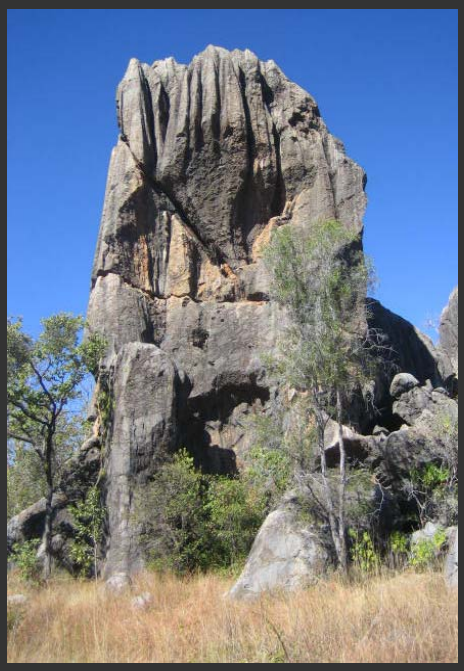

Mungana Goldmines Ltd
Red Dome Pit Extension
Initial Advice Statement
April 2012

MUNGANA GOLDMINES

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Initial Advice Statement

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1. Introduction

This Initial Advice Statement has been prepared to describe a proposal by Mungana Goldmines Ltd to extend the decommissioned Red Dome pit by open pit cut back and underground mining methods (**Plate 1**).

The project is called the Red Dome Pit Extension (RDPE). It represents a stage in the ongoing redevelopment of the decommissioned Red Dome Gold Mine, situated on the existing Red Dome Project leases, 15 km west of Chillagoe in north Queensland (**Figure 1**).

Plate 1: The Red Dome Pit

The Red Dome Project leases are held by Kagara Ltd. Mungana Goldmines Ltd was formed in 2010 to maximise the value of the gold mineralisation contained within Kagara Ltd's Chillagoe leases. As parent company, Kagara owns 62% of Mungana Goldmines Ltd. Mungana Goldmines Ltd owns the rights to gold exploration, and development and mining of gold orebodies within defined Kagara tenements.

An EIS has been completed and approvals are being finalised for the development of an open pit centred on the Mungana deposit (the Mungana Gold Open Pit Development) 2 km to the north west of the Red Dome Pit.

An existing base metals underground operation is operated by Kagara Ltd (currently in care and maintenance mode) within the ML area.

Mining development within the Red Dome leases by open cut and underground mining methods has been approved with conditions under the *Environmental Protection and Biodiversity Conservation Act* 1999 (decision date 3 April 2006).

Current mining activity is also undertaken in conformance with approvals under the *Environmental Protection Act* 1994, including an approved Environmental Management Plan and Environmental Authority number MIN100610207 (dated 21 August 2008).

On 13 March 2012 the Department of Environment and Heritage Protection (DEHP) approved an application under s70 of the *Environmental Protection Act* 1994 to prepare a voluntary environmental impact statement (EIS) for the Red Dome Pit Extension.

1.1 History

The Mungana site is part of the Chillagoe mineral field which was first developed in the late 19th and early 20th centuries. Mining in the area continued sporadically throughout the 20th century. The most significant development was the Red Dome Gold Mine which was operated from 1986 until 1997. Kagara Pty Ltd acquired the Red Dome Project in 2003.

During its life of operations, Red Dome Gold Mine activities included open pit mining, production of gold ore and gold/copper concentrates via heap leaching, CIP/CIL and flotation processes. Following cessation of operations in 1997, site rehabilitation was carried out (**Plate 2**). Rehabilitation has been largely successful as demonstrated by rehabilitation monitoring and environmental investigations.

Plate 2: Decommissioned Red Dome Tailings Storage Facility

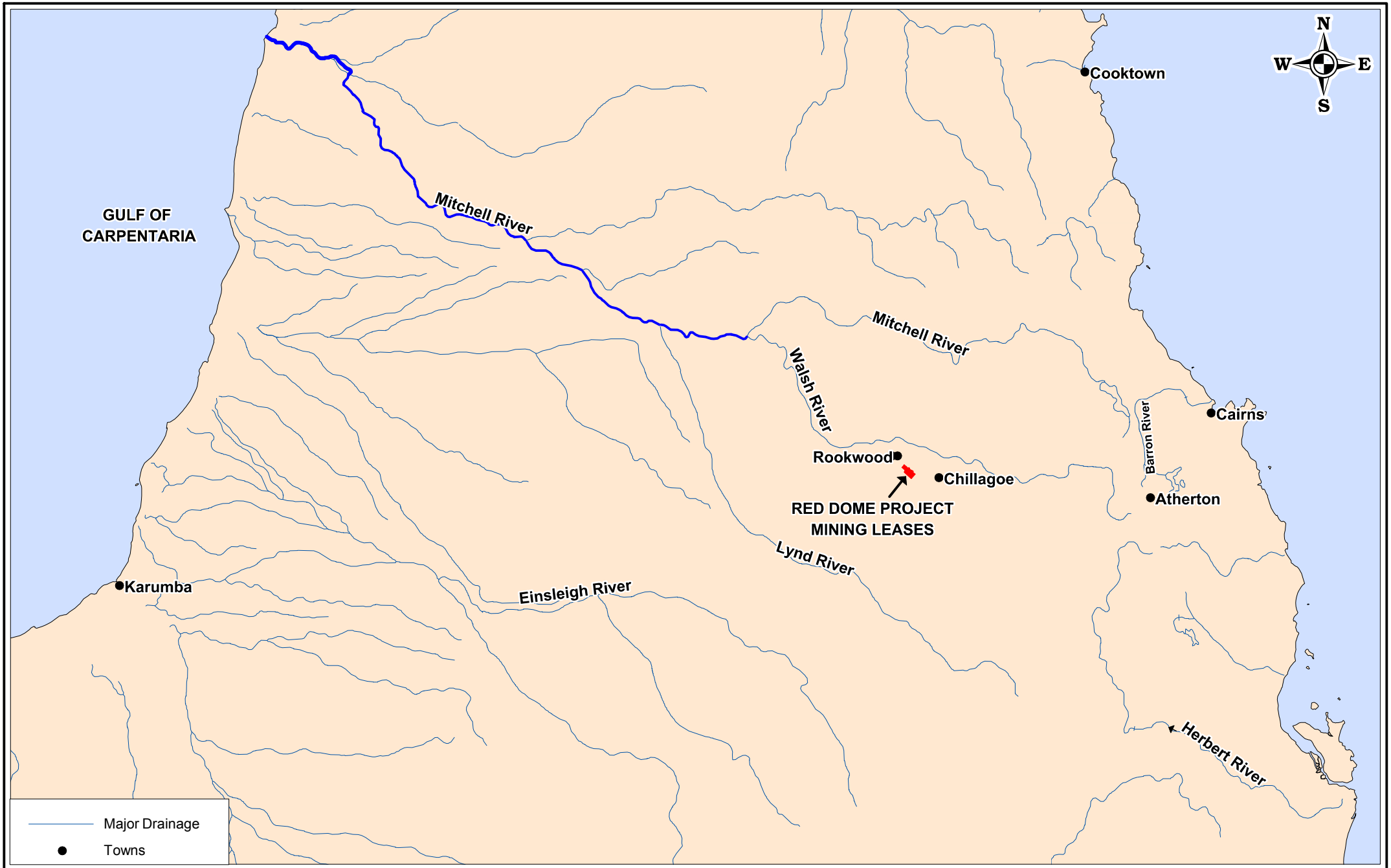
The Red Dome Pit Extension project is on land that has previously been disturbed by mining and/or exploration. Disturbances have included various decommissioned infrastructures such as office space, roads, waste dump, heap leach, tailings dam, water impoundments and the new Mungana Gold Open Pit Project's tailing storage facility that has been constructed to 95% completion.

1.2 Location and Tenure

Mining Leases affected by the proposed project are ML 4928, ML 4977, ML5319, ML 5176 and ML 20640 (**Figure 2**). All are held by Kagara Ltd.

The extended pit boundary will extend into Railway Reserve (the former Chillagoe to Mungana Railway) and will be directly adjacent to the boundary of the Piano Cave section of the Chillagoe-Mungana National Park. The pit boundary will extend into a 100 m buffer area within the ML area which was nominated by Kagara Ltd in its EPBC Referral under the *Environment Protection and Biodiversity Conservation Act* 1999 (EPBC) in 2006. The purpose of the buffer was to '*minimise direct and indirect impacts on limestone karst National Park values*'. Part of the existing Red Dome Pit footprint lies within the buffer. The Referral provided for further mining activity within the Red Dome pit section of the buffer subject to State approvals.

Mining activity will not extend into the National Park.



PROJECT: Red Dome Pit Extension - Initial Advice Statement
TITLE: Red Dome Project Location

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MUNGANA GOLDMINES

Figure 1

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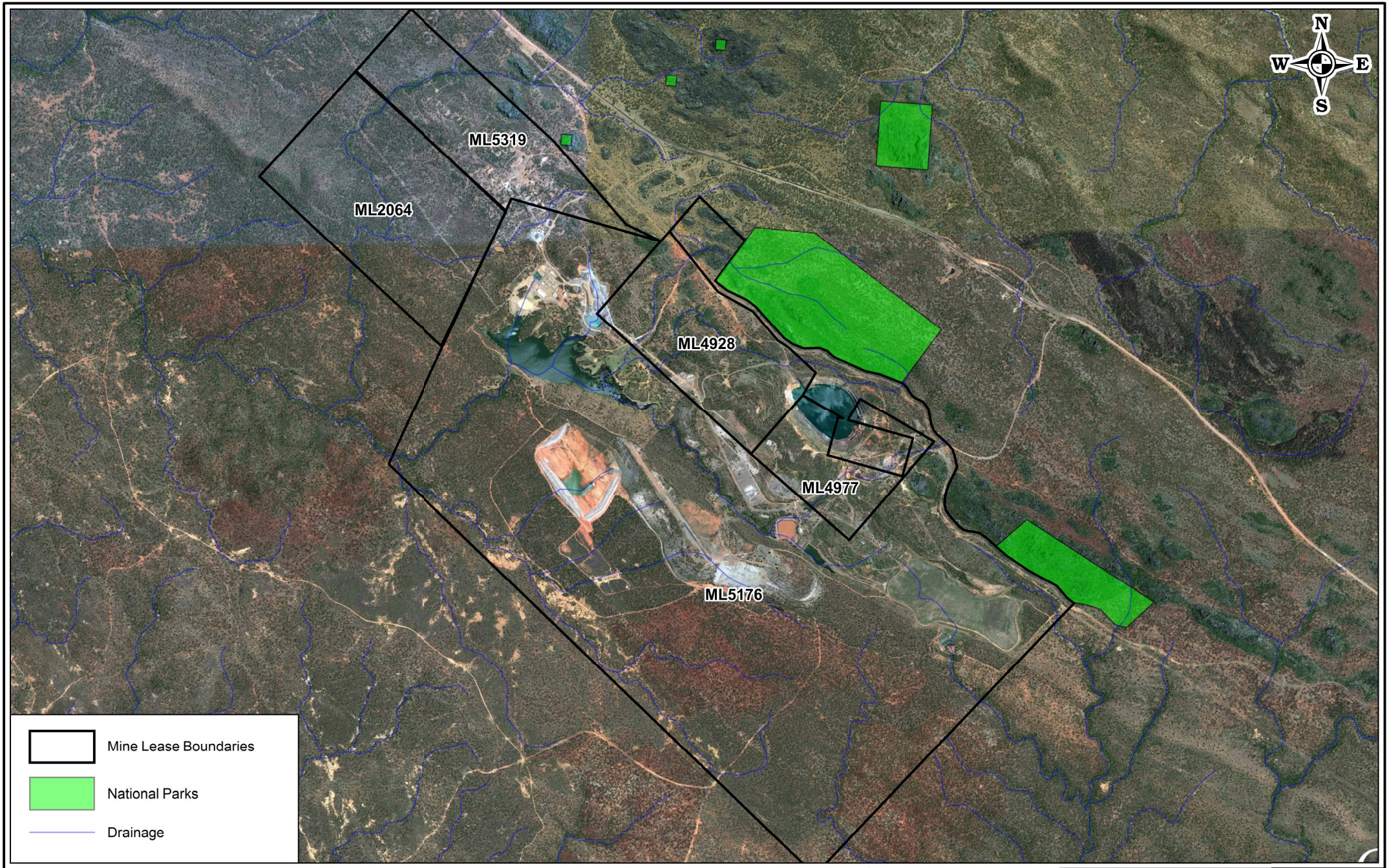

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TITLE: Red Dome Project Mining Leases

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JOB NO: 2301005.01
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SOURCE: NRA, DERM, DME, Google Earth

MUNGANA GOLDMINES

Figure 2

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2. Description of Proposed Activities

The proposed Red Dome Pit Extension (RDPE) will comprise mining of ore from the surface to 370 m in vertical distance by pit cut back and a further 400 m by sub level open stope methods.

Development will include a new minerals processing facility (4 Mtpa capacity), tailings storage facility, waste rock dumps, water management dam(s) and a range of surface support infrastructure (**Figure 3**). The RDPE project will form the 'base' of a larger long term operation which will source ore from a number of on-lease resources to maintain a 4 million tonne per annum processing rate (**Table 1**), specifically:

- RDPE open pit and underground mining
- Mungana open pit
- Mungana underground
- Reprocessing of Red Dome heap leach material.

Other sources of ore including satellite deposits may be identified and developed during the life of the project to further extend the life of mine.

2.1 The Resource

The Red Dome Pit Extension reserve is located within the Mungana Base Metals and Porphyry Lodes. The mineralisation is hosted by the porphyry, breccias, skarns and sandstone rock units. The gold mineralisation extends from the surface to about 730 m in depth. Open pit mining in the 1990's by Elders and Nuigini Mining companies produced over 1 million ounces of gold and resulted in a pit of some 320 m depth. Since cessation of mining operations in 1997, the pit has collected approximately 14 gigalitres of water. Pit dewatering will commence well in advance in preparation for further exploration works and pit extension mining.

A gold equivalent cut-off grade of 0.35 g/t was used to generate the resource value. Within the ore zone there is a considerable variation in material types due to different rock types, weathering surfaces and grade variations (**Table 1**).

The total project will yield at least 42.1 million tonnes of ore and 155.4 million tonnes of waste (**Table 1**).

2.2 Mine Schedule

The proposed mine schedule is provided in **Table 1** and reflects a 4 million tonne per annum processing rate.

Table 1: Ore Resource and Mining Schedule

			Yr1	Yr2	Yr3	Yr4	Yr5	Yr6	Yr7	Yr8	Yr9	Yr10	Yr11	Yr12	Total
Red Dome Open Cut															
	Ore	Mt	0.7	3.2	3.0	2.8	2.9	2.7	1.7	1.6	1.3	1.8	1.2		**22.8**
	Waste	Mt	36.6	33.8	15.5	14.1	4.6	4.3	2.0	2.1	0.9	0.7	0.2		**114.8**
	Total Material	Mt	37.3	37.0	18.5	16.9	7.5	6.9	3.7	3.7	2.2	2.5	1.4		**137.6**
	Cu	%	0.60	0.36	0.42	0.29	0.18	0.18	0.20	0.26	0.29	0.22	0.11		**0.28**
		'000 t	4.4	11.5	12.6	8.2	5.1	4.8	3.3	4.1	3.8	4.1	1.3		**63.1**
	Au	g/t	0.48	0.49	0.63	0.56	0.92	1.11	0.88	0.51	0.49	0.75	0.98		**0.72**

			Yr1	Yr2	Yr3	Yr4	Yr5	Yr6	Yr7	Yr8	Yr9	Yr10	Yr11	Yr12	Total
		'000 oz	11.3	50.4	60.7	50.9	84.5	95.5	46.9	25.5	20.5	44.4	37.0		**527.7**
	Ag	g/t	5.24	4.4	7.22	5.11	5.07	3.49	5.86	9.53	7.40	5.70	2.78		**5.51**
		'000 oz	123.6	452.2	695.7	464.6	465.8	300.4	312.4	477.3	309.2	337.8	104.9		**4,043.9**
Mungana Open Cut															
	Ore	Mt		0.8	1.0	1.1	0.5								**3.4**
	Waste	Mt		25.3	12.2	1.8	0.2								**39.4**
	Total Material	Mt		26.1	13.2	2.8	0.7								**42.8**
	Cu	%		0.10	0.45	0.55	0.74								**0.44**
		'000 t		0.8	4.6	5.9	3.9								**15.3**
	Au	g/t		0.71	0.94	1.18	1.30								**1.02**
		'000 oz		18.2	31.0	40.9	22.3								**112.3**
	Ag	g/t		13.53	57.64	49.67	75.53								**47.68**
		'000 oz		346.3	1,901.4	1,719.9	1,294.3								**5,261.8**
Mungana Sublevel Oper Stoping															
	Ore	Mt				0.1	0.5	0.6	0.7	0.7	0.2				**2.7**
	Waste	Mt				0.1	0.1	0.0	0.0						**0.2**
	Total Material	Mt				0.2	0.6	0.6	0.7	0.7	0.2				**3.0**
	Cu	%				0.51	0.48	0.47	0.47	0.48	0.48				**0.5**
		'000 t				0.5	2.3	2.7	3.3	3.4	0.8				**13.0**
	Au	g/t				1.19	1.14	1.14	1.12	0.99	0.95				**1.09**
		'000 oz				3.6	17.4	21.2	25.4	22.6	5.3				**95.5**
	Ag	g/t				32.5	30.5	30.7	31.3	29.9	29.33				**30.56**
		'000 oz				97.9	464.8	569.8	709.0	681.8	164.3				**2,687.5**
Mungana Sublevel Caving															
	Ore	Mt					0.1	0.8	1.7	1.8	0.9				**5.2**
	Waste	Mt					0.19	0.20	0.19	0.10					**0.7**
	Total Material	Mt					0.3	1.0	1.9	1.9	0.9				**5.9**
	Cu	%					0.26	0.29	0.24	0.31	0.26				**0.28**
		'000 t					0.4	2.2	4.0	5.5	2.3				**14.4**
	Au	g/t					1.22	1.08	1.20	0.90	0.78				**1.01**
		'000 oz					5.4	26.7	64.9	51.0	22.5				**170.4**
	Ag	g/t					26.5	28.1	16.3	16.3	11.75				**17.52**
		'000 oz					117.3	694.1	882.1	922.9	339.0				**2,955.5**
Red Dome Sublevel Oper Stoping															
	Ore	Mt									0.6	1.2	0.6		**2.4**
	Waste	Mt									0.1	0.1	0.1		**0.3**
	Total Material	Mt									0.7	1.3	0.7		**2.7**
	Cu	%									0.8	0.7	0.6		**0.7**
		'000 t									4.6	8.2	3.5		**16.3**
	Au	g/t									1.1	1.0	1.0		**1.04**
		'000 oz									20.2	40.1	19.8		**80.1**
	Ag	g/t									16.0	13.5	11.1		**13.5**
		'000 oz									302.9	520.2	217.2		**1,040.3**
Heap Leach Stockpile															
	Ore	Mt									1.0	1.0	2.2	1.3	**5.5**
	Waste	Mt													**0.0**

			Yr1	Yr2	Yr3	Yr4	Yr5	Yr6	Yr7	Yr8	Yr9	Yr10	Yr11	Yr12	Total
	Total Material	Mt									1.0	1.0	2.2	1.3	**5.5**
	Cu	%									0.3	0.3	0.3	0.3	**0.3**
		'000 t									2.5	2.5	5.5	3.3	**13.8**
	Au	g/t									0.5	0.5	0.5	0.5	**0.5**
		'000 oz									16.1	16.1	35.4	20.9	**88.4**
	Ag	g/t									5.0	5.0	5.0	5.0	**5.0**
		'000 oz									160.8	160.8	353.7	209.0	**884.1**
Totals per year															
	Ore	Mt	0.7	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	1.3	
	Waste	Mt	36.6	59.1	27.7	15.9	5.1	4.5	2.2	2.2	1.0	0.8	0.3	0.0	
	Total Material	Mt	37.3	63.0	31.7	19.9	9.1	8.5	6.2	6.3	5.0	4.9	4.2	1.3	
	Cu	%	0.60	0.31	0.43	0.37	0.29	0.24	0.26	0.32	0.36	0.36	0.26	0.25	
		'000 t	4.4	12.3	17.2	14.6	11.7	9.8	10.7	12.9	14.1	14.7	10.3	3.3	
	Au	g/t	0.48	0.53	0.71	0.74	1.01	1.11	1.05	0.77	0.66	0.77	0.72	0.50	
		'000 oz	11.3	68.5	91.7	95.4	129.6	143.4	137.2	99.1	84.6	100.6	92.2	20.9	
	Ag	g/t	5.24	6.22	20.08	17.75	18.20	12.10	14.64	16.07	10.02	7.84	5.28	5.00	
		'000 oz	123.6	798.5	2597.0	2282.3	2342.3	1564.3	1903.5	2082.0	1276.1	1018.8	675.8	209.0	

Total for the entire project	**Ore**	**Mt**	**42.1**
	Waste	**Mt**	**155.4**
	Total Material	**Mt**	**197.5**
	Cu	**%**	**0.3**
		'000 t	**136.0**
	Au	**g/t**	**0.76**
		'000 oz	**1,074.5**
	Ag	**g/t**	**11.81**
		'000 oz	**16,873.1**

2.3 Mining

2.3.1 Open Pit

The open pit is to be excavated in two stages. The Red Dome stage 1 pit is a pushback of the eastern side of the existing Red Dome pit to recover mineralisation down to 270 metres below the surface. Red Dome stage 2 pit involves a pushback of all four walls. The final pit depth will be 370 metres. Volumes of material mined total 22.8 million tonnes of ore and 92.2 million tonnes of waste.

The operations will involve blast hole drilling, sampling, blasting, wall control, designation of material types, selectively excavating material into dump trucks, and creation of waste rock dumps to designated designs.

The Red Dome pit currently contains a significant volume of water (14 GL) which has accumulated since the previous mining activities ceased in 1997. Dewatering options are currently being assessed and are likely to include pre-pumping prior to mining and dewatering concurrently with mining. Once stored water is removed from the pit dewatering of rainwater and groundwater inflows will continue.

2.3.2 Underground Mining

Recovery of resources below the pit will be through conventional underground mining techniques with decline access from the open pit. Current estimates of material to be mined are 2.4 million tonnes of ore and 0.3 million tonnes of waste.

Based on the geotechnical studies undertaken, the combination of significant thickness and predicted good ground conditions means that some form of open stoping is a suitable approach.

The ground conditions at Red Dome are sufficiently good to allow for some stopes to remain unfilled. Where required, filling of stopes will occur by one of the following methods:

- paste-type fill via fill holes or trucking from the surface fill plant
- waste rock trucked back underground or directly from development.

Minimal land disturbance will occur due to the mining method employed and predicted good ground conditions.

2.3.3 Geotechnical Considerations

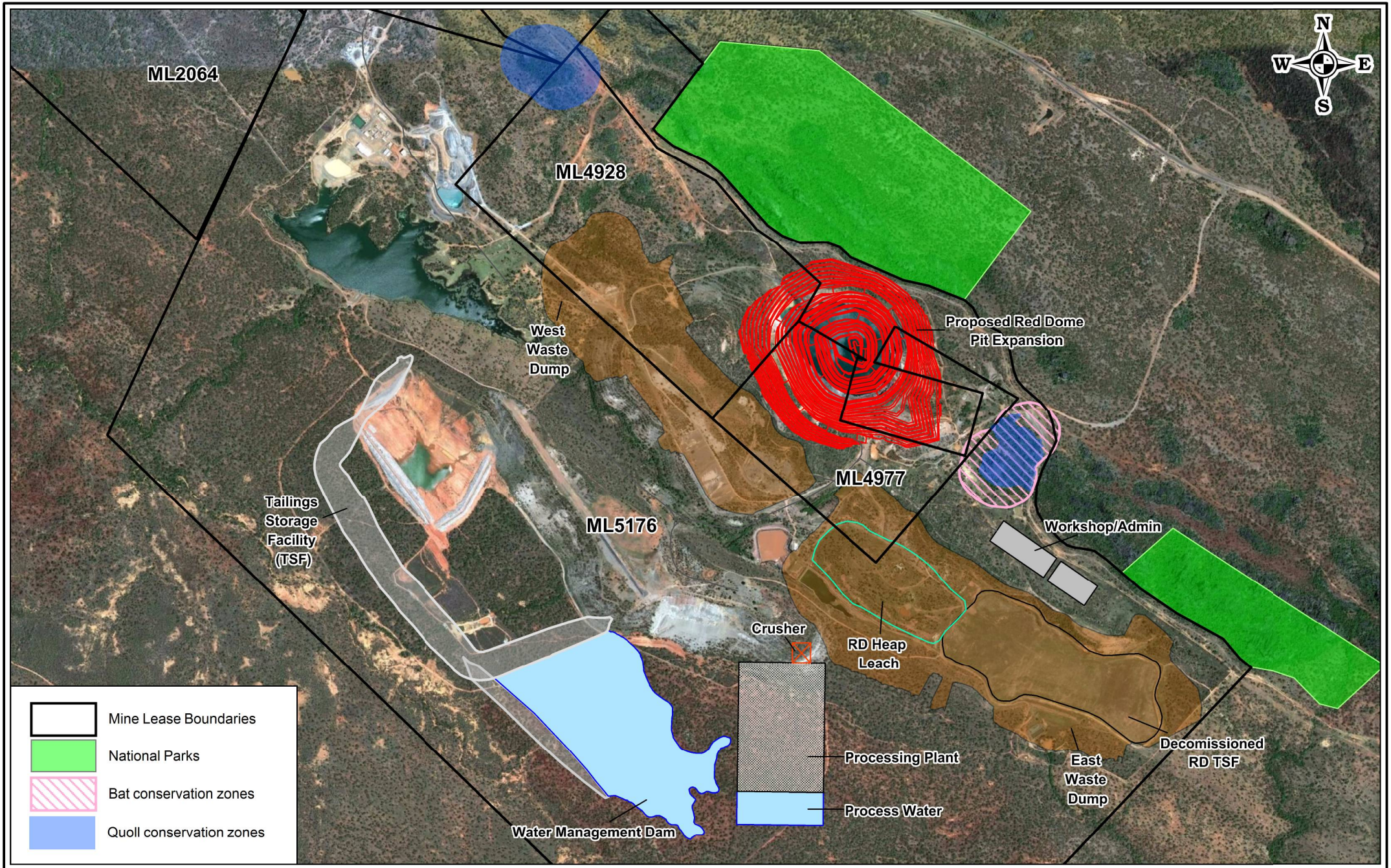
In the stage 1 pit, the lower walls will be located in marble skarn and porphyry, which will support a steep wall design. The upper north wall will be located in basalt and sandstone which will also provide good stability. The upper south wall and west wall are located in sandstone and chert, which will require careful wall design and conservative assumptions for key geotechnical parameters, including overall slope.

In pit stage 2, the wall parameters will be similar to those of stage 1. Bench heights will vary between 15 m and 30 m to facilitate transition between different wall designs.

With respect to the underground development, according to the geotechnical studies undertaken, the combination of significant thickness and predicted good ground conditions means that some form of open stoping is likely to be feasible below RL100.

2.3.4 Blasting and Vibration

The mining of the final walls will involve smooth wall blasting and the firing of trim shots next to the pit wall. Blasting in the underground development will also occur. Blasting will be managed via a Blast Management Plan to ensure maximum peak particle velocity and maximum peak air overpressure within 10 m of the entrance of nominated roosting caves for the Greater Large-eared Horseshoe Bat (Endangered, EPBC and *Nature Conservation Act* 1992 (NC Act)) and the Diadem Leaf-nosed Bat (Near threatened, NC Act) do not exceed 25 m/s and 140 dB(L) respectively. This is consistent with approval conditions for the project under the EPBC Act, existing EA Conditions, and mitigation measures proposed in the recently approved Mungana Gold Open Pit Development EIS.



PROJECT: Red Dome Pit Extension - Initial Advice Statement
TITLE: Red Dome Project Site Layout

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DATE: April 2012
SOURCE: NRA, DERM, MUX, Google Earth

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Figure 3

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2.3.5 Waste Rock Dumps

It is proposed that Waste Rock Dumps will be located on top of the decommissioned Red Dome waste dump, heap leach and TSF (**Figure 3**).

Waste rock dump design will consider Potential Acid Forming material (PAF), Non-Acid Forming material (NAF) and possible Neutral Mine Drainage (NMD). The waste dumps will be designed to manage reactive material by preferential placement within defined areas of the dump according to approved dump designs. During and post-development of the waste dumps, seepage will be monitored and recovered (as required) via seepage collection systems.

2.3.6 Equipment and Facilities

The open pit mining will be carried out using a fleet of conventional diesel powered mining equipment consisting of 190 t to 250 t hydraulic excavators and up to 20 90 t and 150 t class rigid body haul trucks, bulldozers, blast hole hydraulic drill rigs, water trucks and road graders. The underground mining fleet would include two 2 boom jumbos, one 15 t loader; two 20 t loaders, one production drill rig, six 40 t trucks and two service vehicles. The machinery will be serviced on site in a purpose built workshop. The refuelling bay will be configured for large dump trucks.

2.3.7 Disturbance Areas

The total project area will be approximately 450 hectares. Of this, 250 ha will consist of the existing decommissioned waste dumps, heap leach and TSF which were disturbed and rehabilitated in the late 1990s. Approximately 200 ha of new disturbance will be required. A breakdown of the total disturbance area is provided in **Table 2**. Recovered topsoil will be stockpiled for future use in rehabilitation works.

With the exception of the pit, all areas of surface disturbance will be rehabilitated post mining. In terms of the underground development, minimal land disturbance will occur due to the mining method being applied and predicted ground conditions.

Table 2: Land Disturbance Area

Land Feature	Disturbance (Ha)
Pit extension	38.3
Haul road	4.8
Waste dumps (on existing disturbed and rehabilitated area)	211.5
ROM Pad (on existing disturbed and rehabilitated area)	40.0
Office and Workshop	5.0
Processing Plant	30.0
Water Management Dam	30.0
TSF	90.0
Total Area	449.6

2.3.8 Water Balance

The major changes to the site water balance will be the storing of some of Red Dome pit water in a large Water Management Dam (capacity to be determined by life of mine water balance requirements) and ongoing pit dewatering. Both stored water and ongoing pit dewatering flows will be used in processing and dust suppression.

It is expected that the project will have a positive water balance for the first 5 years of operations. Additional water supply sources may need to be considered for operations beyond 5 years.

A water balance flow chart is shown in **Figure 4**.

2.3.9 Road Use

Access to the mine site and administration offices will be via a 2 km access road from the Bourke Development Road.

Copper concentrate will be transported by truck to either Cairns or Townsville ports prior to export. Precious metals dore will be transported under a security arrangement.

2.4 Minerals Processing

2.4.1 Processing Plant Layout

The currently approved Mungana processing facility has a processing capacity of approximately 1 Mtpa. This is insufficient for the proposed Red Dome Pit Extension project and a new plant with a capacity of 4 Mtpa will be constructed for the project. This will be located adjacent to the TSF site (**Figure 3**).

Run of mine ore will be directly fed into the crushing circuit by mining haul trucks. Crushed ore is transferred from the crusher circuit to the open coarse ore stockpile via a stockpile feed conveyor. The ore is reclaimed from the stockpile using reclaim feeders, and transported to the SAG mill via the stockpile reclaim conveyor and mill feed conveyor.

The grinding circuit comprises a SAG mill and a ball mill operating in closed circuit with a cyclone cluster. The cyclone overflow feeds the flotation circuit. A pebble recycle crushing circuit will be installed as part of the SAG mill circuit to maintain throughput when treating the more competent primary ores. The pebbles will be recirculated back into the SAG mill via the pebble conveying system when treating less competent oxide/transition ore types.

The grinding circuit will comminute material sufficiently to liberate minerals for flotation and leaching. A gravity concentration circuit will be included to remove native copper from the mill recirculating material.

Flotation cells will be used in conjunction with various reagent regimes to produce a bulk copper concentrate containing amounts of gold and silver. The bulk flotation circuit aims to maximise recovery of copper minerals in the rougher scavenger section. Rougher scavenger tailings will be thickened and pumped to the leach adsorption circuit. The flotation concentrate will be thickened and filtered by a pressure filter to produce a dry (nominally 10% moisture) copper/gold concentrate, The bulk concentrate will be loaded onto trucks over a weighbridge and shipped to customers.

The combined flotation tails will be dosed with sodium cyanide and leached in a series of leach and adsorption tanks to recover precious metals to solution. Residue from the CIL circuit will be treated in a detox reactor prior to being deposited into the tailings facility. Loaded carbon will be eluted and electrowon and the resulting cathodes smelted to produce doré. The cyanide detoxification process is likely to be the air/SO2 (INCO) process. In this process, sodium metabisulphite provides the reductant (SO2) and copper sulphate is the catalyst for the reaction of free and weak acid dissociable cyanide species to the more inert cyanate product.

The processing plant flowsheet is shown in **Figure 5**.

Figure 4: Water Balance Schematic

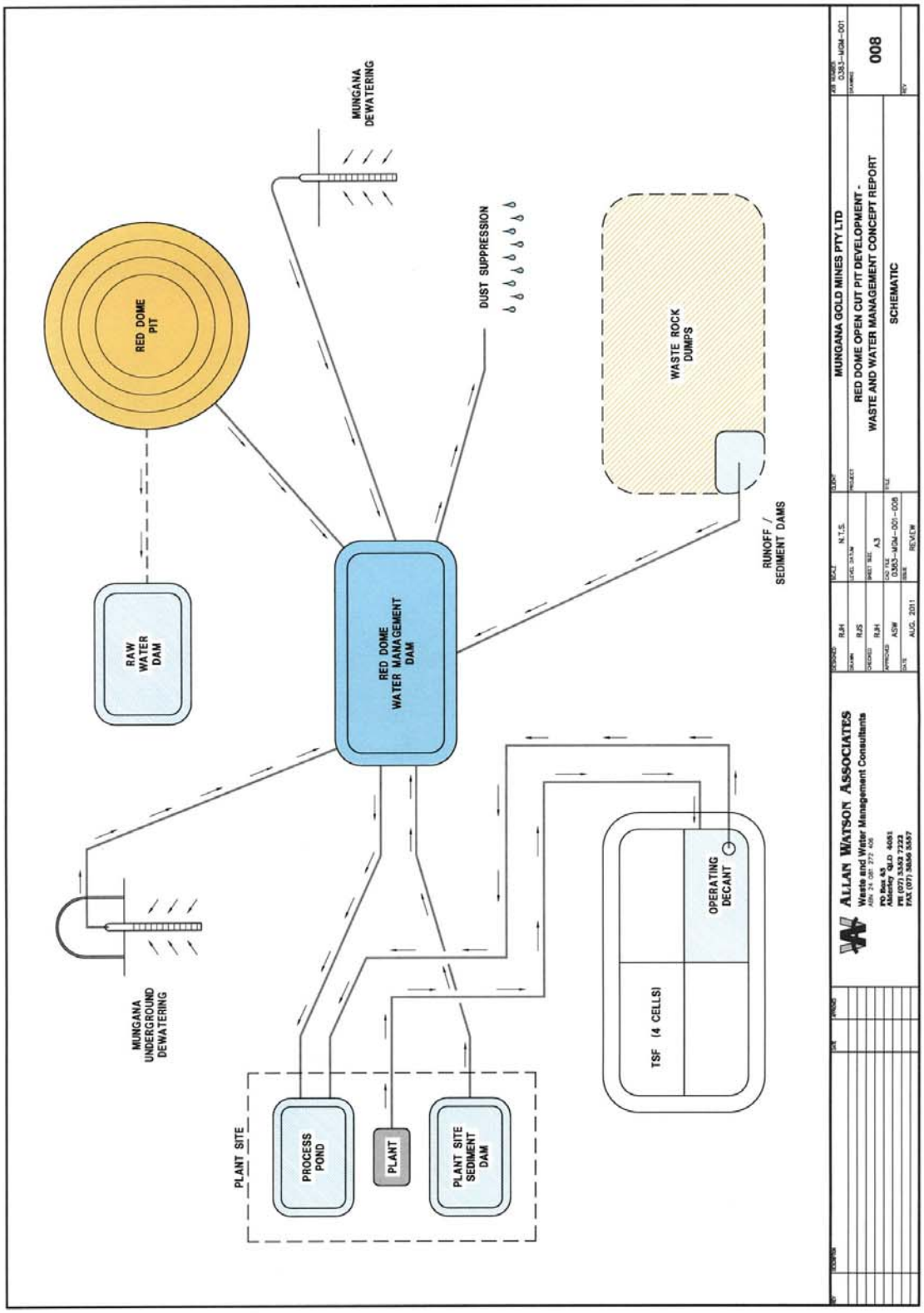
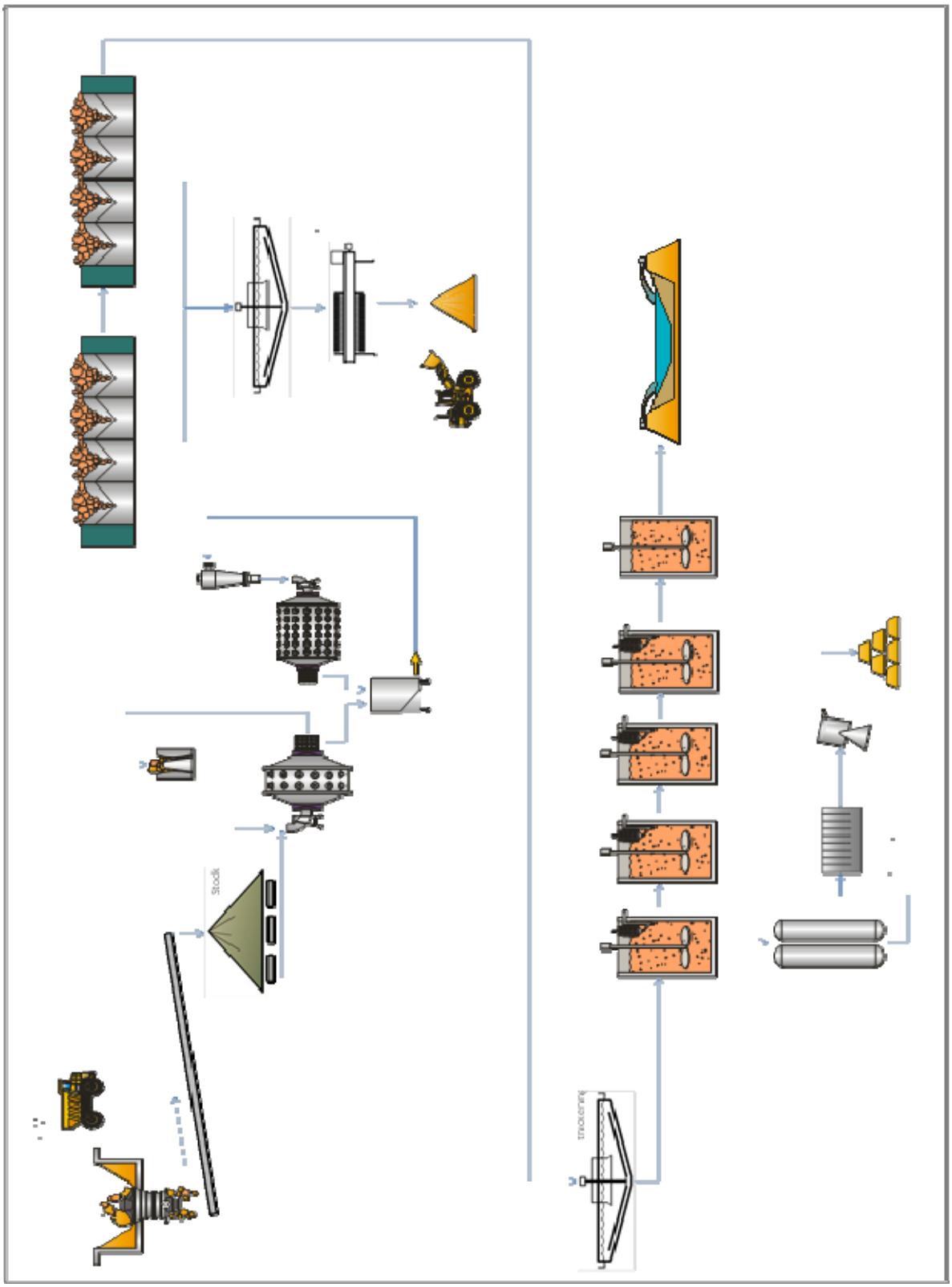


Figure 5: Processing Plant Flowsheet



2.4.2 Reagents

Major reagents and consumables used in processing will include:

- Lime (quicklime)
- Sodium cyanide
- Caustic soda
- Hydrochloric acid
- Activated carbon
- Sodium metabisulphite
- Grinding media (steel balls)
- Flocculant
- Fuel (diesel and LPG)
- Flotation collectors and frothers
- Sodium hydrosulphide.

2.4.3 Tailings Management

The Tailings Storage Facility is situated to the south of the Sentinel Range (**Figure 3**) in a site underlain by the Dargalong Metamorphics which consist of low overall primary porosity metamorphics which are not regarded as hydraulically conductive.

The TSF will be sized to accommodate all tailings produced by the plant over the initial 10 -12 years operation, as well as to provide sufficient freeboard in accordance with regulatory requirements. As such there is sufficient capacity to accommodate all of the tailings produced by the proposed CIL circuit.

The TSF includes the following components.

- TSF subdivided internally into 4 cells (Cell 1 is existing).
- Earth and rockfill embankment.
- Storage clay lining comprising conditioning and compaction of *in situ* storage soils.
- Emergency spillway located on an abutment of the TSF and discharging to a tributary of Welcome Creek.
- Seepage collection system comprising an embankment underdrain, seepage collection sump and return water pump.
- Decant pond for the recovery of free tailings water and stormwater runoff from the beach areas.
- Tailings delivery line from the plant site to the TSF.
- Perimeter tailings deposition line with spigots.
- Return water line from the decant pond to the Process Pond.

The spigotting will be cycled to maximise air drying of the beaches. The recovery of water from the TSF will occur from a decant pond located near the perimeter of the TSF. The decant system will be operated such that the water volume within the decant area is generally kept to a minimum level. It is envisaged that a sled mounted recovery pump would be used to return water to the plant site.

A perimeter seepage collection system will be constructed for the TSF incorporating a subsurface drain downstream of the embankment core with the drain grading to a collection sump for the recovery of seepage and return to the TSF storage.

2.5 Other on-site activities

Telephone communications have already been achieved by the extension of the Telstra network a further 3 km along the Burke Development Road from Red Dome. There is mobile phone service available in the area, there may be reception black spots in certain parts of the development area.

Radio communication will be utilised in the plant site using existing UHF bandwidth.

Fire protection will be provided by:

- strategically located hydrants and reels, connected to the process water distribution system
- a diesel-driven fire water pump for emergency use, located adjacent to the process water pumps at the process water dam
- portable fire extinguishers in high risk areas and site vehicles
- smoke detectors and alarms
- designated fire drill, practice and training area.

2.6 Employment

Estimated employment levels involved in construction, administration, processing and mining schedule of up to 4 Mtpa are shown in **Table 3** for a notional 10 year life of mine. These will be firmed up as planning for construction and operations advances.

Table 3: Staff and Labour Requirements

Expected crew levels	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Construction (contract)	120	120	15	15	15	15	15	15	15	15	15
Administration		20	20	20	20	20	20	20	20	20	20
Processing		70	95	95	95	95	95	95	95	95	95
Mining		70	155	155	155	155	155	155	155	155	155
Transport & services		20	20	20	20	20	20	20	20	20	20
Total	120	300	305	305	305	305	305	305	305	305	305

The level of employment by Mungana Goldmines Ltd and contractors is estimated to be 300-350 people, including the mining workforce for the Mungana Pit. It is envisaged that mining activities at Red Dome will provide long term employment beyond 2024. It is expected that the workforce will largely be drawn from the Tablelands and Cairns region.

2.7 Services

2.7.1 Accommodation

Kagara's existing 240 person Chillagoe Camp is located 15 km from the Red Dome lease area and currently operates at approximately 50 % capacity. It provides ample space for construction of additional accommodation. Mungana Goldmines propose to extend the camp facility to accommodate personnel during the construction and operations phase. The camp extension will

include additional accommodation cabins, potable water supply, wastewater treatment and disposal system, catering hall and other shared facilities.

2.7.2 General Services

Ongoing procurement of services will include:

- Communication systems
- Mobile phone service
- Camp and catering services (locally and regionally sourced)
- Maintenance (locally & regionally sourced)
- Consumables and maintenance in the processing area including supply of reagents (approximately $12 million per year)
- Leasing of vehicles
- Engineering consultants and contractors.

2.7.3 Electricity

Kagara/Ergon recently installed a new 66/22kV substation at Chillagoe and an 11kVA power line to site to provide electricity to the Mungana Gold Open Pit Development project and existing underground operations.

A grid power upgrade is required to meet the energy needs of the proposed RDPE processing facility, Red Dome pit dewatering, and mine support facilities for the RDPE project. Power connection assessment reports completed by Hill Michael & Associates (July 2011 and December 2011) assessed various options and recommended an upgrade/connection to the 66/22kV Chillagoe substation and an upgrade to the power line between Turkinje and Dimbulah. Mungana Goldmines lodged a power connection enquiry with Ergon and a response was received in November 2011. Further consultation with Ergon for a reduced load demand is underway.

3. Description of the Existing Environment

3.1 Climate

The climate of the area is monsoonal, with high rainfall in summer and early autumn, and relatively dry winters. The mean annual rainfall for Chillagoe is 864.2 mm with the highest monthly rainfall occurring in January (223.6 mm) and the lowest in July and August (4 mm). The greatest rainfall occurs in the wet season months from November to March inclusive (782.5 mm). The mean monthly maximum temperature for the area ranges from 25.5°C in July to 33.9°C in December; the mean monthly minimum temperature ranges from 11.2°C in July to 21°C in February. The predominant wind direction during the year is easterly. Wind speed is generally between 5 and 9 knots.

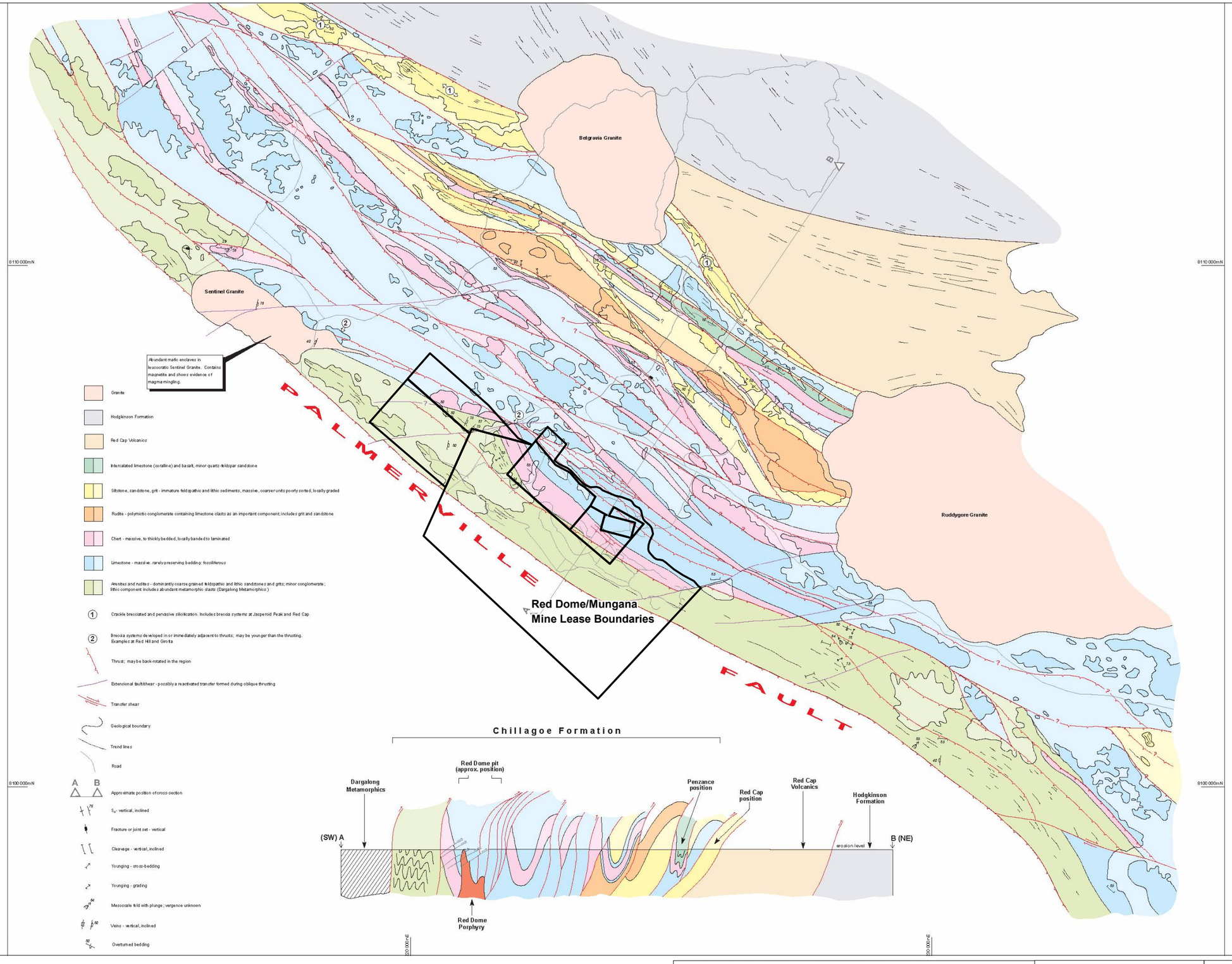
3.2 Land

Topography - The regional setting of the site comprises undulating to rolling hills on sedimentary rocks with numerous rocky outcrops. Much of the Red Dome project area's topography has been modified by the (now decommissioned) Red Dome Gold Mine. Topographic features of the decommissioned mine include the Open Pit, Tailings Storage Facility, Raw Water Dam and Waste Rock Dumps. Approximately 60 % of the Red Dome Mine site has been rehabilitated, with much of the remaining 40 % consisting of undisturbed lands. The most striking natural topography in the area is the karst landscape (bluff and cave systems) formed from the limestone of the Chillagoe Formation.

Geology – The Red Dome deposit lies in the same north-west trending structural 'corridor' as the existing Mungana Mine three kilometres to the west-northwest. The 'corridor' contains a sequence of Siluro-Devonian sediments known as the Chillagoe Formation, which in turn, forms part of the Hodgkinson Province (**Figure 6**). The Chillagoe Formation consists of highly faulted, folded and steeply dipping, west-north-west to east-south-east striking sandstone, chert, conglomerate, breccia, and limestone. Post-deposition tectonic events have severely disrupted the original sedimentary sequence and resulted in a complex of imbricate thrust slices overlying the Palmerville Fault which forms the south-western edge of the 'corridor' (Nethery & Barr 1998). Karst systems have formed in the limestone bands of the Chillagoe Formation.

The Ordovician Mulgrave Formation is a narrow north-westerly trending belt of (mainly) sandstones that occurs between the Chillagoe Formation and the Palmerville Fault. It is dominated by fine to medium-grained, moderately to poorly sorted quartzose arenite, with minor interbedded siltstone, mudstone and shale (Donchak & Bultitude 1998; DME & AGSO 1997).

The Proterozoic Dargalong Metamorphics occupy the area on the south-western side of the Palmerville Fault (**Figure 6**). They consist of a series of highly metamorphosed rocks, chiefly gneisses, amphibolites, and schists. The unit crops out poorly, except in some stream beds, and generally forms flat undulating terrain. Adjacent to the Palmerville Fault, the Dargalong Metamorphics consist mainly of intensely deformed, mylonitised quartzofeldspathic gneiss, amphibolite, minor quartz mylonite and muscovite-quartz mylonite (Donchak & Bultitude 1998; DME & AGSO 1997).



PROJECT: Red Dome Pit Extension - Initial Advice Statement
TITLE: Region Geological Overview and Cross-section

T:_AAA\230\WOR\2301005_01\2301005.01_RDPE Geology_2012_04_26

JOB NO: 2301001.05
DATE: April 2012
SOURCE: NRA, MGL, Normandy Exploration

MUNGANA GOLDMINES

Figure 6

Recommended print size: A3

The Chillagoe Formation is intruded by a number of granitic bodies and later mineralised porphyries such as those worked at Red Dome. Roughly synchronous with the porphyries were a number of episodes of mineralisation with the deposition of significant Au, Cu, Pb and Zn ore bodies (Nethery & Barr 1998).

The primary impact on the geology of the RDPE will be the excavation of the open pit. The proposed pit is contained entirely in the Chillagoe Formation and will largely involve the removal of sandstones, chert, limestone, breccia, porphyry and skarn. The vast majority of the material excavated will be sandstone and limestone.

Land use- The main land uses on the site are low intensity cattle grazing and underground mining. The majority of the site is considered to have a low or marginal suitability for low intensity cattle grazing. Land system mapping indicates that no good quality agricultural land occurs on or in the vicinity of the RDPE.

Visual amenity - The RDPE pit and facilities will not be visible from any public roads, readily accessible lookouts, settlements or residences, and will only be visible to people working at the mine or involved in managing grazing activities or people accessing the Piano Caves section of the Chillagoe-Mungana National Park (access to this section is limited by the terrain). The Red Dome pit (to be cut back as part of this project) will remain as the lasting post mining impact on visual amenity.

Surface waterways

The Red Dome Project area and the RDPE area lie within a sub-catchment of the Walsh River, which is in the Mitchell River catchment. The Walsh River is one of four major rivers that flow into the Mitchell River and the Gulf of Carpentaria (**Figure 1**).

Stream systems immediately relevant to the Red Dome project are Lily Creek, Opera Creek, Welcome Creek and One Mile Creek. The RDPE area lies within the catchments of Lily Creek Opera Creek and Welcome Creek. All streams on the site are ephemeral and generally only flow in response to rainfall with minor persistence from groundwater discharge likely to extend for several months following the wet season.

Because of the relatively small catchment areas and well defined channels with moderate slopes, flooding typically results from short duration high rainfall intensity events, with flooding typically only occurring over periods of several hours or days duration.

Surface water in the vicinity of the Red Dome Project area has been determined to have the following values.

- Slightly-moderately disturbed ecosystems.
- Recreation or aesthetic.
- Primary industry/agriculture (stockwater).

The Red Dome Pit (existing) and Mungana Pit (approved) will remain post-mining. Other storages are planned to be decommissioned and removed, with the exception of the Raw Water Dam which will be managed to achieve water suitable for stock. Although water storages have no environmental values during mining, it is planned to manage the water in the Raw Water Dam to keep its quality consistent with the protection of a slightly modified aquatic ecosystem and no worse than stock water (with reference to ANZECC 2000).

Groundwater

The groundwater resources relevant to the Red Dome Project are described in **Table 4.**

Table 4: Groundwater Resources

Groundwater resources Aquifer Unit	Local Significance	Regional Significance
Chillagoe Formation limestone	High	Aquifer unit is longitudinally extensive, but hydraulically disrupted. It is significant for stockwatering and industrial supplies.
Chillagoe Formation sandstone	Not used as a groundwater resource owing to proximity of limestone aquifers	Not regionally significant
Dargalong Metamorphics	Not used as a groundwater resource	Not regionally significant
Ruddygore Graniodiorite	Locally significant for stockwatering supplies	Not regionally significant
Alluvium	Low significance in project area owing to lack of alluvial development	Not regionally significant

Vulnerability of the groundwater is identified as follows.

- The Ruddygore Granodiorite is remote from the project vicinity and is of low permeability. It is assessed that its groundwater vulnerability is low.
- The Daragalong Metamorphics are closer to the project and underlay the Mungana TSF (which will be utilised and expanded for the RDPE), however they are:
  - of low permeability and thus unlikely to be impacted by the TSF
  - hydraulically isolated from project infrastructure areas, including the pit, by the Palmerville Fault.

  Thus the Dargalong Metamorphics are of relatively low groundwater vulnerability.
- The vulnerability of the Chillagoe Formation sandstone is of low permeability but is assessed to be moderate vulnerability due to proximity to the project infrastructure.
- The aquifer unit with the highest groundwater vulnerability is the Chillagoe Formation limestone. It is the highest permeability aquifer unit in the project area and includes the Red Dome pit.

Values for groundwater in the vicinity of the RDPE are as follows.

- Stock watering.
- Industrial (mine processing) use – water from dewatering will be used in processing.
- Site drinking water supply (after treatment).
- Modified aquatic ecosystems.

Parts of the Chillagoe-Mungana National Park adjoin the lease area. The Spring Tower Complex section of the National Park includes subterranean wetlands. Geological mapping shows that while the limestone karsts of the National Park are within the Chillagoe Formation limestone a hydraulic disruption exists. Cones of depression associated with historical dewatering of the Red Dome Pit and at Kagara's existing Mungana underground mine (2007 to present) have proven to

be elongated along the strike of the Chillagoe Formation. Groundwater levels, normal to the strike (*ie* in the direction of the Chillagoe karst system), have shown little or no impact. The local hydrogeological characteristics will be further investigated as part of the RDPE Environmental Impact Statement and will include the installation of additional investigation and monitoring bores (completed) and investigations within the Chillagoe-Mungana National Park (conducted in association with the Department of National Parks, Recreation, Sport and Racing).

Groundwater is currently taken from bore WB 14 for on-site drinking water supply following treatment. The only other known drinking water source from ground water is the Chillagoe town bore 15 kms to the northeast of the RDPE area. Both bores are in the Chillagoe Formation limestone. No impacts on current or future drinking water supplies from groundwater are expected as:

- the aquifers within the Chillagoe Formation limestone are semi-confined or confined
- flow in the Chillagoe Formation limestone in the vicinity of the project is not towards Chillagoe (and the Chillagoe water supply bore).

The RDPE project area is also hydrologically discontinuous from stockwater bores in the area.

3.5 Air

The closest noise-sensitive residential locations are Chillagoe and Rookwood Station. The National Parks adjoining the Red Dome Project area are also defined as sensitive locations (**Figure 7**). Existing potential sources of particulate emissions from the surrounding environment primarily comprise:

- grazing activities
- mining operations (including marble crushing and bagging in Chillagoe)
- unsealed roads
- smoke.

Environmental values associated with air quality are:

- air quality experienced by residents along Burke Development Road between the site and Mareeba (the transport route along which concentrate will be hauled)
- air quality in the adjacent limestone cave systems containing delicate formations (stalactites and stalagmites) as well as known habitat for the Greater Large-eared Horseshoe Bat (*Rhinolophus philippinensis maros* - Endangered, EPBC and NC Act) and Diadem Leaf-nosed Bat (*Hipposideros diadema reginae* - Near threatened, NC Act) and potential habitat of the Northern Quoll (*Dasyurus hallucatus* - Endangered, EPBC Act).

The most likely source of impact on air quality will be dust. The values of the Chillagoe-Mungana National Park and karst systems do not appear to have been impacted by dust and emissions from the previous Red Dome operations.

Modelling will be carried out to determine if the operation will comply with adopted dust limits at all sensitive receptors. Dust emission controls such as windbreaks and sprays on ore stockpiles are expected to be required to ensure that ultra fine dust limits and nuisance dust limits are met at the entrance to caves in the Chillagoe-Mungana National Park.

Mitigation measures expected to be adopted include the review and maintenance of existing systems including existing conservation zones around known or potential habitat of listed species and implementation of an air quality management plan inclusive of specific controls such as dust suppression and covered storages.

3.6 Noise and Vibration

The closest noise-sensitive residential locations are Chillagoe and Rookwood Station. The National Parks adjoining the Red Dome Project area are also defined as sensitive locations (**Figure 7**). With respect to vibration the occurrence of Indigenous and non-Indigenous cultural heritage sites in the vicinity of the Red Dome pit also require consideration.

Existing noise sources from the surrounding environment primarily comprise:

- road-based traffic (mainly associated with existing mining operations and the cattle transport industry)
- existing mines
- residential activity noise.

Environmental values associated with noise and vibrations are:

- noise experienced by residents along Burke Development Road between the site and Mareeba (the transport route along which supplies and concentrate will be hauled)
- noise and vibration in the adjacent limestone cave systems which contain delicate formations (stalactites and stalagmites) as well as known habitat for threatened species (Greater Large-eared Horseshoe Bat and Diadem Leaf-nosed Bat) and potential habitat of the Northern Quoll.

Modelling of noise levels will be carried out to determine if the operation can comply with adopted acoustic quality goals at noise sensitive receptors. With respect to the caves identified as sensitive receivers, specific modelling will be needed to determine noise levels likely to be experienced especially when operations are on, or close to, the natural surface.

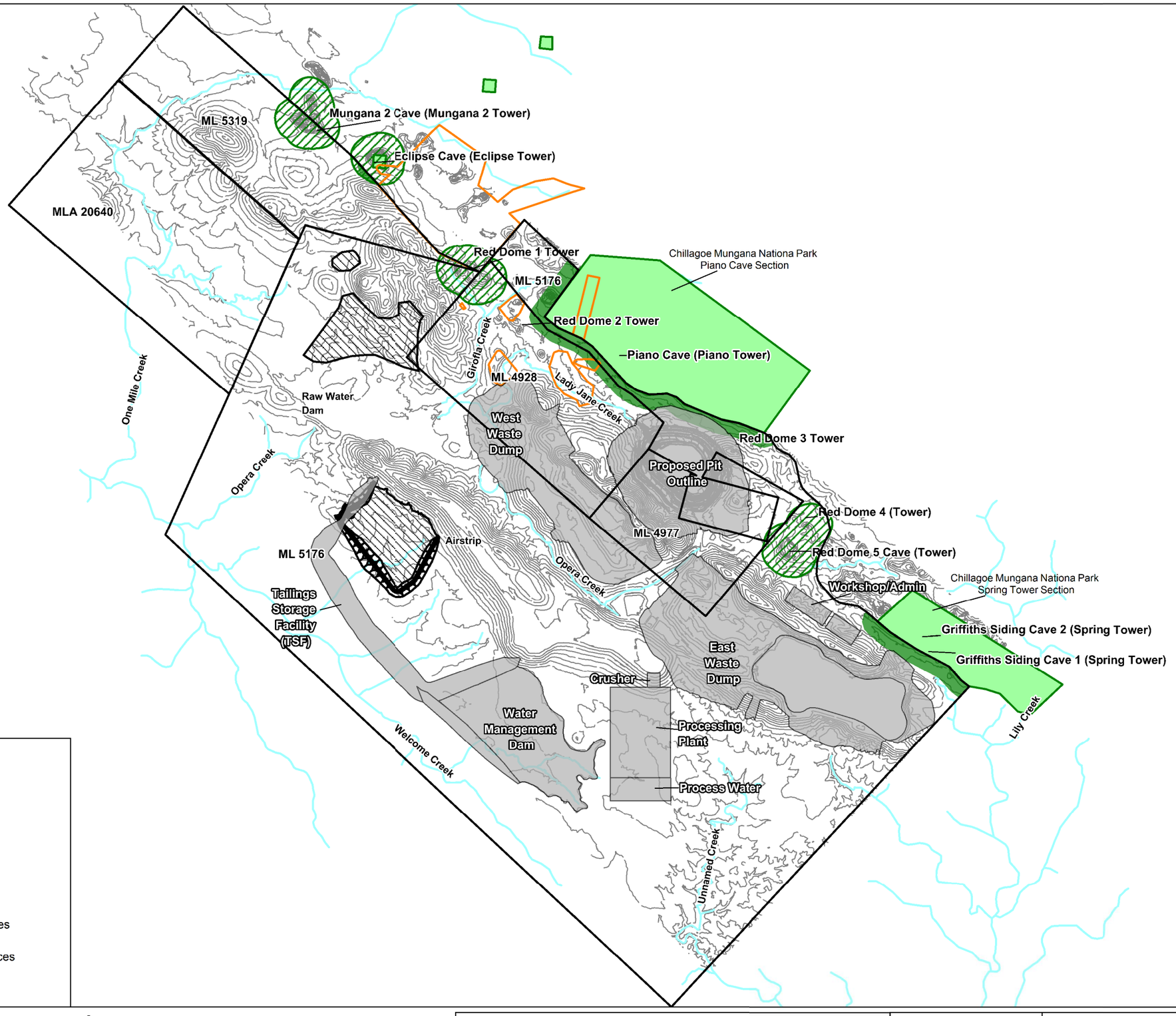
Mitigation measures expected to be adopted include the maintenance of existing conservation zones and the adoption of low-noise impact driving techniques (for example, driving at low-speeds in the vicinity of residences, no use of air brakes within 2 km of the township of Chillagoe).

With respect to vibration, the conditions applying to the Red Dome Project Referral approval (2006) included the nomination of maximum peak particle velocity and maximum peak air overpressure of 25 mm/s and 140 dB(L) respectively, measured within 10 m of the entrance to a designated cave in each of Mungana 2, Eclipse Tower (Eclipse Cave), Piano Tower (Piano Cave), Red Dome 4 and Red Dome 5 limestone karsts. This was based on experience during the Red Dome operation when blasting occurred in the open pit within 100 m of the Chillagoe-Mungana Caves National Park and the caves therein. The values of the National Park and karst systems do not appear to have been impacted by Red Dome operations.

These levels are higher than the Department of Environment and Heritage Protection (DEHP) guidelines for ‘noise sensitive places’ but are conservative in terms of preserving the structural integrity of the caves. Similarly, none of the listed Heritage Sites or other European and Indigenous cultural heritage sites identified in the vicinity represents substantive structures and as such they are not sensitive to ground vibration impacts.

Modelling will be carried out to assist in developing blasting regimes and controls that are required to meet the Red Dome Project Referral levels and DEHP guideline values.

It is expected that blast vibration from each blast will be monitored at a location that will permit the peak particle velocity and airblast overpressure levels resulting at all sensitive sites in the surrounding area to be determined by contour assessment modelling.



PROJECT: Red Dome Pit Expansion - Initial Advice Statement
TITLE: Sensitive Areas and RDPE Footprint

T:_AAA\230\WOR\2301005_01\2301005.01_Env_Sensitive Areas_2012_04_26.wor

JOB NO: 2301001.06
DATE: April 2012
SOURCE: NRA, MGL

MUNGANA GOLDMINES

Figure 7

Recommended print size: A3

3.7 Nature Conservation

Landscape Overview - There are several distinct vegetation types in the local landscape. The landscape around the RDPE is mostly low rolling hills and flats dominated by sclerophyllous woodlands and dry open eucalypt forests. Ephemeral waterways with narrow borders of riparian vegetation dissect the landscape; these are not always distinct or continuous. There are also artificial permanent water sources (dams) in the project area and the surrounding countryside. The northern margin of the RDPE is characterised by limestone karst formations (*ie* towers, caves and scree slopes). Vegetation on and around the limestone towers is dominated by dry Semi-deciduous Vine Thicket. Some species in this vegetation community are restricted to these outcrops due to soil associations, but others maintain their distribution around the limestone karsts due to the reduced fire risk.

Most of the Red Dome Project area supports Ironbark (*Eucalyptus cullenii*) and Red Bloodwood (*Corymbia erythrophloia*) or Box woodland types. A third vegetation community type (Semi-deciduous Vine Thicket) occurs in areas adjacent to limestone towers. Riparian vegetation associated with ephemeral waterways is also present.

A substantial proportion of the project area comprises rehabilitated waste dumps and mining areas associated with the decommissioned Red Dome Gold Mine.

In the surrounding area the remnant vegetation communities are broadly continuous across the landscape. In general the canopy and understory remain intact. Although the dominant vegetation is generally composed of native species, long-term grazing has affected the understory and groundcover. Weed incursion is a significant issue, particularly in the drainages, low lying alluvium and adjacent flats.

Ecological Communities - None of the Regional Ecosystems (REs) in the general project area are listed in the online *Environmental Protection and Biodiversity Conservation Act* (EPBC Act) Threatened Ecological Communities database (DEWHA 2009). None of the REs are listed as Of Concern or Endangered under the *Vegetation Management Act* 1999 (VM Act).

Flora Species of Conservation Significance – Seven species of conservation significance are present or have a high likelihood of occurrence in the vicinity of the RDPE area: *Chamaesyce carissoides* (Vulnerable - EPBC Act and NC Act), *Graptophyllum excelsum* (Near Threatened – NC Act), *Lepturus minutus* (Vulnerable – NC Act), *Lepturus xerophilus* (Near Threatened - NC Act), *Macropteranthes montana* (Vulnerable – EPBC Act and NC Act), *Panicum chillagoanum* (Near Threatened - NC Act), *Stictocardia queenslandica* (Near Threatened - NC Act).

Weeds - The main weed species of management concern are Chinee Apple and Rubber Vine. Kagara Ltd has maintained an ongoing weed control program since 2006 and has successfully reduced the occurrence of these weeds to low levels in parts of the project area where they were previously dominant.

Fauna species of conservation significance (ie Near Threatened, Vulnerable or Endangered species) - 10 fauna species of conservation significance have been recorded or have a high potential to occur in vicinity of the RDPE area.

- *Carlia rococo* (NC Act – Near Threatened)
- *Lerista storri* (NC Act – Near Threatened)
- Black-necked Stork (NC Act – Near Threatened)
- Cotton Pygmy-goose (NC Act – Near Threatened).

- Square-tailed Kite (NC Act – Near Threatened).
- Grey Falcon (NC Act – Near Threatened).
- Mareeba Rock-wallaby (NC Act – Near Threatened).
- Northern Quoll (EPBC Act – Endangered)
- Greater Large-eared Horseshoe Bat (EPBC Act – Endangered; NC Act – Endangered).
- Diadem Leaf-nosed Bat (NC Act – Near Threatened).

Feral pests - Feral pigs, feral cats, rabbits and Dingo/wild dogs have been documented in the area.

Aquatic systems - The stream systems, all of which are ephemeral, that are immediately relevant to the Red Dome Project are:

- Lily Creek
- Opera Creek
- Welcome Creek
- One Mile Creek.

These ephemeral systems are considered to be best characterised as slightly modified aquatic ecosystems.

Environmentally Sensitive Areas – Sensitive areas (**Figure 7**) in the vicinity of the Red Dome Project area are as follows.

- Chillagoe-Mungana Caves National Park. Eclipse Tower, Piano Tower and Spring Tower are part of Chillagoe-Mungana Caves National Park, and are immediately adjacent to the Red Dome Project area. National Parks are defined as Category A environmentally sensitive areas under the *Environmental Protection Regulation* 2008. One hundred metre National Park buffer zones were defined in the 2006 EPBC Act Referral with the exception of areas encompassing the Red Dome pit where the potential for future mining activities (subject to State approvals) was identified.
- Defined Conservation Zones around karst systems which provide known or potential habitat Greater Large-eared Horseshoe Bat, Diadem Leaf-nosed Bat and/or Northern Quoll.
- The Chillagoe Karst Area is listed on the (closed) Register of the National Estate. The National Estate area, together with the Chillagoe-Mungana Caves National Park, has been nominated for National Heritage List (Chillagoe Karst Region, Place ID 105958) under the EPBC Act.
- Nationally Significant Wetland. The Spring Tower Complex is a wetland of national importance and included on the Directory of Important Wetlands in Australia (Environment Australia 2001). The complex is associated with Spring Tower and adjacent limestone areas along the north-east boundary of the Red Dome Project Area.
- The historic Mungana Township, Girofla Mine, Girofla Smelter, Lady Jane Mine, Old Mungana, and the ruins of the Eclipse Limeworks and hospital are listed as the Mungana Archaeological Area (No. 700001) on the Queensland Heritage Register. As such, these areas are defined as Category B environmentally sensitive areas under the *Environmental Protection Regulation* 2008.

Communities or Habitat of Plant Species of Conservation Significance

No Of Concern or Endangered REs listed under the VM Act occur in the project area and the project will not result in impacts to these State protected values. No EPBC Act listed ecological

communities are present in the project area. Therefore, the project is not expected to impact on these Commonwealth protected values.

The majority of EPBC Act and NC Act species that occur in the area are associated with limestone and therefore any potential impacts are minimised as a result of the establishment of Conservation Zones around Mungana 2, Eclipse Tower, Red Dome 1, Red Dome 4 and Red Dome 5 limestone karsts. The zones have been in place since 2006 and have been successfully managed. Status of compliance with EPBC Act approval conditions is reported to the Department of Sustainability, Environment, Water, Population and Communities (DSEWPaC) annually.

Habitat of Fauna Species of Conservation Significance

The 2006 Referral under the EPBC Act determined that potential impacts on the Northern Quoll (EPBC Act – Endangered) and Greater Large-eared Horseshoe Bat (EPBC Act – Endangered; NC Act – Endangered) were:

- clearing, excavation, or other physical disturbance resulting in the long-term loss of roost site use by bats and den sites by quoll
- clearing or disturbance to foraging habitat adjacent to bat roosts and core quoll habitat areas (limestone karsts).
- permanent loss of surface water resources near bat roosts and core quoll habitat areas (limestone karsts).
- exposure of individuals to contaminated surface waters and associated lethal and sublethal effects.

Mitigation measures were proposed in the Referral to avoid long term impacts on these species and include the following.

- The establishment of 100 m conservation zones around Mungana 2, Eclipse Tower, Red Dome 1, Red Dome 4 and Red Dome 5 limestone karsts.
- Limits on peak particle velocity (below 25 mm/s) and maximum peak air overpressure (140 dB (L)) resulting from blasting to avoid structural damage of caves that are known to support the Greater Large-eared Horseshoe Bat.

Conservation Zones are expected to protect important habitat features (such as limestone towers and vine thicket vegetation) and prevent long-term impacts on these and other species including EPBC migratory fauna and fauna listed under the NC Act

Aquatic Biology of Downstream Environments

Impacts on aquatic ecosystems are most likely to come from four sources:

- direct impacts on waterways
- disturbance to soils leading to erosion and sedimentation in waterways
- release of toxic contaminants associated with mining, processing and transport activities (particularly processing)
- mobilisation of sediments from historical mining areas.

Impacts at the local site level have the potential to affect creeks and rivers downstream of the Red Dome Project area. As the site is approximately 30 km upstream of the Walsh River, a commensurate level of attention to managing mining activities will be needed.

Hydrological investigation has concluded that dewatering of the Red Dome Pit (1980s and 1990s) and the existing underground mine (2006 to present) has not impacted on groundwater in

the adjacent karst systems including the Spring Tower Complex. Additional study will be undertaken as part of the Environmental Impact Statement to determine presence and status of subterranean wetlands in the adjoining National Park particularly the Spring Tower Complex. Investigation will include stygofauna surveys.

3.8 Cultural Heritage

Non-Indigenous Values

The Red Dome Project area includes the former mining area known as the Mungana Group of mines. Over 100 sites have been identified, many associated with the Mungana Archaeological Area (No. 700001) listed on the Queensland Heritage Register which includes the following historical features; the Girofla smelter, the Girofla Mine, the Lady Jane Mine, old Mungana and the Mungana Township including the school, hospital and Eclipse lime works (**Figure 7**).

The RDPE will result in an increased area of disturbance and there is a risk of damage to cultural heritage sites and/or values. Additional site investigations will be carried out as part of the Environmental Impact Assessment to identify and provide management direction designed to protect the site's heritage views.

Indigenous cultural heritage

To meet the provisions of the *Aboriginal Cultural Heritage Act* 2003 (ACH Act), Kagara Ltd has developed draft Cultural Heritage Management Plan Agreements with the Wakaman People #1 and the Wakaman People #2 Aboriginal Parties.

The Cultural Heritage Management Plan Agreements form the basis for mitigation of potential impacts on Indigenous cultural heritage values associated with the RDPE. A Coordinating Committee oversees the operation of the Cultural Heritage Management Plan Agreements and the management of Aboriginal cultural heritage. The responsibilities of each Coordinating Committee are numerous, but key provisions are as follows.

- Providing ongoing advice to Kagara on matters relating to the management of Aboriginal cultural heritage;
- Assisting with development and implementation of a cultural heritage induction program;
- Developing management plans and strategies for cultural heritage in the project area, including compliance audits and ongoing assessment of the condition of Aboriginal cultural heritage areas and objects;
- Assisting Kagara Ltd to comply with all legislation relevant to Aboriginal cultural heritage;
- Developing, settling and amending a cultural heritage zoning scheme to assist with management of Aboriginal cultural heritage.

The Cultural Heritage Management Plan Agreements also outline processes for obtaining approval for ongoing project works, access arrangements for Endorsed Parties, confidentiality, procedures to be used in the event of discovery of human remains, dispute resolution and other administrative matters relating to the implementation of the Cultural Heritage Management Plan Agreements.

Since 2008 Aboriginal cultural heritage assessments have been carried out under the terms of the Cultural Heritage Management Plan Agreements and to a standard that satisfies the Endorsed Parties. It is anticipated that development of the RDPE will also take place under this agreement.

3.9 Social

Kagara initiated a consultative program in 2005 and this program remains current. The consultative program commenced with Federal, State and Local Government agency representatives. It has then progressed to encompass the local community as well as Traditional Owners. Mungana Goldmines Ltd has initiated community engagement with respect to the RDPE and will implement a community consultation program as part of the Social Impact Management Plan required under the Environmental Impact Statement.

The affected community of Chillagoe and surrounds can be described as follows.

- A small residential population of about 300 with work based on the pastoral industry, mining and tourism (based on the Chillagoe-Mungana National Park), supported by government services and a small business community.
- It is a community that has fairly typical Australian balances of age and gender, workforce participation and unemployment.
- It has higher levels of full-time employment and high levels of dwellings fully owned as opposed to being purchased, people living in houses rather than flats, but with a segment in ‘other’ caravan type accommodation.
- Individual earnings are lower than national averages and family and household earnings a lot lower.
- There is a relatively high Indigenous population component of about a quarter. The area’s demographics and employment statistics indicate that the Indigenous population is mainly employed in regular work.

4. Community Consultation

4.1 Interested and Affected Persons

Interested and Affected persons for the project are provided in **Tables 5** and **6** respectively.

Table 5: Interested Persons

Name of Interested Person or Organisation	Sector
Queensland Department of Environment and Heritage Protection	Regulators
Queensland Department of Transport and Main Roads	Regulators
Queensland Department of Natural Resources and Mines	Regulators
Queensland Department of Agriculture, Fisheries and Forestry	Regulators
Department of Sustainability, Environment, Water, Population and Communities (Commonwealth)	Regulators
Queensland Department of Health	Services
Queensland Department of Education, Training and Employment	Services
Queensland Department of Communities, Child Safety and Disability Services	Services
Queensland Department of State Development, Infrastructure and Planning	Services
Ergon Energy	Services
Telstra	Services
Mitchell River Watershed Management Group	Community
Office of the Atherton Tablelands Social and Community Planner	Community
Chillagoe Alliance	Community
Tablelands Regional Council	Community

Table 6: Affected Persons

Name of Affected Person or Organisation	Sector
Tablelands Regional Council	Local Government
Wakamin people[1]	Traditional Owners
Queensland Rail	Background landholder
Chillagoe Station	Background landholder /neighbour
Rookwood Station	Background landholder /neighbour
Queensland Department of National Parks, Recreation, Sport and Racing	Neighbour

[1] There are no active Native Title claims over the area. Interested parties have been identified as part of preparing the Cultural Heritage Management Plan for the project.

4.2 Consultation process

Affected and interested persons will be included in the community consultation program for the Project and will be provided with a copy of the Terms of Reference Notice and EIS for public comment in accordance with the statutory process. The community consultation program will include meetings with affected and interested persons as part of the proponent's program of community engagement which includes:

- liaison meetings with indigenous interested parties
- community meetings.

5. References

DEWHA 2009. *EPBC Act Threatened Ecological Communities* database. Department of the Environment, Water, Heritage and the Arts. <http://www.environment.gov.au/epbc/protect/species-communities.html >.

Donchak, P.J.T. and Bultitude, R.J. 1998. *Atherton, Queensland, 1:250,000 Geological Series – Explanatory Notes* (2nd Edition), Sheet SE55-5. Department of Mines and Energy, Brisbane.

DME & AGSO 1997. *Atherton, Queensland, 1:250,000 Geological Series* (2nd Edition), Sheet SE55-5. Department of Mines and Energy, Brisbane, and Australian Geological Survey Organisation, Canberra.

Environment Australia 2001. *A Directory of Important Wetland.* Third edition. Environment Australia, Canberra.

Nethery, J.E. & Barr, M.J. 1998. 'Red Dome and Mungana gold-silver-copper-lead-zinc deposits', in *Geology of Australian and Papua New Guinean Mineral Deposits*, eds. D.A. Berkman & D.H. Mackenzie, pp 723–28. The Australian Institute of Mining and Metallurgy, Melbourne.

NRA 2006. Red Dome Project EPBC Referral. Prepared by NRA Environmental Consultants for the Department of Environment and Heritage, Canberra, on behalf of Kagara Ltd, March 2006.