Mine Management Plan East Arnhem Land Project

Groote Eylandt Mining Company (GEMCO)

June 2018

Author: Kalem Wright

Lead Brownfields Exploration Planning, South32 (Mn, C, Pb, Zn, Ag)

Reviewed: David Hope

Manager Tenure & Resource Geology, South32 (Mn, C, Pb, Zn, Ag)

DISTRIBUTION

Northern Land Council, NT

Department of Primary Industry and Resources (DPIR)

The MMP must be endorsed by a senior representative of the company who has the appropriate level of delegation.

	Author	Reviewed by	Approved by
Date			
Name	Kalem Wright	David Hope	Scott Jeffery
Signature	Wright, Kalem Digitally signed by Wright, Kalem Date: 2018.06.18 07:40:07 +08'00'	Digitally signed by David Hope Date: 2018.06.18 07:45:33 +08'00'	

I S. JEFFERY – M&R. PLANNING .....(*name and position)* declare that to the best of my knowledge the information contained in this mining management plan is true and correct and commit to undertake the works detailed in this plan in accordance with all the relevant Local, Northern Territory and Commonwealth Government legislation.

CONFIDENTIALITY

CONTENTS

LIST OF APPENDICES

		SWI-21441 Exploration - Collar Cutting, Capping - Plugging
Appendix 4	Aboriginal Areas Protection Authority Searches	AAPA Reply Map2 RTX – 201509435
	Dhimurru IPA	Dhimurru IPA Management Plan 2015-22
	Yirralka Rangers	Yirralka Rangers Business Plan 2013-2016
Appendix 5	Security Calculation	MnAus Security_Calculation_Form EAL CY1819
Appendix 6	Closure Evidence	20150702 MnAus EL10182 All Complete Letter.pdf EL27249 All Complete Letter.pdf
Appendix 7	Disturbance Files	EA_Collars_2017 FY18_TrackPlan_Cato
Appendix 8	Enviromental Assessment	Assessment of Biodiversity Values (Desktop) for Cato Plateau exploration area EcOz Environmental Consultants June 7 2017

VERSIONING

Version 1

AMENDMENTS

Section	Amendment
1.3, 3.8, 5, 6, 7	Changed to reflect current work program
3.7, 6.1,	Added details of 2017 results
3.6 - Table 3	Updated expiration dates

1 INTRODUCTION

After the analysis of previous season's results and observations, Groote Eylandt Mining Company (GEMCO) intends to continue their exploration program over the next year, including EL24389, EL24524 & EL4171. The focus will be on a drill site rehabiltation survey of the area and historical exploration activities.

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 manganese mining operation, run by GEMCO 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.

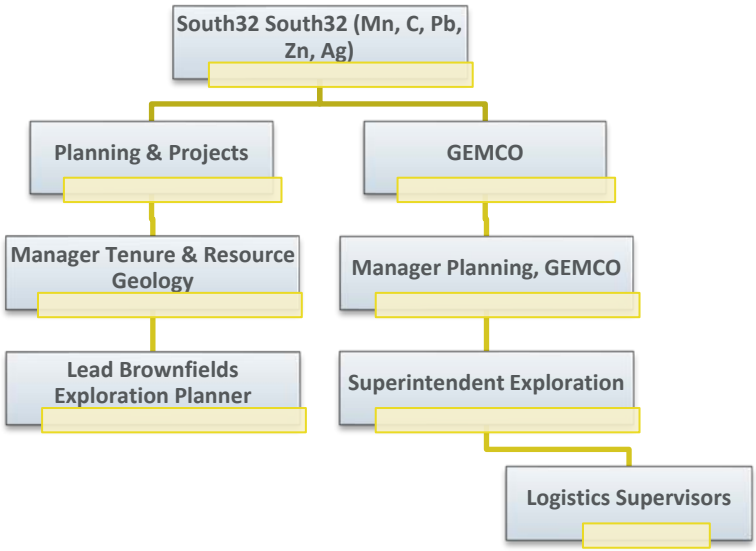
Contact details for South32 and GEMCO as indicated below:

Table 1 Contact Details

Operator Details	
Operator Name	Groote Eylandt Mining Company
Key Contact Person/s	Kalem Wright, Lead Brownfields Exploration planning Leah Fuller, Land Management Specialist Corey Walton, Superintendent Exploration
Street Address	108 St Georges Terrace, Perth, Western Australia, 6000
Phone	+61 8 9324 9593
Email	Kalem.Wright@south32.net; leah.fuller@south32.net; corey.walton@south32.net

1.2 ORGANISATIONAL CHART

Organisation chart for the key contacts is detailed below.



1.3 WORKFORCE

The workforce for the exploration operations will include GEMCO staff (1 to 2 persons), South32 Planning and Projects staff (1 to 2 persons) and contractors (2 to 3 persons at the peak of operations) for ecological surveying. GEMCO also intends to employ two traditional owners to assist during the entire period of field operations. It is expected that no more than 10 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 IDENTIFIED STAKEHOLDERS AND CONSULTATION

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 requested 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.

Identified government, community and interest groups are:

Table 2 Identified Stakeholders

Stakeholder	Contact Details
Department of Primary Industry and Resources (DIPR)	Centrepoint Building, The Mall, Darwin, NT 0801.

NT WorkSafe	NT WorkSafe Office, First Floor, Darwin Plaza Building, 41 Smith Street, The Mall, Darwin, NT 0801 Ph 1800 019 115 Fax 08 8999 5141, Email – ntworksafe@nt.gov.au
NT Water Resources Division	Department of Land Resource Management 4th Floor, Goyer Building, Palmerston, NT 0831 Ph 08 8999 4613
Northern Land Council (NLC)	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)
Dhimurru Rangers	Dhimurru Aboriginal Corporation, Arnhem Road, Nhulunbuy opposite Captain Cook Shopping Centre Ph 08 8987 3992 Fax 08 8987 3224, Email – nhamirri@dhimurru.com)
Gurrumurru and Dhalinbuy Communities	*Care of NLC* 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)
Laynhapuy Homelands Aboriginal Corporation	Laynhapuy Homelands Association Inc, Lot 86 Galpu Road, Yirrkala, NT 0880 Ph 08 8939 1800 Fax 08 8987 1443
Yirralka Rangers	Yirralka Rangers Location: 86 Galpu Rd Yirrkala

	Address: PO Box 1546 Nhulunbuy NT 0881 Phone: 08 8939 1850
Rio Tinto Exploration Pty Limited	The Exploration Director, 37 Belmont Ave, Belmont, WA 6104

3 PROJECT DETAILS

3.1 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).

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 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). In 2016 an ammendment to commence work on EL24389 was obtained (variation 4). In 2017 a variaiton of the authorisation (0671-01 – V5) was issued for the period of grant and any renewal of the titles EL24524, EL4171 and EL24389.

3.2 TARGET MINERALS

The target mineral for the program is manganese.

3.3 EXPLORATION SCHEDULE

The proposed exploration activities are scheduled to commence in during the dry season in 2018 and are expected to be concluded by November. Results will dictate further activities and may alter the current schedule.

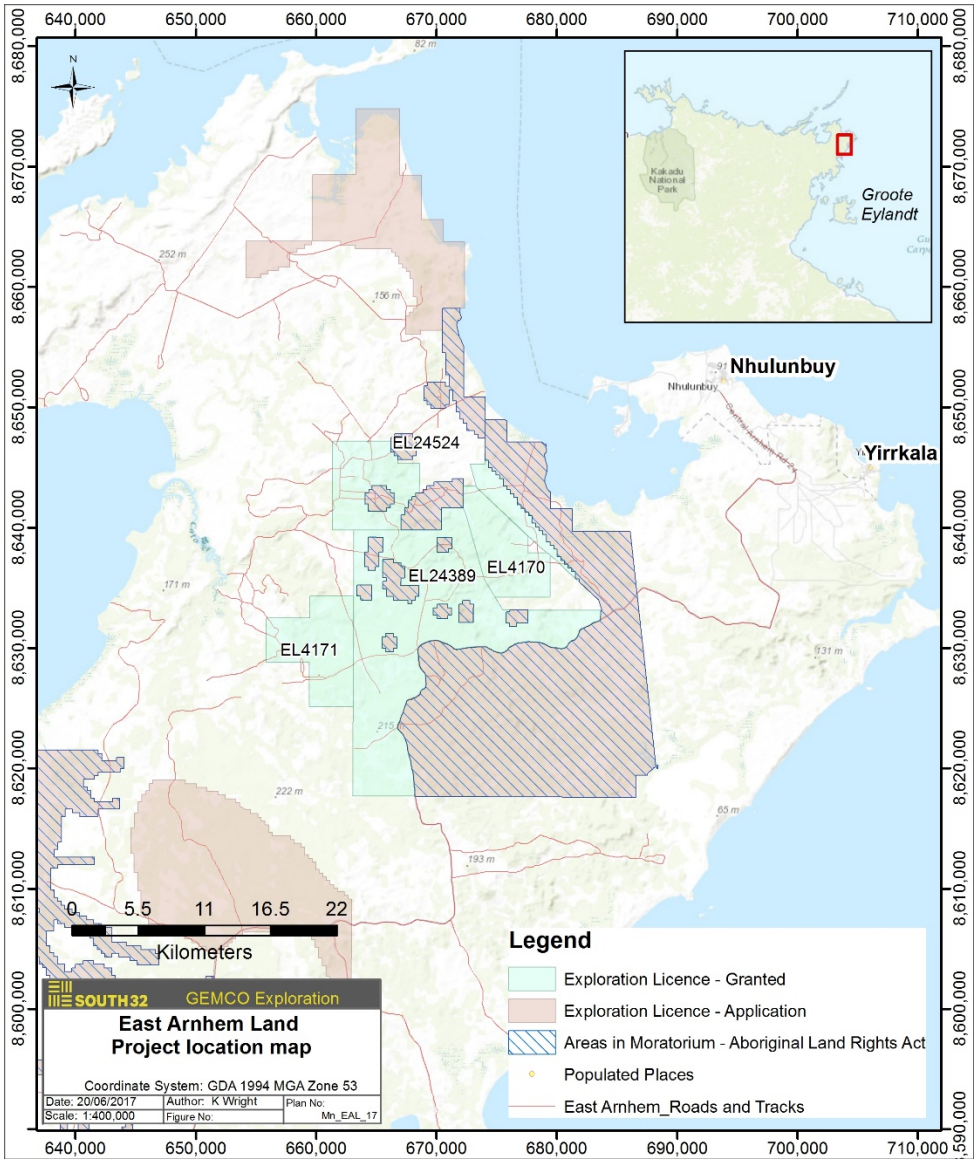


Figure 1 Location Map

3.4 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.

3.5 TRANSPORTATION AND SITE ACCESS

The main access to the project area is from Nhulunbuy via the Central Arnhem Road.

3.6 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 falls under the joint venture agreement between GEMCO and RTX, and has been transferred to RTX as per the conditions of the agreement. The joint venture also includes EL4170 and EL4171.

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 3 East Arnhem Land Exploration titles for upcoming season

Title No.	Owner	Grant Date	No. of Blocks	Area (sq km)	Expiry date
EL24389	RTX	23/06/2016	92	191.4	22/06/2022
EL4170	RTX	14/10/2004	16	38	13/10/2018
EL4171	RTX	12/09/2005	14	45	11/11/2019
EL24524	GEMCO	20/04/2009	15	48	19/04/2019

3.7 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.

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. 60 km 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. An additional 45 holes were drilled totalling 2060 m 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.

In 2016 focus then shifted to the Cato Plateau, EL23489, for any remaining potential based on the model developed. In 2017 a total of 28 air core drill core holes were completed for a total of 1739.5 m. Approximately ~4.2 km of tracks were cleared to access six drill sites, all other site utilised existing tracks.

Table 4 summarises the exploration activities to date and Table 5 provides photographic examples of drill sites pre and post drilling and rehabilitation.

Table 4 Previous Exploration activities

Exploration Leases (Titles)	EL24524	EL4171	EL10182*	EL398	EL27249	EL24389
Number of holes drilled	71	25	59	Nil	Nil	28
Maximum depth of holes	82m	74m	123m	Nil	Nil	120 m
Number of drill pads cleared (Length: 25 m x Width: 20 m)	77	34	58	2	Nil	28
Number of sumps cleared (Length: 3 m x Width: 3 m x Depth: 1 m)	29	30	58	Nil	Nil	Nil
Length of line / track cleared (Kilometres: x Width: metres)	54.9km x 3m	41km X 3m	73.3km x 3m	3.3km X 3m	Nil	4.2 km x 3m
Number of costeans excavated (Length: x Width: x Depth: metres)	Nil	Nil	Nil	Nil	Nil	Nil
Total bulk sample pits excavated (Length: x Width: x Depth: metres)	Nil	Nil	Nil	Nil	Nil	Nil

Exploration Leases (Titles)	EL24524	EL4171	EL10182*	EL398	EL27249	EL24389
Camp area/s cleared	1 (0.27Ha)	Nil	Nil	Nil	Nil	Nil
Total area disturbed (hectares)	18.1 ha	12.9 ha	23 ha	1 ha	Nil	1 ha
Drill holes capped / plugged	71	25	59	Nil	Nil	28
Total area rehabilitated (hectares)	10.3 ha	11.5 ha	23ha	1ha	Nil	

Table 5 Examples of sites pre and post drilling activities

EARC402 – Pre-drilling

EARC402 – Post drilling

EARC402 – Post rehabilitation

EARC410 – Pre-drilling

EARC410 – Post drilling

EARC410 – Post rehabilitation

EARC432 – Pre-drilling

EARC432 – Post drilling

EARC432 – Post rehabilitation

3.8 PROPOSED EXPLORATION ACTIVITIES

GEMCO intends to undertake a technical review and post rehabilitation environmental monitoring survey across acessible historical exploration sites in the East Arnhem Land project area. Final planning including an exploration review of technical results achieved within the East Arnhem project area and an economic value proposition investigation will be reviewed by a technical committee in 2018.

A post rehabilitation environmental monitoring survey is planned for the 2018 dry season to follow up the environmental impact of historical exploration activities. This is likely to include a work team of consultant ecologists, GEMCO personnel and traditional owners.

3.8.1 Rehabilitation Monitoring method

Monitoring will follow the GEMCO Rehabilitation Monitoring and Evaluation Procedure (GEMCO document number GEM PRO−3181). Analogue sites are selected as appropriate reference communities, reflective of the natural forest areas that are self-sustaining and have many of the attributes of the final desired landscape. The data collected from analogue sites is compared against the data collected from each rehabilitation site to show indication of variable change.

Within each site a square 10 m x 10 m plot is established with the four corners marked with star pickets. The following attributes are measured within the plot:

3.8.1.1 Parameters measured

Trees and shrubs
Tree and shrub biomass is a good measure of growth and index of productivity during vegetation succession. This is measured by diameter at breast height (DBH) over bark of all stems in each plot. Dead trees, along with their status, are also measured.

Seedlings and saplings
Regeneration is a critical measure of rehabilitation success, both in recent rehabilitation sites, and older rehab sites where natural regeneration of forests is an important measure of ecosystem health and self-sustainability. Seedling and sapling densities characterise recruitment and forest regeneration. All seedling and saplings are counted within all sites, along with root sprouts and epicormic shoots arising from latent buds near the base of woody plants. Seedlings are woody plants < 1 m in height and saplings are woody plants > 1 m in height with a DBH < 2 cm.

Canopy cover
Measurement of canopy cover (% of foliage cover) contributes to an understanding of vegetation attributes for each study plot, indicating the percentage occupied by the vertical projection of mid- and upper-vegetation strata (including foliage and branches). Mean values obtained from this are used in conjunction with tree-shrub heights to classify vegetation structure.

Ground cover
Ground cover enhances infiltration, reduces soil erosion and may decrease runoff. It also protects the soil surface from raindrop impact, and provides an integrated indicator of soil physical management and organic matter input. At each plot the percent ground cover of grass, organic litter, bare ground, rock and other cover was visually estimated within five randomly-placed 1 m x 1 m quadrats. The pattern expected is that as rehabilitation areas age, and the canopy cover is formed, colonising grasses are replaced and branches and leaves are shed. Fulfilment of succession trends is reflected in a decrease of bare ground over time, a reduction of grass, and increased litter coverage.

Weeds

Weed species here included species declared as weeds under the Northern Territory *Weeds Management Act* and introduced plants considered environmental weeds. The percentage cover of the plot was visual estimated for each weed species as follows:

- < 3 isolated small plants = 0.01 %
- 3 isolated small plants = 0.1 %
- Or a visual estimate of the % cover of plot area.

Fire

Construction of a fire history for a site makes an important contribution to the understanding of current biotic characteristics of an area, and to the formulation of a management objective for a particular area. Resilience of vegetation to threats such as fire will determine the site's succession pathway. At each plot an estimate of the timing of the last fire (this year, last year, more than 3 years ago) and for recently burnt sites the severity was scored from 1 (very low) to 5 (extreme).

3.8.1.2 Photo-monitoring

A digital photo is taken at each plot from the north-west corner in portrait orientation from a height of ~1.5 m, focused on a labelled (site code and date) marker board 1 m to 1.3 m above the ground 4 m towards the centre of the plot.

3.8.1.3 Data analysis

For each site, plot data was averaged for the foliage cover, ground cover and basal area. Data from the plots were summed for species richness and abundances.

3.8.1.4 Vegetation community classification

Vegetation communities at each site are classified using Specht's (1970) classification system (Table 6). Each vegetation community is further labelled by the dominant species in the upper strata. Dominant species are defined as those who contribute greater than 20% to the total basal area and are listed in order of dominance.

Table 6 Structural classification of vegetation communities

Life form	Height	Canopy Cover			
		100-70%	70-30%	30-10%	1-10%
Tree	<30 m	Closed forest	Open forest	Woodland	Open woodland
Tree	<10 m	Low closed forest	Low open forest	Low woodland	Low open woodland
Tree	<5 m	Very low closed forest	Very Low open forest	Very low woodland	Very low open woodland
Shrubs	>2 m	Tall closed shrubland	Tall Shrubland	Tall open shrubland	Tall sparse shrubland
Shrubs	1-2 m	Closed shrubland	Shrubland	Open shrubland	Sparse shrubland
Shrubs	<2 m	Low closed shrubland	Low Shrubland	Low open shrubland	Low sparse shrubland

4 CURRENT PROJECT SITE CONDITIONS

4.1 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.

4.2 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.

4.3 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. tetrodonta), with smaller areas of monsoon rainforest and eucalypt woodlands.

EcOz Environmental Consultants was engaged to prepare a desktop report to assess the area (Appendix 8). The report includes a description of habitat types, and a 'likelihood of occurrence' assessment of threatened species listed under the Commonwealth Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) and Northern Territory Parks and Wildlife Conservation Act (TPWC Act).

A search was completed using the Australian Government Department of Environment Protected Matters Search Tool and Flora and the Fauna Atlas databases maintained by the NT Department of the Environment and Natural Resources. The Protected Matters Search Tool identified 17 threatened species with the potential to occur within the area. A search of the NT Flora and Fauna Atlas added 11 species to this list and is summarised in Table 6 (see Appendix 8 for further details).

Two threatened species are likely to occur within the proposed clearing area – Crested Shrike-tit (northern subspecies) (Near Threatened – TPWC Act, and Vulnerable – EPBC Act) and Red Goshawk (Vulnerable – TPWC Act and EPBC Act). A brief description of both are given below (Section 4.3.1). The remaining threatened species are unlikely to occur within the area (Table 6).

GEMCO has committed to ensuring that no riparian or rainforest vegetation will be cleared as part of the post rehabilitation environmental monitoring survey.

Table 7 Known threatened species in the project area.

Scientific Name	Common Name	Conservation Status
Birds		
Erythrotriorchis radiatus	Red Goshawk	Vulnerable
Erythrura gouldiae	Gouldian Finch	Endangered / Vulnerable
Falcunculus frontatus whitei	Crested Shrike-tit (northern),	Vulnerable / Near Threatened
Tyto novaehollandiae kimberli	Masked Owl (northern)	Vulnerable
Insects		
Euploea alcathoe enastri	Gove Crow Butterfly	Endangered / Near Threatened
Mammals		
Antechinus bellus	Fawn Antechinus	Vulnerable / Endangered
Dasyurus hallucatus	Northern Quoll	Endangered
Isoodon auratus	Golden Bandicoot	Vulnerable / Endangered
Mesembriomys gouldii	Black-footed Tree-rat	Endangered / Vulnerable
Notomys aquilo	Northern Hopping-mouse	Vulnerable
Conilurus penicillatus	Brush-tailed Rabbit-rat, Brush-tailed Tree-rat	Vulnerable
Petrogale concinna canescens	Nabarlek (Top End)	Endangered / Vulnerable
Phascogale pirata	Northern Brush-tailed Phascogale	Vulnerable / Endangered
Saccolaimus nudicluniatus	Bare-rumped Sheathtail Bat	Vulnerable
Xeromys myoides	Water Mouse, False Water Rat	Vulnerable
Rattus tunneyi	Pale Field-rat	Vulnerable
Macroderma gigas	Ghost Bat	Vulnerable
Reptiles (Terrestial)		
Acanthophis hawkei	Plains Death Adder	Vulnerable
Varanus mertensi	Mertens' Water Monitor	Vulnerable
Varanus panoptes	Floodplain Monitor	Vulnerable

Scientific Name	Common Name	Conservation Status
Plants		
Erythroxylum sp. Cholmondely Creek	A sub-shrub	Endangered
Hernandia nymphaeifolia	A shrub / tree	Vulnerable
Intsia bijuga	Merbau (Kwila, Ipil, Molucca Ironwood)	Critically Endangered
Mapania macrocephala	A sedge	Vulnerable
Pternandra coerulescens	Cursed Shade	Vulnerable
Sticherus flabellatus var. compactus	Shiny Fan Fern	Vulnerable

4.3.1 Threatened Species Likely to Occur

Crested Shrike-tit (northern subspecies)

The Crested Shrike-tit (northern) (Falcunculus frontatus whitei) is a medium sized bird with striking black and white facial markings, and a distinctive black crest. This subspecies is endemic to north-western Australia, occurring in the Kimberley region and in the north of the NT. It is known to occur in very low densities, typically in small groups of two to five individuals. There are no records of this species within 10 km of the proposed clearing area. Even if the species is present within the area, the proposed activities would not be anticipated to significantly impact the species given that there is no planned disturbance.

Red Goshawk

The Red Goshawk (Erythrotriorchis radiates) is a large raptor species which is sparsely distributed across northern and eastern Australia, from the western Kimberley through to northern NSW. This species is known to hunt within home ranges of between 50 and 220 km^2. If this species was to occur within the area, there is no proposed disturbance activities. Nests are typically restricted to trees taller than 20m and within 1km of a watercourse or wetland, and the same nest sites are used by a breeding pair each year. Even if the species is present within the area, the proposed activities would not be anticipated to significantly impact the species given that there is no planned disturbance.

4.4 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.

4.5 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 the exploration program has avoided all sensitive areas.

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.

The Cato Plateau largely lies within the boundaries of the The Dhimurru Indigenous Protected Area (IPA) and Laynhapuy IPA (Appendix 4). GEMCO will continue working closely with both the Dhimurru Rangers and Yirralka Rangers to ensure alignment with the Dhimurru IPA Management Plan (2015-2022) and the Yirralka Rangers Business plan (2013-2016).

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.

5 MANAGEMENT STANDARDS

5.1 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 envinronment in a way that demonstrates our values
- Manage environmental aspects to minimise adverse impacts and promote enduring environmental benefits
- Minimise Greenhouse Gas emmissions

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.

5.2 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.

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.

5.3 NON-STATUTORY REQUIREMENTS

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

5.4 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.

5.5 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.

5.5.1 Invasive Species Management

In accordance with the *Weed Management Act*, and GEMCO's weed management procedure (Appendix 3) GEMCO will ensure that quarantine procedures are implemented at all times to ensure that only clean (free of any declared plant material) vehicles and equipment enter and leave any site at any time. These include:

- Routine documented inspections of all vehicles accessing the area
- Engage the Dhimurru and Laynhupuy rangers to conduct audits on vehicles and documented procedures.

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.

5.5.2 Flora and Fauna Management

Access tracks will to utilise existing tracks so as to avoid disturbance of flora and fauna.

GEMCO has committed to ensuring that no riparian or rainforest vegetation will be cleared as part of the proposed post rehabilitation environmental monitoring survey.

5.5.3 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.

5.5.4 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 seeks the assistance of cultural monitors during the post rehabilitation environmental monitoring survey to ensure any culturally sensitive areas are avoided.

5.6 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 ground/surface water and destruction of threatened and vulnerable fauna and flora, as well as the spread of weeds. The risks of these will be captured in a risk register which will be developed for this project.

Table 7 lists the introduced species that have been recorded in the Arnhem Coast bio-region that may occur across the project. GEMCO is committed to identify and avoid sensitive and vulnerable species using established field procedures.

Table 7 Introduced species in the project area.

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

5.7 ENVIRONMENTAL PERFORMANCE

5.7.1 Objectives and Targets

GEMCO aims to complete the planned survey without environmental or cultural incident.

5.7.2 Documentation

A copy of the post rehabilitation surevy report will be made available to the NLC on completion of activities. Location and extent of all rehabilitation sites surveyed will be mapped using a hand held GPS and records kept as a GIS layer, which is available on request.

5.7.3 Environmental Audits and Inspections

GEMCO will seek to obtain a satisfactory rehabilitation report from the NLC /Traditional owners following completion of the operations.

5.8 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.
- Field Response Plan for events requiring medical or other action to be taken to ensure the health and safety of people and the environment.

Incidents will be reported using the established GEMCO and Department of Primary Industry and Resources (DPIR) incident reporting system.

In accordance with guidelines provided by DPIR, 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 DPIR 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.

6 EXPLORATION CLOSURE AND REHABILITATION

6.1 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.

In 2017 a total of 28 drill pads were prepared for exploration on the Cato Plateau, EL23489. A total of 4.2 km of tracks were created to support the drilling program. All pads and tracks were rehabilitated at the conclusion of the drill program.

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.

6.2 REHABILITATION PLANNING

Rehabilitation planning is an integral part of the proposed exploration operations. A summary of rehabilitation practices is provided in Table 8.

Pre and post wet season inspections are undertaken with representatives of the NLC/traditional owners to assess the status of rehabilitation. Remedial work is conducted if there are any concerns.

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

Disturbance	Rehabilitation Activities	Schedule	Closure objectives/ Targets	Monitoring/ Remediation
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

6.3 RE-VEGETATION METHODS

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

6.4 FIRE MANAGEMENT

GEMCO respects traditional land management practices. This includes regular seasonal burning by traditional owners at their discretion, as well as planned burns by rangers. GEMCO do however effectively manage both the risk of fire, and have fire evacuation plans in place for all exploration activities. All equipment utilized on exploration sites complies with GEMCO's fatal risks controls for fire prevention and are equipped with either fire suppression systems and/or fire extinguishers. Evacuation plans are developed for each area which includes designated park up sites and at least two evacuation routes from any work site.

To effectively manage the risk of fire GEMCO will:

- Contact the local authorities to ensure that no fire restrictions are in place.
- Liase with Dhimmuru and Lanyphuy rangers to ensure that planned burns do not place GEMCO personnel at risk and,
- Ensure that adequate evacuation routes are in place

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

6.5 CLOSURE PLANNING

A final report and application for closure certificate will be submitted at the end of the program.

6.6 REHABILITATION ACTIVITIES CONDUCTED DURING THE PREVIOUS PERIOD

Rehabilitation of all drill pads and tracks supporting the 2017 exploration progam was conducted during the previous exploration season. All rehabilitation under the authorisation has been completed.

7 SECURITY CALCULATION

Although all previous rehabilitation obligataions have been met, securities have been retained by the Department for upcoming disturbance. Security for the upcoming proposed works have been calculated and has been attached in Appendix 5. No ground disturbance is planned for the proposed environmental post rehabilitation survey and therefore no additional securities are required.