caseID: 1347

mineral resources

Department:
Mineral Resources
REPUBLIC OF SOUTH AFRICA

Private Bag X6093, Kimberley, 8300, Tel: (053) 807 1700, Fax: (053) 8325 631
First Floor. Liberty Corner, 29-31 Curry Street, Kimberley 8301

From: Directorate: Mineral Regulation: Northern Cape **Date: 14 December 2010**
Enquiries: Ms Linah Tshikororo **Ref:** NC 30/5/1/2/3/2/1/270 EM

The Director
South African Heritage Resources Agency
PO Box 4637
CAPE TOWN
8000

SA HERITAGE RESOURCES AGENCY
RECEIVED
14 JAN 2011

ATTENTION: MRS NONOFHO NDOBOCHANI

CONSULTATION IN TERMS OF SECTION 40 OF THE MINERAL AND PETROLEUM RESOURCES DEVELOPMENT ACT 2002, (ACT 28 OF 2002) FOR THE APPROVAL OF TO THE ENVIRONMENTAL MANAGEMENT PROGRAMME FOR A MINING RIGHT IN RESPECT OF MANGANESE AND IRON ORE ON PORTION 2 OF THE FARM DEMANENG SITUATED IN THE MAGISTERIAL DISTRICT OF KURUMAN, NORTHERN CAPE REGION.

APPLICANT: SOUTH AFRICAN MANGANESE (PTY) LTD.

Attached herewith, please find a copy of EMProgramme received from the above-mentioned applicant, for your comments.

It would be appreciated if you could forward any comments or requirements your Department may have to this office and to the applicant before **14 February 2011** as required by the Act.

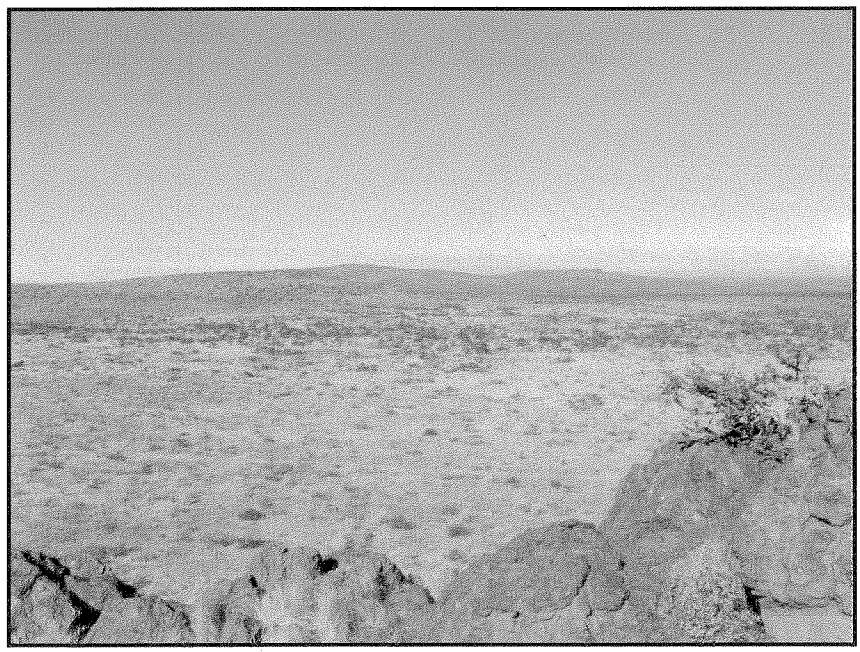
Consultation in this regard has also been initiated with other relevant State Departments. In an attempt to expedite the consultation process please contact **Linah Tshikororo** of this office to make arrangements for a site inspection or for any other enquiries with regard to this application.

Your co-operation will be appreciated.

pp .....
REGIONAL MANAGER: MINERAL REGULATION
NORTHERN CAPE

ENVIRONMENTAL IMPACT ASSESSMENT AND MANAGEMENT REPORT

for a Mining Right application over Portion 2 of the farm Demaneng No. 546, District of Kuruman, Northern Cape Province



Applicant: SA Manganese (Pty) Ltd.

DMR Reference No.: NC 30/5/1/2/2/270 MR

Compiled by:	Karien van der Merwe	Compiled for:	SA Manganese (Pty) Ltd.
Address:	P.O. Box 3620 DIAMOND 8305	Address:	1st Floor, Lakefield Office Park c/o Lenchen & West Streets CENTURION 0157
Phone:	082 964 1667	Phone:	012 643 0118

10 December 2010

CONTENTS

1. INTRODUCTION

1.1 BACKGROUND

The applicant, SA Manganese (Pty) Ltd., has applied for a Mining Right over Portion 2 of the farm Demaneng No. 546, District of Kuruman, Northern Cape Province (Figures 1 & 2), measuring 1136.8563 ha, in terms of Section 22 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) (MPRDA).

1.2 DETAILS OF THE APPLICANT

South African Manganese (Pty) Ltd.
1st Floor, Lakefield Office Park
c/o Lenchen & West Streets
CENTURION
0157

Phone: 012 643 0118
Cellular phone: 082 339 7902

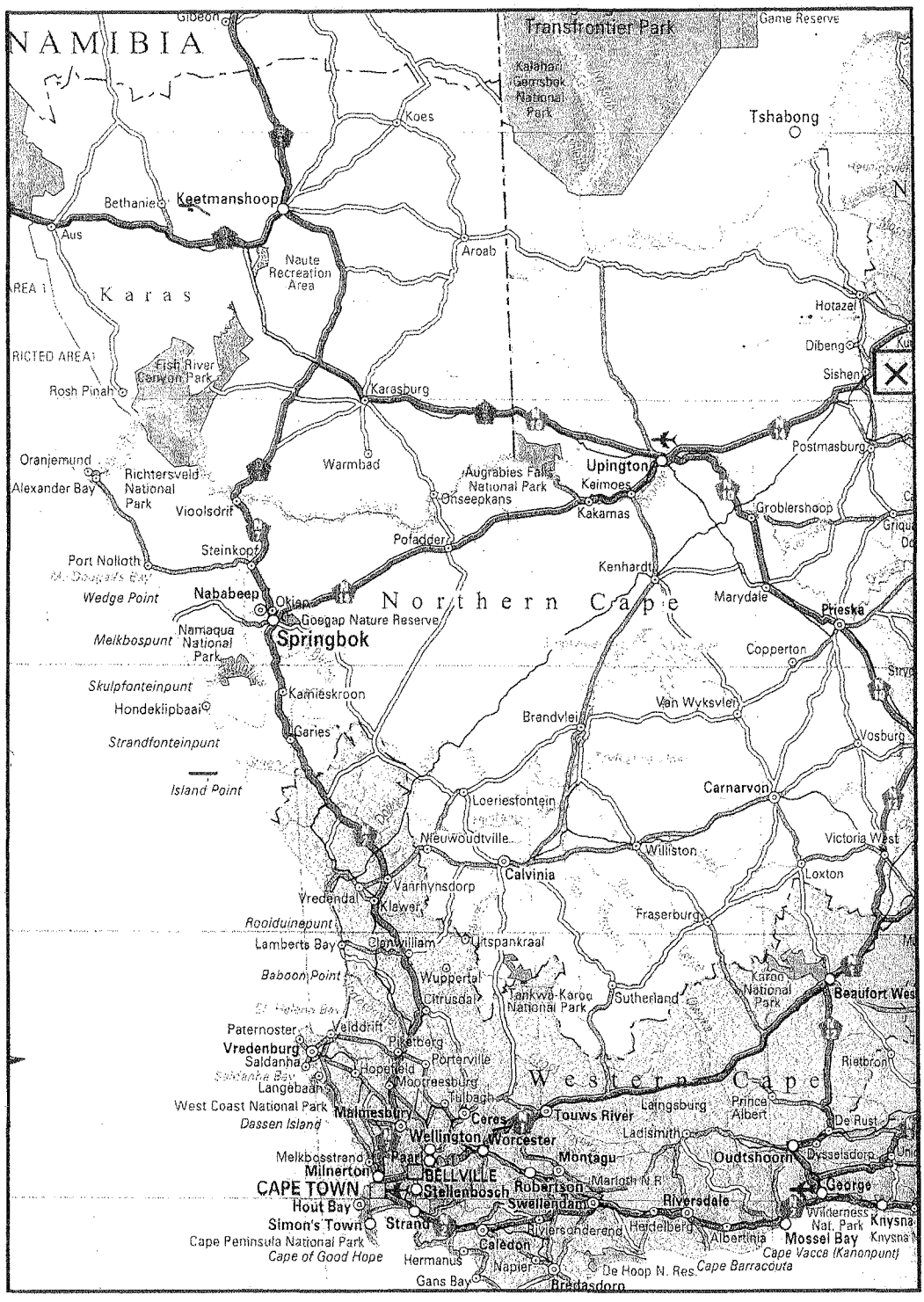
1.3 DETAILS OF THE LAND OWNER

South African Manganese (Pty) Ltd.
1st Floor, Lakefield Office Park
c/o Lenchen & West Streets
CENTURION
0157

HELD: In terms of Deed of Transfer No. T 823/1953.

1.4 TITLE DEED DESCRIPTION

CERTAIN:	Portion 2 of the farm Demaneng No. 546;
SITUATE:	District of Kuruman, Northern Cape Province;



X – Approximate location of the proposed mining area.

Figure 1. Locality plan.

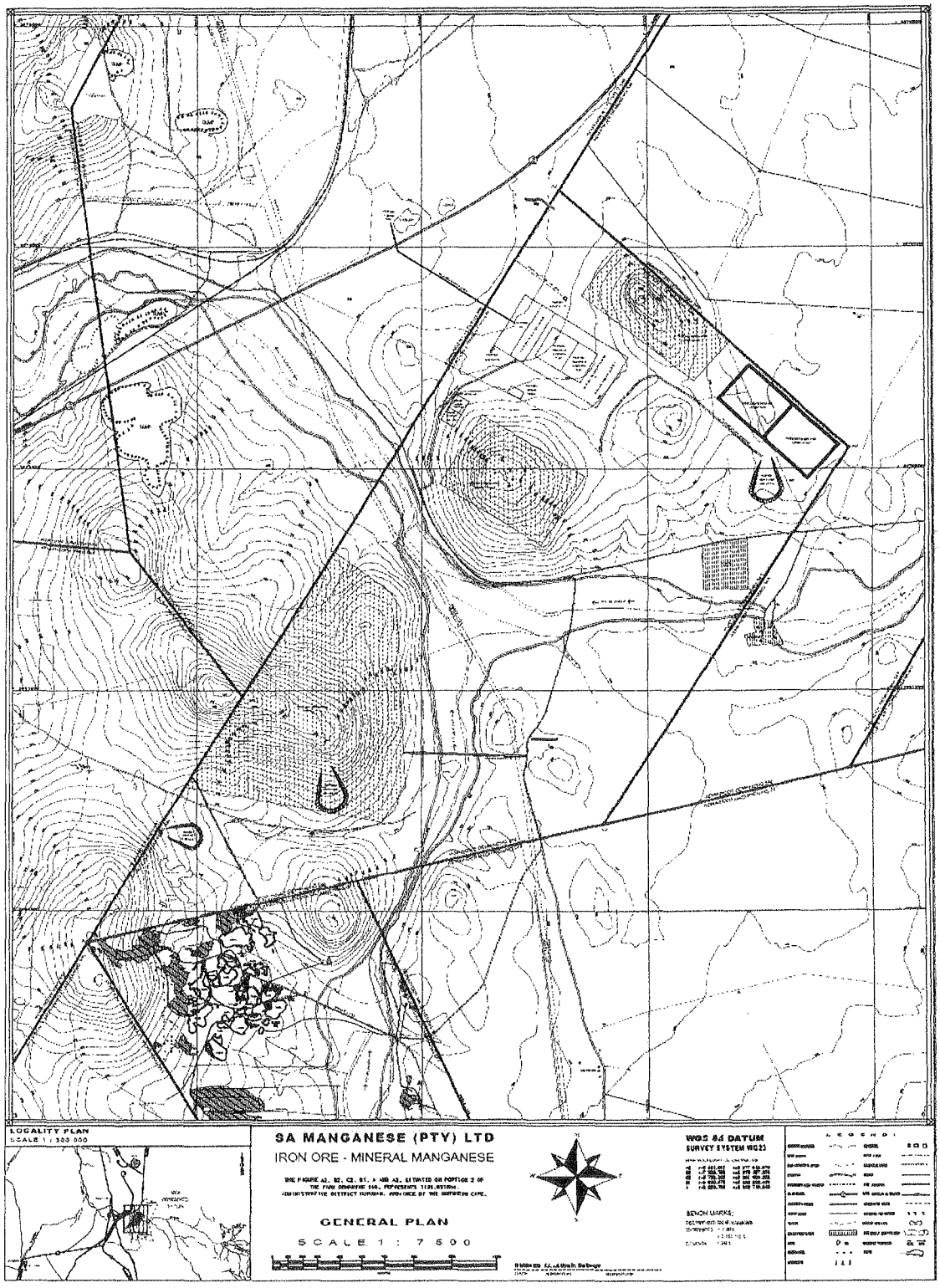


Figure 2. Draft lay-out plan of the proposed mining site.

MEASURING: 1136,8563 (ONE ONE THREE SIX COMMA EIGHT FIVE SIX THREE) hectares;

As per Title Deed T823/1953.

1.5 DETAILS OF THE ENVIRONMENTAL IMPACT ASSESSMENT PRACTITIONER

Karien van der Merwe
P.O. Box 3620
DIAMOND
8305

Telephone number: 082 964 1667
Fax number: 053 832 5004

1.6 DESCRIPTION OF MINING ACTIVITIES

The mining activities of the applicant will in future be the exploitation of manganese ore and iron ore via open cast mining with machinery.

The ore body identified in the proposed mining area is outcropping and, as a result, open cast mining will be implemented (refer to Figure 3 for a schematic representation of the proposed mining process). It is anticipated that the maximum height of benches will not exceed 10 m, while the minimum lead is anticipated to be 30 m.

Blast holes will be percussion drilled in identified target areas, with the diameter of each blast hole measuring 150 mm. Explosives used for blasting will be anfo/cordtex and detonating will be done electrically.

After blasting, waste material will be loaded and hauled to a waste dump, while ore will be loaded and hauled to a primary crusher (jaw crusher). The ore will be crushed to -32 mm via a primary (jaw), secondary (cone) and tertiary (cone) crushing system,

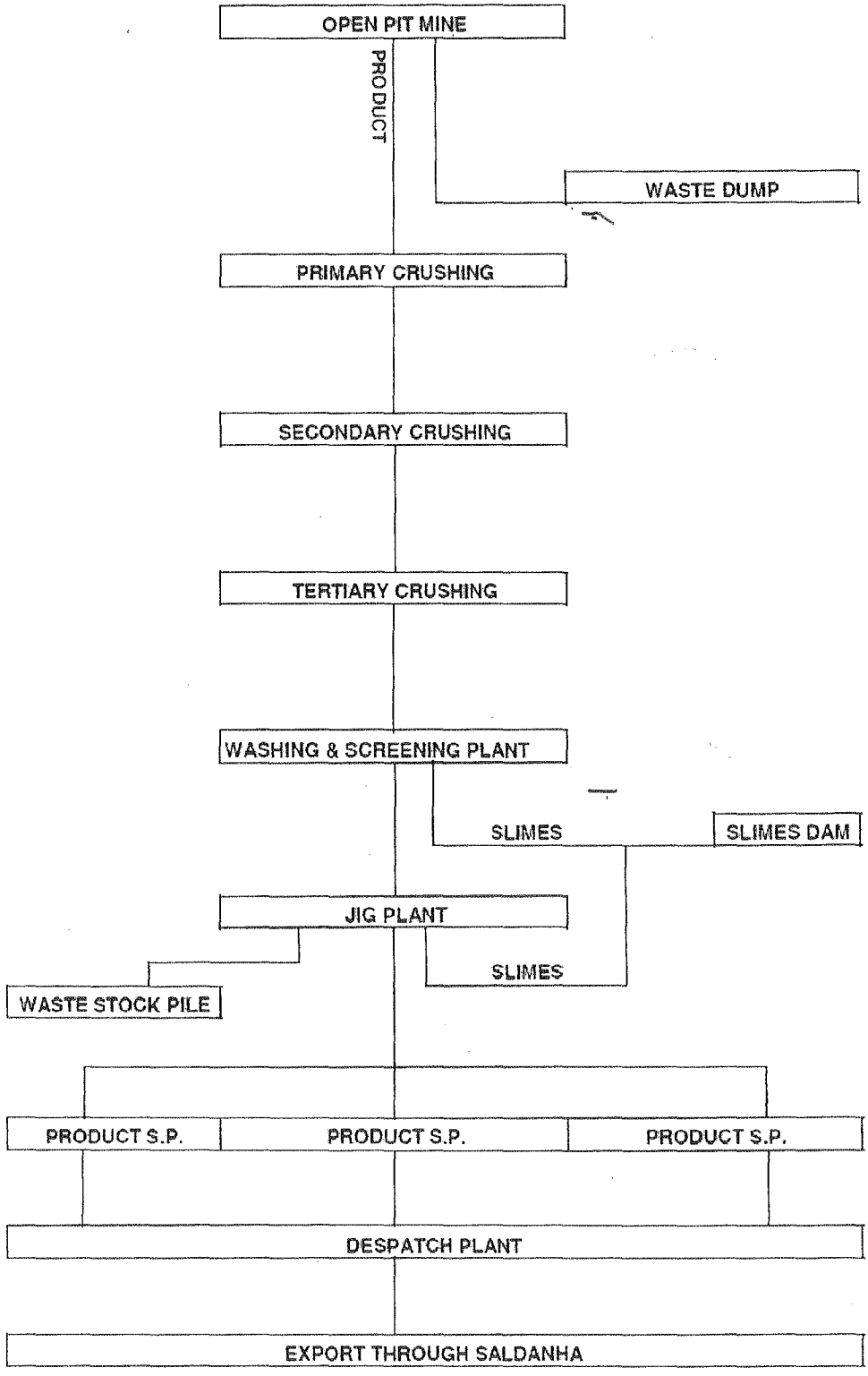


Figure 3. Process flow diagram (compiled by Piet Kotzee, Mine Manager).

where-after crushed material will be washed and screened into different sized fractions, as dictated by the market. Slimes resulting from the washing process will be pumped into one of two slimes dams.

Washed material will be upgraded by means of a dense media separation process and/or jigging process. Slimes from this process will also be pumped into one of two slimes dams.

The final product will be loaded and hauled to stockpiles, while process waste will be stockpiled on waste dumps. Final product will then be transported to a loading plant via conveyor belt, from where it will be loaded onto rail trucks and exported via Saldanha.

The production rate of the proposed mining operation will be approximately 1 736 tons. $month^{-1}$ of manganese ore bearing material and approximately 200 000 $tons.month^{-1}$ of iron ore bearing material, which adds up to a combined total of approximately 201 736 $tons.\ annum^{-1}$. Based on these production figures, the anticipated lifespan of the proposed mining operation is 20 years.

The following mobile equipment will be used for the handling of material:

- 1 x 150 ton haul truck;
- 2 x 20 m^3 loaders;
- 3 x percussion drills;
- 4 x 40 000 ℓ water bowsers (to be used for dust suppression purposes);
- 5 x dozers;
- 6 x graders;
- 7 x 10 m^3 excavators; and
- 8 x utility vehicles.

1.7 REGIONAL SETTING

1.7.1 Magisterial district

The proposed mining area is located within the magisterial district of Kuruman and falls within the borders of the Gamagara Local Municipality, which is located within the John Taolo Gaetsewe district.

1.7.2 Neighbouring towns

Table 1 indicates both the distance and direction from the proposed mining area to the nearest neighbouring towns. Distances given are approximate road measured distances.

2. METHODOLOGY

2.1 LEGISLATION

This document was compiled in accordance with the requirements of Sections 22(4)(a) and 39(1) of the MPRDA and basically consists of two separate sections, namely an Environmental Impact Assessment Report (EIAR) and an Environmental Management Programme (EMPR). The EIAR was compiled in accordance with the requirements of Regulation 50 of the regulations made in terms of Section 107(1) of the MPRDA, while the EMPR was compiled in accordance with the requirements of Regulation 51 of the aforementioned Act.

In addition to meeting the relevant requirements of the MPRDA, as detailed above, this document also aims to incorporate the relevant requirements of the following national and provincial legislation:

- The Constitution of South Africa, 1996 (Act No. 108 of 1996);
- The National Environmental Management Act, 1998 (Act No. 107 of 1998);
- The Environment Conservation Act, 1989 (Act No. 73 of 1989);

Table 1. *Distance to neighbouring towns.*

TOWN	DIRECTION	APPROXIMATE ROAD MEASURED DISTANCE (km)
Kathu	North-west	12
Postmasburg	South	72

- The National Water Act, 1998 (Act No. 36 of 1998);
- The National Heritage Resources Act, 1999 (Act No. 25 of 1999);
- The National Forests Act, 1998 (Act No. 84 of 1998);
- The Nature and Environmental Conservation Ordinance, 1974 (Ordinance No. 19 of 1974);
- The Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983);
- The National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004);
- The Hazardous Substances Act, 1973 (Act No. 15 of 1973); and
- The National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004).

2.2 AIM

The aim of this Environmental Impact Assessment and Management Report is to assist the applicant in conducting the proposed mining operation in accordance with the generally accepted principles of sustainable development by integrating social, economic and environmental factors into the planning and implementation of the proposed mining project in order to ensure that the exploitation of the mineral resource serves the interest of both present and future generations.

2.3 EIA PROCEDURE

The EIA process followed can be briefly summarised as follows:

Firstly a scoping study, which included the process of public participation, was conducted according to the requirements of Regulations 48(1)(a) and 49 of the regulations made in terms of Section 107(1) of the MPRDA, with the main aim of identifying the potential impacts of the proposed mining operation on the natural environment (including the natural, social and cultural aspects thereof) of the proposed mining area. In addition to identifying the potential impacts of the proposed operation on the natural environment, this scoping study was also aimed at identifying potential knowledge gaps which needed to be addressed as part of the EIA process.

Reasonable development and other alternatives were also identified during the scoping process. The alternative of not proceeding with the proposed mining operation was also considered.

Once potential impacts and existing knowledge gaps were identified with the aid of the scoping process, the following specialist investigations were commissioned with the aim of a) filling identified knowledge gaps and b) assessing the significance of identified potential impacts:

- A heritage impact assessment;
- A botanical study;
- A soil study;
- A dust study;
- A noise- and vibration study;
- A hydrological study;
- A baseline geohydrological study; and
- A screening level social assessment.

The results of the above-mentioned specialist studies were then used in the compilation of a description of the existing environmental status of the proposed mining area, as well as the assessment of the identified potential impacts of the proposed mining operation on this environment. During impact assessment, each identified impact was assigned a significance rating based on its anticipated nature, extent, duration and probability, where-after mitigation measures were proposed with the aim of either preventing, or, in instances where total prevention was not deemed possible, the mitigation of each impact.

The mitigation measures proposed for each identified anticipated impact were then used in the compilation of an Environmental Management Programme (EMPR) to be implemented on site. The aim of this programme is to detail the arrangements proposed for the monitoring and management of identified impacts on site, as well as the assessment of the effectiveness of these arrangements after their implementation. It is anticipated that the implementation of the EMPR will enable the applicant to conduct the proposed mining operation in accordance with the generally

accepted principles of sustainable development by integrating social, economic and environmental factors into the planning and implementation of the proposed mining project with the aim of ensuring that the exploitation of the mineral resource serves the interest of both present and future generations.

2.4 REPORT STRUCTURE

This report is structured as follows:

Section 1 – Introduction

This section provides the reader with background information with regard to the proposed mining operation, including the details of the applicant; the title deed description of the proposed mining area; details of the appointed environmental practitioner; the regional setting of the proposed mining area; and a brief description of the proposed mining operation.

Section 2 – Methodology

Section 2 summarises the methodology used in the completion of this project and states the aim of this document.

Section 3 – Existing Environmental Status

This section details the existing environmental status of the proposed mining area (including the natural, social and cultural aspects thereof).

Section 4 – Project Alternatives

Section 4 details identified project alternatives.

Section 5 – Detailed Project Description

This section takes a detailed look at the proposed activities to be associated with each of the phases of the proposed mining operation.

Section 6 – Project Motivation

Section 6 contains a brief project motivation.

Section 7 – Public Participation

This section details the process of public participation conducted as part of this EIA process. Issues raised by interested and/or affected parties, as well as an indication of how these issues have been addressed, are also included in this section.

Section 8 – Objectives

Section 8 contains a summary of the various environmental objectives of this project.

Section 9 – Impact Assessment

The identified potential impacts of the proposed mining operation on the environment are assessed in Section 9.

Section 10 – Environmental Management Programme

Section 10 details the programme to be implemented with the aim of managing and monitoring identified potential impacts, as well as the continued adequacy of the implementation programme.

Section 11 – Assumptions, Uncertainties and Knowledge Gaps

This section lists uncertainties and knowledge gaps identified during the EIA process.

Section 12 – Conclusions

Section 12 contains a summary of the findings of this EIA process.

3. EXISTING ENVIRONMENTAL STATUS

3.1 GEOLOGY

3.1.1 General

The Maremane Dome is a geological structure stretching from just north of Sishen in the north to just south of Postmasburg in the south (Figure 4). Iron ore deposits are known to occur in the north and south of the dome, with manganese ore deposits occurring in two distinct belts between the terminations of the dome (SA Manganese, 2005).

Although iron ore and manganese ore can be found in close proximity to each other, it frequently occurs in stratigraphically distinct units. Manganese ore deposits are generally also relatively small and quite complex in terms of continuity, regularity, size, shape and qualities. It should also be noted that the manganese deposits of the Maremane Dome is distinctly different from and bear no resemblance to the Kalahari Manganese deposits found further north (SA Manganese, 2005).

Manganese mineralisation crops out in two distinct belts on the Maremane dolomite dome: An arcuate Eastern Manganese Belt; and a north-south trending Western Manganese Belt. In addition, mineralisation can also be found in the flanks of the satellite Wolhaarkop and Aucampsrus domes (SA Manganese, 2005).

Manganese found along the Eastern Manganese Belt outcrops in a series of relict Inselbergs referred to as the Klipfontein Hills. These inselbergs are all located at a similar elevation, which points to an original widespread peneplanation surface. The Western Manganese Belt, on the other hand, forms a range of low-lying hills, known as the Gamagara Rand, which are far more continuous as a result of being partly

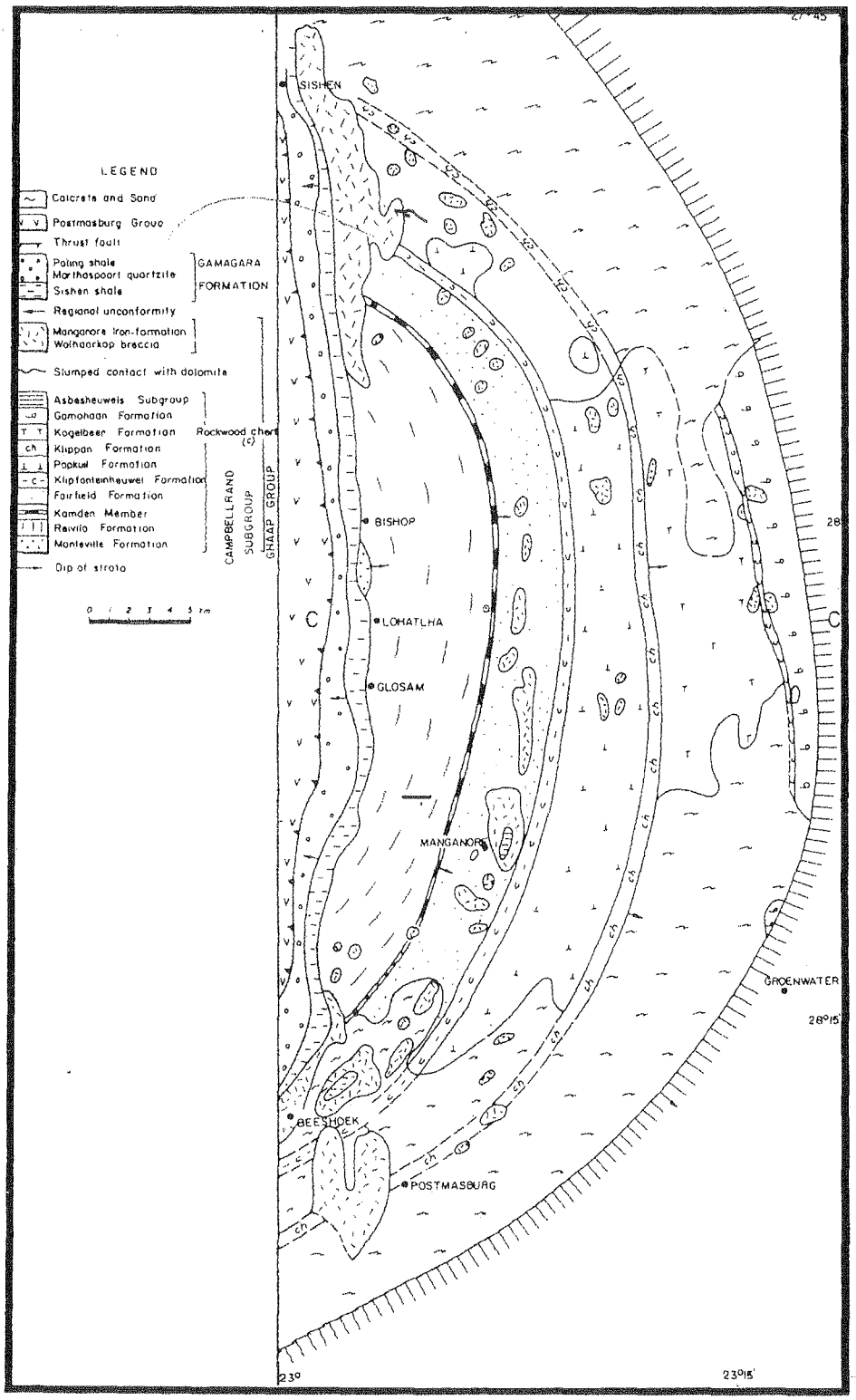


Figure 4. The Maremane dome [from Beukes (1986)].

protected from erosion by the overlying Gamagara quartzites (i.e. Marthaspoort quartzite) (SA Manganese, 2005).

Mineralisation along the two manganese belts is completely different: Ores of the Eastern Manganese Belt consists of braunite and are hosted by a siliceous breccia in elliptically shaped sinkholes, as opposed to those of the Western Manganese Belt, which are composed of ferruginous bixbyite and are hosted by shales of the Gamagara Group with pinnacle-shaped karsts (SA Manganese, 2005).

3.1.2 Site specific geology

According to SA Manganese (2005), the proposed mining area is located in the northern part of the Eastern Manganese Belt. It is strongly suspected that the area is underlain by dolomites of the Lime Acres formation, although no physical outcrop could be located on the farm as a result of a relatively thick sand and calcrete cover.

The Manganore iron formation and Wolhaarkop breccia occur in a number of hills of the area, as a result of the positive erosion of filled sinkholes. The aforementioned hills protrude through the younger cover to form part of the Klipfontein range of hills. Manganese mineralisation is common in the Wolhaarkop breccia. In the proposed mining area, Wolhaarkop breccia consists of massive, matrix supported chert breccia with no remnants of the original structure being preserved. "Manganiferous pods" can be identified in areas where the matrix of this breccia has been either partially or completely replaced by manganese, resulting in a rock consisting of a black manganese matrix with white chert spots. The Manganore iron formation consists of a breccia made up of chaotically distributed rectangular BIF clasts with a diameter of 1 to 5 cm. In specific areas, however, large blocks of up to 2 m have been preserved with its bedding intact (SA Manganese, 2005).

The location of old workings, as well as the results of regional mapping, indicate that the largest portion of the visually better manganese mineralisation is located in the Wolhaarkop breccia underlying the south-western corner of the proposed mining area. Here the manganese mineralisation appears to be concentrated to the top, close to the contact point with the Manganore iron formation, and decreases further

down in the stratigraphic column. This mineralisation is not very continuous, but can be found in a number of disconnected pockets with a diameter of 20 to 50 m and a width of 300 m. Detrital mineralisation is furthermore present as scree on the slopes of the hills found in the area. The manganese content of these occurrences does, however, not seem to be high as a result of the high percentage of iron present therein (SA Manganese, 2005).

The geology of one of the identified target areas of the proposed mining area is illustrated in Figure 5.

3.2 CLIMATE

Weather data used in this section was obtained from the South African Weather Service[1]. Data from Kathu Weather Station No. 0356880 4 (Latitude: -27.6710; Longitude: 23.0100; Altitude: 1186 m above sea level) for the period January 1993 to December 2008 was used throughout.

3.2.1 Regional climate

The study area is situated in an arid to semi-arid region. Rainfall in this region occurs largely in the form of showers and thunderstorms in the summer months of October to March (Van Rooyen, 1971; Van der Merwe, 1973), with the peak of the rainy season normally reached in February and March (Van Rooyen, 1971).

Summers in this region are very hot with temperatures of up to 41°C in some places (Whitelaw, 1998), while winters are cool to cold (Van der Merwe, 1973).

3.2.2 Average monthly and annual rainfall

The average annual rainfall for the Kathu area is 335.07 $mm.annum^{-1}$, verifying that this area is located in a semi-arid region.

[1] South African Weather Service. ✉: Private Bag X097, Pretoria, 0001.

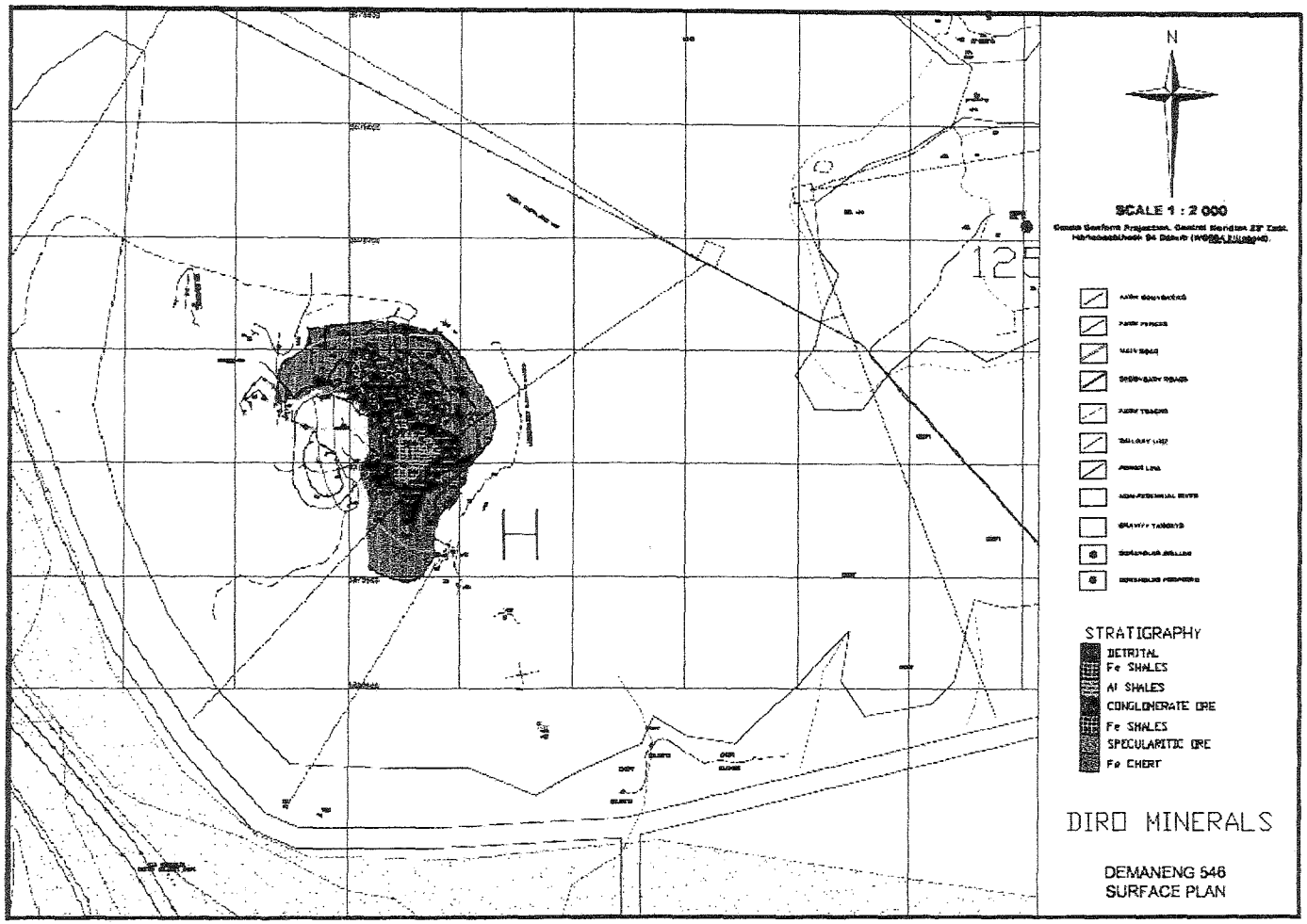


Figure 5. Geological map of one of the identified target areas located within the proposed mining area.

From Figure 6 it is evident that the peak of the rainy season in the Kathu area is reached in January (with an average rainfall of 63.67 mm), February (with an average rainfall of 44.86 mm) and March (with an average rainfall of 43.83 mm).

3.2.3 Maximum rainfall intensities

The highest maximum rainfall intensity over a 24 h period in the Kathu area between 1993 and 2008 was measured in May 2008, with ombrometers measuring a total of 81.00 mm in one day (highlighted in black in Table 2).

3.2.4 Average monthly maximum and minimum temperatures

It is clear from the data recorded in Figure 7 that December is the hottest month of the year in the Kathu area. An average monthly maximum temperature of 33.47°C has been recorded for December (Figure 7) for this area.

Figure 7 furthermore indicates that July is the coldest month of the year in the Kathu area, with an average monthly minimum temperature of 1.43 °C.

3.2.5 Average wind speed and –direction

It is clear from the data presented in Table 3 that south-south-easterly winds (highlighted in black in Table 3) are prevalent in the Kathu area.

3.2.6 Incidence of extreme weather conditions

3.2.6.1 Frost

Frost in the Northern Cape region occurs quite frequently in the colder months of the year, namely May to September (Van Rooyen, 1971; Van der Merwe, 1973; Mucina & Rutherford, 2006). Severe frost development can be expected in times when extreme minimum temperatures of up to -8°C are reached on some winter nights. Frost development may be both more common and severe in low-lying areas (Van Rooyen, 1971).

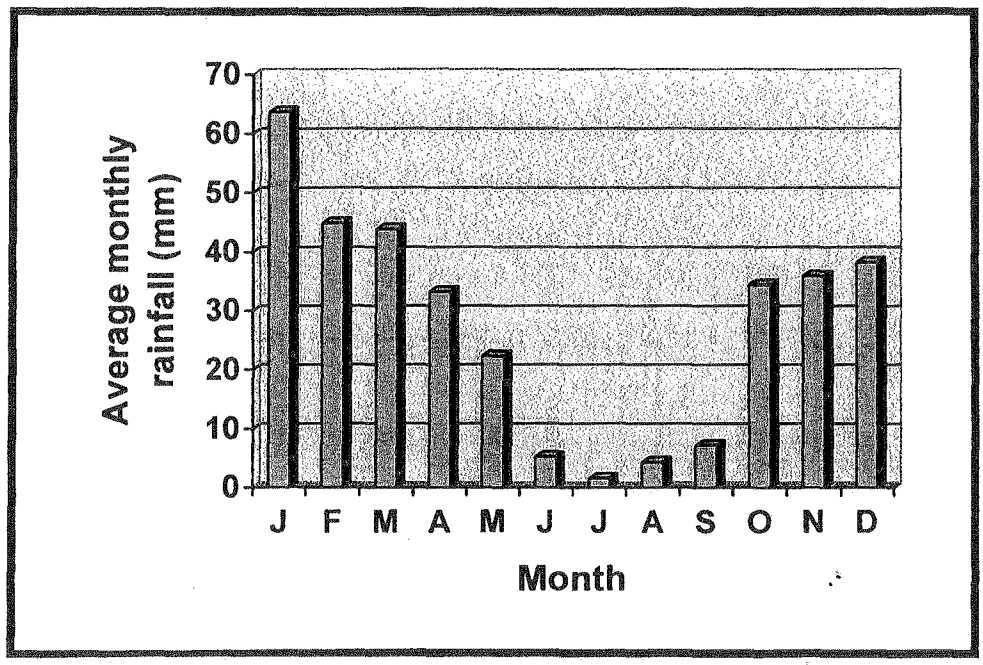


Figure 6. Average monthly rainfall for the Kathu area (Kathu Station No. 0356880 4: Latitude: -27.6710; Longitude: 23.0100; Altitude: 1186 m above sea level).

Table 2. *Maximum rainfall intensities over a 24 h period for the Kathu area (Kathu Station No. 0356880 4: Latitude: -27.6710; Longitude: 23.0100; Altitude: 1186 m above sea level).*

MONTH	MAXIMUM RAINFALL OVER A 24 H PERIOD (mm)	YEAR IN WHICH MAXIMUM RAINFALL OVER A 24 H PERIOD OCCURRED
January	52.40	2002
February	56.20	1994
March	32.80	1995
April	45.60	1999
May	**81.00**	**2008**
June	37.80	2008
July	6.00	1996
August	24.60	2002
September	28.80	2001
October	62.20	1993
November	47.80	2007
December	35.00	1996

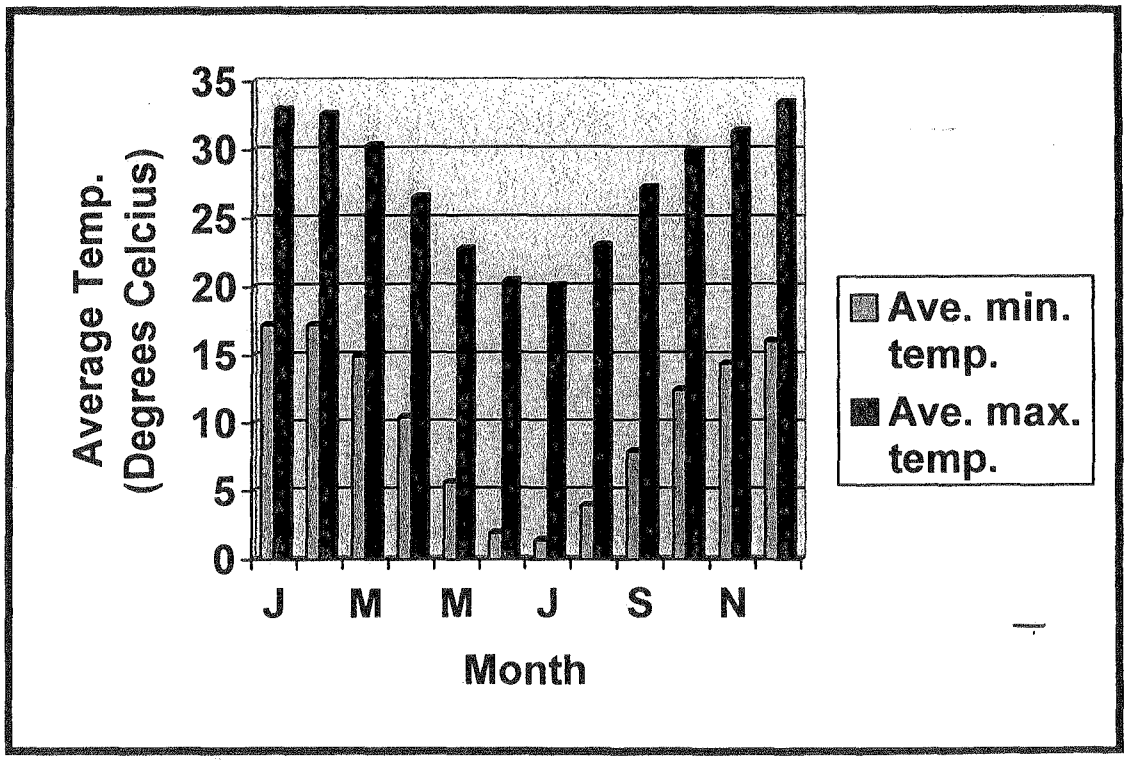


Figure 7. Average monthly maximum and minimum temperatures for the Kathu area (Kathu Station No. 0356880 4: Latitude: -27.6710; Longitude: 23.0100; Altitude: 1186 m above sea level).

Table 3. *The percentage frequency (ff/ss) of winds from every wind direction for the Kathu area (Kathu Station No. 0356880 4: Latitude: -27.6710; Longitude: 23.0100; Altitude: 1186 m above sea level).*

MONTH	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW
J	11 03	5 03	7 03	6 03	7 03	4 03	6 03	**9 03**	8 03	5 03	5 03	4 03	5 03	4 04	5 04	8 04
F	11 03	4 03	5 03	5 03	7 03	4 03	6 03	**9 03**	8 03	5 03	6 03	5 03	6 03	4 03	4 03	8 03
M	8 03	4 03	4 03	5 03	6 03	4 03	6 03	**12 03**	8 03	5 03	4 03	4 03	7 03	6 03	7 03	8 03
A	8 03	4 03	4 03	4 03	6 03	4 03	6 03	**14 03**	10 03	5 03	4 03	4 03	7 03	5 03	6 03	7 03
M	8 03	5 03	7 03	4 03	5 03	4 03	5 03	**15 03**	7 03	5 03	4 03	4 03	5 03	4 03	7 03	8 03
J	10 04	6 03	6 03	4 03	4 03	2 03	4 03	**17 03**	9 03	4 03	4 03	3 03	6 03	5 03	7 03	7 03
J	9 04	6 03	10 03	5 03	5 03	2 03	4 03	**14 03**	7 03	3 03	2 03	3 03	4 03	6 03	9 03	9 04
A	10 04	5 04	6 03	5 03	4 03	2 03	3 03	**12 03**	6 03	6 04	4 04	3 03	6 04	7 03	11 03	11 04
S	8 04	2 04	3 03	3 03	3 03	2 03	3 03	**14 03**	8 03	6 03	6 03	5 03	9 04	8 04	9 04	9 04
O	7 04	4 04	4 04	3 03	3 03	2 03	5 03	**11 03**	8 03	7 03	7 04	6 03	7 04	7 04	9 04	9 04
N	6 04	4 04	4 04	3 03	3 03	2 03	4 03	**10 03**	10 03	9 03	7 03	7 04	11 04	7 04	7 04	6 04
D	7 04	4 04	5 03	4 03	5 03	3 03	4 03	**9 03**	9 03	8 03	7 04	6 04	8 04	7 04	6 04	8 04

3.2.6.2 Hail

Hail often accompanies early summer thunderstorms in this region. These hailstorms can be severe and cause much damage, but is often limited to small areas (Van Rooyen, 1971).

3.2.6.3 Wind

Strong winds seldom occur in the region. In 1959 a storm of hurricane force did, however, cause extensive damage in the Prieska area (Van Rooyen, 1971).

3.2.6.4 Droughts

Periodic droughts, with intensities ranging from mild to severe, commonly occur in the Northern Cape (Van Rooyen 1971). Dust storms may occur in times of drought.

3.3 TOPOGRAPHY

As is evident from Figure 2, a number of rolling hills with gentle to moderate slopes occur in the south-western, north-eastern, north-western and southern parts of the proposed mining area. Altitudes vary from 1285 m above sea level for the highest point of the study area, to 1210 m above sea level in low lying areas (Figure 2).

The dry run of the Ga-Mogara River flows through the proposed mining area from southern- and easterly directions in a north-westerly direction towards the farm Bruce No. 544 (Figure 2).

3.4 SOILS

According to Mucina and Rutherford (2006) the Kuruman Thornveld vegetation type, which can generally be associated with the lower lying parts of the proposed mining area, can be associated with some Campbell Group dolomite and chert, as well as mostly younger, superficial Kalahari Group sediments. This is covered by red, wind-blown sand of between 0.3 and 1.2 m deep. Rocky pavements form locally in places.

Mucina and Rutherford (2006) add that the Hutton soil form is conspicuous in the area.

The Kuruman Mountain Bushveld vegetation type can, on the other hand, generally be associated with the rolling hills of the study area. According to Mucina and Rutherford (2006) the soils of this vegetation type are shallow, sandy soils of the Hutton form.

Soils of the Hutton form are characterised by an Orthic A horizon overlying a Red Apedal B horizon (Soil Classification Working Group, 1991). Soils of the Hutton form with a sandy character can play an important role in the ecology of drier areas, as precipitation is made available to plants almost immediately.

A detailed report on the origins of the soils of the proposed mining area is attached hereto as Appendix A.

3.5 PRE-MINING LAND CAPABILITY

The pre-mining land capability of the proposed mining area can be classified as "grazing land".

3.6 LAND USE

3.6.1 Existing land use

The proposed mining area is currently utilised for livestock farming by Mr. Dihan Jansen van Rensburg, the holder of grazing rights over the said property in terms of Deed of Transfer No. T450/1989.

Mr. Jansen van Rensburg uses a grazing management strategy that is based on a rotational grazing system: The proposed mining area forms an integral part of a larger livestock farming unit, which Mr. Jansen van Rensburg has divided into two sets of 16 camps each. Livestock is rotated between the 16 camps of one set before it is then rotated between the 16 camps of the remaining set. This grazing system

allows Mr. Jansen van Rensburg to rest each of the 32 camps for a period of 105 days after being grazed for a maximum period of one week.

This system has been successfully implemented by the Jansen van Rensburg family for a period of 22 years and, according to Mr. Jansen van Rensburg (pers. comm.[2]), has resulted in the farming unit having a higher grazing capacity than that of the surrounding livestock farming areas. According to Mr. Jansen van Rensburg (pers. comm.[2]) this has been confirmed by the preliminary results of an ongoing study jointly conducted by the University of Pretoria, the Department of Agriculture and KK Animal Nutrition on the larger livestock farming unit: The latter unit has a grazing capacity of approximately 7 to 8 hectares per livestock unit, while the surrounding areas have a grazing capacity of approximately 14 to 15 hectares per livestock unit.

3.6.2 Historical agricultural activities

Historical agricultural activities have taken place in the east-north-eastern parts of the proposed mining area (Figure 2 – Area marked as "Cultivated Land"). This area is, however, not used for agricultural purposes any longer.

3.6.3 Evidence of disturbance/abuse

Remnants of prospecting and mining activities conducted in the proposed mining area in the past, which included drilling, pitting and trenching, are still visible in the study area today in the form of capped boreholes, open pits and trenches, as well as tracks leading to drilling and pitting/trenching sites.

3.6.4 Existing structures

The following permanent structures are currently located within the borders of the proposed mining area:

- Boundary and camp fencing, with gates;
- Water pipelines;

[2] Mr. Dihan Jansen van Rensburg. Holder of grazing rights over the proposed mining area.

Mucina and Rutherford (2006) add that the Hutton soil form is conspicuous in the area.

The Kuruman Mountain Bushveld vegetation type can, on the other hand, generally be associated with the rolling hills of the study area. According to Mucina and Rutherford (2006) the soils of this vegetation type are shallow, sandy soils of the Hutton form.

Soils of the Hutton form are characterised by an Orthic A horizon overlying a Red Apedal B horizon (Soil Classification Working Group, 1991). Soils of the Hutton form with a sandy character can play an important role in the ecology of drier areas, as precipitation is made available to plants almost immediately.

A detailed report on the origins of the soils of the proposed mining area is attached hereto as Appendix A.

3.5 PRE-MINING LAND CAPABILITY

The pre-mining land capability of the proposed mining area can be classified as "grazing land".

3.6 LAND USE

3.6.1 Existing land use

The proposed mining area is currently utilised for livestock farming by Mr. Dihan Jansen van Rensburg, the holder of grazing rights over the said property in terms of Deed of Transfer No. T450/1989.

Mr. Jansen van Rensburg uses a grazing management strategy that is based on a rotational grazing system: The proposed mining area forms an integral part of a larger livestock farming unit, which Mr. Jansen van Rensburg has divided into two sets of 16 camps each. Livestock is rotated between the 16 camps of one set before it is then rotated between the 16 camps of the remaining set. This grazing system

allows Mr. Jansen van Rensburg to rest each of the 32 camps for a period of 105 days after being grazed for a maximum period of one week.

This system has been successfully implemented by the Jansen van Rensburg family for a period of 22 years and, according to Mr. Jansen van Rensburg (pers. comm.[2]), has resulted in the farming unit having a higher grazing capacity than that of the surrounding livestock farming areas. According to Mr. Jansen van Rensburg (pers. comm.[2]) this has been confirmed by the preliminary results of an ongoing study jointly conducted by the University of Pretoria, the Department of Agriculture and KK Animal Nutrition on the larger livestock farming unit: The latter unit has a grazing capacity of approximately 7 to 8 hectares per livestock unit, while the surrounding areas have a grazing capacity of approximately 14 to 15 hectares per livestock unit.

3.6.2 Historical agricultural activities

Historical agricultural activities have taken place in the east-north-eastern parts of the proposed mining area (Figure 2 – Area marked as "Cultivated Land"). This area is, however, not used for agricultural purposes any longer.

3.6.3 Evidence of disturbance/abuse

Remnants of prospecting and mining activities conducted in the proposed mining area in the past, which included drilling, pitting and trenching, are still visible in the study area today in the form of capped boreholes, open pits and trenches, as well as tracks leading to drilling and pitting/trenching sites.

3.6.4 Existing structures

The following permanent structures are currently located within the borders of the proposed mining area:

- Boundary and camp fencing, with gates;
- Water pipelines;

[2] Mr. Dihan Jansen van Rensburg. Holder of grazing rights over the proposed mining area.

- Two concrete dams, one of which is a 1 m^2 pressure decreasing dam;
- One corrugated iron dam;
- Three concrete stock watering points located in watering corrals;
- Gravel roads;
- Two 130 kVA Eksom power lines;
- One single phase Eskom power line with conductors; and
- The ruins of mine workers' houses remnant from historical mining activities conducted in the area.

3.7 NATURAL FAUNA

3.7.1 Common species

The animal species listed in Table 4 are known to frequent the proposed mining area and surrounds (Van Rensburg, pers. comm.[3]).

3.7.2 Protected, threatened and red data species

Of the mammal species listed in Table 4, the following species is classified as endangered in terms of the Nature and Environmental Management Ordinance, 1974 (Ordinance No. 19 of 1974) and is therefore protected in the Northern Cape Province: African Scaly Ant-Eater *M. temminckii*. This species is also listed as "vulnerable" in terms of Section 56(1) of the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004). In addition, *M. temminckii* is also included in the IUCN Red List of Threatened Species.

The following mammal species included in Table 4 are classified as protected in terms of the Nature and Environmental Management Ordinance, 1974 (Ordinance No. 19 of 1974): Aardvark *O. afer*, Bat-eared Fox *O. megalotis*, Blesbok *D. dorcas phillipsi*, Common Duiker *S. grimmia*, Gemsbok *O. gazella*, Klipspringer *O. oreotragus*, Kudu *T. strepsiceros*, Springbok *A. marsupialis*, Steenbok *R. campestris* and Warthog *P. aethiopicus*.

[3] Mr. Dihan van Rensburg. Holder of grazing rights over the proposed mining area.

Table 4. Mammal species known to frequent the proposed mining area and surrounds.

COMMON NAME	LATIN NAME
Aardvark	*Orycteropus afer*
African Scaly Ant-eater	*Manis temminckii*
Bat-eared fox	*Otocyon megalotis*
Black-backed jackal	*Canis mesomelas*
Blesbok	*Damaliscus dorcas phillipsi*
Cape Hare	*Lepus capensis*
Chacma baboon	*Papio ursinus*
Common duiker	*Sylvicapra grimmia*
Gemsbok	*Oryx gazella*
Klipspringer	*Oreotragus oreotragus*
Kudu	*Tragelaphus strepsiceros*
Rock dassie	*Procavia capensis*
Scrub hare	*Lepus saxatilis*
Springbok	*Antidorcas marsupialis*
Spring hare	*Pedetes capensis*
Steenbok	*Raphicerus campestris*
Suricate	*Suricata suricatta*
Warthog	*Phacochoerus aethiopicus*

3.8 NATURAL LAND VEGETATION

3.8.1 General

The proposed mining area is located within the Kuruman Thornveld and Kuruman Mountain Bushveld vegetation types of southern Africa (Mucina & Rutherford, 2006).

3.8.1.1 The Kuruman Thornveld Vegetation Type

According to Mucina and Rutherford (2006), the Kuruman Thornveld vegetation type can generally be associated with flat, rocky plains, as well as some gentle sloping hills. As is evident from Figure 8, a map indicating the general vegetation classification of the study area according to Mucina and Rutherford (2006), this vegetation type can be generally associated with the lower lying parts of the study area.

The Kuruman Thornveld vegetation type is characterised by a very well-developed, closed shrub layer and a well-developed open tree stratum of Camel Thorn Tree *Acacia erioloba* (Mucina & Rutherford, 2006). Other important plant species occurring in this vegetation type include: *Acacia mellifera* subsp. *detinens, Boscia albitrunca, Grewia flava, Lycium hirsutum, Tarchonanthus camphoratus, Gymnosporia buxifolia, Acacia hebeclada* subsp. *hebeclada, Monechma divaricatum, Gnidia polycephala, Helichrysum zeyheri, Hermannia comosa, Pentzia calcarea, Plinthus sericeus, Elephantorrhiza elephantina, Aristida meridionalis, A. stipitata* subsp. *stipitata, Eragrostis lehmanniana, E. echinochloidea, Melinis repens, Dicoma schinzii, Gisekia africana, Harpagophytum procumbens* subsp. *procumbens, Indigofera daleoides, Limeum fenestratum, Nolletia ciliaris, Seddera capensis, Tripteris aghillana* and *Vahlia capensis* subsp. *vulgaris* (Mucina & Rutherford, 2006).

In addition to the species listed, the following biogeographically important taxa can also be found in the Kuruman Thornveld vegetation type (Mucina & Rutherford, 2006): *Acacia luederitzii* var. *luederitzii* and *Acacia haematoxylon* (Kalahari endemics); *Blepharis marginata, Digitaria polyphylla* and *Corchorus pinnatipartitus*

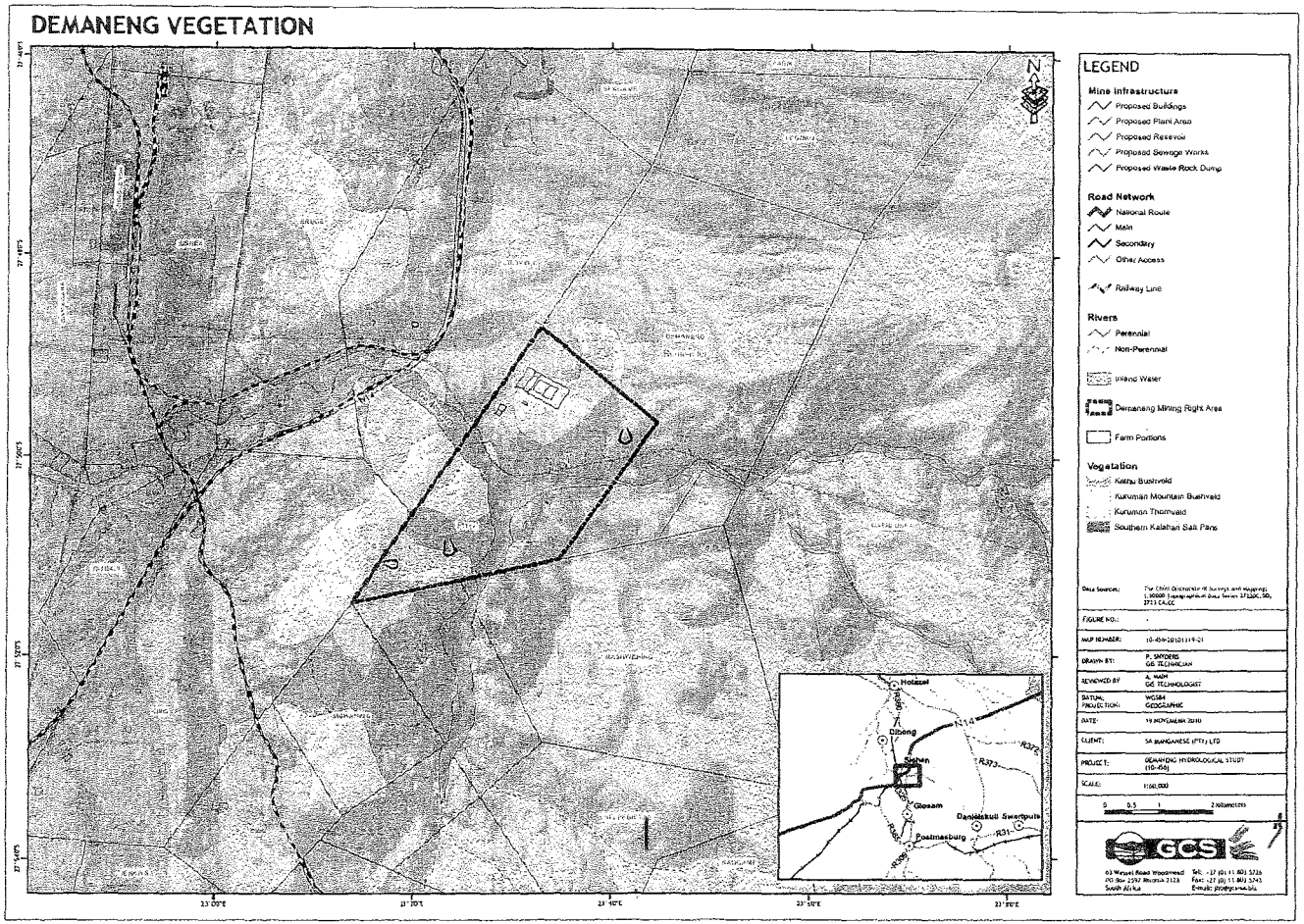


Figure 8. Map indicating the general classification of the natural vegetation of the study area according to Mucina and Rutherford (2006).

(Griqualand West endemics); and *Terminalia sericea* (southernmost distribution in the interior of southern Africa).

3.8.1.2 The Kuruman Mountain Bushveld Vegetation Type

According to Mucina and Rutherford (2006), the Kuruman Mountain Bushveld vegetation type can generally be associated with rolling hills with gentle to moderate slopes, as well as hill pediment areas. This corresponds to what is evident from Figure 8: The Kuruman Mountain Bushveld vegetation type can generally be associated with the hillier parts of the proposed mining area.

The grass layer of the Kuruman Mountain Bushveld vegetation type is well-developed (Mucina & Rutherford, 2006). The following important plant species can generally be associated with this vegetation type (Mucina & Rutherford, 2006): *Rhus lancea, Diospyros austro-africana, Euclea crispa* subsp. *crispa, E. undulata, Olea europaea* subsp. *africana, Rhus pyroides* var. *pyroides, R. tridactyla, Tarchonanthus camphoratus, Tephrosia longipes, Rhus ciliata, Amphiglossa triflora, Anthospermum rigidum* subsp. *pumilum, Gomphocarpus fruticosus* subsp. *fruticosus, Helichrysum zeyheri, Lantana rugosa, Wahlenbergia nodosa, Ebracteola wilmaniae, Hertia pallens, Rhynchosia totta, Andropogon chinensis, A. schirensis, Anthephora pubescens, Aristida congesta, Digitaria eriantha* subsp. *eriantha, Themeda triandra, Triraphis andropogonoides, Aristida diffusa, Brachiaria nigropedata, Bulbostylis burchellii, Cymbopogon caesius, Diheteropogon amplectens, Elionurus muticus, Eragrostis chloromelas, E. nindensis, Eustachys paspaloides, Heteropogon contortus, Melinis repens, Schizachyrium sanguineum, Trichoneura grandiglumis, Dicoma anomala, D. schinzii, Geigeria ornativa, Helichrysum cerastioides, Heliotropium strigosum, Hibiscus marlothianus, Kohautia cynanchica, Kyphocarpa angustifolia, Boophane disticha* and *Pellaea calomelanos*.

In addition to the aforementioned important species, the following Griqualand West endemics are also known to occur in this vegetation type: *Lebeckia macrantha, Justicia puberula, Tarchonanthus obovatus, Euphorbia wilmaniae, Digitaria polyphylla* and *Sutera griquensis* (Mucina & Rutherford, 2006).

3.8.2 Protected, red data and geographically important plant species

3.8.2.1 Tree species protected in terms of the National Forests Act, 1998 (Act No. 84 of 1998)

Three tree species protected in terms of Section 12 of the National Forests Act, 1998 (Act No. 84 of 1998) (NFA), as published in Government Notice No. 1106 of 27 November 2009, were recorded within the boundaries of the proposed mining area. These are: Camel Thorn *A. erioloba*, Shepherd's Tree *B. albitrunca* and Grey Camel Thorn *A. haematoxylon*.

According to Section 15 of the NFA, no person may cut, disturb, damage or destroy any protected tree, or possess, collect, remove, transport, export, donate, purchase or sell or in any other manner acquire or dispose of any protected tree or any forest product derived from a protected tree without a license from the Department of Agriculture, Forestry and Fisheries.

3.8.2.2 Plant species protected in terms of the Nature and Environmental Conservation Ordinance, 1974 (Ordinance No. 19 of 1974)

Plant species protected in the Northern Cape Province in terms of the Nature and Environmental Conservation Ordinance, 1974 (Ordinance No. 19 of 1974) that were either recorded in the study area (Appendix A) or are expected to occur in the study area according to Anderson (2003), Mucina and Rutherford (2006) and Van der Merwe (2006), include: *Aloe grandidentata*, *Aloe claviflora*, *Aloe hereroensis*, *Ammocharis coranica*, *Anacampseros* cf. *subnuda*, *Babiana hypogea*, *Boophane disticha*, *Crinum bulbispermum*, *Ebracteola wilmaniae*, *Fockea angustifolia*, *Gomphocarpus fruticosus* subsp. *fruticosus*, *Haworthia* spp., *Huerniopsis decipiens*, *Lithops aucampiae* subsp. *aucampiae*, *Mestoklema arboriforma*, *Nerine laticoma*,

3.8.2.3 Red Data plant species

Although no individuals of Red Data plant species were recorded within the study area as part of the field surveys conducted during October 2010, the following Red Data plant species (as per Hilton-Taylor, 1996) have been recorded in the surrounding areas and may therefore also occur within the borders of the proposed mining area: Devil's Claw *Harpagophytum procumbens* subsp. *procumbens*, Ghaap *Hoodia gordonii*, *Adenia repanda*, *Antimima lawsonii* and *Euphorbia planiceps* (Anderson, 2003; Mucina & Rutherford, 2006; Van der Merwe, 2006).

3.8.2.4 Plant species protected in terms of the National Environmental Management: Biodiversity Act, 2004

The following plant species known to occur in the areas surrounding the proposed mining area (Anderson, 2003; Mucina & Rutherford, 2006; Van der Merwe, 2006) are included in the list of critically endangered, endangered, vulnerable and protected species published in terms of Section 56(1) of the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) and are classified as "protected": Devil's Claw *H. procumbens* subsp. *procumbens* and Ghaap *H. gordonii*.

3.8.2.5 Biogeographically important plant species

The proposed mining area is located within the borders of the Griqualand West Centre of Endemism (GWCE). The following plant species endemic or near-endemic to the GWCE were either recorded within the borders of the proposed mining area, or are anticipated to occur in the proposed mining area and surrounds: *Rhus tridactyla* (endemic) (Van Wyk & Smith, 2001; Anderson, 2003), *Tarchonanthus obovatus* (near-endemic) (Van Wyk & Smith, 2001; Anderson, 2003), *Triaspis* spp. (possibly endemic) (Anderson, 2003), *Blepharis marginata* (Van Wyk & Smith, 2001; Mucina & Rutherford, 2006), *Digitaria polyphylla* (Van Wyk & Smith, 2001; Mucina & Rutherford, 2006), *Corchorus pinnatipartitus* (Van Wyk & Smith, 2001; Mucina & Rutherford, 2006), *Lebeckia macrantha* (Van Wyk & Smith, 2001; Mucina & Rutherford, 2006), *Justicia puberula* (Van Wyk & Smith, 2001; Mucina & Rutherford, 2006), *Euphorbia wilmaniae* (Mucina & Rutherford, 2006) and *Sutera griquensis* (Van Wyk & Smith, 2001; Mucina & Rutherford, 2006).

3.8.2.6 Aquifer Dependent Ecosystems

Although research into South African ADEs is still at an early stage, terrestrial keystone species such as the Camel Thorn Tree *A. erioloba* of the Kalahari region of South Africa is regarded as having a high probability of being linked to aquifers (Colvin *et al.*, 2007) and is therefore regarded as a South African ADE (Colvin *et al.*, 2008).

3.8.3 Alien weeds and invasive plant species

A wide variety or large numbers of alien weeds and invasive plants, declared as such in terms of the Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983) (CARA), as amended, were not recorded within the borders of the study area.

A few individuals of *Prosopis glandulosa* subsp. *torreyana*, classified as a "Category 2 Invader" in terms of Regulation 15 of the regulations made in terms of Section 29 of CARA, were recorded within the dry run of the Ga-Mogara River. This distribution pattern is in line with the observations of Henderson (2001), who states that this species is known to invade riverbanks, riverbeds and drainage lines in semi-arid to arid regions.

In addition, a few individuals of *Lantana rugosa* were recorded within the *Euclea undulata* Tall Open Shrubland vegetation community (Section 2.2.1). This species is classified as a "Category 1 Weed) in terms of Regulation 15 of the regulations made in terms of Section 29 of CARA.

A detailed botanical report is attached hereto as Appendix B.

3.9 SURFACE WATER

3.9.1 Sources of surface water

The main surface water resource in the vicinity of the proposed mining area is the Ga-Mogara River and some of its tributaries. The confluence of two main tributaries of the aforementioned river occurs in the south-western part of the proposed mining area (Figure 2). The southern tributary flows from south to north and then continues westward, while the northern tributary flows from east to west across the proposed mining site (Figure 2). The proposed mining area is located upstream of the Kumba and Khumani Iron Ore Mines.

The Ga-Mogara River is non-perennial, flowing only for short periods during the rainy season.

3.9.1.1 Catchment Area

The proposed mining area falls within Water Management Area 10, Lower Vaal (WMA 10) and is located in the Ga-Mogara Quaternary Catchment Area D41J.

3.9.1.2 Mean Annual Run-off

A mean annual run-off (MAR) of 1.75 million m^3 (mcm) can be used to describe the general flow of surface water over the quaternary catchment D41J, within which the proposed mining area is located.

Based on an area vs. volume relationship, the above-mentioned MAR was then used to calculate the MAR of the sub-catchment areas of each of the two major tributaries of the Ga-Mogara River present within the proposed mining area, as well as a site specific MAR. A MAR of 0.16 mcm was calculated for Sub-catchment 1 (i.e. the sub-catchment of the south-north flowing tributary – refer to Figure 9), while a MAR of 1.25 mcm was calculated for Sub-catchment 2 (i.e. the east-west flowing tributary – refer to Figure 9). A site specific MAR of 0.022 mcm was calculated for the proposed mining area.

3.9.1.3 Normal Dry Weather Flow

Based on all available data and information, indications are that there is no normal dry weather flow (NDWF) within the entire D41J quaternary catchment area. It is therefore anticipated that no NDWF will occur within the proposed mining area.

3.9.1.4 Flood Volumes

Flood flows for each of the two sub-catchments (refer to Section 3.9.1.2 above) were calculated with the aid of the Rational Method. The results of these calculations indicate that Sub-catchment 1 will have a flood flow of 221.68 $m^3.s^{-1}$ during a 1:50-year flooding event and a 282.35 $m^3.s^{-1}$ during a 1:100-year flooding event (Figure 9). Sub-catchment 2, on the other hand, is anticipated to have a flood flow of 640.27 $m^3.s^{-1}$ during a 1:50-year flooding event and a flood flow of 819.15 $m^3.s^{-1}$ during a 1:100-year flooding event (Figure 9).

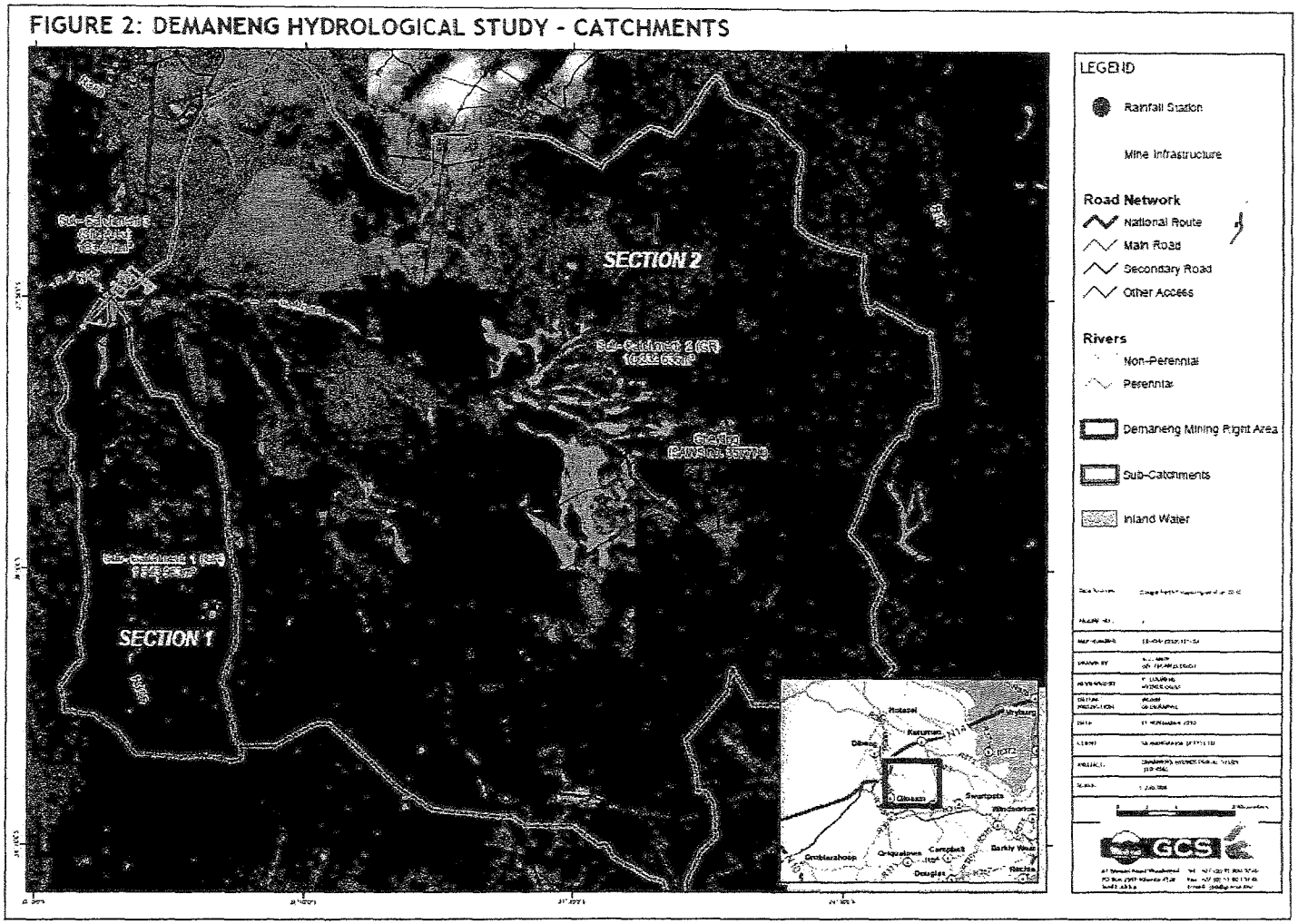


Figure 9. Location of sub-catchments.

The figures above were then used to calculate the anticipated flood (or storm water) volumes for each of the sub-catchment areas, as well as the proposed mining site, during both 1:50-year and 1:100-year flooding events. Sub-catchment 1 is anticipated to have a flood (or storm water) volume of 1 343 369.28 m^3 in the event of a 1:50-year flooding event and 1 941 359.22 m^3 in the event of a 1:100-year flooding event (Figure 9). Sub-catchment 2, on the other hand, is anticipated to have a flood (or storm water) volume of 10 232 636.04 m^3 during a 1:50-year flooding event and 14 781 075.21 m^3 during a 1:100-year flooding event (Figure 9). The proposed mining site is anticipated to have a flood (or storm water) volume of 183 448.32 m^3 during a 1:50-year flooding event and 264 991.68 m^3 during a 1:100-year flooding event.

3.9.1.5 Flood Levels

Flood lines for both 1:50-year and 1:100-year flooding events, as well as a 100 m exclusion zone, were modelled for all sections of the Ga-Mogara River located within the proposed mining area (Figures 10 and 11).

3.9.1.6 Water Quality

No baseline surface water quality measurements were taken as part of this project as a result of the fact that no run-off was present during the site visits to the proposed mining area during October 2010.

3.9.2 Wetlands and pans

No known wetlands or pans occur within the boundaries of the proposed mining area.

3.9.3 Change of rivers

No change of rivers is planned as part of the proposed mining operation.

3.9.4 Use of surface water

Neither surface water, nor groundwater is anticipated to be abstracted for use as process water as part of the proposed mining operation. The applicant will obtain water from the Vaal-

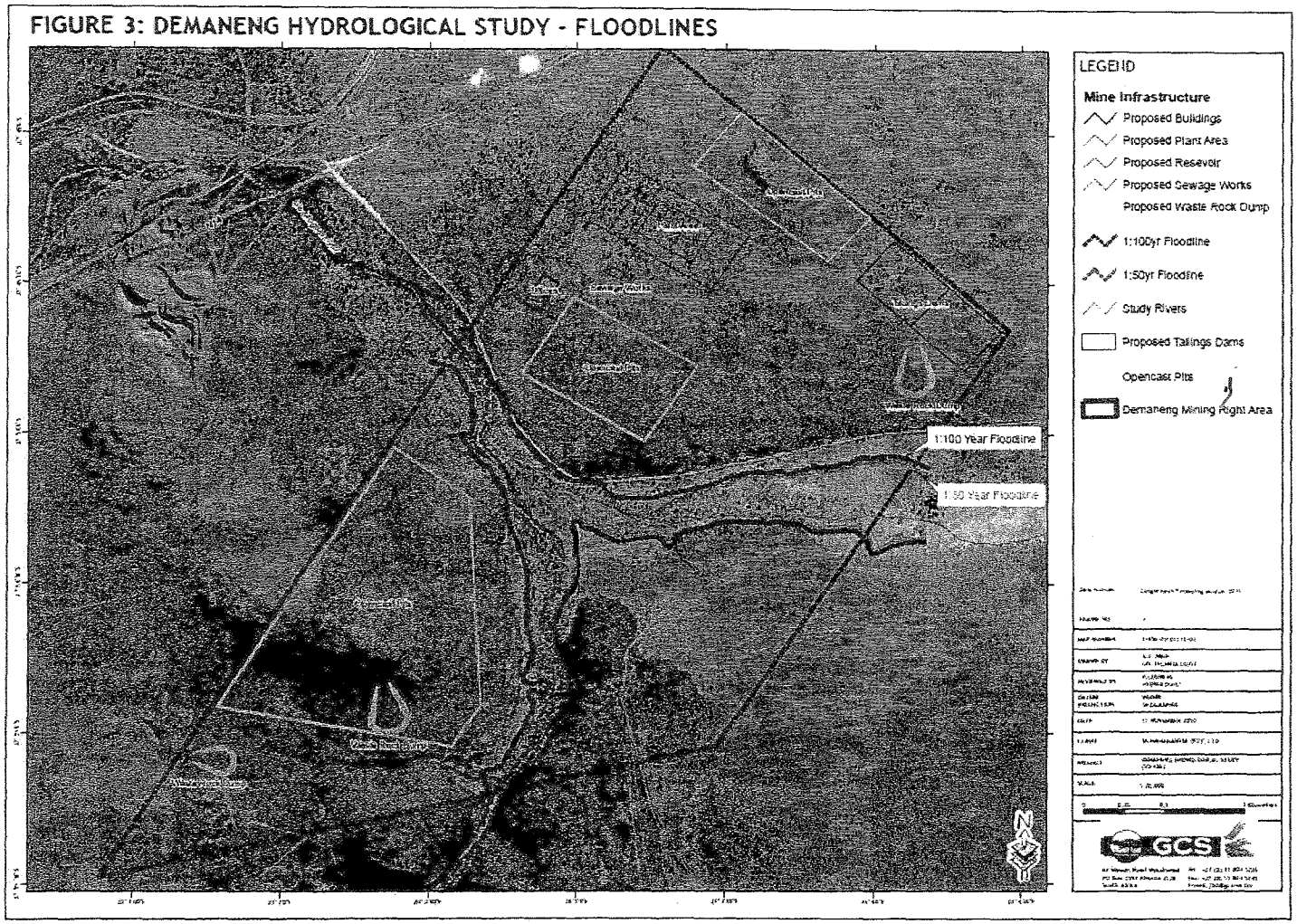


Figure 10. The location of the 1:50-year and 1:100-year flood lines within the proposed mining area.

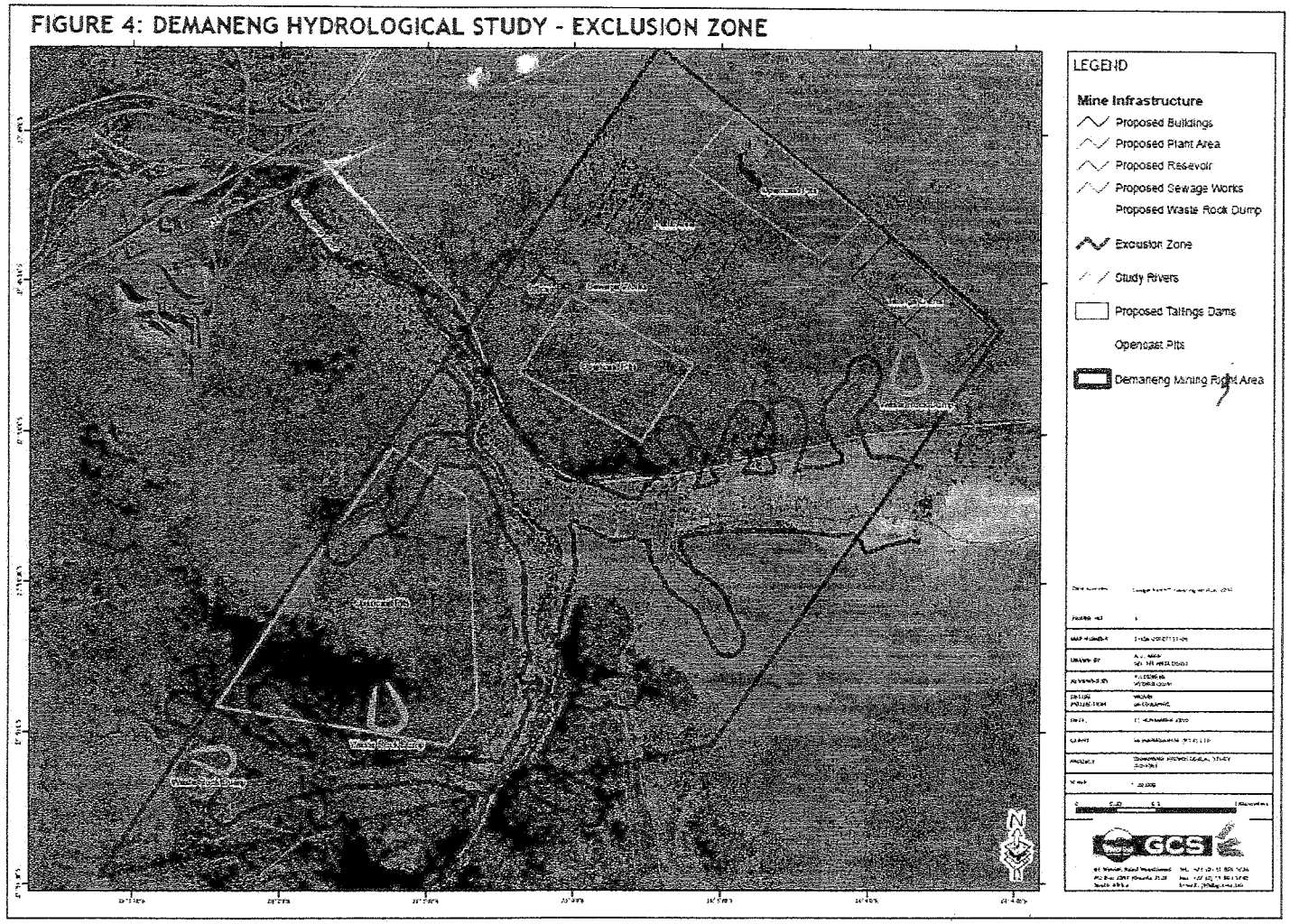


Figure 11. The location of the 100 m exclusion zone within the proposed mining area.

Gamagara Pipeline in this regard. Arrangements for the obtainment of water from this pipeline have been finalised.

A detailed hydrological report is attached hereto as Appendix C.

3.10 GROUNDWATER

3.10.1 Depth of the water table

The results of a hydrocensus of boreholes located within a 5 km radius of the proposed mining area indicate that water levels in the area vary between 13.05 m and 54.89 m below the soil surface.

The regional depth to ground water is 15 to 25 m below ground level, with a recharge of between 5 and 10 $mm.annum^{-1}$.

3.10.2 Location of boreholes and fountains

The results of a hydrocensus conducted within a 5 km radius of the proposed mining area indicate that a total of 49 boreholes are located within the study area and the immediate surrounds.

No natural ground-water seeps or springs, discharging continuously and indicative of shallow groundwater discharge, are located within the borders of the proposed mining area or the immediate surrounds.

3.10.3 Groundwater quality

The results of a water quality sampling exercise conducted by GCS (Pty) Ltd. in the study area and surrounds indicate that the overall groundwater quality of the boreholes in the vicinity of the study area is good, except in two instances.

Water samples taken from borehole DM4 (located within a river bed within the borders of the greater Demaneng farm) had an elevated reading with regard to conductivity and total dissolved solids. This can be explained by the presence of concentrated salts in the dry river bed. Water

samples collected from Borehole DM5 (also located within the borders of the greater Demaneng farm) also had elevated conductivity and total dissolved solids readings, which is assumed to be a result of the presence of calcrete in the immediate surroundings. Relatively high Fe-levels found in the samples from both the aforementioned boreholes can be explained by the naturally high levels of iron found in the Banded Iron Stone Formations present in the area.

3.10.4 Groundwater usage

The main existing groundwater use in the study area is domestic use and stock watering.

A detailed geo-hydrological report of the study area is attached hereto as Appendix D.

3.11 AIR QUALITY

The proposed mining area is located in close proximity to a number of existing, fully operational open cast mining operations, including the Kumba Iron Ore-, Khumani Iron Ore-, Burk- and Kadgame mines. As a result of the fact that the actual mining excavation process used in surface mining leads to the dispersion of particulate matter by wind, the proposed study area and surrounds is, as a result of its location, regarded as an area with high instances of dust pollution.

It is anticipated that the proposed mining activities of the applicant will contribute further to the already high instances of dust pollution experienced in the area.

Occuserv has been appointed by the applicant and is currently in the process of conducting a baseline assessment of the proposed mining area with regard to dust pollution. This fall-out study commenced on 1 November 2010 and will continue over a three month period, i.e. until 1 February 2011. As a result of the limited time period available for the completion of the EIA/EMPR document according to the requirements of the MPRDA, the final results of this study will not be included in this document. These results will, however, be used as a baseline for the future monitoring of dust pollution within the mining site.

A status report compiled by Occuserv is attached hereto as Appendix E.

3.12 NOISE

3.12.1 Existing sources

The proposed mining area is located in close proximity to a number of other existing, fully operational mines, e.g. the Kumba Iron Ore and Khumani Iron Ore Mines. Noises associated with the mining activities of these mines, e.g. blasting activities, are audible within the borders of the proposed mining area at times.

Mr. Willem Barwise has been appointed and is currently busy with the compilation of a specialist noise- and vibration study that will largely focus on the establishment of baseline data with regard to noise and vibration levels present within the study area prior to the commencement of the proposed mining operation. It is furthermore anticipated that the monitoring of both noise- and vibration levels will continue after the commencement of mining activities in the study area. Where necessary, mitigation measures proposed by Mr. Barwise will be incorporated in this regard.

3.12.2 New sources

It is anticipated that the proposed mining activities of the applicant, which will include blasting activities, will contribute to the existing noise levels experienced in the area.

3.13 AREAS OF CULTURAL, HISTORICAL OR ARCHAEOLOGICAL INTEREST

Early Stone Age archaeological material of exceptional technological skill has been discovered in the red sand deposits of the Kathu area as part of previous investigations: Investigations at the Kathu cemetery by Peter Beaumont and on the farms Hartnolls and Bestood by Cobus Dreyer produced Early Stone Age hand axes and pointed flakes in abundance (Dreyer, 2010).

In contrast to the exhilarating finds made in the red sand deposits detailed above, the geology of the Kathu-area and surrounds appears to change rapidly from the town of Kathu towards the proposed mining area. In the latter area, deep red sand deposits transform into hills, which produce rich iron ore accumulations.

Historical remains are present in the proposed mining area in the form of ruined buildings occurring in a number of separate clusters. It is speculated that these ruins could be remnants of historical manganese mining activities conducted in the area many years ago. The walls of these buildings were constructed of concrete blocks and lintels, while windowpanes and doorframes consist of wood. A concrete lined pit with a dividing wall down the centre, of which the purpose is uncertain, is located in close association with one of the building clusters. It is speculated, but cannot be stated with certainty, that these ruined buildings are older than sixty years. They are, however, in a dilapidated state and there is no obvious function or practical purpose to restore and preserve these features of unknown origin (Dreyer, 2010).

A single glass soft drink bottle from Sullivan's in Kimberley, as well as baked bricks from New Castle, which were found in the vicinity of the ruins, give no indication of the age of the occupation of the site.

According to Dreyer (2010), no other cultural or historical material was found within the proposed area of development as part of the present study.

A detailed heritage assessment of the proposed mining area is attached hereto as Appendix F.

3.14 POTENTIALLY SENSITIVE AREAS

The following potentially sensitive areas were identified within the boundaries of the proposed mining area during the scoping phase of the EIA:

- The dry run of the Ga-Mogara River;
- The ruins of mine workers' houses remnant from historical mining activities conducted in the area;
- Areas with high densities of plant species protected in terms of legislation.

3.15 VISUAL ASPECTS

3.15.1 Visibility of the mine from existing roads

The N14 is located to the north-west of the proposed mining site, while the D3333 intersects the study area into two parts: a north-eastern and a south-western part (Figure 2).

It is anticipated that the mining activities to be associated with the proposed mining operation will be visible from both these roads.

3.15.2 Visibility of the mine from residential areas

As is evident from Table 1, the proposed mining site is located approximately 12 km to the south-east of Kathu (Figure 1; Table 1). It is therefore not anticipated that the infrastructure of the proposed mine will be visible from Kathu.

3.15.3 Visibility of dust being generated

Dust clouds formed as a result of blasting activities to be conducted in the proposed mining area may in future be visible from Kathu.

3.15.4 Visibility of the mine from tourist routes

As is mentioned in Section 5.15.2, it is anticipated that the proposed mine will be visible from the N14, which links the towns of Kuruman and Upington.

3.16 SOCIO-ECONOMIC STRUCTURE OF THE REGION

The study area is located within the boundaries of the Gamagara Local Municipality (GLM) (Figure 12). [Information detailed in the following sections applies to the GLM.

All information supplied was sourced from Census 2001: Key Municipal Data (2004) and reflects the results of the 2001 South African Population Census.]

3.16.1 Housing

As is evident from Figure 13, the majority of households resident in the GLM (73.00%) resides in brick structures on separate stands or yards. A total of 13.30% of households resident in the GLM live in informal dwellings or shacks that are not located in another party's backyard. The remaining 13.7% of households of the GLM reside in traditional dwellings; flats, town- or cluster houses; houses/rooms or shacks located in backyards; rooms or flatlets on shared properties; caravans; and tents.

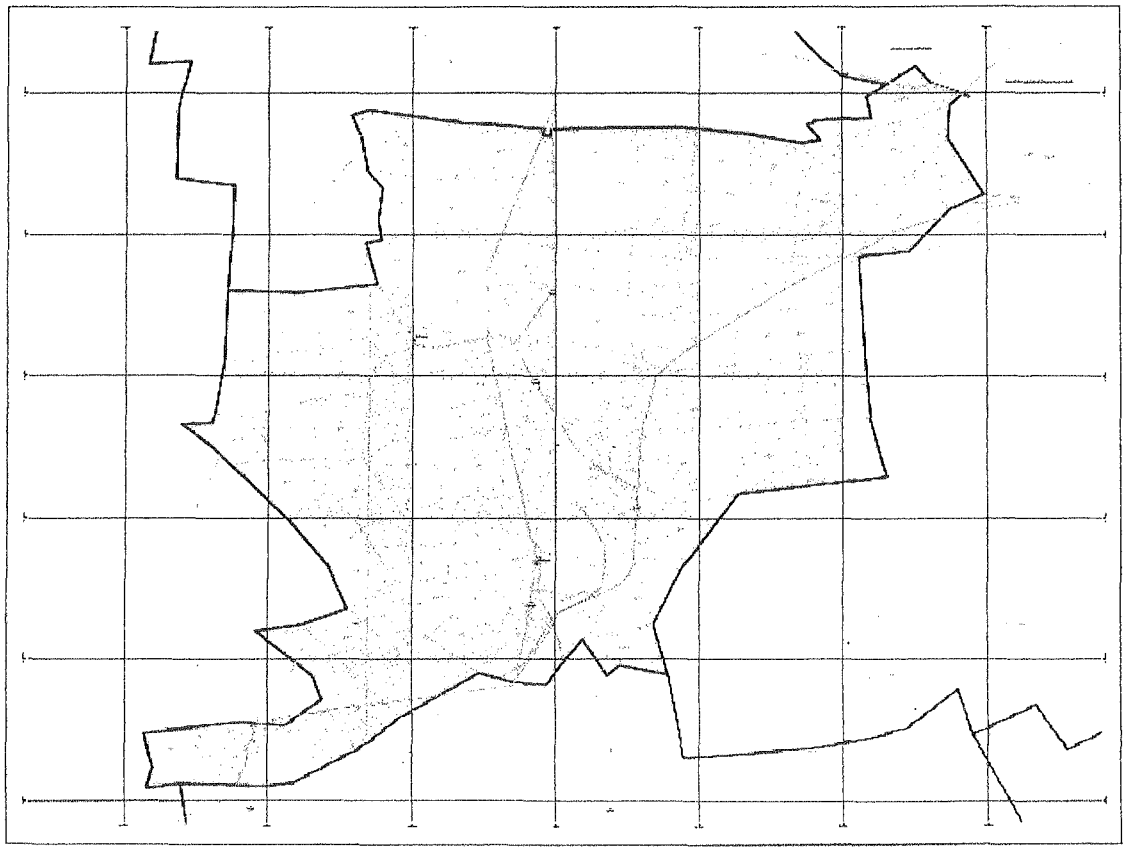


Figure 12. The geographical setting of the Gamagara Local Municipality (from www.demarcation.org.za).

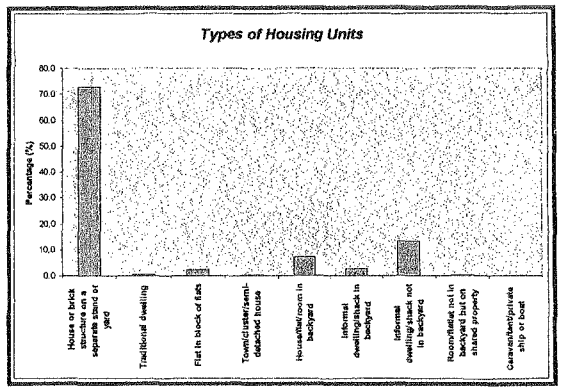


Figure 13. Different types of housing units in the Gamagara Local Municipality.

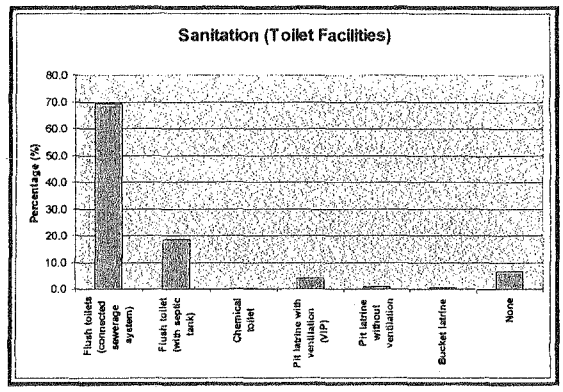


Figure 14. The availability of different sanitation facilities to households resident in the Gamagara Local Municipality.

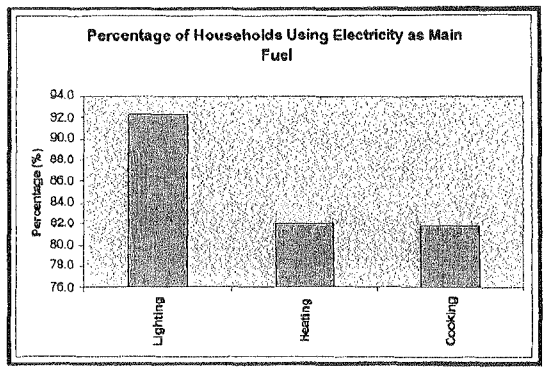


Figure 15. Percentage of households resident in the Gamagara Local Municipality using electricity as main source of fuel for lighting, heating and cooking purposes.

3.16.2 Sanitation

Figure 14 indicates that the largest portion of households in the GLM (69.20%) have access to flush toilets that are connected to a sewerage system. Only 0.50% of households resident in the GLM still make use of the bucket toilet system, while 6.70% of households do not have access to any sanitation facilities at all. The remaining 23.60% of households make use of flush toilets connected to a septic tank; chemical toilets or pit latrines.

3.16.3 Electricity

It is evident from Figure 15 that the largest portion of households (92.30%) resident in the GLM use electricity as main source of fuel for lighting purposes. A further 82.00% of households resident in the area use electricity as main fuel source for heating purposes, while 81.80% of households use electricity as main fuel source for cooking purposes.

3.16.4 Access to water

Figure 16 clearly indicates that the largest portion of households resident in the GLM (90.20%) has access to piped water within their dwelling or yard. A further 8.90% of households have access to piped water obtainable from a source located 200 m or further away. The remainder of households of the GLM (0.90%) makes use of borehole water; rainwater tanks; dams or pools of stagnant water; rivers or streams; water vendors; or other alternative sources of water.

3.16.5 Labour market status

It is evident from Figure 17 that 52.20% of persons aged 15 to 65 years residing in the GLM are employed. 13.10% of persons in this age group are unemployed, while the remaining 34.70% is economically inactive.

3.16.6 Industry labour statistics

Figure 18 indicates that the largest portion of the labour force of the GLM (33.60%) is employed by the mining/quarrying sector. Relatively large portions of the labour force are also employed by the community service, wholesale/retail and manufacturing sectors (12.70%, 9.20% and 10.00%, respectively). The remaining 34.50% of the labour force of the GLM is employed by

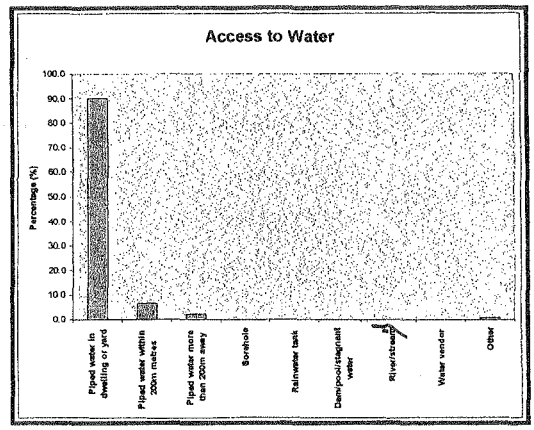


Figure 16. Percentage of households resident in the Gamagara Local Municipality with access to water.

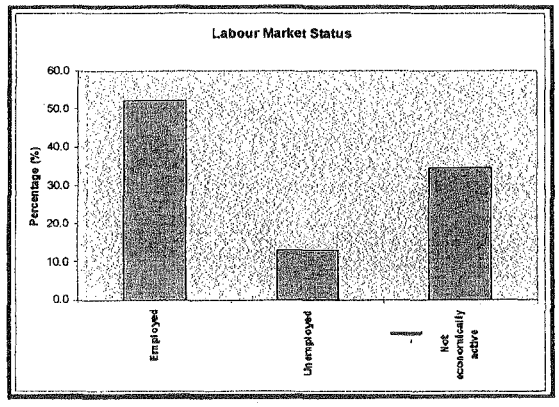


Figure 17. Labour market status of the Gamagara Local Municipality.

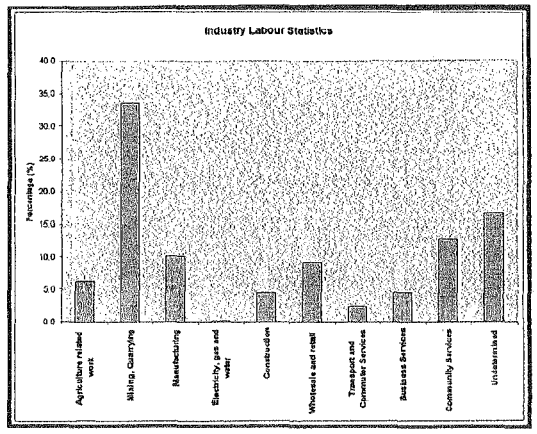


Figure 18. Industry labour statistics of the Gamagara Local Municipality.

the following sectors: Electricity, gas and water; agriculture; construction; transport and commuter services; business services; and an undetermined sector (which includes private households).

3.16.7 Social infrastructure

No social infrastructure exists within the boundaries of the proposed mining area.

A total of six schools (three primary schools, one intermediate and one secondary school); four medical facilities (including three clinics and one mobile clinic); and three police stations are situated within the borders of the GLM.

3.16.8 Key economic activities

The key economic activities of the GLM are detailed in Figure 18 and Section 3.16.6 above.

3.16.9 Site-specific social situation

No parties are currently permanently resident within the borders of the proposed mining area. Mr. Dihan Jansen van Rensburg is, however, the holder of grazing rights over the said area in terms of Deed of Transfer No. T450/1989.

Mr. Jansen van Rensburg, his family, his employees and their families are resident on a neighbouring property, the Remaining Extent of the farm Demaneng No. 546. The Jansen van Rensburg family farmstead is located approximately 1 km from the border fence of the proposed mining area, in an easterly direction.

Mr. Jansen van Rensburg (52) is, in addition to being a livestock farmer by profession, also a marketing agent for a company selling herbicides and toxicants for the control of alien and invasive plant species. Mr. Jansen van Rensburg's wife, Elsa Jansen van Rensburg (54) is a teacher by profession. They have two children, one of whom is a student and is therefore still financially dependent on them. In addition, Mr. Jansen van Rensburg's mother is also partially financially dependent on him.

Mr. Jansen van Rensburg has three employees: One female (aged 57) and two males (aged 27 and 37, respectively). These three employees are financially supporting a total of 16 family members (nine children and seven adults).

In light of the above, it is therefore evident that a total of 23 individuals are currently financially dependent (either fully or partially) on the livestock farming practices carried out within the borders of the proposed mining area.

A screening level social impact report is attached hereto as Appendix G.

4. PROJECT ALTERNATIVES

4.1 METHODOLOGY USED IN THE IDENTIFICATION OF ALTERNATIVES

Alternatives were identified through informal discussions with the applicant, as well as an intensive literature study.

4.2 ALTERNATIVES

4.2.1 The option of not proceeding with the proposed mining operation

In the event of not proceeding with the proposed mining operation, it is anticipated that:

- There will be no decrease in grazing with regard to the proposed mining area;
- The holder of grazing rights over the proposed mining area will be able to continue with his current grazing management strategy (which is based on a rotational grazing system);
- There will not be any destruction of protected tree and plant species, red data species and endemic species in the proposed mining area for the purpose of site clearance and physical mining;
- Soil erosion will not increase within the borders of the mining area;
- Potential sites of archaeological significance (if present) will be left undisturbed;
- No positive impact will be made on the unemployment figures of the GLM, as the creation of 200 to 250 job opportunities will not take place;

- The anticipated positive social impact of the implementation of the Social and Labour Plan (SLP) of the applicant will not take place; and
- An additional positive injection into the local economy will not take place (also refer to point above).

Based on the fact that a number of existing, fully operational mining operations are located in close proximity to the study area, a number of potential identified impacts associated with the proposed operation (such as dust pollution; noise pollution; groundwater and surface water issues; sinkhole formation; poaching; vibration and shock; the deterioration of roads and other infrastructure; and theft of infrastructure and livestock) are still anticipated to have an impact/occur in the area, albeit at slightly lower intensities, should the proposed mining operation not proceed. These are all impacts that can also be associated with neighbouring mining operations.

In light of the discussion above, it is clear that the anticipated positive impacts of the proposed mining operation on the local economy and unemployment figures have to be weighed up against the (mitigated) anticipated negative impacts of the proposed operation on the environment (including cumulative impacts), as well as its potential social impact on the holder of grazing rights over the area, his family and his workers.

4.2.2 Alternative mining method

Opencast mining with machinery is regarded as the only feasible method for mining the outcropping ore bodies identified within the borders of the proposed mining area. No alternative mining methods were therefore considered as part of the scoping study.

4.2.3 Lay-out alternatives

A draft mine lay-out plan has been compiled by the applicant (Figure 2). It is, however, anticipated that the final lay-out of the mine will, to a large extent, depend on the results of specialist studies currently being conducted in the study area. The following environmental aspects are anticipated to have an impact on the final lay-out of the mine: The natural vegetation of the area (including the distribution and density of protected, endemic and red data plant species); the archaeology and palaeontology of the area; and the location of the Ga-Mogara River and its associated flood lines.

4.2.4 Operational alternatives

In order to limit the potential impact of the proposed mining operation on the quantity of the surface- and ground water resources of the area, it was decided that process water will not be abstracted, but, instead, purchased from the Vaal-Gamagara Pipeline.

5. DETAILED PROJECT DESCRIPTION

5.1 PROJECT INFRASTRUCTURE

5.1.1 Existing infrastructure

The existing infrastructure related to the proposed mining area is summarised in Section 3.6.4.

5.1.2 Proposed new infrastructure

The following additional infrastructure will be constructed in the study area as part of the proposed mining operation:

- An office complex;
- A workshop and vehicle maintenance area;
- A processing plant;
- A sewerage plant;
- Change rooms;
- A storage facility;
- A laboratory;
- Two slimes dams;
- A load-out facility;
- A substation;
- A 66 kVA Eskom power line decreased to 22 kVA via a transformer;
- A water pipeline from the connection point to the Vaal-Gamagara scheme;
- Two water storage tanks with a capacity of 500 000 ℓ each;
- Haul roads; and
- A conveyor.

5.2 MINE SURFACE LAY-OUT

Figure 2 illustrates the draft lay-out of the proposed mining site and details the proposed placement of each of the structures mentioned in Section 5.1.2.

5.3 ROADS, RAILWAY LINES AND CONVEYOR BELTS

5.3.1 Access roads

Direct vehicular access to the proposed mining area will be obtained from an existing, gravel district road, D3333. From the D3333, access to the N14 will obtained from the existing N14/D3333 crossing, located south of Dingleton.

No new access roads are therefore planned as part of the proposed mining operation.

5.3.2 Haul roads

Haul roads measuring a total of approximately 10 km (long) x 10 m (wide) will be constructed as part of the proposed mining operation. Road surfaces will be covered with process fines.

5.3.3 Railway lines

A load-out facility covering approximately 2 ha will be constructed on the Remaining Extent of the farm Lyleveld No. 545, District of Kuruman. Processed ore obtained from the mining area will be transported to this loading facility via conveyor belt, where-after it will be loaded onto rail trucks before being transported via rail to Saldanha Bay for exporting purposes.

5.3.4 Conveyor belt

As is mentioned in Section 5.3.3, processed ore will be transported to the proposed load-out facility to be constructed on the Remaining Extent of the farm Lyleveld No. 545, District of Kuruman, via conveyor belt. It is anticipated that this conveyor belt will be approximately 2 km long and 10 m wide.

5.4 POWER LINES

5.4.1 Existing power lines

As is evident from Figure 2 and Section 3.6.1, the following existing power lines can currently be found within the borders of the proposed mining area: Two 130 kVA Eksom power lines; and one single phase Eskom power line with conductors.

5.4.2 Proposed power lines

An additional 66 kVA Eskom power line, which will be reduced to 22 kVA by means of a transformer, will be constructed as part of the proposed mining operation.

5.5 WORKSHOPS, ADMINISTRATION BUILDINGS AND OTHER BUILDINGS

An office complex measuring approximately 200 m x 200 m, which will include offices, change rooms and a laboratory, will be constructed as part of the proposed mining operation. This structure will be located adjacent to a workshop/vehicle maintenance yard, which will also contain a storage facility, measuring approximately 100 m x 200 m.

5.6 MINERAL PROCESSING PLANT

A mineral processing plant consisting of a crushing system and a wet screening plant will be constructed as part of the proposed mining operation. This plant will cover a total area of approximately 500 m x 200 m.

A detailed process description is given in Section 1.6 and Figure 3.

5.7 SOLID WASTE MANAGAMENT FACILITIES

5.7.1 Solid waste disposal

5.7.1.1 Domestic waste

Domestic waste will be stored in an adequate number of strategically placed, closed containers. These containers will be emptied and the waste taken to the Dingleton Municipal waste disposal facility on a daily basis.

5.7.1.2 Hazardous waste

Hazardous waste will be stored in closed containers within a properly bunded area on site. These containers will be collected and removed by Oilkol on a regular basis. Oilkol is ISO 14001 accredited and their offices are situated in Bloemfontein.

5.7.1.3 Industrial waste

Industrial waste will be collected from the site on a regular basis by Enviroserve. Enviroserve will supply waste skips for the collection of industrial waste on site. Enviroserve operates from Bloemfontein.

5.7.2 Sewerage

A sewerage treatment plant covering approximately 2 ha will be constructed as part of the proposed mining operation. The final design of this system will only take place during the design phase of the proposed mining operation. It is, however, anticipated that this system will be designed using the latest technology in order to ensure legal compliance.

5.8 DIESEL STORAGE

Diesel will be stored on site in an above-ground storage facility with a capacity of 100 000 ℓ. Oil will be stored in an above-ground storage facility with a capacity of 10 000 ℓ.

5.9 MINE WASTE (DISCARD AND PRODUCT STOCKPILES)

5.9.1 Discard stockpiles

As is mentioned in Section 1.6, waste material collected after blasting will be loaded and hauled to a waste dump. In addition hereto, process waste will also be stockpiled on waste dumps.

5.9.2 Product stockpiles

The final product will be loaded and hauled to stockpiles.

5.9.3 Slimes

Slimes formed as a by-product of the wet screening process will be pumped into one of two slimes dams to be constructed on site. After washing, material will be upgraded by means of a dense media separation process and/or jigging process. Slimes from this process will also be pumped into one of two slimes dams.

5.10 PROCESS WATER SUPPLY

Neither surface water, nor groundwater is anticipated to be abstracted for use as process water as part of the proposed mining operation. The applicant will obtain water from the Vaal-Gamagara Pipeline in this regard. Arrangements for the obtainment of water from this pipeline have been finalised.

It is anticipated that approximately 300 000 ℓ of process water will be required by the proposed mining operation per day.

5.11 PROJECT PLANNING AND ASSOCIATED ACTIVITIES

It is anticipated that the proposed mining operation will take place in four distinct phases, namely a design phase, construction phase, operational phase and a decommissioning phase and closure phase.

5.11.1 Phase 1: Design phase

The design of the following infrastructure will be finalised during the first phase of the proposed mining operation: Haul roads, waste dumps, water pipeline, workshops/vehicle maintenance area and office complex. No construction will take place during this phase. It is anticipated that Phase 1 will last for six months.

It is anticipated that the finalisation of the site lay-out may impact on the environment of the proposed mining operation.

5.11.2 Phase 2: Construction phase

The design of the following structures will be finalised during the construction phase: The sewerage system, processing plant, slimes dams, loading facility and electrical systems.

In addition to the aforementioned design activities, it is anticipated that all construction activities will be finalised during this phase, including the following:

- The construction of an office complex, including change rooms and a laboratory;
- The construction of a workshop and vehicle maintenance area, including a storage area;
- The construction of a process plant;
- The construction of a sewerage plant;
- The construction of two slimes dams;
- The construction of a load-out facility;
- The construction of a water pipeline from the study area to the connection point with the Vaal-Gamagara pipeline;
- The construction of a 66 kVA power line decreased to 22 kVA via a transformer;
- The construction of a substation;
- The construction of haul roads; and
- The construction of a conveyor belt.

It is anticipated that Phase 2 will take a period of 12 months to complete.

It is furthermore anticipated that the following aspects of this phase could impact on the environment of the proposed mining area (including the natural, social and cultural aspects thereof):

- Site clearing prior to the commencement of construction, which will include the stripping of vegetation, topsoil and subsoil; the stockpiling of topsoil and subsoil; as well as landscaping activities.
- The establishment of infrastructure, which will involve the presence and movement of contractors and staff on site; the movement of construction vehicles on site; as well as waste generation.

5.11.3 Phase 3: Operational phase

The following activities will take place on site as part of the operational phase of the proposed mining operation:

- Mining and excavation activities (including blasting);
- The processing of excavated material;
- The transportation of excavated material, product and waste;
- Waste rock disposal;
- Slimes disposal;
- The storage and handling of hazardous substances;
- Sewerage treatment;
- The disposal of domestic, industrial and hazardous waste; and
- Administration, maintenance and other non-mining related activities.

It is anticipated that Phase 3 will take 30 years to complete.

It is furthermore anticipated that all of the above-mentioned aspects associated with the construction phase could impact on the environment (including natural, social and cultural aspects) of the proposed mining area:

5.11.4 Phase 4: Decommissioning and closure phase

The following activities may be associated with the decommissioning phase of the mine:

- The recovery of saleable infrastructure;
- The demolition of structures;
- The ripping of compacted areas;
- The sloping of all remaining dumps and piles;
- The re-vegetation of disturbed areas, where deemed necessary;
- The monitoring of the re-vegetation process;
- The monitoring of other key environmental variables; and
- Weed management and the monitoring thereof.

It is anticipated that Phase 4 may take up to three years to complete.

6. PROJECT MOTIVATION

It is anticipated that the proposed mining operation will have the following benefits:

- The creation of long-term employment opportunities;
- Benefits associated with the implementation of the various plans contained within the Social and Labour Plan (SLP) compiled as part of the requirements of this mining right application;
- A positive impact on the local economy; and
- The flow of foreign capital into South Africa.

6.1 CREATION OF LONG-TERM EMPLOYMENT OPPORTUNITIES

It is anticipated that the proposed mining operation will create up to 400 new employment opportunities for individuals resident within the borders of the GLM. This is anticipated to cause a decrease in the existing unemployment rate of 13.10% within the GLM (Figure 17).

6.2 IMPLEMENTATION OF THE SOCIAL AND LABOUR PLAN

6.2.1 Implementation of the Local Economic Development Plan

The implementation of the Local Economic Development (LED) Plan contained in the SLP is anticipated to contribute to an LED-project already identified within the GLM; contribute to the

development and upliftment of the local community; and contribute to a poverty eradication initiative within the GLM.

6.2.2 Implementation of the Human Resource Development Plan

It is anticipated that the proposed mining operation will positively impact on the lifestyles of its 400 employees and their families by providing them with a reliable source of income and by implementing the Human Resources Development Plan (HRDP) contained in the Social and Labour Plan of the applicant. In addition, the housing and living conditions, as well as nutrition of the employees of the mine will be addressed by the applicant as per the commitments made in the SLP.

It is anticipated that the implementation of the HRDP will result in the upliftment of the employees of the mine through an ongoing process of training and skills and qualification improvement.

6.3 A REGIONAL SOCIO-ECONOMIC BENEFIT

It is anticipated that the mine will positively impact on the local and regional economy by appointing local and regional procurement companies, as per the commitments contained in the Procurement Progression Plan of the SLP.

6.4 EARNING FOREIGN CAPITAL

Exporting the final product is anticipated to ensure a flow of foreign capital into South Africa.

7. PUBLIC PARTICIPATION

7.1 PARTIES INTERESTED IN OR AFFECTED BY THE PROPOSED OPERATION

Potential interested and affected parties (I&APs) were identified prior to the commencement of the public participation process. These include:

- Competent authorities: Department of Mineral Resources, Ngwao Boswa Kapa Bokoni (Northern Cape Provincial Heritage Resources Authority) & South African Heritage Resources Agency (SAHRA);
- Commenting authorities: Northern Cape Department of Environmental Affairs and Nature Conservation, Northern Cape Department of Roads and Public Works, Department of Water Affairs, Department of Agriculture, Fisheries and Forestry, South African National Roads Agency Limited, Transnet Freight Rail;
- Property owners within 100 m from the boundaries of the proposed mining area: Mr. Dihan Jansen van Rensburg and Mrs. Elsa Jansen van Rensburg, Mr. André Posthumus and the Khumani Iron Ore Mine;
- The Ga-Segonyana Local Municipality (Kuruman), Gamagara Local Municipality (Kathu), Councillor Nampa (Ward Councillor) and the Tshiping Water User Association;
- Surrounding mines; and
- The general public and farmers.

Table 5 lists all I&APs registered to date, as well as their contact details.

7.2 PROCEDURE USED TO OFFER INTERESTED AND/OR AFFECTED PARTIES THE OPPORTUNITY TO PARTICIPATE

7.2.1 Written notification/correspondence

Written notices were sent out to 15 registered I&APs before 27 August 2010 to inform them of the first public meeting held on 27 August 2010 in Kuruman. Copies of these notices are attached hereto as Appendix H.

In addition to the written notices sent to I&APs before 27 August 2010, a background information document (BID) was drafted and distributed to all registered I&APs on 25 October 2010 (Appendix I). This document provides an overview of the proposed project and alternatives, potential environmental impacts, as well as of the environmental impact assessment process being undertaken and includes template response forms to facilitate I&AP participation. The information provided was deemed to be sufficient to allow I&APs to participate in the EIA process. Written notices were sent to 15 registered I&APs before 26 October 2010 to

Table 5. Registered interested and/or affected parties and their contact details.

NO.	NAME AND SURNAME ORGANISATION	INTEREST	CONTACT DETAILS	COMMUNICATION
Land owners adjacent to/within 100m of the site				
1	Mr Dihan Jansen van Rensburg Dihan Eiendoms Trust	Adjacent farmer with grazing rights on the farm Demaneng 546	Phone: 053 724 2016 / 082 628 7552 Fax:053 723 3214 PO Box 678, Kathu, 8446	Afrikaans
2	Mrs Elsa Jansen van Rensburg	Spouse of adjacent farmer	Phone: 053 724 2016 / 082 628 7552 Fax:053 724 2016 PO Box 678, Kathu, 8446	Afrikaans
3	Mr. Alex Mostert Khumani Iron Ore Mine [1] Assmang Limited	Adjacent iron ore mine	Phone: 082 376 6211 Fax: 053 311 4310 Private Bag X503, Kathu, 8446	English
4	Mr. Alasdair Macphee	Adjacent iron ore mine	Phone: 012 679 2154 Fax: 053 739 2000 Private Bag X563, Kathu, 8446	English
5	Mr. André Posthumus [4]	Farmer that uses the D3333 on which the ore will be transported	Phone: 082 534 8893	Afrikaans
Registered personally				
6	Mrs. Stephanie Cornelissen Tshiping WUA	Tshiping WUA Representative, Interested farmer	Phone: 053 724 2129 / 083 649 5452 Fax: 088 053 724 2129 e-mail: tshiping@lantic.net / wright@polka.co.za PO Box 170, Kathu, 8446	Afrikaans
7	Mr. Pieter Colyn P3 Consultancy	Advisor to farmers	Phone: 011 454 4566 / 082 553 8844 Fax: 086 622 5552 e-mail: rpcolyn@telkomsa.net PO Box 628, Edenvale, 1610	Afrikaans

[4] Was only identified at the meeting and therefore not invited before the meeting. Will, however, be invited to participate in the process and sent the minutes of the meeting.

NO.	NAME AND SURNAME ORGANISATION	INTEREST	CONTACT DETAILS	COMMUNICATION
8	Mrs. Tania Anderson WESSA: Northern Cape	WESSA representative	Phone: 053 839 2713 Fax: 053 842 1433 e-mail: spothil@gmail.com	English
9	Mrs Mariagrazia Galimberti / Mrs Nonofho Ndobochani SAHRA	APM Impact Assessor	Phone: +27 (0)21 462 4502 Fax : +27 (0)21 462 4509 E-mail: mgalimberti@sahra.org.za PO Box 4637, Cape Town 8000,	English
10	Mr. Lucas du Plessis Transnet Freight Rail	Transnet Freight Rail representative	Phone: 053 723 2641 Fax: 053 723 2641 e-mail: lucas.duplessis@transnet.net 12 Melkbos street, Kathu, 8446	Afrikaans
		Ex officio		
11	Mr. Anthony Rooiland SA Manganese (Pty) Ltd Burk Mining (Pty) Ltd	Director, SA Manganese (Pty) Ltd Director, Burk Mining (Pty) Ltd	Phone: 012 643 0118 Fax: 086 681 8808 e-mail: anthony@burk.co.za PO Box 8155, Centurion, 0046	Afrikaans
12	Mr. Manne Dipico	Director, SA Manganese (Pty) Ltd	Phone: 012 643 0118 Fax: 086 681 8808 e-mail: nbfillis@telkomsa.net PO Box 8155, Centurion, 0046	English
13	Mr. Piet Kotzee	Mine Manager, Burk Mining Mine Manager, SA Manganese	Phone: 053 791 9100 / 082 413 2227 Fax: 053 791 9199 e-mail: pietkotzee@gmail.com PO Box 879, Kathu, 8446	Afrikaans
14	Mr. Japie Loubser Milnex 189 cc	Consultant	Phone: 053 963 1081 / 072 998 6008 Fax: 053 963 1081 e-mail: japie@milnex-sa.co.za PO Box 1086, Schweizer Reneke, 2780	Afrikaans
15	Mr. Johny Jantjes Transnet (Pty) Ltd	Transnet representative	Fax: 053 838 2725 e-mail: johny.jantjes@transnet.net PO Box 620, Kimberley	English
16	Ms. KP Monosi Department of Mineral Resources	DMR official	Fax: 053 832 5631 Private Bag X6093, Kimberley, 8300	English
17	Mrs. Beatrice Mashoboa	NC DENC official	Fax: 053 807 7392	English

NO	NAME AND SURNAME ORGANISATION	INTEREST	CONTACT DETAILS	COMMUNICATION
	Northern Cape Department of Environment and Nature Conservation		Private Bag X6102, Kimberley, 8300	
18	Mr. Ndindani Hlupheka Humphrey Northern Cape Department of Environment and Nature Conservation	NC DENC official	Phone: 053 712 0108 / Cell: 079 694 9650 Fax: 053 712 0936 (werk) E-mail: hndindani7@gmail.com / ndindanih@yahoo.com PO Box 2249, Kuruman, 8460	English
19	Mr. Louis Snyders Department of Water Affairs	DWA official	Fax: 053 831 4534 Private Bag X6101, Kimberley, 8300	English
20	Jackie Mans Department of Agriculture, Forestry and Fisheries	DAFF official - potential impact on protected trees	Phone: 054 338 5860 Fax: 054 334 0030 E-mail: JacolineMa@daff.gov.za PO Box 2782, Upington, 8800	English
21	Mr. Steven Seokwang Department of Transport	DoT official	Fax: 053 773 1740 Private Bag X148, Mothibistad, 8474	English
22	The Director: Roads Northern Cape Department of Roads and Public Works	NC DRPW official	Phone: 053 861 9600 Fax: 053 839 2290/1 PO Box 3132, Squarehill Park, Kimberley, 8300	English
23	Mr. Kobus van der Walt [5] Regional Manager: Western Region SA National Road Agency	SANRAL Manager	Phone: 021 957 4600 Fax: 021 946 1630 Private Bag X19, Bellville, 7535	Afrikaans
24	Mr. Jimmy Walker Kumba Iron Ore	Kumba Iron Ore representative	Fax: 053 739 2000 Private Bag 563, Kathu, 8446	English
25	Me Jacqueline Maisily/ Dr. Rebone Moerane National Department of Agriculture, Forestry and Fisheries	DAFF official	Fax: 086 419 6554 Private Bag X5018, Kimberley, 8300 Fax: 086 419 6554 e-mail: Private Bag X5018, Kimberley, 8300	English

[5] Was only identified after the meeting and therefore not invited before the meeting. Will, however, be invited to participate in the process and sent the minutes of the meeting.

NO.	NAME AND SURNAME ORGANISATION	INTEREST	CONTACT DETAILS	COMMUNICATION
26	Mr. Eric Gaborone Ga-Segonyana Local Municipality (Kuruman)	Ga-Segonyana Municipality official	Phone: 053 712-1095/6/7 Fax: 053 712 3581 e-mail: kurmun@spg.co.za Private Bag X1522, Kuruman, 8460	English
27	Mr. Cornelius Joachim Gamagara Local Municipality (Kathu)	Gamagara Municipality official	Phone: 053 723-2261 Fax: 053 732 2021 e-mail: kathu1@hotmail.com PO Box 1001, Kathu, 8446	English
28	Mr. Andrew Hall Ngwao Boswa Kapa Bokoni	NC PHRA representative	Phone: 053 831 2537 Fax: 053 833 1435 Email: info@sahra.org.za PO Box 1930, Kimberley, 8300	English
29	Clr. Nampa [6] Gamagara Local Municipality	Ward Councillor	Phone: 082 396 5596	English
30	Mr. Theunis Meyer Centre for Environmental Management, North-West University	Public Participation Facilitator	Phone: 018 299 1467 / 083 627 0637 Fax: 086 513 7996 e-mail: theunis.meyer@nwu.ac.za Private Bag X6001, Potchefstroom, 2520	Afrikaans
31	Ms. Esmé Snyman Centre for Environmental Management, North-West University	Public Participation Facilitator	Phone: 018 299 1590 / 082 964 1667 Fax: 018 299 4266 e-mail: esme.snyman@nwu.ac.za Private Bag X6001, Potchefstroom, 2520	Afrikaans
32	Ms. Karien van der Merwe KvdM Consultants	Environmental Assessment Practitioner	Phone: 082 964 1667 Fax: 053 832 5004 e-mail: karienvdm@msn.com PO Box 3620, Diamond, 8305	Afrikaans
Attendance to the Public Participation meetings only				
33	Mr. Willie Cornelissen	Interested farmer	Phone: 082 368 0356 e-mail: wright@polka.co.za	Afrikaans
34	Mr. Stefan Cornelissen	Interested farmer	Phone: 053 724 2129 e-mail: wright@polka.co.za	Afrikaans

[6] Was only identified at the meeting and therefore not invited before the meeting. Will, however, be invited to participate in the process and sent the minutes of the meeting.

NO.	NAME AND SURNAME ORGANISATION	INTEREST	CONTACT DETAILS	COMMUNICATION
35	Mrs. Charné Kemp Volksblad	Media	Phone: 053 712 1472 e-mail: charne.attie@gmail.com	Afrikaans
36	Mr. Joseph Rolyn	Interested party	Phone: 053 331 0692 / 074 049 1149 Fax: 053 331 0692 e-mail: charne.attie@gmail.com	Afrikaans

provide them with a copy of the BID and invite them to the second Public meeting held on 26 October 2010 in Kathu (Appendix J).

7.2.2 Newspaper advertisements

Advertisements of the EIA process and the first public meeting were published in the *Diamond Fields Advertiser* and *Kathu Gazette* of 13 and 14 August 2010, respectively (Figures 19 and 20).

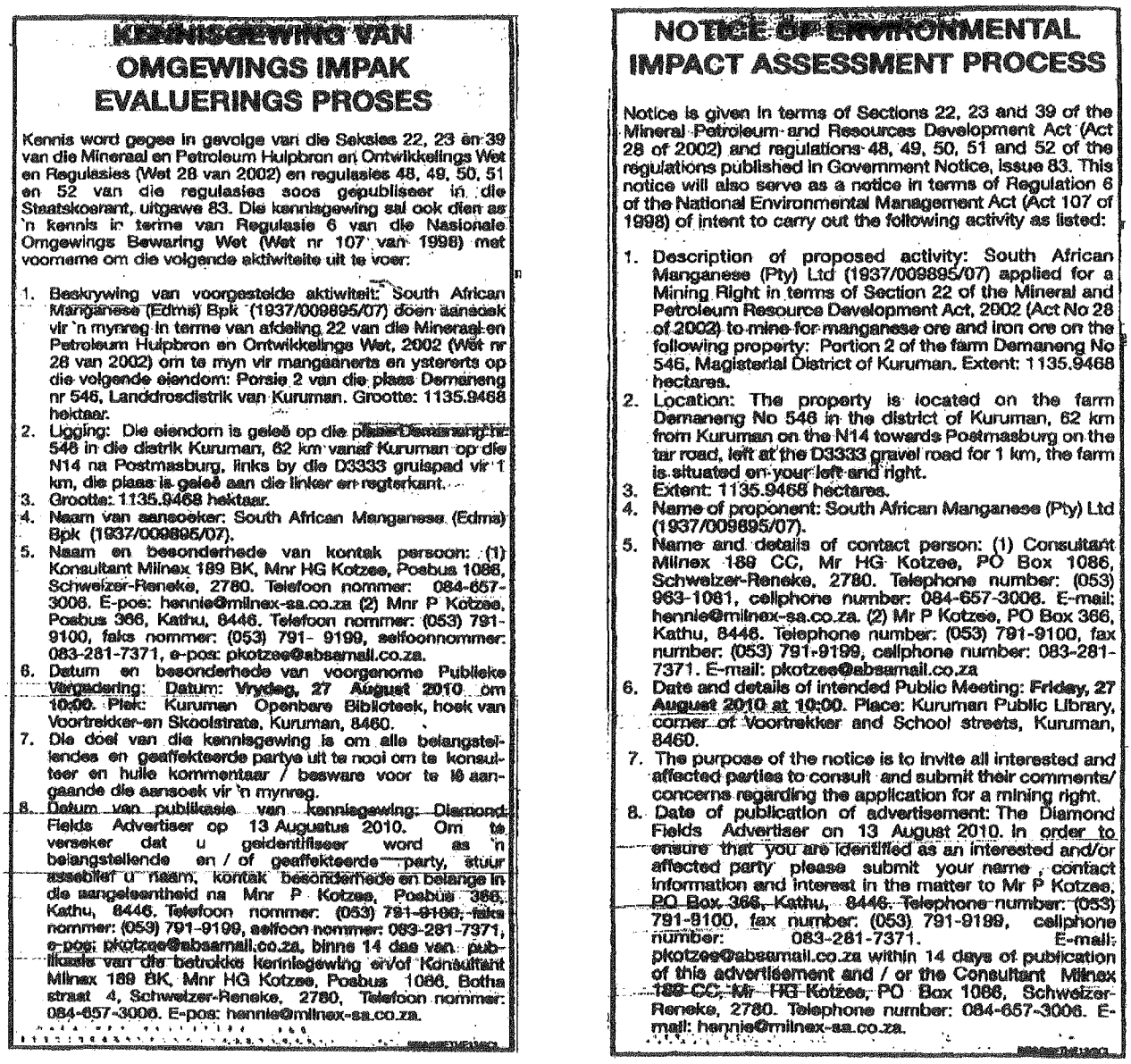
Additional advertisements of the EIA process and the second public meeting, conforming to the DEAT guidelines, were published in the *Diamond Fields Advertiser* and *Kathu Gazette* on 27 and 28 August 2010 and 3 and 4 September 2010 (Figures 21, 22, 23 & 24).

7.2.3 Public meetings

A public meeting was held on 27 August 2010 in Kuruman to inform I&APs of the proposed project and alternatives, potential environmental impacts, as well as of the environmental impact assessment process being undertaken, as well as to solicit input and comments from I&APs to inform the EIA processes. A total of 5 people attended the meeting and the minutes of the meeting (Appendix K) was circulated to registered I&APs on 30 August 2010.

A second public meeting was held on 26 October 2010 in Kathu to inform I&APs of the proposed project and alternatives, potential environmental impacts, as well as of the environmental impact assessment process being undertaken, as well as to solicit input and comments from I&APs to inform the EIA processes. A total of 17 people attended the meeting and the minutes of the meeting was circulated to registered I&APs on 1 November 2010 (Appendix L). A copy of the presentation given during the second public meeting is attached hereto as Appendix M.

A public information article regarding the EIA process and the second public meeting was generated and published in *Die Volksblad* on 27 October 2010 (Figure 25).



KENNISGEWING VAN OMGEWINGS IMPAK EVALUERINGS PROSES

Kennis word gegee in gevolge van die Seksies 22, 23 en 39 van die Mineraal en Petroleum Hulpbron en Ontwikkelings Wet en Regulasies (Wet 28 van 2002) en regulasies 48, 49, 50, 51 en 52 van die regulasies soos gepubliseer in die Staatskoerant, uitgawe 83. Die kennisgewing sal ook dien as 'n kennis in terme van Regulasie 6 van die Nasionale Omgewings Bewaring Wet (Wet nr 107 van 1998) met voorneme om die volgende aktiwiteite uit te voer:

1. Beskrywing van voorgestelde aktiwiteit: South African Manganese (Edms) Bpk (1937/009895/07) doen aansoek vir 'n mynreg in terme van afdeling 22 van die Mineraal en Petroleum Hulpbron en Ontwikkelings Wet, 2002 (Wet nr 28 van 2002) om te myn vir mangaanerts en ystererts op die volgende eiendom: Porsie 2 van die plaas Demaneng nr 546, Landdrosdistrik van Kuruman. Grootte: 1135.9468 hektaar.
2. Ligging: Die eiendom is geleë op die plaas Demaneng nr 546 in die distrik Kuruman, 62 km vanaf Kuruman op die N14 na Postmasburg, links by die D3333 gruispad vir 1 km, die plaas is geleë aan die linker en regterkant.
3. Grootte: 1135.9468 hektaar.
4. Naam van aansoeker: South African Manganese (Edms) Bpk (1937/009895/07).
5. Naam en besonderhede van kontak persoon: (1) Konsultant Milnex 189 BK, Mnr HG Kotzee, Posbus 1086, Schweizer-Reneke, 2780. Telefoon nommer: 084-657-3006. E-pos: hennie@milnex-sa.co.za (2) Mnr P Kotzee, Posbus 366, Kathu, 8446. Telefoon nommer: (053) 791-9100, faks nommer: (053) 791- 9199, selfoonnommer: 083-281-7371, e-pos: pkotzee@absamail.co.za.
6. Datum en besonderhede van voorgenome Publieke Vergadering: Datum: Vrydag, 27 August 2010 om 10:00. Plek: Kuruman Openbare Biblioteek, hoek van Voortrekker-en Skoolstrate, Kuruman, 8460.
7. Die doel van die kennisgewing is om alle belangstellendes en geaffekteerde partye uit te nooi om te konsulteer en hulle kommentaar / besware voor te lê aangaande die aansoek vir 'n mynreg.
8. Datum van publikasie van kennisgewing: Diamond Fields Advertiser op 13 Augustus 2010. Om te verseker dat u geïdentifiseer word as 'n belangstellende en / of geaffekteerde party, stuur asseblief u naam, kontak besonderhede en belange in die aangeleentheid na Mnr P Kotzee, Posbus 366, Kathu, 8446. Telefoon nommer: (053) 791-9199, faks nommer: (053) 791-9199, selfoon nommer: 083-281-7371, e-pos: pkotzee@absamail.co.za, binne 14 dae van publikasie van die betrokke kennisgewing en/of Konsultant Milnex 189 BK, Mnr HG Kotzee, Posbus 1086, Botha straat 4, Schweizer-Reneke, 2780, Telefoon nommer: 084-657-3006. E-pos: hennie@milnex-sa.co.za.

NOTICE OF ENVIRONMENTAL IMPACT ASSESSMENT PROCESS

Notice is given in terms of Sections 22, 23 and 39 of the Mineral Petroleum and Resources Development Act (Act 28 of 2002) and regulations 48, 49, 50, 51 and 52 of the regulations published in Government Notice, Issue 83. This notice will also serve as a notice in terms of Regulation 6 of the National Environmental Management Act (Act 107 of 1998) of intent to carry out the following activity as listed:

1. Description of proposed activity: South African Manganese (Pty) Ltd (1937/009895/07) applied for a Mining Right in terms of Section 22 of the Mineral and Petroleum Resource Development Act, 2002 (Act No 28 of 2002) to mine for manganese ore and iron ore on the following property: Portion 2 of the farm Demaneng No 546, Magisterial District of Kuruman. Extent: 1135.9468 hectares.
2. Location: The property is located on the farm Demaneng No 546 in the district of Kuruman, 62 km from Kuruman on the N14 towards Postmasburg on the tar road, left at the D3333 gravel road for 1 km, the farm is situated on your left and right.
3. Extent: 1135.9468 hectares.
4. Name of proponent: South African Manganese (Pty) Ltd (1937/009895/07).
5. Name and details of contact person: (1) Consultant Milnex 189 CC, Mr HG Kotzee, PO Box 1086, Schweizer-Reneke, 2780. Telephone number: (053) 963-1081, cellphone number: 084-657-3006. E-mail: hennie@milnex-sa.co.za. (2) Mr P Kotzee, PO Box 366, Kathu, 8446. Telephone number: (053) 791-9100, fax number: (053) 791-9199, cellphone number: 083-281-7371. E-mail: pkotzee@absamail.co.za
6. Date and details of intended Public Meeting: Friday, 27 August 2010 at 10:00. Place: Kuruman Public Library, corner of Voortrekker and School streets, Kuruman, 8460.
7. The purpose of the notice is to invite all interested and affected parties to consult and submit their comments/ concerns regarding the application for a mining right.
8. Date of publication of advertisement: The Diamond Fields Advertiser on 13 August 2010. In order to ensure that you are identified as an interested and/or affected party please submit your name , contact information and interest in the matter to Mr P Kotzee, PO Box 366, Kathu, 8446. Telephone number: (053) 791-9100, fax number: (053) 791-9199, cellphone number: 083-281-7371. E-mail: pkotzee@absamail.co.za within 14 days of publication of this advertisement and / or the Consultant Milnex 189 CC, Mr HG Kotzee, PO Box 1086, Schweizer-Reneke, 2780. Telephone number: 084-657-3006. E-mail: hennie@milnex-sa.co.za.

Figure 19. Bilingual notices published in the *Diamond Fields Advertiser* of 13 August 2010.

Kathugazet

ıthu se Top 10

Op 22 Julie 2010 is die jaarlikse Top 10-aand by Laerskool Kathu in die Stoffel Fouché saal gehou. Baie geluk aan die volgende leerders.

Graad 5 - 1: Clarise le Grange, 2: Annine Pretorius, 3: Kyla Gricius, 4: Deudliefd Slabbert, 5: Rachel van Dyk, 6: Jarus Botma, 7: Christo Erasmus, 8: Caroline Venter, 9: Liandri Ackermann en 10: Shonita Basson.

Graad 6 - 1: Melanie Badenhorst, 2: James Garisch, 3: Martle Loots, 4: Altus van Blerk, 5: Jacob Steyn, 6: Marco van Niekerk, 7: Wiandri Vorster, 8: Madeli van der Walt, 9: Celine van Rensburg en 10. Na-Leth van Niekerk.

Graad 7 - 1: Gielle Botma, 2: Paul-Daniël van Dyk, 3: Marille Reyneke, 4: Elizabeth Fiedler, 5: Mardus Botha, 6: Johannes Nelson, 7: Diann Cilliers, 8: Terence Saincic, 9: Wian van Zyl en 10: Marisce Fleming.

ɛen Skin Initiative

dren about equality. "We want to create awareness in town that God created us all in his image and no race is superior to another," said Mrs Isaacs. As a member of the initiative, she wants the word to spread. The learners printed their hands on a white cloth as a symbol. *By Jessie Phillips*

Right: **Luxor Academy in Kathu going green for the Green Skin Initiative.** ***Pic: Jessie Phillips***

KATHU

Hoërskool Kathu Hokkie

Die eerste dogtershokkiespan van Hoërskool Kathu het die hokkieseisoen goed afgesluit teen Hoërskool Kalahari op 5 Augustus 2010. Hulle het 1-0 verloor in 'n harde wedstryd. Hulle het goed verbeter na Interskole. Die skool is trots op elke speler. Die tweede- en beginners span het saam gespeel en ongelukkig 2-1 teen Kallas verloor. Dit was nog steeds 'n heerlike seisoen wat almal sal onthou. Hokkie is die beste!

NOTICE OF ENVIRONMENTAL IMPACT ASSESSMENT PROCESS

Notice is given in terms of Sections 22, 23 and 39 of the Mineral Petroleum and Resources Development Act (Act 28 of 2002) and regulations 48,49, 50, 51 and 52 of the regulations published in Government Notice, issue 83. This notice will also serve as a notice in terms of Regulation 6 of the National Environmental Management Act (Act 107 of 1998) of intent to carry out the following activity as listed:

1. Description of proposed activity: South African Manganese (Pty) Ltd (1937/009895/07) applied for a Mining Right in terms of Section 22 of the Mineral and Petroleum Resource Development Act, 2002 (Act no. 28 of 2002) to mine for manganese ore and iron ore on the following property: Portion 2 of the farm Demaneng no 546, Magisterial District of Kuruman. Extent: 1135.9468 hectares.
2. Location: The property is located on the farm Demaneng no 546 in the district of Kuruman, 62 km from Kuruman on the N14 towards Postmasburg on the tar road, left at the D3333 gravel road for 1 km. the farm is situated on your left and right.
3. Extent: 1135.9468 hectares.
4. Name of proponent: South African Manganese (Pty) Ltd (1937/009895/07)
5. Name and details of contact person: (1) Consultant Milnex 189 CC, Mr. HG Kotzee, P.O Box 1086, Schweizer Reneke, 2780, Telephone number: 053 963 1081, Cellphone number: 084 657 3006, E-mail: hennie@milnex-sa.co.za (2) Mr P Kotzee, P.O Box 366, Kathu, 8446, Telephone number: 053 791 9100, Fax number:053 791 9199, Cellphone number:083 281 7371 E-mail:pkotzee@absamail.co.za
6. Date and details of intended Public Meeting: Friday, 27 August 2010 at 10:00. Place: Kuruman Public Library, Corner of Voortrekker and School Street, Kuruman, 8460.
7. The purpose of the notice is to invite all interested and affected parties to consult and submit their comments / concerns regarding the application for a mining right.
8. Date of Publication of advertisement: Kathu Gazette on 14 August 2010. In order to ensure that you are identified as an interested and/or affected party please submit your name, contact information and interest in the matter to Mr P Kotzee, P.O Box 366, Kathu, 8446, Telephone number: 053 791 9100, Fax number:053 791 9199, Cellphone number:083 281 7371, E-mail:pkotzee@absamail.co.za within 14 days of publication of this advertisement, and / or the Consultant Milnex 189 CC, Mr HG Kotzee, P.O Box 1086, Schweizer Reneke, 2780 Telephone number: 084 657 3006. E-mail:hennie@milnex-sa.co.za.

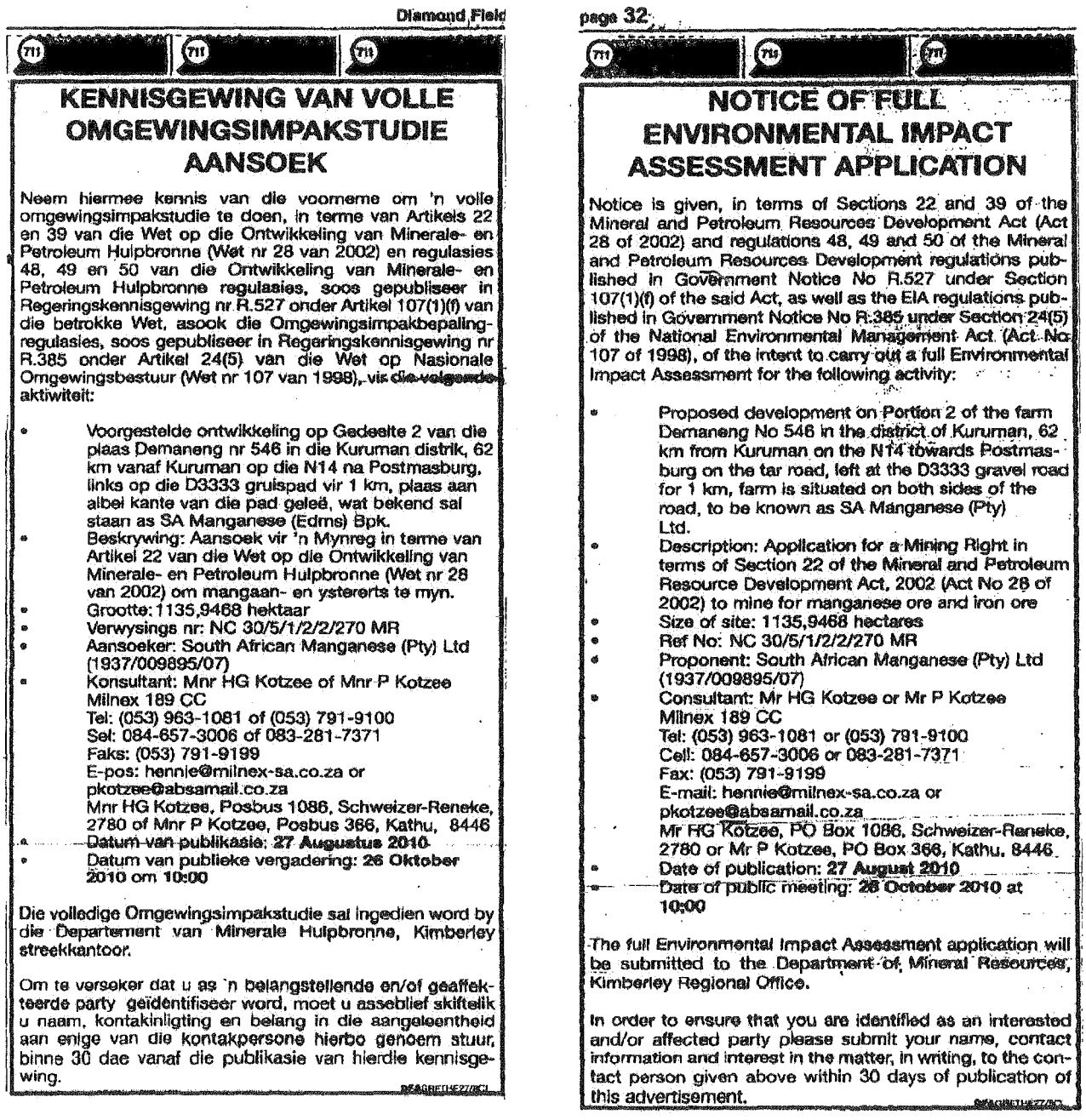
KENNISGEWING VAN OMGEWINGS IMPAK EVALUERINGS PROSES

Kennis word gegee in gevolge van die Seksies 22,23 en 39 van die Mineraal en Petroleum Hulpbron en Ontwikkelings Wet en Regulasies (Wet 28 van 2002) en regulasies 48,49,50,51 en 52 van die regulasies soos gepubliseer in die Staatskoerant, uitgawe 83. Die kennisgewing sal ook dien as 'n kennis in terme van Regulasie 6 van die Nasionale Omgewings Bewaring Wet (Wet 107 van 1998) niet voorneme om die volgende aktiwiteite uit te voer:

1. Beskrywing van voorgestelde aktiwiteit: South African Manganese (Edms) Bpk (1937/009895/07) doen aansoek vir 'n mynreg in terme van afdeling 22 van die Mineraal en Petroleum Hulpbron en Ontwikkelings Wet, 2002 (Wet nr 28 van 2002) om te myn vir mangaanerts en ystererts op die volgende eiendom: Porsie 2 van die plaas Demaneng nr 546, Landdrosdistrik van Kuruman. Grootte: 1135.9468 hektaar.
2. Ligging: Die eiendom is geleë op die plaas Demaneng nr 546 in die distrik Kuruman, 62 km vanaf Kuruman op die N14 na Postmasburg, links by die D3333 gruispad vir 1 km. die plaas is geleë aan die linker en regterkant
3. Grootte: 1135.9468 hektaar.
4. Naam van aansoeker: South African Manganese (Edms) Bpk (1937/009895/07)
5. Naam en besonderhede van kontak persoon (1) Konsultant Milnex 189 BK, Mnr. HG Kotzee, Posbus 1086, Schweizer Reneke, 2780, Telefoon nommer 084 657 3006. E-pos: hennie@milnex-sa.co.za (2) Mnr. P Kotzee, Posbus 366, Kathu, 8446, Telefoon nommer: 053 791 9100, Faks nommer:053 791 9199, Selfoon nommer:083 281 7371,E-pos:pkotzee@absamail.co.za.
6. Datum en besonderhede van voorgenome Publieke Vergadering: Datum:Vrydag, 27 August 2010 om 10:00. Plek: Kuruman Openbare Biblioteek, Hoek van Voortrekker en Skoolstraat, Kuruman, 8460.
7. Die doel van die kennisgewing is om alle belangstellendes en geaffekteerde partye uit te nooi om te konsulteer en hulle kommentaar / besware voorte lê aangaande die aansoek vir 'n mynreg.
8. Datum van Publikasie van kennisgewing: Kathu Gazette op 14 Augustus 2010. Om te verseker dat u geïdentifiseer word as n belangstellende en/of geaffekteerde party, stuur asseblief u naam, kontak besonderhede en belange in die aangeleentheid na Mnr. P Kotzee, Posbus 366, Kathu, 8446, Telefoon nommer: 053 791 9100, Faks nommer:053 791 9199, Selfoon nommer: 083 281 7371,E-pos:pkotzee@absamail.co.za, binne 14 dae van publikasie van die betrokke kennisgewing en/of Konsultant Milnex 189 BK, Mnr. HG Kotzee, Posbus 1086,Bothastraat 4, Schweizer Reneke, 2780 Telefoon nommer: 084 657 3006. E-pos:hennie@milnex-sa.co.za.

50% discount

Figure 20. Bilingual notices published in the *Kathu Gazette* of 14 August 2010.



Diamond Field

KENNISGEWING VAN VOLLE OMGEWINGSIMPAKSTUDIE AANSOEK

Neem hiermee kennis van die voorneme om 'n volle omgewingsimpakstudie te doen, in terme van Artikels 22 en 39 van die Wet op die Ontwikkeling van Minerale- en Petroleum Hulpbronne (Wet nr 28 van 2002) en regulasies 48, 49 en 50 van die Ontwikkeling van Minerale- en Petroleum Hulpbronne regulasies, soos gepubliseer in Regeringskennisgewing nr R.527 onder Artikel 107(1)(f) van die betrokke Wet, asook die Omgewingsimpakbepaling-regulasies, soos gepubliseer in Regeringskennisgewing nr R.385 onder Artikel 24(5) van die Wet op Nasionale Omgewingsbestuur (Wet nr 107 van 1998), vir die volgende aktiwiteit:

- Voorgestelde ontwikkeling op Gedeelte 2 van die plaas Demaneng nr 546 in die Kuruman distrik, 62 km vanaf Kuruman op die N14 na Postmasburg, links op die D3333 gruispad vir 1 km, plaas aan albei kante van die pad geleë, wat bekend sal staan as SA Manganese (Edms) Bpk.
- Beskrywing: Aansoek vir 'n Mynreg in terme van Artikel 22 van die Wet op die Ontwikkeling van Minerale- en Petroleum Hulpbronne (Wet nr 28 van 2002) om mangaan- en ystererts te myn.
- Grootte: 1135,9468 hektaar
- Verwysings nr: NC 30/5/1/2/2/270 MR
- Aansoeker: South African Manganese (Pty) Ltd (1937/009895/07)
- Konsultant: Mnr HG Kotzee of Mnr P Kotzee Milnex 189 CC
  Tel: (053) 963-1081 of (053) 791-9100
  Sel: 084-657-3006 of 083-281-7371
  Faks: (053) 791-9199
  E-pos: hennie@milnex-sa.co.za or pkotzee@absamail.co.za
  Mnr HG Kotzee, Posbus 1086, Schweizer-Reneke, 2780 of Mnr P Kotzee, Posbus 366, Kathu, 8446
- Datum van publikasie: **27 Augustus 2010**
- Datum van publieke vergadering: **26 Oktober 2010 om 10:00**

Die volledige Omgewingsimpakstudie sal ingedien word by die Departement van Minerale Hulpbronne, Kimberley streekkantoor.

Om te verseker dat u as 'n belangstellende en/of geaffekteerde party geïdentifiseer word, moet u asseblief skriftelik u naam, kontakinligting en belang in die aangeleentheid aan enige van die kontakpersone hierbo genoem stuur, binne 30 dae vanaf die publikasie van hierdie kennisgewing.

page 32

NOTICE OF FULL ENVIRONMENTAL IMPACT ASSESSMENT APPLICATION

Notice is given, in terms of Sections 22 and 39 of the Mineral and Petroleum Resources Development Act (Act 28 of 2002) and regulations 48, 49 and 50 of the Mineral and Petroleum Resources Development regulations published in Government Notice No R.527 under Section 107(1)(f) of the said Act, as well as the EIA regulations published in Government Notice No R.385 under Section 24(5) of the National Environmental Management Act (Act No 107 of 1998), of the intent to carry out a full Environmental Impact Assessment for the following activity:

- Proposed development on Portion 2 of the farm Demaneng No 546 in the district of Kuruman, 62 km from Kuruman on the N14 towards Postmasburg on the tar road, left at the D3333 gravel road for 1 km, farm is situated on both sides of the road, to be known as SA Manganese (Pty) Ltd.
- Description: Application for a Mining Right in terms of Section 22 of the Mineral and Petroleum Resource Development Act, 2002 (Act No 28 of 2002) to mine for manganese ore and iron ore
- Size of site: 1135,9468 hectares
- Ref No: NC 30/5/1/2/2/270 MR
- Proponent: South African Manganese (Pty) Ltd (1937/009895/07)
- Consultant: Mr HG Kotzee or Mr P Kotzee Milnex 189 CC
  Tel: (053) 963-1081 or (053) 791-9100
  Cell: 084-657-3006 or 083-281-7371
  Fax: (053) 791-9199
  E-mail: hennie@milnex-sa.co.za or pkotzee@absamail.co.za
  Mr HG Kotzee, PO Box 1086, Schweizer-Reneke, 2780 or Mr P Kotzee, PO Box 366, Kathu, 8446
- Date of publication: **27 August 2010**
- Date of public meeting: **26 October 2010 at 10:00**

The full Environmental Impact Assessment application will be submitted to the Department of Mineral Resources, Kimberley Regional Office.

In order to ensure that you are identified as an interested and/or affected party please submit your name, contact information and interest in the matter, in writing, to the contact person given above within 30 days of publication of this advertisement.

Figure 21. Second set of bilingual notices published in the *Diamond Fields Advertiser* on 27 August 2010.


28 Augustus/ August/ Phatwe 2010 · KATHU GAZETTE 9

www.kathugazette.com

KATHU

Pikkie Pret Besoek Biblioteek

KURUMAN

Miekie & Mienie se Trollieloop

POSTMASBURG

Lief en Leed

deur Mimi Swart

workforce staffing

SALES MANAGER / BRANCH MANAGER

GAMAGARA MUNISIPALITEIT

VOORGESTELDE BEROEPSBEOEFENING ERF 191 OLIFANTSHOEK

Tau Mining Consultants

VACANCY

DIESEL MECHANIC

NOTICE OF FULL ENVIRONMENTAL IMPACT ASSESSMENT APPLICATION

Notice is given, in terms of Sections 22 and 39 of the Mineral and Petroleum Resources Development Act (Act 28 of 2002) and regulations 48, 49 and 50 of the Mineral and Petroleum Resources Development regulations published in Government Notice No. R527 under Section 107(1)(f) of the said Act, as well as the EIA regulations published in Government Notice No. R385 under Section 24(5) of the National Environmental Management Act (Act No. 107 of 1998) of the intent to carry out a full Environmental Impact Assessment for the following activity:

- Proposed development on Portion 2 of the farm Demaneng No 546 in the district of Kuruman, 62 km from Kuruman on the N14 towards Postmasburg on the tar road, left at the D3333 gravel road for 1 km, farm is situated on both sides of the road, to be known as SA Manganese (Pty) Ltd.
- Description: Application for a Mining Right in terms of Section 22 of the Mineral and Petroleum Resource Development Act 2002 (Act no. 28 of 2002) to mine for manganese ore and iron ore
- Size of site: 135.9468 hectares
- Ref. No.: NC 30/5/1/2/2/270 MR
- Proponent: South African Manganese (Pty) Ltd, 193 009895/07
- Consultant: Mr HG Kotzee or Mr P Kotzee, Milnex 169 CC, Tel 053 963 1081 or 053 791 9100, Cell 084 657 3006 or 083 281 7371, Fax 053 791 9199, Email: [illegible], Mr HG Kotzee, PO Box 1086, Schweizer-Reneke 2780 or Mr P Kotzee PO Box 368 Kathu 8446
- Date of publication: 27 August 2010
- Date of public meeting: 26 October 2010 at 10:00

The full Environmental Impact Assessment application will be submitted to the Department of Mineral Resources, Kimberley Regional Office.

In order to ensure that you are identified as an interested and/or affected party please submit your name, contact information and interest in the

KENNISGEWING VAN VOLLE OMGEWINGSIMPAKSTUDIE AANSOEK

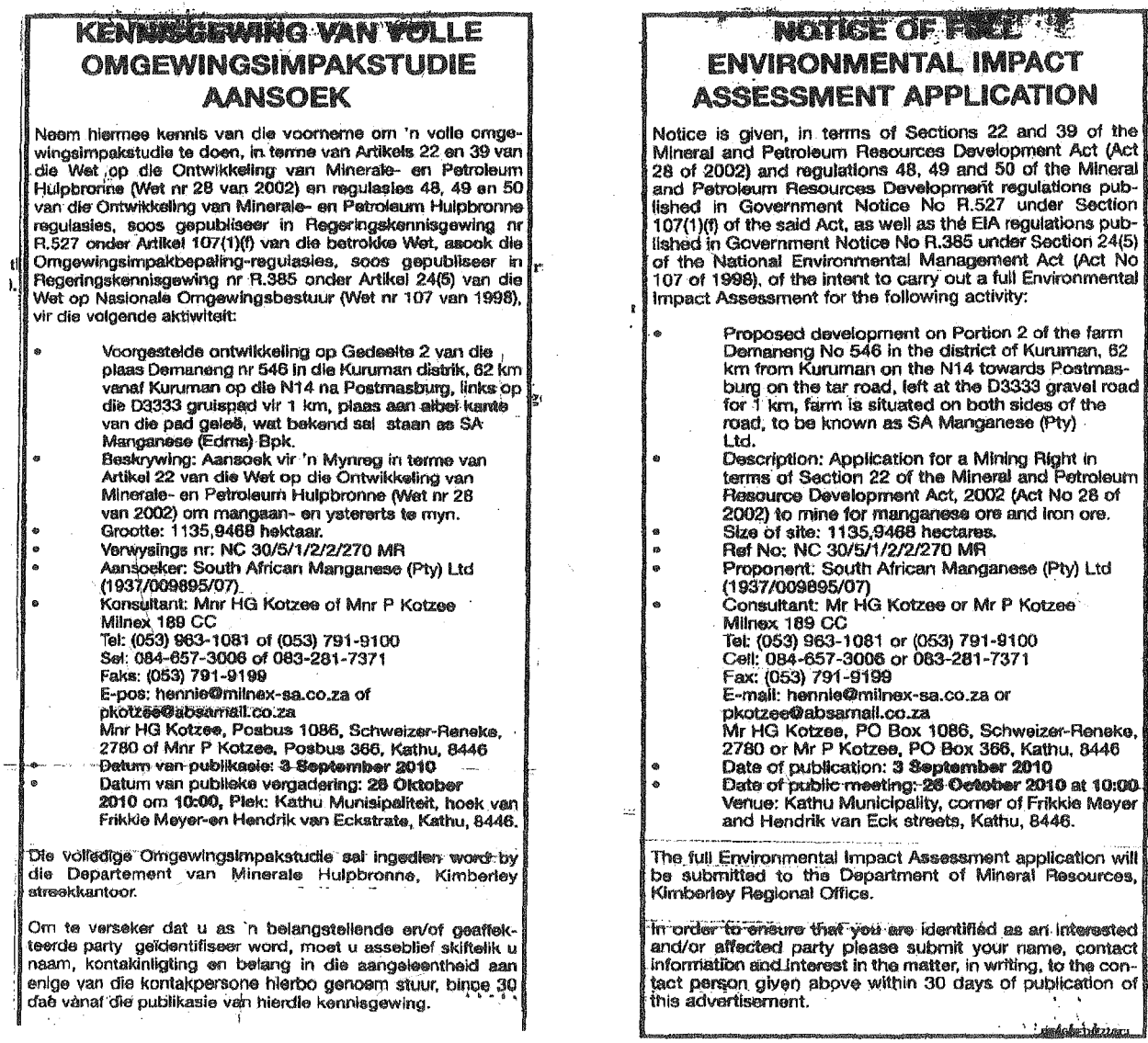
Kennis geskied van die voorneme om 'n volle omgewingsimpakstudie te doen in terme van Artikels 22 en 39 van die Wet op die Ontwikkeling van Minerale- en Petroleum Hulpbronne (Wet No. 28 van 2002) en regulasies 48, 49 en 50 van die Ontwikkeling van Minerale- en Petroleum Hulpbronne regulasies, soos gepubliseer in Regeringskennisgewing No. R527 onder Artikel 107(1)(f) van die genoemde Wet, asook die Omgewingsimpakbepaling-regulasies soos gepubliseer in Regeringskennisgewing No. R385 onder Artikel 24(5) van die Wet op Nasionale Omgewingsbestuur (Wet No. 107 van 1998) vir die volgende aktiwiteit:

- Voorgestelde ontwikkeling op Gedeelte 2 van die plaas Demaneng No 546 in die Kurumandistrik, 62 km vanaf Kuruman op die N14 na Postmasburg, links op die D3333 grondpad vir 1 km, plaas aan albei kante van die pad geleë, wat bekend sal staan as SA Manganese (Eums) Bpk.
- Beskrywing: Aansoek vir 'n Mynreg in terme van Artikel 22 van die Wet op die Ontwikkeling van Minerale- en Petroleum Hulpbronne (Wet No. 28 van 2002) om mangaan- en ystererts te myn.
- Grootte: 135.9468 hektaar
- Verwysingsno.: NC 30/5/1/2/2/270 MR
- Aansoeker: South African Manganese (Pty) Ltd (193 009895/07)
- Konsultant: Mnr. HG Kotzee of Mnr. P Kotzee, Milnex 169 CC, Tel 053 963 1081 of 053 791 9100, Sel 084 657 3006 of 083 281 7371, Faks 053 791 9199, e-pos: [illegible], Mnr. HG Kotzee, Posbus 1086, Schweizer-Reneke 2780 of Mnr. P Kotzee, Posbus 368, Kathu, 8446
- Datum van publikasie: 27 Augustus 2010
- Datum van publieke vergadering: 26 Oktober 2010 om 10:00

Die volledige Omgewingsimpakstudie sal ingedien word by die Departement van Minerale Hulpbronne, Kimberley streekkantoor.

Om te verseker dat u as 'n belanghebbende en/of geaffekteerde party geïdentifiseer word, moet u asseblief skriftelik u naam, kontakbesonderhede en belang in die aangeleentheid aan enige van die kontakpersone hierbo genoem stuur binne 30 dae vanaf die publikasie van hierdie kennisgewing.

Figure 22. Second set of bilingual notices published in the *Kathu Gazette* on 28 August 2010.



KENNISGEWING VAN VOLLE OMGEWINGSIMPAKSTUDIE AANSOEK

Neem hiermee kennis van die voorneme om 'n volle omgewingsimpakstudie te doen, in terme van Artikels 22 en 39 van die Wet op die Ontwikkeling van Minerale- en Petroleum Hulpbronne (Wet nr 28 van 2002) en regulasies 48, 49 en 50 van die Ontwikkeling van Minerale- en Petroleum Hulpbronne regulasies, soos gepubliseer in Regeringskennisgewing nr R.527 onder Artikel 107(1)(f) van die betrokke Wet, asook die Omgewingsimpakbepaling-regulasies, soos gepubliseer in Regeringskennisgewing nr R.385 onder Artikel 24(5) van die Wet op Nasionale Omgewingsbestuur (Wet nr 107 van 1998), vir die volgende aktiwiteit:

- Voorgestelde ontwikkeling op Gedeelte 2 van die plaas Demaneng nr 546 in die Kuruman distrik, 62 km vanaf Kuruman op die N14 na Postmasburg, links op die D3333 gruispad vir 1 km, plaas aan albei kante van die pad geleë, wat bekend sal staan as SA Manganese (Edms) Bpk.
- Beskrywing: Aansoek vir 'n Mynreg in terme van Artikel 22 van die Wet op die Ontwikkeling van Minerale- en Petroleum Hulpbronne (Wet nr 28 van 2002) om mangaan- en ystererts te myn.
- Grootte: 1135,9468 hektaar.
- Verwysings nr: NC 30/5/1/2/2/270 MR
- Aansoeker: South African Manganese (Pty) Ltd (1937/009895/07)
- Konsultant: Mnr HG Kotzee of Mnr P Kotzee Milnex 189 CC
  Tel: (053) 963-1081 of (053) 791-9100
  Sel: 084-657-3006 of 083-281-7371
  Faks: (053) 791-9199
  E-pos: hennie@milnex-sa.co.za of pkotzee@absamail.co.za
  Mnr HG Kotzee, Posbus 1086, Schweizer-Reneke, 2780 of Mnr P Kotzee, Posbus 366, Kathu, 8446
- Datum van publikasie: **3 September 2010**
- Datum van publieke vergadering: **28 Oktober 2010** om **10:00**, Plek: Kathu Munisipaliteit, hoek van Frikkie Meyer-en Hendrik van Eckstrate, Kathu, 8446.

Die volledige Omgewingsimpakstudie sal ingedien word by die Departement van Minerale Hulpbronne, Kimberley streekkantoor.

Om te verseker dat u as 'n belangstellende en/of geaffekteerde party geïdentifiseer word, moet u asseblief skiftelik u naam, kontakinligting en belang in die aangeleentheid aan enige van die kontakpersone hierbo genoem stuur, binne 30 dae vanaf die publikasie van hierdie kennisgewing.

NOTICE OF FULL ENVIRONMENTAL IMPACT ASSESSMENT APPLICATION

Notice is given, in terms of Sections 22 and 39 of the Mineral and Petroleum Resources Development Act (Act 28 of 2002) and regulations 48, 49 and 50 of the Mineral and Petroleum Resources Development regulations published in Government Notice No R.527 under Section 107(1)(f) of the said Act, as well as the EIA regulations published in Government Notice No R.385 under Section 24(5) of the National Environmental Management Act (Act No 107 of 1998), of the intent to carry out a full Environmental Impact Assessment for the following activity:

- Proposed development on Portion 2 of the farm Demaneng No 546 in the district of Kuruman, 62 km from Kuruman on the N14 towards Postmasburg on the tar road, left at the D3333 gravel road for 1 km, farm is situated on both sides of the road, to be known as SA Manganese (Pty) Ltd.
- Description: Application for a Mining Right in terms of Section 22 of the Mineral and Petroleum Resource Development Act, 2002 (Act No 28 of 2002) to mine for manganese ore and iron ore.
- Size of site: 1135,9468 hectares.
- Ref No: NC 30/5/1/2/2/270 MR
- Proponent: South African Manganese (Pty) Ltd (1937/009895/07)
- Consultant: Mr HG Kotzee or Mr P Kotzee Milnex 189 CC
  Tel: (053) 963-1081 or (053) 791-9100
  Cell: 084-657-3006 or 083-281-7371
  Fax: (053) 791-9199
  E-mail: hennie@milnex-sa.co.za or pkotzee@absamail.co.za
  Mr HG Kotzee, PO Box 1086, Schweizer-Reneke, 2780 or Mr P Kotzee, PO Box 366, Kathu, 8446
- Date of publication: **3 September 2010**
- Date of public meeting: **28 October 2010** at **10:00** Venue: Kathu Municipality, corner of Frikkie Meyer and Hendrik van Eck streets, Kathu, 8446.

The full Environmental Impact Assessment application will be submitted to the Department of Mineral Resources, Kimberley Regional Office.

In order to ensure that you are identified as an interested and/or affected party please submit your name, contact information and interest in the matter, in writing, to the contact person given above within 30 days of publication of this advertisement.

Figure 23. Third set of bilingual notices published in the *Diamond Fields Advertiser* on 3 September 2010.

Lourens en Sophie Laut, opgevoer.

NOTICE OF FULL ENVIRONMENTAL IMPACT ASSESSMENT APPLICATION

Notice is given, in terms of Sections 22 and 39 of the Mineral and Petroleum Resources Development Act (Act 28 of 2002) and regulations 48, 49 and 50 of the Mineral and Petroleum Resources Development regulations published in Government Notice No. R527 under Section 107(1)(f) of the said Act, as well as the EIA regulations published in Government Notice No. R385 under Section 24(5) of the National Environmental Management Act (Act No. 107 of 1998), of the intent to carry out a full Environmental Impact Assessment for the following activity:

Proposed development on Portion 2 of the farm Demaneng No 546 in the district of Kuruman, 62 km from Kuruman on the N14 towards Postmasburg on the tar road, left at the D3333 gravel road for 1 km. farm is situated on both sides of the road, to be known as SA Manganese (Pty) Ltd.

- Description: Application for a Mining Right in terms of Section 22 of the Mineral and Petroleum Resource Development Act, 2002 (Act no. 28 of 2002) to mine for manganese ore and iron ore
- Size of site: 1135.9468 hectares
- Ref. No.: NC 30/5/1/2/2/270 MR
- Proponent: South African Manganese (Pty) Ltd (1937/009895/07)
- Consultant: Mr. HG Kotzee or Mr. P Kotzee
  Milnex 189 CC
  Tel: 053 963 1081 or 053 791 9100
  Cell: 084 657 3006 or 083 281 7371
  Fax: 053 791 9199
  Email: [redacted] or [redacted]
  Mr. HG Kotzee, P.O Box 1086, Schweizer Reneke, 2780 or Mr. P Kotzee, PO Box 366, Kathu, 8446
- Date of publication: 3 September 2010
- Date of public meeting: 26 October 2010 at 10:00. Venue: Kathu Municipality, Corner of Frikkie Meyer and Hendrik van Eck Street, Kathu, 8446.

The full Environmental Impact Assessment application will be submitted to the Department of Mineral Resources, Kimberley Regional Office.

In order to ensure that you are identified as an interested and/or affected party please submit your name, contact information and interest in the matter, in writing, to the contact person given above within 30 days of publication of this advertisement.

KENNISGEWING VAN VOLLE OMGEWINGSIMPAKSTUDIE AANSOEK

Neem hiermee kennis van die voorneme om 'n volle omgewingsimpakstudie te doen, in terme van Artikels 22 en 39 van die Wet op die Ontwikkeling van Minerale- en Petroleum Hulpbronne (Wet No. 28 van 2002) en regulasies 48, 49 en 50 van die Ontwikkeling van Minerale- en Petroleum Hulpbronne regulasies, soos gepubliseer in Regeringskennisgewing No. R527 onder Artikel 107(1)(f) van die betrokke Wet, asook die Omgewingsimpakbepaling-regulasies, soos gepubliseer in Regeringskennisgewing No. R385 onder Artikel 24(5) van die Wet op Nasionale Omgewingsbestuur (Wet No. 107 van 1998), vir die volgende aktiwiteit:

- Voorgestelde ontwikkeling op Gedeelte 2 van die plaas Demaneng No. 546 in die Kurumandistrik, 62 km vanaf Kuruman op die N14 na Postmasburg, links op die D3333 gruispad vir 1 km, plaas aan albei kante van die pad geleë, wat bekend sal staan as SA Manganese (Edms) Bpk.
- Beskrywing:Aansoek vir 'n Mynreg in terme van Artikel 22 van die Wet op die Ontwikkeling van Minerale- en Petroleum Hulpbronne (Wet No. 28 van 2002) om mangaan- en ystererts te myn.
- Grootte: 1135.9468 hektaar
- Verwysingsno.: NC 30/5/1/2/2/270 MR
- Aansoeker: South African Manganese (Pty) Ltd (1937/009895/07)
- Konsultant: Mnr. HG Kotzee of Mnr. P Kotzee
  Milnex 189 CC
  Tel: 053 963 1081 of 053 791 9100
  Sel: 084 657 3006 of 083 281 7371
  Faks: 053 791 9199
  E-pos: [redacted] of [redacted]
  Mnr. HG Kotzee, Posbus 1086, Schweizer Reneke, 2780 of Mnr. P Kotzee, Posbus 366, Kathu, 8446
- Datum van publikasie: 3 September 2010
- Datum van publieke vergadering: 26 Oktober 2010 om 10:00. Plek: Kathu Munisipaliteit, Hoek van Frikkie Meyer en Hendrik van Eck Straat, Kathu, 8446

Die volledige Omgewingsimpakstudie sal ingedien word by die Departement van Minerale Hulpbronne, Kimberley streekkantoor.

Om te verseker dat u as 'n belangstellende en/of geaffekteerde party geïdentifiseer word, moet u asseblief skriftelik u naam, kontakinligting en belang in die aangeleentheid aan enige van die kontakpersone hierbo genoem stuur, binne 30 dae vanaf die publikasie van hierdie kennisgewing.

Drie leerders van Hoërskool Duineveld op Upington het elk 'n bronssertifikaat by die onlangse Namakwalandse Toneelfees verdien: Jaco Visser vir sy teks, en Tiaan Hendriks en Jdi Human vir die vertolking van hulle rolle in die toneelstuk wat Duineveld opgevoer het - "Matriekafskeid". Baie geluk aan hierdie drie leerders!

POSTMASBURG

VEK hou Gala Dinee

Deur Edward Smit

Die Postdene, Newtown en Boichoko gemeente van die Volle Evangelie Kerk in Postmasburg het 'n Gala Dinee vir Saterdag 28 Augustus 2010 in die Blinkklip skoolsaal op Postmasburg beplan as deel van die breë Volle Evangelie Kerk se honderdste bestaansjaar vanjaar. Gemeentes dwarsoor die land is besig met feestelikhede om hierdie mylpaal te vier. Die Kerk het sy onstaan gehad in 1896 in die VSA. In 1910 word dit in Suid-Afrika geregistreer. Die Volle Evangelie Kerk strek oor 40 lande wêreldwyd met meer as 2000 opgeleide en toegeruste Pastore. Net in Suid-Afrika alleen het die kerk meer as 40 000 geregistreerde lidmate. In Oktober 1997 word die Kerk 'n eenheid bestaande uit blanke, bruin, swart en indiër lidmate. Die dogsgemeente in Pretoriusstraat staan onder leiding van Pastoor Bokkie Haasbroek, en Pastoor Philip van Rensburg is die herder van die Postdene, Newtown, Boichoko gesamentlike gemeente.

POSTMASBURG

VEK Eeufees

Deur Edward Smit

Die breë Volle Evangelie Kerk van God is hierdie jaar 100 jaar oud en gemeentes dwarsoor die land het verskeie feestelikhede aangepak om hul verjaarsdag te herdenk. Die Volle Evangelie Kerk het sy onstaan gehad in 1896 in die VSA en dis in 1910 in Suid-Afrika geregistreer. Die Volle Evangelie Kerk strek oor 40 lande met meer as 2 000 opgeleide en toegeruste Pastore. Net in Suid-Afrika alleen het die kerk meer as 40 000 geregistreerde lidmate. In Oktober 1997 word die Kerk 'n eenheid bestaande uit blanke, bruin, swart en indiër lidmate. Die gesamentlike gemeente van Postdene, Boichoko en Newtown staan onder leiding van pastoor Philip en Linda van Rensburg. Hierdie gemeente het n gala dinee op Saterdag 28 Augustus 2010 aangebied in die Blinkklip skoolsaal op Postmasburg waar die lidmate bedien was deur die veelsydige Sjef Mindo en sy bekwame kookspan. Die gaste se lagspiere was ook behoorlike geprikkel toe Pastoor Abraham Barker van die Port Elizabeth VEK gemeente sy kwinkslae en staaltjies van sy groot gesin deel. Die Dakbrekers dans- en dramagroep het die glansgeleentheid verder opgekikker met hul passievolle dans en drama.

Figure 24. Third set of bilingual notices published in the *Kathu Gazette* on 4 September 2010.

VOLKSBLAD
NUUS MET MENING

Dipico vra vrede

2010-10-27 15:54

KATHU. – Mnr. Manne Dipico, voormalige Noord-Kaapse premier, en sy mynvennoot, mnr. Anthony Rooiland, het gister onderneem om die strydbyl met die boer op die buurplaas langs hul mynbedrywighede te begrawe.

Dipico en Rooiland is die eienaars van Burk Mine wat die laaste tyd in die spervuur was oor onder meer die geskil met die boer.
Burk Mine besit die plaas waarop hulle wil myn, maar die weidingsregte behoort aan die boer.

Die boer beweer geen ooreenkoms is met hom aangegaan oor die verlies aan weiding nie.

Hul belofte het gekom op 'n opvolgvergadering oor 'n omgewingsimpakstudie vir die terrein wat glo deur hul mynbedrywighede ontwrig word.

Rooiland het namens Burk Mine en SA Manganese verskoning gevra dat sy myn die boer en sy vrou se lewe beïnvloed het.
Die boer en sy vrou het vertel dat hulle 47 jaar op die plaas woon en dat die afgelope jaar traumaties was. Ná maande se onmin was albei partye dit gister eens dat kommunikasie die oplossing vir die geskil sal wees.

Die Burk Mine-bestuurder, mnr. Piet Kotzee, en mnr. Pieter Colyn wat die anonieme boer verteenwoordig, het op die vorige openbare vergadering in Augustus woorde gewissel oor Burk se beweerde onwettige mynbedrywighede en ontwrigting van die boerdery.

Colyn het toe beweer dat Burk onwettig gewerk het met 'n prospekteerlisensie wat verval het. Kotzee het teruggekap en gesê hulle volg die voorskrifte van die mynwet. Colyn het gister gesê dit is beter dat Dipico en Rooiland met die boer persoonlik vergader en prokureurs vir eers uit die ontmoeting hou sodat hulle mekaar se behoeftes kan leer ken en 'n skikking bereik.

Burk Mine beplan om yster en mangaan te myn en werk aan 300 mense te verskaf. Na raming kan daar moontlik

Figure 25. Newspaper article generated and published in *Die Volksblad* of 27 October 2010 with reference to the second public meeting held on 26 October 2010.

mangaan van 5?miljoen ton en yster van 100 miljoen ton wees. Die maatskappy hoop om sy aansoek om mynregte teen Februarie volgende jaar in te dien nadat al die omgewingstudies voltooi en alle partye geraadpleeg is.

Mnr. Theunis Meyer van die Noordwes-universiteit is die fasiliteerder van die omgewingstudie. Hy het navorsing oor geraas, stofbesoedeling, die Gamagara-rivier en grondwater-kwessies, rehabilitasie, wetgewing en ander kwessies verduidelik.

Figure 25 (contd.). Newspaper article generated published in Die Volksblad of 27 October 2010 with reference to the second public meeting held on 26 October 2010.

7.2.4 Site notices

Four notice boards with advertisements in Afrikaans and English that conform to the guidelines published by the Department of Environmental Affairs (DEA) in terms of the National Environmental Management Act No. 107 of 1998 (NEMA) were put up on the boundaries of Portion 2 of the farm Demaneng No. 546, District of Kuruman on 29 August 2010 to inform the public about the proposed project, the public participation process and the opportunity to register as I&APs (Photo plates 1A & B and 2A, B & C).

7.3 ISSUES IDENTIFIED AS BEING OF CONCERN TO INTERESTED AND/OR AFFECTED PARTIES

Throughout the process, I&APs were invited to submit written comments to the independent consultant. These were recorded and appropriately responded to. Copies of written comments received from I&APs to date are attached hereto as Appendix N. Records of correspondence with the relevant authorities are also included in Appendix O.

A summary of all the issues raised by I&APs to date is listed in Table 6.

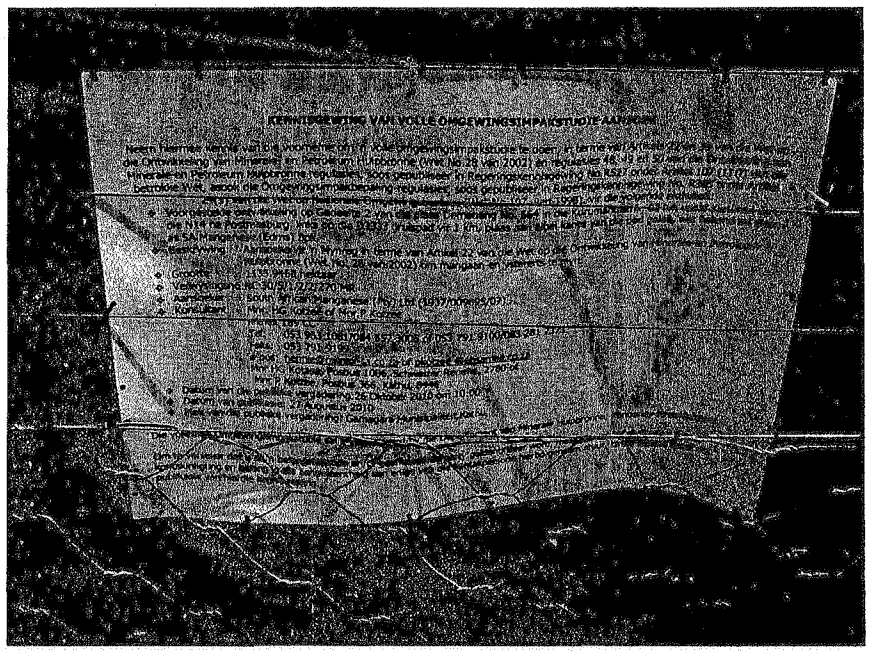
7.4 COMMENTS ON DRAFT DOCUMENTS

7.4.1 Comments received regarding draft documents

A draft scoping report was compiled upon completion of the scoping phase of this EIA-process. This draft document was made available for public comment for a period of 30 days: All registered interested and/or affected parties were invited to view the document during this 30 day period and address comments and/or suggestions to the appointed consultant.

Two comments were received regarding the draft scoping report: One from a representative of the Northern Cape branch of the Wildlife and Environment Society

1A



1B

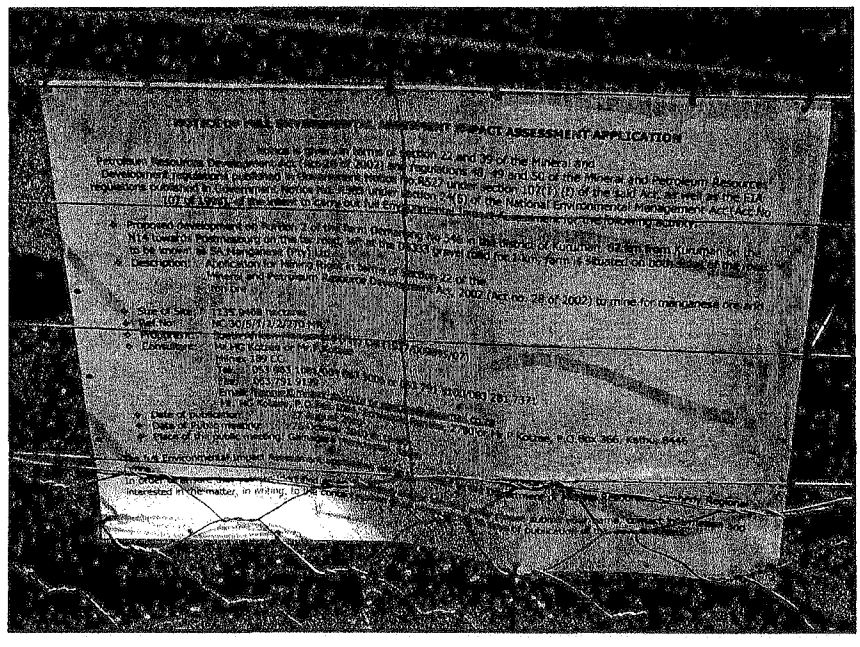
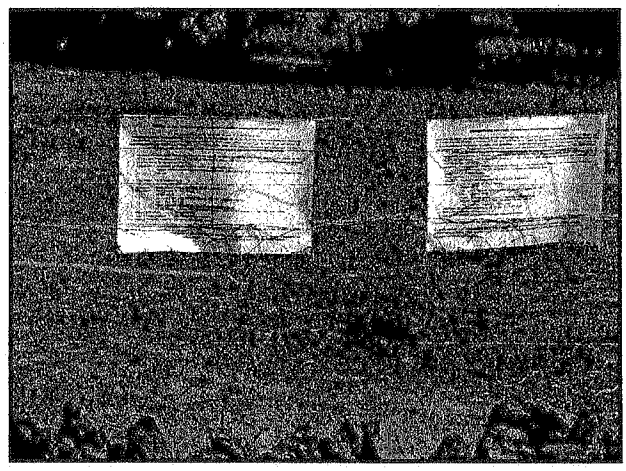
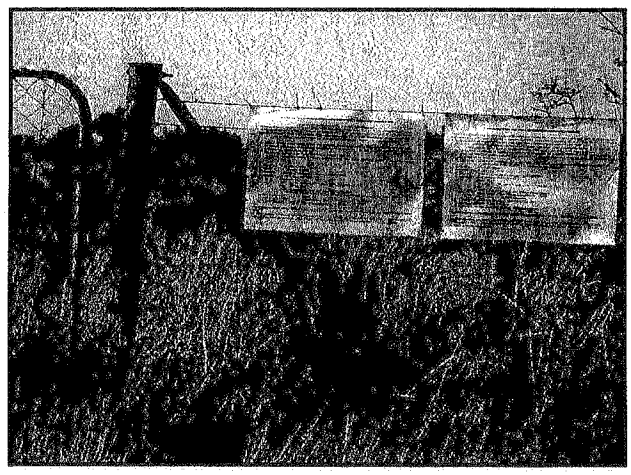


Photo plates 1A & B. Site notices displayed at the boundaries of the proposed mining area.

2A



2B



2C

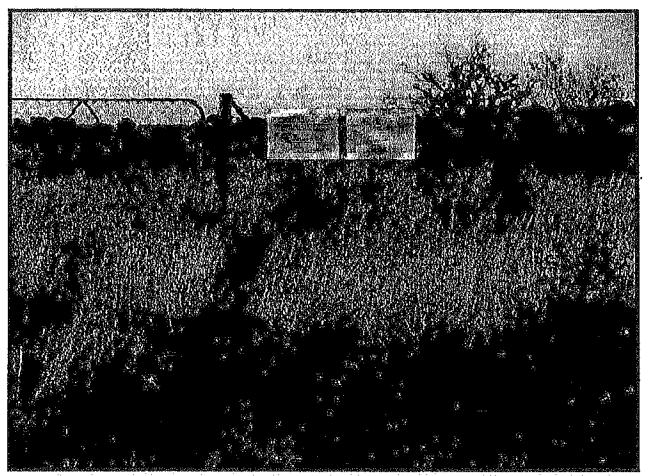


Photo plates 2A, B & C. Site notices displayed at the boundaries of the proposed mining area.

Table 6. Summary of issues raise by interested and/or affected parties.

ANTICIPATED IMPACTS
Anticipated environmental impacts
1. Groundwater issues (including the potential impact on the quality and quantity of groundwater).
2. Surface water issues (including the potential impact on the quality and quantity of surface water and the Gamagara River).
3. Dust issues (including adverse health effects; nuisance effects; damage of materials; reduction in visibility; and impact on vegetation).
4. Noise issues (including a potential increase in noise pollution in the area, as well as the potential impact of blasting and vibration on infrastructure).
5. Vegetation issues [including the destruction of natural vegetation (including protected tree and plant species, as well as endemic and red data species); the impact of dust on vegetation; and a potential increase in invasive plant species].
6. Soil issues (including matters relating to soil erosion).
7. Geology issues (including the potential formation of sinkholes).
8. Fauna issues (including an increase in the poaching of game and livestock).
Anticipated social impacts
1. Social issues (including the potential impact on the social lives of farmers, their families, their workers and the workers' families).
2. Agricultural issues (including the loss of grazing, as well as the potential impact on livestock production).
3. Health issues related to dust pollution.
4. Security issues (including the potential impact on the safety and security of farmers, farm workers and livestock).
5. Infrastructure issues (including the potential impact on farming, railway and road infrastructure).
Anticipated cultural impacts
1. Heritage resource issues (including the potential impact on the archaeology and built environment of the area).

of South Africa (WESSA) and one from a representative of the Department of Agriculture, Forestry and Fisheries. Copies of these comments are attached hereto as Appendix P.

7.4.2 Manner in which comments were addressed

7.4.2.1 Comments received from WESSA

An alternative site lay-out was proposed in the specialist botanical study compiled by Ms. Karien van der Merwe, based on the distribution of tree species protected in terms of the National Forests Act, 1998 (Act No. 84 of 1998) throughout the proposed mining area.

A copy of the archaeological assessment compiled by Peter Beaumont in the Demaneng area has been requested from AGES and Kumba Iron Ore. As soon as a copy of this report is obtained, it will be forwarded to Cobus Dreyer, the appointed archaeological specialist, for taking into consideration in his heritage impact assessment. In the interim, a copy of an archaeological assessment conducted on a neighbouring property, Lyleveld No. 545, has been obtained and forwarded to Mr. Dreyer for his input. Mr. Dreyer indicated that the results of the Lyleveld document do not necessitate the amendment of his report in any way.

7.4.2.2 Comments received from DAFF

The potential presence of *A. erioloba, A. haematoxylon* and *B. albitrunca* within the proposed mining area formed one of the focus points of the botanical assessment conducted by Ms. Karien van der Merwe.

Flora classified as protected or endangered in terms of other legislation were also taken into consideration as part of the botanical assessment conducted by Ms. Van der Merwe.

A copy of the botanical assessment and draft EIA/EMPR will be provided to DAFF for their comments and input upon completion thereof.

8. ENVIRONMENTAL OBJECTIVES AND SPECIFIC GOALS

As is mentioned in Section 5.11, it is anticipated that the following aspects of each phase of the proposed mining operation could potentially impact on the environment of the proposed mining area (including the natural, social and cultural aspects thereof):

- Phase 1: Design phase
    - Finalising the site lay-out.
- Phase 2: Construction phase
    - Site clearing prior to the commencement of construction, which will include the stripping of vegetation, topsoil and subsoil; the stockpiling of topsoil and subsoil; as well as landscaping activities.
    - The establishment of infrastructure, which will involve the presence and movement of contractors and staff on site; the movement of construction vehicles on site; physical construction and excavation activities; as well as waste generation.
- Phase 3: Operational phase
    - Mining and excavation activities (including blasting);
    - The processing of excavated material;
    - The transportation of excavated material, product and waste;
    - Waste rock disposal;
    - Slimes disposal;
    - The storage and handling of hazardous substances;
    - Sewerage treatment;
    - The management of domestic, industrial and hazardous waste; and

- Administration, maintenance and other non-mining related activities.

- Phase 4: Decommissioning and closure phase

  - The recovery of saleable infrastructure;
  - The demolition of structures;
  - The management of waste production;
  - The ripping of compacted areas;
  - The sloping of all remaining dumps and piles;
  - The topsoiling of ripped and sloped areas;
  - The re-vegetation of disturbed areas, where deemed necessary;
  - The monitoring of the re-vegetation process;
  - The monitoring of other key environmental variables; and
  - Weed management and the monitoring thereof.

The environmental objectives and goals listed in the sections to follow are based on the above-mentioned activities that are regarded as having the potential of impacting on the environment of the proposed mining area.

8.1 ENVIRONMENTAL OBJECTIVES AND SPECIFIC GOALS FOR THE DESIGN PHASE

The environmental objective and specific goal for the design phase is as follows:

- To ensure that the final site lay-out takes into consideration the natural and cultural aspects of the environment and causes the least amount of disturbance possible thereto.

8.2 ENVIRONMENTAL OBJECTIVES AND SPECIFIC GOALS FOR THE CONSTRUCTION PHASE

The environmental objectives and specific goals for the construction phase are as follows:

- To ensure that site clearing only takes place in areas where it is regarded as being absolutely necessary;
- To ensure that site clearing and construction activities only take place within the borders of the proposed mining area (except for the water pipeline, conveyor belt and loading facility, as negotiated with the relevant land owners);
- To limit damage to the natural flora of the proposed mining area and surrounds for as far as is practicable, especially with regard to threatened or protected plant and tree species;
- To limit damage to the natural fauna of the proposed mining area and surrounds for as far as is practicable;
- To prevent damage to heritage resources;
- To prevent potential cumulative impacts associated with the removal of vegetation and topsoil, e.g. erosion, by ensuring that an effective surface run-off control system is in place;
- To limit dust dispersion for as far as is practicable;
- To limit noise pollution for as far as is practicable;
- To manage waste production effectively;
- To prevent and manage spillages effectively;
- To keep an open channel of communication with surrounding land owners throughout the lifetime of the mine; and
- To keep in mind the proposed end-state of the mining area during site clearing and construction.

8.3 ENVIRONMENTAL OBJECTIVES AND SPECIFIC GOALS FOR THE OPERATIONAL PHASE

The environmental objectives and specific goals for the operational phase of the proposed mining operation are as follows:

- To ensure that mining activities only take place within the borders of the proposed mining area;

- To limit damage to the natural flora of the proposed mining area for as far as is practicable, especially with regard to threatened or protected plant and tree species;
- To limit damage to the natural fauna of the proposed mining area for as far as is practicable;
- To prevent damage to heritage resources;
- To limit dust dispersion resulting from mining activities as far as is practicable;
- To limit noise pollution resulting form mining activities as far as is practicable;
- To manage waste production effectively;
- To prevent and manage spillages effectively;
- To ensure that an effective surface run-off control system, separating clean and dirty water, is in place;
- To ensure, for as far as is practicable, that the safety of both humans and animals are not compromised;
- To keep an open channel of communication with surrounding land owners throughout the lifetime of the mine; and
- To keep in mind the proposed end-state of the mining area.

8.4 ENVIRONMENTAL OBJECTIVES AND SPECIFIC GOALS FOR THE DECOMMISSIONING AND CLOSURE PHASE

The environmental objectives and specific goals for the decommissioning and closure phase of the proposed mining operation are as follows:

- To rehabilitate the proposed mining area to its proposed end-state as per the relevant closure objectives; and
- To conduct an ongoing monitoring project in order to assess progress made in rehabilitation.

9. ASSESSMENT OF IMPACTS

Potential impacts anticipated to occur as a result of the activities to be associated with the proposed mining operation were identified during a scoping process

described in detail in the revised scoping report prepared as part of the requirements of this mining right application.

The significance of each identified anticipated impact was subsequently determined as part of the specialist investigation phase or the EIA-phase or both of these phases of the EIA-process. The manner in which the significance of each identified anticipated impact was determined, is detailed in the section that follows.

9.1 ENVIRONMENTAL IMPACT SIGNIFICANCE RATING METHODOLOGY

A clearly defined impact rating scale was used in the rating of each identified anticipated impact. This scale enables the assessment of each identified anticipated impact in terms of the probability or likelihood of the impact occurring; the extent or spatial scale in which the impact is anticipated to occur; the intensity or severity of the anticipated impact; the duration or temporal scale over which the impact is anticipated to take occur; and, lastly the significance or importance of the anticipated impact. Tables 7 through 11 detail the impact rating scale used in this study.

9.2 ASSESSMENT OF ANTICIPATED IMPACTS ASSOCIATED WITH THE DESIGN PHASE

As is indicated in Section 8, it is anticipated that the finalising of the site lay-out of the proposed mine may impact on the environment of the proposed mining area. The direct, indirect and cumulative impacts anticipated as a result of the aforementioned activity are listed in Table 12.

Table 13 details the mitigated significance ratings of the impacts anticipated as a result of finalising the site lay-out of the proposed mine. Proposed management and mitigation measures are also included.

Table 7. Probability.

CATEGORY	RATING	DESCRIPTION
Definite	4	The impact will definitely occur.
Probable	3	The impact is highly likely to occur.
Possible	2	The impact has some possibility, but a low likelihood of occurring.
Improbable	1	The impact is not likely to occur, except in extreme and/or rare conditions.

Table 8. Extent.

CATEGORY	RATING	DESCRIPTION
Site	1	Impact anticipated to be limited to the immediate project site.
Local	2	Impact anticipated up to 5 km from the project site.
Regional	3	Impact anticipated within a 20 km radius from the project site.
Provincial	4	Impact anticipated to be provincial.
National	5	Impact anticipated to be national (i.e. within the borders of South Africa).
International	6	Impact anticipated to be international.

Table 9. Duration.

CATEGORY	RATING	DESCRIPTION
Very short-term	1	Less than 24 hours.
Short-term	2	Less than 1 year.
Medium-term	3	1 to 5 years.
Long-term	4	5 to 15 years.
Very long-term	5	More than 15 years.
Permanent	6	Permanent.

Table 10. Intensity.

CATEGORY	RATING	DESCRIPTION
Very low	0	Where the impact is anticipated to affect the environment in such a way that natural, cultural and social functions will not be affected.
Low	2	Where the impact is anticipated to affect the environment in such a way that natural, cultural and social functions are only marginally affected.
Medium	4	Where the affected environment is altered but natural, cultural and social function and processes continue, albeit in a modified way.
High	6	Where natural, cultural or social functions or processes are anticipated to be altered to the extent that they will temporarily cease.
Very high	8	Where natural, cultural or social functions or processes are anticipated to be altered to the extent that they will permanently cease.

Table 11. Significance.

SCORE	SIGNIFICANCE RATING
2-4	Low
5-7	Low to moderate
8-10	Moderate
11-15	Moderate to high
16-19	High
20+	Very high

Table 12. Anticipated direct, indirect and cumulative impacts associated with the design phase of the proposed mining operation.

ACTIVITY	ANTICIPATED DIRECT IMPACTS	ANTICIPATED INDIRECT AND CUMULATIVE IMPACTS
Finalising the lay-out of the mining site.	None	Potential destruction of individuals of protected tree species. Potential construction of infrastructure within the 1:100-year flood line or 100 m exclusion zone of the Ga-Mogara River. Potential opencast mining within the 1:50-year flood line or 100 m exclusion zone of the Ga-Mogara River.

Table 13. Anticipated mitigated environmental impact significance ratings and proposed mitigation measures associated with the design phase of the proposed mining operation.

ENVIRONMENTAL PARAMETER	IMPACT DESCRIPTION	PROBABILITY	EXTENT	DURATION	INTENSITY	SIGNIFICANCE	PROPOSED MANAGEMENT/MITIGATION MEASURES
Geology	No impacts anticipated.	-	-	-	-	-	-
Topography	No impacts anticipated.	-	-	-	-	-	-
Soils	No impacts anticipated	-	-	-	-	-	-
Land capability	No impacts anticipated.	-	-	-	-	-	-
Natural fauna	No impacts anticipated.	-	-	-	-	-	-
Natural flora	Destruction of individuals of protected tree species.	3	2	6	4	17 High	Amendment of draft surface lay-out (Figure 2) in order to accommodate areas with higher densities of individuals of protected tree species.
Surface water	Change in surface water flow regime. Contamination of surface run-off.	1	1	3	0	5 Low to Moderate	Amendment of draft surface lay-out (Figure 2) in order to ensure that no opencast mining activity takes place within the 1:50-year flood line or at a horizontal distance of 100 m from the river bed, whichever is furthest. Amendment of draft surface lay-out plan in order to ensure that no mining infrastructure is placed within the 1:100-year flood line or at a horizontal distance of 100 m from the river bed, whichever is furthest.
Groundwater	No impacts anticipated.	-	-	-	-	-	-
Air quality	No impacts anticipated.	-	-	-	-	-	-
Noise	No impacts anticipated.	-	-	-	-	-	-
Heritage resources	No impacts anticipated.	-	-	-	-	-	-
Aesthetics	No impacts anticipated.	-	-	-	-	-	-
Socio-economic	No impacts anticipated.	-	-	-	-	-	-

9.3 ASSESSMENT OF ANTICIPATED IMPACTS ASSOCIATED WITH THE CONSTRUCTION PHASE

As is mentioned in Section 8, the following activities to be associated with the construction phase of the proposed mining operation are anticipated to impact on the environment of the proposed mining area:

- The stripping of vegetation;
- The stripping of topsoil and subsoil;
- The stockpiling of topsoil and subsoil;
- Landscaping activities;
- The presence and movement of contractors and staff on site;
- The movement of construction vehicles on site;
- Physical construction and excavation activities; and
- Waste generation.

Table 14 summarises the anticipated direct, indirect and cumulative impacts associated with each of the above-mentioned activities of the construction phase. Mitigated[7] significance ratings and proposed mitigation and management measures for each of these anticipated impacts are detailed in Table 15.

Only anticipated negative impacts were rated as part of this assessment. Mitigation measures were, in addition, also only proposed for anticipated negative impacts.

9.4 ASSESSMENT OF ANTICIPATED IMPACTS ASSOCIATED WITH THE OPERATIONAL PHASE

As is detailed in Section 8, the following activities to be associated with the operational phase of the proposed mining operation are anticipated to impact on the environment of the proposed mining area:

- Mining and excavation activities (including blasting);

[7] Mitigated significance ratings were not calculated for social issues for the purpose of this study (refer to Appendix G).

Table 14. Anticipated direct, indirect and cumulative impacts associated with the construction phase of the proposed mining operation.

ACTIVITY	ANTICIPATED DIRECT IMPACTS	ANTICIPATED INDIRECT AND CUMULATIVE IMPACTS
The stripping of vegetation.	A decrease in the grazing available to the holder of grazing rights. Negative impact on the rotational grazing system of the grazing rights holder. A potential impact on the cultural heritage of the area via the destruction of Early Stone Age material. The potential destruction of individuals of protected tree species. The potential destruction of red data plant species. The potential destruction of threatened or protected plant species. Potential increase in dust pollution. Potential increase in noise pollution. The forming of waste wood stockpiles.	A potential loss in cattle production. A reduction in the market value of the larger livestock farming unit of the grazing rights holder. A potential decrease in the grazing capacity of the area. A loss of economic benefits and income derived from farming activities. A loss of employment opportunities related to farming. Soil erosion. Loss of habitat. Physical, chemical and physiological impact of dust on vegetation. Adverse impact on health of farmer and farm workers. A potential increase in the abundance and variety of alien weeds and invasive plant species. An increased fire hazard.
The stripping of topsoil and subsoil.	A potential impact on the cultural heritage of the area via the destruction of Early Stone Age material. Potential increase in dust pollution. Potential increase in noise pollution. Removal of plant growth medium. Destruction of natural soil conditions.	Physical, chemical and physiological impact of dust on vegetation. Adverse impact on health of farmer and farm workers. A potential increase in the abundance and variety of alien weeds and invasive plant species. Contamination of soils.

Table 14 (contd.). Anticipated direct, indirect and cumulative impacts associated with the construction phase of the proposed mining operation.

ACTIVITY	ANTICIPATED DIRECT IMPACTS	ANTICIPATED INDIRECT AND CUMULATIVE IMPACTS
The stockpiling of topsoil and subsoil.	Potential increase in dust pollution.	Soil erosion. Physical, chemical and physiological impact of dust on vegetation. A potential increase in the abundance and variety of alien weeds and invasive plant species. Adverse impact on health of farmer and farm workers.
Landscaping activities.	A potential impact on the cultural heritage of the area via the destruction of Early Stone Age material. Potential increase in dust pollution.	Physical, chemical and physiological impact of dust on vegetation. Adverse impact on health of farmer and farm workers. A potential increase in the abundance and variety of alien weeds and invasive plant species.
The presence and movement of contractors and staff on site.	Increase in mining related employment opportunities. An increase in the number of unknown persons present in the area. Gates left open. Damaging of fence lines. An increase in poaching activities. The potential destruction of individuals of protected tree species for use as firewood.	Negative impact on safety and security of farmer, farm workers and livestock. Increased fire hazard as a result of smoking and potential open fires.
The movement of construction vehicles on site.	A potential increase in dust pollution.	A potential negative impact on groundwater quality as a result of spillages. Contamination of clean surface run-off as a result of potential spillages. Physical, chemical and physiological impact of dust on vegetation. Adverse impact on health of farmer and farm workers.

Table 14 (contd.). Anticipated direct, indirect and cumulative impacts associated with the construction phase of the proposed mining operation.

ACTIVITY	ANTICIPATED DIRECT IMPACTS	ANTICIPATED INDIRECT AND CUMULATIVE IMPACTS
Physical construction and excavation activities.	A potential impact on the cultural heritage of the area via the destruction of Early Stone Age material. Change in surface water flow regime. Potential increase in dust pollution. Potential increase in noise pollution. Potential destruction of individuals of protected tree species. Potential destruction of threatened, protected and red data plant species. Potential destruction of fauna.	Physical, chemical and physiological impact of dust on vegetation. Adverse impact on health of farmer and farm workers. A potential increase in the abundance and variety of alien weeds and invasive plant species.
Waste generation.	An increase in instances of littering.	Negative impact on livestock health. Contamination of clean surface run-off.

Table 15. Anticipated mitigated environmental impact significance ratings and proposed management and mitigation measures associated with the construction phase of the proposed mining operation.

ENVIRONMENTAL PARAMETER	IMPACT DESCRIPTION	PROBABILITY	EXTENT	DURATION	INTENSITY	SIGNIFICANCE	PROPOSED MANAGEMENT/MITIGATION MEASURES
Geology	No impacts anticipated.	-	-	-	-	-	-
Topography	No impacts anticipated.	-	-	-	-	-	-
Soils	Removal of plant growth medium.	4	1	5	2	12 Moderate to High	Only remove topsoil from areas earmarked for development.
	Soil erosion.	2	1	5	2	9 Moderate	The implementation of a proper erosion control and storm water management system on site. Include erosion control measures in all design drawings and implement on site. The re-establishment of natural vegetation should be encouraged in exposed areas. The implementation of dust control measures on site. Erosion control measures should be implemented whenever topsoil stockpiles exceed a height of 1.5 m. Topsoil stockpiles should be re-vegetated or treated with an environmentally friendly dust allying agent.
	Destruction of natural soil conditions.	2	1	5	2	9 Moderate	Topsoil and subsoil should be stripped to a depth of at least 250 mm prior to the commencement of construction, or until hard rock is reached in areas with shallow soils.

							Topsoil should be stockpiled separately from subsoil, rocks and spoil material. Vehicle movement over topsoil stockpiles should be limited in order to prevent compaction and contamination.
	Contamination of soils.	2	1	5	2	9 Moderate	Use natural construction materials wherever possible, e.g. for the construction of haul roads and slimes dams. Vehicle movement over topsoil stockpiles should be limited in order to prevent contamination. A detailed waste management strategy should be compiled and implemented on site. Waste management should form a detailed component of the induction process provided by the mine.
Land capability	A potential decrease in the grazing capacity of the area.	3	2	5	4	14 Moderate to High	Sufficient compensation for anticipated direct and indirect impacts calculated over the short- and long term. Alternatively, purchasing of entire livestock farming unit.
Natural fauna and livestock	A potential increase in poaching activities.	2	2	5	2	11 Moderate to High	Regular awareness training for contractors and staff on the identification of threatened and protected species. Hunting and the setting of traps will be strictly prohibited. No domestic pets will be allowed on site.
	Potential destruction of fauna.	2	2	5	2	11 Moderate to High	Regular awareness training for contractors and staff on the identification of threatened and protected species.
	Adverse effect on the health of livestock and game.	3	2	5	4	14 Moderate to High	Sufficient compensation for anticipated direct and indirect impacts calculated over the short- and long term (i.t.o. livestock). Alternatively, purchasing of entire livestock farming unit.

	A potential loss in cattle production.	3	2	5	4	14 Moderate to High	Sufficient compensation for anticipated direct and indirect impacts calculated over the short- and long term. Alternatively, purchasing of entire livestock farming unit.
	Loss of habitat.	3	1	5	4	13 Moderate to High	Disturbed areas should be re-vegetated as soon as possible.
Natural flora	A decrease in the grazing available to the holder of grazing rights.	3	2	5	4	14 Moderate to High	Sufficient compensation for anticipated direct and indirect impacts calculated over the short- and long term. Alternatively, purchasing of entire livestock farming unit.
	The potential destruction of individuals of protected tree species.	3	2	6	4	17 High	Avoid destruction where possible. Regular awareness training for contractors and staff. Establishment of biodiversity offset area. Obtainment of permits to destruct/damage protected trees.
	The potential destruction of red data plant species.	2	1	2	4	9 Moderate	Regular awareness training for contractors and staff. Sweeping of areas prior to commencement of construction. Plant relocation. Obtainment of permits prior to removal and transport. Establishment of biodiversity offset area.
	The potential destruction of threatened or protected plant species.	2	1	2	4	9 Moderate	Regular awareness training for contractors and staff. Sweeping of areas prior to commencement of construction. Plant relocation. Obtainment of permits prior to removal and transport. Establishment of biodiversity offset area.
	Physical, chemical and physiological	4	2	5	2	13	Mitigation measures to be obtained from dust assessment.

	impact of dust on vegetation.					Moderate to High	
	A potential increase in the abundance and variety of alien weeds and invasive plant species.	2	3	2	2	9 Moderate	Regular awareness training for contractors and staff. Combated according to requirements of Reg. 15 of Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983). Regular monitoring and record keeping of distribution of alien weeds and invasive plants.
	An increased fire hazard.	2	2	2	4	10 Moderate	Compilation and implementation of a fire prevention and –control plan on site. Regular awareness training for contractors and staff.
Surface water	Change in surface water flow regime.	3	1	3	2	10 Moderate	Redirect and/or divert water to maintain water balance. Compile and implement a storm water management plan on site.
	Contamination of clean surface run-off.	1	1	1	1	4 Low	Restrict by containing water in a closed clean-dirty water system. Treatment of roads with prevention chemicals.
Groundwater	A potential decrease in groundwater quality.	1	1	2	1	5 Low to Moderate	The implementation of a proper storm water system as part of the storm water management system. The construction of pollution control dams.
Air quality	Potential increase in dust pollution.	4	2	1	2	9 Moderate	Dust levels should be monitored and recorded on an ongoing basis. A dust management programme should be compiled and implemented on site.
Noise	Potential increase in noise pollution.	4	2	1	2	9 Moderate	Noise and vibration levels should be monitored and recorded on an ongoing basis. Mitigation measures as proposed in the noise- and vibration assessment to be completed shortly.
Heritage resources	A potential impact on the cultural heritage of the area via the destruction of Early	2	1	5	2	10 Moderate	Regular awareness training of contractors and staff re. the identification of stone flakes and tools.

	Stone Age material.						Be alert for potential discovery of stone flakes and tools. Stop all work immediately and contact the relevant officials at the McGregor Museum in Kimberley upon discovering stone flakes or tools.
Aesthetics	Potential increase in dust pollution.	4	2	5	2	9 Moderate	Dust levels should be monitored and recorded on an ongoing basis. A dust management programme should be compiled and implemented on site.
	A potential increase in littering.	2	1	1	2	6 Low to Moderate	Compile and implement a waste management strategy on site.
Socio-economic	Increase in mining related employment opportunities.	-	-	-	-	-	Create an anticipated 400 employment opportunities for individuals residing in the GLM.
	A reduction in the market value of the larger livestock farming unit of the grazing rights holder.	4	2	6	8	20 Very High	Sufficient compensation for anticipated direct and indirect impacts calculated over the short- and long term. Alternatively, purchasing of entire livestock farming unit.
	A loss of economic benefits and income derived from farming activities.	4	2	6	8	20 Very High	Sufficient compensation for anticipated direct and indirect impacts calculated over the short- and long term. Alternatively, purchasing of entire livestock farming unit.
	A loss of employment opportunities related to farming.	4	2	4	6	16 High	Providing guarantees employment for retrenched farm workers at the mine.
	Adverse impact on health of farmer and farm workers.	3	2	5	4	14 Moderate to High	Sufficient compensation for anticipated direct and indirect impacts calculated over the short- and long term. Alternatively, purchasing of entire livestock farming unit.

	Negative impact on safety and security of farmer, farm workers and livestock.	3	2	5	4	14 Moderate to High	Sufficient compensation for anticipated direct and indirect impacts calculated over the short- and long term. Alternatively, purchasing of entire livestock farming unit.

- The processing of excavated material;
- The transportation of excavated material, product and waste;
- Product stockpiling;
- Waste rock disposal;
- Slimes disposal;
- The storage and handling of hazardous substances;
- Sewerage treatment;
- The management of domestic, industrial and hazardous waste; and
- Administration, maintenance and other non-mining related activities.

Table 16 lists all the anticipated direct, indirect and cumulative impacts associated with the above-mentioned activities. Mitigated[8] significance and management measures for each of these anticipated impacts are detailed in Table 17.

Only anticipated negative impacts were rated as part of this assessment. Mitigation measures were, in addition, also only proposed for anticipated negative impacts.

9.5 ASSESSMENT OF ANTICIPATED IMPACTS ASSOCIATED WITH THE DECOMMISSIONING AND CLOSURE PHASE

The following activities to be associated with the decommissioning and closure phase of the proposed operation are anticipated to impact on the environment of the proposed mining area:

- The recovery of saleable infrastructure;
- The demolition of structures;
- The management of waste production;
- The ripping of compacted areas;
- The sloping of all remaining dumps and piles;
- The topsoiling of ripped and sloped areas;
- The re-vegetation of disturbed areas, where deemed necessary;
- The monitoring of the re-vegetation process;

[8] Mitigated significance ratings were not calculated for social issues for the purpose of this study (refer to Appendix G).

Table 16. Anticipated direct, indirect and cumulative impacts associated with the operational phase of the proposed mining operation.

ACTIVITY	ANTICIPATED DIRECT IMPACTS	ANTICIPATED INDIRECT AND CUMULATIVE IMPACTS
Mining and excavation activities (including blasting).	A decrease in the grazing available to the holder of grazing rights. An increase in dust pollution. A potential impact on the cultural heritage of the area via the destruction of Early Stone Age material. Change in surface water flow regime. Contamination of clean surface run-off. Potential destruction of individuals of protected tree species. Potential destruction of threatened, protected and red data plant species. Removal of soil as a plant growth medium. Potential dewatering. Alteration in site topography.	A potential reduction in the market value of the larger livestock farming unit of the grazing rights holder. Potential decrease in grazing capacity. A potential decrease in animal production. A loss of economic benefits and income derived from farming activities. Loss of quality of life for farmer and farm workers. A loss of employment opportunities related to farming. Physical damage to infrastructure as a result of tremors resulting from blasting operations. Adverse effects on the health of people, livestock and game as a result of dust pollution. Contamination of clean run-off as a result of spillages. Physical, chemical and physiological impacts of dust on vegetation. A potential increase in the abundance and variety of alien weeds and invasive plant species. Potential soil contamination. Potential soil erosion.
The processing of excavated material.	The construction of a water pipeline from the farm to the Vaal-Gamagara Scheme. An increase in dust pollution.	Potential benefit for farming purposes as a result of infrastructure construction. Physical, chemical and physiological impacts of dust on vegetation. Adverse effects on the health of people, livestock and game as a result of dust pollution.

Table 16 (contd.). Anticipated direct, indirect and cumulative impacts associated with the operational phase of the proposed mining operation.

ACTIVITY	ANTICIPATED DIRECT IMPACTS	ANTICIPATED INDIRECT AND CUMULATIVE IMPACTS
The transportation of excavated material, product and waste.	An increase in dust pollution.	Contamination of clean run-off. Physical, chemical and physiological impacts of dust on vegetation. Adverse effects on the health of people, livestock and game as a result of dust pollution.
Product stockpiling.	Change in surface water flow regime. Contamination of clean surface run-off.	Contamination of clean run-off. Potential negative impact on groundwater quality.
Waste rock disposal.	Change in surface water flow regime. Contamination of clean surface run-off. Increased potential for groundwater pollution.	Contamination of clean run-off.
Slimes disposal.	Change in surface water flow regime. Destruction of natural soil conditions.	Soil contamination. Increased potential for groundwater pollution. Contamination of clean surface run-off.
The storage and handling of hazardous substances.	Increased fire hazard.	Potential negative impact on groundwater quality. Potential for contamination of clean surface run-off. Potential soil contamination.
Sewerage treatment.	Increased potential for groundwater pollution. Potential for contamination of clean surface run-off.	Potential soil contamination.
The management of domestic, industrial and hazardous waste.	In increase in littering.	Negative impact on livestock health. Potential negative impact on groundwater quality. Potential for contamination of clean surface run-off. Potential soil contamination.

Table 16 (contd.). Anticipated direct, indirect and cumulative impacts associated with the operational phase of the proposed mining operation.

ACTIVITY	ANTICIPATED DIRECT IMPACTS	ANTICIPATED INDIRECT AND CUMULATIVE IMPACTS
The presence and movement of staff on site.	An increase in poaching activities. Increase in mining related employment opportunities. The potential destruction of individuals of protected tree species for use as firewood.	Negative impact on safety and security of farmer, farm workers and livestock. Increased fire hazard as a result of smoking and possible open fires.
Administration, maintenance and other non-mining related activities.	No impacts anticipated.	Potential for contamination of clean surface run-off. Potential for contamination of groundwater. Potential for contamination of soils.

Table 17. Anticipated mitigated environmental impact significance ratings and proposed management and mitigation measures for the operational phase of the proposed mining operation.

ENVIRONMENTAL PARAMETER	IMPACT DESCRIPTION	PROBABILITY	EXTENT	DURATION	INTENSITY	SIGNIFICANCE	PROPOSED MANAGEMENT/MITIGATION MEASURES
Geology	No impacts anticipated.	-	-	-	-	-	-
Topography	Alteration in site topography.	4	1	5	0	10 Moderate	Topographical alteration should be limited to sites requiring alteration. Where possible, topographical alteration should be done while taking the natural topography of the site into account.
Soils	Removal of soil as a plant growth medium.	4	1	5	2	12 Moderate to High	Only remove topsoil from areas earmarked for development.
	Destruction of natural soil conditions.	2	1	5	2	9 Moderate	Refer to measures listed for "potential soil contamination", as well as soil erosion.
	Potential soil contamination.	2	1	5	2	9 Moderate	A detailed waste management strategy should be compiled and implemented on site. Waste management should form a detailed component of the induction process provided by the mine. A detailed spill prevention and –response plan should be compiled and implemented on site. The management of hazardous substances should form part of the emergency preparedness and response plan of the mine. The maintenance and washing of vehicles and equipment may only take place within the specifically designated, contained vehicle wash bay and maintenance areas.

	Soil erosion.	2	1	5	2	9 Moderate	A detailed storm water management plan should be compiled and implemented on site. An environmental awareness plan should be compiled and made available to contractors and staff. Hydrocarbons should be stored in designated, bunded areas with a capacity of at least 110% of the volume stored. Include erosion control measures in all design drawings and implement these designs.
Land capability	Potential decrease in grazing capacity.	3	2	5	4	14 Moderate to High	Sufficient compensation to farmer for anticipated direct and indirect impacts. Purchasing of entire livestock farming unit.
Natural fauna	Adverse effects on the health of livestock and game.	3	2	5	4	14 Moderate to High	Sufficient compensation for anticipated direct and indirect impacts calculated over the short- and long term (w.r.t. livestock). Alternatively, purchasing of entire livestock farming unit.
	An increase in poaching activities.	2	2	5	2	11 Medium to High	Regular awareness training for contractors and staff on the identification of threatened and protected species. Hunting and the setting of traps will be strictly prohibited. No domestic pets will be allowed on site.
	A potential decrease in animal production.	3	2	5	4	14 Moderate to High	Sufficient compensation for anticipated direct and indirect impacts calculated over the short- and long term. Alternatively, purchasing of entire livestock farming unit.
	Potential destruction of animals.	2	2	5	2	11 Moderate to High	Regular awareness training for contractors and staff on the identification of threatened and protected species.
Natural flora	A decrease in the grazing available to the	3	2	5	4	14	Sufficient compensation to farmer for anticipated direct and indirect

	holder of grazing rights.					Moderate to High	impacts. Purchasing of entire livestock farming unit.
	Potential destruction of individuals of protected tree species.	3	2	6	4	17 High	Avoid destruction where possible. Regular awareness training for contractors and staff. Establishment of biodiversity offset area. Obtainment of permits to destruct/damage protected trees.
	Potential destruction of threatened, protected and red data plant species.	2	1	2	4	9 Moderate	Regular awareness training for contractors and staff. Sweeping of areas prior to commencement of construction. Plant relocation. Obtainment of permits prior to removal and transport. Establishment of biodiversity offset area.
	Increased fire hazard.	2	2	2	4	10 Moderate	Compilation and implementation of a fire prevention and –control plan on site. Regular awareness training for contractors and staff.
	Physical, chemical and physiological impacts of dust on vegetation.	4	2	5	2	13 Moderate to High	Mitigation measures to be obtained from dust assessment.
	A potential increase in the abundance and variety of alien weeds and invasive plant species.	2	3	2	2	9 Moderate	Regular awareness training for contractors and staff. Combated according to requirements of Reg. 15 of Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983). Regular monitoring and record keeping of distribution of alien weeds and invasive plants.
Surface water	Change in surface water flow regime.	3	1	3	2	10 Moderate	Redirect and/or divert water to maintain water balance. Compile and implement a storm water management plan on site.

	Contamination of clean surface run-off.	1	1	1	1	4 Low	Restrict by containing water in a closed clean-dirty water system. Treatment of roads with prevention chemicals.
Groundwater	Potential negative impact on groundwater quality.	1	1	2	1	5 Low to Moderate	The implementation of a proper storm water system as part of the storm water management system. The construction of pollution control dams.
	Potential dewatering.	1	1	1	1	4 Low	No risk for groundwater dewatering is foreseen.
Air quality	A potential increase in dust pollution.	4	2	1	2	9 Moderate	Dust levels should be monitored and recorded on an ongoing basis. A dust management programme should be compiled and implemented on site.
Noise	A potential increase in noise pollution.	4	2	1	2	9 Moderate	Noise and vibration levels should be monitored and recorded on an ongoing basis. Implementation of mitigation measures as proposed in the noise- and vibration study to be completed.
Heritage resources	A potential impact on the cultural heritage of the area via the destruction of Early Stone Age material.	2	1	5	2	10 Moderate	Regular awareness training of contractors and staff re. the identification of stone flakes and tools. Be alert for potential discovery of stone flakes and tools. Stop all work immediately and contact the relevant officials at the McGregor Museum in Kimberley upon discovering stone flakes or tools.
Aesthetics	Potential increase in dust pollution.	4	2	5	2	9 Moderate	Dust levels should be monitored and recorded on an ongoing basis. A dust management programme should be compiled and implemented on site.
	A potential increase in littering.	2	1	1	2	6 Low to Moderate	Compile and implement a waste management strategy on site.
Socio-economic	The construction of a water pipeline from	-	-	-	-	-	-

	the farm to the Vaal-Gamagara Scheme. Increase in mining related employment opportunities.						
	A potential reduction in the market value of the larger livestock farming unit of the grazing rights holder.	4	2	6	8	20 Very High	Sufficient compensation for anticipated direct and indirect impacts calculated over the short- and long term. Alternatively, purchasing of entire livestock farming unit.
	A loss of economic benefits and income derived from farming activities.	4	2	6	8	20 Very High	Sufficient compensation for anticipated direct and indirect impacts calculated over the short- and long term. Alternatively, purchasing of entire livestock farming unit.
	Loss of quality of life for farmer and farm workers.	4	2	6	4	16 High	Sufficient compensation for anticipated direct and indirect impacts calculated over the short- and long term. Alternatively, purchasing of entire livestock farming unit.
	A loss of employment opportunities related to farming.	4	2	4	6	16 High	Providing guarantees employment for retrenched farm workers at the mine.
	Physical damage to infrastructure as a result of tremors resulting from blasting operations.	3	2	5	6	16 High	Sufficient compensation for anticipated direct and indirect impacts calculated over the short- and long term. Alternatively, purchasing of entire livestock farming unit.
	Adverse effects on the health of people, livestock and game.	3	2	5	4	14 Moderate to High	Sufficient compensation for anticipated direct and indirect impacts calculated over the short- and long term. Alternatively, purchasing of entire livestock farming unit.
	Potential benefit for farming purposes as a result of infrastructure construction.	-	-	-	-	-	-

	Negative impact on safety and security of farmer, farm workers and livestock.	3	2	5	4	14 Moderate to High	Sufficient compensation for anticipated direct and indirect impacts calculated over the short- and long term. Alternatively, purchasing of entire livestock farming unit.

- The monitoring of other key environmental variables; and
- Weed management and the monitoring thereof.

Table 18 lists all the anticipated direct, indirect and cumulative impacts associated with the above-mentioned activities. Significance and management measures for each of these anticipated impacts are detailed in Table 19.

Only anticipated negative impacts were rated as part of this assessment. Mitigation measures were, in addition, also only proposed for anticipated negative impacts.

10. ENVIRONMENTAL MANAGEMENT PROGRAMME

10.1 MANAGEMENT MEASURES

10.1.1 Design Phase

An action plan for the implementation of management and mitigation measures proposed for the design phase of the proposed mining operation is detailed in Table 20.

10.1.2 Construction Phase

An action plan for the implementation of management and mitigation measures proposed for the construction phase of the proposed mining operation is detailed in Table 21.

10.1.3 Operational Phase

An action plan for the implementation of management and mitigation measures proposed for the operational phase of the proposed mining operation is detailed in Table 22.

Table 18. Anticipated direct, indirect and cumulative impacts associated with the decommissioning and closure phase of the proposed mining operation.

ACTIVITY	ANTICIPATED DIRECT IMPACTS	ANTICIPATED INDIRECT IMPACTS
The recovery of saleable infrastructure	-	-
The demolition of structures	Increase in dust pollution. Increase in noise pollution.	Physical, chemical and physiological impacts of dust on vegetation. Adverse effects on the health of people, livestock and game as a result of dust pollution. Increased fire hazard.
The management of waste production	In increase in littering.	Negative impact on livestock health. Potential negative impact on groundwater quality. Potential for contamination of clean surface run-off. Potential soil contamination.
The ripping of compacted areas	Increase in dust pollution.	Physical, chemical and physiological impacts of dust on vegetation. Adverse effects on the health of people, livestock and game as a result of dust pollution. A potential increase in the abundance and variety of alien weeds and invasive plant species. Increase in grazing capacity.
The sloping of all remaining dumps and piles	Increase in dust pollution.	Physical, chemical and physiological impacts of dust on vegetation. Adverse effects on the health of people, livestock and game as a result of dust pollution. A potential increase in the abundance and variety of alien weeds and invasive plant species.
The topsoiling of ripped and sloped areas	Increase in dust pollution.	Physical, chemical and physiological impacts of dust on vegetation. Adverse effects on the health of people, livestock and game as a result of dust pollution. A potential increase in the abundance and variety of alien weeds and invasive plant species.

Table 18 (contd.). Anticipated direct, indirect and cumulative impacts associated with the decommissioning and closure phase of the proposed mining operation.

ACTIVITY	ANTICIPATED DIRECT IMPACTS	ANTICIPATED INDIRECT IMPACTS
The re-vegetation of disturbed areas, where deemed necessary	Decrease in soil erosion. Re-establishment of habitats. Increase in grazing capacity.	-
The monitoring of the re-vegetation process	Decrease in soil erosion. Re-establishment of habitats. Increase in grazing capacity.	-
The monitoring of other key environmental variables	Re-establishment of habitats.	-
Weed management and the monitoring thereof	Re-establishment of habitats.	-

Table 19. Anticipated mitigated environmental impact significance ratings and proposed management and mitigation measures associated with the decommissioning and closure phase of the proposed mining operation.

ENVIRONMENTAL PARAMETER	IMPACT DESCRIPTION	PROBABILITY	EXTENT	DURATION	INTENSITY	SIGNIFICANCE	PROPOSED MANAGEMENT/MITIGATION MEASURES
Geology	No impacts anticipated.	-	-	-	-	-	-
Topography	No impacts anticipated.	-	-	-	-	-	-
Soils	Decrease in soil erosion.	-	-	-	-	-	The natural re-establishment of vegetation should be encouraged in rehabilitated areas.
	Potential soil contamination.	2	1	5	2	9 Moderate	A detailed waste management strategy should be compiled and implemented on site. A detailed spill prevention and –response plan should be compiled and implemented on site.
Land capability	Increase in grazing capacity.	-	-	-	-	-	The natural re-establishment of vegetation should be encouraged in rehabilitated areas.
Natural fauna	Re-establishment of habitats.	-	-	-	-	-	The natural re-establishment of vegetation should be encouraged in rehabilitated areas.
	Adverse effects on the health of livestock and game.	3	2	5	4	14 Moderate to High	Sufficient compensation for anticipated direct and indirect impacts calculated over the short- and long term (i.t.o. livestock). Alternatively, purchasing of entire livestock farming unit. Mitigation measures re. dust pollution to be obtained from dust assessment.
Natural flora	Increase in grazing capacity.	-	-	-	-	-	The natural re-establishment of vegetation should be encouraged in rehabilitated areas.

	Physical, chemical and physiological impacts of dust on vegetation.	4	2	5	2	13 Moderate to High	A dust management and monitoring plan should be compiled and implemented on site.
	A potential increase in the abundance and variety of alien weeds and invasive plant species.	2	3	2	2	9 Moderate	Regular awareness training for contractors and staff. Combated according to requirements of Reg. 15 of Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983). Regular monitoring and record keeping of distribution of alien weeds and invasive plants.
	Increased fire hazard.	2	2	2	4	10 Moderate	Compilation and implementation of a fire prevention and –control plan on site. Regular awareness training for contractors and staff.
Surface water	Potential for contamination of clean surface run-off.	1	1	1	1	4 Low	Restrict by containing water in a closed clean-dirty water system. Treatment of roads with prevention chemicals.
Groundwater	Potential negative impact on groundwater quality.	1	1	2	1	5 Low to Moderate	The implementation of a proper storm water system as part of the storm water management system. The construction of pollution control dams.
Air quality	Increase in dust pollution.						Mitigation measures to be obtained from dust assessment.
Noise	Increase in noise pollution.	4	2	1	2	9 Moderate	Noise and vibration levels should be monitored and recorded on an ongoing basis.
Heritage	No impacts anticipated	-	-	-	-	-	-
Aesthetics	Increase in littering.	2	1	1	2	6 Low to Moderate	Compile and implement a waste management strategy on site.
Socio-economic	Adverse effects on the health of people.	3	2	5	4	14 Moderate to High	Sufficient compensation for anticipated direct and indirect impacts calculated over the short- and long term. Alternatively, purchasing of entire livestock farming unit.

Table 20. Action plan for the implementation of management and mitigation measures proposed for the design phase of the proposed mining operation.

ENVIRONMENTAL PARAMETER	ANTICIPATED IMPACT	PROPOSED MANAGEMENT/MITIGATION MEASURES	ACTION PLAN	FREQUENCY	RESPONSIBLE PERSON
Natural flora	Destruction of individuals of protected tree species.	Amendment of draft surface lay-out in order to accommodate areas with higher densities of individuals of protected tree species.	Amend proposed site lay-out (Figure 2), taking into consideration the recommendations made by the flora expert.	Prior to commencement of construction phase.	Appointed Engineer
Surface water	Contamination of surface run-off. Change in surface water flow regime.	Amendment of draft surface lay-out in order to ensure that no opencast mining activity takes place within the 1:50-year flood line or at a horizontal distance of 100 m from the river bed, whichever is furthest. Amendment of draft surface lay-out plan in order to ensure that no mining infrastructure is placed within the 1:100-year flood line or at a horizontal distance of 100 m from the river bed, whichever is furthest.	Amend proposed site-lay-out (Figure 2), taking into consideration the location of the 1:50-year flood line, as well as 100 m exclusion zone. Amend proposed site lay-out (Figure 2), taking into consideration the location of the 1:100-year flood line, as well as the 100 m exclusion zone.	Prior to commencement of construction phase.	Appointed Engineer

Table 21. Action plan for the implementation of management and mitigation measures proposed for the construction phase of the proposed mining operation.

ENVIRONMENTAL PARAMETER	ANTICIPATED IMPACT	PROPOSED MANAGEMENT/MITIGATION MEASURES	ACTION PLAN	FREQUENCY	RESPONSIBLE PERSON
Soils	Removal of plant growth medium.	Only remove topsoil from areas earmarked for development.	Compile and implement a topsoil stockpiling procedure on site, addressing the following aspects: Exact areas to be stripped; method of stripping; location of topsoil stockpiles; method of stockpiling; and stockpile management.	Plan compilation: Design Phase. Implementation: Construction and Operational Phases.	Project Manager
	Soil erosion.	The implementation of a proper storm water management system on site.	Implement the Integrated Surface Water Management Plan as set out in Section 13 of the specialist hydrological study (Appendix C).	To be completed prior to commencement of Mining Phase.	Appointed Engineer
		Include erosion control measures in all design drawings and implement on site.	Implement erosion control measures on site.	To be completed prior to commencement of Mining Phase.	Appointed Engineer
		The re-establishment of natural vegetation should be encouraged in exposed areas.	Regular monitoring re. the re-establishment of natural vegetation should take place on a regular basis.	Once per month.	Environmental Officer

			Proper records should be kept in this regard. If the results of the natural re-vegetation of the area is not satisfactory, measures such as seeding with an approved local seed mix; the protection of seeds and seedlings; and the watering of seeded areas should be implemented.		
		The implementation of dust control management and monitoring measures on site.	Compile and implement a dust management and monitoring strategy on site.	To be implemented prior to the commencement of Phase 2.	Environmental Officer
		Erosion control measures should be implemented whenever topsoil stockpiles exceed a height of 1.5 m.	Implement erosion control measures, such as re-vegetation or treatment with an environmentally friendly dust allying agent once the height of topsoil stockpiles exceed 1.5 m.	Once the height of a specific topsoil stockpile exceeds 1.5 m.	Environmental Officer
	Destruction of natural soil conditions.	Topsoil and subsoil should be stripped to a depth of at least 250 mm prior to the commencement of construction, or until hard rock is reached in areas with shallow soils. Topsoil should be stockpiled separately from subsoil, rocks and spoil material. Vehicle movement over topsoil stockpiles should be limited in order to prevent compaction and contamination.	Compile and implement a topsoil stockpiling procedure on site, addressing the following aspects: Exact areas to be stripped; method of stripping; location of topsoil stockpiles; method of stockpiling; and stockpile management.	Plan compilation: Design Phase. Implementation: Construction and Operational Phases.	Project Manager/Env. Officer

	Contamination of soils.	Use natural construction materials wherever possible, e.g. for the construction of haul roads and slimes dams.	Use natural materials wherever practicable during construction.	To be completed prior to the Construction Phase.	Appointed Engineer
		A detailed waste management strategy should be compiled and implemented on site.	Compile and implement a waste management strategy on site.	To be completed prior to the commencement of the Construction Phase.	Project Manager/Env. Officer
		Waste management should form a detailed component of the induction process provided by the mine.	Compile and implement a waste management strategy on site, including awareness training.	To be completed prior to the commencement of the Construction Phase.	Project Manager/Env. Officer
Land capability	A potential decrease in the grazing capacity of the area.	Sufficient compensation for anticipated direct and indirect impacts calculated over the short- and long term. Alternatively, purchasing of entire livestock farming unit.	Initiate negotiations with the grazing rights holder. Draw up and sign agreements in this regard.	Negotiations and agreements to be finalised prior to the commencement of Phase 1.	Applicant
Natural fauna and livestock	A potential increase in poaching activities.	Regular awareness training for contractors and staff on the identification of threatened and protected species. Hunting and the setting of traps will be strictly prohibited. No domestic pets will be allowed on site.	Compile and implement a poaching prevention plan on site. Compile and implement a penalty system for non-compliance.	Plan to be completed prior to the commencement of Phase 2.	Mine Manager/Env. Officer

	Potential destruction of fauna.	Regular awareness training for contractors and staff on the identification of threatened and protected species.	Compile and implement a poaching prevention plan on site. Compile and implement a penalty system for non-compliance.	Plan to be completed prior to the commencement of Phase 2.	Mine Manager/Env. Officer
	Adverse effect on the health of livestock and game.	Sufficient compensation for anticipated direct and indirect impacts calculated over the short- and long term (i.t.o. livestock). Alternatively, purchasing of entire livestock farming unit.	Initiate negotiations with the grazing rights holder. Draw up and sign agreements in this regard.	Negotiations and agreements to be finalised prior to the commencement of Phase 1.	Applicant
	A potential loss in cattle production.	Sufficient compensation for anticipated direct and indirect impacts calculated over the short- and long term. Alternatively, purchasing of entire livestock farming unit.	Initiate negotiations with the grazing rights holder. Draw up and sign agreements in this regard.	Negotiations and agreements to be finalised prior to the commencement of Phase 1.	Applicant
	Loss of habitat.	Disturbed areas should be re-vegetated as soon as possible.	Regular monitoring re. the re-establishment of natural vegetation should take place on a regular basis. Proper records should be kept in this regard. If the results of the natural re-vegetation of the area is not satisfactory, measures such as seeding with an approved local seed mix; the	Once per month.	Env. Officer

			protection of seeds and seedlings; and the watering of seeded areas should be implemented.		
Natural flora	A decrease in the grazing available to the holder of grazing rights.	Sufficient compensation for anticipated direct and indirect impacts calculated over the short- and long term. Alternatively, purchasing of entire livestock farming unit.	Initiate negotiations with the grazing rights holder. Draw up and sign agreements in this regard.	Negotiations and agreements to be finalised prior to the commencement of Phase 1.	Applicant
	The potential destruction of individuals of protected tree species.	Avoid destruction where possible.	Vegetation clearing should only take place in footprint areas. Individuals of protected tree species to be left as is wherever possible, even in footprint areas.	Ongoing.	Env. Officer
		Regular awareness training for contractors and staff.	Protected tree identification to be included in monthly toolbox talks.	Once per month.	Mine Manager/Env. Officer
		Establishment of biodiversity offset area.	Site selection, offset area establishment and compilation of management plan to be completed with the guidance of suitably qualified specialists.	To be finalised prior to Year 5 of Operational Phase.	Applicant/Mine Manager/Env. Officer/Specialists
		Obtainment of permits to destruct/damage protected trees.	Permits to be applied for from the Department of Agriculture, Forestry and Fisheries.	Prior to commencement of Operational Phase.	Env. Officer
	The potential destruction of red data plant species.	Regular awareness training for contractors and staff.	Red data species identification to be included in monthly toolbox talks.	Once per month.	Mine Manager/Env. Officer
		Sweeping of areas prior to commencement of	Compile phased strategy for sweeping	Prior to	Suitably qualified

		construction.	of all areas to be cleared and prepared for construction and mining.	commencement of Construction Phase.	specialist & Env. Officer
		Plant relocation.	Compile phase strategy for plant relocation from all areas to be cleared, including the finalisation and preparation of a final destination for plants.	Prior to commencement of Construction Phase.	Relocation specialist
		Obtainment of permits prior to removal and transport.	Apply for permits for the removal and transport of plants to be relocated, where relevant.	Prior to commencement of site clearing.	Env. Officer
		Establishment of biodiversity offset area.	Site selection, offset area establishment and compilation of management plan to be completed with the guidance of suitably qualified specialists.	To be finalised prior to Year 5 of Operational Phase.	Applicant/Mine Manager/Env. Officer/Specialists
	The potential destruction of threatened or protected plant species.	Regular awareness training for contractors and staff.	Threatened and protected species identification to be included in monthly toolbox talks.	Once per month.	Mine Manager/Env. Officer
		Sweeping of areas prior to commencement of construction.	Compile phased strategy for sweeping of all areas to be cleared and prepared for construction and mining.	Prior to commencement of Construction Phase.	Suitably qualified specialist & Env. Officer
		Plant relocation.	Compile phase strategy for plant relocation from all areas to be cleared, including the finalisation and preparation of a final destination for plants.	Prior to commencement of Construction Phase.	Relocation specialist
		Obtainment of permits prior to removal and	Apply for permits for the removal and	Prior to	Env. Officer

		transport. Establishment of biodiversity offset area.	transport of plants to be relocated, where relevant. Site selection, offset area establishment and compilation of management plan to be completed with the guidance of suitably qualified specialists.	commencement of site clearing. To be finalised prior to Year 5 of Operational Phase.	Applicant/Mine Manager/Env. Officer/Specialists
	Physical, chemical and physiological impact of dust on vegetation.	Compilation and implementation of a dust management and monitoring strategy on site.	Compile and implement a dust management and monitoring strategy on site.	To be finalised prior to commencement of Construction Phase.	Env. Officer
	A potential increase in the abundance and variety of alien weeds and invasive plant species.	Regular awareness training for contractors and staff. Combated according to requirements of Reg. 15 of Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983). Regular monitoring and record keeping of distribution of alien weeds and invasive plants.	Compile and implement an eradication, spread prevention and monitoring plan with regard to alien weeds and invasive plant species.	To be finalised prior to commencement of Construction Phase.	Env. Officer
	An increased fire hazard.	Compilation and implementation of a fire prevention and –control plan on site.	Compile and implement a fire prevention and –control plan on site.	To be finalised prior to commencement of Construction Phase.	Env. Officer
		Regular preparedness training for contractors and staff.	Preparedness training to be included in monthly toolbox talks.	Once per month.	Env. Officer/Mine Manager
Surface water	Change in surface water flow regime.	Redirect and/or divert water to maintain water	Implement the Integrated Surface	To be	Appointed

	employment opportunities.	opportunities for individuals residing in the GLM.		prior to the commencement of the Construction Phase.	
	A reduction in the market value of the larger livestock farming unit of the grazing rights holder.	Sufficient compensation for anticipated direct and indirect impacts calculated over the short- and long term. Alternatively, purchasing of entire livestock farming unit.	Initiate negotiations with the grazing rights holder. Draw up and sign agreements in this regard.	Negotiations and agreements to be finalised prior to the commencement of Phase 1.	Applicant
	A loss of economic benefits and income derived from farming activities.	Sufficient compensation for anticipated direct and indirect impacts calculated over the short- and long term. Alternatively, purchasing of entire livestock farming unit.	Initiate negotiations with the grazing rights holder. Draw up and sign agreements in this regard.	Negotiations and agreements to be finalised prior to the commencement of Phase 1.	Applicant
	A loss of employment opportunities related to farming.	Providing guarantees employment for retrenched farm workers at the mine.	Ensure that the staff employment procedure caters for the guaranteed employment of retrenched farm workers.	To be completed prior to the commencement of Phase 2.	Mine Manger
	Adverse impact on health of farmer and farm workers.	Sufficient compensation for anticipated direct and indirect impacts calculated over the short- and long term.	Initiate negotiations with the grazing rights holder. Draw up and sign agreements in this regard.	Negotiations and agreements to be finalised prior	Applicant

		Establishment of biodiversity offset area.	Site selection, offset area establishment and compilation of management plan to be completed with the guidance of suitably qualified specialists.	To be finalised prior to Year 5 of Operational Phase.	Applicant/Mine Manager/Env. Officer/Specialists
	Increased fire hazard.	Compilation and implementation of a fire prevention and –control plan on site.	Compile and implement a fire prevention and –control plan on site.	To be finalised prior to commencement of Construction Phase.	Env. Officer
		Regular awareness training for contractors and staff.	Preparedness training to be included in monthly toolbox talks.	Once per month	Env. Officer/Mine Manager
	Physical, chemical and physiological impacts of dust on vegetation.	Compilation and implementation of a dust management and monitoring strategy on site.	Compile and implement a dust management and monitoring strategy on site.	To be finalised prior to commencement of Construction Phase.	Env. Officer
	A potential increase in the abundance and variety of alien weeds and invasive plant species.	Regular awareness training for contractors and staff. Combated according to requirements of Reg. 15 of Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983). Regular monitoring and record keeping of distribution of alien weeds and invasive plants.	Compile and implement an eradication, spread prevention and monitoring plan with regard to alien weeds and invasive plant species.	To be finalised prior to commencement of Construction Phase.	Env. Officer
Surface water	Change in surface water flow regime.	Redirect and/or divert water to maintain water balance. Compile and implement a storm water	Implement the Integrated Surface Water Management Plan as set out in Section 13 of the specialist hydrological	To be implemented prior to the	Appointed Engineer

		management plan on site.	study (Appendix C).	completion of the Construction Phase.	
	Contamination of clean surface run-off.	Restrict by containing water in a closed clean-dirty water system. Treatment of roads with prevention chemicals.	Implement the Integrated Surface Water Management Plan as set out in Section 13 of the specialist hydrological study (Appendix C).	To be implemented prior to the completion of the Construction Phase.	Appointed Engineer
Groundwater	Potential negative impact on groundwater quality.	The implementation of a proper storm water system as part of the storm water management system.	To implement the Integrated Surface Water Management Plan as set out in Section 13 of the specialist hydrological study (Appendix C).	To be implemented prior to the completion of the Construction Phase.	Appointed Engineer
		The construction of pollution control dams.	Pollution control dams should be included in the storm water management system.	Construction to be completed during Phase 2.	Appointed Engineer
		A groundwater monitoring network should be implemented.	Network should be implemented prior to the commencement of the Construction Phase.	Six monthly.	Env. Officer
Air quality	A potential increase in dust pollution.	Dust levels should be monitored and recorded on an ongoing basis. A dust management programme should be compiled and implemented on site.	Compile and implement a dust management and monitoring strategy on site.	To be finalised prior to commencement of Construction Phase.	Env. Officer

Noise	A potential increase in noise pollution.	Noise and vibration levels should be monitored and recorded on an ongoing basis. Implementation of mitigation measures as proposed in the noise- and vibration study to be completed.	Compile and implement a noise and vibration management and monitoring strategy.	To be completed prior to the commencement of Phase 2.	Env. Officer
Heritage resources	A potential impact on the cultural heritage of the area via the destruction of Early Stone Age material.	Regular awareness training of contractors and staff re. the identification of stone flakes and tools. Be alert for potential discovery of stone flakes and tools. Stop all work immediately and contact the relevant officials at the McGregor Museum in Kimberley upon discovering stone flakes or tools.	Training on the procedure to be followed in case of the discovery of a heritage site should take place on a regular basis and include a practical identification course.	Once per month.	Env. Officer/Specialist
Aesthetics	Potential increase in dust pollution. A potential increase in littering.	Dust levels should be monitored and recorded on an ongoing basis. A dust management programme should be compiled and implemented on site. Compile and implement a waste management strategy on site.	Compile and implement a dust management and monitoring strategy on site. Compile and implement a waste management strategy on site. Implement a penalty system for non-compliance.	To be finalised prior to commencement of Construction Phase. To be finalised prior to the commencement of Construction Phase.	Project Manager/Env. Officer Project Manager/Env. Officer
Socio-economics	The construction of a water pipeline from the farm to the Vaal-Gamagara Scheme.	Construct pipeline from mining area to contact point with Vaal-Gamagara Scheme.	Finalise plans for pipeline construction and commence with construction.	To be finalised during the Design and Construction Phases.	Appointed Engineers

	Increase in mining related employment opportunities.	Create 400 employment opportunities for individuals residing in the GLM.	Finalise a staff employment procedure.	To be finalised prior to the commencement of Phase 2.	Mine Manager
	A potential reduction in the market value of the larger livestock farming unit of the grazing rights holder.	Sufficient compensation for anticipated direct and indirect impacts calculated over the short- and long term. Alternatively, purchasing of entire livestock farming unit.	Initiate negotiations with the grazing rights holder. Draw up and sign agreements in this regard.	Negotiations and agreements to be finalised prior to the commencement of Phase 1.	Applicant
	A loss of economic benefits and income derived from farming activities.	Sufficient compensation for anticipated direct and indirect impacts calculated over the short- and long term. Alternatively, purchasing of entire livestock farming unit.	Initiate negotiations with the grazing rights holder. Draw up and sign agreements in this regard.	Negotiations and agreements to be finalised prior to the commencement of Phase 1.	Applicant
	Loss of quality of life for farmer and farm workers.	Sufficient compensation for anticipated direct and indirect impacts calculated over the short- and long term. Alternatively, purchasing of entire livestock farming unit.	Initiate negotiations with the grazing rights holder. Draw up and sign agreements in this regard.	Negotiations and agreements to be finalised prior to the commencement of Phase 1.	Applicant
	A loss of employment opportunities related to farming.	Providing guarantees employment for retrenched farm workers at the mine.	Ensure that the staff employment procedure caters for the guaranteed	To be finalised prior to the	Mine Manager

			employment of retrenched farm workers.	commencement of Phase 2.	
	Physical damage to infrastructure as a result of tremors resulting from blasting operations.	Sufficient compensation for anticipated direct and indirect impacts calculated over the short- and long term. Alternatively, purchasing of entire livestock farming unit.	Initiate negotiations with the grazing rights holder. Draw up and sign agreements in this regard.	Negotiations and agreements to be finalised prior to the commencement of Phase 1.	Applicant
	Adverse effects on the health of people, livestock and game.	Sufficient compensation for anticipated direct and indirect impacts calculated over the short- and long term. Alternatively, purchasing of entire livestock farming unit.	Initiate negotiations with the grazing rights holder. Draw up and sign agreements in this regard.	Negotiations and agreements to be finalised prior to the commencement of Phase 1.	Applicant
	Potential benefit for farming purposes as a result of infrastructure construction.	Construction of infrastructure as per final site lay-out plan.	Finalise site lay-out and designs and commence with construction.	To be finalised prior to the completion of Phase 2.	Appointed Engineers
	Negative impact on safety and security of farmer, farm workers and livestock.	Sufficient compensation for anticipated direct and indirect impacts calculated over the short- and long term. Alternatively, purchasing of entire livestock farming unit.	Initiate negotiations with the grazing rights holder. Draw up and sign agreements in this regard.	Negotiations and agreements to be finalised prior to the commencement of Phase 1.	Applicant

10.1.4 Decommissioning and Closure Phase

An action plan for the implementation of management and mitigation measures proposed for the decommissioning and closure phase of the proposed mining operation is detailed in Table 23.

10.2 ENVIRONMENTAL MONITORING

The ongoing monitoring of certain aspects of the bio-physical environment of the proposed mining area will take place throughout the life of the proposed mining project, as recommended by various specialist investigation reports.

It is recommended that the following monitoring programmes be implemented throughout the life of the mine:

- Groundwater (quality and water levels);
- Vegetation (alien weeds and invasive species, as well as the natural re-vegetation of disturbed areas);
- Dust;
- Noise and vibration; and
- Surface water (several aspects).

10.2.1 Groundwater

A groundwater monitoring network should be put in place in the vicinity of the following areas: Mining areas, tailings dams, waste rock dumps and the sewage treatment facility. There should be at least two monitoring boreholes at each of the aforementioned sites. (There are currently no boreholes in the area southwest of the Ga-Mogara River at the proposed mining area in the southern part of the farm. Two monitoring boreholes need to be drilled in this area.)

Each monitoring borehole should be sampled on a six monthly basis and be analysed for standard anions and cations, ICP-scan (heavy metals), pH, Total Dissolved Solids (TDS), Electrical Conductivity (EC) and Total Hardness (TH). The

Table 23. Action plan for the implementation of management and mitigation measures proposed for the decommissioning and closure phase of the proposed mining operation.

ENVIRONMENTAL PARAMETER	ANTICIPATED IMPACT	PROPOSED MANAGEMENT/MITIGATION MEASURES	ACTION PLAN	FREQUENCY	RESPONSIBLE PERSON
Soils	Decrease in soil erosion.	The natural re-establishment of vegetation should be encouraged in rehabilitated areas.	Regular monitoring re. the re-establishment of natural vegetation should take place on a regular basis. Proper records should be kept in this regard. If the results of the natural re-vegetation of the area is not satisfactory, measures such as seeding with an approved local seed mix; the protection of seeds and seedlings; and the watering of seeded areas should be implemented.	Once per month.	Env. Officer
	Potential soil contamination.	A detailed waste management strategy should be compiled and implemented on site.	Compile and implement a waste management strategy on site. Implement a penalty system for non-compliance.	To be implemented prior to the commencement of the Construction Phase.	Project Manager/Env. Officer
		A detailed spill prevention and –response plan should be compiled and implemented on site.	Compile and implement a detailed spill prevention and –response plan on site, including awareness training.	Compilation: Design Phase. Implementation:	Project Manager/Env. Officer

				Remainder of life of mine.	
Land capability	Increase in grazing capacity.	The natural re-establishment of vegetation should be encouraged in rehabilitated areas.	Regular monitoring re. the re-establishment of natural vegetation should take place on a regular basis. Proper records should be kept in this regard. If the results of the natural re-vegetation of the area is not satisfactory, measures such as seeding with an approved local seed mix; the protection of seeds and seedlings; and the watering of seeded areas should be implemented.	Once per month.	Env. Officer
Natural fauna	Re-establishment of habitats.	The natural re-establishment of vegetation should be encouraged in rehabilitated areas.	Regular monitoring re. the re-establishment of natural vegetation should take place on a regular basis. Proper records should be kept in this regard. If the results of the natural re-vegetation of the area is not satisfactory, measures such as seeding with an approved local seed mix; the protection of seeds and seedlings; and the watering of seeded areas should be implemented.	Once per month.	Env. Officer
	Adverse effects on the health of livestock and game.	Sufficient compensation for anticipated direct and indirect impacts calculated over the short- and long term (i.t.o. livestock). Alternatively, purchasing of entire livestock	Initiate negotiations with the grazing rights holder. Draw up and sign agreements in this regard.	Negotiations and agreements to be finalised prior to the	Applicant

		farming unit. Mitigation measures re. dust pollution to be obtained from dust assessment.		commencement of Phase 1.	
Natural flora	Increase in grazing capacity.	The natural re-establishment of vegetation should be encouraged in rehabilitated areas.	Regular monitoring re. the re-establishment of natural vegetation should take place on a regular basis. Proper records should be kept in this regard. If the results of the natural re-vegetation of the area is not satisfactory, measures such as seeding with an approved local seed mix; the protection of seeds and seedlings; and the watering of seeded areas should be implemented.	Once per month.	Env. Officer
	Physical, chemical and physiological impacts of dust on vegetation.	A dust management and monitoring plan should be compiled and implemented on site.	Compile and implement a dust management and monitoring strategy on site.	To be finalised prior to commencement of Construction Phase.	Env. Officer
	A potential increase in the abundance and variety of alien weeds and invasive plant species.	Regular awareness training for contractors and staff. Combated according to requirements of Reg. 15 of Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983). Regular monitoring and record keeping of distribution of alien weeds and invasive plants.	Compile and implement an eradication, spread prevention and monitoring plan with regard to alien weeds and invasive plant species.	To be finalised prior to commencement of Construction Phase.	Env. Officer

	Increased fire hazard.	Compilation and implementation of a fire prevention and –control plan on site. Regular awareness training for contractors and staff.	Compile and implement a fire prevention and –control plan on site.	To be finalised prior to commencement of Construction Phase.	Env. Officer
Surface water	Potential for contamination of clean surface run-off.	Restrict by containing water in a closed clean-dirty water system.	To implement the Integrated Surface Water Management Plan as set out in Section 13 of the specialist hydrological study (Appendix C).	To be implemented prior to the completion of the Construction Phase.	Appointed Engineer
Groundwater	Potential negative impact on groundwater quality.	The implementation of a proper storm water system as part of the storm water management system.	To implement the Integrated Surface Water Management Plan as set out in Section 13 of the specialist hydrological study (Appendix C).	To be implemented prior to the completion of the Construction Phase.	Appointed Engineer
		The construction of pollution control dams.	Pollution control dams should be included in the storm water management system.	Construction to be completed during Phase 2.	Appointed Engineer
		A groundwater monitoring network should be implemented.	Network should be implemented prior to the commencement of the Construction Phase.	Six monthly.	Env. Officer
Air quality	Increase in dust pollution.	Dust levels should be monitored and recorded on an ongoing basis. A dust management programme should be compiled and implemented on site.	Compile and implement a dust management and monitoring strategy on site.	To be finalised prior to commencement of Construction	Env. Officer

				Phase.	
Noise	Increase in noise pollution.	Noise and vibration levels should be monitored and recorded on an ongoing basis.	Compile and implement a noise and vibration management and monitoring strategy.	To be completed prior to the commencement of Phase 2.	Env. Officer
Aesthetics	Increase in littering.	Compile and implement a waste management strategy on site.	Compile and implement a waste management strategy on site. Implement a penalty system for non-compliance.	To be completed prior to the commencement of Phase 2.	Env. Officer
Socio-economic	Adverse effects on the health of people.	Sufficient compensation for anticipated direct and indirect impacts calculated over the short- and long term. Alternatively, purchasing of entire livestock farming unit.	Initiate negotiations with the grazing rights holder. Draw up and sign agreements in this regard.	Negotiations and agreements to be finalised prior to the commencement of Phase 1.	Applicant

main focus in monitoring should, however, be in the monitoring and comparison of iron, manganese and heavy metals in order to determine the potential for groundwater deterioration over time.

10.2.2 Vegetation

Two aspects regarding the natural vegetation of the proposed mining area need to be monitored: A potential increase in the number and density of alien weeds and invasive plant species; as well as the rate of re-vegetation of disturbed areas.

It is recommended that both of these aspects be monitored once per month via a) the taking of photographs of disturbed areas (photographs should also be taken prior to any disturbance), and b) plant surveys. Proper photographic and written records should be kept in this regard.

It is anticipated that the results of these monitoring programmes will indicate whether alien weeds and invasive plant species are increasing in the proposed mining area and to what extent the re-establishment of vegetation in disturbed areas is taking place.

10.2.3 Dust

Monitoring to be conducted as per the recommendations of the specialist dust surveys currently being conducted on site.

10.2.4 Noise and vibration

Monitoring to be conducted as per the recommendations of the specialist noise and vibration study currently being conducted on site.

10.2.5 Surface water

The following monitoring aspects are recommended as part of the proposed Integrated Surface Water Management Plan: