks in designated refuelling areas. Spill kits will be in place and disposal of absorbent mats etc will be done in local council authorised locations.

## 4.5 OBJECTIVES AND TARGETS

GEMCO aims to complete the planned program without environmental or cultural incident. GEMCO will rehabilitate all areas disturbed for undertaking the exploration activities within the project area. GEMCO will only leave open any access tracks where requested by Traditional Owners and as confirmed through NLC. An audit and signoff process is in place to ensure disturbances are inspected and that suitable measures have been taken to rehabilitate the disturbed areas.

## 4.6 DOCUMENTATION

Location and extent of all ground disturbances will be mapped using hand held GPS and records kept as GIS layer. Disturbance layers are included in Appendix 7.

A final rehabilitation closeout meeting will be held with the NLC on completion of rehabilitation activities.

## 4.7 IDENTIFIED STAKEHOLDERS AND CONSULTATION

Identified government, community and interest groups are:

Table 6 Identified Stakeholders

Stakeholder	Contact Details
<i>Department of Mines and Energy</i>	Centrepont Building, The Mall, Darwin, NT 0801.
<i>NT WorkSafe</i>	NT WorkSafe Office, First Floor, Darwin Plaza Building, 41 Smith Street, The Mall, Darwin, NT 0801

## MANAGEMENT STANDARDS CONTINUED

Ph 1800 019 115  
Fax 08 8999 5141,  
Email – [ntworksafe@nt.gov.au](mailto:ntworksafe@nt.gov.au)

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<i>NT Water Resources Division</i>	Department of Land Resource Management 4th Floor, Goyer Building, Palmerston, NT 0831 Ph 08 8999 4613
<i>Northern Land Council</i>	45 Mitchell Street, Darwin NT 0801 Ph 08 8920 5249 Fax 08 8920 5249 (Darwin) and Endeavour Square, Nhulunbuy NT 0880, Ph 08 8987 2602 Fax 8987 1334 (Nhulunbuy)
<i>Dhimurru Rangers</i>	Dhimurru Aboriginal Corporation, Arnhem Road, Nhulunbuy opposite Captain Cook Shopping Centre Ph 08 8987 3992 Fax 08 8987 3224, Email – <a href="mailto:nhamirri@dhimurru.com">nhamirri@dhimurru.com</a>
<i>Gurramurru and Dhalinbuy Communities</i>	Laynhapuy Homelands Association Inc, Lot 86 Galpu Road, Yirrkala, NT 0880 Ph 08 8939 1800 Fax 08 8987 1443
<i>Rio Tinto Exploration Pty Limited</i>	The Exploration Director, 37 Belmont Ave, Belmont, WA 6104

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Stakeholder consultation will be undertaken in accordance with the Exploration Agreement. The proposed work programme will be presented to the NLC/Traditional Owners' prior to commencing any exploration activities on site. In addition, an NLC nominated exploration committee will make periodic visits to the operations on site for inspections and consultations.

Additionally, one or two NLC nominated traditional owners will always be present as cultural monitors during all ground disturbance activities for consultations on an ongoing basis. Any issues or concerns raised at any stage will be taken into consideration and the work programme will be modified if deemed necessary.

### 4.8 INDUCTION AND TRAINING

All personnel working on the project will receive and induction prior to starting operations. This will include both GEMCO and site specific operating requirements.

### 4.9 IDENTIFICATION OF ENVIRONMENTAL ASPECTS AND IMPACTS

Potential environmental impacts to the area include the risk of introducing non-native flora or fauna species, erosion by water, compaction of soil, and contamination of soil or

## MANAGEMENT STANDARDS CONTINUED

ground/surface water and destruction of threatened and vulnerable fauna and flora. The risks of these will be captured in a risk register which will be developed for this project.

Table 5 lists the introduced species that have been recorded in the Arnhem Coast bio-region that may occur across the project. Of particular significance is the presence of the introduced Yellow Crazy Ant (*Anoplolepis gracilipes*). Controls to manage the risk presented by the Yellow Crazy Ant are mentioned in other areas of this document.

Table 7 Introduced species in the project area.

Scientific Name	Common Name
<b>Plants</b>	
<i>Senna alata</i>	Candle Bush
<i>Hyptis suaveolens</i>	Hyptis
<i>Jatropha gossypifolia</i>	Bellyache Bush
<i>Calotropis procera</i>	Rubber Bush
<i>Cenchrus echinatus</i>	Mossman River Grass
<i>Salvinia molesta</i>	Salvinia
<i>Stachytarpheta spp.</i>	Snakeweeds
<i>Senna occidentalis</i>	Coffee Senna
<i>Sida Acuta</i>	Spiny head Sida
<b>Animals</b>	
<i>Anoplolepis gracilipes</i>	Yellow Crazy Ant
<i>Bufo marinus</i>	Cane Toad
<i>Felis catus</i>	Feral Cat
<i>Sus scrofa</i>	Feral Pig
<i>Bubalus bubalis</i>	Water Buffalo

GEMCO's clearing procedures are focused on minimising disturbances in exploration areas, and exploration activities have been planned to maximise the use of existing tracks. For the remaining areas GEMCO will:

- Identify and avoid sensitive and vulnerable species using established field procedures,
- Employ a blade-up method to minimise topsoil disturbance,
- Utilise compact drilling and clearing equipment to minimise the clearing footprint,
- Rehabilitate disturbed areas using established procedures and,
- Maintain photographic records of disturbed areas

## **MANAGEMENT STANDARDS CONTINUED**

### **4.10 EMERGENCY PROCEDURES AND INCIDENT REPORTING**

The East Arnhem Project falls under GEMCO's mine site safety management system. As such, minesite health and safety policies and procedures are followed. These include procedures related to:

- Emergency procedures in the event of an environmental spill include the use of spill kits to contain, absorb and remove contaminated material.
- Drilling safety requirements including daily, weekly and monthly inspections
- Field Response Plan for events requiring medical or other action to be taken to ensure the health and safety of people and the environment.
- Travel management plans for long distance travel

Incidents will be reported using the established GEMCO and Department of Mines and Energy (DME) incident reporting system.

In accordance with guidelines provided by the DME, all environmental incidents will be recorded in a site register and classified and reported accordingly.

All serious accident or critical incident (environmental) will also be reported to the Chief Executive Officer of the DME and NT WorkSafe in accordance with the Mine Management Act and Workplace Health and Safety Act.

Relevant standards and procedures are included in Appendices 2 and 3.

### **4.11 ENVIRONMENTAL AUDITS AND INSPECTIONS**

GEMCO will organise periodic environmental inspections of the areas disturbed for exploration activities by the NLC/Traditional Owners as per the Exploration Agreement. Cultural monitors nominated by the traditional owners will always be present during first entry and ground disturbance as observers. GEMCO will seek to obtain a satisfactory rehabilitation report from the NLC /Traditional owners following completion of the operations.



## 5 EXPLORATION CLOSURE AND REHABILITATION

### 5.1 STATUS OF CURRENT REHABILITATION

The first exploration programme on the East Arnhem Project was completed on EL24524 during the period July to October 2009. The exploration programme comprised drilling (27 shallow RC drill holes) as well as ground clearance for access tracks (approximately 27 kilometres), 29 drill pads (average size 25m x 20m) and one camp site (35m x 30m). All these ground disturbances have been rehabilitated and inspected and duly signed off as satisfactory by the NLC.

During July to November 2010, a second exploration programme was undertaken and activities were focused on EL10182. The programme comprised clearance of 58 drill pads (average size 25m x 20m) and 73.8km of access tracks (~ 3.0m wide).

Owing to a series of major rig breakdowns and the early start of the rainy season, the programme was terminated after drilling of only 12 holes (out of 58 proposed). Access tracks became too soft and driving of any mobile equipment including light vehicles proved risky. By that time only the 12 sites where drilling was completed were rehabilitated. Therefore, BHP Billiton consulted the NLC/Traditional Owners on the matter. Consent was given that BHP Billiton would close the operations in 2010 without rehabilitating the drill pads and access tracks, but would return to finish the remainder of the drilling and do all the rehabilitation. To prevent others using the access track during the wet season, all the entrances from the Central Arnhem Road were blocked off.

During the 2012 drilling season, access to the remaining 46 holes on EL10182 was re-established in order to complete the drill program. Minor grading work was required to clear regrowth on tracks and pads. On completion, TO's in the area were consulted and requested that 5.5km of track remained open. All remaining tracks and pads were rehabilitated. In addition, 3 pads along the Mata Mata road in EL24524 were established to drill stratigraphic diamond core holes. These were all rehabilitated prior to the end of the drill season.

To support the 2013 drilling activities, a total of 33.9km of tracks and 49 pads were prepared in EL24524, EL4171 and EL398. All pads were rehabilitated at the conclusion of the drill program, however track rehabilitation was terminated due to the early onset of rains in the area. In 2014 BHP Billiton completed all rehabilitation works in EL24524 and EL4171 with tracks identified by Traditional Owners left open as approved by the NLC, specifically EL398.

GEMCO has closed out all formalities to date for current and surrendered leases (Appendix 6), however have elected not to obtain closure certificates for the project in order to carry over securities for this program. Closure certificates will be obtained at the end of the project.

## EXPLORATION CLOSURE AND REHABILITATION CONTINUED

### 5.2 REHABILITATION PLANNING

Rehabilitation planning is an integral part of the proposed exploration operations. Ground disturbance while creating access tracks and preparing work sites will be kept to essential minimum and rehabilitation of disturbed areas will commence as soon as practicable after the work has been completed. A blade-up clearing approach will be conducted in order to minimise topsoil disturbance.

Drill programs are planned along existing tracks as far as possible. All windrows along tracks will be pulled back and ground levelled. Pits will be filled and levelled. Photographic record of work sites and a few sites along tracks will be maintained as evidence of rehabilitation. Table 8 summarises the ground disturbance and rehabilitation activities.

Table 8 Summary of Rehabilitation Plan

Disturbance	Rehabilitation Activities	Schedule	Closure objectives/ Targets	Monitoring/ Remediation
Drill Holes	Collars cut and cap inserted ~1m down the hole before backfilling	At hole completion	All holes capped before completion of program	Inspection at the end of the field season, and follow up after 12 months to ensure stability (no collapsed holes)
Drill Pads	Pull down any windrows and replace topsoil if removed. Branches/trees pulled back onto pad.	Within 12 months of drilling	All pads rehabilitated within 12 months	Inspection at the completion of rehabilitation and photographic monitoring of selected sites
Sumps	N/A	N/A	N/A	N/A
Costeans	N/A	N/A	N/A	N/A
Bulk Sample Pits	N/A	N/A	N/A	N/A
Tracks and Gridlines	Rip surface and manage runoff (bunds). Block access if necessary.	Within 12 months	All tracks rehabilitated and bunds in place to manage runoff if necessary	Inspection at the completion of rehabilitation and photographic monitoring of selected sites
Sample Bags	Removed from site	At the end of each hole	No sample bags left on site	Inspection of drill locations
Camp	N/A	N/A	N/A	N/A

Pre and post wet season inspections will be undertaken along with representatives of the NLC/Traditional Owners to assess the status of rehabilitation. Remedial work will be conducted if there are any concerns.

Track disturbance GIS layers are included in Appendix 7.

## **EXPLORATION CLOSURE AND REHABILITATION CONTINUED**

### **5.3 TOPSOIL MANAGEMENT**

Effort will be made to minimise removal of topsoil wherever possible by raising the blade at the time track and work site clearance. However where removed, topsoil will be stockpiled separately to subsoil and respread over the disturbed areas during rehabilitation for easy revegetation.

### **5.4 RE-VEGETATION METHODS**

Clearing is usually conducted using the blade-up method however any removed topsoil will be spread over the affected area to help with revegetation. Any compaction on tracks and work sites will be broken up by ripping to allow the seed stock to settle into the soil.

As the project site falls within high rainfall and sub tropical conditions, it is expected that all the areas disturbed during such low impact exploration operations will be naturally revegetated within one or two wet seasons..

### **5.5 FIRE MANAGEMENT**

To effectively manage the risk of fire GEMCO will monitor fire restrictions by local authorities and manage machinery and operations in compliance with any such restrictions.

Gas barbecues or stoves will be used at camp locations in preference to open fires. Where allowed, camp fires will be managed as follows:

- Located at a minimum of 10 metres from any tent or flammable structure and within an area cleared of flammable vegetation matter at least 12 metres in diameter;
- Supervised at all times, extinguished if still burning at lights-out and fire extinguishers kept within easy reach;
- Size will be kept moderate and 'bonfires' not be used, wood placed on the fire be over-length;
- Will not be lit or extinguished in excessively windy dry conditions where hot embers may be blown into flammable areas;
- Will be located in a designated spot marked by stones or other suitable structure; and
- Fires may not be lit or revived using any flammable liquids such as diesel, kerosene or petrol.

In the event that a fire does escape, GEMCO will attempt to extinguish it without placing personnel at risk and notify local authorities.

### **5.6 CLOSURE PLANNING**

Closure planning will commence soon after the completion of exploration operations. Closure will start with rehabilitation of all work sites and temporary access tracks created for the exploration operations. All equipment and camp infrastructure will then be removed from the project area and the camp site(s) rehabilitated. A final report and application for closure certificate will be submitted at the end of the program.

### **5.7 REHABILITATION ACTIVITIES CONDUCTED DURING THE PREVIOUS PERIOD**

No rehabilitation has been conducted during the previous exploration season. All rehabilitation under the authorisation has been completed.

## 6 SECURITY CALCULATION

\$62,449 is currently held as security for the East Arnhem Land project. Although all previous rehabilitation obligations have been met, securities have been retained by the Department for upcoming disturbance. Security for the upcoming proposed works have been calculated at \$23,722. The calculation spreadsheet has been attached in Appendix 5.