Macarthy EMP 10013

Our Ref: 9/2/074/0001

Enquiries: Kathryn Smuts
Tel: 021 462 4502
Email: ksmuts@sahra.org.za
CaseID: 812

Date: Friday February 15, 2013

Letter

In terms of Section 38(8) of the National Heritage Resources Act (Act 25 of 1999)

Attention: Mr Adrian Sinovich
Thari Resources (Pty) Ltd
Postnet Suite 433
Private Bag X 51
BRYANSTON
2021

CONSULTATION IN TERMS OF SECTION 40 OF THE MINERAL AND PETROLEUM RESOURCES DEVELOPMENT ACT 2002, (ACT 28 OF 2002) IN RESPECT OF MANGANESE AND IRON ORE ON REMAINDER OF PORTION 2, PORTIONS 3, 4 AND 5 OF THE FARM MACARTHY NO.559, SITUATED IN THE MAGISTERIAL DISTRICT OF POSTMASBURG, NORTHERN CAPE.

We have received notification of your application for an environmental management plan in respect of mining permit for manganese and iron ore on Farm Macarthy, Northern Cape.

In terms of the National Heritage Resources Act (NHRA), no 25 of 1999, heritage resources, including archaeological or palaeontological sites over 100 years old, graves older than 60 years, structures older than 60 years are protected. They may not be disturbed without a permit from the relevant heritage resources authority. This means that before such sites are disturbed by development it is incumbent on the developer (or mine) to ensure that a Heritage Impact Assessment is done. This must include the archaeological component (Phase 1) and any other applicable heritage components. Appropriate (Phase 2) mitigation, which involves recording, sampling and dating sites that are to be destroyed, must be done as required.

Although it is stated in the EMP form that no areas or sites of historical significance were identified within the affected environment, no indication of a professional assessment is given. Consequently, the quickest process to follow for the archaeological component would be to contract a specialist (see www.asapa.org.za) to provide a Phase 1 Archaeological Impact Assessment Report. This must be done before any prospecting drilling, trenching or mining takes place.

The Phase 1 Impact Assessment Report will identify the archaeological sites and assess their significance. It should also make recommendations (as indicated in section 38 of the NHRA) about the process to be followed. For example, there may need to be a mitigation phase (Phase 2) where the specialist will collect or excavate material and date the site. At the end of the process the heritage authority may give permission for destruction of the sites.

Where bedrock is to be affected, or where there are coastal sediments, or marine or river terraces and in potentially fossiliferous superficial deposits, a Palaeontological study must be undertaken to assess whether or not the development will impact upon palaeontological resources - or at least a letter from a Palaeontologist motivating for an exemption is needed to indicate that this is unnecessary. If the area is deemed sensitive, a

full Phase 1 Palaeontological Impact Assessment will be required and if necessary a Phase 2 rescue operation might be necessary (see www.palaeontologicalsociety.co.za).

Any other heritage resources that may be impacted such as built structures over 60 years old, sites of cultural significance associated with oral histories, burial grounds and graves, graves of victims of conflict, and cultural landscapes or viewscapes must also be assessed.

Should you have any further queries, please contact the designated official using the case number quoted above in the case header.

Yours faithfully

Kathryn Smuts
Heritage Officer: Archaeology
South African Heritage Resources Agency

Colette Scheermeyer
SAHRA Head Archaeologist
South African Heritage Resources Agency

ADMIN:
(DMR, Ref: NC 30/5/1/2/3/2/1/10013 EM)

mineral resources

Department:
Mineral Resources
REPUBLIC OF SOUTH AFRICA

Private Bag X6093, Kimberley, 8300, Tel: (053) 807 1700, Fax: (053) 832 8527
First Floor. Liberty Corner, 29-31 Curry Street, Kimberley 8301

From: Directorate: Mineral Regulation: Northern Cape **Date:** 14 February 2012
Enquiries: Ms. Ndidzulafhi Mavhungu
Ref: NO 30/5/1/2/3/2/1/10013 EM

On Sahris
Case ID: 812

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

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 THE SCOPING REPORT FOR MINING RIGHT ON THE REMAINDER OF PORTION 2, PORTIONS 3, 4 AND 5 OF THE FARM MACARTHY 559 SITUATED IN THE MAGISTERIAL DISTRICT OF POSTMASBURG, NORTHERN CAPE REGION.

APPLICANT: THARI RESOURES (PTY) LTD

Attached herewith, please find a copy of an EMP 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 the **14 March 2012** as required by the Act, failure of which will lead to the assumption that your Department has no objection(s) or comments with regard to this application and this Department will in that instance proceed with the finalization thereof.

Consultation in this regard has also been initiated with other relevant State Departments. In an attempt to expedite the consultation process please contact **Ndidzulafhi Mavhungu** 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.

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

SCOPING REPORT

THARI RESOURCES (PTY) LTD

SUBMITTED IN SUPPORT OF AN APPLICATION FOR A MINING RIGHT FOR IRON ORE AND MANGANESE IN TERMS OF SECTION 22 OF THE MINERAL AND PETROLEUM RESOURCES DEVELOPMENT ACT, 2002 (ACT 28 of 2002), COVERING **THE REMAINDER OF PORTION 2, PORTIONS 3, 4 AND 5 OF .THE FARM MACARTHY 559, MAGISTERIAL DISTRICT OF KURUMAN.**

FEBRUARY 2012

DMR REF NO (NC) 30/5/1/2/2/10013 MR

TABLE OF CONTENTS:

WORD DEFINITIONS:

In this document, unless otherwise indicated, the following words will have the meanings as indicated herein:

Word:	Definition:
Act (The Act)	Mineral and Petroleum Resources Development Act, 2002 (Act 28 of 2002)
ARC – AGIS	Agricultural Research Council's Agricultural Geo-referenced Information System.
ARC – ISCW	Agricultural Research Council Institute for Soil, Climate and Water.
Archaeological	Material remains resulting from human activities which are in a state of disuse and are in, or on, land and which are older than 60 years, including artefacts, human and hominid remains, and artificial features and structure.
Authority	National, regional or local authority, which has decision-making role or interest in the development
Best Practicable Environmental Option (BPEO)	BPEO is the outcome of a systematic consultative and decision-making procedure that emphasizes the protection of the environment across land, air and water. It establishes, for a given set of objectives, the option that provides the most benefit or least damage to the environment as a whole at an acceptable cost in the long term and as well as the short term.
BID	Background Information Document
Biodiversity	This refers to both the variety of different species of plants and animals, as well as genetic variability within species, which is essential in maintaining life-sustaining ecosystems.
Biome	A complex of communities of very wide extent, characterised by distinctive vegetation and climate.
Borehole	A hole drilled for the purposes of prospecting i.e. extracting a sample of soil or rock chips by pneumatic, reverse air circulation percussion drilling, or any other type of probe entering the surface of the soil.
CARA	The Conservation of Agricultural Resources Act, 1989
Cultural resources	The physical elements of both the built and natural environment, which are integral to a sense of shared identity.
DEAT	Department of Environmental Affairs and Tourism
Development	This is a broad term which refers to actions taken by individuals, communities, industry or government aimed at improving quality of life and fulfilling human potential. Measures of development include average income per person and reduced levels of poverty, unemployment and child morality.

Word:	Definition:
Disturbance	Any event or series of events that disrupts ecosystem, community, or population structure and changes resources, substrate availability, or the physical environment.
DME	Department of Minerals and Energy
DWAF	The Department of Water Affairs and Forestry – both national office and their various regional offices, which are divided across the country on the basis of water catchment areas.
EAP	Environmental Assessment Practitioner
EIA	An Environmental Impact Assessment as contemplated in Section 38(1) (b)of the Act
EMP	An Environmental Management Plan as contemplated in Regulation 52 of the Mineral and Petroleum Resources Development Act, 2002 (Act 28 of 2002).
Endemic species	Species with a distribution restricted to specific geographical areas. Endemism may occur on local, regional, sub continental or continental scales. Local endemism is usually associated with particular habitat requirements.
ENPAT	Environmental Potential Atlas
Environment	The external circumstances conditions and objects that affect the existence and development of an individual, organism or group. These circumstances include biophysical, social, economic, historical, cultural and political aspects.
Environmental impacts	The consequences of environmental aspects on environmental resources of particular value or sensitivity.
Environmental incident	♦ Any action undertaken (or omitted) by the proponent or his duly appointed representatives (e.g. contractors) that results in overly/unnecessary disturbance or damage to the environment. ♦ Any action undertaken (or omitted) by the proponent or his duly appointed representatives (e.g. contractors) that could lead to (has potential for) overly/unnecessary disturbance or damage to the environment. ♦ Non adherence to environmental legal requirements/laws (including the stipulations of authorizations issued in respect of a proposed activity e.g. those contained in a Record of Decision).
Environmental Officer	Independent environmental consultant appointed to monitor compliance with the EMP.
Erosion	A process that involves the wearing away of the land surface by mechanical or chemical action.
Fauna	All living biological creatures, usually capable of motion, including insects and predominantly of protein-based consistency.
Feasible	Acceptable, capable of being used or implemented successfully, without unacceptably damaging the environment.

Word:	Definition:
Fence	A physical barrier in the form of posts and barbed wire and/or "Silex" or any other concrete construction, ("palisade"- type fencing included), constructed with the purpose of keeping humans and animals within or out of defined boundaries.
Flora	All living plants, grasses, shrubs, trees, etc., usually incapable of easy natural motion and capable of photosynthesis.
GOSP	Gauteng Open Surface Plan
Ground water	All subsurface water occupying voids within a geological medium.
Habitat	The natural environment of an organism. The living space occupied by an organism. Physical surroundings in which an organism is likely to be found.
House	Any residential dwelling of any type, style or description that is used as a residence by any human being.
I&AP	Interested and/or affected party
Infrastructure	Refers to permanent physical structures such as roads, storm water drains and electricity lines.
Land-use	The actual or permitted activities on a defined piece of land.
MAMSL	Meters above mean sea level
MAP	Mean Annual Precipitation
Mitigation measures	Mitigation measures encompass all actions taken to eliminate offset or reduce potentially adverse environmental impacts to acceptable levels (World Bank, 1999:1).
MPRDA Regulation	Mineral and Petroleum Resources Development Regulation in terms of Government Notice R527, published on 23 April 2004.
NDA	National Department of Agriculture
NEMA	National Environmental Management Act (Act 107 of 1998)
NWA	National Water Act, Act 36 of 1998
Pit	Any open excavation
Pollution	The introduction of substances into the environment, which can have a negative effect on human health or the quality of the environment.
"Porrel"	The term used for the sludge created at alluvial diamond diggings where the alluvial gravels are washed and the diamonds separated in a water-and-sand medium.
Project activities	Those activities or actions of a project which are likely to give rise to an impact on the environment.

Word:	Definition:
Proponent	An individual and/or organisation that is of the intention to undertake an activity identified in terms of Section 21 of the Environmental Conservation Act, 1989 (Act no. 73 of 1989). Typically a proponent, ♦ stands to benefit directly from the proposed activity (e.g. a private developer gaining financially), or ♦ is duly sanctioned in terms of its legal mandate (e.g. a government department) to undertake such activities for the attaining of its objectives.
Red data species	Species of animals and plants recognized internationally as having a high conservation value or which are being threatened through natural or unnatural causes.
Resource	Any goods, services or environmental conditions which may have the potential to enhance social well being.
Risk	The scientific judgement of probability and significance of harm to the environment.
ROD	Record of Decision
SAHRA	South African Heritage and Resource Agency
Scoping	A procedure for narrowing the scope of an assessment and ensuring that the assessment remains focused on the significant issues or impacts. Scoping requires input from authorities and the public.
Significant	Factors or considerations are termed significant when they are important, because they are of consequence. For example, they will have a detectable influence on a process, the environment, or the end result.
Species	A group of organisms with distinctive characteristics and which remain distinct by virtue of barriers to interbreeding with other kinds of organisms.
Tc (Time of concentration)	This is the time it would take for a drop of water to flow along the furthest drainage path to the exist point of a defined catchment area.
Threatened	Used to describe the status of a species or population of a species, which has deteriorated through natural or unnatural causes to the point where it may be considered as rare, vulnerable or endangered.
Topsoil	♦ The layer of soil covering the earth which- ♦ provides a suitable environment for the germination of seed; ♦ allows the penetration of water; ♦ is a source of micro-organisms, plant nutrients and in some cases seed; ♦ and is not of a depth of more than 0,5 metres or such depth as the Minister may prescribe for a specific prospecting or exploration area or mining area.

Word:	Definition:
Trench	A type of excavation usually made by digging in a line towards a mechanical excavator and not pivoting the boom – a large, U-shaped hole in the ground, with vertical sides and about 6 – 8 metres in length. Also a prospecting trench.
Vegetation	Any and all forms of plants, see also Fauna
Water – "Clean Water"	Any water that originates outside of the mining area, entering the mining area through overland flow, lateral subsurface flow, or any other natural movement of water.
Water – "Clean Water System"	Any dam, other form of impoundment, canal, works, pipeline and any other structure or facility constructed for the retention or conveyance of unpolluted water.
Water – "Dirty Water"	Any water that originates within the mining area, either as a result of precipitation or as part of mineral processing, as well as untreated sewage and Grey Water.
Water – "Dirty Water System"	Any dam, other form of impoundment, canal, works, pipeline, residue deposit and any other structure or facility constructed for the retention or conveyance of water containing waste.
Water – "Grey Water"	Domestic Waste water not containing sewage.

Background Information:

Introduction:
The company was the holder of a Prospecting Right for Iron ore and Manganese on the said Mining application area for five years and there is a proven reserve for a successful mining operation.

It will be observed from contents in this mining work programme, financial and technical competence report and financing plan also submitted in support of this application, that the Company has access to the necessary finances, equipment and other means to mine Iron ore and Manganese on the above proposed mining area and to conduct all activities incidental thereto on the proposed mining area successfully.

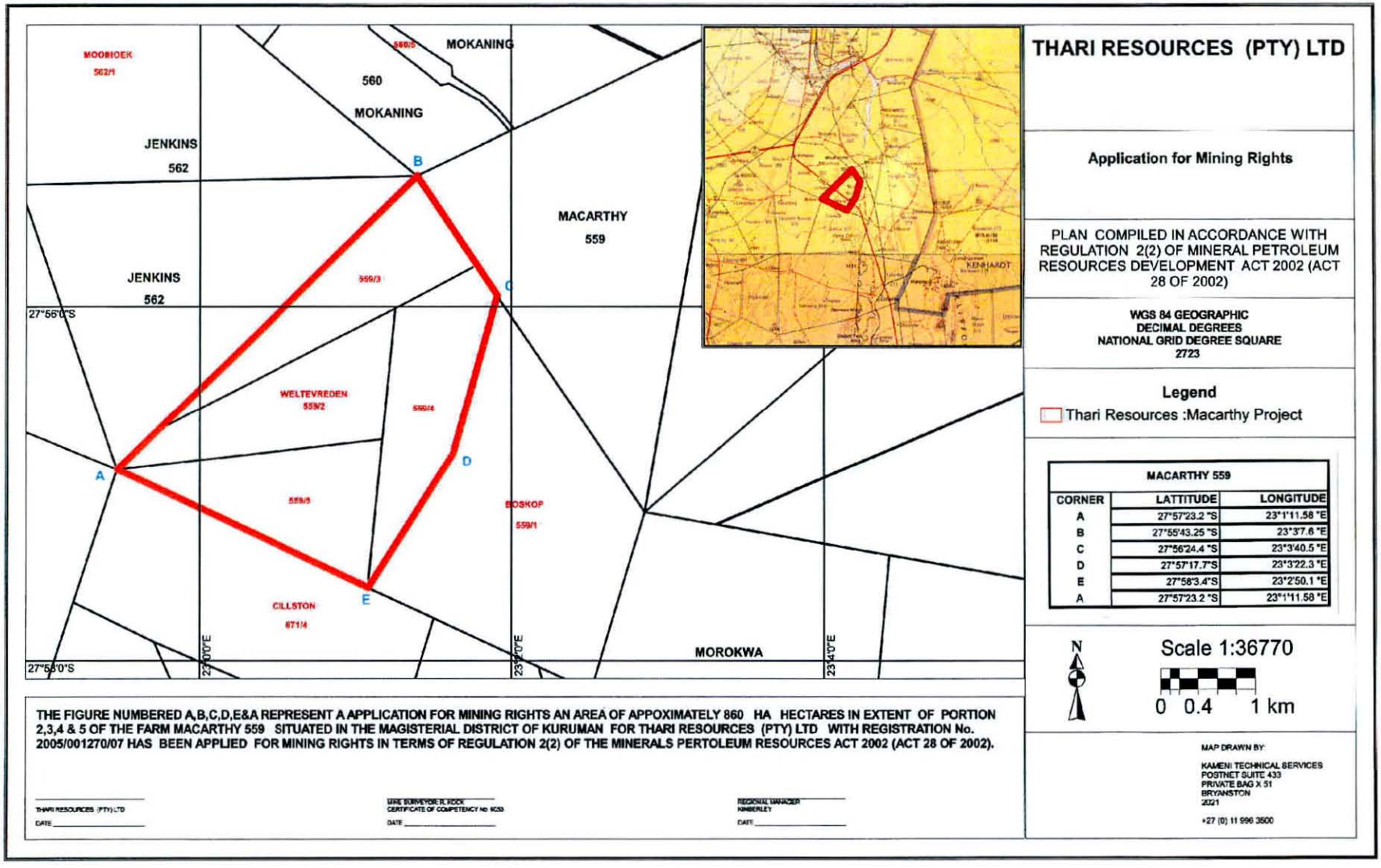
Details of the Applicant:

Company Name:	Thari Resources (Pty) Ltd
Company Registration Number:	2005/001270/07
Contact Person:	Adrian Sinovich
Telephone Number:	011 996 3500
Cell phone Number:	083 231 5788
Physical Address:	179 Lynwood Drive, Brooklyn
Postal Address:	Postnet Suite 433 Private bag x 51 Bryanston 2021
Email:	asinivich@kameni.co.za

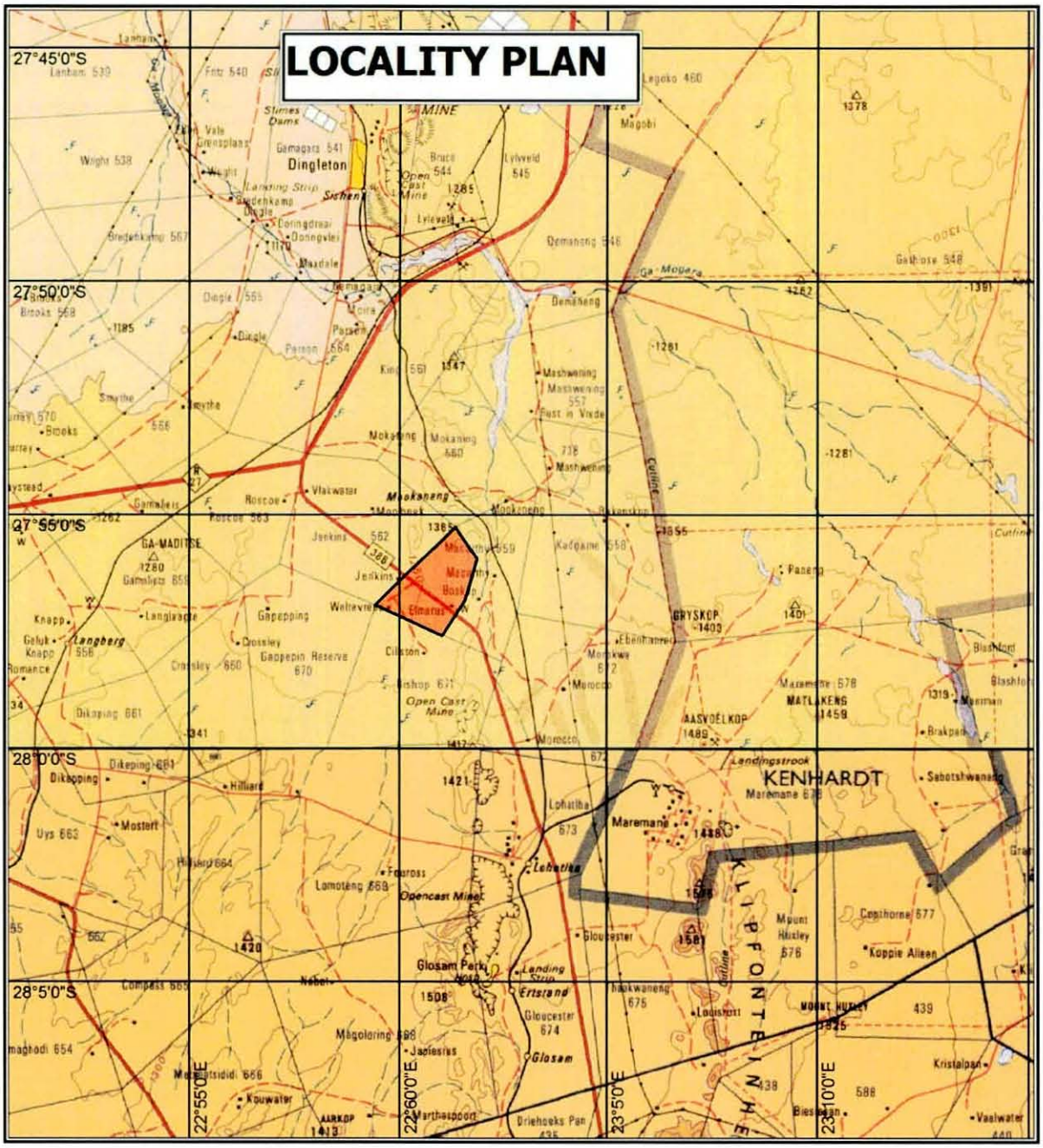
Regional Setting:

The area (hereinafter referred to as "the mining application area") is situated at South - 27.939876°and East 23.016308° which is 21 kilometres South–South-East from Sishen and 25 kilometres South of Kathu and 41 kilometres North of Postmasburg on the remainder of Portion 2, Portions 3, 4 and 5 of .the farm Macarthy 559, Magisterial District of Kuruman.

Regulation 2(2) Plan



Locality Map



Nature and Extent of the Development:

The minerals will be mined with the opencast mining method and all beneficiation will take place on the proposed mining area. Apart from the portable Crusher and screen which will be located on the mining area, a permanent office and weighbridge with sanitation is already on site. The extent of the proposed mining area is approximately 860 hectares

Existing Rights, Licenses and Permits:

It is confirmed that no other rights whatsoever are held by the Company.

Methodology:

MPRDA Regulation 49 (1) (a)

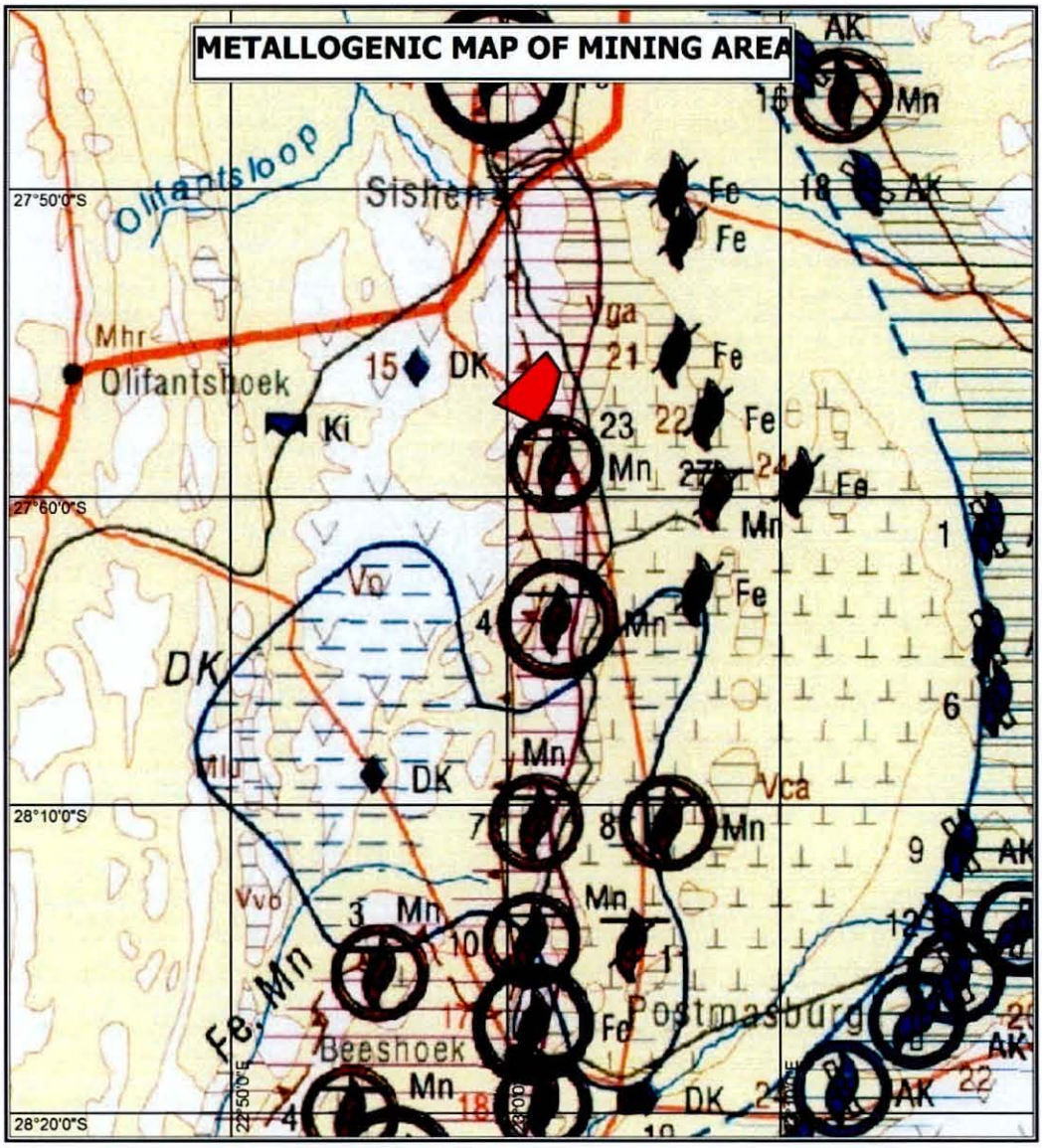
During the course of compilation of this document the following steps were followed:

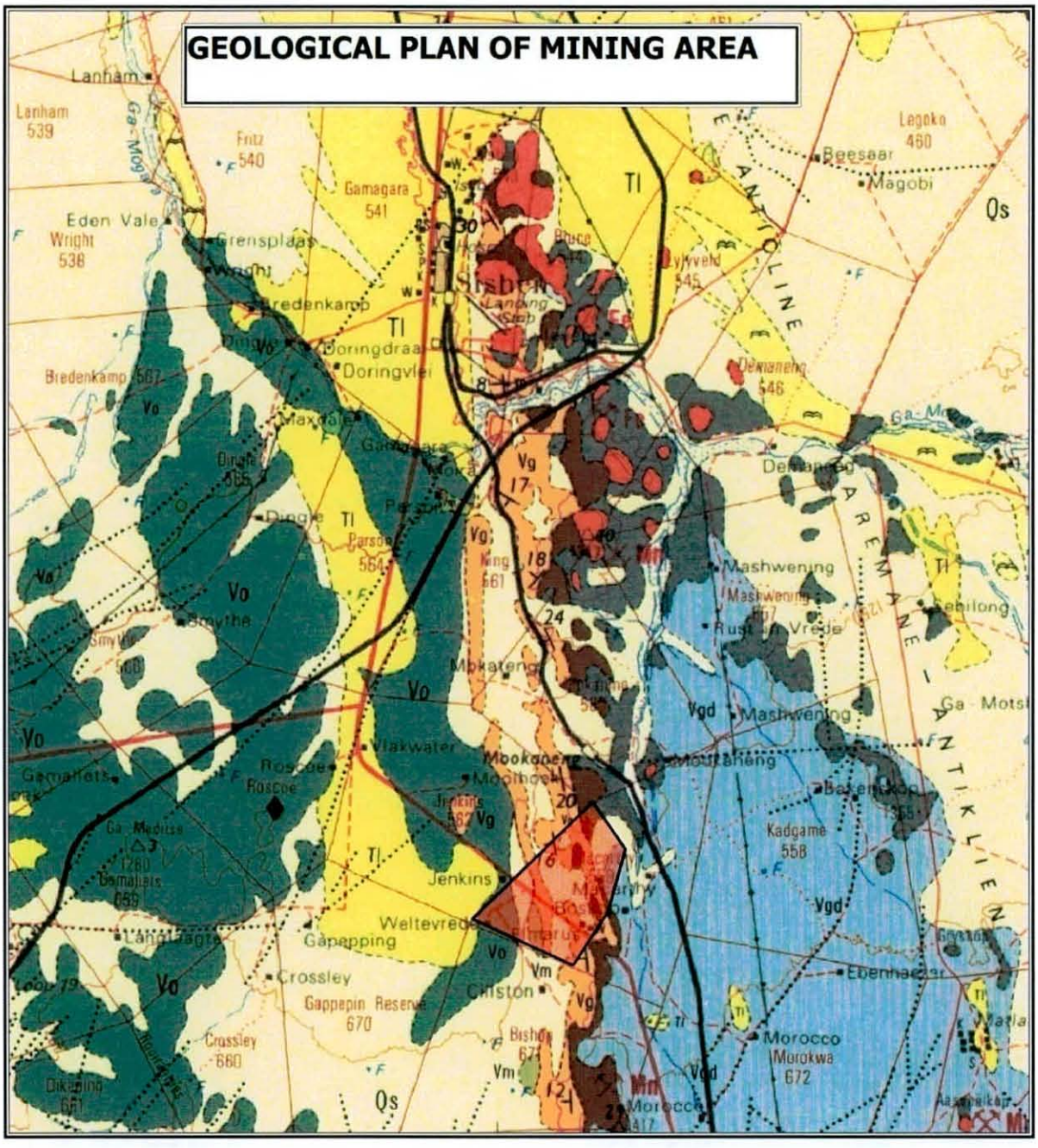
- An *in loco* inspection/site visit was conducted during February 2012, during which time an investigation of the surrounding land use and associated infrastructure took place. The mining area assessment also included an analysis of the physical, biological cultural, historical and environmental components on the proposed site. The said investigation also resulted in the identification of potential interested and affected parties in the areas surrounding the proposed activity.
- The identification of all potential impacts that may occur as a result of the proposal followed. Appropriate and effective measures to mitigate any of the identified impacts were also considered and discussed with the Company from an early stage.
- A desk study also commenced at an early stage of the project in order to determine which policies, guidelines and legislation of the relevant governmental institutions would be relevant for the compilation of the scoping report (and for the EIA report at a later stage).
- Data was obtained through desk studies to obtain information on the environmental description of the mining area, property description and all other relevant information regarding the proposed project, such as assessment of the land use conditions surrounding same.
- The public participation process will commence during February and March 2012. Public participation will include consultation with interested and affected parties. These I&AP's include adjacent property owners that will be notified personally and identification shall commence further by the placement of a notice on the gate/main entrance of the proposed mining area. The DMR shall notify any other I&AP's they see fit to be part of the process as prescribed in the Act. Public participation shall commence further by the placement of a notice at the Regional Manager's office and a site notice at the mining area itself. An advertisement will be published in a local newspaper. The preliminary results of the public participation process will be submitted on or before 13 February 2012 and the full results will be submitted with the EMP.
- After the scoping report was used in the official consultation process and comments have been collected by the DMR, an environmental impact assessment report as well as an environmental management programme will be submitted on or before the date as instructed by the DMR.
- Data required for the EIA report and the EMP report will mostly be obtained from literature and information contained in the existing EMPlan for the prospecting right that was in place until end of November 2011, as well as new information through other literature and additional information and "on site studies".
- Impacts, including biological, physical, social, economic, historical, etc, as well as its mitigation measures, will be dealt with in more detail in the EIA and EMP. The scoping report merely consists of a summary of these impacts.

Chapter 1 – Description of the Existing Environment:

MPRDA Regulation 49 (1) (b)
MPRDA Section 39 (3) (a)

Geology and Regional Geology:





Legend

Thari Resources Mccarthy

N

Scale 1:149290

0 1 2 4 6 8 10 km

The well known Northern Cape, Postmasburg manganese (Mn) deposits (Figure below) were discovered in 1922 but presently Thari Resources is focusing on an area situated more than 100 km north of Postmasburg where roughly 80 % of the worlds known manganese deposits occur, referred to as the Kalahari Manganese Field (KMF).

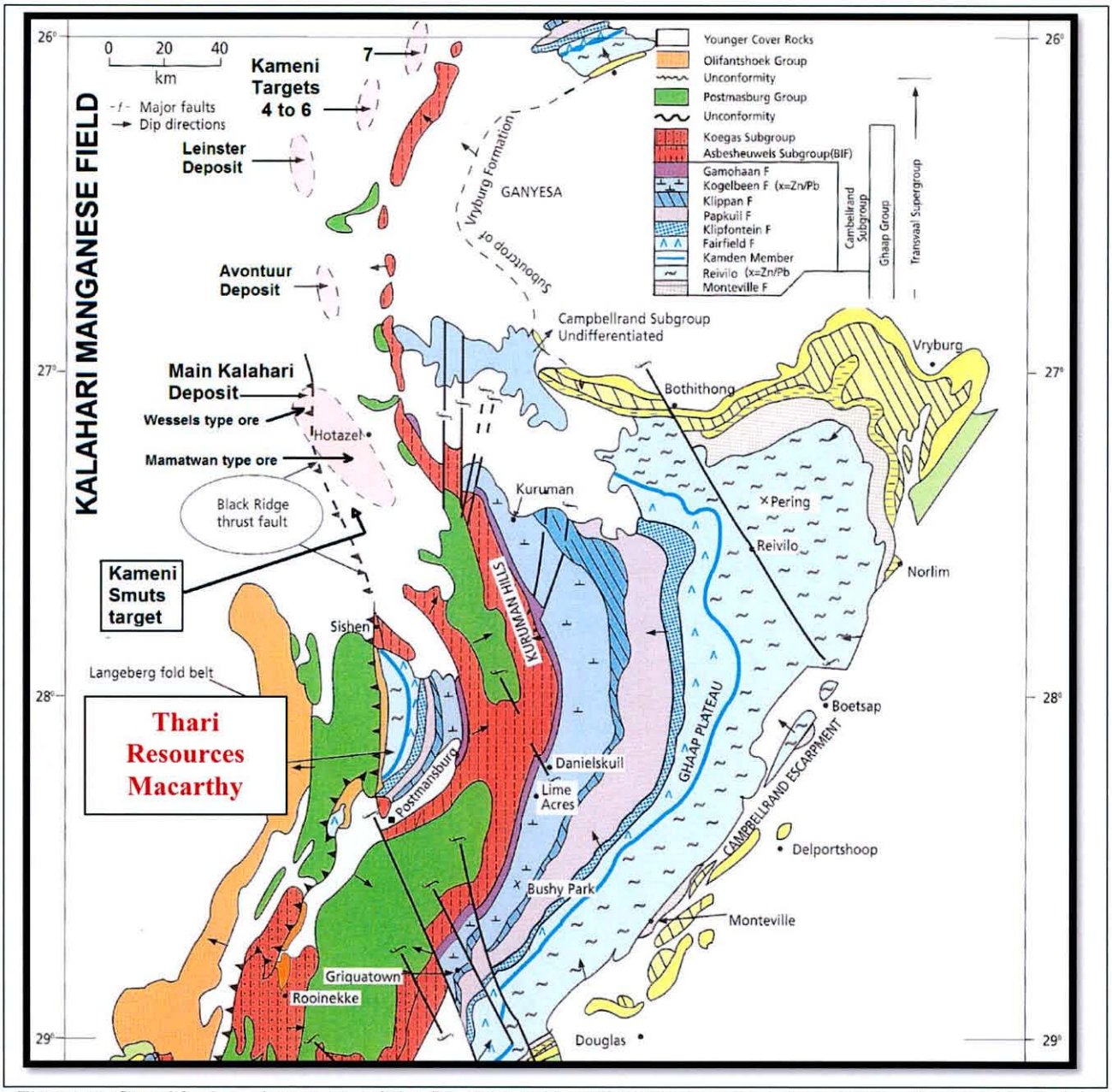


Figure 3. Simplified geology map of the Postmasburg and Kalahari manganese fields. Targets studied by Thari Resources presently are also shown. Figure adapted from Cairncross et al.,1997

The manganese ore of the KMF is considered to be of sedimentary origin, (Beukes,1986) hydrothermally enriched, carbonate-rich and inter-bedded with Lake Superior type banded iron formations (BIF's) of the Kuruman Formation. The KMF is only known from borehole information as the whole basin is covered by Kalahari sand. The KMF is recognized as the remains of five structurally preserved erosional entities consisting of the Mamatwan-Wessels basin which is the largest and indicated by the brown coloured hatchings in Figure 4, the super high grade Hotazel and Langdon Annex graben deposits respectively northwest and southeast of the town of Hotazel (Figure 4) and the sub-economic Avontuur and Leinster deposits some 20 km north of the Mamatwan-Wessels basin (Figure 3) where other companies are presently exploring.

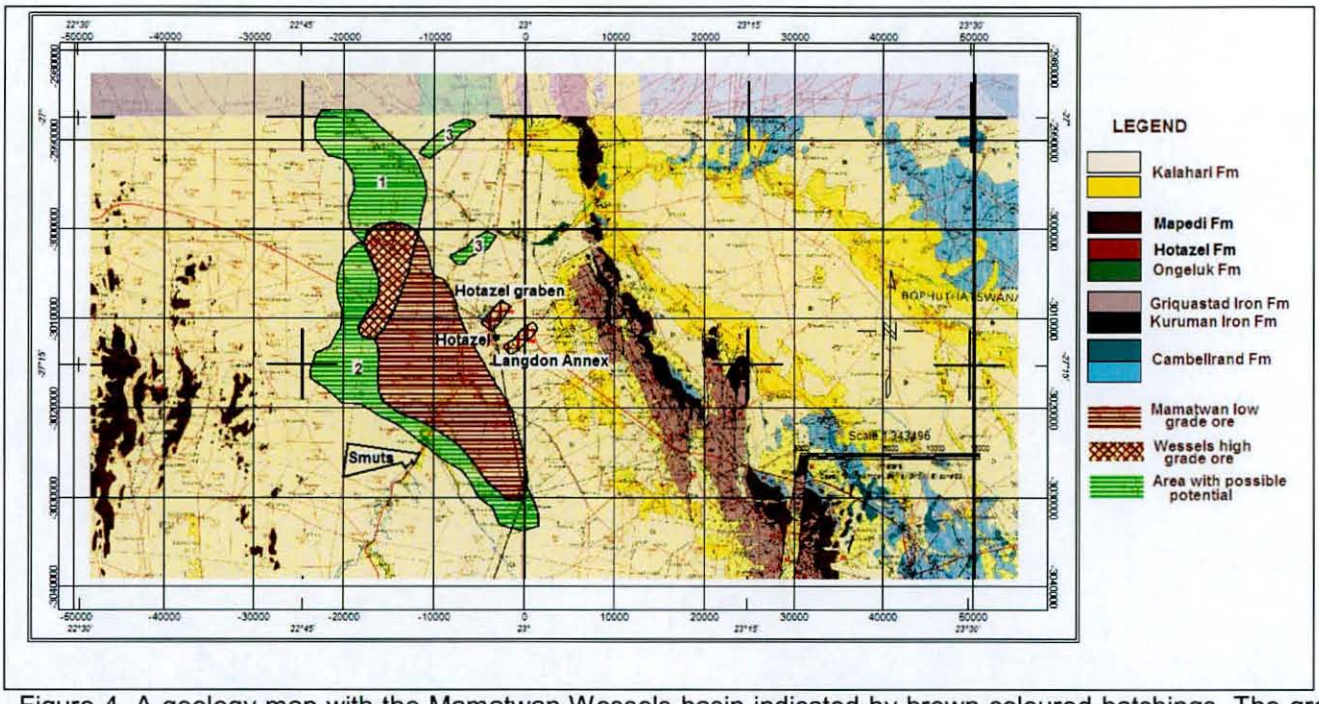
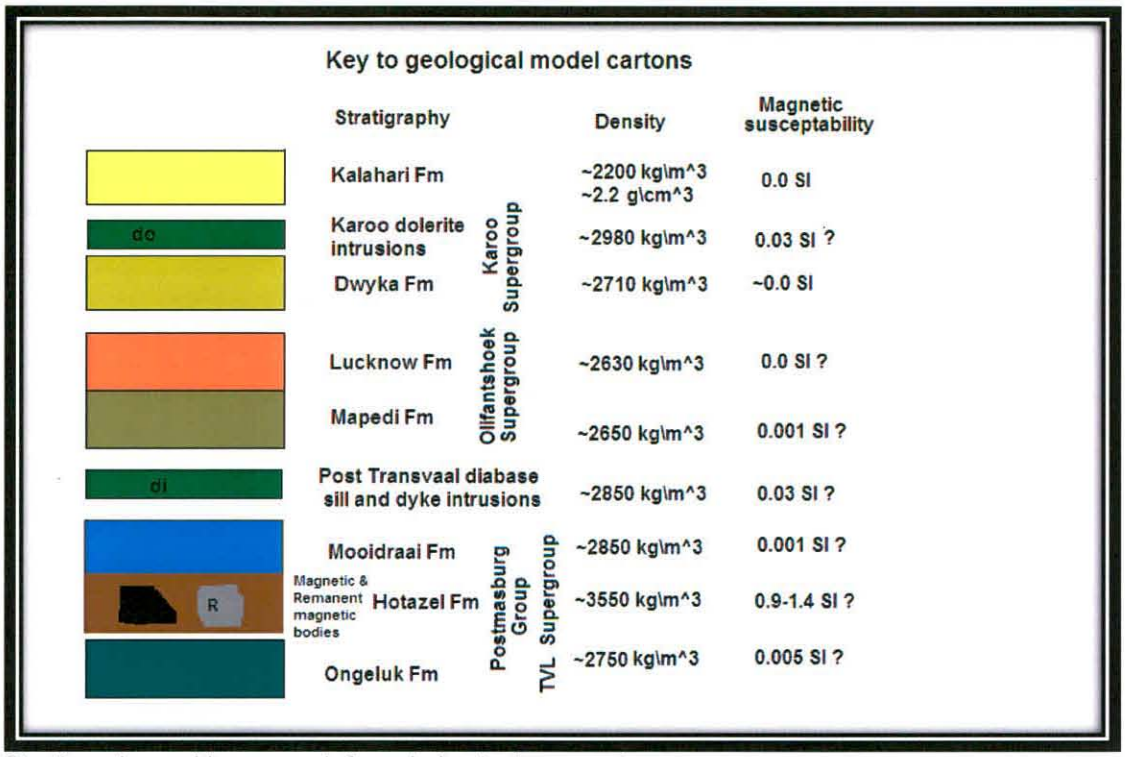


Figure 4. A geology map with the Mamatwan-Wessels basin indicated by brown coloured hatchings. The green coloured hatchings are Kameniexploration targets and targets 1 and 2 show similarities with the Hotazel & Langdon grabens. Smuts is acreage offered to Kameni that fell outside the original selected targets.

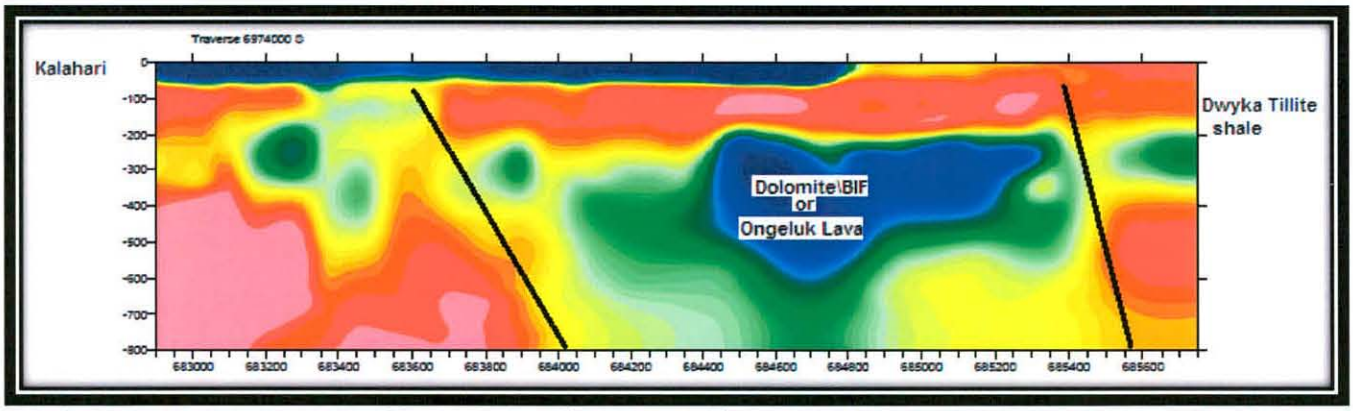
The interbedded manganese ore in the HotazelFm occurs as three layers(Astrup, Tsikos,1998), the upper layer and where best developed being about 5m thick, the middle body is only from 1-3m thick and the lower body varies in thickness between 5-45m. In the southern part of the KMF the upper body can reach a thickness of 30m and the middle layer being absent.

The Mamatwan-type ore consists of Braunite-Kutnahorite which forms more than 90% of the known manganese resource of the KMF and is considered a lower grade ore with a Mn content of more than 38%. The Wessels type ore which is only found in the northern extremity of the Mamatwan-Wessels basin (Figure 4, brown diamond shaped hatching) has a Mn concentration varying between 44-65 %. Hotazel type super enriched ore has a manganese content in excess of 60%. Large parts of the Mamatwan-Wessels basin are unmineable at present as the cover rocks can be up to 900m thick.

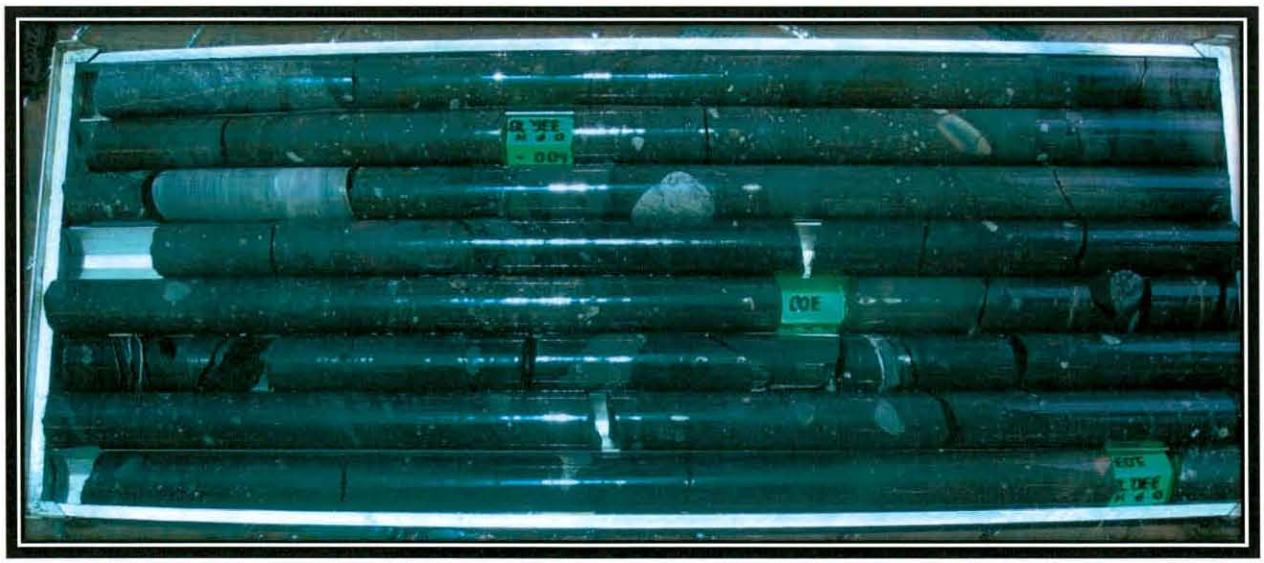
The challenge for Kameni is to find a new deposit preferably of Hotazel, or Wessels-type ore in areas that have been investigated in detail by many companies in the past. Adding to the challenge is that opportunists have taken out exploration licenses all over acreages of land surrounding the known Mn occurrences. Another obstacle is that 99% of the exploration area is sand covered which makes detailed geological information unobtainable.

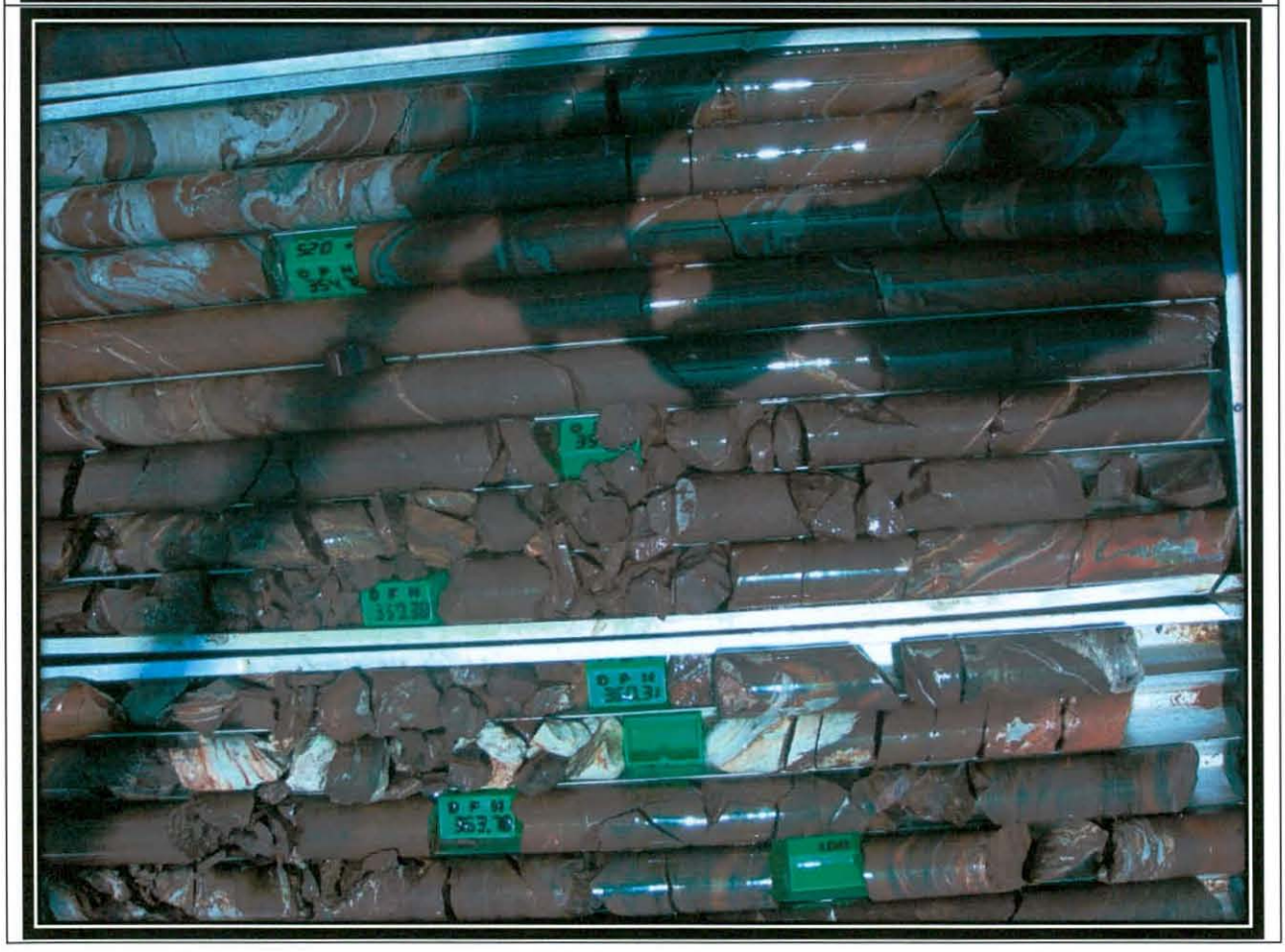


Stratigraphy and known or inferred physical parameters.



Detailed gravity coverage over Macarthy 559 (upper image). Lower image represents a cross-section through the earth along the magneto-telluric survey line as shown in the upper image.





Photographs of the borehole core from 0 m to 65m on the farm Macarthy 559.

A full geological report is attached as Annexure A.

Climate:

Regional Climate:

The climate of the Sishen area is described to be semi-arid with a mean annual precipitation of 349 mm. This tends to fall in summer and early autumn. Temperatures vary between –9°C and +42°C, with an average of 19. 2°C.

Rainfall

Rainfall records extending a period of 40 years for the Sishen Weather Station (Station No. 0356857AX) show that the mean annual precipitation (MAP) is 349 mm. The majority of rain falls in the late summer months of January, February and March, whilst the lowest rainfall records are recorded for the months of June, July and August. Rainfall tends to vary widely over the years as typical of most arid and semi-arid climates. The mean monthly rainfall figures in mm for Sishen are presented in the table below.

	Total	Jan	Feb	Mar	April	May	June	July	Aug	Sep	Oct	Nov	Dec
Average	349	70	56	62	33	12	6	2	3	8	23	31	55
Minimum	105	0	0	0	0	0	0	0	0	0	0	0	0
Maximum	1086	418	291	275	130	101	79	18	51	51	91	132	276

Evaporation

The average annual evaporation rate in the region is 2 026 mm a year, which is more than 5 times greater than the MAP (i.e. 349 mm/year)

	Total	Jan	Feb	Mar	April	May	June	July	Aug	Sep	Oct	Nov	Dec
Average	2026	272	220	186	135	112	91	107	143	203	249	265	293
Minimum	1488	150	138	93	75	73	44	72	112	143	180	197	211
Maximum	3132	339	337	284	196	148	143	137	193	249	331	387	388

Wind

The most commonly occurring wind direction for Kathu (period extending 1993 to 2001) is SSE where the wind velocity is 3,0 m/s. Commonly the wind speed fluctuates between 1,6 m/s and 3,5 m/s although speeds in the range 3,6 m/s to 5,5 m/s are regularly recorded.

Topography:

The topography of the area has slightly undulating plains. Most of Portions 20 and 22 consists of semi-cultivated land, semi grazing and grass lands..

See **Regulation 2(2) Plan** on page 10.

Soil:

Much of the area comprises either shallow to very shallow (<300 mm deep) soils onto rock, with only a very small portion of deep soils. The study site is covered by only two land types, i.e. Ae6 (red, high base status soils, usually deep) and Ag110 (shallow red soils, high base status), the latter of which dominates across the site has a low agricultural potential.

Land Capability:

The low rainfall in the area means that the only means of cultivation would be by irrigation, and there are no signs of agricultural infrastructure and/or irrigation present on the site. Due to the climatic restrictions, this part of the Northern Cape is suited at best for low density grazing practices at around 40 - 50 ha/large stock unit.

Land use:

The predominant land use in this area is mining, farming and other agricultural activities.

A land cover map of the study area (Fairbanks *et al.* 2000) indicates that the entire site consists of natural vegetation; however, the study area has been impacted upon to some degree by livestock farming. Impacts from grazing and browsing livestock are mostly evident at animal collection points, namely waterholes and kraals. Bush encroachment is a moderately serious problem throughout the study area and landowners expend much time and resources on preventing bush-encroachment problems.

The study area has been impacted upon to some degree by livestock farming, although the vegetation is in relatively good condition and mostly natural. Impacts from grazing and browsing livestock are mostly evident at animal collection points, namely waterholes and kraals. Bush encroachment is a moderately serious problem throughout the study area and land-owners expend much time and resources on preventing serious bush-encroachment problems.

Fauna and Flora:

Broad vegetation types of the region:

The study area falls within the Karoo Biome (Rutherford & Westfall 1986). The most recent and detailed description of the vegetation of this region is part of a national map (Mucina, Rutherford & Powrie, 2005; Mucina *et al.* 2006). This map shows a single vegetation type occurring in the area, i.e. Kathu Bushveld, which extends in all directions from the site. The nearest boundary to another vegetation type is 13 km away. This vegetation type is described in more detail below.

Kathu Bushveld:

This vegetation type occurs on the extensive, relatively flat plains between Kathu and the Botswana border. It has a medium-tall tree layer with *Acacia erioloba* in places, but is mostly open with *Boscia albitrunca* as the most prominent tree. The shrub layer is generally the most important component of the vegetation, dominated by species such as *Acacia mellifera*, *Diospyros lycioides*, and *Lycium hirsutum*. The grass layer is variable in cover, sometimes dense and sometimes sparse depending on local conditions or recent climatic or grazing regimes.

Conservation status of broad vegetation types:

On the basis of a recently established approach used at national level by SANBI (Driver et al. 2005), vegetation types can be categorised according to their conservation status which is, in turn, assessed according to the degree of transformation relative to the expected extent of each vegetation type. The status of a habitat or vegetation type is based on how much of its original area still remains intact relative to various thresholds. The original extent of a vegetation type is as presented in the recent national vegetation map (Mucina, Rutherford & Powrie 2005) and is the extent of the vegetation type in the absence of any historical human impact. On a national scale the thresholds are as depicted in Table 1, as determined by best available scientific approaches (Driver et al. 2005).

The level at which an ecosystem becomes Critically Endangered differs from one ecosystem to another and varies from 16% to 36% (Driver et al. 2005).

At a national scale Kathu Bushveld has been transformed by only a small amount (Table below). It is not therefore considered to be a threatened vegetation type (Driver *et al.* 2005; Mucina et al. 2006).

Conservation status of different vegetation types occurring in the study area, according to Driver et al. 2005 and Mucina et al. 2005.

Vegetation Type	Target (%)	Conserved (%)	Transformed (%)	Conservation status
Kathu Bushveld	16	0	1	Least Threatened

Red List plant species of the study area:

Lists of plant species previously recorded in the quarter degree grids in which the study area is situated were obtained from the South African National Biodiversity Institute. These are listed in Table below. Additional species that could occur in similar habitats, as determined from database searches and literature sources, but have not been recorded in these grids are also listed. There were two species on this list, both listed as Declining. These two Declining species, *Acacia erioloba* and *Hoodia gordonii*, both have a high probability of occurring on site. *Acacia erioloba* is also a protected tree. It usually occurs in deep sandy soils, along drainage lines and sometimes on rocky outcrops, but may also occur more widely in other habitats.

Plant species of conservation importance (Threatened, Near Threatened and Declining) that have historically been recorded in the study area.
Sources: South African National Biodiversity Institute in Pretoria.

Family	Taxon	Status	Habitat	Likelihood of occurrence on site
FABACEAE	Acacia erioloba	Declining	Savanna, semi-desert and desert areas, deep sandy soils and along drainage lines in very arid areas, sometimes in rocky outcrops.	HIGH
APOCYNACEAE	Hoodia gordonii	Declining	Wide variety of arid habitats	HIGH

* Conservation Status Category assessment according to IUCN Ver. 3.1 (IUCN, 2001), as evaluated by the Threatened Species Programme of the South African National Biodiversity Institute in Pretoria. *IUCN (3.1) Categories: VU = Vulnerable, EN = Endangered, CR = Critically Endangered, NT = Near Threatened.

Explanation of IUCN Ver. 3.1 categories (IUCN, 2001), and Orange List categories (Victor & Keith, 2004).

IUCN / Orange List category	Definition	Class
EX	Extinct	Extinct
CR	Critically Endangered	Red List
EN	Endangered	Red List
VU	Vulnerable	Red List
NT	Near Threatened	Orange List
Declining	Declining taxa	Orange List
Rare	Rare	Orange List
Critically Rare	Rare: only one subpopulation	Orange List
Rare-Sparse	Rare: widely distributed but rare	Orange List
DDD	Data Deficient: well known but not enough information for assessment	Orange List
DDT	Data Deficient: taxonomic problems	Data Deficient
DDX	Data Deficient: unknown species	Data Deficient

The quantity and quality of floristic data for the study area is poor. There are few taxonomic collections and relatively little floristic information for the area (van Wyk & Smith 2001). There may therefore be unknown species in this area or known species that have not been previously collected in this area. For this study, floristic information was collected for the quarter degree grid in which the site is located as well as in all eight surrounding grids and no additional species were identified of potential conservation concern.

Red List animal species of the study area:

All Red List vertebrates (mammals, reptiles, amphibians) that could occur in the study area are listed in Tables below. Those vertebrate species with a geographical distribution that includes the study area and habitat preference that includes habitats available in the study area are discussed further.

There is one mammal species of conservation concern that could occur in available habitats in the study area. This is the Natal Long-fingered Bat, classified as near threatened. This species may make use of the site while foraging, but its roosting requirements are not met by any habitats found on site or in the nearby areas.

There is no frog or reptile species of conservation concern previously recorded in the grids in which the study area is located which are likely to occur on site.

Threatened vertebrate species with a geographical distribution that includes the current study area.

MAMMALS

Common name	Taxon	Habitat	Status1	Likelihood of occurrence
Black rhinoceros	*Diceros bicornis bicornis*	Wide variety of habitats, but currently only occurs in game reserves.	CR	**NONE**, only occurs in game reserves
Honey badger	*Mellivora capensis*	Wide variety of habitats. Probably only in natural habitats.	LC, (was NT)	**MEDIUM**, overall geographical distribution includes this area, habitat is suitable.
Natal long-fingered bat	*Miniopterus schreibersii*	Caves and sub-terranean habitats in Fynbos, savanna, woodland, succulent and Nama Karoo, grassland; cave-dwelling aerial insectivore.	NT	**HIGH**, previously recorded in neighbouring grid
South African hedgehog	*Atelerix frontalis*	Wide variety of habitats where there is ample ground cover. Avoids mesic habitats.	LC, (was DD)	**MEDIUM**, previously recorded neighbouring grid
Reddish-grey musk shrew	*Crocidura cyanea*	Wide variety of habitats. Nocturnal, terrestrial.	LC, (was DD)	**MEDIUM**, previously recorded in nearby grid and geographical distribution includes this area.
Lesser red musk shrew	*Crocidura hirta*	Wide range of habitats from moist savanna and wetlands to Kalahari thornveld. Terrestrial, nocturnal.	LC, (was DD)	**LOW**, overall distribution includes this area, but low reporting rate in arid part of country.
Bushveld Gerbil	*Tatera leucogaster*	Terrestrial, sandy soils. Excavates burrows in sandy soils, usually at the base of small shrubs, but also in the open. Granivorous, insectivorous and herbivorous.	LC, (was DD)	**MEDIUM**, recorded in nearby grid, on edge of distribution; suitable habitat may occur on site.

[1]Distribution according to Friedmann & Daly 2004.
[2]Status according to IUCN 2010. IUCN Red List of Threatened Species. Version 2010.3. (www.iucnredlist.org). Downloaded on 15 November 2010.

AMPHIBIANS

Common name	Species	Habitat	Status2	Likelihood of occurrence
Giant Bullfrog	*Pyxicephalus adspersus*	Widely distributed in southern Africa, mainly at higher elevations. Inhabits a variety of vegetation types where it breeds in seasonal, shallow, grassy pans in flat, open areas; also utilises non-permanent vleis and shallow water on margins of waterholes and dams. Prefer sandy substrates although they sometimes inhabit clay soils.	NT1 LC2 Protected (NEMBA)	**LOW**, just outside known distribution range.

[1]Distribution according to du Preez & Carruthers 2009.
[2]Status according to IUCN 2010. IUCN Red List of Threatened Species. Version 2010.3. (www.iucnredlist.org). Downloaded on 15 November 2010.

REPTILES

Common name	Species	Habitat	Status3	Likelihood of occurrence
Black spitting cobra	*Naja nigricollis woodi*	Favours rocky terrain and dry rocky watercourses.	RARE3, (no entry on IUCN list)	**LOW**, overall geographical distribution peripheral to this area
African rock python	*Python Sebae natalensis*	Wide range of habitats, but mostly moist, rocky well-wooded valleys. Frequently found in and around water. Prefer open savanna type habitat but have been found in forest areas	VU3 (no entry on IUCN list)	**LOW**, overall geographical distribution peripheral to this area

[3]Status according to Branch 1988.

Protected trees

All tree species protected under the National Forest Act are listed in Table below. Those that have a geographical distribution that includes the study area are *Acacia erioloba, Acacia haematoxylon* and *Boscia albitrunca*.

The tree *Acacia erioloba* occurs in dry woodland along watercourses in arid areas where underground water is present as well as on deep Kalahari sands. It may also occur more widely. *Acacia haematoxylon* occurs on deep Kalahari sand between dunes or along dry watercourses. *Boscia albitrunca* occurs in semi-desert areas and bushveld, often on termitaria, but is common on sandy to loamy soils and calcrete soils (mostly Bushmanland Arid Grassland). *Acacia erioloba* and *Boscia albitrunca* are relatively common in the broader study area.

Acacia erioloba occurs as scattered individuals throughout the site. The density varies in different parts of the site, but there are few areas on site where it does not occur.

List of protected tree species (National Forests Act, Act 84 of 1998).

Acacia erioloba	*Acacia haematoxylon*
Adansonia digitata	*Afzelia quanzensis*
Balanites subsp. *maughamii*	*Barringtonia racemosa*
Boscia albitrunca	*Brachystegia spiciformis*
Breonadia salicina	*Bruguiera gymnhorrhiza*
Cassipourea swaziensis	*Catha edulis*
Ceriops tagal	*Cleistanthus schlectheri* var. *schlechteri*
Colubrina nicholsonii	*Combretum imberbe*
Curtisia dentata	*Elaedendron (Cassine) transvaalensis*
Erythrophysa transvaalensis	*Euclea pseudebenus*
Ficus trichopoda	*Leucadendron argenteum*
Lumnitzera racemosa var. *racemosa*	*Lydenburgia abottii*
Lydenburgia cassinoides	*Mimusops caffra*
Newtonia hildebrandtii var. *hildebrandtii*	*Ocotea bullata*
Ozoroa namaensis	*Philenoptera violacea (Lonchocarpus capassa)*
Pittosporum viridiflorum	*Podocarpus elongatus*
Podocarpus falcatus	*Podocarpus henkelii*
Podocarpus latifolius	*Protea comptonii*
Protea curvata	*Prunus africana*
Pterocarpus angolensis	*Rhizophora mucronata*
Sclerocarya birrea subsp. *caffra*	*Securidaca longependunculata*
Sideroxylon inerme subsp. *inerme*	*Tephrosia pondoensis*
Warburgia salutaris	*Widdringtonia cedarbergensis*
Widdringtonia schwarzii	

Acacia erioloba, Acacia haematoxylon, Boscia albitrunca have a geographical distribution that coincides with the study area.

During the site visit none of the possible Red data fauna and flora species was noticed.

Surface Water:

Due to the fact that the average annual evaporation rate in the region is 2 026 mm a year, which is more than 5 times greater than the MAP (i.e. 349 mm/year) water does not form in to dams or wetlands in the area. There is accordingly no permanent surface water present on the said area and no wetland areas have been identified on the mining application area. A hydrology map will be included in the environmental management programme.

Surface Water Quantity:

No Surface water was encountered during the site visit and in further investigation it was confirmed by Department of Water Affairs that no surface water can accumulate due to the severe evaporation.

Surface Water Quality

Due to the absence of natural surface water bodies on the application area no baseline for surface water quality was determined.

Drainage Density of Areas to be disturbed:

Due to the absence of water courses on the application area the drainage is 0km/km^2.

Surface Water Use:

No surface water occurs on the mining application area.

Water Authority:

Tsantsabane Local Municipality (NC085).

River Diversions:

There is no river diversion required by mining operation.

Wetland

No wetlands occur on the mining application area.

Groundwater:

These regions consist mainly of secondary water-bearing formations, with the water bearing rock being predominantly extrusive in nature (rather than crystalline metamorphic and igneous, intrusive, sedimentary or composite)(Vegter, 2001). In secondary water-bearing formations, the movement of water through the rock is via secondary openings that have originated from processes that affect rocks after they were formed, such as tectonic deformation, weathering and unloading through degradation of the land surface. These secondary openings are planar and were formed along joints, cleavage, bedding and fault planes (Vegter, 2001). The occurrence and available of ground water at any point is determined by (Vegeter, 2001).

- Storage and transmissive properties of the geological formation,
- Rate of ground water movement to discharge points,
- Rate of ground water discharge as springs, effluent seepage in streams, and
- Loss through evapo-transpiration.

According to the said owner the water table is in the region of 25 metres on the bottom of the proposed mining and around 150m – 200m where the main ore occurs the proposed mining activities will accordingly not intersect the ground water table.

Presence of Water Boreholes and Springs and their Estimated Yields:

There is only one borehole on Portion 3 which is 25 metres deep. No springs are on the mining area.

Ground Water Quality:

Although no site specific test were undertaken during the Scoping phase of this application, generic information is available from Vegter (1995a), in terms of Total Dissoved Solids (TDS), Nitrate and Fluoride. The quality of the ground water at the proposed mining site can be expected to be within the following range:

- TDS levels of between 300mg/l and 500mg/l (Vegeter, 1995a) which is predominantly within the ideal range for domestic consumption (<450mg/l) but may only be considered "acceptable" for domestic consumption if TDS levels exceed 450 mg/l (DWAF, 1996a, DWAF, 2001). The Department of Water Affairs and Forestry (DWAF) also sets

guidelines for industrial use, which are often stricter than the levels for domestic consumption. In the case of TDS, industrial guidelines do exists. The levels of TDS expected in the vicinity of the site fall within industrial Class 3 (DWAF, 1996b).

- ❖ Nitrate levels are not expected to exceed 10mg/l (Vegter, 1995a), which is the upper limit considered acceptable for domestic consumption (DWAF, 1996a; DWAF, 2001).
- ❖ Fluoride levels are not expected to exceed 0.15mg/L (Vegter, 1995a) which is maximum allowable limit for domestic consumption (DWAF, 1996a; /DWAF, 2001).

Ground Water Use:

Ground water will be used from the existing borehole for sanitary use, office use and for dust suppression. No water is used in the production process. Application for the necessary water use licence form DWAF is in the process of submission.

Air Quality:

According to the Mine Health and Safety Act (Act, 29 of 1996) an employer must maintain a healthy and safe environment that is without risk to the health of employees. As far as reasonably practicable every employer must identify the relevant hazards and assess the related risks to persons, who are not employees, who may be exposed and ensure that persons who are not employees, but who may be directly affected by the activities at the mine are not exposed to any hazards to their health and safety.

From the above is clear that activities, which can cause a negative impact on the surrounding environment, need to be assessed, considered and managed where necessary. Other statutory requirements include:

- Threshold Limit values – ACHIH 1998/1999
- Chemical Substances Regulations – R1179 of 25 August 1995.
- The Air Pollution Prevention Act, Act 45 of 1965
- Guidelines – Department of Environmental Affairs and Tourism – Air Pollution Division.

The only risk identified in this regard is that of excessive dust levels on the mining area caused by hauling, excavating and loading of material.

The ambient air quality within the area is considered to be fair, with dust originating from gravel roads being the primary source of pollution.

The air quality of any region is controlled by a combination of a number of factors; viz. climate, topography, as well as both natural and anthropogenic activities occurring in the area of interest and in surrounding regions (GDACE, 2004a). The climate and topography of the site is discussed elsewhere in this section. The natural and anthropogenic activities in the vicinity of the site (within a 5km radius) that must be considered when evaluating the ambient air quality are as follows:

Anthropogenic activities	Natural activities
Vehicle emissions (minimal due to rural nature of area). Domestic fuel burning (minimal due to low population density). Fugitive dust emissions from agricultural activities (commercial dry-land cultivation). Mining activities (such as those conducted at the neighbouring B&E Silica mine).	Veldt fires. Fugitive dust emissions from exposed surfaces at neighbouring mines (B&E Silica mine).

Air Quality

Due to the rural nature of the area and the dominance of agricultural practices, no monitoring data are available for this area. Based on the pollution sources in the vicinity (listed above), the site is likely to be characterised by periodic and intermittent high particulate concentrations (followed by high dust fall rates), coinciding with agricultural activities such as ploughing. Particulate concentrations in the vicinity will also increase during the dryer seasons when the occurrence of veldt fires increases.

Noise:

Based on observation of the activities that take place on and in the vicinity of the site, noise levels in the area are characterized as being of a rural-agricultural nature. No baseline date is available to indicate the noise levels being typical of such a surrounding. The Noise Rating Level (according to SANS 10103:2003) for day time and night time should not exceed 45dB(A) and 35dB(A), respectively. From on-site observations this does not seem to be the case and normally the site appears to be very quiet.

Sites of Archaeological and Cultural Interest:

No areas or sites of archaeological and/or cultural significance were identified to occur on the study area for the proposed mining area.

Sensitive Landscapes:

No sensitive areas occur on the proposed mining area.

Visual Aspects:

The proposed site lies on a privately owned farm and is located adjacent to a tar road (R 325 between Postmasburg and the N14 connection) running through the area. It is therefore inevitable that that the proposed mining area will be visible to the by passers and farmers using this road.

Regional Socio-economic Structure:

General Description of the Study Area:

Main Industries

Mining:

This district was the richest mining region in the Northern Cape until a decline in mining employment and the near extinction of the asbestos mining industry in the 1980s. Today, minerals mined include manganese ore, iron ore and tiger's eye. The Sishen iron-ore mine is one of the largest open-cast mines in the world and the iron-ore railway from Sishen to Saldanha is one of the longest iron-ore carriers in the world. Mining opportunities include:

- Extensive manganese deposits and possible new mining areas
- Pig iron smelter (Kathu)
- Manganese smelter (Hotazel)
- Small scale manganese mining where deposits are not suitable for large scale mining operations
- Semi-precious stone mining (Granite, Tiger's Eye)
- Mining in industrial minerals such as clay, sand and salt

Agriculture:

The rural land in the district is used extensively for cattle, sheep, goat and game farming. The area is well known for its good commercial hunting in the winter. Agricultural opportunities within the district include:

- Beef cattle: meat processing
- Leather tannery and processing of leather into products
- Sheep farming: meat processing, wool, leather
- Fresh produce market, storage and packaging facilities
- Game farming: commercial game hunting, meat Processing, eco-tourism
- New technologies and methods of production etc.

Tourism:

The district holds potential as a viable tourism destination. Attractions include:

- The Eye: the biggest natural fountain in the southern hemisphere, proclaimed a national monument in 1992
- Wonderwerk Cave: one of the longest-inhabited caves in the world, with San rock paintings in areas near its mouth
- Sishen Golf Club: Kathu is home to one of the most attractive golf courses in the country
- Khai Apple Recreation Resort: situated in the Gamagara Municipality, the resort offers outstanding accommodation, camping and caravanning facilities, fishing and horse riding
- Game hunting: old limestone farmsteads, a feature of the Kalahari landscape, have been converted into hunting lodges with excellent accommodation and game-processing facilities
- Moffat Mission: established in 1820 by Scottish missionary, Robert Moffat, in Kuruman, the mission church was declared a national monument in 1993

Tourism opportunities in the district include:

- Marketing of the hunting industry in the district
- Integrating hunting and eco tourism which can be beneficial outside of the hunting season
- Community tourism initiatives
- Arts and crafts
- Training of tour guides or hunting guides
- Mining tourism
- Agri-tourism

Industrial Opportunities

Based on the findings of the 2007 District Growth and Development Summit, manufacturing plants in the following industries could be established in the district:

- Agro- processing (e.g. meat processing, canning of beef and making of products such as biltong etc.)
- Packaging and distribution of products
- Heavy minerals refining, processing and beneficiation:
- Sanitary ware
- Ceramic ware and products
- Tile and cement products
- Jewellery manufacturing
- Manufacturing of mining supplies
- Manufacturing of mining equipment and supplies
- Machinery and construction materials
- Textiles and protective clothing

If the above can be done, then some of the District Growth and Development Summit targets, such as halving the unemployment rate by 2014, reducing the number of household living in abject poverty by 5% per annum and improving the literacy rate by 50% by 2014, will be achieved.

Key facts and figures:

1. Local municipalities covered: Gamagara, Ga-Segonyana and Moshaweng
2. Population: 191 537
3. Area covered: 27 283km²
4. Major towns: Kuruman, Kathu

Key infrastructure:

1. Main roads: N14
2. Railways: Rail network between Black Rock and Dibeng, and from Sishen South
3. Airport: Kathu

Population, Size and Distribution:

Population Figures:

The John Taolo Gaetsewe District Municipality has a total population of 176 925 (StatsSA, Census 2001)[1] and there are 16 181 people living within the municipal area of the Gamagara Local Municipality according to the old demarcation area, with only 4 053 people in the Ward (Phetogo Consulting, KDM SDF, 2006). In terms of the new demarcation, the Gamagara Local Municipality has a population of 23 192 people and the John Taolo Gaetsewe District Municipality 188 833 people (Phetogo Consulting, KDM SDF, 2006).

Seventy percent (70%) of the population in the Northern Cape is Afrikaans speaking, followed by 20% Tswana speaking and 6.5% Xhosa speaking people. This province also accommodates minor cultural groups, such as the Nama, San, Khoi.Xu and the Khwe communities, which are scattered in various rural settlements throughout the province.

Age Groups:

The age structure of the District and Local Municipalities in the study area indicates a predominantly young population with a small percentage of the population in the 60 + age category. This "young population" indicates a definite need for social activities, services, youth development, training opportunities and job creation in the region (Phetogo Consulting, KDM SDF, 2006).

Population Stability:

Since the mid nineties, the Northern Cape has experienced an influx of people from the rural areas to the towns in search of improved quality of life and employment opportunities. The Gamagara Local Municipality IDP (2007-2008) also states that the area has experienced some population growth due to the expansion of the Kumba Sishen Iron Ore Mine and the establishment of the new Khomani Mine in Kathu. This created some social challenges, especially in terms of crime prevention, providing the necessary infrastructure and limiting the growth of informal settlements without basic services. As the majority of the total population in the area are South Africans, one could conclude that there is some population stability in the study area with no socio-economic challenges created by an inflow of immigrants.

1 According to Census 2001 the population of the John Taolo Gaetsewe District Municipality stands at approximately 185 297 people.

Education Levels:

The John Taolo Gaetsewe District Municipality: Spatial Development Framework 2006/7 states that 2 282 people in the Gamagara Local Municipal area do not have any form of schooling. Only 2 852 individuals have completed Grade 12 or a similar level of education and just over 300 people have a higher form of education. The John Taolo Gaetsewe District Municipality's Strategic Development Framework noted that "Education statistics indicate that in 2001, 20.1% of the population had no education and only 8.7% had tertiary qualifications" (Phetogo Consulting, KDM SDF, 2006).
In Ward 1, a large portion of the total adult population have no schooling (1 137 individuals), and only 116 of the total adult population have completed Grade 12. One can assume that a large part of the population in the municipal area would thus have the necessary level of education and/or skills to undertake semi-skilled work, but not necessarily those living in Ward 1. The low percentages that have any higher form of education could be attributed to the lack of tertiary educational facilities in the region.

Education Grouped:

Category	District	Ga-Segonyana LM	Gamagara LM	Joe Morolong LM
No schooling	23,137	7,210	2,905	13,022
Some primary	23,421	8,312	2,150	12,959
Complete primary	5,743	2,287	958	2,498
Some secondary	22,042	10,153	3,353	8,536
Std 10/Grade 12	12,951	6,633	3,136	3,182
Higher	4,771	2,218	1,304	1,249

Education Institution:

Category	District	Ga-Segonyana LM	Gamagara LM	Joe Morolong LM
None	24,321	8,287	3,156	12,878
Pre – school	2,653	1,171	258	1,224
School	59,350	22,302	5,510	31,538
College	438	155	209	74
Technikon	205	110	77	18
University	207	90	54	63
Adult education	656	226	95	335
Other	104	59	24	21

CONCLUSIONS:

The educational levels among the population of the district are relatively low. 27,6% of the population has no formal education, while only 67,4% has some school education. Only 1,83% of the population has some tertiary education. These statistics have obvious implications for the employment potential of the population, and therefore also for the district's local economic development and job creation initiatives.

Employment and Income

Employment Status:

The John Taolo Gaetsewe District Municipality IDP states that "...out of the population of 185 297 people, only 21 584 are employed. This is contrasted with 17 511 unemployed and 66 645 economically inactive people in the municipality". A large section of the population has been unaccounted for and it was assumed that these individuals were employed in the informal sector.

In the Gamagara Local Municipality, 5 896 people are employed, while 2 410 were unemployed or could not find work or chose not to work. In Ward 1, 560 people are employed, but 893 were unemployed or could not find work or chose not to work (KDM IDP, 2008). The John Taolo Gaetsewe District Municipality: Strategic Environmental Assessment and Integrated Environmental Management Programmes: Phase 5 Report also states that Ward 1 in the Gamagara Local Municipality is the worst off with regards to their social, infrastructural and economic status quo.

Due to the above high unemployment rate and the lack of service provision as well as economic and educational opportunities, the area has been earmarked as a presidential rural node under the Integrated Sustainable Rural Development Programmes (ISRDPs). Development in this area is thus predicted to be boosted speedily (Eko-Impak, 2005).

Employment Sectors:

Due to the underground deposits of manganese and iron ore (e.g. Assmang Iron Ore's Beeshoek mine), mining is one of the main employment sectors in the Gamagara Local Municipal area, followed by the agricultural sector, tourism and retail (KDM IDP, 2008).

Income:

Income distribution is an important indicator of an area's welfare, as it determines the ability to meet basic needs and it provides information on the poverty levels in the area.

The majority of the people living in the John Taolo Gaetsewe District Municipality have no income or earn below R800.00 per month (Phetogo Consulting, KDM SDF, 2006). These figures correlate with the high unemployment rates and also show high levels of dependency and poverty due to the fact that the majority of the economically active population has an income of below R800.00 per month.

The reduction of poverty therefore remains the most critical challenge faced by provincial government through providing job opportunities, addressing backlogs in terms of housing, infrastructure and services, by improving health, education and social services, and addressing the prevalence of HIV/Aids.

Household Income:

Category	District	Ga-Segonyana LM	Gamagara LM	Joe Morolong LM
No income	14,375	5,700	894	7,781
R1 - R4 800	4,828	1,839	667	2,322
R4 801 - R 9 600	9,210	3,268	983	4,959
R9 601 - R 19 200	6,163	2,428	930	2,805
R19 201 - R 38 400	4,422	1,978	998	1,446
R38 401 - R 76 800	2,937	1,350	906	681
R76 801 - R153 600	1,729	808	713	208
R153601-R307200	775	300	441	34
R307201-R614400	124	46	73	5
R614401-R1228800	45	16	23	6
R1228801-R2457600	66	21	22	23
R2 457 601 , more	13	5	6	2
Not Applicable	58	35	20	3

(Source: Municipal Demarcation Board)

Personal Income:

Category	District	Ga-Segonyana LM	Gamagara LM	Joe Morolong LM
No income	140,082	51,854	14,423	73,805
R1 - R400	12,711	4,869	1,597	6,245
R401 - R800	16,852	6,167	2,133	8,552
R801 - R1 600	4,395	2,258	948	1,189
R1 601 - R3 200	5,035	2,567	1,404	1,064
R3 201 - R6 400	3,821	1,783	1,403	635
R6 401 - R12 800	1,697	684	849	164
R12 801 - R25 600	465	128	326	11
R25 601 - R51 200	92	29	55	8
R51 201 - R102 400	58	22	31	5
R102401-R204800	68	20	26	22
R204 801 or more	7	3	2	2

CONCLUSIONS:

- ☑ A total of 75% of the district's population has no recordable income. This is extremely high and put extreme pressure on the Municipalities operating in the district. The result of such high level of unemployment is that communities cannot pay for basic services and that severe pressure is put on municipal resources due to demands for services to a poverty-stricken population.
- ☑ The huge discrepancies between income levels in the district are a matter of concern. In spite of the desperate levels of unemployment and poverty, 1,29% of the district's population earns more than R6,400 per month.

Employment Status:

Category	District	Ga-Segonyana LM	Gamagara LM	Joe Morolong LM
Employed	21,584	10,196	6,937	4,451
Unemployed	17,511	8,516	2,575	6,420
Not Econom Active	66,645	24,098	5,930	36,617

(Source: Municipal Demarcation Board)

Work Status:

Category	District	Ga-Segonyana LM	Gamagara LM	Joe Morolong LM
Paid employee	19,955	6,704	6,704	3,912
Paid family worker	269	44	44	125
Self-employed	1,259	188	188	420
Employer	260	41	41	29
Unpaid worker	77	3	3	48
Not applicable	163,472	16,219	16,219	87,171

(Source: Municipal Demarcation Board)

Employment Industry:

Category	District	Ga-Segonyana LM	Gamagara LM	Joe Morolong LM
Agric relate work	1,747	601	426	720
Mining, Quarrying	3,217	747	1,999	471
Manufacturing	1,418	603	671	144
Elec,gas,water	247	113	18	116
Construction	1,044	451	310	283
Wholesale,Retail	2,937	1,759	746	432
Transport, Comm	571	282	167	122
Business Services	947	545	302	100
Community Services	6,998	3,943	1,362	1,693
Undetermined	163,472	60,082	16,219	87,171

(Source: Municipal Demarcation Board)

Occupations:

Category	District	Ga-Segonyana LM	Gamagara LM	Joe Morolong LM
Senior Officials	882	431	279	172
Professionals	1,254	572	477	205
Tech/Assoc Prof	3,014	1,480	501	1,033
Clerks	2,501	1,336	751	414
Service workers	1,937	1,240	446	251
Skilled agric work	873	239	154	480
Other	3,260	1,189	1,609	462
Elementary occup	5,635	2,602	1,974	1,059
Occupations NEC	760	482	209	69
Plant Operators	1,698	733	578	387

(Source: Municipal Demarcation Board)

CONCLUSIONS:

- ☑ Unemployment is a serious problem in the district area. If the non-economically active part of the population is excluded from the calculation, the unemployment rate, according to the statistics above, is 44,79%. The situation is especially bad in the area of the Joe Morolong LM.
- ☑ The area's job opportunities are provided by three primary economic sectors, which are agriculture, mining and retail. The other job opportunities essentially feed of these three sectors.
- ☑ Following the national trend, it is clear from the above-mentioned statistics that job creation must be a key priority consideration for the Municipality in formulating its strategies.