mineral resources

Department:
Mineral Resources
REPUBLIC OF SOUTH AFRICA

DRAFT SCOPING REPORT

AUTUMN SKIES TRADING 689

REG: 2010/145525/23

ABBREVIATIONS AND ACRYNOMS

KOEGAS COMMUNAL PROPERTY ASSOCIATION: CPA
AIA: Archaeological Impact Assessment
ASAPA: Association of South African Professional Archaeologists
BH: Borehole
CMA: Catchment Management Agency
CMAs: Catchment Management Agencies
CRM: Cultural Resources Management
DEA: Department of Environmental Affairs
DFA: Diamond Fields Advertiser
DMR: Department of Mineral Resources
DMS: Dense Medium Separation
DWA: Department: Water Affairs
DWS: Department of Water Affairs and Sanitation
EC: Electrical Conductivity
EIA: Environmental Impact Assessment
ELWU: Existing Lawful Water Use
EMPR: Environmental Management Programme Report
ESA: Early Stone Age
GA: General Authorisation
GN: Government Notice
GPS: Global Positioning System
HIA: Heritage Impact Assessment
HIR: Heritage Impact Report
HSR: Heritage Scoping Report
I&AP: Interested & Affected Party
IBA: Important Bird Area
LIA: Late Iron Age
LSA: Later Stone Age
MAE :Mean Annual Evaporation
mamsl: metres above mean sea level
MAP: Mean Annual Precipitation
MAR: Mean Annual Runoff
MCM: Million cubic metres
MIA: Middle Iron Age
MPRDA: Minerals and Petroleum Resources Development Act, 2002
MSA: Middle Stone Age
NEM:WA: National Environmental Management: Waste Amendment Act, 2008
NEMA: National Environmental Management Act, Act, 1998(Act 107 of1998) (as amended)
NGDB: National Groundwater Database
NHRA: National Heritage Resources Act
NWA: National Water Act, 1998 (as amended)
PASA: Petroleum Agency South Africa
PHRA: Provincial Heritage Resources Authority
PSSA: Palaeontological Society of South Africa
RoD: Record of Decision
SADC: Southern African Development Community
SAHRA: South African Heritage Resources Agency
SWL: Static Water Level
TMM: Trackless Mobile Machinery
TDS: Total Dissolved Solids
WMA: Water Management Area
WUL: Water Use Licence

(a) NAME OF APPLICANT:

DETAILS OF THE APPLICANT

Project applicant:	Autumn Skies Trading 689		
Registration no (if any):	2010/145525/23		
Responsible Person, (e.g. Director, CEO, etc).:	Gamza Gool		
Contact person:	CEO		
Physical address:	52 Otto Street, Homestead, Kimberley		
Postal address:	52 Otto Street, Homestead, Kimberley		
Postal code:	8301	Cell:	0832760245
Telephone:	0832760245	Fax:	goliathmalcolm@yahoo.com
E-mail:	goliathmalcolm@yahoo.com		

(i) **ENVIRONMENTAL ASSESSMENT PRACTITIONER (EAP) INFORMATION**

EAP:	M A Goliath		
Contact person (if different from EAP):	M A Goliath		
Company:	BNL Nnake Trading		
Physical address:	23 Goedehoop Avenue, Royldene, Kimberley		
Postal address:	23 Goedehoop Avenue, Royldene, Kimberley		
Postal code:	8301	Cell:	0824523693
Telephone:	0824523693	Fax:	goliathmalcolm@yahoo.com
E-mail:	goliathmalcolm@yahoo.com		

(ii)

EXPERTISE OF THE EAP
CURRICULUM VITAE
M A GOLIATH

ITEM	DETAILS
Name	Malcolm Angus Goliath
Qualification/s	NHD-Metalliferous Mining Mine Managers Certificate of Competency LSTD(Science, Geology and Botany) Basic Gravimetric Sampling
Profession	Mine Manager
Experience	CONSULTANT MINING 2007-Present Responsibilities Develop: Mine Design inclusive of calculation of mine resource Mining Work Programme Financial Model Environmental Management Plan/Programme Social and Labour Plan Annual Reporting-Performance Assessment Report 1999 – 2006 Managing Director-Sedibeng Mining Mine Manger Responsibilities Reporting to the Board of Directors. Manage all Mining disciplines Implement Mining Work Programme Financial and Technical ability Maintain Environmental Management Plan/Programme Social and Labour Plan Prospecting Work Programme Pre-1998 Regional Co-ordinator Minerals and Policy Centre. Inspector of Mines-DME Northern Cape De Beers Consolidated Mines-Finsch Mine Mining Shiftboss Secondary Teacher ----------
EXPERIENCE RELATING TO APPLICATION	Northern Cape Environmental Committee member (Mineral and Energy Policy Centre Mining Permit Applications Small- Scale Mining Consultant Prospecting Right Applications Mining Right Applications

(b) LOCATION

FIGURE 1: ***LOCALITY MAP***

(i) 21 DIGIT SURVEYOR CODES:

Koegas 324 C03100000000032400000
Hounslow 323 C03100000000032300000

(ii) PHYSICAL ADDRESS AND FARM NAMES

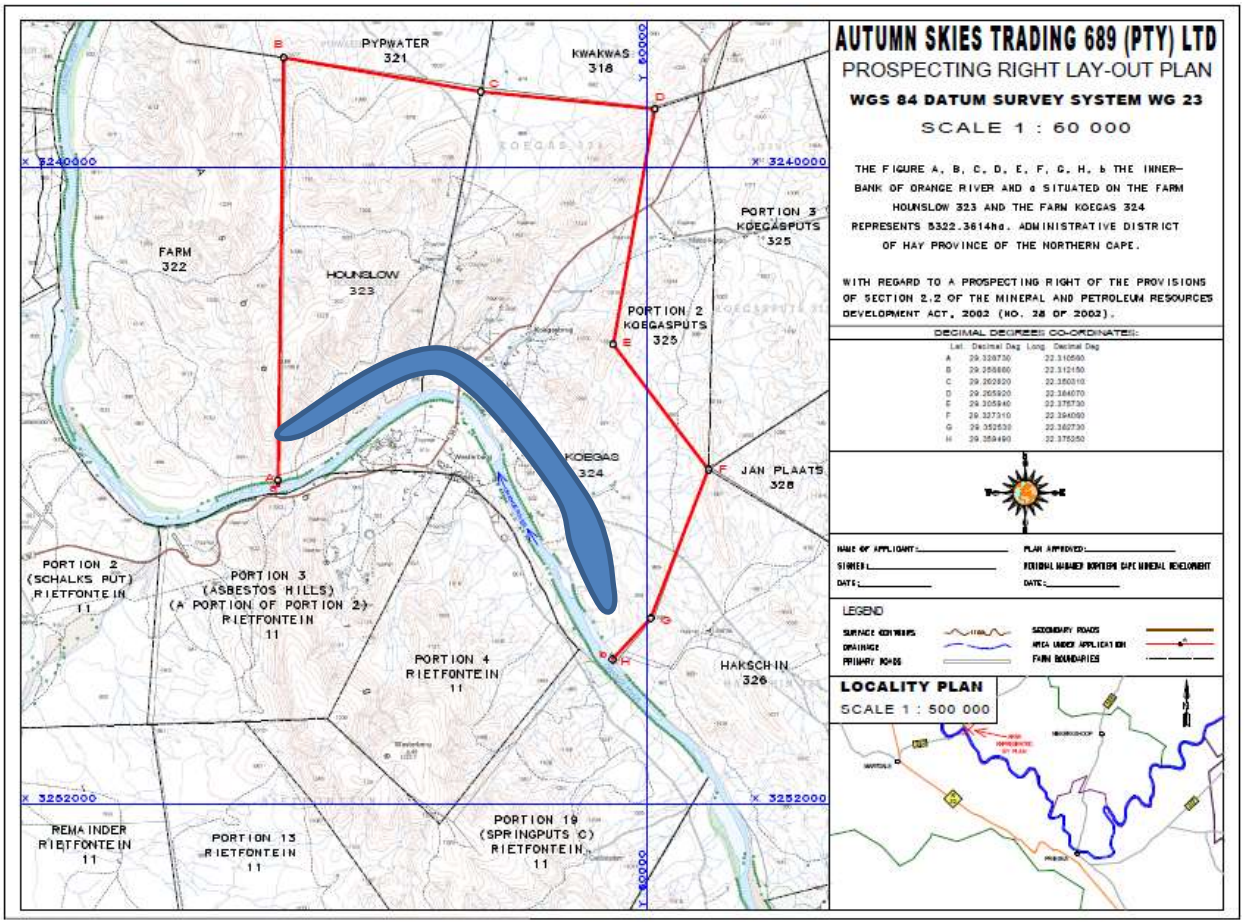
Farm Name:	Koegas 324 and Hounslow 323
Application area (Ha)	5322.361 ha
Magisterial district:	Hay
Distance and direction from nearest town	60km NW of Prieska
21 digit Surveyor General Code for each farm portion	Koegas 324 C03100000000032400000 Hounslow 323 C03100000000032300000
Description of the overall activity. **(Indicate Mining Right, Mining Permit, Prospecting right, Bulk Sampling, Production Right, Exploration Right, Reconnaisance permit, Technical co-operation permit, Additional listed activity)**	Prospecting Right Method Prospecting Right Desktop Study (Completed) A first phase of geological investigations comprises of collecting various geological literature relating to the area of interest. This literature may be obtained from relevant books and journals. Information can also be inquired from companies which have previously mined in the area. Satellite images as well as geological maps will be used to identify possible mining target areas. Geological Mapping (1 month) Thorough filed mapping of the surface geology will be done in order to

	narrow down target areas for determining the location of the ore body. Field mapping and satellite images makes it possible to eliminate certain areas and focus on the possible ore deposits. Geological Report (months 2-58) This written report comprises of all prospecting results as well as recommendations for future activities. When the prospecting period is done decisions will be made regarding the necessity of future prospecting or application for a mining right Bulk Sampling(month 2-58) Bulk sampling is done by using machinery as well as labour. Excavators are used to remove the overburden as well as ore. The dimensions of the excavations is 10 pits at 10m X 10m X 3m average depth and 5 pits at 10 x 10 x 2m planned intervals of 200 m in a checkered pattern . The deviation to this prospecting program could be when a particular line of interest is encountered and the prospecting be done along a channel. The ore is then transported to the plant by means of Dump Trucks. The alluvial ore is introduced to the Plant Receiving Bin by means of a Load Haul Dumper.The oversize material (+100mm) is used as backfill in the opened-up excavation areas. The overburden is placed on site where it is later backfilled into the pit, i.e. formations will be placed back in the same sequence it was extracted. The topsoil is then introduced to complete the rehabilitation process. Rehabilitation is thus continous. The ore is treated in a processing plant that consists of rotary pans. These pans operate on the principle of density of which the medium is puddle. The concentrate will report to a recovery house, and the diamonds recovered through grease tables

(iii) CO-ORDINATES OF THE APPLICATION AREA

COORDINATES		
	LONGITUDE	**LATITUDE**
A	**22.310560**	**29.328730**
B	**22.312150**	**29.256860**
C	**22.350310**	**29.262820**
D	**22.384070**	**29.265920**
E	**22.375730**	**29.305940**
F	**22.394060**	**29.327310**
G	**22.382730**	**29.352530**
H	**22.375250**	**29.359490**

(c) PLAN



(i) DESCRIPTION OF THE CORRIDOR

The area of interest is the demarcated blue zone on the Plan c above. Observation of 300m from the river for any prospecting activity.

(ii) Property has been defined and co-ordinates under b (iii) above

(d) SCOPE OF PROPOSED ACTIVITY

(i) LISTED ACTIVITIES DESCRIPTION OF ACTIVITIES AND INFRASTRUCTURE

NAME OF ACTIVITY (**E.g. For prospecting -** drill site, site camp, ablution facility, accommodation, equipment storage, sample storage, site office, access route **etc…etc…etc** **E.g. for mining**,- excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc…etc…etc.)	**Aerial extent of the Activity** **Ha or m²**	**LISTED ACTIVITY** (Mark with an **X** where applicable or affected).	**APPLICABLE LISTING NOTICE** ***(GNR 544, GNR 545 or GNR 546)***	**WASTE MANAGEMENT AUTHORISATION** (Indicate whether an authorisation is required in terms of the Waste Management Act). **(Mark with an X)**
Any activity including the operation of that activity which requires a prospecting right in terms of section 16 of the Mineral and Petroleum	5322.361 ha lodged for the surveyed	**X**	GNR 327 Ln 1, Activity 20	

Development Act, 2002 (Act No.28 of 2002), including- (a) associated infrastructure, structures and earthworks directly related to the extraction of a mineral resource: or (b) the primary processing of a mineral resource including winning, extraction, classifying, concentrating, crushing, screening or washing: but exclude the secondary processing of a mineral resource, including the smelting, beneficiation, reduction, refining, calcining or gasification of the mineral resource in which case activity 6 in Listing Notice 2 applies (Activity 20 of Listing Notice 1	portion only.			
The removal and disposal of minerals contemplated in terms of section 20 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002), including- (a) associated infrastructure, structures and earthworks, directly related to prospecting of a mineral resource: or (b) the primary processing of a mineral resource including winning, extraction, classifying, concentrating, crushing, screening or washing: but exclude the secondary processing of a mineral resource, including the smelting, beneficiation, reduction, refining, calcining or gasification of the mineral resource in which case activity 6 in Listing Notice 2 applies (Activity 19 of Listing Notice 2)	5322.361 ha lodged for the surveyed portion only.	**X**	GNR 325 Listed 2,Activity 19	
Activity 27 of GNR 983 The clearance of an area of 1 hectares or more, but less than 20 hectares of indigenous vegetation, except where such clearance of indigenous vegetation is required for— (i) the undertaking of a linear activity; or (ii) maintenance purposes undertaken in accordance with a maintenance management plan.	5322.361 ha lodged for the surveyed portion only. Extent 1.025 ha	**X**	GNR 327 LN 1 Activity 27	
NOT LISTED-FOOTPRINT				
Plant Processing Area	600m^2			
Topsoil Stockpiles	500m^2			
Production Treatment Stockpiles	500m^2			

Portable Ablution Facilities	25m^2			
Tailings and Discard Dam	400m^2			
Clear Process Water Facilities (JOJO)	160m^3			
Workshop	300**m^2**			
Site Office	40**m^2**			
Diesel Bay with Bund wall	4m^2			
Mine Roads (4m widthx180m)	720m^2			

Prospecting Right
Desktop Study (Completed)
A first phase of geological investigations comprises of collecting various geological literature relating to the area of interest. This literature may be obtained from relevant books and journals. Information can also be inquired from companies which have previously mined in the area. Satellite images as well as geological maps will be used to identify possible mining target areas.
Geological Mapping (1 month)

Thorough filed mapping of the surface geology will be done in order to narrow down target areas for determining the location of the ore body. Field mapping and satellite images makes it possible to eliminate certain areas and focus on the possible ore deposits.
Geological Report (months 2-58)

This written report comprises of all prospecting results as well as recommendations for future activities. When the prospecting period is done decisions will be made regarding the necessity of future prospecting or application for a mining right

Bulk Sampling(month 2-58)
Bulk sampling is done by using machinery as well as labour. Excavators are used to remove the overburden as well as ore. The dimensions of the excavations is 10 pits at 10m X 10m X 3m average depth and 5 pits at 10 x 10 x 2m planned intervals of 200 m in a checkered pattern . The deviation to this prospecting program could be when a particular line of interest is encountered and the prospecting be done along a channel. The ore is then transported to the plant by means of Dump Trucks. The alluvial ore is introduced to the Plant Receiving Bin by means of a Load Haul Dumper.The oversize material (+100mm) is used as backfill in the opened-up excavation areas. The overburden is placed on site where it is later backfilled into the pit, i.e. formations will be placed back in the same sequence it was extracted. The topsoil is then introduced to complete the rehabilitation process. Rehabilitation is thus continous.
The ore is treated in a processing plant that consists of rotary pans. These pans operate on the principle of density of which the medium is puddle. The concentrate will report to a recovery house, and the diamonds recovered through grease tables.

Infrastructure
Plant 600m^2, Production Stockpiles 500m^2, Ablution Facilities 25m^2, Tailings Dam 400m^2, Site office 40m^2, Workshop 300m^2 Clear Water Reservoir 160m^3
Topsoil Stockpiles 500m^2, Roads 720m^2, Diesel Bay with Bund wall 4m^2

FIGURE 4

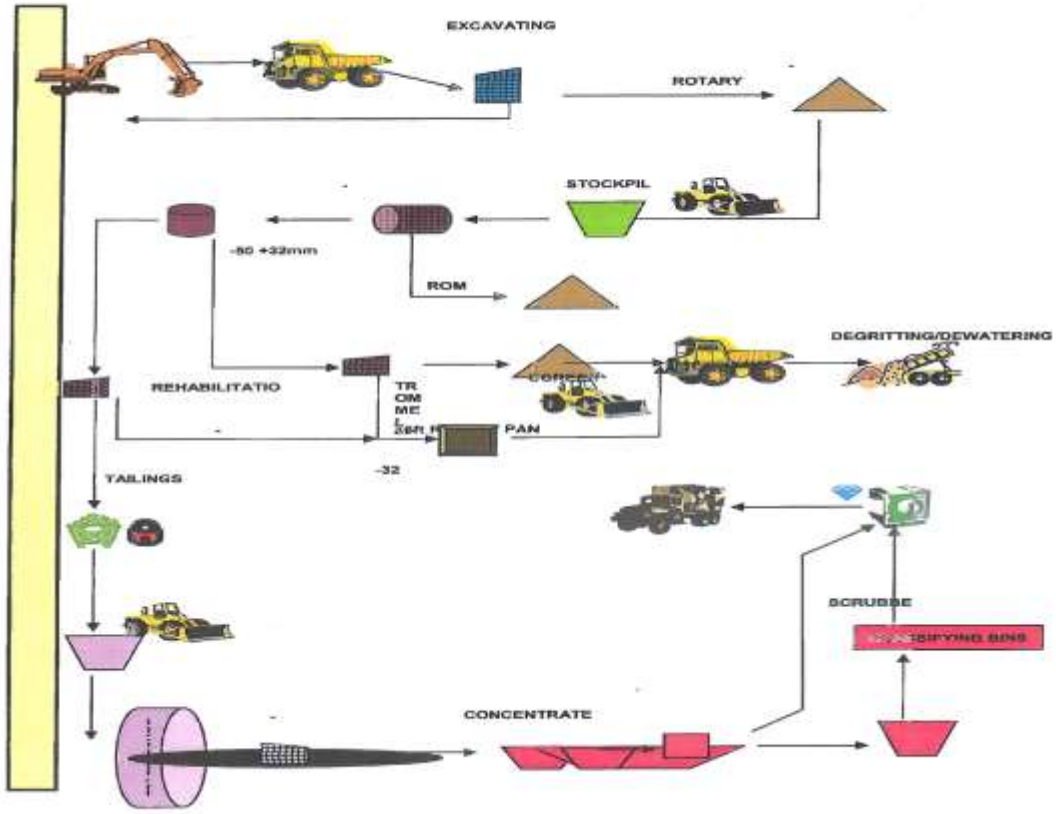


Figure 4: Schematic representation of the planned processing flow

(e) LEGISLATIVE AND POLICY CONTEXT

Policy and Legislative Context

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT (A description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process);	**REFERENCE WHERE APPLIED** **(i.e. Where in this document has it been explained how the development complies with and responds to the legislation and policy context)**	**HOW DOES THIS DEVELOPMENT COMPLY WITH AND RESPOND TO THE POLICY AND LEGISLATIVE CONTEXT** **(E.g In terms of the National Water Act:- Water Use Liscence has/has not been applied for).**
Mineral and Petroleum Resource Development Act; 2002 (Act No.28 of 2002)	A Prospecting Right application	A Prospecting Right has lodged been with the DMR Northern Cape Province
Mineral and Petroleum Resource Development Act; 2002 (Act No.28 of	A Prospecting Right Environmental Authorisation	In the process at DMR

2002)		
National Environmental Management Act, 1998(Act 107 of1998) NEMA	Section 28 of the National Environmental Management Act, Act No. 107 of 1998 required duty of care where reasonable measures are taken to prevent pollution or degradation from occurring, continuing or recurring, or, where this is not possible, to minimise and rectify pollution or degradation of the environment. Section 29 addresses the protection of workers refusing to do environmentally hazardous work. Section 30 addresses procedure to be followed in the event of emergency incident which may impact on the environment. Access to environmental information and protection of whistle blowers are addressed in Section 31.	Part of Environmental Management Programme
National Environmental Management Act, 1998 (Act 107 of1998) Environmental Impact Assessment Regulations,2014(G38282-2982-985)	GNR 983: 2014 Regulations promulgated in terms of NEMA, Act No.107 of 1998: GNR 982,983,984 and 985 Government Gazette No. 38282 Pretoria, in terms of Chapter 5 of the National Environmental Management Act, Act No 107 of 1998 (as amended), contain the EIA Regulations, as well as a schedule of activities that may have substantial detrimental effects on the environment and therefor required authorisation from the competent environmental authority.	In the process at DMR
National Environmental Management Act: Biodiversity Act, 2004 (Act 10 of 2004)	Reforms the law regulating waste management in order to protect health and the environment by providing reasonable measures for the prevention of pollution and ecological degradation and for securing ecologically sustainable development.	To take note of
National Water Act, 1998(Act36 of 1998)	In terms of the definitions contained in Section 1 of the National Water Act, Act No.36of 1998, a ‘water resource’ includes a watercourse, surface water, estuary or aquifer. “Aquifer” means a geological formation which has structures or textures that hold water or permit appreciable water movement though them. “Watercourse” means a river or spring; a natural channel in which water flows regularly or intermittently; a wetland, lake or dam into which,	In the process at DWS

	or from which, water flows; and any collection of water which the Minister may, by notice in the Gazette declare to be a watercourse, and a reference to a watercourse includes, where relevant, its bed and banks. The Minister of Water and Environmental Affairs is allowed to regulate activities which have a detrimental impact on water recourse by declaring them to be controlled activities. No person may undertake a controlled activity unless such person is authorised to do so by or under the Act. Duty of Care to prevent and remedy the effects of pollution to water recourse is addressed in Section 19. Section 20 address the procedure to be followed, as well as control of emergency incidents which may impact on a water resource. Recognised water uses are addressed in terms of section 21 and the requirements for registration of water uses are stipulated in Section 26 and 34.	
Environmental Conservation Amendment Act, 2003 (Act 50 of 2003) G26023	Section 25 of the Environmental Conservation Act, Act No 73 of 1989, as well as the National Noise Control Regulations GNR 154 dated 10 January 1992, regarding noise, vibration and shock, is applicable.	This is also legislated by Mine Health and Safety from DMR and will be adhered to.
National Environmental Management Act: Protected Areas Act, 2003 (Act 57 of 2003)	To provide for the management, conservation of protected areas of ecologically viable (natural landscapes and seascapes) areas in South Africa.	Take note
In terms of the National Heritage Resources Act, 1999 (Act No. 25 of 1999)	In terms of the National Heritage Resources Act, 1999 (Act No. 25 of 1999), any person who intends to undertake “any development or other activity which change the character of a site – exceeding 5000m3 in extent” and the “construction of a ….. Linear development or barrier exceeding 300m in length” must at the very earliest stages of initiating the development, notify the responsible heritage resources authority, viz, the South African Heritage Resources Agency and /or Department of Environment.	Consult SAHRA
Conservation of Agricultural Resources	Section 5 of the Conservation of Agricultural Resources Act, Act	Take note

Act, Act No 43 of 1983	No 43 of 1983, prohibits the spreading off weeds and Section 6 and Regulation 15 and 15E of GNR 1048 address the implementation of control measures for alien and invasive plant species. This aspect has been addressed in the Environmental Management Programme. This Act also make provision for the conservation of agricultural land.	
National Forest Act, 190 (Act No. 84 of 1998)	National Forest Act, 190 (Act No. 84 of 1998) and Regulations, Section 7: No person may cut, disturb, damage or destroy any indigenous , living tree in a natural forest, except in terms of a licence issued under Section 7(4) or Section 23: or an exemption from the provisions of this subsection published by the Minister in the Gazette. Sections 12 – 16 deal with protected trees, with the Minister having the power to declare a particular tree, a group of trees, a particular woodland, or trees belonging to a certain species, to be a protected tree, group of trees, woodlands or species. In terms of section 15, no person may cut, disturb, damage, destroy or remove any protected tree; or collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree, except under a licence granted by the Minister.	Take note
Subdivision of Agricultural Land Act, Act 70 of 1970	Control the subdivision, and in connection therewith, the use of agricultural land. It also control long term leases over agricultural land. The applicant needs to apply for consent from the Department of Agriculture for these leases.	Take note
Section 17 of the Fencing Act, Act No.31 of 1983	States that any person erecting a boundary fence may clean any bush along the line of the fence up to 1,5m on each side therefore and remove any tree standing in the immediate line of the fence. However, this provision must be read in conjunction with the environmental legal provisions relevant to protection of flora.	Take note
Section 8 of the Atmospheric Pollution Prevention Act, Act No.45 of 1965	Section 8 of the Atmospheric Pollution Prevention Act, Act No.45 of 1965 regulating controlled areas, as well as	Comply

	section 27, with regard to dust control is still applicable.	
The Occupational Health and Safety act, Act 85 of 1993 GNR 22810f 1987-10-16	Environmental Regulations for Workplaces are applicable.	Comply
The South African Civil Aviation Regulation Act, Act 13 of 2009.	Controls marking of structures that may influence aviation through the Civil Aviation Technical Standards, SA-CATS-AH 139.01.33 Obstacle Limitations and Markings outside Aerodrome or Heliports. It states that any structure exceeding 45m above ground level, or structures exceeds 150m above the MEAN ground level, like on top of a hill, the mean ground level considered to be the lowest point in a 3km radius around such structure. Structures lower than 45m, which are considered as a danger or a potential danger to aviation, shall be marked as such when specified. Overhead wires, cables, etc., crossing a river, valley or major roads shall be marked and in addition, their supporting towers marked and lighted if an aeronautical study indicate that it constitute a hazard to aircraft.	Take note

(f) NEED AND DESIRABILITY OF THE PROPOSED ACTIVITIES

The study area alluvial diamond gravel sources. This prospecting program seeks to quantify these sources through bulk sampling and prove it to be economically viable. The prospecting operation would provide much needed employment to the local communities of the Marydale, Prieska and Griquatown area.

Desirability of the Project:

- Creation of employment opportunities to the Koegas community in the mining sector
- The availability of bursaries, internships and training programs that would impact on the employment opportunities of the youth if proceeded with the mining right application with reference to the Social and Labour Plan.
- BEE suppliers of consumables to the projects
- Engagement of women in mining
- Ensure the optimal use of mining resources
- Improve the lack of entrepreneurship
- Underutilization of the regions natural resources and economic opportunities
- Lack of investment in the region

Positive impact of the prospecting activities include:

- ✓ Employment through the life of mine;
- ✓ Skills transfer of employees through training which will be used after the end of life span of the mine; and
- ✓ Poverty Eradication through income

The preferred site on the farm will have the least disturbance and risk to the environment, minimal impact to adjacent farmers and taking into account all biological, and possible archaeological and water sources destruction and contamination.

(h) DESCRIPTION OF PROCESS TO REACH THE PROPOSED PREFERRED ACTIVITY, SITE AND LOCATION .

The decision on the activity is based on the fact that the study area has alluvial diamond bearing gravels which could be economically exploited. The reason for this prospecting program is to quantify the diamond resource and establish the quality thereof.

The diamond gravel sources is site specific and no alternative to its location exists.

The following factors were considered for the infrastructure location on-site

Weighing Factors	Impact	Preferred Site	Any Alternative
Proximity of neighbouring farms	Noise and Dust, Visibility.	✓	✓
Rehabilitation	The most effective and efficient rehabilitation program	✓	
Definition of the infrastructure in relation to the prospecting resource	Destruction of Fauna and Flora when developing mine and access roads and plant with other complimentary infrastructure.	✓	
Fauna and Flora	Destruction	✓	
Water supply infrastructure	Any boreholes	✓	
Noise	Noise pollution	✓	✓
Orange River	Contamination	✓	✓
Dust (Wind Regime)	Air Quality	✓	✓
Visibility	Poor view from distance		
Landowner input	Land capability after mining	✓	
Koegas Community (Residential area-currently abandoned)	Socio-Economic and Cultural impact	✓	
Topography	Erosion factors	✓	
Geology	Sterilization of mining resource	✓	
Soil	Contamination and erosion	✓	✓
Surface Water	Contamination of canal	✓	
Ground Water	Contamination	Not Known	Not Known
Sensitive Landscape	Destruction	✓	✓
Land Capability	Pre and Post land use	✓	✓

(i) An alternative site was not identified as the diamond gravel resource is site specific
No alternatives to the placement of infrastructure were considered taking into account the factors under h above, and the following negative impacts:

- An additional 2.8 ha be cleared for roads with the destruction to fauna and flora
- Noise and dust impact to the adjacent farmer in terms of his residence
- Greater impact to the current land use which is livestock farming
- Extensive are to be cleared for a water pipeline
- Sterilization of a portion of the diamond resource
- Contamination to surface water due to the general topography and slope of the farm

- Viability of the project in terms of infrastructure, water sources, on-mine roads and distances, product transport cost, rehabilitation and closure program.
- The existence of an asbestos rehabilitated area on the adjacent farms, Rietfontein 11

(ii) PUBLIC PARTICIPATION PROCESS

The following process for public participation was undertaken:

(1) ADVERTISEMENT

An advert was place in a local newspaper, Diamond Fields Advertiser as invitation to Interested and Affected parties to register on the application database. The advertisement was placed on the 3rd August 2018.

GALS

Park, Kimberley, who died on 7 December 2016.
Estate No 2157/2017
Creditors and debtors in the abovementioned Estate are requested to lodge their claims and to settle their accounts at the undermentioned within 30 (thirty) days from 3 August 2018.
ROUX WELGEMOED & DU PLOOY ATTORNEYS, Attorneys for Executrix, 14 Stead Street, Kimberley 8301. Tel (053)833-1436
Ref DU PLOOY/Leona/SV0009

ELLIOTT MARIS WILMANS & HAY

In the Estate of the late PETRUS MZINYATI, identity number 310325 5130 089, of 11 Phala Street, Galeshewe, Kimberley, who died on 27 September 2017.
Estate No 2094/2018
All persons having claims against the above-mentioned Estate are required to lodge their claims with the undersigned Attorneys within 30 days after the death of publication hereof.
ELLIOTT MARIS WILMANS & HAY ATTORNEYS, PO Box 179, Cheapside, Kimberley, 8300.
Ref: PIENAAR/S493

Estate No 693/2016
The First and Final Liquidation and Distribution Account in the above Estate will lie for inspection at the offices of the Master of the High Court, Sol Plaatje Avenue, Kimberley, for a period of 21 (twenty one) days from the date of publication hereof. Dated at Kimberley on 3 August 2018.
ENGELSMAN, MAGABANE INC, Attorneys for Executor, PO Box 609, Kimberley, 8300.

In the Estate of the late DESMOND RAYMOND JAMES BROWN, identity number 481205 5054 088, and surviving spouse Joyce Brown, identity number 520212 0094 088, of 11 Maude Street, Kimberley.
Estate No 2570/2010
The Supplementary First and Final Liquidation and Distribution Account in the above Estate will lie open for inspection at the office of the Master of the High Court, Kimberley for a period of 21 (twenty one) days from the date of publication.
HPA VENTER, Attorney for Executor, Duncan & Rothman, PO Box 64, Kimberley, 8300.
Ref: HVjm/Brot47/0002

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053 832 6261

Estate will lie for inspection of all persons with an interest therein at the offices of the Master of the High Court, Kimberley, for a period of 21 days from the date of publication hereof, namely 3 August 2018.
HUGO, MATHEWSON & OOSTHUIZEN INC, Attorneys for the Executor, Reuben Mooketsi Williams. 3A Bean Street, Kimberley, 8301. PO Box 169, Kimberley, 8300. Tel (053) 831-3221, Fax (053) 832-7471. E-mail: elaw@telkosanet.
Ref: AMATHIma/SOL31/0001

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EIA PUBLIC PARTICIPATION PROCESS

AUTUMN SKIES TRADING 689, has in terms of the Mineral and Petroleum Resources Development Act, 2002 (Act 28 of 2002 as amended), the National Environmental Act, 1998 (Act 107 of 1998 as amended), lodged an application for a Prospecting Right with the Department of Mineral Resources, Northern Cape Region, on farms Koegas 324 and Hounslow, situated in the administrative district of Hay, Northern Cape. DMR Reference: NC 30/5/1/1/2/12212 PR

Listed Activities:
GNR 327 Listed Notice 1, Activity 20
GNR 325 Listed Notice 2, Activity 19
GNR 327 Listed Notice 1 Activity 27

Minerals: Alluvial Diamonds

Reports available at Griquatown Library for 30 days:

Draft Scoping Report, Draft Environmental Impact Report and Environmental Management Programme from **8 August 2018.**

All interested and/or affected parties are hereby invited to register on the application database (goliathmalcolm@yahoo.com), or lodge any complaints in writing to: MA Goliath, 23 Goedehoop Avenue, Royldene, Kimberley, 8301.

excellent, but nothing is
Ten percent of the purchase pric
with Value Added Tax thereon,
cable and Auctioneer's charge
with Value Added Tax on such
payable in cash on the date of
balance of the purchase price fo
Value Added Tax on such bala
applicable, against transfer to
by an acceptable guarantee.
TAKE FURTHER NOTICE THAT:
This is a sale in execution pu
judgment obtained in the above
rules of this auction are availab
foregoing the sale at the office
riff of the High Court, 39 Holland
Park, Kimberley, Province of th
Cape.
Registration as a buyer, subjec
conditions, is required, ie:
1. Directions of the Consume
Act 68 of 2008 (obtainable a
http://www.kmtc.gov.za/view/DownloadFile
2. Fica-legislation in respect of
address particulars.
3. Payment of registration mon
4. Registration conditions.
The Conditions of Sale may b
during office hours at the office
iff of the High Court, 39 Holland
Park, Kimberley and will be rea
diately prior to the sale.
The aution will be conducted b
Mpe.
All bidders are required to p
identity documents together wi
of residance for FICA compliar
All bidders are required to pay
(refundable) registration fee
commencement of the auctio
obtain a buyer's card.
Advertising costs at current pu
iffs and sale costs according t
will apply.
Dated at Kimberley on this 28t
2018.
Pla
Office 69, Suite 1, 1st Floor
North Cape Mall
31 Jacobus Smit Street
Royldene
Kimberley
(Ref: A BOTHA/sdw/NED2/0501)

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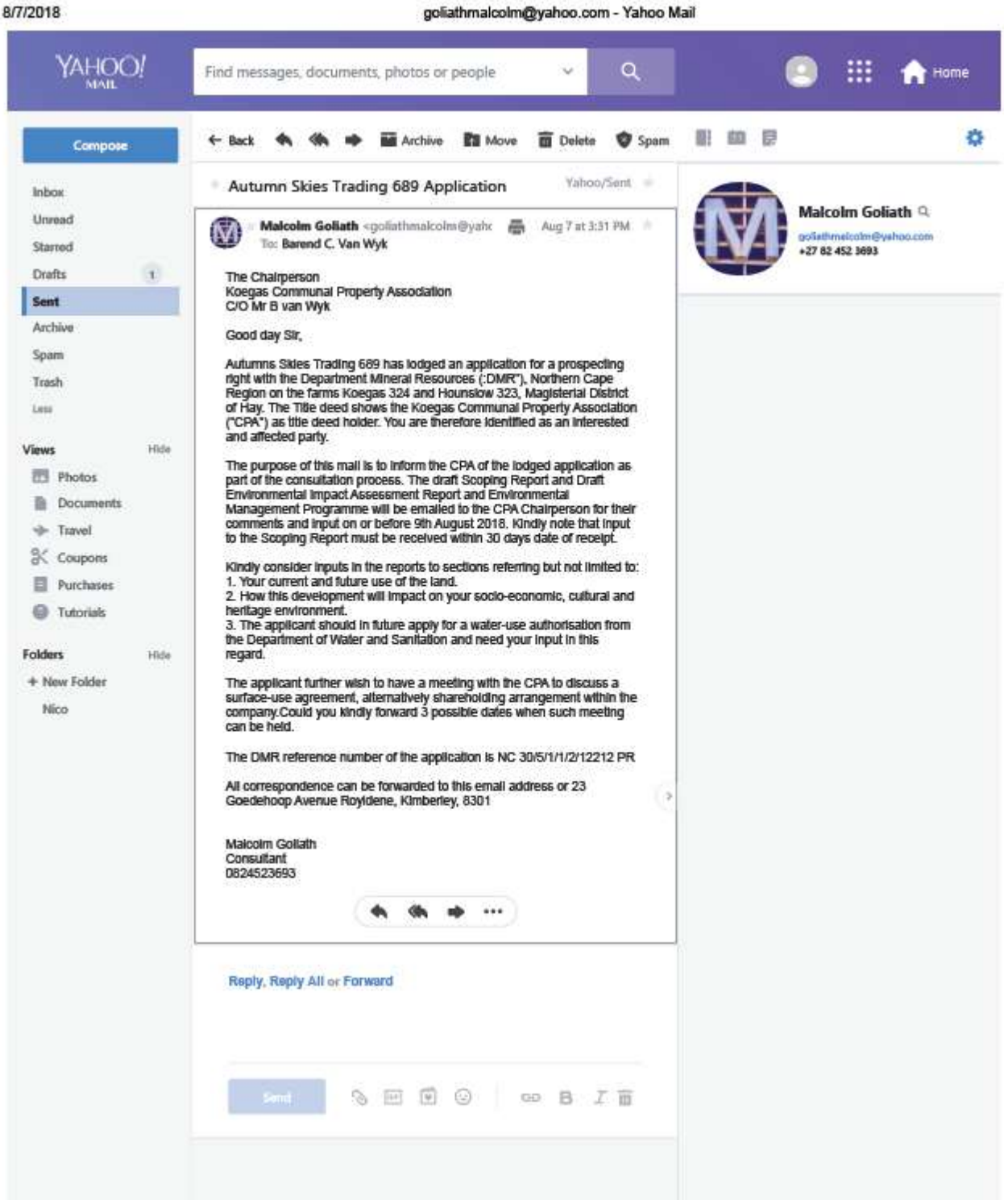
(2) KOEGAS COMMUNAL PROPERTY ASSOCIATION

Consultation with the Koegas Communal Property Association (Title holder) is on-going as the CPA members don't reside on the property. Email that was send to the chairperson Mr B van Wyk is attached. 7th August 2018


8/7/2018 goliathmalcolm@yahoo.com - Yahoo Mail

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Autumn Skies Trading 689 Application — Yahoo/Sent

Malcolm Goliath <goliathmalcolm@yahc — Aug 7 at 3:31 PM
To: Barend C. Van Wyk

The Chairperson
Koegas Communal Property Association
C/O Mr B van Wyk

Good day Sir,

Autumns Skies Trading 689 has lodged an application for a prospecting right with the Department Mineral Resources (:DMR"), Northern Cape Region on the farms Koegas 324 and Hounslow 323, Magisterial District of Hay. The Title deed shows the Koegas Communal Property Association ("CPA") as title deed holder. You are therefore identified as an interested and affected party.

The purpose of this mail is to inform the CPA of the lodged application as part of the consultation process. The draft Scoping Report and Draft Environmental Impact Assessment Report and Environmental Management Programme will be emailed to the CPA Chairperson for their comments and input on or before 9th August 2018. Kindly note that input to the Scoping Report must be received within 30 days date of receipt.

Kindly consider inputs in the reports to sections referring but not limited to:
1. Your current and future use of the land.
2. How this development will impact on your socio-economic, cultural and heritage environment.
3. The applicant should in future apply for a water-use authorisation from the Department of Water and Sanitation and need your input in this regard.

The applicant further wish to have a meeting with the CPA to discuss a surface-use agreement, alternatively shareholding arrangement within the company.Could you kindly forward 3 possible dates when such meeting can be held.

The DMR reference number of the application is NC 30/5/1/1/2/12212 PR

All correspondence can be forwarded to this email address or 23 Goedehoop Avenue Royldene, Kimberley, 8301

Malcolm Goliath
Consultant
0824523693

Reply, Reply All or Forward

Send

Malcolm Goliath
goliathmalcolm@yahoo.com
+27 82 452 3693

(3)PUBLIC NOTICE BOARD

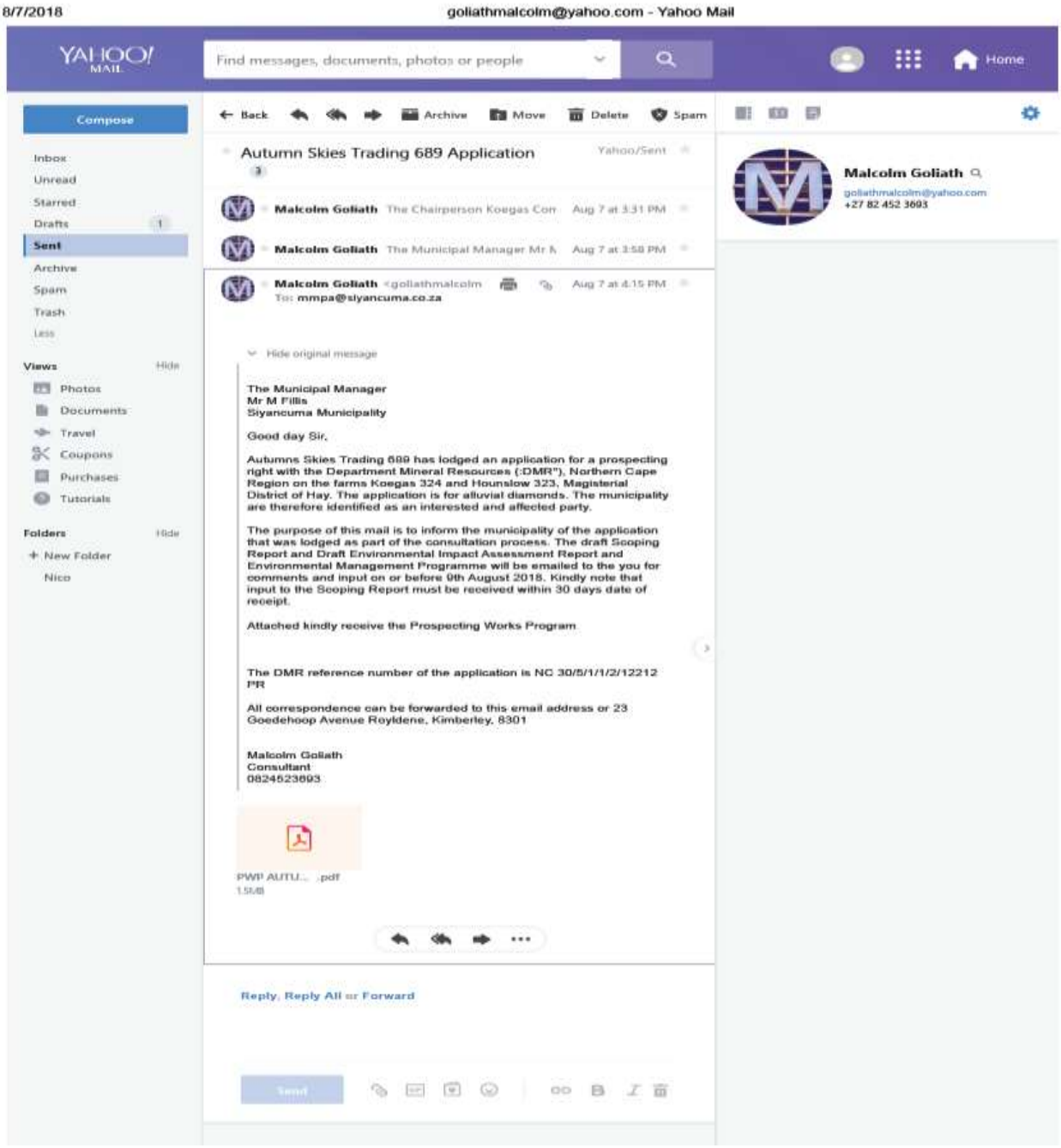
A Board of dimension 60cm x 42cm was placed on the farm gate of Hounslow 323 and on the bridge on the side of the portion of Farm Koegas 324 on the 10th August 2018.

Hounslow Gate

Bridge on Site of Farm Koegas

(4) SIYANCUMA LOCAL MUNICIPALITY

Email of the Prospecting Work Programme forwarded to the Municipal Manager Mr Fillis on the 7th August 2018.



DRAFT SCOPING REPORT will be forwarded to the Municipal Manager Mr Fillis on 25th August 2018.

(5) Government Departments

Department Water and Sanitation
Department: Environment and Agriculture
Department: Agriculture Land Reform and Rural Development.

DRAFT SCOPING REPORT will be forwarded by email on 25th August 2018.
. Commission for Land Restitution

M A GOLIATH
23 GOEDEHOOP AVENUE
ROYLDENE
KIMBERLEY
8301

goliathmalcolm@yahoo.com
15 August 2018

THE LAND CLAIMS COMMISSIONER
Northern Cape Province
BY email

Dear Sir/Madam

RE: DEPARTMENT MINERAL RESOURCES APPLICATIONS

Applications has been lodged in terms of section 16 of the Mineral and Petroleum Resources Development Act, 2002 (Act 28 of 2002), for a Mining Permits or Prospecting Right with The Department of Mineral Resources, Northern Cape Region on the following farms:

1. Koegas 324 and Hounslow 323**, ADMINISTRATIVE DISTRICT of HAY, DEPARTMENT MINERAL RESOURCES REFERENCE NUMBER** NC 30/5/1/1/2/12212 PR

2. Nek 106, Portion 1 Cairntoul 189, Remainder /Extent Cairntoul 189, **ADMINISTRATIVE DISTRICT of HAY, DEPARTMENT MINERAL RESOURCES REFERENCE NUMBER** NC 30/5/1/1/2/12046 PR

3. A Portion of Portion 10 of the farm Dorstfontein 77, **MAGISTERIAL DISTRICT of KIMBERLEY, DEPARTMENT MINERAL RESOURCES REFERENCE NUMBER** NC 30/5/1/3/2/10697 MP

4. Portion 4 of farm Klipdam 157*,* **MAGISTERIAL DISTRICT of BARKLY WEST, DEPARTMENT MINERAL RESOURCES REFERENCE NUMBER** NC 30/5/1/1/2/12178 PR

5. A Portion of ERF 12956 and Erf 135607 **MAGISTERIAL DISTRICT of KIMBERLEY (**Application not yet lodged)

Could you kindly inform if any land restitution claim has been lodged with your Commission either by email address (goliathmalcolm@yahoo.com) or postal address 23 Goedehoop Avenue, Royldene, Kimberley, 8301.

Kind Regards

M A Goliath
Project Consultant

(6) Mc GREGOR MUSEUM
DRAFT SCOPING REPORT will be forwarded by email on 25th August 2018.

(7) SAHRA
DRAFT SCOPING REPORT will be forwarded to SAHRA on 25th August 2018.

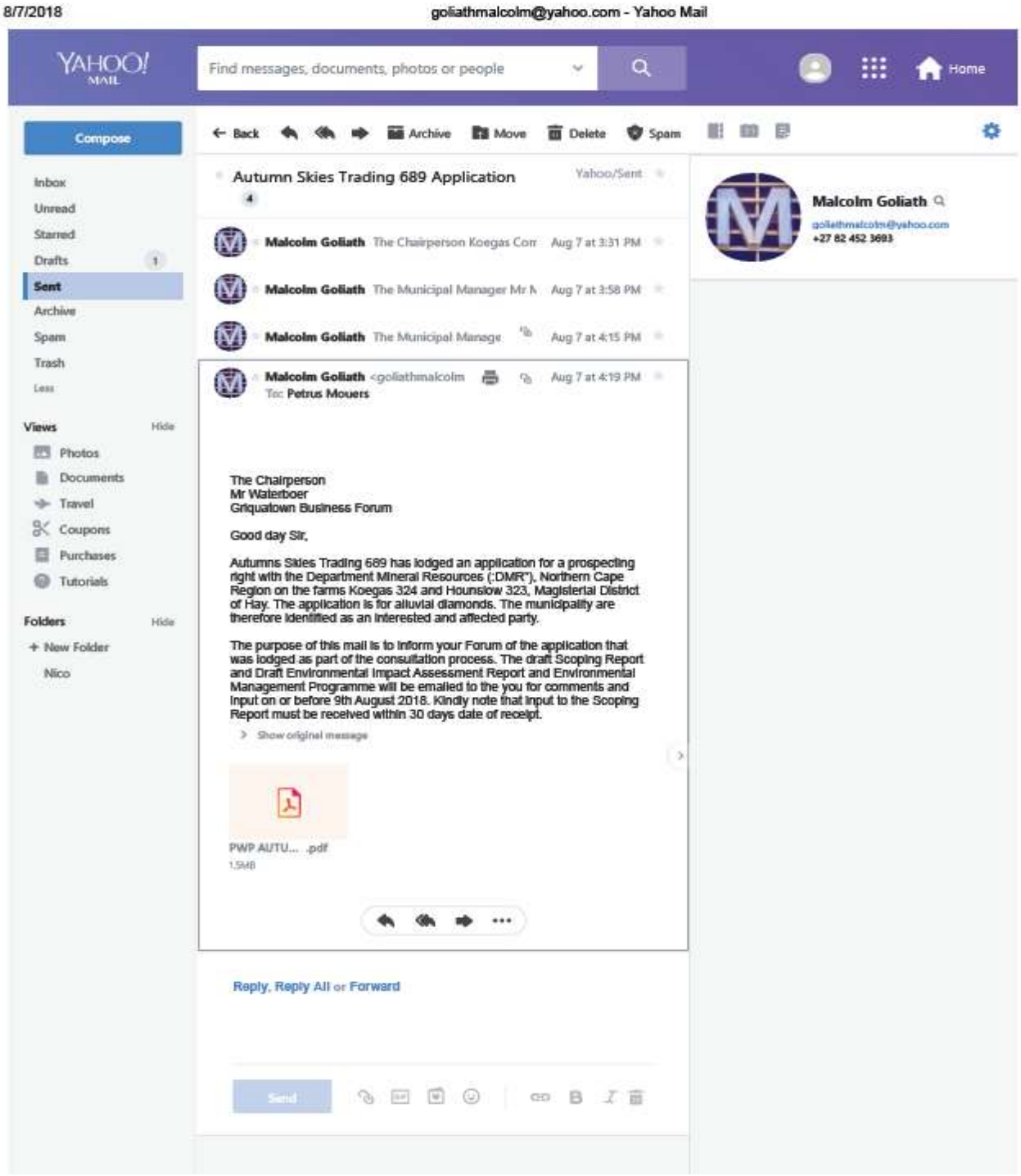
(8) GRIQUATOWN LIBRARY
DRAFT SCOPING REPORT, THE ENVIRNMENTAL IMPACT ASSESSMENT REPORT AND ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT PLACED AT THE GRIQUATOWN LIBRARY ON 8TH AUGUST 2018

PUBLIC PARTICIPATION BOARD PLACED AT THE GRIQAUTOWN LIBRARY ON 8th AUGUST 2018

(9) DEPARMENT MINERAL RESOURCES
By SAMRAD 27th August 2018

(10) GRIQUTOWN BUSSINESS FORUM

Email of the Prospecting Work programme send to the Chairperson of the Forum on 8th August 2018.



DRAFT SCOPING REPORT WILL BE SEND BY EMAIL ON 25TH AUGUST 2018

SUMMARY OF ISSUES RAISED BY INTERESTED AND AFFECTED PARTIES
None Received as at 25th August 2018

(iv) ENVIRONMENTAL ATTRIBUTES

1. GEOGRAPHY, HISTORY AND ECONOMY

Area: 14725km²

Description: The Siyathemba Local Municipality is a Category B municipality situated within the Pixley Ka Seme District of the Northern Cape Province. It is one of the eight municipalities in the district. The municipality was established as a result of the Local Government Municipal Structures Act of 1998 on 22 September 2000.

Initially it was established as 'Primanday', which was a combination of the names Prieska, Marydale and Niekerkshoop. However, this was not an acceptable solution and on the 25th June 2001, as a result of a Council decision and Provincial Government notice 22/2001, became Siyathemba. The meaning of Siyathemba is 'we hope'.

Prieska was originally named Prieschap, a Koranna word meaning 'place of the lost she-goat', and used to be a fording place for travellers over the Orange River. Known to the locals as 'the gem of the Northern Cape', Prieska is the seat of the municipality and is located on the hills of the Doring Mountains on the southern banks of the Orange River. Prieska's infrastructure is impressive – it has Eskom power; an abundant water supply from the Orange River, with the Gariep and the Vanderkloof Dams on the upstream side of the river; easy access to the main railway line to Namibia; good tarred road linkage with Kimberley, Upington and De Aar; two landing strips for light aircraft; and complete and reasonably inexpensive industrial stands, with or without siding facilities. Industrial activities include: grain silos; a cotton mill; a bakery; manufacture of furniture, built-in cupboards; cattle fodder pellets; and a tiger's eye processing plant.

Niekerkshoop is attractively placed between hills, and large trees shade the streets. There is no domestic water supply but irrigation water is supplied by a spring to the north of the town. On the north-west side of Marydale is a rich underground water source, and the main means of water supply is by borehole and wind pumps. It depends mainly onsheep farming.

Cities/Towns: Copperton, Marydale, Niekerkshoop, Prieska

Main Economic Sectors: Government services (28.9%), financial services (23.8%), agriculture (16.4%).

2. MAP

Geology

In Griqualand West the succession can be broadly subdivided into a basal, chemical sedimentary unit, referred to as the Ghaap Group, which is overlain by a mixed volcanic-clastic-chemical sequence, known as the Postmasburg Group (Table 1). The Ghaap and Postmasburg Groups represent two separate, major unconformity-bounded sequences (Cheney and Winter, 1995).

According to Beukes (1983 and 1987), deposition of the Transvaal sequence in Griqualand West took place on a continental margin or trailing edge and was controlled by three tectonic-sedimentary elements:

- A shallow water platform on the Kaapvaal Craton.
- A platform edge (shelf margin) located parallel to the Griquatown fault zone (A growth fault across which there are a number of facies changes).
- A deep basin along the western margin of the Kaapvaal Craton (Fig2).

SUPER-GROUP	GROUP	SUB-GROUP	FORMATION		MAJOR LITHOLOGY	APPROX. THICNESS in m.
TRANSVAAL	OLIFANTS-HOEK	VOLOP	VERWATER GLEN LYON — ELLIES RUS FULLER		Grey quartzite Brown quartzite — Grey quartzite Brown quartzite	3500
			HARTLEY		Andesitic lava	700
			LUCKNOW		Purple and white quartzite	450
			MAPEDI		Shale, quartzite, lava Basal iron-rich conglomerate	10–1500
	POSTMAS-BURG	VOËL-WATER	MOOIDRAAI	Laterally into	Dolomite, chert,	250
			HOTAZEL	BEAUMONT	Iron-formation, manganese, lava	
			ONGELUK		Andesitic lava	900
			MAKGANYENE		Diamictite	50–150
	GHAAP	KOM-GAS	ROOINEKKE & NELANI		Iron-formation, shale	300
	OLIFANTS-HOEK		GAMAGARA (Correlative of Mapedi)		Quartzite and shale, basal iron-rich conglomerate	290
TRANSVAAL	GHAAP		MANGANORE* Correlative of Asbesheuwels		Iron-formation and iron ore	0–200
			WOLHAARKOP* Solution collapse breccia		Siliceous chert breccia	
		KOEGAS	ROOINEKKE		Iron-formation	100
			NARAGAS		Quartz wacke, shale	240–600
			KWAKWAS		Riebeckitic slate	
			DORADALE		Iron-formation	
			PANNETJIE		Quartz wacke, shale	
		ASBES-HEUWELS	GRIQUATOWN		Clastic-textured iron-formation	200–300
			KURUMAN* * On Maremane dome Manganore and Wolhaarkop		Microbanded iron-formation	150–750
		CAMPBELLRAND	GAMOHAAN	Laterally into NAUTE and NARAGAS	Sparry limestone, shale	1500–1700
			KOGELBEEN		Dolomite, limestone	
			KLIPPAN		Cherty dolomite	
			PAPKUIL		Dolomite	
			KLIPFONTEIN-HEUWEL		Cherty dolomite	
			FAIRFIELD		Sparry dolomite	
			REIVILO		Micritic dolomite	
			MONTEVILLE		Dolomite, limestone, shale	
		SCHMIDTS-DRIF	LOKAMMONA		Shale	10–250
			BOOMPLAAS		Dolomite, limestone, shale	
			VRYBURG		Quartzite, shale, lava	

Table 1: TRANSVAAL SUPER GROUP STRATIGRAPHY (after Beukes and Smit, 1987a, as amended by Hälbich et al.,1993)

2. THE GHAAP GROUP

The Ghaap Group is subdivided, from the base upward, into the Schmidtsdrif Subgroup (interbedded siliclastics and carbonates), The Campbellrand Subgroup (carbonates), the Asbesheuwel Subgroup (iron formation) and the Koegas Subgroup (interbedded siliclastics and iron formations) (Table1 and Fig. 1).
Carbonates from the Schmidtsdrif Subgroup have been dated at 2557 ± 49 Ma by Pb-Pb method (Jahn et al, 1990). The lower Asbesheuwel Subgroup (Kuruman Iron Formation) has been dated at 2432 ± 31 Ma using single zircons from ash beds (Trendall et al, 1990).

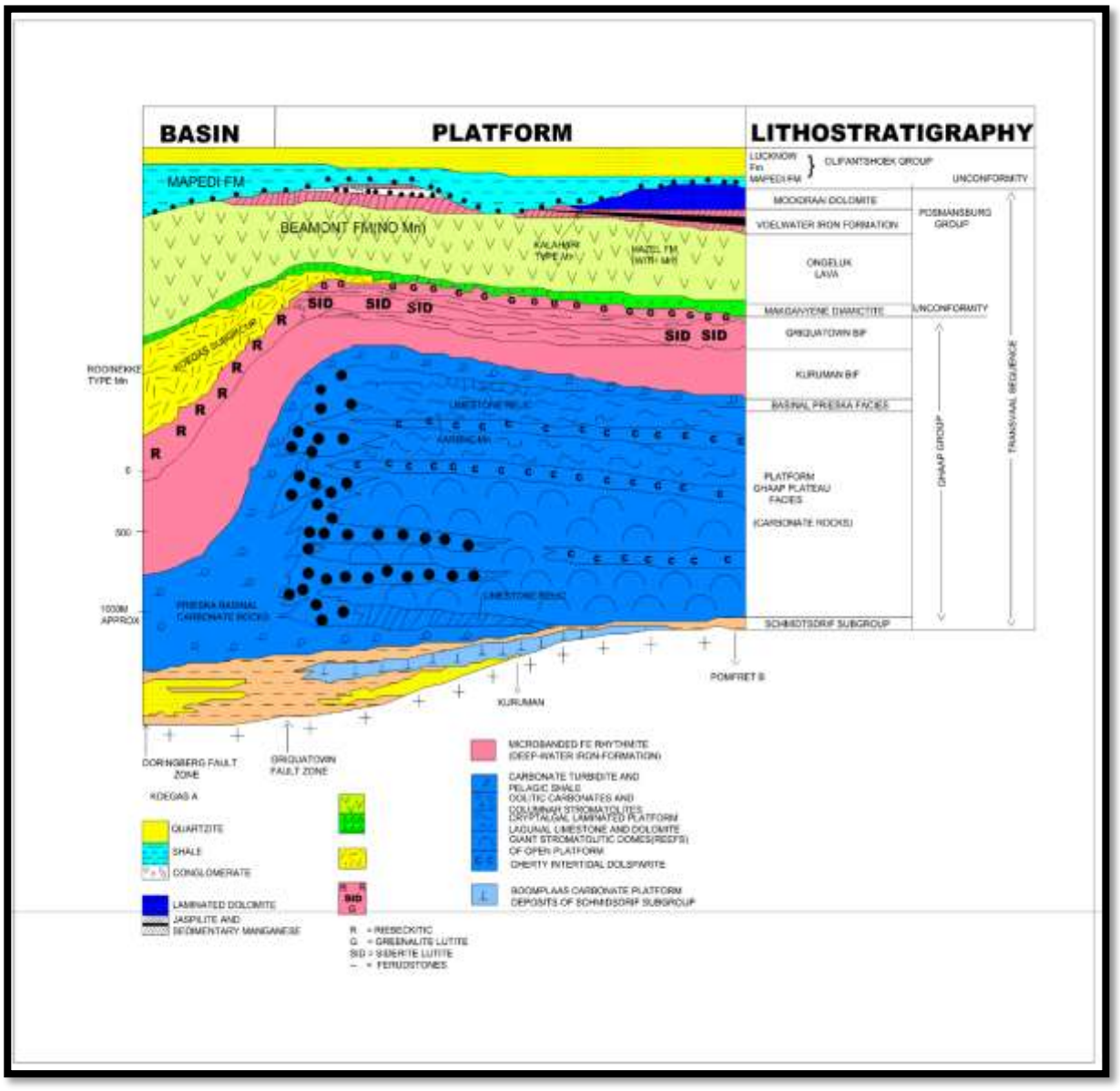


Fig.2 North-south section illustrating the relationships of the stratigraphic and sedimentological facies in the Transvaal Supergroup of Griqualand West.

2.1 The Schmidtsdrif Subgroup

The basal Schmidtsdrif Subgroup comprises fluvially deposited feldspatic quartz arenites, shallow marine and intertidal quartz arenites as well as a plat formal carbonate sequence (Beukes, 1979).

2.2 The Campbellrand Subgroup

The Campbellrand Subgroup consists of stromaolitic dolomite and limestone platform facies, which interfingers down slope with carbonate turbidites (Fig. 4). The turbidites have been ankerized and silicified to form banded ferruginous chert. Toward the south the turbidites interfinger with carbonaceous shale (Prieska facies), which, according to Beukes, relates to deposition within an euxinic basin, in front of the carbonate platform.

2.3 The Asbesheuwel Subgroup

Shallow water carbonate deposition was terminated during a major transgression, which drowned the shelf, resulting in a fairly sudden transition from carbonates through cherts and into the banded iron formation of the Asbesheuwel Subgroup (Fig. 2).

Beukes, 1978 subdivided the Asbesheuwel Subgroup into the Kuruman Iron Formation at the base followed by the Griquatown Iron Formation at the top (Table 1). According to Beukes the Kuruman Iron Formation was deposited within a deep shelf setting over the entire Kaapvaal Craton. It comprises an upward-shallowing sequence consisting of carbonaceous shale deposited in an euxinic basin, ankerite-banded chert, representing distal carbonate turbidites which was deposited in a transition zone, between the euxinic basin and the open shelf. Magnetite-hematite-chert micro banded rhythmite macrocycles containing interbedded stilpnomelane band- lutites, were deposited on the deep open shelf, while greenalite-siderite rhythmites mark the toe-of-slope and slope areas of a shallow water platform. The Ouplaas Member, which marks the top of the Kuruman Iron Formation, represents a clastic-textured shallow-water platform deposit (Beukes, 1983 and 1984).

The Griquatown Iron Formation overlies the Kuruman Iron Formation and consists of upward coarsening megacycles, deposited in environments that vary from low energy, subtidal to high energy, intertidal and lagoonal settings.

2.4 The Koegas Subgroup

The Koegas Subgroup was only deposited down slope and within the deeper part of the basin toward the south (Prieska area) and is absent toward the north (Sishen) (Fig. 4). The Koegas Subgroup was deposited during a transgressional phase and comprises a quartz-chlorite-mudstone unit at the base followed upward by iron formations with interbedded quartz-wackes, with more iron formations, containing interbedded carbonates toward the top. The Koegas Subgroup was subdivided by Beukes; (1978), from the base upward into the following formations :

- Pannetjie Formation: Quartz-chloritic mudstone.
- Dorasdale Formation: Iron-lutites.
- Kwakwas Formation: Greenalite-lutites and interbedded quartz-wackes.
- Naragas Formation: Mudstones and carbonates.
- Rooinekke Formation: Iron band-lutites.
- Nelani Formation: Mudstones with interbedded limestone, chert and grit beds.

3. STRUCTURAL GEOLOGY

Deposition of the early Proterozoic sequence in Griqualand West took place along the western margin of the Kaapvaal Craton.Alterman and Halbich (1990 and 1991) recognized an early phase of thrusting within the Asbesheuwel Formation, pre-dating the deposition of the Makganyene Diamictite. This D_1 thrust is between 2500 and 2240 Ma in age and possibly initiated N-S trending F_1 folds in its hanging-wall, extending from Kuruman to Prieska. (Figs. 9 and 9A). The eastward convex shape of these F_1 axial traces around the Maremane double plunging anticline, is seen as part of this deformational phase (Alterman and Halbich 1990 and 1991).

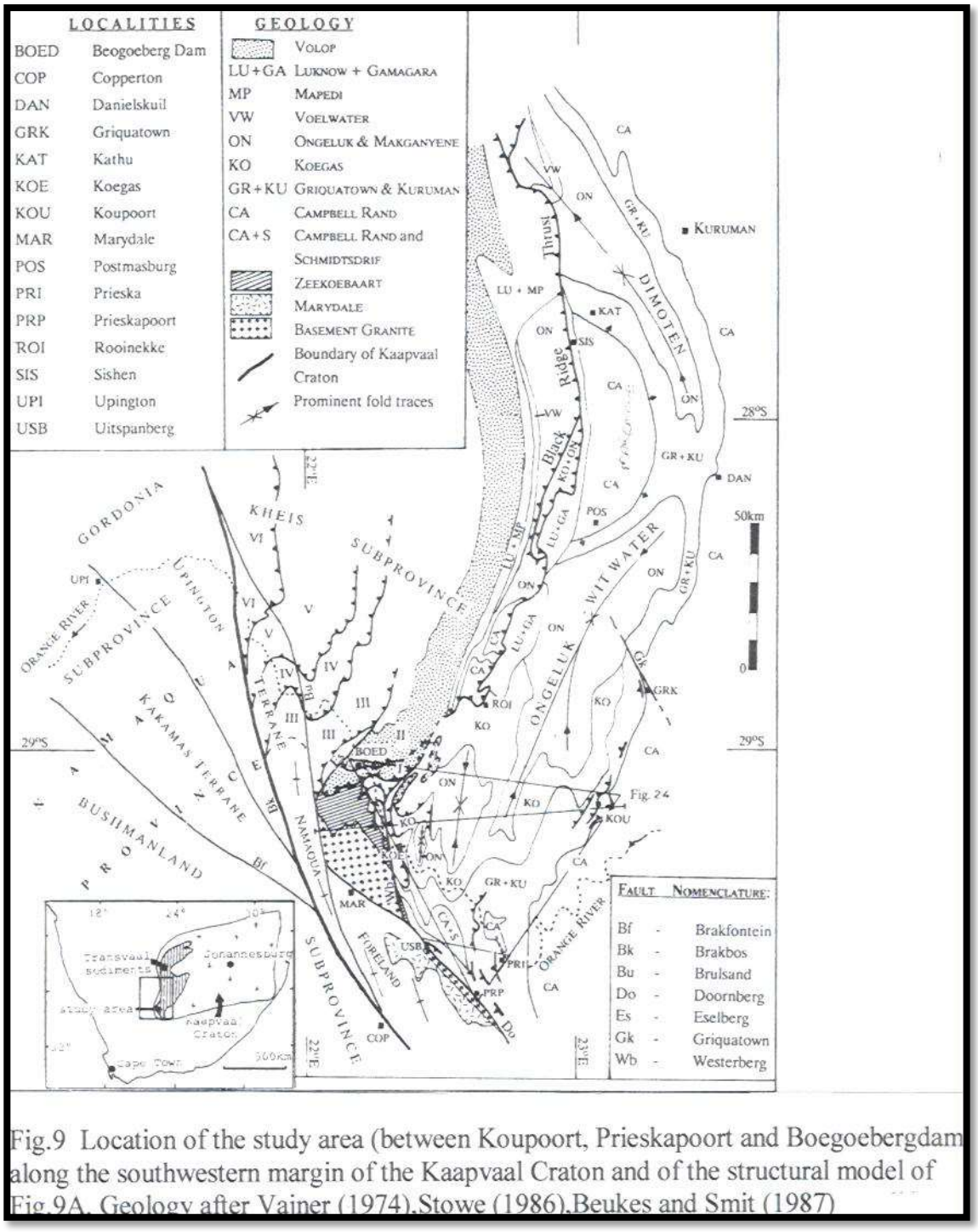
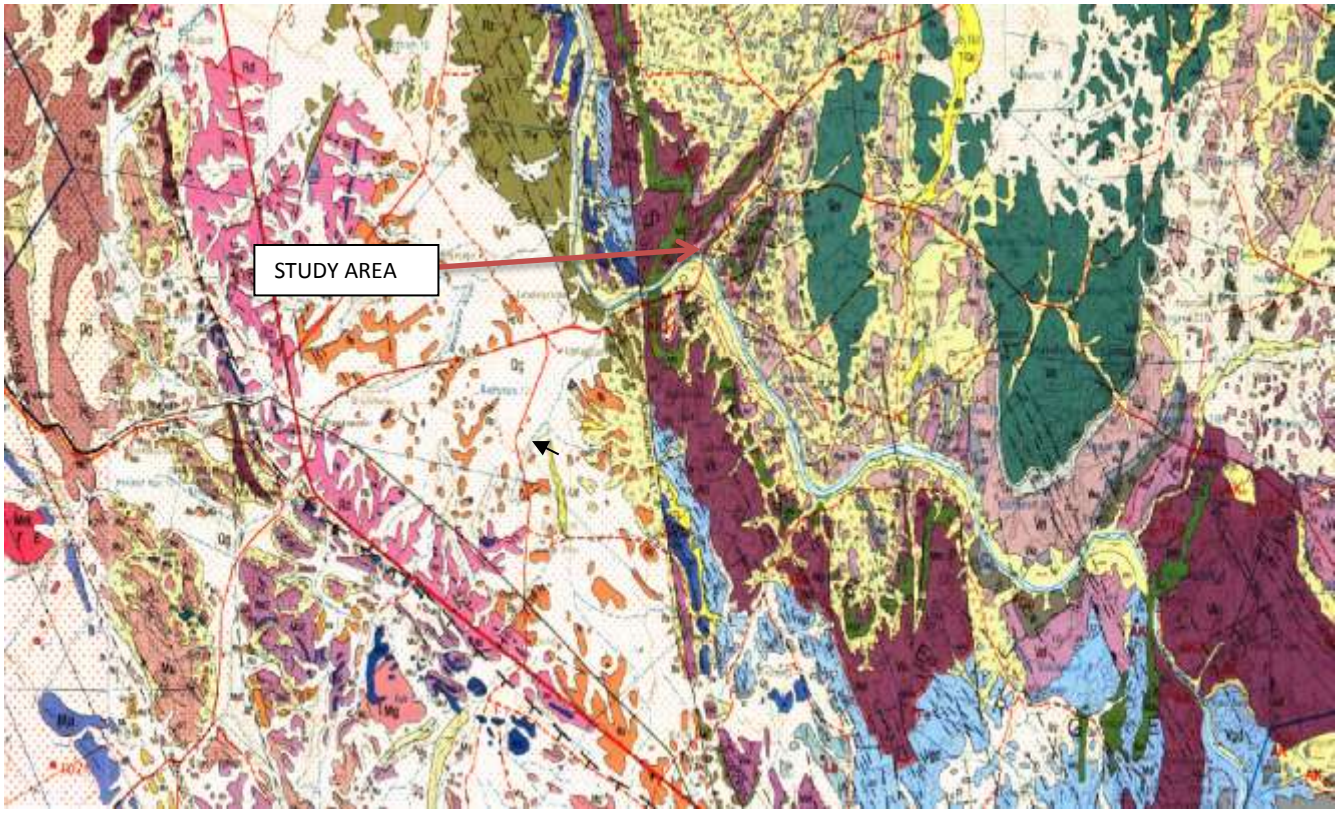


Fig.9 Location of the study area (between Koupoort, Prieskapoort and Boegoebergdam along the southwestern margin of the Kaapvaal Craton and of the structural model of Fig.9A. Geology after Vainer (1974),Stowe (1986),Beukes and Smit (1987)

Diamonds were laid down during the Tertiary Epoch (dd 60 million years), together with unconsolidated fragmental matter of rocks carried downstream by the river flow. These deposits or alluvial fans may overlay any of the formations of the Ghaap Group and Ongeluk lavas. The gravels my also consist of disentegrated rock material which was moved from its original site and are foreign to the area.

The locality of these fans will very much depend on the migration of divide, palaeo and current erosion cycles and the density of the rock material transported by water.

GEOLOGICAL MAP

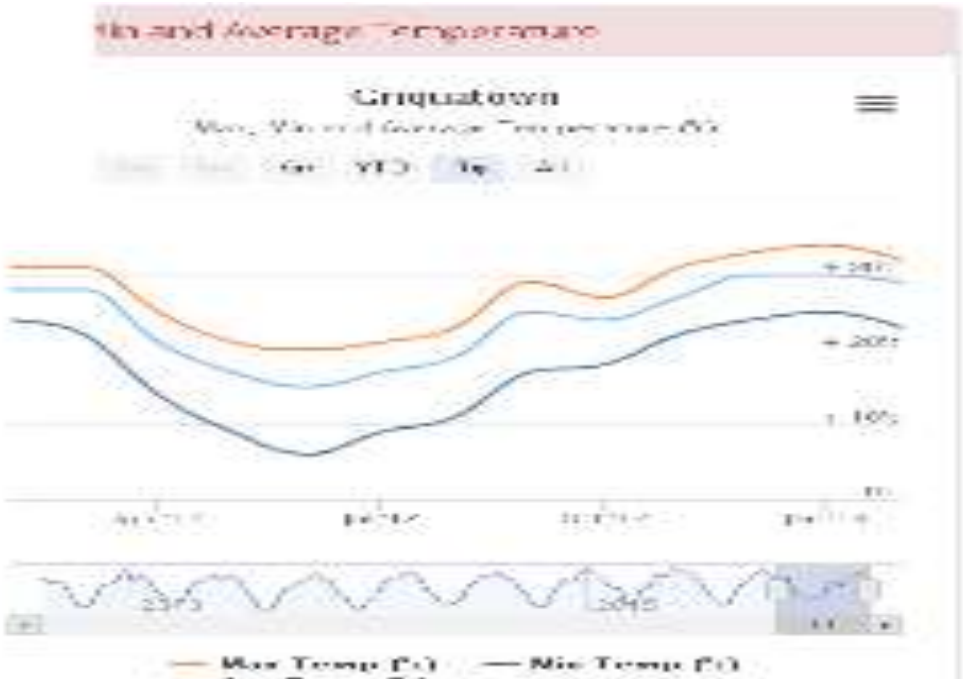


CLIMATIC CONDITIONS

The study area is located within an area referred to as “low rainfall gravel plains” (Smith, 2000 and Van Wyk *et al.,* 2001 as cited by Mucina & Rutherford, 2006). Rainfall occurs mainly during the summer months, with an average rainfaill of 250-500mm.The area is characterized by cold winters and hot summers with temperatures varying from between 8^{0}C in winter and 42^{0}C in summer, with an annual temperature of 20^{0}C.

SOURCE:WORLDWEATHERONLINE(2017)

MAX, MIN AND AVERAGE TEMPERATURE



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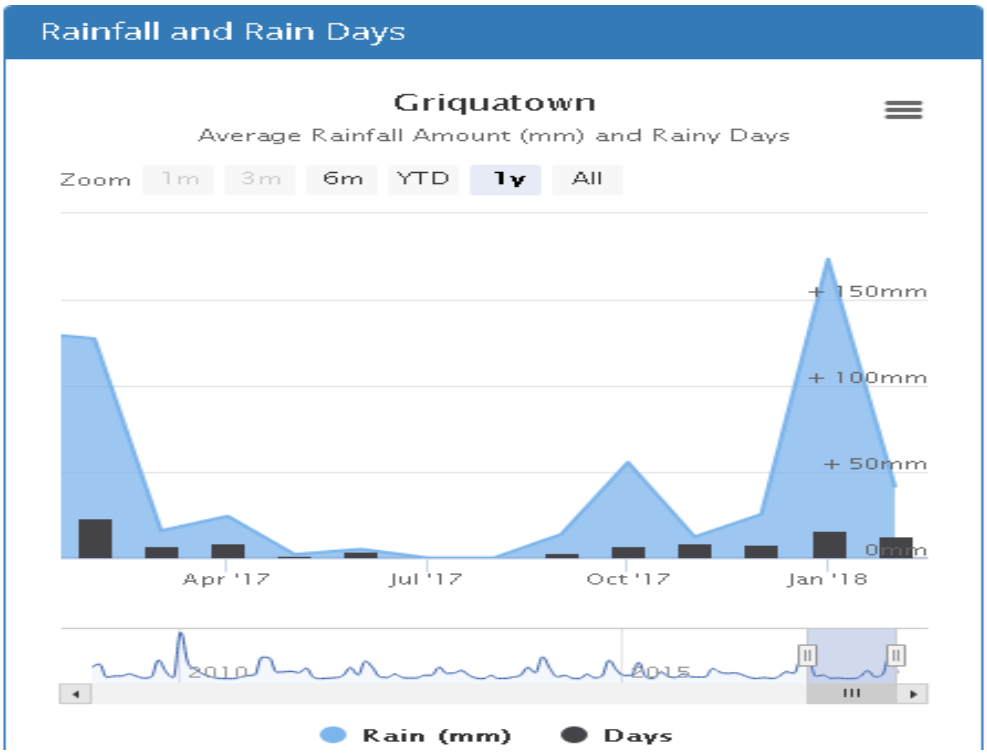
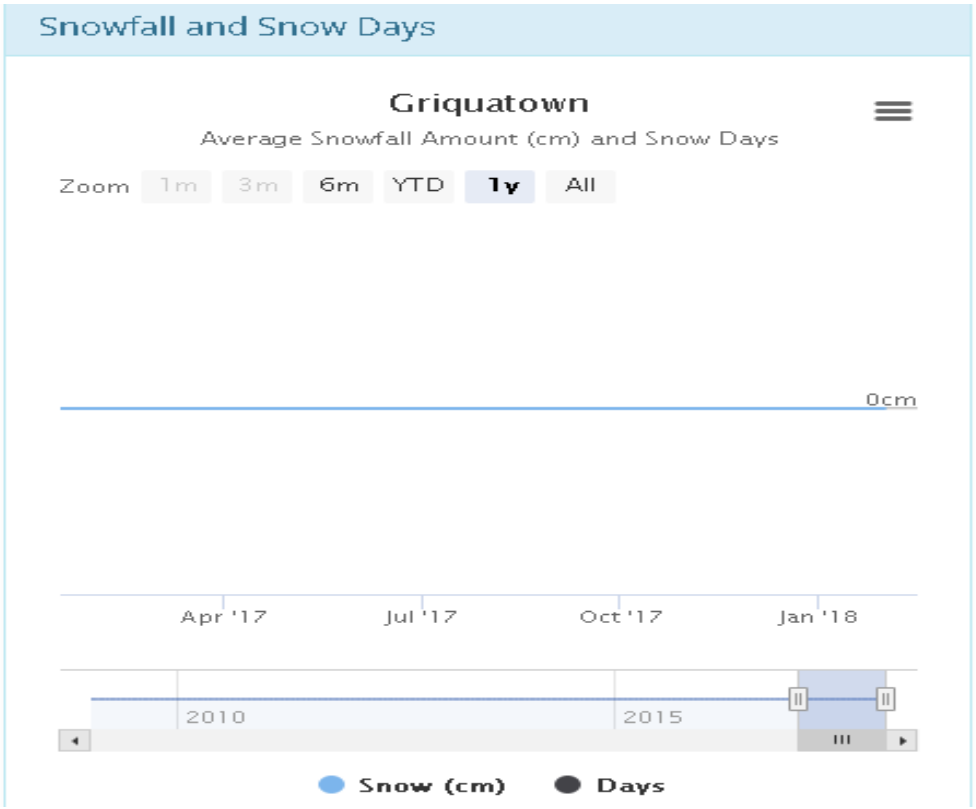
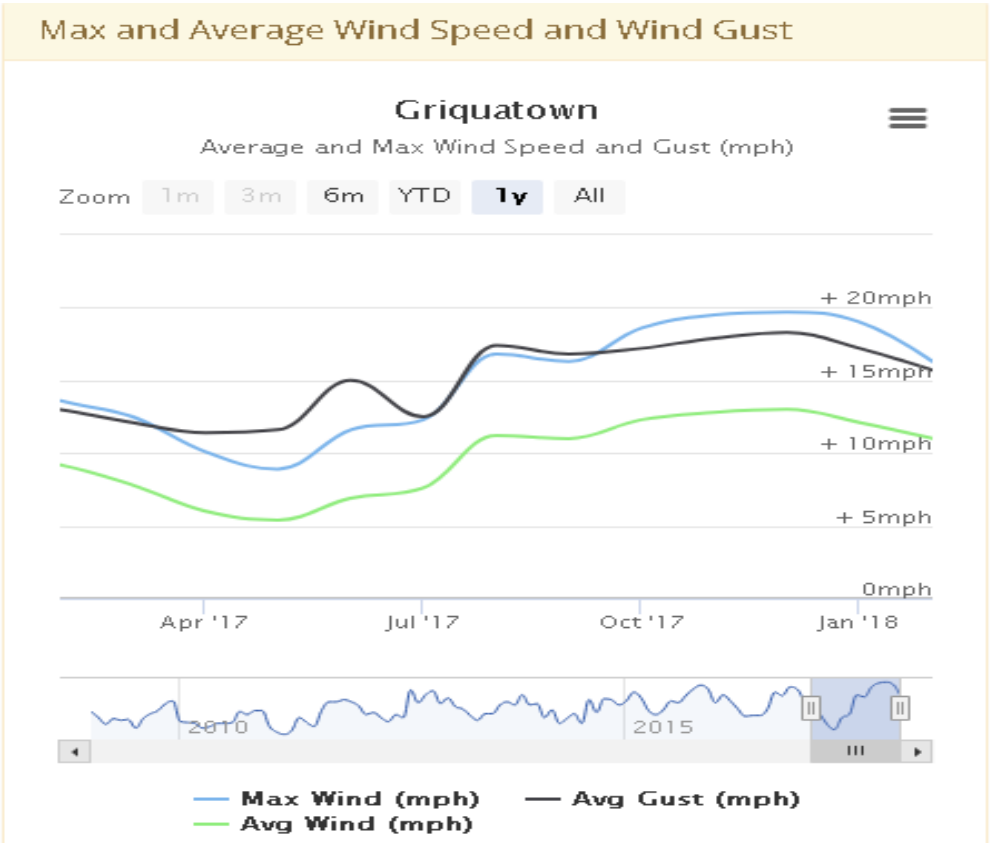


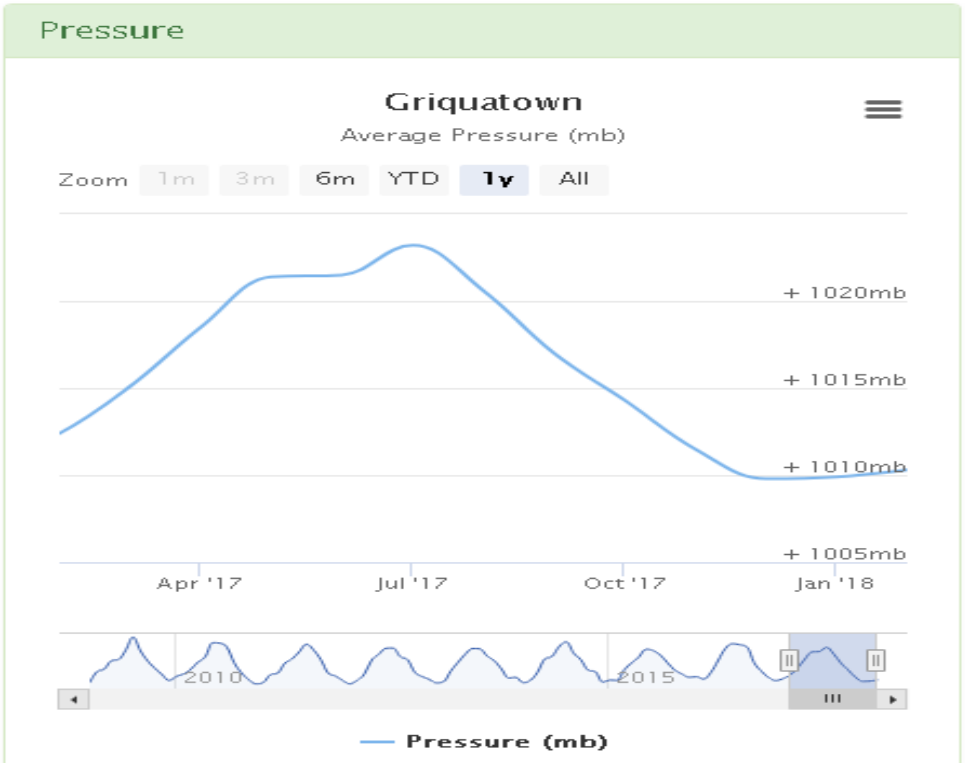
SNOWFALL



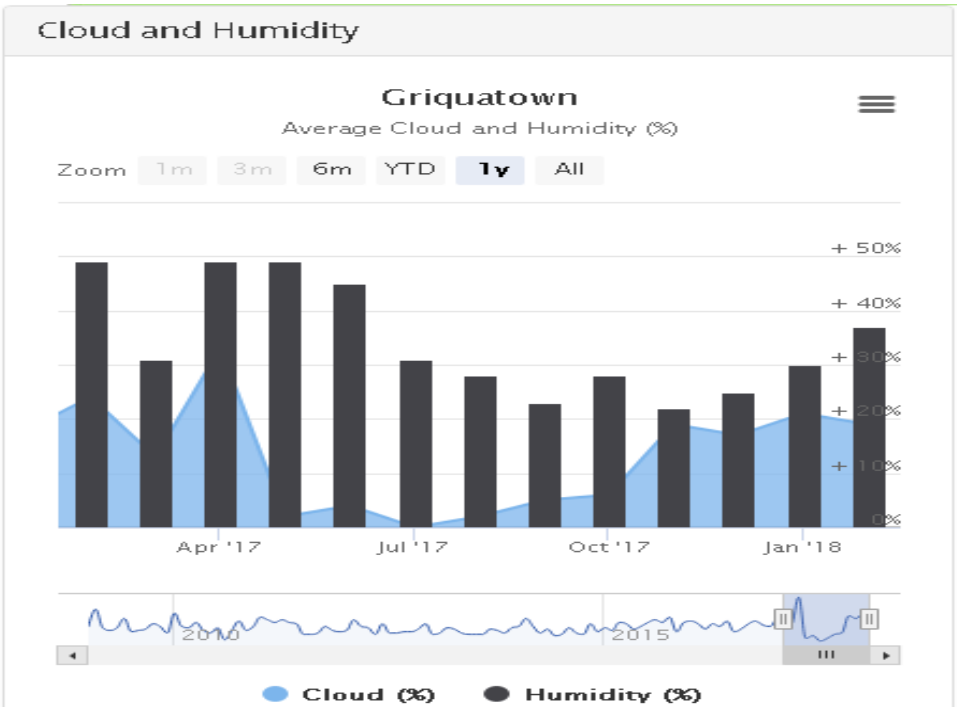
WIND



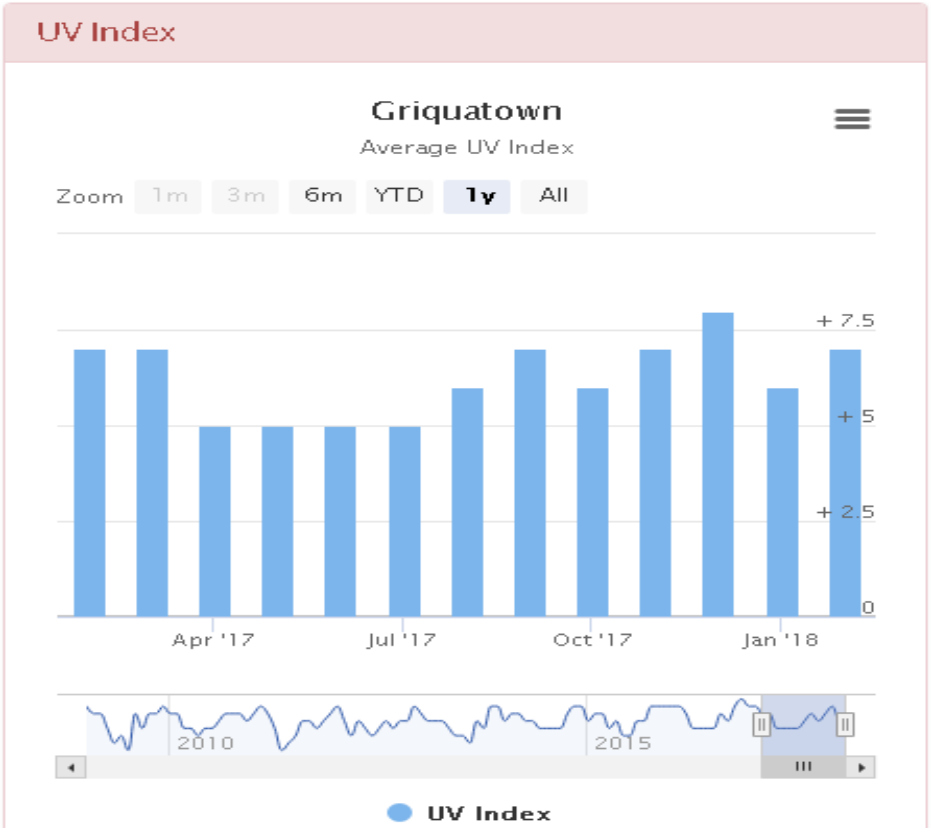
PRESSURE



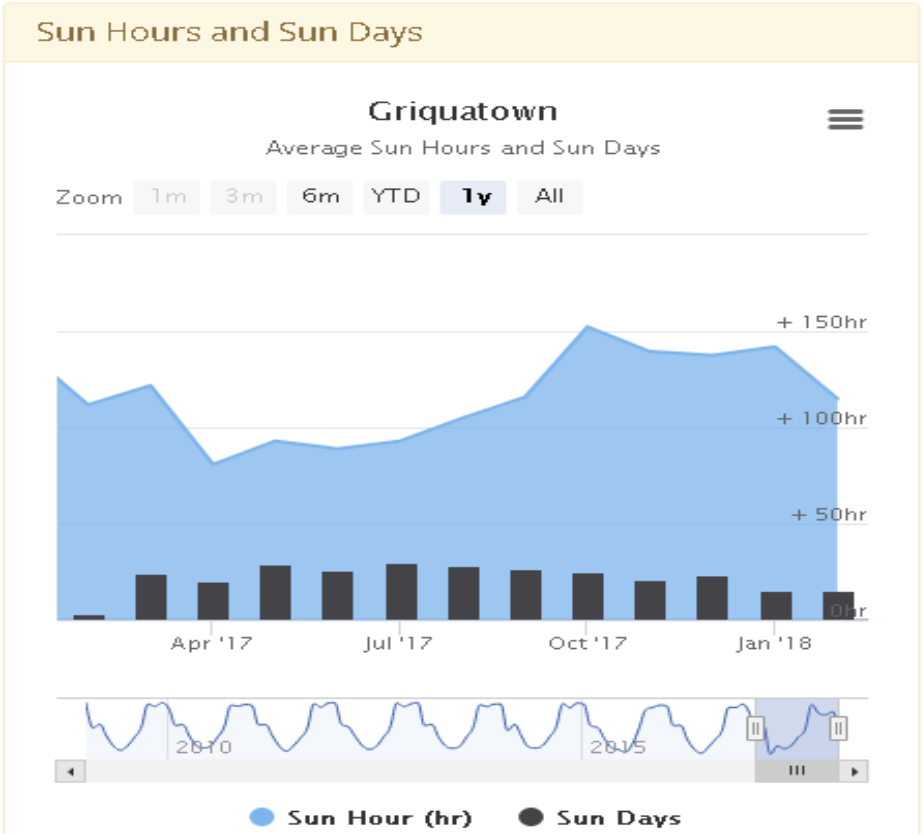
CLOUD AND HUMIDITY



UV INDEX



SUN HOURS AND SUN DAYS



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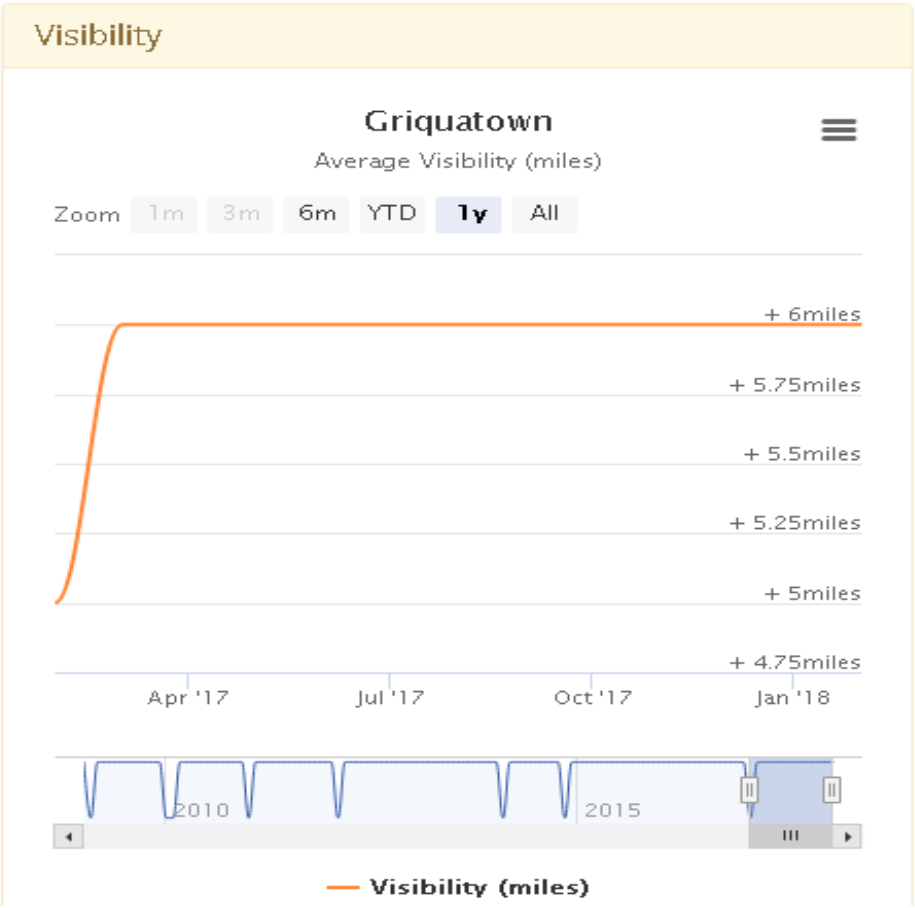


SOILS

SOIL CONDITIONS

The top of the rocky and hills areas are caved sandstone with a shallow covering of loose sandy soil. The flatter slopes and undulating territory have a deeper layer of loose sandy top soil underlain either by decomposed shales and mudstones or by sandstones. The shales decompose to clays. In many instances, especially where underground drainage is bad, the clay is decomposed to montmorillirite clay mineral. The sandstones usually decompose to a dense clayey sand. In low laying areas transported soils (usually clay) are found. Because of bad drainage the clays are expansive. The so-called escort soils which are clays with an excess of sodium cations have dispersive properties. The dispersive properties usually lead to rapid erosion in rain water (i.e. water with a low dissolved solids content). The latter clay also require special engineering treatment when they are to be used in down walls or roads embankments. The study area composes of variable composition of soil due to variation in rock types. Soil type available at the proposed study area include calcrete and aeolin sands. The depth of top soil is 600 mm.

SOIL DEPTH
Vary from 10mm to 600mm.

VEGETATION

Hounslow farm

Koegas farm South African environmentalists identify six biomes on land in South Africa. A biome can, in general terms, be described as a broad ecological unit, representing a large natural area with a relatively uniform plant and animal life, closely determined by environmental conditions and, especially, climate.
The six biomes of South Africa are:

- Grassveld Biome;
- Succulent Karoo Biome;
- Forest Biome;

 Savannah Biome; and

 Fynbos Biome.

The proposed project area falls within Nama-Karoo biome.
The following species were found on the study area:

Shrubs present include Black thorn (*Acacia mellifera subs, detines*) and Rhino thorn (*Ziziphus micrionates*)
Trees include Kokerboom, or quiver tree (*Aloe dichotoma*). Umbrella Trees (*Acacia tortrills subs, heteracactha);* Sweethorn *(Acacia Karoo)*
Grasses include weather grass *(eragrostis nindensis);* Long awned Grass *((aristida stipata);* Bottlebrush *(Enneapogon scoparium);* Nine-Awed Grass *(Enneapogon Cenchroides) and* Annual Tree Awn Grass *(Aristida Adscensionis)*

Alien Species
Prosopis Juliflora
Opuntia Ficus-indica (Prickley Pear)

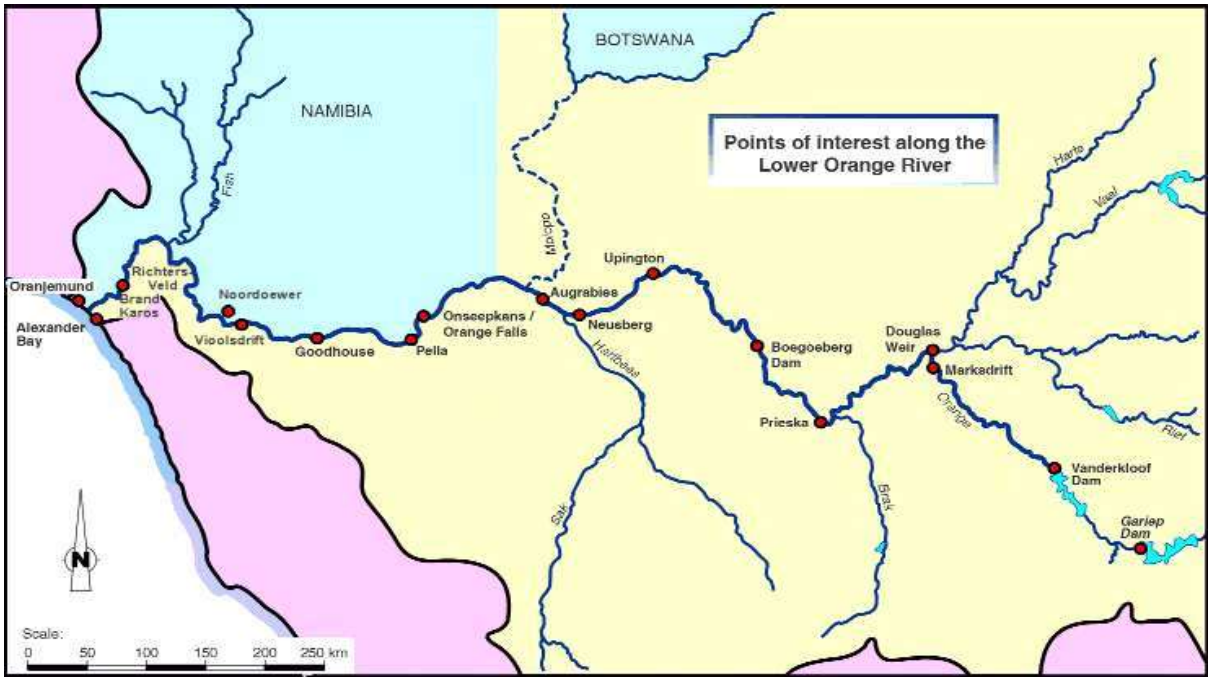
FAUNA
The following mammals were observed during the site visit. Meercats (Suricata suricata), Striped Field Mouse (Rhabolomys pumillo) Springhare (Pedeyes capensis) and Common Duiker (Sylvicapra grimmia) and Ground Squirrel (Funisciurus congicus).

Bird Life Spotted

Laughing Dove	Streptopelia
Redeyed Dove	Streptopelia semitorquata
Cape Turtledove	Streptopelia capicola
European Swallow	Hirundo rustica
Hoopoo	Upupa epops
Secretary Bird	Sagittarius serpentarus

Other mammals to which the applicant bears testimony include; Kudu, Steenbok, Aardvark, Jackal, Porcupine, African Wild Cat and Moles. Pofadder, Mole snakes and Cape Cobra.

WATER



OVERVIEW OF WATER QUALITY STATUS OF ORANGE RIVER BASIN

A brief overview of the water quality status in the main stem of the Vaal and Orange Rivers was undertaken. The approach used was to collect water quality data at key stations on the Vaal, Caledon, Fish (Namibia) and the Orange Rivers. The water quality data was accessed from the South African Department of Water Affairs and Forestry, Windhoek Consulting Engineers and the Lesotho government databases and the details of the stations used in the analysis are listed in the Table below.

Table : Details of stations used in the water quality status overview

Station number	Station name	Lat	Long	Beg Date	End Date
DIH003Q01	Allwal North	-30.679722	26.7125	29/01/1972	18/08/2004
D2H036Q01	Caledon	-30.279167	26.654167	12/05/1993	14/07/2004
D3R002Q01	Gariep Dam	-30.623056	25.507222	08/01/1971	12/10/2004
D3R003Q01	Vanderkloof Dam	-29.991111	24.731667	24/07/1971	29/10/2004
D7H002Q01	Prieska	-29.651389	22.746389	28/09/1965	08/05/2001
D7H005Q01	Upington	-28.460833	21.248889	01/11/1965	23/08/2004
D8H003Q01	Vloolsdrift	-28.760833	17.730278	11/11/1965	10/10/2004
C1R002Q01	Grootdraai Dam	-26.918056	29.295	18/11/1982	20/10/2004
C1H017Q01	Inflow Vaal	-27.0225	28.594444	16/11/1975	28/10/2004
C2R008Q01	Vaal Barrage	-26.853611	29.326111	06/06/1980	19/01/2005
C9H021Q01	Bloemhof Dam	-27.669167	25.618056	23/11/1972	19/10/2005
C9R003Q01	Douglas Barrage	-29.043333	23.836944	03.10/1977	26/10/2005
-	Naute Dam on Fish River (Purification plant raw water)	-	-	01/02/1997	01/09/2005
	South Phuthiatsana River	-	-	20/10/1997	12/10/2002

The data covering the period 1994 to 2004 was analysed. The following water quality variables were analysed to give an overview of the water quality status of the basin:

- Electrical conductivity which gives an indication of the salinity or TDS of the river system. The EC was compared to the South African water quality guidelines for agriculture (most sensitive crops) and domestic. (Class 0, Class 1 and Class 2) water uses to give an indication of the fitness for use of the water as far as salinity is concerned.
- Sulphate which gives an indication of the extent of mining pollution. The sulphate concentrations have been compared to the Class 0, Class 1 and Class 2 water quality guidelines for domestic use.
- Ortho-phosphate (as P) which gives an indication of the nutrient levels and the

potential for eutrophication of the river system. The South African Water Quality guidelines give the trophic status associated with different concentrations of inorganic phosphorus

The concentrations associated with the different categories used in the water quality status assessment are summarised in Table below.

Table : Concentrations associated with the different categories used in water quality status assessment

Water Quality variables	Ideal	Acceptable	Tolerable	Unacceptable
EC (mS/m)	<40 (irrigation)	40-70 (Class O)	70-150 (Class I)	>150 (Class II)
SO4 (mg/)	<200 (Class O)	200-400 (Class I)	400-600 (Class II)	>600 (Class III)
PO4 (mg/)	<0.005 (Oligotrophic)	0.005-0.025 (Mesotrophic)	0.025-0.25 (Eutrophic)	>0.25 (Hypertrophic)

The results of the analysis have been represented as pie charts on a map of the Orange River Basin. The sectors of the pies represent the fraction of the total samples that fall in the different concentration ranges used to assess the water quality. The results are given in, Figure 1, Figure 2 and Figure 3 for EC, sulphate and ortho-phosphate respectively. The results of the analysis can be summarised as follows:

The upper reaches of the Vaal River upstream of Vaal Dam has good quality water as far as salinity is concerned. The EC and sulphate concentrations meet Class 0 domestic water quality guideline. The general consensus as far as users are concerned is that the salinity aspects of the water quality meet their requirements but should not deteriorate any further.

- The salinity deteriorates along the stretch of the river from Vaal Dam to the Douglas weir. There is a significant deterioration in water quality from the Vaal Dam to the Vaal Barrage. This is due to the contributions from the Suikerbosrand, Rietspruit and Klip River catchments. This is largely driven by mine water sewage and industrial discharges as well as runoff from urban areas.
- The salinity in the Orange River from Lesotho to the confluence with the Vaal River is of good quality.
- The salinity deteriorates downstream of the confluence of the Vaal and Orange Rivers but still remains good. There is an increase in EC from the Prieska station to Vioolsdrift along the reaches of the lower Orange River. This is due to irrigation return flows and evaporative losses along the river.
- The measured EC data at Naute Dam on the Fish River (Namibia) showed that 93% of the EC reading met the Class 0 domestic water use guideline.
- The analysis of the water quality in the South Phuthiatsana River showed that the EC of the river is low with a maximum value of 25mSm. However, the orthophosphate concentrations are high with 43% exceeding 0.25 mg/l i.e. falling in the hyperthrophic range. The source of the ortho-phosphate is from the runoff from the settlements scattered throughout the Lesotho lowlands catchment.
- The ortho-phosphate pie charts show that the ortho-phosphate concentrations are indicating potential for eutrophic conditions throughout the catchment and a possibility of hypertrophic conditions in the Vaal Barrage. There are a number of factors however that determine the extent of algal growth. These include the availability of other nutrients such as nitrogen, adequate sunlight and suitable temperatures. The turbid waters experienced in the catchment is limiting sunlight penetration and limiting algal growth. The pie charts shown in Figure 3 can only be considered indicative. However the indications are supported by observations and reports of algal blooms in impoundments, the Vaal Barrage and along the lower reaches of the Orange River downstream of the confluence of the Orange and Vaal Rivers.

ISSUES AND GAPS

The issues and knowledge gaps identified during this desk top overview of the water quality in the Orange River Basin are discussed in Table 5 below. Measures to address the gaps identified are also proposed for inclusion in the future phases of the development of the IWRMP for the Orange River Basin.

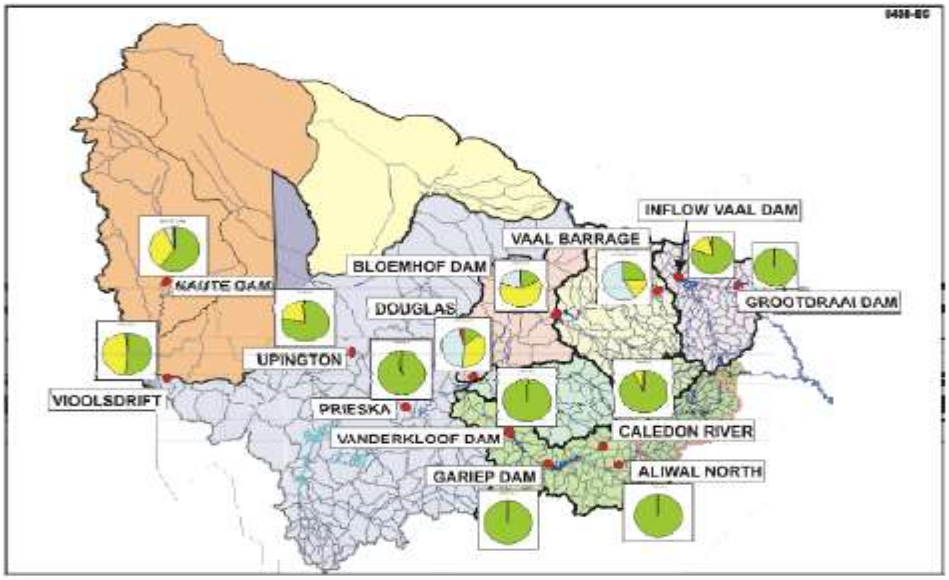


Figure 1: Pie charts showing water quality status for EC in the Orange River Basin

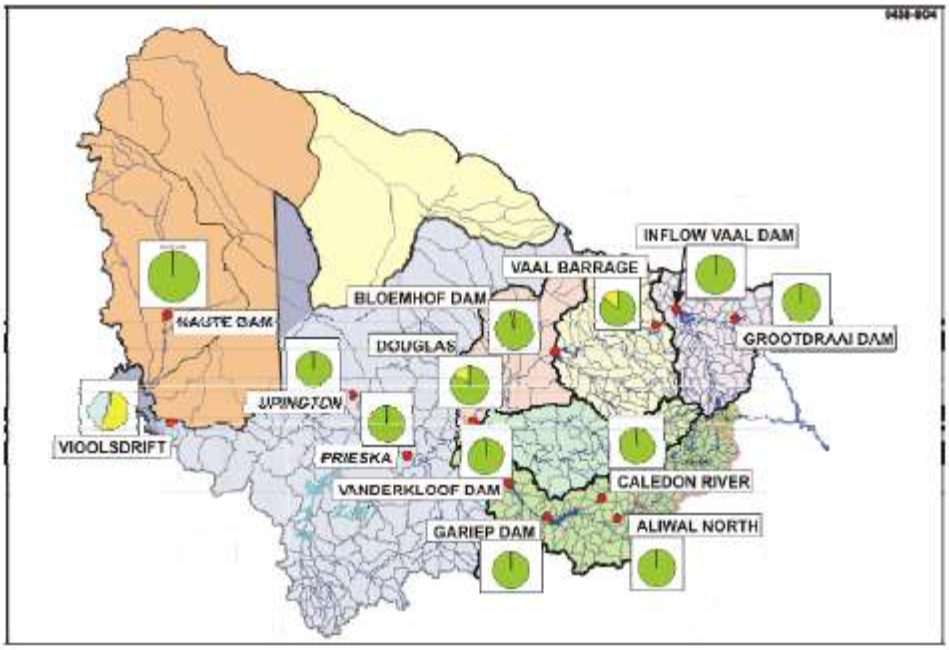


Figure 2: Pie charts showing water quality status for sulphate in the Orange River Basin

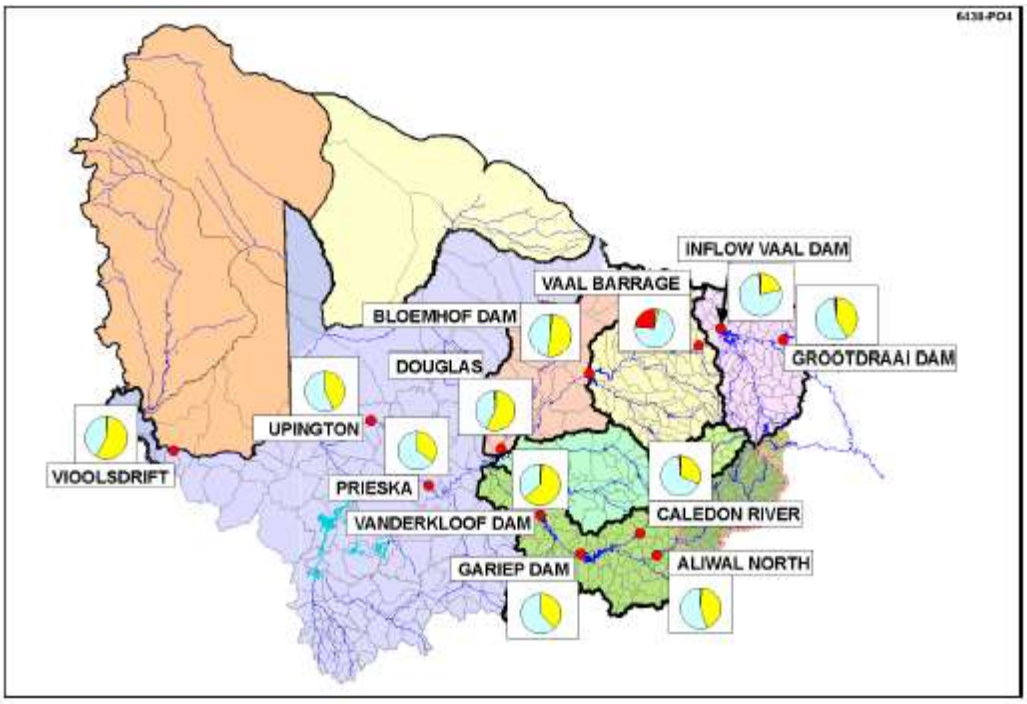


Figure 3: Pie charts showing water quality status for ortho-phosphate in the Orange River Basin

Table: Summary of issues and knowledge gaps

Issue	Description of issue and gap	Proposed measure to address gap
Insufficient water quality data and data management	During the analysis of the water quality data collected in the Orange River Basin, a number of issues related to data collection were identified : Data collection is fragmented between countries and institutions. The location of the water quality monitoring points are not optimal. The water quality variables analysed for are not consistent between institutions. The sampling frequency and the water quality variables. analysed for are insufficient to manage the Orange River Basin successfully. There is no single or standard data management and reporting systems. Lack of information on discharge volumes and qualities from sewage treatment works, mines and industries	A coordinated monitoring programme needs to be developed to address : The establishment of monitoring objectives The monitoring point locations Frequency of monitoring and water quality variables to be tested for The current network of continuous water quality monitoring stations needs to be reviewed and expanded. In designing the system consideration should be given to real time management of both water quality and quantity Database systems, data management and reporting Institutional responsibilities and implementation Program A series of workshops involving the major role players is the approach recommended to achieve the objectives listed above
Eutrophication	The analysis of the water quality data showed that nutrient levels in the Vaal River, particularly in the Vaal Barrage, are such that there is a potential for eutrophic conditions to develop. The problems with excessive algae development are already reported by Sedibeng and MidVaal Water. The following gaps have been identified : A lack of understanding of the fate of nutrients once they are discharged to the river. The pathways for the nutrients, organics and algae growth need to be better understood. A planning level nutrient model needs to be developed and set up for the Orange River Basin. The model should allow for cause and affect modelling so that nutrient management strategies can be developed.	A project should be initiated that will investigate the nutrient mass balance and pathways. The Vaal Barrage catchment is the most impacted and the largest source of nutrients. A pilot scale project to determine the fate of nutrients within this catchment is proposed. If the pilot scale project proves to be successful the model can be rolled out to the entire catchment
Issue	**Description of issue and gap**	**Proposed measure to address gap**

Integrated RWQO	The RWQO are being set in isolation in priority catchments. The integration of the RWQO for the Vaal River is being addressed in the Integrated Water Quality Management Plan (IWQMP) that is being developed for the Vaal River by the South African Department of Water Affairs and Forestry. The link between the Vaal and the Orange river needs to be addressed	The IWQMP for the Vaal River study needs to be extended to include the Orange River.
Mine water closure planning	The gold mine dewatering discharges contribute a significant salt load to the Vaal River System. The time frames for the continued mining depend on the gold price. Mines are starting to close down and flow of water between mines and the management thereof is becoming an issue. A management strategy for the mine water currently and post closure need to be developed	Projects are being initiated by the South African Department of Water Affairs and Forestry and the Water Research Commission in South Africa to address the mine closure and water management issue
Presence of pesticide and herbicides in the Vaal and Orange Rivers	There is extensive irrigation practised in the Vaal and Orange Rivers where herbicides and pesticides are used. These could be present in the return flows and conveyed in the surface runoff to the river systems. The current water quality database does not support the identification of pesticides and herbicides in the rivers.	A pesticide and herbicide monitoring program should be initiated to determine the extent of the problem

CONCLUSIONS AND RECOMMENDATIONS

The following conclusions and recommendations can be made as a result of this desktop study:

- The water quality has to be managed in conjunction with the development of the water resource for supply. The reduction in flow from Lesotho due to transfers to Vaal Dam could affect the water quality in the lower Orange. Similarly the management of the system to meet water requirements and generate hydropower should be coupled to the management of water quality;
- The salinity is currently being managed with releases of water for dilution from Vaal Dam. The modelling tools have been set up to manager the salinity aspects of the water quality of the Orange River Basin. The consensus is that the salinity aspects of the water quality meet user requirements. However the water quality must not be allowed to deteriorate further.
- Many of the coal and gold mines are closing down and the workings are starting to fill and will decant sometime in the future. Management strategies have to be developed to manage the filling process and the decants.
- Nutrients and the resulting algal growth are an issue. The modelling of nutrients has not reached the same level as salinity and the nutrient pathways are not well understood. Attention will have to be given to the development of modelling tools, management of point sources such as sewage works as well as diffuse sources associated with runoff from urban areas and agriculture. A nutrient management strategy needs to be developed.
- Currently very little information is available on pesticides and herbicides in the river systems. There is extensive agriculture on the banks of the Vaal and Orange Rivers. The presence of these pollutant types should be determined by designing and carrying out a round of monitoring.
- An integrated water quality monitoring programme and data management systems need to be developed for the Orange River Basin. The monitoring programme should include discharge information.

SURFACE WATER

Defined drainage towards the Orange River on farm Koegas 324.

GROUND WATER
The depth and quality of the water is not known.

BOREHOLES
6 boreholes of which the quantity, quality and depth is unknown was found on the study area.

WETLANDS
The only area considered as a wetland is THE boundary of the study area with the Orange River.

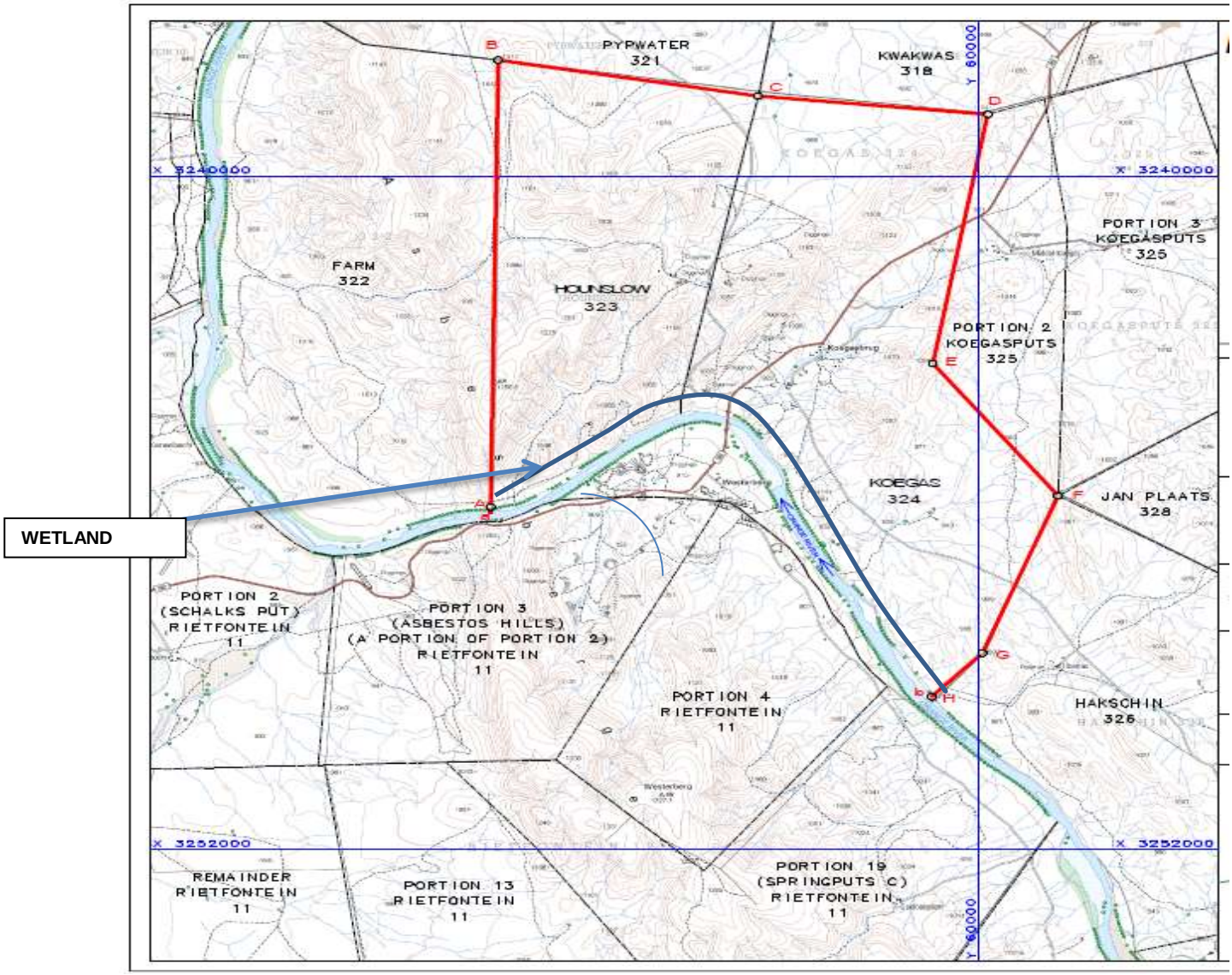


Figure 1: The proposed of the project site.
Farms Koegas 324 and Hounslow 323, Magisterial District of Hay, Northern Cape

RIVER DIVERSIONS
No river diversions are required for this project.

SOCIO ECONOMIC PROFILE

SOCIO-ECONOMIC STRUCTURE OF THE REGION
SIYANCUMA LOCAL MUNICIPALITY MAP

GEOGRAPHY, HISTORY AND ECONOMY

Siyancuma Local Municipality is part of Pixley Ka Seme District Municipality.

MDB code: NC078

Description: The Siyancuma Local Municipality is situated within the Pixley Ka Seme District of the Northern Cape Province. It is bordered by the ZF Mgcawu and Frances Baard Districts in the north, Siyathemba and Thembelihle in the south, the Free State Province in the east, and the ZF Mgcawu District in the west.
It is one of the eight municipalities that make up the district, accounting for 16% of its geographical area.

Area: 16 753km²

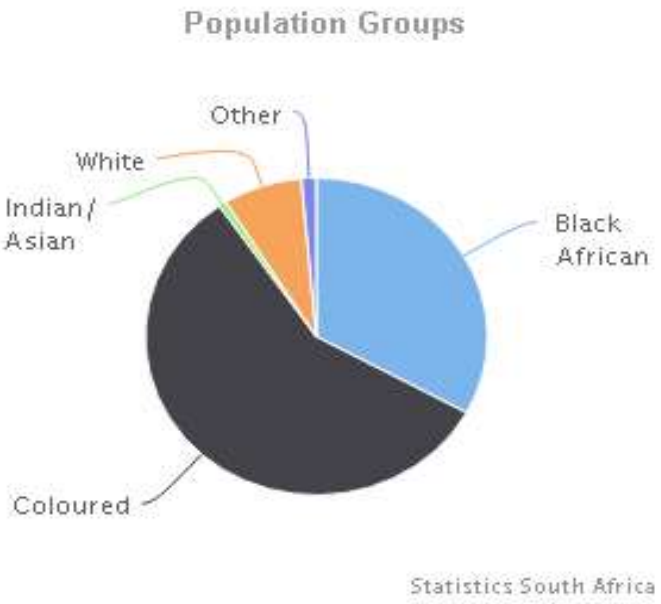
Cities/Towns: Campbell, Douglas, Griekwastad, Riet River, Schmidtsdrif

Main Economic Sectors: Agriculture, mining

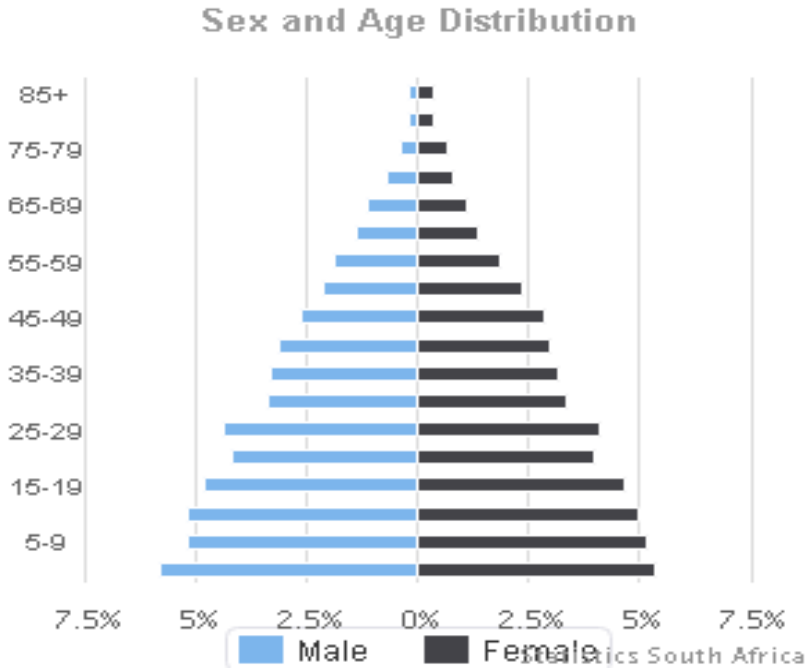
According to the 2011 Census, Siyancuma Local Municipality has a total population of 37 076 people. The majority of the population in the municipality are Coloured at 57,5%,33,3% are Black African,7,5% are White, 0,7% are Indian/Asian, with the other population groups making up the remaining 1,4%.

Of those aged 20 years and older,7,2% have completed primary school, 30,3% have some secondary education, 16,9% have completed matric and 5,4%have some form of higher education. Of the mentioned age group, 16,8% have no form of schooling.

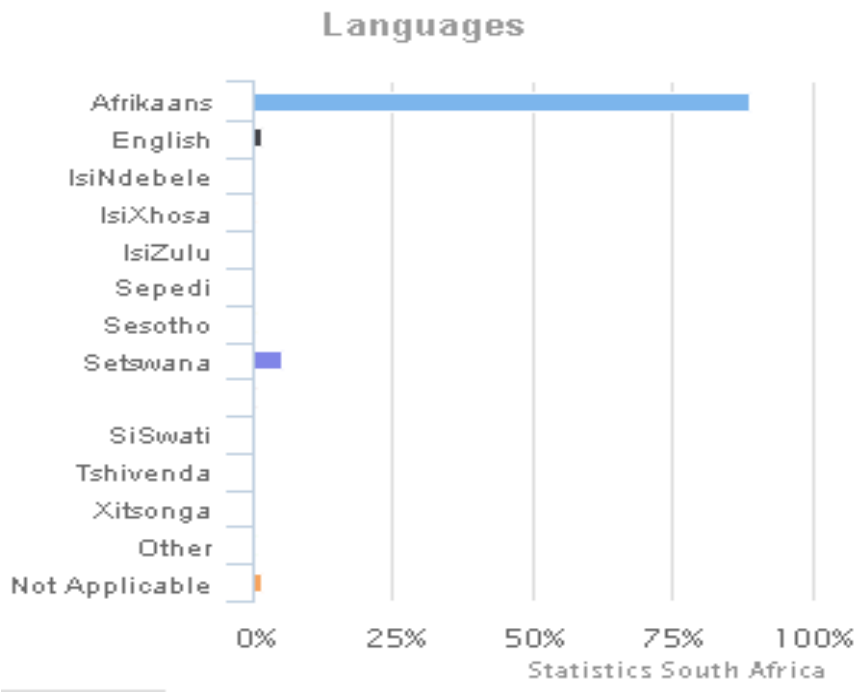
POPULATION GROUPS
(SOURCE: STATS SOUTH - AFRICA)



SEX AND AGE DISTRIBUTION



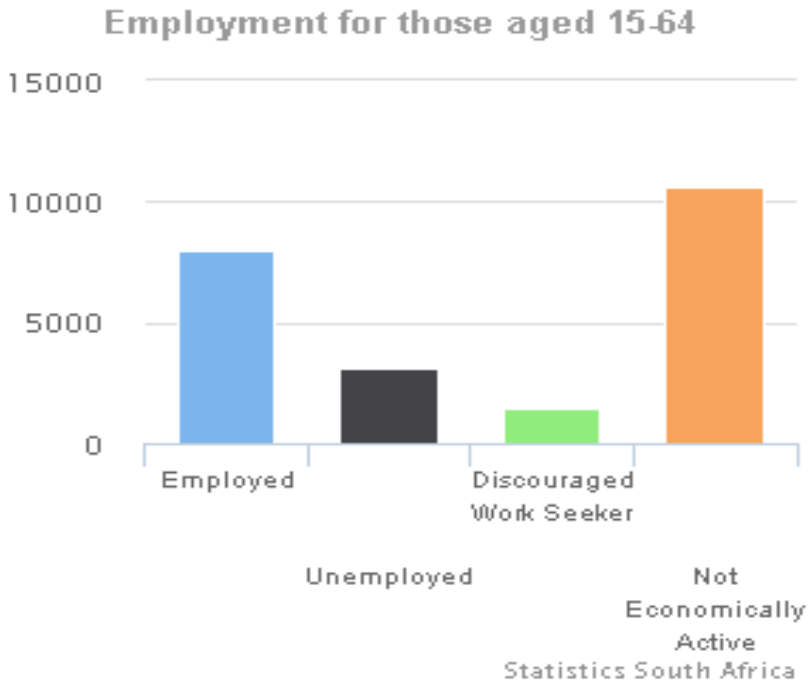
LANGUAGES



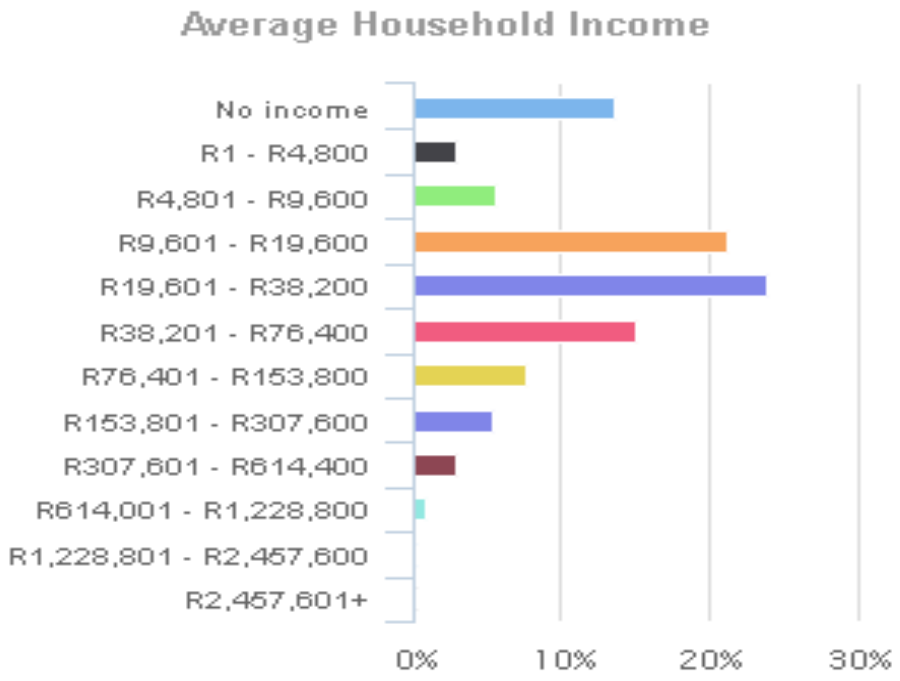
MARITAL STATUS

SEX

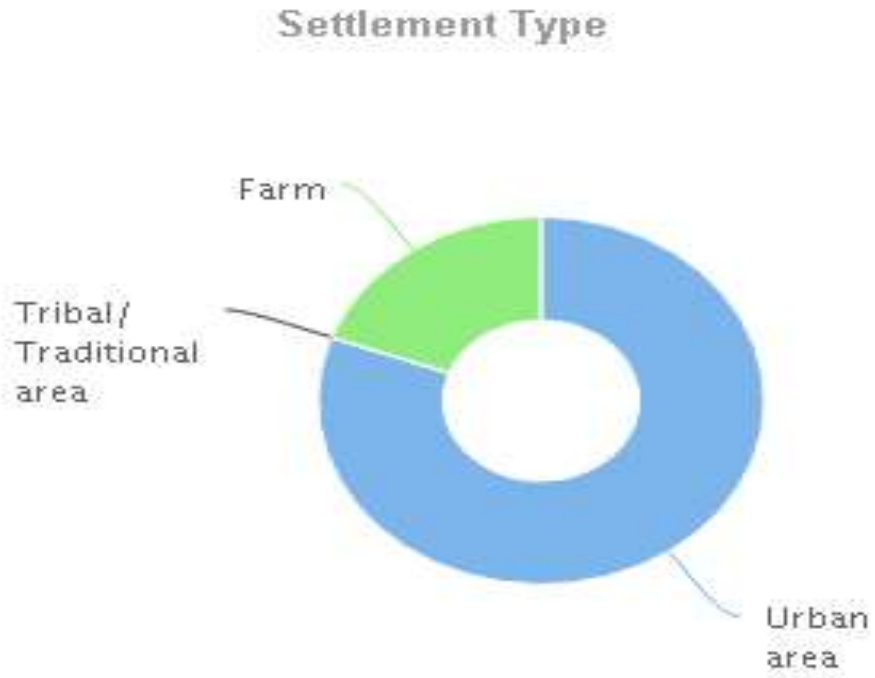
EMPLOYMENT AGED 15-64



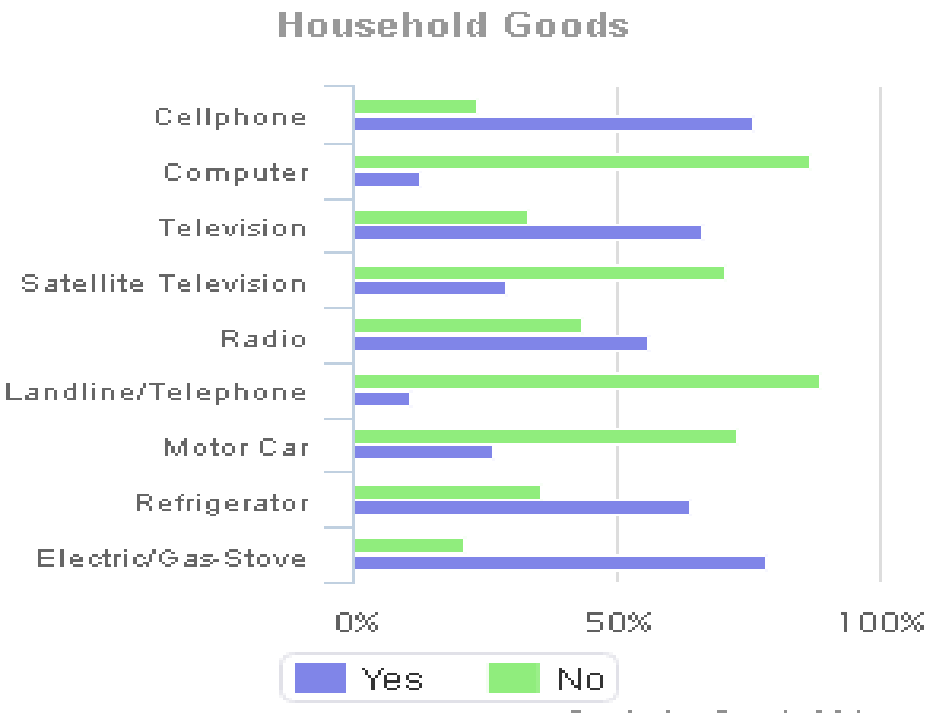
AVERAGE HOUSEHOLD INCOME



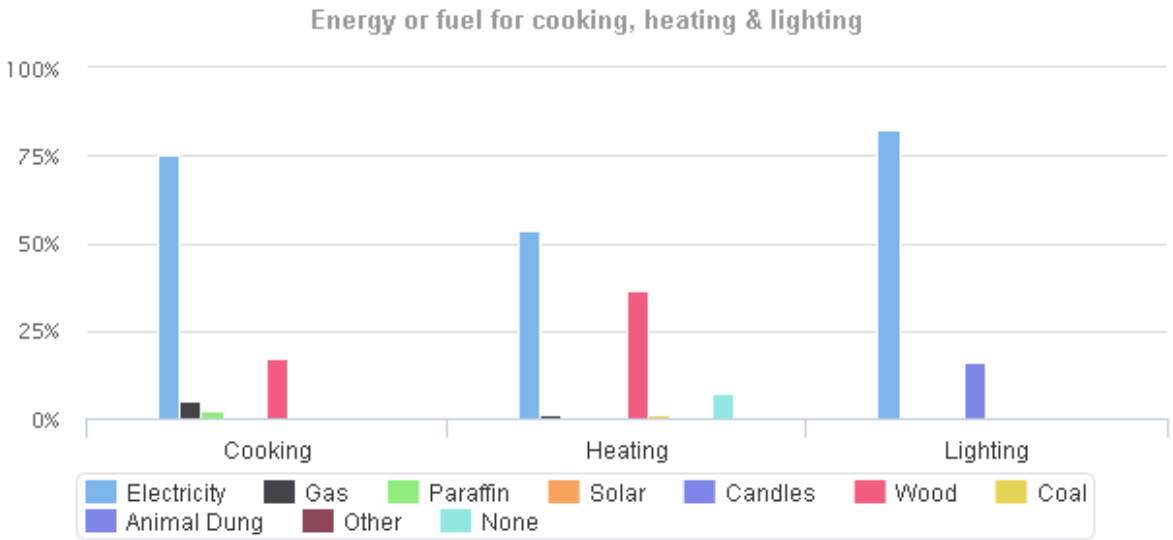
SETTLEMENT TYPE



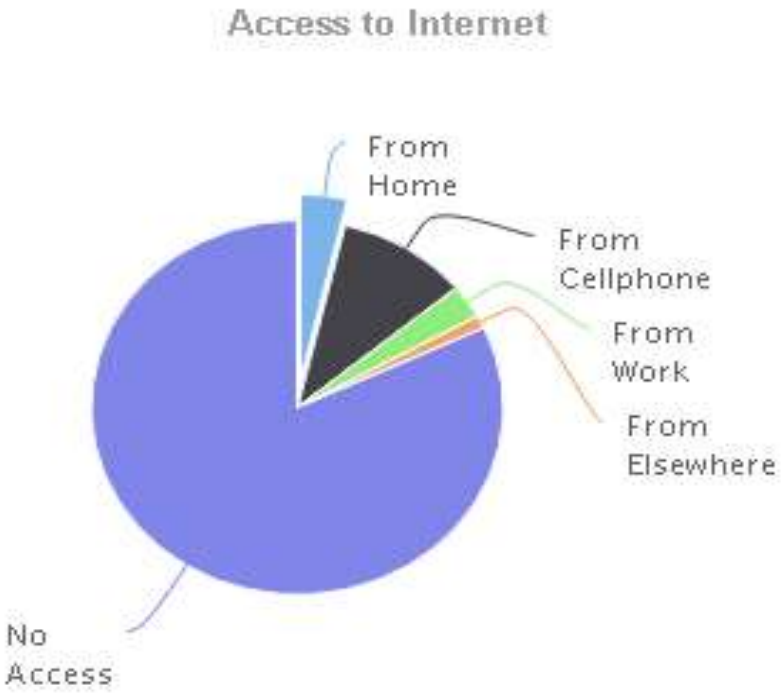
HOUSEHOLD GOODS



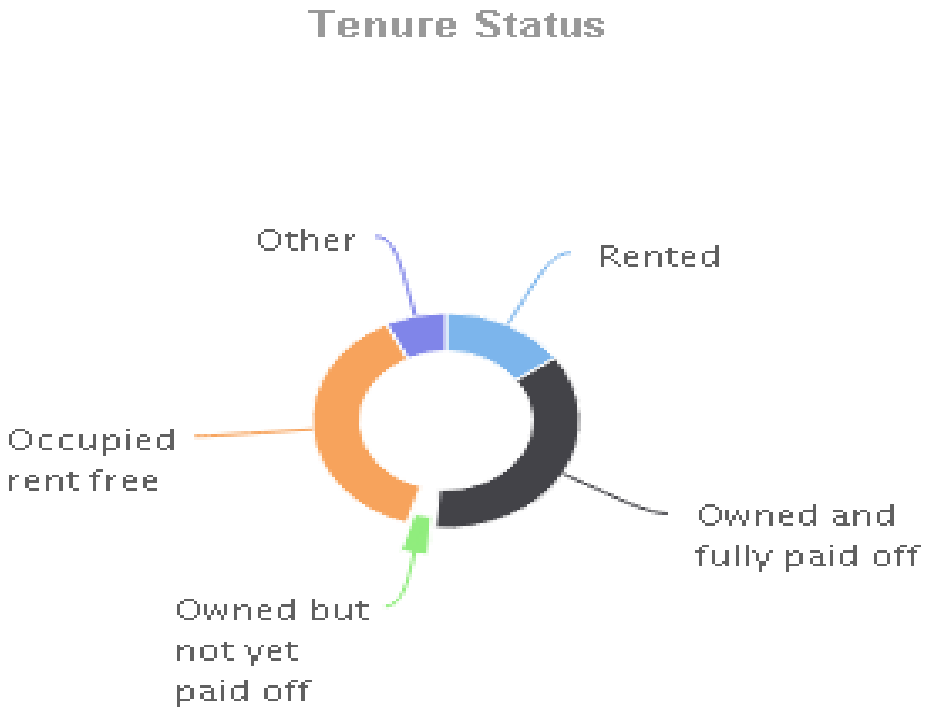
ENERGY OR FUEL FOR COOKING



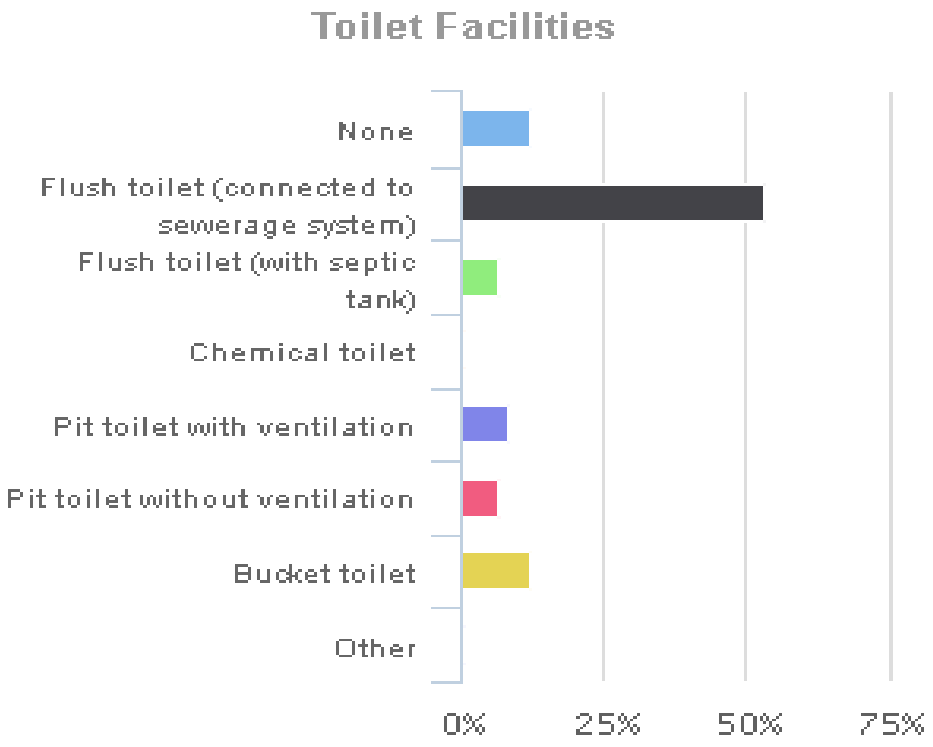
ACCESS TO INTERNET



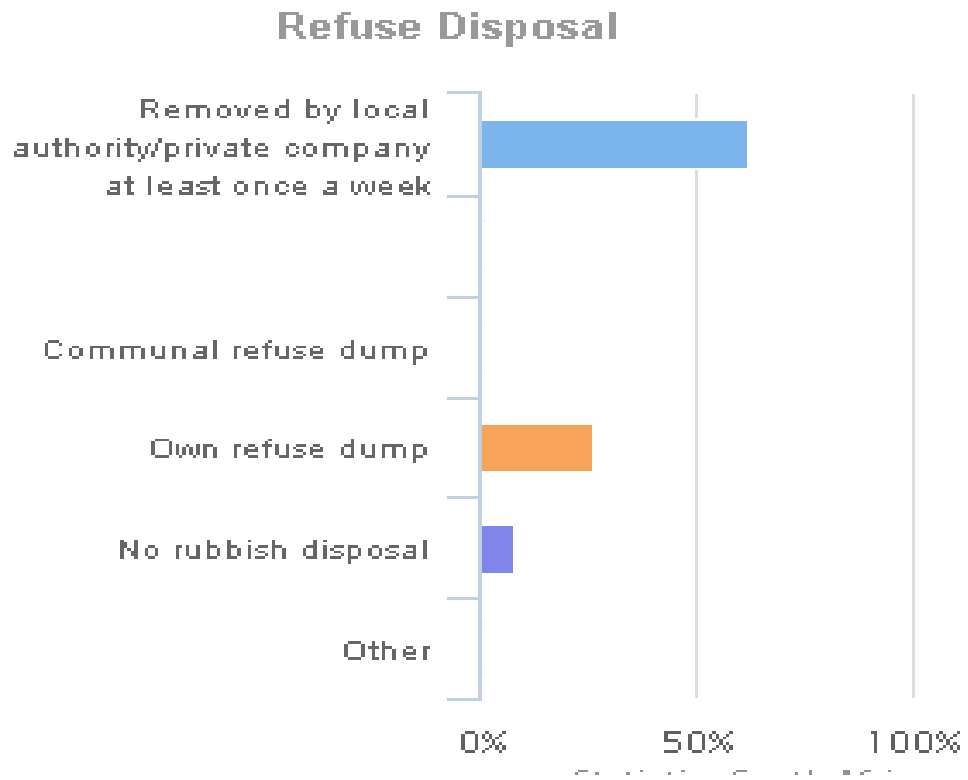
TENURE STATUS



TOILET FACILITIES



REFUSE DISPOSAL



DEMOGRAPHIC INFORMATION

(SOURCE: MUNICIPALITIES OF SOUTH AFRICA 2016)

	2016	**2011**
Population	35 941	37 076
Age Structure		
Population under 15	26.2%	31.8%
Population 15 to 64	67.8%	62.2%
Population over 65	6.0%	6.0%
Dependency Ratio		
Per 100 (15-64)	47.5	60.8
Sex Ratio		
Males per 100 females	100.0	100.4
Population Growth		
Per annum	-0.71%	n/a
Labour Market		
Unemployment rate (official)	n/a	28.2%
Youth unemployment rate (official) 15-34	n/a	35.2%
Education (aged 20 +)		
No schooling	9.7%	16.7%
Matric	20.4%	16.8%
Higher education	8.9%	5.4%
Household Dynamics		
Households	10 191	9 578
Average household size	3.5	3.8
Female headed households	36.4%	35.7%
Formal dwellings	82.0%	73.0%
Housing owned	50.3%	39.6%
Household Services		
Flush toilet connected to sewerage	59.7%	53.4%
Weekly refuse removal	71.9%	62.3%
Piped water inside dwelling	41.5%	41.4%
Electricity for lighting	89.1%	82.2%

SERVICE DELIVERY STATISTICS

	2015/16	2014/15	2013/14	2012/13	2011/12
Water					
Blue Drop Score	n/a	n/a	54.02	n/a	19.66
Is the municipality responsible to provide?	Yes	Yes	Yes	Yes	Yes
Does the municipality have infrastructure to provide?	Yes	Yes	Yes	Yes	Yes
Does the municipality actually provide?	Yes	Yes	Yes	Yes	Yes
Is the service outsourced/commercialised?	No	No	No	No	No
Number of households and non-domestic customers to which provided	6 519	6 519	6 517	6 351	6 200
Number of domestic households/delivery points	6 280	6 280	6 280	6 151	6 000
Inside the yard	6 280	6 280	6 280	6 151	6 000
Less than 200m from yard	0	0	0	0	0
More than 200m from yard	0	0	0	0	0
Domestic households with access to free basic service	2 787	2 787	2 584	2 910	2 694
Electricity					
Is the municipality	Yes	Yes	Yes	Yes	Yes

	2015/16	2014/15	2013/14	2012/13	2011/12
responsible to provide?					
Does the municipality have infrastructure to provide?	Yes	Yes	Yes	Yes	Yes
Does the municipality actually provide?	Yes	Yes	Yes	Yes	Yes
Is the service outsourced/commercialised?	Yes	Yes	Yes	Yes	Yes
Number of households and non-domestic customers to which provided	5 916	5 916	5 916	5 307	7 639
Domestic households with access to free basic service	2 745	2 745	2 625	1 832	2 694
Sewerage and Sanitation					
Green Drop Score	n/a	n/a	n/a	n/a	0
Is the municipality responsible to provide?	Yes	Yes	Yes	Yes	Yes
Does the municipality have infrastructure to provide?	Yes	Yes	Yes	Yes	Yes
Does the municipality actually provide?	Yes	Yes	Yes	Yes	Yes
Is the service outsourced/commercialised?	No	No	No	No	No
Number of households and non-domestic customers to which provided	6 734	6 734	6 253	6 081	6 370

	2015/16	2014/15	2013/14	2012/13	2011/12
Number of households using:					
Flush toilet - public sewerage	3 187	3 187	3 141	3 141	2 992
Flush toilet - septic tank	123	123	126	126	564
Ventilated pit latrine	572	572	572	572	572
Bucket system	2 238	2 238	2 226	2 115	2 115
Other	0	0	0	0	0
Domestic households with access to free basic service	2 787	2 787	2 584	2 710	2 694
Solid Waste Services					
Is the municipality responsible to provide?	Yes	Yes	Yes	Yes	Yes
Does the municipality have infrastructure to provide?	Yes	Yes	Yes	Yes	Yes
Does the municipality actually provide?	Yes	Yes	Yes	Yes	Yes
Is the service outsourced/commercialised?	No	No	No	No	No
Number of households and non-domestic customers to which provided	6 199	6 199	6 111	6 084	5 960
Domestic households with access to free basic service	2 787	2 787	2 584	2 710	2

SITES OF ARCHAELOGICAL, HISTORICAL AND CULTURAL IMPORTANCE

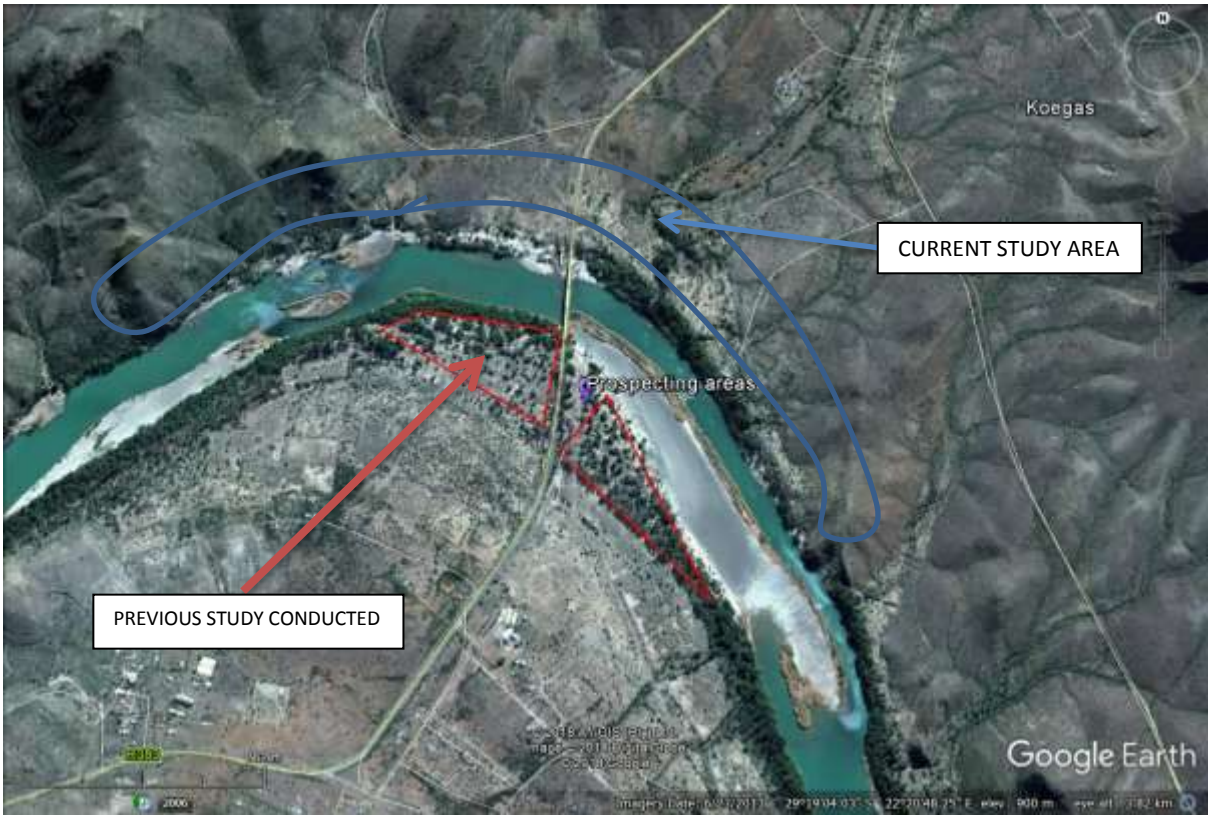
Archaeological remains can be defined as human-made artefacts, which reflect past ways of life, deposited on or in the ground. All archaeological remains, artificial features and structures older than 100 years and historic structures older than 60 years are protected by the National Heritage Resources Act (NHRA) (Act No. 25 of 1999). No archaeological artefact, assemblage or settlement (site) may be moved or destroyed without the necessary approval from the South African Heritage Resources Agency (SAHRA).

The graveyards are protected under the South African Heritage Resources Act (Act no. 25 of 1999), and by the Human Tissues Act, 1983 (Act No. 65 of 1983). No disturbance to these sites is permitted.

It does not exempt Autumn Skies Trading 689 from its obligation to suspend prospecting activity and immediately report to Provincial Authority and/or SAHRA, if some artefacts will be discovered during the prospecting operation.

Study Area

The study area is directly opposite an area to which a scoping phase evaluation was conducted by the Mc Gregor Museum, Kimberley.



"The McGregor Museum archaeology department was appointed by Mr. Gamja Gool (contact: G. Gool, email: gamjagool@gmail.com tel: 082 654 0798) and M.A. Gool (contact: M.A. Goliath, 22 Goedehoop Avenue, Royldene, Kimberley 8301; email: goliathmalcolm@yahoo.com tel: 0824523693) to conduct a Heritage Impact Assessment for Prospecting Right on the farm: Portion 3 (Asbestos Hills) and Portion 2 and 4 (Rietfontein 11), near Koegas, Administrative District of Prieska, Northern Cape. A scoping phase evaluation of the full site was aimed at providing high-level identification of potential areas of sensitivity together with a recommended methodology for the HIA process.

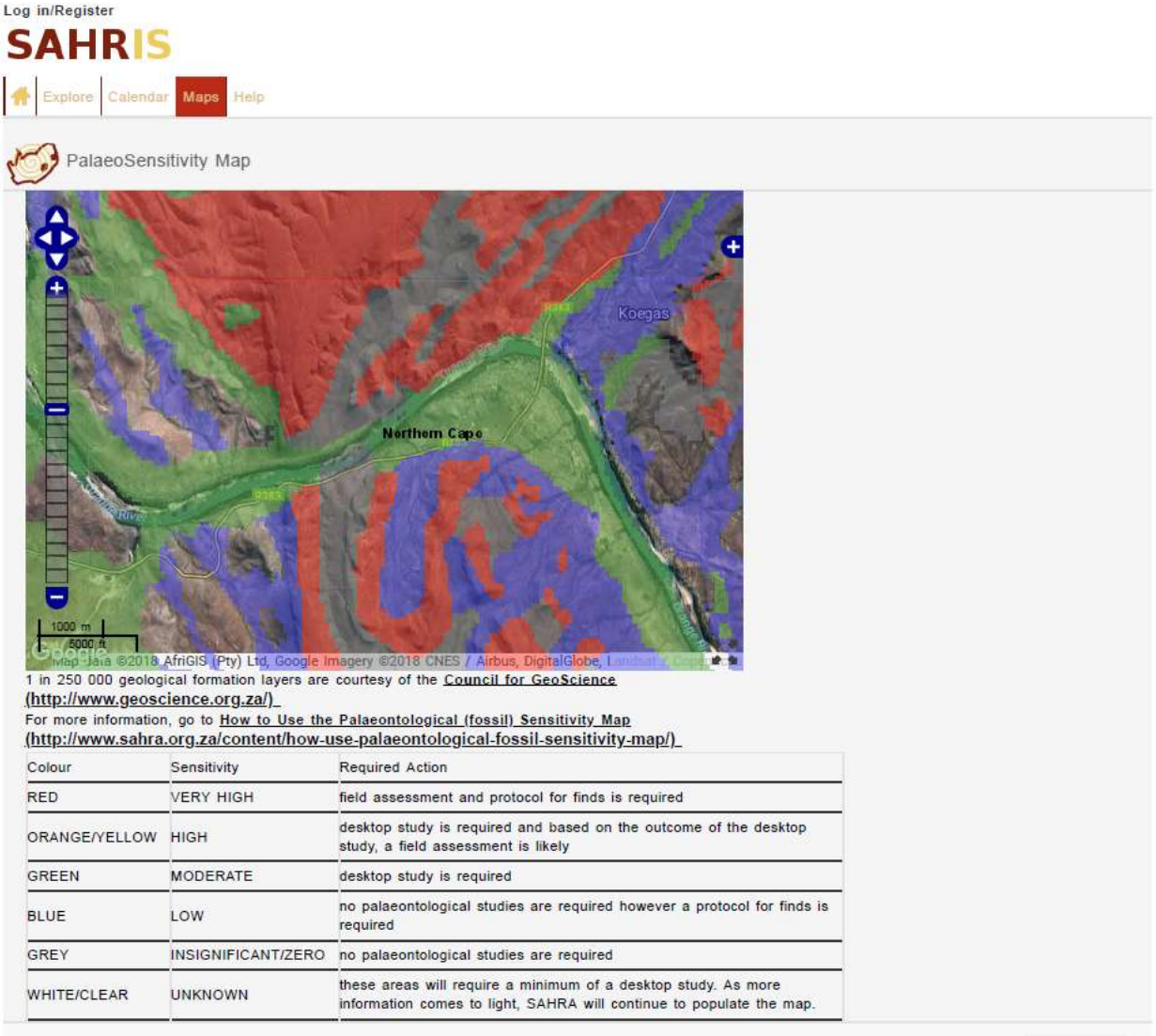
The site was inspected on foot on the 20 April 2018 and relevant observations are indicated in this report.

Fieldnotes and photographs are lodged with the McGregor Museum, Kimberley. “

Full report attached as **APPENDIX A.**

SAHRA

SAHRIS MAP



1 in 250 000 geological formation layers are courtesy of the Council for GeoScience (http://www.geoscience.org.za/)

For more information, go to How to Use the Palaeontological (fossil) Sensitivity Map (http://www.sahra.org.za/content/how-use-palaeontological-fossil-sensitivity-map/)

Colour	Sensitivity	Required Action
RED	VERY HIGH	field assessment and protocol for finds is required
ORANGE/YELLOW	HIGH	desktop study is required and based on the outcome of the desktop study, a field assessment is likely
GREEN	MODERATE	desktop study is required
BLUE	LOW	no palaeontological studies are required however a protocol for finds is required
GREY	INSIGNIFICANT/ZERO	no palaeontological studies are required
WHITE/CLEAR	UNKNOWN	these areas will require a minimum of a desktop study. As more information comes to light, SAHRA will continue to populate the map.

The SAHRIS paleontological map shows a very high sensitivity to the west and a low sensitivity to the east on the study area.

AIR QUALITY

The sources of airborne particulate matter include:

- Agricultural activities which result in wind-blown soil dust that occur from bare fields, especially in dry periods,
- Vehicles, unpaved roads and construction,
- Mining/ Prospecting including open pits,
- Domestic fuel burning,
- Industries including power plants and to lesser extent natural sources

PROSPECTING AREA

No site specific air quality data could be found to assess the air quality baseline conditions associated within the study area. Due to minimal activity on the study area the air quality can generally be described as of excellent quality

NOISE

The sources of the noise pollution during prospecting activities are:

- From the operation of earth moving equipment and other vehicles;
- Mineral processing and recovery;
- Generator noise.

The extent of this noise is mostly limited to the prospecting site.

VISUAL

The prospecting activities will be visible from the road that connects Prieska with Griekwastad.

SPECIALIST STUDIES

Due to the limited level of detail that is normally implemented during a scoping exercise, it will be imperative to conduct more investigation into the ecology (ecological management plan), archaeology, heritage and culture. The studies that will be commissioned is therefore not yet quantified.

(v) **IMPACTS AND RISKS IDENTIFIED**

ACTIVITY whether listed or not listed. **(E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc…etc…etc.).**	**POTENTIAL IMPACT** **(e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc….etc…)**	**ASPECTS AFFECTED**	**PHASE** In which impact is anticipated **(e.g. Construction, commissioning, operational Decommissioning, closure, post-closure)**	**SIGNIFICANCE** if not mitigated	**MITIGATION TYPE** **(modify, remedy, control, or stop) through (e.g. noise control measures, storm-water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc. etc)** **E.g. Modify through alternative method. Control through noise control Control through management and monitoring through rehabilitation..**	**SIGNIFICANCE** if mitigated
ROADS	Air Quality	Nuisance dust would be created by the mining equipment and load and hauling of the material between the granite benching pit area and product loading area.	Construction and Operational phase	Medium	To wet roads or use a dust agent.	Low
	Flora	New haulage roads will destroy the vegetation	Construction	High	Re-establish self-sustaining vegetation units in rehabilitated areas; and control invasion by exotic and invasive plant species	Low
	Fauna	New haulage roads will destroy the vegetation	Construction	High	Re-establish vegetation in cleared areas and therefor a habitat to wildlife and eliminate poaching and the extermination of animal species within the boundaries of the prospecting area.	Low

	Ground Water	No Impact expected from the new haulage roads	Construction	No Significance	To minimise and prevent the contamination of ground water	None
	Noise	Noise from the mining equipment on the haulage roads.	Construction	Low	Control the incidence of unacceptable noise levels.	No Significance
	Soil	No Significance	Construction	No Significance	No Significance	No Significance
	Surface Water	No impact to surface water is expected from the new roads.	Construction	No Significance	Water conservation. Eliminate the contamination of run-off surface water.	No Significance
	Topography	No impact on topography is expected from the new roads.	Construction	No Significance	Remain within road demarcation	No Significance
	Visual	The roads will be visible to some extent from the immediate surroundings	Construction	Low	Minimise aesthetic disturbance. Reduce the visual impact through continuous rehabilitation. Institute a Waste Management program that will reduce the visibility effect. Introduce a dedicated waste disposal area.	Low
PROCESSING PLANT	Air quality	Nuisance dust would be created by the mining equipment	Operational	Medium	Avoidance of unnecessary removal of vegetation. Routine spraying of unpaved areas. Re-vegetation of rehabilitated areas not occupied by plant infrastructure.	Low
	Fauna	New Block cutting will disturb and destroy the natural habitat of the animals.	Operational	High	If any endangered species is found they must be reported to Department of Nature Conservation/relocated. Any form of poaching by outsiders will be reported to the authorities. On mine employees would be severely disciplined. Any type of snares and traps would be removed.	Medium
	Flora	New Block	Operational	High	Indigenous vegetation to be used for	Low

		cutting will disturb and destroy the natural vegetation.			landscaping to minimise water requirements. Any area that is rehabilitated or decommissioned will be seeded with a seed mixture reflecting the natural vegetation as is currently found. Management will control invader or exotic species on the site. General Treatment Procedure for invader or exotic species: Plants uprooted or cut off and can be destroyed completely. Only herbicides used that is registered for that purpose. Valid licences obtained from the Northern Cape Nature Conservation before protected plants are removed. Fires will only be allowed in demarcated areas build for that purpose. .	
	Ground Water	No impact to ground water is expected from the benching and pitting operations.	Operational	No Significance	Water conservation and elimination of run-off water contamination of surface water.	No Significance
	Noise	Noise impact from the equipment and machinery will be created	Operational	Medium	82dB(A)at the site boundary. Compliance to the Occupational Health and Safety Act, Act 85 of 1993. Comply with a program of good practice with regard to noise related impacts. If complaints are received from the public or state, noise levels will be monitored at prescribed monitoring points to ensure compliance within limits. Mechanical equipment	Medium

					/vehicles fitted with silencers and periodic maintenance program to ensure compliance with the Road Traffic Act. Hearing Protection available to all employees and visitors to the site. Screening/Migration control Appropriate measures installed to reflect/reduce noise.	
	Soil	The disturbance of the soil structure during Block opening.	Operational	High	Prevent soil pollution. Limit soil compaction. Curb soil erosion. Reinstate growth medium able to sustain plant life. In all places will the first 300mm weathered or loose material be classified as growth medium. In all areas where the above medium will be impacted on, it will be removed and stockpiled of 2.5m height. The growth medium would be used during rehabilitation phase on the impacted areas. If any soil is contamination during the life of the mine, it will be removed with the industrial waste to a recognized facility or company. Topsoil will be kept separate from overburden and will not be used for road maintenance.	High
	Surface water	Impact on surface water is expected during the bench cutting activities	Operational	No Significance	Water conservation and elimination of run-off water contamination of surface water. .	No Significance
	Topography	Changing of	Operational	Low	To reduce the potential of the surface	Low

		natural slopes by pitting / benching activities			erosion caused by run-off in excavated and backfilled areas; and to ensure the stability and safety of all backfilled excavation	
	Visual	The excavation will be visible to some extend from the immediate surroundings	Operational	No significance	No significance	No significance
TEMMPORARY WASTE DUMP AND TOPSOIL AREA	Air quality	Nuisance dust will be created by the mining equipment when the material is dumped/ stockpiled in these areas	Commissioning	Medium	Air quality: To limit the creation of nuisance dust the following management guidelines will be followed: Avoidance of unnecessary removal of vegetation: Routine spraying of unpaved site areas road and waters with water; Re-vegetation of rehabilitated areas not occupied by plant infrastructure to take place as soon as possible	Low
	Fauna	The natural habitat of the animals will be disturbed and/ or destroyed in these areas	Commissioning	High	If any endangered species are found on the mine they will be relocated. If this is not possible potential changes in the habitat of endangered species will be monitored. The above programme will also focus on species that depend on specific host plants or on specific symbiotic relationships with specific reference to possible impacts such related to emissions from the mine. Any form of poaching by workers from the mine will result in the max form of punishment as allowed for by common law. Any form of snares or traps on the site will be removed. If any endangered species are encountered the Department of Nature Conservation will be contacted	High
	Flora	Where new pits/ excavations will be created the vegetation will	Commissioning	High	Indigenous vegetation to be used for landscaping to minimize watering requirements. Any area that rehabilitated or decommissioned will be	High

		be disturbed and / or destroyed			seeded with a seed mixtures reflecting the natural vegetation as is currently found. If this is not to be feasible during rehabilitation a general seed mixture of the area will be used. Management will also take responsibility to control declared invader or exotic species on the mine. The following control methods will be used: The plant will be uprooted felled or cut off and can be destroyed completely. The plants will be treated with an herbicide that is registered for use in connection therewith and in accordance with the direction for the use of such an herbicide; The end objective of the re-vegetation program will be to achieve a stable self-sustaining habitat unit; Vegetation on flat surfaces will be established using dry land technique requiring no irrigation; Valid permits from the Nature Conservation will be obtained before any protected plant species are removed; Fires will only be allowed in facilities or equipment specially constructed for this purpose. If required by applicable legislation, a firebreak will be cleared around the perimeter of the mine.	
	Ground water	No impact to groundwater is expected from the creation of excavations	Commissioning	No Significance	Water conservation and elimination of run-off water contamination of surface water	No Significance
	Noise	Noise impact from the prospecting equipment will be created	Commissioning	Medium	Noise: As a minimum, ambient noise levels emanating from the mine will not exceed 82 dB(A) at the site boundary: The applicant will comply with the occupational noise regulations of the	Medium

					Occupational Health and Safety Act, Act 85 of 1993. The applicant will comply with the measures for good practice with regard to management of noise related impacts during construction and operation. The management objective will be able to reduce any level of noise, shock that may have effect on persons or animals, both inside the plant and that which may migrate outside the plant area. When the equivalent noise exposure, as defined in the South African Bureau of Standards Code of Practice for the Measurement and Assessment of Occupational Noise for Hearing Conservation Purposes, SABS 083 as amended, in any place at or in any mine or works where persons may travel or work exceeds 82 Db(A), the site manager will take the necessary steps to reduce the noise below this level. Hearing protection will be available for all employees where attenuation cannot be implemented. If any complaint is received from the public or state department regarding noise levels the levels will be monitored at prescribed monitoring points. Mechanical equipment: All mechanical equipment will be in good working order and vehicles will adhere to the relevant noise requirements of the Road Traffic Act. All vehicles in operation will be equipped with a silencer on their exhaust system. Safety measures, which generate noise such as reverse gear alarms on large vehicles, will be appropriately calibrated/ adjusted.	

					Screening/ Migration control; Appropriate measures will specifically be installed and or employed at the plant to act as screen and to reflect/reduce the noise. Appropriate non-metallic washers/ insulation will be used with any joining apparatus to join screens such as corrugated iron to other structures and to each other. Such screens will be maintained in a fixed position	
	Soil	The disturbance of the soil structures during block cutting activities	Commissioning	High	Soils To prevent soil pollution To limit soil compaction To curb soil erosion; and To reinstate a growth medium able to sustain plant life. In all place of development the first 300mm of loose or weathered material found will be classified as a growth medium. In all areas where the above growth medium impacted on, it will be removed and stockpiled on a dedicated area. The maximum height of stockpiles will be 2.5 meters. The growth medium/topsoil will be used during the rehabilitation of any impacted areas, after sloping in order to re-establish the same land capability. If any soil is contaminated during the life of the mine, It will either be treated on site or be removed together with the contaminant and placed in acceptable containers to be removed with the industrial waste to a recognized facility or company. Erosion control in the form of re-vegetation and contouring of slopes will be implemented on disturbed areas in and around the site.	High

					Topsoil will be kept separate from overburden and will not be used for building or maintenance of access roads. The stored topsoil will be adequately protected from being blown away or being eroded.	
	Surface water	Impact to surface water is expected during block cutting activities.	Commissioning	No Significance	To conserve water; and To eliminate the contamination of run-off and sources of surface water.	No Significance
	Topography	Changing of natural slopes by open pit activities	Commissioning	Low	To reduce the potential of surface erosion caused by runoff in excavated and backfilled areas; and To ensure the stability and safety of all backfilled excavation	Low
	Visual	The benching activities will be visible to some extend from immediate surroundings,	Commissioning	High	Only Landscaping on completion of project	High
Discard Dam	Air Quality	No impact to air quality expected.	Commissioning	Medium	Air quality: To limit the creation of nuisance dust the following management guidelines will be followed: Avoidance of unnecessary removal of vegetation: Routine spraying of unpaved site areas road and waters with water; Re-vegetation of rehabilitated areas not occupied by plant infrastructure to take place as soon as possible	Medium
	Fauna	The natural habitat of the animals will be disturbed when the mine residue is created.	Commissioning	High	If any endangered species are found on the mine they will be relocated. If this is not possible potential changes in the habitat of endangered species will be monitored. The above programme will also focus on species that depend on specific host plants or on specific symbiotic relationships with specific	High

					reference to possible impacts such related to emissions from the mine. Any form of poaching by workers from the mine will result in the max form of punishment as allowed for by common law. Any form of snares or traps on the site will be removed. If any endangered species are encountered the Department of Nature Conservation will be contacted.	
	Flora	The natural vegetation will be disturbed when the mine residue is created.	Commissioning	High	Indigenous vegetation to be used for landscaping to minimize watering requirements. Any area that rehabilitated or decommissioned will be seeded with a seed mixtures reflecting the natural vegetation as is currently found. If this is not to be feasible during rehabilitation a general seed mixture of the area will be used. Management will also take responsibility to control declared invader or exotic species on the mine. The following control methods will be used: The plant will be uprooted felled or cut off and can be destroyed completely. The plants will be treated with an herbicide that is registered for use in connection therewith and in accordance with the direction for the use of such an herbicide; The end objective of the re-vegetation program will be to achieve a stable self-sustaining habitat unit; Vegetation on flat surfaces will be established using dry land technique requiring no irrigation; Valid permits from the Northern Cape Nature Conservation will be obtained before any protected plant species are removed; Fires will only be allowed in facilities or equipment specially constructed for this purpose. If required by applicable legislation, a	

					firebreak will be cleared around the perimeter of the mine.	
	Groundwater	No impact to groundwater expected.	Commissioning	No Significance	Water conservation.	No Significance
	Noise	No noise impact is expected.	Commissioning	No Significance	No measures taken	No Significance
	Soil	The disturbance of the soil structure when the mine residue dam is created.	Commissioning	High	Soils To prevent soil pollution To limit soil compaction To curb soil erosion; and To reinstate a growth medium able to sustain plant life. In all place of development the first 300mm of loose or weathered material found will be classified as a growth medium. In all areas where the above growth medium impacted on, it will be removed and stockpiled on a dedicated area. The maximum height of stockpiles will be 2.5 meters. The growth medium/topsoil will be used during the rehabilitation of any impacted areas, after sloping in order to re-establish the same land capability. If any soil is contaminated during the life of the mine, It will either be treated on site or be removed together with the contaminant and placed in acceptable containers to be removed with the industrial waste to a recognized facility or company. Erosion control in the form of re-vegetation and contouring of slopes will be implemented on disturbed areas in and around the site. Topsoil will be kept separate from overburden and will not be used for building or maintenance of access roads.	Medium

					The stored topsoil will be adequately protected from being blown away or being eroded.	
	Surface water	No impact to surface water is expected	Commissioning	No Significance	Water conservation and elimination of run-off water contamination of surface water	No Significance
	Topography	Changing of natural slopes	Commissioning	Low	The main objective of the applicant is to rehabilitate the whole site in such a way to ensure that the topographical landscape would blend in with the surrounding landscape, not pose a safety hazard to humans and animals, while at the same time allow for alternative land uses.	Low
Visual	Visual	The mine residue dam will be visible to the immediate surroundings	Commissioning	Medium	The main objective of the applicant is to rehabilitate the whole site in such a way to ensure that the topographical landscape would blend in with the surrounding landscape, not pose a safety hazard to humans and animals, while at the same time allow for alternative land uses.	No Significance
OFFICES, ABLUTION FACILITIES AND OTHER INFRASTRUCTURE	Air Quality	Nuisance dust will be created by the processing plant.	Operational	Medium	Air quality: To limit the creation of nuisance dust the following management guidelines will be followed: Avoidance of unnecessary removal of vegetation: Routine spraying of unpaved site areas road and waters with water; Re-vegetation of rehabilitated areas not occupied by plant infrastructure to take place as soon as possible	Low
	Fauna	The natural habitat of the animals will be disturbed or destroyed when the plant residue is created.	Operational	High	If any endangered species are found on the mine they will be relocated. If this is not possible potential changes in the habitat of endangered species will be monitored. The above programme will also focus on species that depend on specific host plants or on specific symbiotic relationships with specific reference to possible impacts such	Low

					related to emissions from the mine. Any form of poaching by workers from the mine will result in the max form of punishment as allowed for by common law. Any form of snares or traps on the site will be removed. If any endangered species are encountered the Department of Nature Conservation will be contracted.	
	Flora	The natural vegetation will be disturbed when the plant is created.	Operational	High	Indigenous vegetation to be used for landscaping to minimize watering requirements. Any area that rehabilitated or decommissioned will be seeded with a seed mixtures reflecting the natural vegetation as is currently found. If this is not to be feasible during rehabilitation a general seed mixture of the area will be used. Management will also take responsibility to control declared invader or exotic species on the mine. The following control methods will be used: The plant will be uprooted felled or cut off and can be destroyed completely. The plants will be treated with an herbicide that is registered for use in connection therewith and in accordance with the direction for the use of such an herbicide; The end objective of the re-vegetation program will be to achieve a stable self-sustaining habitat unit; Vegetation on flat surfaces will be established using dry land technique requiring no irrigation; Valid permits from the Nature Conservation will be obtained before any protected plant species are removed; Fires will only be allowed in facilities or equipment specially constructed for this purpose. If required by applicable legislation, a firebreak will be cleared around the perimeter of the	Low

					prospecting operation.	
	Groundwater	No impact to groundwater expected.	Operational	No Significance	Water conservation and elimination of run-off water.	No Significance
	Noise	No Noise pollution expected.	Operational	Medium	Noise: As a minimum, ambient noise levels emanating from the mine will not exceed 82 dB(A) at the site boundary: The applicant will comply with the occupational noise regulations of the Occupational Health and Safety Act, Act 85 of 1993. The applicant will comply with the measures for good practice with regard to management of noise related impacts during construction and operation. The management objective will be able to reduce any level of noise, shock that may have effect on persons or animals, both inside the plant and that which may migrate outside the plant area. When the equivalent noise exposure, as defined in the South African Bureau of Standards Code of Practice for the Measurement and Assessment of Occupational Noise for Hearing Conservation Purposes, SABS 083 as amended, in any place at or in any mine or works where persons may travel or work exceeds 82 Db (A), the site manager will take the necessary steps to reduce the noise below this level. Hearing protection will be available for all employees where attenuation cannot be implemented. If any complaint is received from the public or state department regarding noise levels .The levels will be monitored at prescribed monitoring points. Mechanical equipment: All mechanical	Low

					equipment will be in good working order and vehicles will adhere to the relevant noise requirements of the Road Traffic Act. All vehicles in operation will be equipped with a silencer on their exhaust system. Safety measures, which generate noise such as reverse gear alarms on large vehicles, will be appropriately calibrated/ adjusted. Screening/ Migration control; Appropriate measures will specifically be installed and or employed at the plant to act as screen and to reflect/reduce the noise. Appropriate non-metallic washers/ insulation will be used with any joining apparatus to join screens such as corrugated iron to other structures and to each other. Such screens will be maintained in a fixed position.	
	Soil	The disturbance of the soil with the erection of the site office, ablution facilities and infrastructure.	Operational	High	Soils To prevent soil pollution To limit soil compaction To curb soil erosion; and To reinstate a growth medium able to sustain plant life. In all place of development the first 300mm of loose or weathered material found will be classified as a growth medium. In all areas where the above growth medium impacted on, it will be removed and stockpiled on a dedicated area. The maximum height of stockpiles will be 2.5 meters. The growth medium/topsoil will be used during the rehabilitation of any impacted areas, after sloping in order to re-establish the same land capability.	High

					If any soil is contaminated during the life of the mine, It will either be treated on site or be removed together with the contaminant and placed in acceptable containers to be removed with the industrial waste to a recognized facility or company. Erosion control in the form of re-vegetation and contouring of slopes will be implemented on disturbed areas in and around the site. Topsoil will be kept separate from overburden and will not be used for building or maintenance of access roads. The stored topsoil will be adequately protected from being blown away or being eroded.	
	Surface Water	Surface water not utilised	Operational	Medium	To conserve water; and To eliminate the contamination of run-off and sources of surface water.	Medium
	Topography	No impact to the topography is expected from the erection of the site office, ablution facilities and infrastructure	Operational	No Significance	Remain within demarcated area for structures	No Significance
	Visual	The erection of the site office, ablution facilities and infrastructure	Operational	Low	The main objective of the applicant is to rehabilitate the whole site in such a way to ensure that the topographical landscape would blend in with the surrounding landscape, not pose a safety hazard to humans and animals, while at the same time allow for alternative land uses.	Low

. **IMPACTS AND RISKS IDENTIFIED, NATURE SIGNIFICANCE AND EXTENT**

Mining Activity	Impact On	Duration	Probability	Significance	Extent
Roads and Hauling	Air Quality	Medium	Moderate	Moderate	Local-Minimised through Dust control measures
	Fauna	Long	Definite	High	Site Specific-Reversed with rehabilitation
	Flora	Long	Definite	High	Site Specific-Reversed with rehabilitation
	Noise	Short	Definite	Low	Local-Managed through Maintenance program of TMM's
	Visual	Long	Probable	No significance	Local-Reversed with rehabilitation
	Soil	Long	Definite	High	Site specific-Reversed with rehabilitation
Open Pit (Excavations)	Air Quality	Short	Definite	Low	Site Specific-Minimised through Dust control measures
	Fauna	Long	Definite	High	Site Specific-Reversed with rehabilitation
	Flora	Long	Definite	High	Site Specific-Reversed with rehabilitation
	Noise	Short	Moderate	Medium	Local-Managed through Maintenance program of TMM's
	Soil	Long	Definite	High	Reversed with rehabilitation
	Topography	Long	Very High	Low	Site Specific-Irreplaceable loss
	Visual	Medium	Very High	No significance	Local-Reversed with rehabilitation
	Archaeological	Permanent	Very Low	Very High	Global-Awareness program
	Land Use	Medium	Low	Moderate	Site Specific-within EA area
	Sensitive Landscapes	Very short	Very low	Very High	Avoid –None present on site
	Land Capability	Very Short	Low	High	Site specific
Waste Dump	Air Quality	Short	Low	Medium	Site Specific-Managed through Dust control measures
	Fauna	Medium	Definite	High	Site Specific-Reversed with rehabilitation
	Flora	Medium	Definite	High	Site Specific-Reversed with rehabilitation
	Soil	Medium	Low	High	Site Specific-Reversed with rehabilitation
	Topography	Medium	Definite	Low	Site Specific-Irreplaceable loss Used for backfill purposes to some extent
	Visual	Medium	Definite	High	Site Specific-Mitigated to some when rehabilitated
	Surface Water	Medium	Low	Low	Site Specific-Mitigated to some extent with water barriers
	Ground water	Very Short	Low	Low	Local-Mitigated to some extent with water barriers
Discard Dam	Air Quality	Short	Low	Low	Site Specific-Managed

					through Dust control measures
	Fauna	Long	Definite	High	Site Specific-Reversed with rehabilitation
	Flora	Long	Definite	High	Site Specific-Reversed with rehabilitation
	Noise	Short	Very Low	Medium	Site Specific-Reversed with rehabilitation
	Soil	Long	Definite	High	Site Specific-Irreplaceable loss Used for backfill purposes to some extent
	Topography	Long	Definite	Low	Site Specific-Mitigated to some when rehabilitated
	Visual	Long	Definite	No significance	Site Specific-Mitigated to some when rehabilitated
	Surface Water	Very Long	Definite	Low	Site Specific-Mitigated to some extent with water barricade
	Ground water	Very Long	Definite	Very High Significance	Regional Specific-Mitigated to some extent with water barricade
Topsoil Storage	Air Quality	Very Short	Moderate	High	Site Specific-Managed through Dust control measures
	Fauna	Long	Definite	High	Site Specific-Reversed with rehabilitation
	Flora	Long	Definite	High	Site Specific-Reversed with rehabilitation
	Noise	Short	Definite	Medium	Site Specific-Reversed with rehabilitation
	Soil	Medium	Definite	High	Site Specific-Irreplaceable loss Used for backfill purposes to some extent
	Topography	Long	Definite	Low	Site Specific-Mitigated to some when rehabilitated
	Visual	Long	Definite	No significance	Site Specific-Mitigated to some when rehabilitated
Plant and Processing areas	Air Quality	Short	Definite	Medium	Site Specific-Managed through Dust control measures
	Fauna	Long	Definite	High	Site Specific-Reversed with rehabilitation
	Flora	Long	Definite	High	Site Specific-Reversed with rehabilitation
	Noise	Short	Definite	Medium	Site Specific-Reversed with rehabilitation
	Soil	Long	Definite	High	Site Specific-Irreplaceable loss Used for backfill purposes to some extent
	Surface water	Long	Definite	Low	Site Specific-Mitigated to some extent with water barricade
	Visual	Long	Definite	No significance	Site Specific-Mitigated to some when rehabilitated
Office, Ablution facilities, & other temporary buildings	Air Quality	Very Short	Very Low	No Significance	Site Specific-Managed through Dust control measures
	Fauna	Long	Definite	Site Specific-Managed	Site Specific-Reversed with rehabilitation

				through Dust control measures	
	Flora	Long	Definite	Site Specific-Reversed with rehabilitation	Site Specific-Reversed with rehabilitation
	Noise	Short	Definite	Site Specific-Reversed with rehabilitation	Site Specific-Reversed with rehabilitation
	Soil	Long	Definite	Site Specific-Reversed with rehabilitation	Site Specific-Irreplaceable loss Used for backfill purposes to some extent
	Visual	Long	Definite	No significance	Site Specific-Mitigated to some when rehabilitated
Workshops and Diesel Tanks	Air Quality	Very Short	Very Low	No Significance	Site Specific-Managed through Dust control measures
	Fauna	Long	Definite	Site Specific-Managed through Dust control measures	Site Specific-Reversed with rehabilitation
	Flora	Long	Definite	Site Specific-Reversed with rehabilitation	Site Specific-Reversed with rehabilitation
	Noise	Short	Definite	Site Specific-Reversed with rehabilitation	Site Specific-Reversed with rehabilitation
	Soil	Long	Definite	Site Specific-Reversed with rehabilitation	Site Specific-Irreplaceable loss Used for backfill purposes to some extent
	Visual	Long	Definite	No significance	Site Specific-Mitigated to some when rehabilitated
	Groundwater	Long	Moderate	Low	Site Specific-Mitigated with drip trays/oils/solvents/domestic and industrial waste

(vi) **METHODOLOGY**

Table -Explanation of probability of impact occurrence

Probability of impact occurrence	Explanation of probability
Very Low	<20% sure of particular fact or likelihood of impact occurring
Low	20-39% sure of particular fact or likelihood of impact occurring
Moderate	40-59% sure of particular fact or likelihood of impact occurring
High	80-79% sure of particular fact or likelihood of impact occurring
Very High	80-99% sure of particular fact or likelihood of impact occurring
Definite	100% sure of particular fact or likelihood of impact occurring

Table-Explanation of extend of impact

Extent of Impact	Explanation of extent
Site specific	Direct and indirect impacts limited to site of impact only
Local	Direct and indirect impacts affecting environmental elements within the study area
Regional	Direct and indirect impacts affecting environmental elements within the Northern Cape
National	Direct and indirect impacts affecting environmental element on national level
Global	Direct and indirect impact affecting environmental elements on global level

Table -Explanation of duration of impact

Duration of impact	Explanation of duration
Very short	Less than 1 year
Short	1 to 5 years
Medium	6 to 12 years
Long	13 to 50 years
Very long	Longer than 50 years
Permanent	Permanent

Table -Explanation of impact significance

Impact significance	Explanation of significance
No impact	There will be no impact at all not even a very low impact on the system or any of its parts
Very low	Impact will be negligible. In the cast of negative impact, almost no mitigation and/or remedial activity would be needed, and any minor steps which might be needed would be easy, cheap and simple. In the case of positive impacts alternative means would almost all likely be better, if one or a number of ways, then this means of achieving benefit
Low	Impact would be of low order and with little real effect. In the case of negative impacts, mitigation and /or remedial activity would be either easily achieved or little would be required or both. In the case of positive impacts alternative means for achieving this benefit would likely be easier, cheaper, more effective, less time consuming, or some combination of these
Moderate significance	Impact would be real but not substantial within the bounds of those which could occur. In the case of negative impacts, mitigation and /or remedial activity would be feasible and fairly easily possible. In the case of positive impacts other means

	of covering these benefits would be about equal in cost and effort
High significance	Impacts of substantial order. In the case of negative impacts, mitigation and/or remedial activity would be feasible but difficult, expensive, time consuming or some combination of these. In the case of positive impact other means of achieving this benefit would be feasible but would be more difficult, expensive, time consuming or some combination of these
Very high significance	Of the highest order possible within the bounds of impact which could occur, in the case of negative impacts, there would be no possible mitigation and /or remedial activity to offset the impact at the spatial or time scale for which was predicted. In the case of positive impact there is no real alternative to achieving the benefit

(vii) POSITIVE AND NEGATIVE IMPACTS

	IMPACTS
Geographical	Geographical environment will remain the same
Physical	Remain Unchanged
Biological Temporary Waste Dump and Topsoil Area Discard Dam Site Office, Ablution Facilities, Workshop and Infrastructure	Fauna and Flora destruction. Possible Soil contamination Noise pollution Air Quality Contamination to Ground (Orange River) and Surface Water Land capability
Social	No families or social network exists currently on the study area. The prospecting will positively contribute towards the re-establish of a social environment
Economic	Land use after the prospecting activity. Economic activity of neighbouring farm owners
Archaeology, Heritage and Culture	Minimum impact on Archaeology, Heritage and Cultural sources as it will be avoided

(vii) **MITIGATION MEASURES**

ACTIVITY Whether listed or not listed (E.g. Excavations, blasting Stockpiles, discard dumps or dams, loading hauling and transport, water supply dams and, boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, beams, roads, pipelines, power lines, conveyers, etc...etc...etc...)	**POTENTIAL IMPACT** (E.g. dust, noise ,drainage surface Disturbance, fly rock, surface water contamination, air pollution etc...etc)	**ASPECTS AFFECTED**	**PHASE** In which impact is anticipated (e.g. Construction, commissioning, operational Decommissioning, closure, post-closure)	**SIGNIFICANCE** if not mitigated	**MITIGATION TYPE** (modify, remedy, control, or stop) through (e.g. noise control measures, storm-water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc. etc) E.g. Modify through alternative method. Control through noise control Control through management and monitoring through rehabilitation.	**SIGNIFICANCE** if mitigated
Bulk Sampling (Excavations)	Geological	Loss	Operational	Medium	-	Medium
	Topographic	Change		Low	Rehabilitation	Low
	Soil	Pollution		High	Immediate rehabilitation Continuous Inspection	Low
	Water table	Depressed		-	-	-
	Fauna	Migration		-	-	-
	Water Quality	Loss		-	-	-
	Noise	Elevated levels		Low	Operation during office hours only	Low
	Air quality	Degradation		Low	Damping of mine roads. Speed restriction	Low
	Archaeological items	Loss		Medium	Avoid sites of significance	Low
	Sensitive landscape	Destruction		-	-	-
	Visual impact	Scenery loss		Low	Within Wall enclosure	Low
	Waste	Disposal	Decommissioning	Low	Management standards	Positive
	Re-vegetation	Re-growth	After closure	-	No Vegetation required for after use	Positive

	Safety Risks	Waste disposal		Positive	Closure standards	Positive
Topsoil Dump	Vegetation	Loss	Construction	-	No Vegetation	-
	Geological	Loss	Operational	-	-	-
	Topographic	Change		Low	Rehabilitation	Low
	Soil	Pollution		Low	Immediate rehabilitation	Low
	Vegetation	Invader plants		Low	Regular Removal	Low
	Water table	Depressed		-	-	-
	Fauna	Migration		Low	-	Low
	Water quality	Loss		-	-	-
	Noise	Elevated levels		-	-	-
	Air quality	Degradation		Low	Protect against wind erosion	Low
	Archaeological items	Loss		Low	Avoid sites of significance	Low
	Sensitive landscape	Destruction		Low	Avoid significant sensitive sites	Low
	Visual impact	Scenery loss		Low	-	Low
	Waste	Disposal	Decommissioning	Low	Management standards	Positive
	Exposed area Rehab	Re-vegetation	After closure	Positive	No vegetation required for future use	Positive
	Safety risks	Waste disposal		Positive	Closure standards	Positive
Stock Piles	Vegetation	Loss	Construction	-	-	-
	Geological	Loss		-	-	-
	Topographic	Change		Low	Rehabilitation standards	Low
	Soil	Pollution		Medium	Regular inspection Immediate rehabilitation	Low
	Water table	Depressed		-	-	-
	Fauna	Migration		Low	-	Low
	Water quality	Loss		-	-	-
	Noise	Elevated levels		Low	Operations during office hours	Low
	Air quality	Degradation		Low	Protect against wind erosion	Low
	Archaeological items	Loss		Low	Avoid sites of significance	Low
	Sensitive landscape	Destruction		Low	Avoid significant sensitive sites	Low
	Visual impact	Scenery loss		Low	In enclosed area behind a	Low

	waste				wall	
	Safety risks	Waste disposal	After Closure	Positive	Closure standards	Positive
Waste Dumps	Vegetation	Loss	Construction	-	-	-
	Geological	Loss	Operational	-	-	-
	Topographic	Change		Low	Rehabilitation	Low
	Soil	Pollution		Medium	Regular inspection Immediate rehabilitation	Low
	Water table	Depressed		-	-	-
	Fauna	Migration		Low	-	Low
	Water quality	Waste water		-	-	-
	Noise	Elevated levels		Low	Operations during office hours	Low
	Air quality	Degradation		Low	Protect against wind erosion	Low
	Archaeological items	Loss		Low	Avoid sites of significance	Low
	Sensitive landscape	Destruction		Low	Avoid significant sensitive sites	Low
	Visual impact	Scenery loss		Low	In enclosed area behind a wall	Low
	Waste	Disposal	Decommissioning	Low	Management standards	Positive
	Safety risks	Waste disposal	After closure	Positive	Closure standards	Positive
Settling Dams	Vegetation	Loss	Construction	-	-	-
	Geological	Loss	Operational	-	-	-
	Topographic	Change		Medium	Rehabilitation	Low
	Soil	Pollution		Medium	Immediate rehabilitation	Low
	Water table	Depressed		High	Water reticulation	Positive
	Fauna	Migration		Low	-	Low
	Water quality	Waste water		Medium	Water reticulation	Low
	Noise	Elevated levels		Low	-	Low
	Air quality	Degradation		-	-	-
	Archaeological items	Loss		Medium	Avoid sites of significance	Low
	Sensitive landscape	Destruction		-	Avoid significant sensitive sites	-
	Visual impact	Scenery loss		Low	-	Low
	Waste	Disposal	Decommissioning	Low	Management standards	Positive
	Safety risks	Waste disposal	After Closure	Positive	Closure standards	Positive
Site Office	Geological	Loss	Operational	-	-	-

	Topographic	Change		Medium	Rehabilitation	Low
	Soil	Pollution		Medium	Immediate rehabilitation	Low
	Water table	Depressed		-	Water reticulation	Positive
	Fauna	Migration		Low	-	Low
	Water quality	Waste water		Low	Water reticulation	Low
	Noise	Elevated levels		Low	-	Low
	Air quality	Degradation		-	-	-
	Archaeological items	Loss		Low	Avoid sites of significance	Low
	Visual impact	Scenery loss		Low	Behind enclosed wall	Low
	Waste	Disposal	Decommissioning	Low	Management standards	Positive
	Safety risks	Waste disposal		Positive	Closure standards	Positive
Plant site	Vegetation	Loss	Construction	-	Vegetation clearing control	-
	Geological	Loss	Operational	-	-	-
	Topographic	Change		Low	Rehabilitation	Low
	Soil	Pollution		Medium	Immediate rehabilitation	Low
	Water table	Depressed		-	Water reticulation	Positive
	Fauna	Migration		Low	-	Low
	Water quality	Waste water		Medium	Water reticulation	Low
	Noise	Elevated levels		Low	-	Low
	Air quality	Degradation		-	-	-
	Archaeological items	Loss		Medium	Avoid sites of significance	Low
	Visual impact	Scenery loss		Low	Behind enclosed wall	Low
	Waste	Disposal	Decommissioning	Low	Management standards	Positive
	Safety risks	Waste disposal		Positive	Closure standards	Positive
	Geological	Loss	Operational	-	-	-
	Topographic	Change		Low	Rehabilitation	Low
	Soil	Pollution		Medium	Immediate rehabilitation	Low
	Grazing	Loss		Low	Rehabilitation	Low
	Water table	Depressed		-	Water reticulation	Positive
	Fauna	Migration		Low	-	Low
	Water quality	Waste water		Medium	Water reticulation	Low
	Noise	Elevated levels		Low	-	Low
	Air quality	Degradation		-	-	-
	Archaeological items	Loss		Medium	Avoid sites of significance	Low
	Visual impact	Scenery loss		Low	-	Low
	Waste	Disposal	Decommissioning	Low	Management standards	Positive
	Safety risks	Waste disposal		Positive	Closure standards	Positive

Vehicle Parking	Vegetation	Loss	Construction	-	Vegetation clearing control	-
	Geological	Loss	Operational	-	-	-
	Topographic	Change		-	Rehabilitation	-
	Soil	Pollution		Low	Immediate rehabilitation	Low
	Water table	Depressed		-	Water reticulation	Positive
	Fauna	Migration		Low	-	Low
	Water quality	Waste water		Low	Water reticulation	Low
	Noise	Elevated levels		Low	-	Low
	Air quality	Degradation		-	-	-
	Archaeological items	Loss		Low	Avoid sites of significance	Low
	Sensitive landscape	Destruction		Medium	Avoid significant sensitive sites	Low
	Visual impact	Scenery loss		Low	-	Low
	Waste	Disposal	Decommissioning	Low	Management standards	Positive
	Safety risks	Waste disposal	After closure	Positive	Closure standards	Positive
Chemical Storage	Vegetation	Loss	Construction	-	Vegetation clearing control	-
	Geological	Loss	Operational	-	-	-
	Topographic	Change		Medium	Rehabilitation	Low
	Soil	Pollution		Medium	Immediate rehabilitation	Low
	Water table	Depressed		-	Water reticulation	Positive
	Fauna	Migration		Low	-	Low
	Water quality	Waste water		Medium	Water reticulation	Low
	Noise	Elevated levels		Low	-	Low
	Air quality	Degradation		-	-	-
	Archaeological items	Loss		Medium	Avoid sites of significance	Low
	Visual impact	Scenery loss		Low	Behind enclosed wall	Low
	Waste	Disposal	Decommissioning	Low	Management standards	Positive
	Re-vegetation	Re-growth		Medium	Rehabilitation standards	Positive
	Safety risks	Waste disposal		Positive	Closure standards	Positive
Diesel Storage	Vegetation	Loss	Construction	-	Vegetation clearing control	-
	Geological	Loss	Operational	-	-	-
	Topographic	Change		Medium	Rehabilitation	Low
	Soil	Pollution		Medium	Immediate rehabilitation	Low
	Grazing	Loss		Low	Rehabilitation	Low
	Water table	Depressed		-	Water reticulation	Positive
	Fauna	Migration		Low	-	Low
	Water quality	Waste water		Medium	Water reticulation	Low

	Noise	Elevated levels		Low	-	Low
	Air quality	Degradation		-	-	-
	Archaeological items	Loss		Medium	Avoid sites of significance	Low
	Visual impact	Scenery loss		Low	-	Low
	Waste	Disposal	Decommissioning	Low	Management standards	Positive
	Safety risks	Waste disposal	After closure	Positive	Closure standards	Positive
Domestic waste	Vegetation	Loss	Construction	-	Vegetation clearing control	-
	Geological	Loss	Operational	-	-	-
	Topographic	Change		Low	Rehabilitation	Low
	Soil	Pollution		Medium	Immediate rehabilitation	Low
	Grazing	Loss		Low	Rehabilitation	Low
	Vegetation	Loss/disturbance		Low	Vegetation clearing control	Low
		Invader plants		Low	Regular removal	Low
	Water table	Depressed		-	Water reticulation	Positive
	Fauna	Migration		Low	-	Low
	Water quality	Waste water		Medium	Water reticulation	Low
	Noise	Elevated levels		Low	-	Low
	Air quality	Degradation		-	-	-
	Archaeological items	Loss		Medium	Avoid sites of significance	Low
	Visual impact	Scenery loss		Low	-	Low
	Waste	Disposal	Decommissioning	Low	Management standards	Positive
	Safety risks	Waste disposal	After closure	Positive	Closure standards	Positive
Mine and access roads	Vegetation	Loss	Construction	-	-	-
	Geological	Loss	Operational	-	-	-
	Topographic	Change		-	Rehabilitation	-
	Soil	Pollution		Medium	Immediate rehabilitation	Low
	Water table	Depressed		-	Water reticulation	Positive
	Fauna	Migration		-	-	-
	Water quality	Waste water		Medium	Water reticulation	Low
	Noise	Elevated levels		Low	-	Low
	Air quality	Degradation		-	-	-
	Archaeological items	Loss		Medium	Avoid sites of significance	Low
	Visual impact	Scenery loss		Low	-	Low
	Waste	Disposal	Decommissioning	Low	Management standards	Positive
	Safety risks	Waste disposal	After closure	Positive	Closure standards	Positive

ACTIVITY whether listed or not listed. **(E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc…etc…etc.)**.	**POTENTIAL IMPACT** **(e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc….etc…)**	**ASPECTS AFFECTED**	**PHASE** In which impact is anticipated **(e.g. Construction, commissioning, operational Decommissioning, closure, post-closure)**	**MITIGATION TYPE** **(modify, remedy, control, or stop) through (e.g. noise control measures, storm-water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc. etc)** **E.g.** • **Modify through alternative method.** • **Control through noise control** • **Control through management and monitoring** • **Remedy through rehabilitation..**	**STANDARD TO BE ACHIEVED** **(Impact avoided, noise levels, dust levels, rehabilitation standards, end use objectives) etc.**
Site Establishment	Surface disturbance Air Pollution Topsoil	Fauna and Flora Topography	Construction phase	Dust suppression by means of water spraying. Rehabilitation, Ripping of compact ground. Seeding with indigenous plant. Speed limits of 30km per hour	Compliance with NEMA, NWA, MPRDA, NEM:WA and the NEMA principles will be done.
Roads construction	Surface disturbance Air Pollution Topsoil	Fauna and Flora Topography	Construction phase	Dust suppression by means of water spraying. Roads will be ripped to a depth of 300mm in order to allow vegetation growth	Compliance with NEMA, NWA, MPRDA, NEM:WA and the NEMA principles will be done.
Temporal Storage of hydrocarb	Surface /ground water contamination	Contamination	Operational	Demolishing of cement slabs and bund wall during decommissioning phase	Compliance with NEMA, NWA, MPRDA, NEM:WA and the NEMA principles will be done.
Open Cast Prospecting Method	Surface disturbance Air Pollution Noise Surface /ground water contamination	Visual Geology Topography Fauna and Flora Visibility	Operational phase	Dust suppression by means of water spraying. Dust fall-out buckets. Concurrent rehabilitation will be done by backfilling the trenches. Topsoil will be spread on top to allow plant succession.	Compliance with NEMA, NWA, MPRDA, NEM:WA and the NEMA principles will be done.

				Site Access restriction Monitoring. Drip trays placed under each stationary equipment. Seeding with indigenous plant. Speed limit of 30km/h. Labelled Waste containers. Vegetation will be protected by avoiding unnecessary clearance and by using existing roads at all times. No poaching allowed. Comply with occupational noise regulations of the Occupational Health and Safety Act, Act 85 of 1993. Provide ear plugs for noise pollution.	
Decommissioning and final rehabilitation	Decommissioning phase	Visual Geology Topography Fauna and Flora Visibility	All infrastructure removed from site Waste will be disposed of at licenced facilities. Any contaminated soils will be cleaned and rehabilitated. All compacted surfaces will be ripped to a depth of 300mm. The successful establishment of vegetation is important to ensure the return of animals in the area. if sucseccion	Compliance with NEMA, NWA, MPRDA, NEM:WA and the NEMA principles will be done.	Last Phase

			does not take place, a seeding programme in consultation with the ecologist should be implemented. Boreholes will be capped and made safe, in agreement with the landowner.		

(ix) **OUTCOME OF SITE SELECTION MATRIX**

The following impacts were considered during the site selection layout plan.

	SCORING	PREFERED LAYOUT	FUTURE LAND USE AREA
Asbestos Location (Adjacent Farms Rietfontein-Asbestoshill)	10	0	0
Current Infrastructure on site	10	0	0
Current land use	10	0	0
Water contamination (Orange river)	10	5	0
Diamond gravel resource (Positive)	10	0	10
Prieska-Marydale roads	10	5	5
Neighbours Noise Dust Visibility	10	5	5
Future land use	10	0	10
Closure Objective	10	5	10
Fauna and Flora	10	5	10
Archaeology, Heritage and Culture	10	5	1
TOTAL	110	30	51

SELECTION SCORING
10-Avoidance
5-Mitigation Measures Required
1-Monitoring Required -

(x) **MOTIVATION**

No alternative location site has been considered as the diamond gravel resource is site specific. The preliminary site layout plan has been identified using an engineering selection process which is explained above.

The alternative for technology was changed from a grease table recovery to a Sortex system due to its efficiency and avoidance of diamond grease use.

(xi) **CONCLUDING STATEMENT**

The applicant has applied for a Prospecting Right and is intending on prospecting the proposed areas in a sustainable manner

(i) PLAN OF STUDY

(i) **Description of alternatives to be considered including the option of not going ahead with the activity.**

The alternatives site include Rietfontein 11 farm which is currently under application.

The alternative for technology was changed from a grease table recovery to a Sortex system due to its efficiency and avoidance of diamond grease use.

ii. Description of the aspects to be assessed as part of the environmental impact assessment process

This section describes the nature and extent of further investigations to be conducted in the Environmental Impact Assessment.

Ecology, Archaeology, Heritage and Culture: Need to be further investigated. The assessment and detailed management measures will be provided in the EMPr report.

(iii) **ASPECTS TO BE ASSESSED BY SPECIALISTS**

This will be identified during the EIA and EMPr stage

(iv) **METHOD OF ASSESSMENT**

Methodology used in determining and ranking nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks. The impacts were individually described and assessed using the criteria drawn from the Environmental Impact Assessment (EIA) Regulations, published by the DEA in terms of the NEMA (Act 107 of 1998).The significance of each impact is assessed using the following formula (before and after mitigation):Significance Point (SP) = (Probability + Extent + Duration) x Intensity

The significance of the impacts was determined through the consideration of the following criteria:

Probability:	Provides a description of the likelihood/probability of the impact occurring
Extent:	Describes the spatial scale over which the impact will be experienced
Duration:	The period over which the impact will be experienced
Intensity:	The degree/order of magnitude/severity to which the impact affects the health and welfare of humans and the environment
Significance:	Overall significance of the impact on components of the affected environment and whether it is a negative or positive impact

SP > 75	Indicates **high** environmental significance	An impact that could influence the decision about whether or not to proceed with the project regardless of any possible mitigation.
SP 30 – 75	Indicates **moderate** environmental significance	An impact or benefit which is sufficiently important to require management and which could have an influence on the decision unless it is mitigated.
SP < 30	Indicates **low** environmental significance	Impacts with little real effect and which should not have an influence on or require modification of the project design.
+	Positive impact	An impact that is likely to result in positive consequences/effects.

Probability (P)		
None (N)	1	The possibility of the impact occurring in none, due either to the circumstances, design or experience (0%).
Possible (P)	2	The possibility of the impact occurring is very low, due either to the circumstances, design or experience (25%).
Likely (L)	3	There is a possibility that the impact will occur to the extent that provisions must therefore be made (50%).
Highly likely (H)	4	It is most likely that the impacts will occur at some stage of the development and plans must be drawn up before carrying out the activity (75%).
Definite (D)	5	The impact will take place regardless of any prevention plans, and only mitigation actions or contingency plans to contain the effect can be relied on (100%).
Extent (E)		
Footprint (F)	1	The impact area extends only as far as the activity which occurs within the total site area.
Site (S)	2	The impact could affect the whole site or a significant portion of the site.
Regional (R)	3	The impact could affect the area including the neighbouring farms, the transport route and/or the adjoining towns.
National (N)	4	The impact could have an effect that expands throughout the country.
International (I)	5	Where the impact has international ramifications that extend beyond the boundaries of the country.
Duration (D)		
The period over which the impact will be experienced		
Temporary (T)	1	0 – 3 years (or confined to the construction period).
Short term (S)	2	3 – 10 years (or confined to the construction and part of the operational period).
Medium	3	10 – 15 years (or confined to the construction and whole operational

term (M)		period).
Long term (L)	4	For the whole life of mine (including closure and rehabilitation period).
Permanent (P)	5	Beyond the anticipated lifetime of the project.
Intensity (I)		
Insignificant (I)	2	Will have a no or very little impact on the health and welfare of humans and environment
Low (L)	4	Will have a slight impact on the health and welfare of humans and environment
Moderate (M)	6	Will have a moderate impact on the health and welfare of humans and environment
High (H)	8	Will have a significant impact on the health and welfare of humans and the environment
Very high/ don't know (V)	10	Will have a severe impact on the health and welfare of humans and the environment

Other Information required by the competent Authority

Compliance with the provisions of sections 24(4)(a) and (b) read with section 24 (3) (a) and (7) of the National Environmental Management Act (Act 107 of 1998). the EIA report must include the:-

18.1.1 Impact on the socio-economic conditions of any directly affected person. (Provide the results of Investigation, assessment, and evaluation of the impact of the mining, bulk sampling or alluvial diamond prospecting on any directly affected person including the landowner, lawful occupier, or, where applicable, potential beneficiaries of any land restitution claim, attach the investigation report as **Appendix 2.19.1** and confirm that the applicable mitigation is reflected in 2.5.3; 2.11.6.and 2.12.herein).

The prospecting activities will contribute to the local economy via its impact on job creation, total disposable income and value added activities. The operation would further support local businesses in Marydale, Griquatown and Prieska for the supply of project consumables. The project would further assist with the re-establishment of some of the families to the now abended area.

Five measures of economic impacts can be defined to demonstrate the positive effect of the proposed operation on the local economy of Brits.

- The employment opportunities created
- The income that employees would derive
- The CAPEX spend on fixed assets
- The monthly operational expenditure for consumables (OPEX
- Revenue- the total value of sales arising from the sale of diamonds recovered

18.1.2 Impact on any national estate referred to in section 3(2) of the National Heritage Resources Act. **(**Provide the results of Investigation, assessment, and evaluation of the impact of the mining, bulk sampling or alluvial diamond prospecting on any national estate referred to in section 3(2) of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) with the exception of the national estate contemplated in section 3(2)(*i*)(vi) and (vii) of that Act, attach the investigation report as **Appendix 2.19.2** and confirm that the applicable mitigation is reflected in 2.5.3; 2.11.6.and 2.12.herein).

The impact of the prospecting activities on the National Heritage Resources will be fully investigated during the EIA and EMPr phase. Current consultation is with SAHRA, Mc Gregor Museum of which a scoping phase report on the adjacent farms has been conducted.

Other matters required in terms of sections 24(4)(a) and (b) of the Act.

(the EAP managing the application must provide the competent authority with detailed, written proof of an investigation as required by section 24(4)(b)(i) of the Act and motivation if no reasonable or feasible alternatives, as contemplated in sub-regulation 22(2)(h), exist. The EAP must attach such motivation as **Appendix 4)**.

The compiler of this document, also the appointed EAP, conducted a field visit and an in-depth desktop study conducted using existing literature and data. During the Investigation numerous reports of the area has been consulted.

Impact Management Actions

(A description of impact management outcomes, identifying the standard of impact management required for the aspects contemplated in paragraph ();

ACTIVITY whether listed or not listed. **(E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc…etc…etc.)**.	**POTENTIAL IMPACT** **(e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc….etc…)**	**ASPECTS AFFECTED**	**PHASE** In which impact is anticipated **(e.g. Construction, commissioning, operational Decommissioning, closure, post-closure)**	**MITIGATION TYPE** **(modify, remedy, control, or stop) through (e.g. noise control measures, storm-water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc. etc)** **E.g.** • **Modify through alternative method.** • **Control through noise control** • **Control through management and monitoring** • **Remedy through rehabilitation..**	**STANDARD TO BE ACHIEVED** **(Impact avoided, noise levels, dust levels, rehabilitation standards, end use objectives) etc.**
Site Establishment	Surface disturbance Air Pollution Topsoil	Fauna and Flora Topography	Construction phase	Dust suppression by means of water spraying. Rehabilitation, Ripping of compact ground. Seeding with indigenous plant. Speed limits of 30km per hour	Compliance with NEMA, NWA, MPRDA, NEM:WA and the NEMA principles will be done.
Temporal Roads construction	Surface disturbance Air Pollution Topsoil	Fauna and Flora Topography	Construction phase	Dust suppression by means of water spraying. Roads will be ripped to a depth of 300mm in order to allow vegetation growth	Compliance with NEMA, NWA, MPRDA, NEM:WA and the NEMA principles will be done.
Temporal storage of hydrocarb	Surface /ground water contamination	Contamination	Operational	Demolishing of cement slabs and bund wall during decommissioning phase	Compliance with NEMA, NWA, MPRDA, NEM:WA and the NEMA principles will be done.
Open Cast Mining	Surface disturbance Air Pollution Noise Surface /ground water contamination	Visual Geology Topography Fauna and Flora Visibility	Operational phase	Dust suppression by means of water spraying. Dust fall-out buckets. Concurrent rehabilitation will be done by backfilling the trenches. Topsoil will be spread on top to allow plant succession.	Compliance with NEMA, NWA, MPRDA, NEM:WA and the NEMA principles will be done.

				Site Access restriction Monitoring. Drip trays placed under each stationary equipment. Seeding with indigenous plant. Speed limit of 30km/h. Labelled Waste containers. Vegetation will be protected by avoiding unnecessary clearance and by using existing roads at all times. No poaching allowed. Comply with occupational noise regulations of the Occupational Health and Safety Act, Act 85 of 1993. Provide ear plugs for noise pollution.	
Decommissioning and final rehabilitation	Decommissioning phase	Visual Geology Topography Fauna and Flora Visibility	All infrastructure removed from site Waste will be disposed of at licenced facilities. Any contaminated soils will be cleaned and rehabilitated. All compacted surfaces will be ripped to a depth of 300mm. The successful establishment of vegetation is important to ensure the return of animals in the	Compliance with NEMA, NWA, MPRDA, NEM:WA and the NEMA principles will be done.	Last Phase

			area. if sucseccion does not take place, a seeding programme in consultation with the ecologist should be implemented. Boreholes will be capped and made safe, in agreement with the landowner.		

Mechanisms for monitoring compliance with and performance assessment against the environmental management programme and reporting thereon, including

a. **Monitoring of Impact Management Actions**
b. **Monitoring and reporting frequency**
c. **Responsible persons**
d. **Time period for implementing impact management actions**
e. **Mechanism for monitoring compliance**

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY and TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
Topography	To minimise the reduce of land capability	To ensure that rehabilitation post-mining slopes are stable free draining and no slopes have an angle in excess of 20	Site Manager/ Environmentalist	Monitoring will be done on an annual basis to ensure that the levels and the slopes are in order
Soil	To prevent soil pollution; To limit soil compaction; To curb soil erosion; and To reinstate a growth medium able to sustain plant life.	Soil depth and chemical composition will be tested and possible erosion damage will be assisted and rectified	Site Manager/ Environmentalist	Monitoring will be done on an annual basis or after a heavy rain event
Air quality	To control the incidence of unacceptable levels of dust pollution on site	To ensure that the mine minimise dust omission, so that dust does not become a nuisance for affected parties and health hazard	Site Manager/ Foreman appointed SHE Consultant	Visual inspection will be done and managed by dust suppression by a water tanker. Quarterly test will also be conducted by a Health and Environmental Consultant and submitted to Mine Health and Safety for monitoring purposes
Fauna	To minimise vegetation destruction in drill areas, and therefore a habitat for wildlife; and To eliminate poaching and the extermination of animal species	To ensure that the species diversity and abundance is not significantly reduced	Site Manager/ Environmentalist	Monitoring will be done at rehabilitated area on annual basis to investigate species diversity and abundance

	within the boundaries of the study area as well as the surroundings area.			
Flora	To minimise the destruction of vegetation units; and To control invasion of exotic and invasive plant species.	To ensure that the rehabilitated areas become self-maintaining	Site Manager/ Environmentalist	Monitoring will be done at the rehabilitated areas on a twice a year basis (mid- summer and mid- winter). Where species diversity and vegetation cover will be investigated
Noise	To control the incidence of unacceptable noise levels on site	The management objective will be to reduce any level of noise, shock and lightning that may have an effect on persons and animals, both inside the plant and that which may migrate outside the plant area.	Site Manager/ Foreman appointed SHE Consultant	Quarterly reports on fall-out noise monitoring will be conducted as required. If any complaints are received from the public or state departments regarding noise levels the levels will be monitored at prescribed monitoring points
Surface water	To conserve water; and To eliminate the contamination of run-off and source of the water surface	There are no sources in the vicinity of the mine.	Site Manager/ Water supply	No monitoring will be done to monitor the quality of the surface water
Ground water	To minimise and prevent as far as practically possible the contamination of the ground water	No ground water is used	Site Manager/ Water supply	No monitoring will be done to monitor the levels and quality

Frequency of performance assessment report.

Performance Assessment and Environmental Audit will be conducted and submitted annually to the DMR- NORTHERN CAPE Province

Quarterly reports on fall-out and nuisance dust and noise monitoring will be conducted and incorporated into the annual reports forwarded to the Principle Inspector of Mine Health and Safety, Northern Cape Province

ACKNOWLEDGEMENTS

(1) ORANGE RIVER INTEGERATED WATER RESOURCES MANAGEMENT PLAN-ORASCOM 007/2007-WRP (PTY)LTD, JEFFARES GREEN ARKMAN CONSULTANT(PTY)LTD

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(3) DEMOGRAPHIC AND ECONOMIC ACTIVITY IN THE FOUR ORANGE BASIN STATES-D HALL, G JENNINGS

(4) *FINAL SCOPING REPORT* FOR DEVELOPMENT OF MINE ON REMAINDER AND PORTION 1 OF FARM ETTRICK 182- MAWEJE CONSULTING AFRICA

(5) HERITAGE IMPACT ASSESSMENT REPORT FOR THE PROPOSED PROSPECTING RIGHT ON THE FARMS :PORTION 3 (ASBESTOS HILLS) AND PORTION 2 AND 4 (RIETFONTEIN11) PRIESKA, NORTHERN CAPE- DAVID MORRIS AND ABENICIA HENDERSON APRIL 2018

DECLARATION OF THE EAP

I, Malcolm Angus Goliath, declare that –

General declaration:

- I act as the independent environmental practitioner in this application
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting environmental impact assessments, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, Regulations and all other applicable legislation;
- I will take into account, to the extent possible, the matters listed in regulation 8 of the Regulations when preparing the application and any report relating to the application;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- I will ensure that information containing all relevant facts in respect of the application is distributed or made available to interested and affected parties and the public and that participation by interested and affected parties is facilitated in such a manner that all interested and affected parties will be provided with a reasonable opportunity to participate and to provide comments on documents that are produced to support the application;
- I will ensure that the comments of all interested and affected parties are considered and recorded in reports that are submitted to the competent authority in respect of the application, provided that comments that are made by interested and affected parties in respect of a final report that will be submitted to the competent authority may be attached to the report without further amendment to the report;
- I will keep a register of all interested and affected parties that participated in a public participation process; and
- I will provide the competent authority with access to all information at my disposal regarding the application, whether such information is favourable to the applicant or not
- all the particulars furnished by me in this form are true and correct;
- will perform all other obligations as expected from an environmental assessment practitioner in terms of the Regulations; and
- I realise that a false declaration is an offence in terms of regulation 71 of the Regulations and is punishable in terms of section 24F of the Act.

Disclosure of Vested Interest (delete whichever is not applicable)

- I do not have and will not have any vested interest (either business, financial, personal or other) in the proposed activity proceeding other than remuneration for work performed in terms of the Regulations;

Signature of the environmental assessment practitioner:

BNL Nnake Trading

Name of company:

25th August 2018

Date:

APPENDIX A
McGregor Museum

Department of Archaeology

Heritage Impact Assessment Report for the proposed Prospecting Right on the farms: Portion 3 (Asbestos Hills) and Portion 2 and 4 (Rietfontein 11) Prieska, Northern Cape

David Morris and Abenicia Henderson
April 2018

Heritage Impact Assessment Report for the proposed Prospecting Right of farms: Portion 3 (Asbestos Hills), and Portion 2 and 4 (Rietfontein 11) Prieska, Northern Cape.

David Morris and Abenicia Henderson, McGregor Museum, Kimberley
P.O. Box 316 Kimberley 8300
Tel 082 2224777 email dmorriskby@gmail.com
April 2018

1. INTRODUCTION

The McGregor Museum archaeology department was appointed by Mr. Gamja Gool (contact: G. Gool, email: gamjagool@gmail.com tel: 082 654 0798) and M.A. Gool (contact: M.A. Goliath, 22 Goedehoop Avenue, Royldene, Kimberley 8301; email: goliathmalcolm@yahoo.com tel: 0824523693) to conduct a Heritage Impact Assessment for Prospecting Right on the farm: Portion 3 (Asbestos Hills) and Portion 2 and 4 (Rietfontein 11), near Koegas, Administrative District of Prieska, Northern Cape. A scoping phase evaluation of the full site was aimed at providing high-level identification of potential areas of sensitivity together with a recommended methodology for the HIA process.

The site was inspected on foot on the 20 April 2018 and relevant observations are indicated in this report.

Fieldnotes and photographs are lodged with the McGregor Museum, Kimberley.

1.1. FOCUS AND CONTENT OF SPECIALIST REPORT: HERITAGE

This archaeology and heritage specialist study is focused on the portion of the farm where the proposed irrigation farming is to be developed.

This study outlines:

- Introduction, explaining the focus of the report (1.1) and introducing the author in terms of qualifications, accreditation and experience to undertake the study (1.2)
- Description of the affected environment (2) providing background to the development and its infrastructure (2.1); Heritage features of the region(2.2);and defining environmental issues and potential impacts (2.3)
- Methodology (3) including an assessment of limitations (3.1); statement of expectations or predictions (3.2) and outline of EIA procedures including criteria for assessing archaeological significance (3.3).
- Observations and assessment of impacts (4), including field observations (4.1); characterizing archaeological significance (4.2); and characterizing the overall significance of impacts (4.3).
- Summary of Significance of Impacts is stated in tabular form (4.3.1).
- Measures for inclusion in a draft Environmental Management Plan for the development are set out in tabular form (5).
- Conclusions (6).

1.2 THE AUTHORS OF THIS REPORT

The authors (both on staff of the McGregor Museum) are independent of the organization commissioning this specialist input, and provide this heritage assessment (archaeology and colonial history but not palaeontology) within the framework of the National Heritage Resources Act (No 25 of 1999).

The senior author is a professional archaeologist (PhD) accredited as a Principal Investigator by the Association of Southern African Professional Archaeologists. He has worked as a museum archaeologist and has carried out specialist research and surveys in the Northern Cape and western Free State since 1985. In addition, he has a comprehensive knowledge of the Northern Cape history and built environment, and received UCT-accredited training at a workshop on Architectural and Urban Conservation; researching and assessing local (built) environments (S. Townsend, UCT). He is also Chairman of the Historical Society of Kimberley and the Northern Cape.

The National Heritage Resources Act no. 25 of 1999 (NHRA) protects heritage resources which include archaeological and palaeontological objects/sites older than 100 years, graves older than 60 years, structures older than 60 years, as well as intangible values attached to places. The Act requires that anyone intending to disturb, destroy or damage such sites/places, objects and/or structures may not do so without a permit from the relevant heritage resources authority. This means that a Heritage Impact Assessment should be performed, resulting in a specialist report as required by the relevant heritage resources authority/ies to assess whether authorisation may be granted for the disturbance or alteration, or destruction of heritage resources.

Where archaeological sites and palaeontological remains are concerned, the South African Heritage Resources Agency (SAHRA) at national level acts on an agency basis for the Provincial Heritage Resources Agency (PHRA) in the Northern Cape. The Northern Cape Heritage Resources Authority (formerly called Ngwao Boŝwa ya Kapa Bokone) is responsible for the built environment and other colonial era heritage and contemporary cultural values.

2. DESCRIPTION OF THE AFFECTED ENVIRONMENT

The area for proposed prospecting is approximately 1.6 km from Koegas and 25 km from Marydale. It is situated on the southern bank of the Orange River and located on the west and east side of the R383 national road running from Griekwastad. The area is characterized by exposed gravels in places, otherwise mantled by unconsolidated yellowish white river silt, occasionally formed as dunes. Locally dispersed riverine vegetation includes alien eucalyptus and prosopis with a few *Acacia karoo* trees (Fig. 3-6).

Figure 1. Locality map for the proposed Prospecting area

The surrounding landscape is substantially disturbed by existing agricultural activities/infrastructure, with the settlement of Westerberg being situated upslope to the south. It is likely that the construction of the bridge would have caused disturbance to sediments flanking it. Asbestos (north bank) and alluvial diamond mining is in evidence in the area (Fig. 2). Surface visibility was relatively good at the time of the visit in terms of observing surface archaeological traces, although vegetation is relatively dense in some areas.

It was indicated that although prospecting (for alluvial diamonds) would take place on both areas shown in Fig 2, the preferred area lies on the eastern side of the R383 regional road. The major anticipated impact would thus be on this eastern area.

Figure 2: Locality map

Figure 3: Portion 2 and 4 Rietfontein 11 proposed Prospecting area

Figure 4: Portion 2 and 4 Rietfontein: Abandoned farm buildings

Figure 5: Portion 3 (Asbestos Hills) area for proposed impact


Figure 6: Portion 3 (Asbestos Hills)

2.1. BACKGROUND TO THE DEVELOPMENT-DESCRIPTION OF PROPOSED INFRASTRUCTURE

It was indicated that prospecting, with preferred location on the eastern side of the R383, would take place on an abandoned farm with existing infrastructure, as shown in Fig. 2. Both areas (east and west) were examined.

2.2. HERITAGE FEATURES OF THE REGION

Prior to the survey, there were no known heritage resources on or in the immediate vicinity of the proposed areas for prospecting.

The Northern Cape is known for its rich and varied archaeological resources specifically relating to the Stone Age (Morris 2006). Significant archaeological sites have been discovered at pans in the wider region. For instance, the pan-side site at Bundu (50 kmm to the south) has been found to have important archaeological traces which include ESA, MSA and LSA artefacts and fossil fauna, illustrative of the potential wealth of archaeological material in the area. The ochre mine of Nauga (14 km upstream from Koegas) was excavated by Beaumont (Beaumont & Morris 1990).

No previously recorded sites are on record for the area on SAHRIS and only one heritage study by A.C. Van Vollenhoven (2014) was conducted close to the proposed areas of impact. Van Vollenhoven conducted a study at Marydale which is to the west of the study area.

2.2.1 Colonial frontier

Actions took place in the vicinity of Koegas in May and June 1878, during the Griqualand West uprising of that year, when a “rebel” stronghold on the north bank of the Orange (i.e. within Griqualand West) was attacked by a force sent out from Kimberley.

Figure 7. Illustration from the Griqualand West campaign of 1878.

Subsequently what was dubbed the ‘Koegas Massacre’ took place on 30th October 1878, perpetrated by a patrol of burghers under Field-Commandant Van Niekerk. This took place on the then Cape Colony side of the river, at Luisdraai, about 42 km downstream from Koegas (in the current Buchuberg Water Reserve).

Questions about the incident were raised in the Commons (Parliament of UK) (https://api.parliament.uk/historic-hansard/commons/1879/jul/22/south-africa-griqualand-west-alleged):

> 22 July 1879
> DR. CAMERON asked the Secretary of State for the Colonies, Whether he has observed in the South African Papers just issued (C. 2367), page 78, a Report from Field Commandant Van Niekerk admitting that in an attack upon a party of Natives at Luisdraai, near Koegas, he had killed forty-six, including ten women and children, and captured the rest, being five men and twenty-seven women and children; whether it is a fact that in the same Papers, pages 157 and 158, Mr. Jackson, the Special Commissioner appointed by the Government of Cape Colony to inquire into atrocities alleged to have been perpetrated on the occasion, reports—That a terrible and unjustifiable massacre of a party of bushmen, with their wives and children, had taken place at the hands of burghers under command of Commandant Van Niekerk; adding— Nothing could justify the shooting at Luisdraai, and subsequently on the march to Koegas, of the wounded, among whom were women and little children; and recommending that a preparatory examination should be instituted against Commandant Van Niekerk with the view of bringing the guilty parties to justice; and how he reconciles with

these statements a despatch from Colonel Lanyon, published at page 120 of the same Papers, which is apparently fairly enough summarized in the index of the Papers, as Showing that the alleged massacre of Natives at Koegas, as referred to by Dr. Cameron in the House of Commons, never occurred?
§SIR MICHAEL HICKS-BEACH Sir, Colonel Lanyon's despatch is perfectly consistent with the statements quoted by 968 the hon. Member, because in that despatch he merely denies that the occurrence took place in Griqualand West, or that the massacre was perpetrated by Volunteers from his Province. Of course, Colonel Lanyon could not say what had or what had not taken place beyond the limits of his own government; and the mistake is in the index to the Papers, in which Colonel Lanyon's despatch certainly is not fairly summarized as showing that this event "never occurred." I regret that the index was not more carefully compiled.
DR. CAMERON Is Koegas not in Griqualand West?
§SIR MICHAEL HICKS-BEACH The massacre certainly took place within the jurisdiction of the Cape Colony, because the Government instituted an inquiry into the facts of the case, and intend to prosecute those who took part in the massacre.

It is clear that neither of these incidents took place at the site of proposed alluvial mining, but cognizance is taken of them with respect to any future mining or development in the wider vicinity. Substantial asbestos mining had already taken place on the north bank.

2.2.2 Later Stone Age

Late Holocene Later Stone Age (LSA) sites are frequently noted in surveys along the Orange River (e.g. Morris & Beaumont 1991; Beaumont et al. 1995). These sites are generally short-duration occupations by small groups of hunter-gatherers. The LSA could be ascribed to either hunter-gatherers or herders. Beaumont identifies two broad categories described as the Swartkop Industry associated with hunter-gatherers and the Doornfontein Industry associated with herders (Beaumont 1995).

Notable in the wider area is the site of Nauga, near the Orange River some 14 km south east of Koegas, an ochre mine recorded by Dunn in 1872 and excavated by Beaumont (Beaumont & Morris 1990:59-61).

Rock art sites also occur in the wider region (Fock & Fock 1989).

2.2.3 Pleistocene: Middle and Earlier Stone Age

Earlier, Middle and Later Stone Age material is documented in river gravels and silts of the Orange-Vaal River Basins (Beaumont & Morris 1990).

Excavations at Bundu Pan, about 50 km south of Koegas, by Kiberd (2001, 2005, and 2006) has demonstrated the presence of stratified deposits that could be associated with the entire span of the Stone Age.

2.3 DESCRIPTION AND EVALUATION OF ENVIRONMENTAL ISSUES AND POTENTIAL IMPACTS

Heritage resources including archaeological sites are in each instance unique and non-renewable resources. Area and linear developments can have a permanent destructive

impact on these resources. The objective of an HIA would be to assess the sensitivity of such resources where present, to evaluate the significance of potential impacts on these resources and, if and where appropriate, to recommend no-go areas and/or measures to mitigate or manage said impacts.

In relation to the proposed Prospecting area a great deal of land disturbance is anticipated especially on the south-eastern side of the river bank.

2.3.1 Direct, indirect and cumulative impacts (in terms of nature, magnitude and extent)

The destructive impacts that are possible in terms of the transformation of land, excavation and extraction of minerals tend to be direct, once-off events occurring during the prospecting phase. In the long term, the proximity of such mining operations in the area could result in secondary indirect impacts resulting from the movement of people or vehicles in the immediate or surrounding vicinity.

3. METHODOLOGY

This study defines the heritage component of the EIA process being undertaken for the proposed Prospecting Right. The area was inspected on foot on the 20 April 2018. Heritage traces were evaluated in terms of their archaeological significance.

In preparation for this:

- A desktop assessment was done of the Prospecting Right area relative to the wider known archaeological landscape.
- A search was done on SAHRIS database to determine what previous Archaeological and Heritage Impact studies existed for the area.
- Based on the site's locality preliminary predictions were made which the study would test with observations made in the field.

3.1 ASSUMPTIONS AND LIMITATIONS

It was assumed that, by and large in this landscape, with its sparse vegetation that where shallow soil profiles exist some sense of the archaeological traces to be found in the area would be readily apparent from surface observations (including assessment of places of erosion or past excavations that expose erstwhile below-surface features). However, the aeolian dunes and loose sand present more of a challenge as they may contain buried sites owing to known dune mobility and growth. Hence areas of wind deflation or erosion (e.g. along farm tracks) would be place to examine in particular.

Due to the fact that most cultural remains may occur below surface, the possibility exists that some features or artefacts may not have been discovered/ recorded during the survey. Low ground visibility of parts of the study area is due to sand cover and disturbance from previous mining and farming , and the possible occurrence of unmarked graves and other cultural material cannot be excluded. Only the portion of impact on the two farms were surveyed and not the entire area as indicated by the Location map in figure (2). It is

assumed that information obtained from the broader region is accurate and applicable to this study.

Although the McGregor Museum surveyed the area as thoroughly as possible a proviso is routinely given, that should sites or features of significance be encountered during mining on the site (this could include an unmarked burial, an ostrich eggshell water flask cache, or a high density of stone tools, for instance), specified steps are necessary (beginning with immediate suspension of work, and reporting to the heritage authority).

This study does not comment on Palaeontology.

3.2 PREDICTIONS

- Based on previous experience the terrain on which the proposed Prospecting is taking place may yield significant archaeological traces
- Terraces of River gravels may contain artefacts of Pleistocene and Holocene context
- The plain away from the river may contain topographic features indicative of past human activity, such as pan or vlei margins, and features such as koppies or rocky outcrops. Which may have afforded shelter, a vantage point above the local landscape, and available rock panels for the making of rock engravings.

3.2.1 POTENTIALLY SIGNIFICANT IMPACTS TO BE ASSESSED IN THE HIA PROCESS

Any area or linear, primary and secondary, disturbance of surfaces in the proposed development locale could have a destructive impact on heritage resources, where present. In the event that such resources are found, they are likely to be of a nature that potential impacts could be mitigated by documentation and/or salvage following approval and permitting by the South African Heritage Resources Agency and, in the case of any built environment features, by the Northern Cape Heritage Resources Authority. Although unlikely, there may be some that could require preservation in situ and hence modification of intended footprint

Disturbance of surfaces includes any mining, construction or agricultural farming (including quarries, pits, roads, pipelines, pylons, sub-stations or plants, buildings), or any other clearance of, or excavation into, a land surface. In the event of archaeological materials being present such activity would alter or destroy their context (even if the artefacts themselves are not destroyed, which is also obviously possible). Without context, archaeological traces are of much reduced significance. It is the contexts as much as the individual items that are protected by the heritage legislation.

3.3 DETERMINING ARCHAEOLOGICAL SIGNIFICANCE

In addition to guidelines provided by the National Heritage Resources Act (Act No. 25 of 1999), a set of criteria based on Deacon (nd) and Whitelaw (1997) for assessing

archaeological significance has been developed for Northern Cape settings (Morris 2000a). These criteria include estimation of landform potential (in terms of its capacity to contain archaeological traces) and assessing the value to any archaeological traces (in terms of their attributes or their capacity to be construed as evidence, given that evidence is not given but constructed by the investigator).

Estimating site potential

Table 1 (below) is a classification of landforms and visible archaeological traces used for estimating the potential of archaeological sites (after J. Deacon nd, National Monuments Council). Type 3 sites tend to be those with higher archaeological potential, but there are notable exceptions to this rule, for example the renowned rock engravings site Driekopseiland near Kimberley which is on landform L1 Type 1 – normally a setting of lowest expected potential. It should also be noted that, generally, the older a site the poorer the preservation, so that sometimes any trace, even of only Type 1 quality, can be of exceptional significance. In light of this, estimation of potential will always be a matter for archaeological observation and interpretation.

Assessing site value by attribute

Table 2 is adapted from Whitelaw (1997), who developed an approach for selecting sites meriting heritage recognition status in KwaZulu-Natal. It is a means of judging a site's archaeological value by ranking the relative strengths of a range of attributes (given in the second column of the table). While aspects of this matrix remain qualitative, attribute assessment is a good indicator of the general archaeological significance of a site, with Type 3 attributes being those of highest significance.

Table 1. Classification of landforms and visible archaeological traces for estimating the potential for archaeological sites (after J. Deacon, National Monuments Council).

Class	**Landform**	**Type 1**	**Type 2**	**Type 3**
L1	Rocky surface	Bedrock exposed	Some soil patches	Sandy/grassy patches
L2	Ploughed land	Far from water	In floodplain	On old river terrace
L3	Sandy ground, inland	Far from water	In floodplain or near feature such as hill	On old river terrace
L4	Sandy ground, Coastal	>1 km from sea	Inland of dune cordon	Near rocky shore
L5	Water-logged deposit	Heavily vegetated	Running water	Sedimentary basin
L6	Developed urban	Heavily built-up with no known record of early settlement	Known early settlement, but buildings have basements	Buildings without extensive basements over known historical sites
L7	Lime/dolomite	>5 myrs	<5000 yrs	Between 5000 yrs and 5 myrs
L8	Rock shelter	Rocky floor	Sloping floor or small area	Flat floor, high ceiling
Class	**Archaeo-logical traces**	**Type 1**	**Type 2**	**Type 3**
A1	Area previously excavated	Little deposit remaining	More than half deposit remaining	High profile site
A2	Shell or bones	Dispersed scatter	Deposit <0.5 m thick	Deposit >0.5 m thick;

Class	Landform	Type 1	Type 2	Type 3
	visible			shell and bone dense
A3	Stone artefacts or stone walling or other feature visible	Dispersed scatter	Deposit <0.5 m thick	Deposit >0.5 m thick

Table 2. Site attributes and value assessment (adapted from Whitelaw 1997)

Class	Attribute	Type 1	Type 2	Type 3
1	Length of sequence/context	No sequence Poor context Dispersed distribution	Limited sequence	Long sequence Favourable context High density of arte/ecofacts
2	Presence of exceptional items (incl regional rarity)	Absent	Present	Major element
3	Organic preservation	Absent	Present	Major element
4	Potential for future archaeological investigation	Low	Medium	High
5	Potential for public display	Low	Medium	High
6	Aesthetic appeal	Low	Medium	High
7	Potential for implementation of a long-term management plan	Low	Medium	High

4. OBSERVATIONS AND ASSESSMENT OF IMPACTS

The manner in which archaeological and other heritage traces or values might be affected by proposed Prospecting Right on farms: Portion 3 (Asbestos Hills) and Portion 2 and 4 (Rietfontein) may be summed up in the following terms: it would be any act or activity that would result immediately or in the future in the destruction, damage, excavation, alteration, removal or collection from its original position, any archaeological material or object (as indicated in the National Heritage Resources Act (No 25 of 1999)). The obvious impact in this case would be land development.

4.1 FIELDWORK OBSERVATIONS

The site was visited on 20 April 2018. The area of impact is characterized by exposed river gravels, unconsolidated river silt/dunes on the lee side of a bend in the river. The following observations were made:

4.1.1 Occurrence of Stone Age traces:

Most of the area traversed during the survey was found to be without any trace of archaeological materials. The areas of immediate impact were the focus of the assessment and were as follows:

On Portion 2 and 4 (Rietfontein 11)

No archaeological traces were found in the immediate as well as surrounding vicinity.

On portion 3 (Asbestos Hills)

No significant archaeological observations were made in this area. Isolated Stone Age pieces were recorded throughout the study area. The raw material used consists mostly of banded ironstone/jaspilite. The artefacts show a high degree of weathering probably being of secondary alluvial context and therefore of negligible archaeological value. Unretouched flakes and blades were noted, typologically possibly representative of the MSA (derived from exposed river gravels). Artefact densities were generally low and hence recorded as occurrences of low archaeological significance.

However, against this background of paucity, the following sites were found (Table 3)

Table 3. Plotted artefact scatters and observations made.

	Latitude (S)	Longitude (E)	Comment	Significance
1	29°19'10.4"	22°20'49.1"	Prospecting area on the south-eastern side of the river- bank (Fig. 8).	(No artefacts)
2	29°19'06.2"	22° 20'49.8"	Exposed River gravel (Fig. 9).	LOW
3	29°19'03.2"	22°20'51.5"	Quartz flake and Fresh water Mussel shell (Fig. 10).	LOW
4	29°19'03.2	22°20'49.8"	Bridge (Fig. 11).	(No artefacts)
5	29°18'58.1"	22°20'39.7"	Prospecting area on the south-western side of the river- bank (Fig. 5).	(No artefacts)
6-7	29°18'55.4" 29°18'54.9"	22°20'33.3" 22°20'26.5"	Prospecting area on the south-western river - bank landscape (Fig. 6).	(No artefacts)
8	29°19'02.6"	22°20'29.5"	Exposed gravel layers on the south-western side of the river- bank with isolated jaspilite flakes (Fig. 12-13).	LOW
9	29°19'03.4"	22°20'35.1"	MSA flakes; Jaspilite flake with Old sardine tin (Fig. 14-15).	LOW
10	29°19'0.6"	22°20'51.5"	Old Brookes historical bottle (Fig. 16).	LOW
11	29°19'26"	22°20'35.6"	Grave near abandoned farmhouse (Fig. 17).	HIGH

Figure 8a: Archaeological observations as tabulated in table. Plotting of archaeological observations as tabulated in Table 3 (larger scale in Figures 7b.

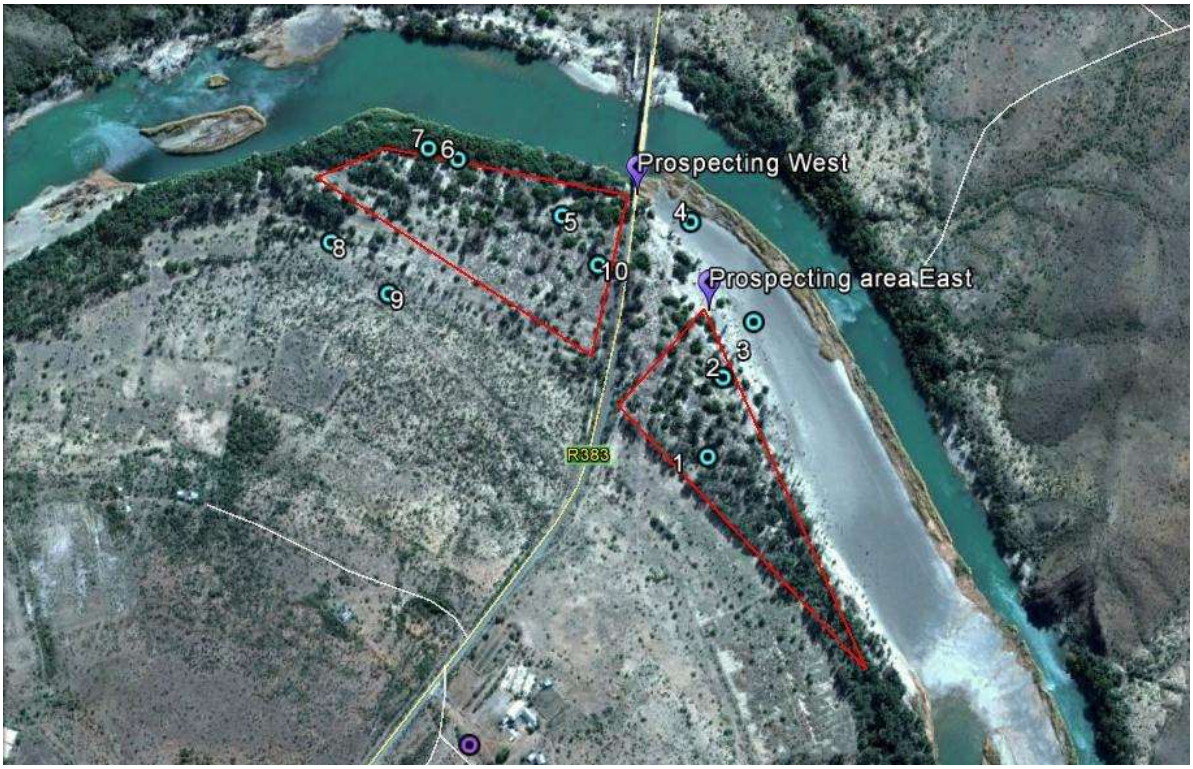

Figure: 8b. Detail of site location indicated in Table

Figure 9: Prospecting area: Observation 1

Figure 10: Exposed River gravels: Observation 2

Figure 11: Quartzite and Shell: Observation 3

Figure 12: Bridge : Observation 4

Figure 13: Lithics scatter-Jaspilite flakes: Observation 8

Figure 14a: Exposed River gravels with dispersed lithic satter: Observation 8

Figure 14b: Observation 8

Figure 15: Jaspilite flakes : Observation 9

Figure 16: Jaspilite flake and old sardine tin: Observation 9

Figure 17: Old Brookes bottle: Observation 10

Figure 18: Grave located near abandoned farmhouse

4.1.2 Colonial era traces

Colonial era traces are seen in the old abandoned farm buildings; recent farm tracks; fencing and other agricultural infrastructure.

4.2 CHARACTERISING THE ARCHAEOLOGICAL SIGNIFICANCE (REFER TO 3.4 ABOVE)

In terms of the significance matrices in Tables 1 and 2 under 3.4 above, the archaeological observations fall under Landform L3, generally Type 2 or 3, i.e. of medium to low potential. In terms of archaeological traces they all fall under Class A3 Type 1. These ascriptions (Table 1) reflect low potential for these criteria. For site attribute and value assessment (Table 2), the observations may be characterised as Type 1 for Classes 1-7.

On archaeological grounds, the Stone Age occurrences, generally sparse, can be said to be of mainly low significance. They are instructive about the exploitation of this landscape in Later Stone Age times and points to the possibility of greater number of occurrences presumably hidden by river silt sand.

For colonial era context, the site has no particular significance in terms of physical heritage traces.

4.3 CHARACTERISING THE SIGNIFICANCE OF IMPACTS

The criteria on which significance of impacts is based include **nature**, **extent**, **duration**, **magnitude** and **probability of occurrence**, with quantification of significance being grounded and calculated as follows:

- The **nature**, namely a description of what causes the effect, what will be affected, and how it will be affected.

- The **extent**, indicating the geographic distribution of the impact:
    - local extending only as far as the development site area – assigned a score of 1;
    - limited to the site and its immediate surroundings (up to 10 km) – assigned a score of 2;
    - impact is regional – assigned a score of 3;
    - impact is national – assigned a score of 4; or
    - impact across international borders – assigned a score of 5.

- The **duration**, measuring the lifetime of the impact:
    - very short duration (0–1 years) – assigned a score of 1;
    - short duration (2-5 years) - assigned a score of 2;
    - medium-term (5–15 years) – assigned a score of 3;
    - long term (> 15 years) - assigned a score of 4;
    - or permanent - assigned a score of 5.

- The **magnitude**, quantified on a scale from 0-10:
    - 0 is small and will have no affect on the environment;
    - 2 is minor and will not result in an impact on environmental processes;
    - 4 is low and will cause a slight impact on environmental processes;
    - 6 is moderate and will result in environmental processes continuing but in a modified way;

- 8 is high (environmental processes are altered to the extent that they temporarily cease); and
- 10 is very high and results in complete destruction of patterns and permanent cessation of environmental processes.

- The **probability of occurrence**, indicating the likelihood of the impact actually occurring (scale of 1-5)
  - 1 is highly improbable (probably will not happen);
  - 2 is improbable (some possibility, but low likelihood);
  - 3 is probable (distinct possibility);
  - 4 is highly probable (most likely); and
  - 5 is definite (impact will occur regardless of any prevention measures).

- The **significance**, determined by a synthesis of the characteristics described above and expressed as low, medium or high. Significance is determined by the following formula:
  S= (E+D+M) P; where S = Significance weighting; E = Extent; D = Duration; M = Magnitude; P = Probability.

- The **status**, either positive, negative or neutral, reflecting:
  - the degree to which the impact can be reversed.
  - the degree to which the impact may cause irreplaceable loss of resources.
  - the degree to which the impact can be mitigated.

- **The significance weightings for each potential impact are as follows:**

  - < 30 points: Low (i.e. where this impact would not have a direct influence on the decision to develop in the area),

  - 30-60 points: Medium (i.e. where the impact could influence the decision to develop in the area unless it is effectively mitigated),

  - > 60 points: High (i.e. where the impact must have an influence on the decision process to develop in the area).

4.3.1 SUMMARY OF THE SIGNIFICANCE OF IMPACTS

Table 4. Significance of Impacts, with and without mitigation – based on the worst case scenario – for all area investigated.

Nature: Acts or activities resulting in disturbance of surfaces and/or sub-surfaces containing artefacts (causes) resulting in the destruction, damage, excavation, alteration, removal or collection from its original position (consequences), of any archaeological or other heritage material or object (what affected). The following assessment refers to impact on physical archaeological/heritage traces.		
	Without mitigation	**With mitigation**
Extent	1	Not needed

Duration	5	Not needed
Magnitude	6	Not needed
Probability	2	Not needed
Significance	**22**	
Status (positive or negative)	WEAKLY NEGATIVE	But locally low to very low significance
Reversibility	No	
Irreplaceable loss of resources?	Low density and significance	Loss of context but possible to mitigate.
Can impacts be mitigated?	Not needed	Not needed
Mitigation: Not needed at this stage however, note need for monitoring in management plan recommendations, there is a probability that artefacts occur subsurface. Other possible occurrences are burials and ostrich eggshell on pottery caches, especially within the silt deposits capping the gravels		
Cumulative impacts: Cumulative Impacts: where any archaeological contexts occur, direct impacts are once-off permanent destructive events. Secondary cumulative impacts may occur with the increase in development and operational activity associated with the life of the proposed Prospecting area.		
Residual Impacts: -		

5. MEASURES FOR INCLUSION IN THE DRAFT ENVIRONMENTAL MANAGEMENT PLAN

The objective

Archaeological or other heritage materials that may occur in the path of any surface or sub-surface disturbances associated with any aspect of the Prospecting/ mining are likely to be subject to destruction, damage, excavation, alteration, or removal. The objective is to limit such impacts to the primary activities associated with the mining and hence to limit secondary impacts during the medium and longer term operational life of the operation.

Project component/s	Any road or other infrastructure construction over and above what is outlined in respect of the proposed Prospecting area.
Potential Impact	The potential impact if this objective is not met is that wider areas or extended linear developments may result in further destruction, damage, excavation, alteration, removal or collection of heritage objects (minimal as they are) from their current context along the route.
Activity/risk source	Activities which could impact on achieving this objective include deviation from any planned development without taking heritage impacts into consideration.
Mitigation: Target/Objective	An environmental management plan that takes cognizance of heritage resources in the event of any future extensions of

	infrastructure. Mitigation (based on present observations and development proposal as communicated) is not considered to be necessary.

Mitigation: Action/control	Responsibility	Timeframe
Provision for on-going heritage monitoring in an environmental management plan which also provides guidelines on what to do in the event of any major heritage feature being encountered during any phase of mining.	Environmental management provider with on-going monitoring role set up by the mining company for the mining phase and for any instance of periodic or on-going land surface modification thereafter.	Environmental management plan to be in place before commencement of mining.
Should unexpected finds be made during development (e.g. precolonial burials; ostrich eggshell container cache; or localised Stone Age sites with stone tools, pottery), the relevant Heritage Authority should be contacted.	Environmental Control Officer should become acquainted at a basic level with the kinds of heritage resources potentially occurring in the area and should report to the Heritage Authority as needed (see next column).	In the event of finding any of the features mentioned in column 1, reporting by the developer to relevant heritage authority should be immediate. Contact: SAHRA Ms N. Higgins 021-4624502 or NC Heritage Resources Authority Mr Andrew Timothy 053-8312537/8074700.

Performance Indicator	Inclusion of further heritage impact consideration in any future extension of mining or any infrastructural elements.
Monitoring	Officials from relevant heritage authorities (National, Provincial or Local) to be permitted to inspect the site at any time in relation to the heritage component of the management plan.

6. CONCLUSIONS

Precolonial/Stone Age material noted and investigated on portions 3 (Asbestos Hills) and 2 and 4 (Rietfontein 11) in this study was found to be generally of low significance. Other possible occurrences to look at are ostrich eggshell and ceramics caches, and burials. This report therefore recommends careful monitoring during the development phase of the proposed agricultural development.

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