Case ID 1401

mineral resources

Department:
Mineral Resources
REPUBLIC OF SOUTH AFRICA

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From: Directorate: Mineral Regulation: Northern Cape **Date:** 06 December 2010
Enquiries: Ms. M.S Makoele Email:maphakiso.makoele @dmr.gov.za
Ref: NC 30/5/1/2/3/2/1/277 EM

SA HERITAGE RESOURCES AGENCY
RECEIVED
14 JAN 2011

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

Attention: MRS NONOFHO NDOBOCHANI

CONSULTATION IN TERMS OF SECTION 40 OF THE MINERAL AND PETROLEUM RESOURCES DEVELOPMENT ACT 2002, (ACT 28 OF 2002) FOR ENVIRONMENTAL SCOPING REPORT FOR MINING RIGHT APPLICATION IN RESPECT OF DIAMONDS IN GENERAL ON VARIOUS FARMS SITUATED IN MAGISTERIAL DISTRICTS OF HOPETOWN, HAY AND PRIESKA NORTHERN CAPE REGION.

APPLICANT: SAXENDRIFT MINE (PTY) LTD

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

It would be appreciated if you could forward any comments or requirements your Department may have to this office and to the applicant before **04 January 2011** as required by the Act.

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

Your co-operation will be appreciated.

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

ENVIRONMENTAL SCOPING REPORT FOR THE MINING RIGHT APPLICATION SAXENDRIFT MINE PTY LTD (NC) 277MR

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CONTENTS

1 DESCRIPTION OF PROJECT

Saxendrift Mine (Pty) Ltd is in the process of applying for a mining right on the various farms listed below. On a large number of the properties the company had prospecting rights that have been ceded to Saxendrift Mine (Pty) Ltd during 2008 from Trans Hex and Mvelaphanda. The area under application covers 56 684.801 ha and includes the following properties:

FARM NAME	PORTIONS	DISTRICT
Annex Saxes Drift No. 21	Portion of the Remainder; Portion of Portion 1 (Paarde Pan)	Hopetown
Saxendrift No. 20	Portion of the Remainder; Portion 1; Portion 4; Portion 12; Portion 13; Portion 14; Portion 15; Portion 16; Portion 22; Portion 24 & Portion 25	Hopetown
Kwartelspan No. 25	The Remainder; Remaining Extent of Portion 1; Portion 2 (Brakkies Annes No. 2) & Portion 3 (Annex Kransfontein)(Portion of Portion 1)	Hopetown
Kransfontein No. 19	Portion 1	Hopetown
Vals Pan No. 26	Remainder & Portion 1	Hopetown
Vraai Plaats No. 27	Remainder & Portion 4 (Vraai Plaats Put)	Hopetown
Annex Diamond Valley No. 28	Remainder & Portion 1	Hopetown
Diamond Valley No. 29	Remainder; Portion 1 (Bredenhands Pan) & Portion 2 (lentvort)	Hopetown
Holsloot No. 47	Remainder; Portion 2 (Taaibos Leegte) & Remainder of Portion 3 (Rooisloot)	Hay
Mooidraai No. 36	Remainder (Jonkmanskloof)	Prieska
Zwemkuil No. 37	Remainder; Portion 2 & Portion 6	Prieska
Viegulands Put No. 39	Remainder; Portion 1	Prieska
Niewejaarskraal No. 40	Remaining Extent Portion 1(Driehoek); Portion of Portion 2; Portion 3 (a portion of Portion 1); A Portion of portion 6; Portion of Portion 4; Portion 7 (a portion of Portion 6); Portion 8 (a portion of Portion 6) & Portion 9	Prieska
Kalk Krans No. 41	Remainder; Remainder of Portion 1; Remainder of Portion 2; Portion 3 (Portion of Portion 2 (Welgegund); Portion 4 (Portion of Portion 1 of Kalkkrans B); Portion 5 (a portion of Portion 1) & Portion 6	Prieska

The aim of the above mining right application will be to consolidate the above properties into a single Mining Right held by Saxendrift Mine Pty Ltd.

The DMR reference for the application is:
NC 30/5/1/2/2/**0277 MR**

2 NAME OF APPLICANT AND ADDRESS

Saxendrift Mine (Pty) Ltd

PO Box 251
Barkly West
8375

Erasmus Street 2 A
Barkly-Wes
8375

Tel: 053 531 1300
Fax: 053 531 1420

Contact person: Roelien Oosthuizen (Environmental Manager)
Cell: 084 208 9088

3 METHODOLOGY

Our scoping process will have an integrated approach on the environmental management of the mine. This process requires firstly, a full understanding of the development demand on the mine, which are the activities and facilities associated with the mining process. Secondly, a synopsis of the natural, physical, socio-economic and cultural historical environment is conducted in order to gain understanding of the environmental status quo. Environmental sensitivity of sites are identified that culminates in environmental opportunities and constrains that is used to guide further mining development. Development and project alternatives are identified if applicable and the mine land use is zoned according to its sensitivity. There will be a focus on establishing monitoring programmes to monitor potential impacts, thereby minimizing the environmental liability of the mine.

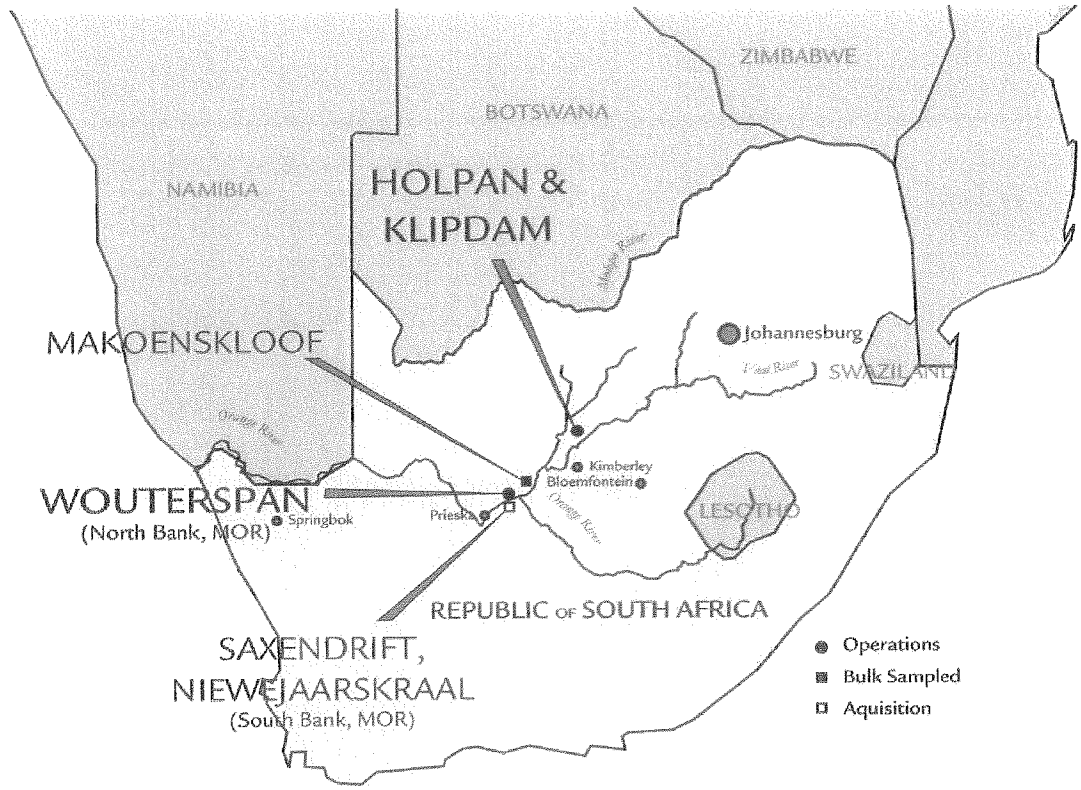
The following steps will be followed during the scoping process:

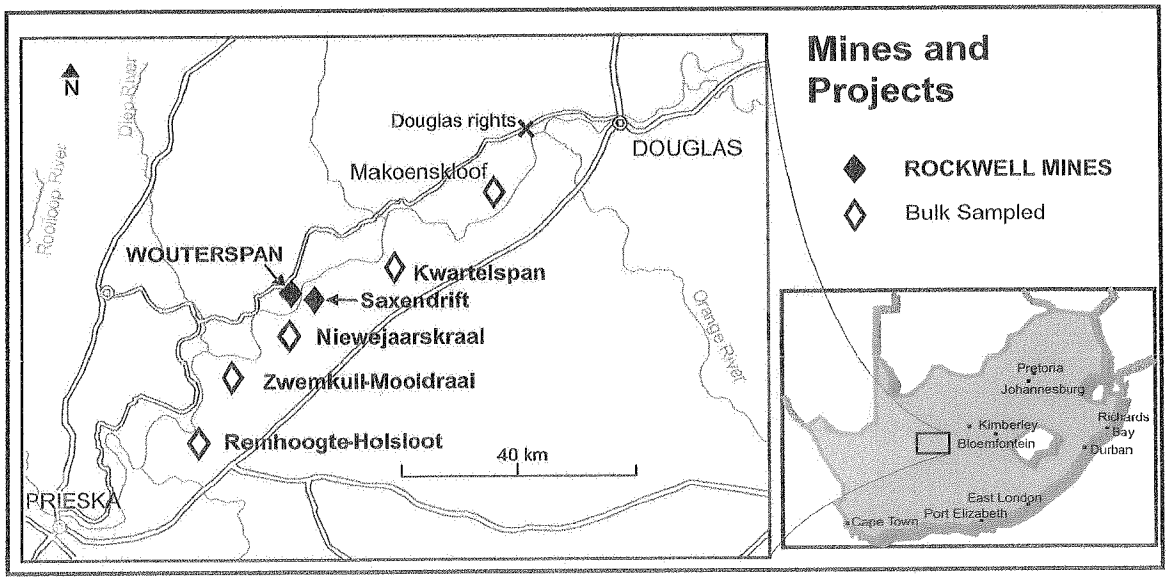
a) Discussion with all the relevant authorities and key interested parties will be held to collate available information, to identify information gaps and address their relevant fears and concerns
b) Any issues and alternatives (social or environmental) will be identified
c) Concerns will be evaluated in order to assign priority to the more important issues.
d) A strategy will be developed to address and resolve each key issue
e) All data will be integrated to be able to understand the environment, the impact on it and the management guidelines that will limit these impacts.

4 PROJECT LOCATION

The nearest towns are Douglas – 55km northeast of the proposed mining area and Prieska 70km southwest of the proposed mining area (Fig. 1). The capital of the Northern Cape, Kimberley is 165 km northeast of the proposed area.

Figure1: Site location





5 DESCRIPTION OF THE EXISTING ENVIRONMENT

5.1 Geology

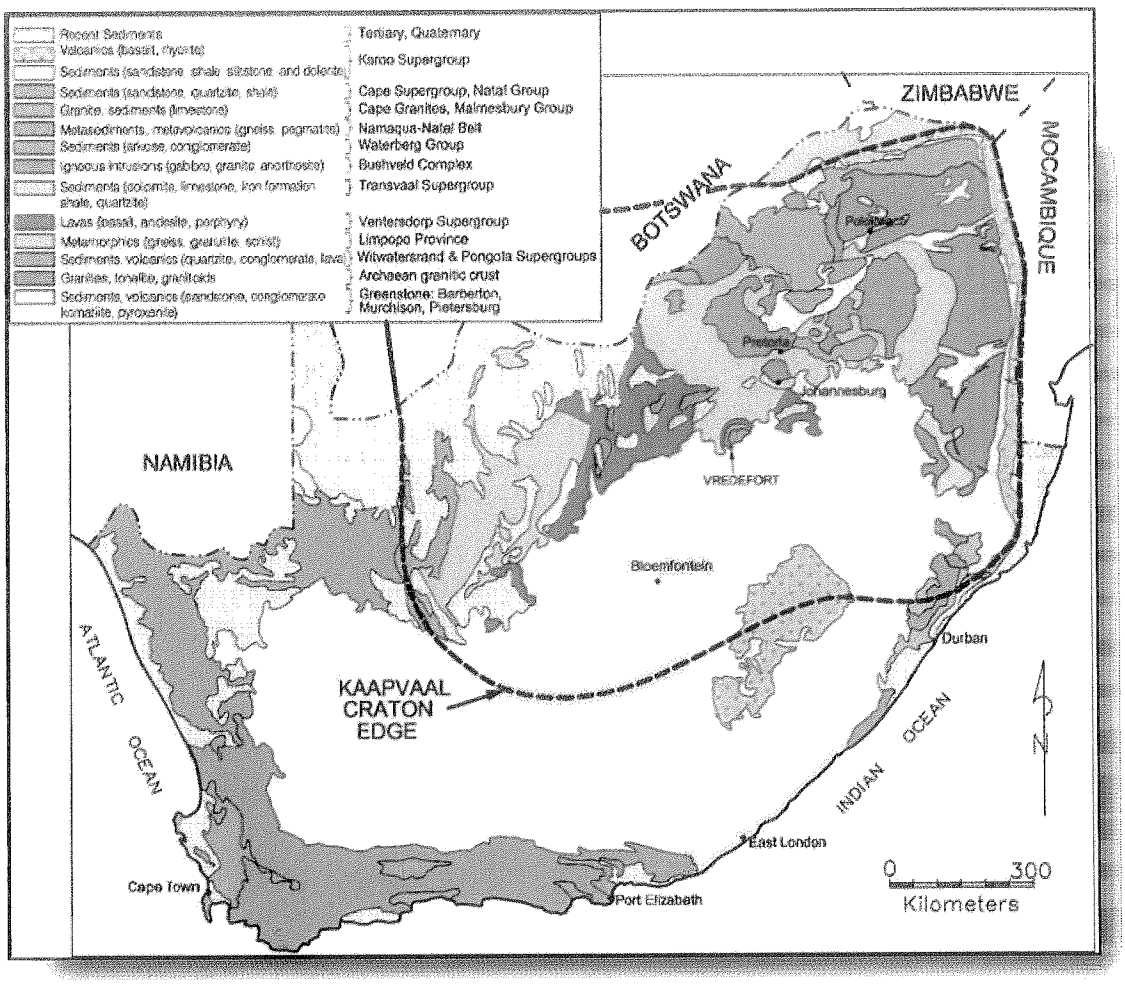
Terraces of the Palaeo-Orange River between Douglas and Prieska occur at three general elevations above the present Orange River:

0 – 20 m: Lower Terraces
30 – 60 m: Intermediate Terraces
70 – 110 m: Upper Terraces

The ages of these terraces are young with decreasing elevation and vary from Pleistocene-Pliocene for the lower terraces to Palaeo-Miocene for the upper terraces. Diamond content also generally decreases with lower elevation. A marked increase in banded iron formation clast content downstream from Kafferfontein (situated 20 km upstream from Saxendrift) has led to speculation that a major palaeo-river system draining from the north intersects the course of the Orange River in this region and provided additional course bed load and diamonds to the Mid-Orange River deposits.

Lower terrace deposits are generally covered by 1 – 4 m of sand whereas the upper terrace deposits are capped by a hard calcrete layer some 2 – 3 m thick which protected the gravel deposits from erosion and prevented exploitation in the past. Historical mining activity focussed on the unconsolidated Rooikoppie gravels overlying the calcrete layer.

The properties are situated on the south bank of the Orange River 60 km downstream from Douglas. An alluvial floodplain deposit of fine sand and silt line the south bank of the Orange River over a width of up to 400 m. Inland of the floodplain the landscape rises by 80 - 90 m (940 m.a.s.l. to 1026 m.a.s.l.) to the elevation of the calcrete-capped palaeoterraces. Where exposed the slopes comprise Dwyka diamictite but colluvial deposits derived from the Dwyka Group, palaeo-fluvial deposits or calcrete cover most of these slopes.



The primary sedimentary package, constituting all three terraces, is basically the same and comprises the following units, some or all of which may be present in any one section.

Thickness (m)	Lithology	Nature
0 – 0,1	*Thin, red sand*	*Aeolian*
0,1 – 1,0	*Rooikoppie gravel*	Secondary deposits
1,0 – 3,0	*Calcrete*	
3,0 – 4,0	*Gravelly calcrete*	*Primary deposits* *Palaeo-fluvial*
4,0 – 6,0	*Calcretised gravel*	
6,0 – 8,0	*Gravel, sandy gravel and/or sand*	
> 8,0	*Diamictite*	*Bedrock (Dwyka Group)*

TABLE 1: SAXENDRIFT LITHOLOGY

Red wind blown (Kalahari) sand covers parts of the southern portions of the two properties and often forms the matrix of Rooikoppie gravels, especially where these have gravitated down-slope to form "secondary" fan deposits.

Rooikoppie gravels represent a derived or deflation deposit formed on top of the calcrete by liberation of durable clasts from the calcrete during chemical weathering and deflation. The deposit is pervasively stained red by Fe-oxide and the rounded to subrounded clasts (pebble to cobble size) comprises only the most resistant siliceous and ferruginous clasts (i.e. banded iron formation, quartzite, quartz,

chert, agate, etc.) of the original (primary) gravel deposits. There has generally been a down-slope gravitational migration of Rooikoppie gravels with time causing an apron of secondary (reworked) Rooikoppie gravel to form at the foot of the scarp and along small recent streams or "runs" on the calcrete surface.

The upper layer of hardpan calcrete is generally very hard and has to be blasted or ripped with specialised machinery. Where the calcretization process has affected gravel layers the calcrete has to be crushed before treatment. The matrix of upper layers of "primary" gravels and sands underlying the surface calcrete are generally calcretized as well but the degree of calcretization decreases with depth, thus facilitating more efficient liberation of diamonds.

The primary palaeo-fluvial successions comprise of various proportions of gravel, sand and silt. Cross-bedded, fine-grained to granular sand layers and lenses, where recognised, reflect lateral stream migration and point bar build-out. Multi-storeyed, stacked, upward fining sand - pebbly sand - gravel cycles generally represent channel fill and bar deposition. Very fine-grained silty sands reflect upper meander deposits that formed prior to meander cut-off (ox-bow lake phase). Massive, clast-supported gravel beds are generally chaotic without any visible gradation or layering. Most of the primary sedimentary features have been destroyed by the subsequent calcretization. The poorly sorted gravels vary from pebble to cobble gravels, generally with a fair percentage of boulders (rarely up to 1 m diameter).

Interbedded sandy or granule beds and lenses occur frequently in more sandy, matrix supported gravel successions. Clasts are generally rounded to well rounded and polished. Clast types include Ventersdorp and Drakensberg lava, banded iron formation, quartzite, dolomite, chert, agate, chalcedony, jasper and variably coloured, rounded quartz amygdales and zeolites derived from the lavas.

The primary Cenozoic sedimentary succession underlying calcrete on Saxendrift and Brakfontein represents ancient fluvial channel and point bar deposits formed in cut-off meanders (ox-bows) of the paleo-Orange River. It varies in thickness from 3 – 20 m, increasing in thickness towards the last channel position before avulsion. Channel migration and switching is manifested by channel-in-channel incision and local unconformities at various places in the succession leading to complicated stratigraphic successions and internal variations in gravel thickness and distribution within terraces. Large scale lateral facies changes, recorded by systematic drilling of the terrace deposits, reflect lateral channel migration prior to meander cut-off.

5.2 Climate

5.2.1 Regional climate

The mine is located in a semi-arid region, receiving on average about 250mm of rain in the west to 500mm on its eastern boundary. It is situated within the Sn climate region. The rainfall is largely due to showers and thunderstorms falling in the summer months October to March. The peak of the rainy season is normally March or February. The summers are very hot with cool winters.
The nearest weather station to the mine is at Douglas #0256424 but due to the limited range of information available from this station and the number of periods with broken records, the data from the weather stations at Kimberley will also be used.

Average monthly and annual rainfall for the site and number of days per month with measurable precipitation

Table 1: Average monthly rainfall data and number of days per month with measurable precipitation

6 Kimberley
Position: 28° 48' S 24° 46' E

Height: 1198m

Period: 1961-1990

This climatologically information is the normal values and, according to World Meteorological Organization (WMO) prescripts, based on monthly averages for the 30-year period 1961 – 1990

Month	Precipitation		
	Average Monthly (mm)	Average Number of days with >= 1mm	Highest 24 Hour Rainfall (mm)
January	57	10	45
February	76	10	88
March	65	10	54
April	49	8	51
May	16	3	55
June	7	3	18
July	7	2	22
August	7	2	26

September	12	3	44
October	30	6	35
November	42	8	60
December	46	8	60
Year	**414**	**71**	**88**

Source: SA Weather service

Maximum rainfall intensities
Table 2: Maximum rainfall intensities

MONTH	60 MINUTES	24 HOURS	24 HOURS IN 50 YEARS	24 HOURS IN 100 YEARS
January	35.8	57	65.1	73.8
February	70.1	82	58.9	66.5
March	63.7	67.8	72.1	81.4
April	25.7	51.6	65.9	75.2
May	14.6	54.6	36.8	42.4
June	19.1	67.5	26	30.4
July	12	26.7	26.6	31
August	17	58.2	23.4	27.3
September	16.3	26.7	24.1	28
October	37.6	59.2	53.8	61.8
November	25.2	60.1	41.2	46.7
December	59.9	64.5	70.7	80.9

Source: South Africa (WB42)
Station: 0290468 - Kimberley: 1961-1990

Average monthly maximum and minimum temperatures
Table 3: Average monthly maximum and minimum temperatures

MONTH	DAILY MAXIMUM °C	DAILY MINIMUM °C
January	32.8	17.9
February	31	17.3
March	28.8	15.2
April	24.8	10.9
May	21.4	6.5
June	18.2	3.2
July	18.8	2.8
August	21.3	4.9
September	25.5	8.9
October	27.8	11.9
November	30.2	14.6
December	32.1	16.6
YEAR	26.1	10.9

Source: Directorate: Climatology South African Weather Bureau © 2000 Station: 0290468 - Kimberley: 1960-2000

Wind

The prevailing wind (occasionally slightly) is from the east (June & October) and the south-west (October - January) but the strongest winds are from the north-west. The average monthly wind speeds are generally below 6.3 m/s.

Humidity

Table 4: Monthly relative humidity in the region

MONTH	AVERAGE (%)	MAXIMUM (%)	MINIMUM (%)
January	47	91	8
February	54	94	12
March	57	96	15
April	60	96	16
May	56	96	16
June	54	97	15
July	49	97	13
August	42	94	10
September	36	91	8
October	39	89	8
November	42	92	8
December	43	90	7
Year	48	94	11

Source: Directorate: Climatology South African Weather Bureau © 2000 Station: 0290468 - Kimberley: 1960-2000

Average monthly evaporation

Table 5: Average monthly evaporation data

MONTH	EVAPORATION IN mm
	SYMONS PAN
January	365.6
February	279.1
March	235.8
April	169.1
May	135.1
June	108.6
July	130.1
August	181.2
September	252.6
October	314.9
November	345.5
December	378.6
YEAR	2896

Source: South Africa Weather Bureau
Station: 0290468 - Kimberley: 1957-1987

Incidence of extreme weather conditions

Hail: Hail is sometimes associated with thunderstorms and mainly occurs in early to late summer (November to February). It occurs on average three times a year and although these storms may sometimes be severe and cause much damage, they usually impact on a relatively small area.

Frost: The period during which frost can be expected lasts for about 120 days (May to August). With extreme minimum temperatures to below -8°C at night in the winter, frost development can be severe.

Droughts: Droughts are common and may vary from mild to severe. During these periods dust storms sometimes occur, depending mainly on denudation of the surface.

Wind: High winds are unusual but when they do occur can uproot trees and take off roofs.

5.3 Topography

The proposed mining area is situated in a region of gently undulating hills on the edge of the Karoo, an area of sparse, arid semi desert that occupies much of central South Africa. The area comprises elevated palaeo- river terraces at elevations of between 1,100m and 1,000m above mean sea level ("amsl"), some 60-70m above the present Orange River. The terraces are cut by a number of small ephemeral streams dry for most of the year they flow through the application area before they confluence and enter the Orange River. The surrounding terrain is a flat semi-desert environment with sparse grass and occasional shrubs, thorn bushes and succulents in a sandy soil (**See Plate below**). Bigger trees often line the banks of the Orange River

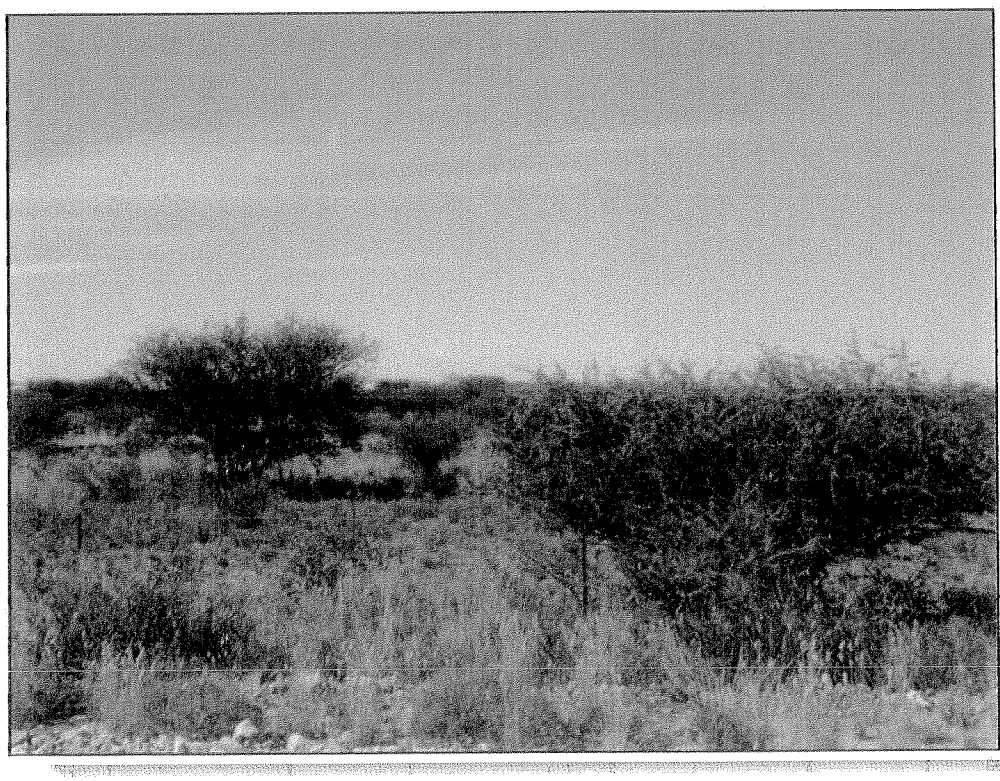


Plate : ***Thin grassland, low bush and sparse trees typical of the middle Orange River properties***

Since no exploration or mining activities will be undertaken in the present river channel, bank-full discharge conditions will have no effect on operations. Even during floods, the effect on operations will be negligible, since the modern-day floodplains are not exploration targets.

5.4 Soil

The soil types that may be potentially disturbed include the Litho-soil, the Mispah and the Hutton soil. The depth is 100-300 mm and the soil types have a low erosion potential. However on a slope these soils could have the potential to erode owing to the gradient. The subsoil will consist of rock such as diamictite, sandstone, shale, grit and conglomerate and quartz-schist. There is also the river terrace gravel, which is largely not erodible.

5.4.1 Pre-mining land capability

Prior to any mining activity the land capability correlated directly with the different soil forms. Before any historical mining activity the area would have been suitable for stock grazing and in some places would have had an arable capability.

The homogeneous grazing land is disturbed throughout the area. The land capability of the mining area is homogeneous, and would been suitable only for grazing purposes for either game or sheep, and therefore a plan is not necessary.

5.5 Land use

Parts of the land was taken over as an existing mine so there were areas of disturbed land. There were also large areas, which had been mined by early alluvial miners, and this had led to piles of "rooikoppie" being left scattered throughout this area. The local land use would have been for grazing purposes.

5.5.1 Land use before mining

The properties had been used for grazing and agriculture

The carrying capacity for the area is low. (20 ha / Large Animal Unit (LAU). 1 LAU = 7 Small Animal Units (SAU) i.e. 20 ha for 7 sheep) (Agric. Dept. 1990) This has been re-determined in a current carrying capacity study. The conclusion of this study is that the area could support approximately 1 sheep for every 4.8 ha in an average rainfall year without causing degradation of the veld. It is suitable mainly for goats or maybe sheep.
Kudu (Tragelaphus strepsiceros), steenbuck (Raphicerus campestris) and the Common duiker Sylvicapra grimmia) probably occur.

5.5.2 Evidence of disturbance

Sporadic mounds of "rooikoppie" indicate the activities of old diamond diggings. The hill slopes are very stony and no serious gulleys or other erosion was noted, with exception of that in some of the drainage lines. There is some erosion resulting from run-off from roads. Two small, reasonably stable road quarries are present.

Current mining activities have caused a high degree of disturbance in the area however this impact can be mitigated through effective rehabilitation during the mining operations.

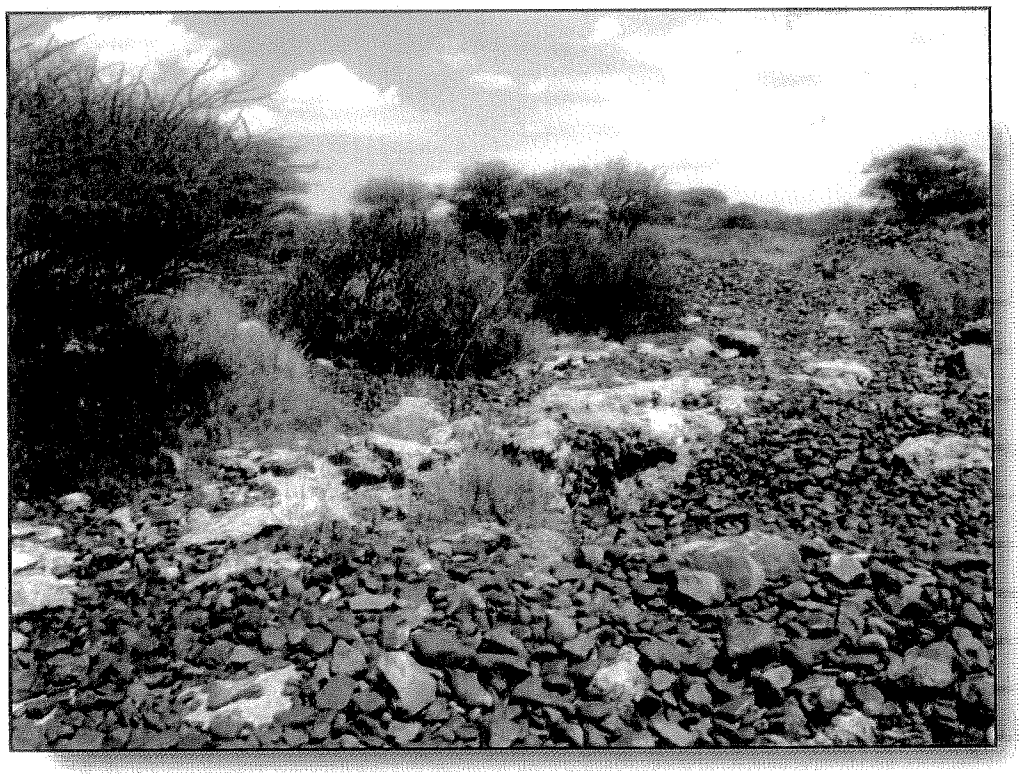


Plate : **Mined out Rooikoppie gravels**

5.5.3 Existing structures

The existing mining area has a series of access roads, single quarters for accommodating employees. Further to this toilet facilities are available on site.

- five security offices;
- three geology/survey offices;
- 16 offices for administration;
- A small kitchen and dining-room, where meals are served three times daily;
- three workshops with associated offices and ablutions;
- mine stores; and
- a clinic

- A small hall serves as a recreational facility and has been supplied with satellite television, board soccer, pool table and dartboards.
- A soccer field has also been constructed on-site.

5.6 Natural vegetation

According to Hoffman (1998) the area falls into the Nama Karoo Biome, and this area specifically is part of the Orange River Nama Karoo (51). The dominant vegetation is a grassy, dwarf shrub land. Grasses tend to be more common in depressions and on sandy soils, and less abundant on clayey soils. Grazing rapidly increases the relative abundance of shrubs.

The dominant species in the mine lease area are: *Acacia mellifera* subsp. *detinens, Acacia tortilis subsp.heteracantha, Boscia albitrunca subsp. albitrunca, Stipagrostis iniplumis, S.obtusa, Enneapogon desvauxii, E. scoparius, Rhigozum trichotomum, Ziziphus mucronata subsp.mucronata, Zygophyllum* species.

5.6.1 ENDANGERED OR RARE FLORA SPECIES

There are very few rare or Red Data Book plant species in the Nama Karoo Biome (Hoffman, T. 1998). No rare or endangered species are known from the mine lease area. Lithops species could occur if there were outcrops of quartz or gneiss (T. Anderson pers comm.), but there are no such outcrops in the area (J. Bristow pers.comm). Following a number of days spent walking the area doing vegetation plots, no sign of these plants or likely habitats were seen. The protected plants, which occur in the area, are *Hoodia gordonii*, *Nymania capensis* namely *Boscia albitrunca*, and *Aloe claviflora*.

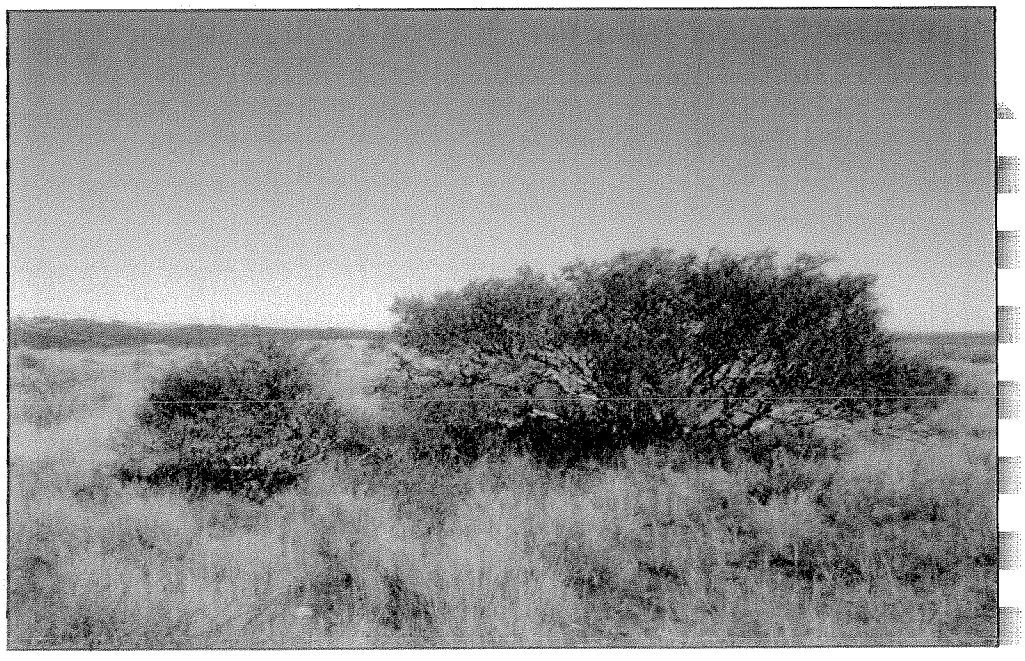


Plate:* Shepherd's Bush** (*Boscia albutrunca*) – ***a protected species

5.6.2 INVADER OR EXOTIC FLORA SPECIES

There are a number of invaders or exotic species present. These include *Prosopis glandulosa* var. *glandulosa* (Mesquite), *Prosopis velutina* (Velvet Mesquite), *Nicotiana glauca* (Wild tobacco), *Agave americana* (American agave), *Opuntia imbricata* (Imbricate prickly pear), *Cereus peruvianus* (Queen of the Night), *Schinus molle* (Pepper Tree), *Opuntia ficus-indica* (Normal Prickly Pear), and *Argemone subfusiformis* (Mexican Poppy).

5.7 Natural fauna

5.7.1 Common species

The fauna listed below is already found in the proposed mining area or may be found there as rehabilitation proceeds.

5.7.2 Birds

An extensive bird life can be found on the proposed mining area and specifically on the hills and small valleys with dense vegetation growth. Some of the following birds have been spotted on the proposed mine or are known to occur in the area.

Table 6: Common bird species found in the area

Common name	Scientific name
Feral Pigeon	*Columba livia*
Rock Pigeon	*Columba guinea*
Redeyed dove	*Streptopelia semitorquata*
Cape turtledove	*Streptopelia capicola*
Laughing dove	*Streptopelia senegalenses*
Namaqua dove	*Oena capensis*
Diederik cuckoo	*Chrysococcyx caprius*
Redchested cuckoo	*Cuculus solitarius*
Barn owl	*Tyto alba*
Pearlspotted Owl	*Glaucidiumperlatum*
Spotted eagle owl	*Bubo africanus*
Whiterumped swift	*Apus caffer*
Little swift	*Apus affinis*
Whitebacked mousebird	*Colius colius*
Redfaced mousebird	*Urocolius indicus*
Brownhooded kingfisher	*Halcyon albiventris*
Lilacbreasted roller	*Coracias coudata*
Purple roller	*Coracius naevia*
Hoopoo	*Upupa epops*

Scimitarbilled woodhoopoo	*Rhino omastus cyanomelas*
Grey hornbill	*Tockus nasutus*
Pied barbet	*Tricholaema leucomelas*
Crested barbet	*Trachyphonus vaillantii*
Rufousnaped lark	*Mirafta africana*
Clapper lark	*Mirafta apiata*
Fawncoloured lark	*Mirafta africanoides*
Chestnutbacked finchlark	*Eremopterix leucotis*
Greybacked finchlark	*Eremopterix verticalis*
European swallow	*Hirundo rustica*
Greater striped swallow	*Hirundo cucullata*
Forktailed drongo	*Dicrurus adsimilis*
Black crow	*Corvus capensis*
Pied crow	*Corvus album*
Ashy tit	*Parus cinerascens*
Pied babbler	*Turdoides bicolor*
Redeyed bulbul	*Pycnonotus nigricans*
Groundscraper thrush	*Turdus litsitsirupa*
Familiar chat	*Cercomelafamiliaris*
Anteating chat	*Myrmecocichlaformicivora*
Stonechat	*Saxicolaporquata*
Cape robin	*Cossypha caffta*
Kalahari robin	*Erythropygia paean*
Titbabbler	*Parisoma subcaeruleum*
Fantailed cisticola	*Cisticolajuncididis*
Desert cisticola	*Cisticola aridula*
Rattling cisticola	*Cisticola chiniana*
Spotted flycatcher	*Muscicapa striata*
Chat flycatcher	*Melaenornis infuscatus*
Fiscal flycatcher	*Sigelus silens*
Cape wagtail	*Motacilla capensis*
Orange striated langclaw	*Macronyx capensis*
Lesser grey shrike	*Lanius minor*
Grassveld pip	*Anthus cinnamomeus*
Fiscal shrike	*Lanius collaris*
Glossy starling	*Lamprotornis nitens*
Cape white eye	*Zosteropspallidus*
Whitebrowed sparrowweaver	*Plocepasser mahali*
House sparrow	*Passer*
Great sparrow	*Passer motitensis*
Cape sparrow	*Passer melanurus*
Masked weaver	*Ploceus velatus*
Redbilled quelea	*Quelea quelea*
Red bishop	*Euplectes orix*
Longtailed widow	*Euplectesprogne*
Melba finch	*Pytilia melba*
Redbilled firefinch	*Lagonosticta senegala*
Common waxbill	*Estrilda astrild*
Redheaded finch	*Amdina erythrocephala*

Quail finch	*Ortygospiza atricollis*
Pintailed whydah	*Vidua macroura*
Shafttailed whydah	*Vidua regia*
Blackthroated canary	*Serinus atrogularis*
Swallowtailed Bee-Eater	*Merops hirundineus*
Yellow canary	*Serinusflaviventris*
Kalahari Robins	*Erythropygia paean*
Dusky Sunbird	*Nectarinia fusca*
Common Quail	*Coturnix coturnix*
Cardinal Woodpecker	*Dendropicos fuscescens*
White-breasted cormorant	*Phalacrocorax cardo*
Grey heron	*Ardea cinerea*
Black headed heron	*Ardea melanocephala*
Cattle egret	*Bululcus ibis*
Hamerkop	*Scopus umbretta*
Hadeda ibis	*Bostrychia hagedash*
Whitefaced duck	*Dendrocygna viduata*
Egyptian goose	*Alopochen aegyptiacus*
Yellowbilled duck	*Anas undulate*
Redbilled teal	*Anas erythrorhyncha*
Spurwinged goose	*Plectropterus gambensis*
Secretarybird	*Sagittarius serpentarius*
Black-breasted snake eagle	*Circaetus pectoralis*
Steppe buzzard	*Buteo buteo*
Lanner falcon	*Falco biarmicus*
Greater kestrel	*Falco rupicoloides*
Lesser kestrel	*Falco naumanni*
Orange river francolin	*Francolinus levaillantoides*
Helmeted Guineafowl	*Numida meleagris*
Redknobbed coot	*Fulica cristata*
Whitewinged black korhaan	*Eupodotis aftaoides*
Crowned plover	*Vanellus coronatus*
Blacksmith plover	*Vanellus armatus*
Common sandpiper	*Actitis hypoleucos*
Blackwinged stilt	*Himantopus himantopus*
Spotted dikkop	*Birhinus capensis*
Doublebanded courser	*Smutsornus africanus*
Temminck's courser	*Cursorius temminckii*
Whitewinged tem	*Chlidonias leucopterus*
Burchell's sandgro	*Pterocles burchelli*

5.7.3 Mammals

Suncus infinitesimus	-	Least dwarf shrew
Crocidura cyanea	-	Reddish-grey musk shrew
Chlorotohpa sclater	-	Golden Mole
Tadarida aegyptiaca	-	Egyptian free-tailed bat
Eptesicus capensis	-	Cape serotine bat

Nycteris thebaica	-	Common slit-faced bat
Rhinolophus clivosus	-	Geoffroy's horseshoe bat
Papio ursinus	-	Chacma baboon
Tatera lencogaster	-	Bushveld gerbil
Tatera brantsii	-	Highveld gerbil
Gerbillurus paeba	-	Hairy-footed gerbil
Desmodillus auricularis	-	Short-tailed gerbil
Mus musculus	-	Domestic mouse
Rhabolomys pumilio	-	Striped field-mouse
Saccostomus campestris	-	Pouched mouse
Malacothrix typica	-	Large-eared mouse (on calcrete)
Graphiurus ocularis	-	Spectacled dormouse
Mus minutoides	-	Pygmy mouse
Aethomys namaquensis	-	Namaqua rock mouse
Parotomys brontsii	-	Bronts' whistling rat
Otomys unisulcatus	-	Karoo bushrat
Thallomys nigricauda	-	Black-tailed tree rat (camel-thom)
Cryptomys hottentotus	-	Common mole rat
Rattus rattus	-	Domestic rat
Lepus capensis	-	Cape hare
Lepus saxatilis	-	Shrub hare
Pedetes capensis	-	Springhare
Pronologus rupestris	-	Smith's red rock rabbit
Helogale parvula	-	Dwarf mongoose
Cynictis penicillata	-	Yellow mongoose
Atilax paludinosus	-	Water mongoose
Galerella sanguinea	-	Slender mongoose
Ictonyx striatus	-	Striped polecat
Genetta genetta	-	Small spotted genet
Xerus inauris	-	Ground squirrel
Funisciurus congicus	-	Striped ground squirrel
Atelerix frontalis	-	Cape hedgehog
Felis caracal	-	Caracal
Felis lybica	-	African wild cat
Felis nigripes	-	Small spotted cat
Otocyan megalotis	-	Bat-eared fox
Vulpes charma	-	Cape fox
Canis mesomelas	-	Black-backed jackal
Pronolagus rupestris	-	Smith's red rock rabbit
Hystrix africaeaustralis	-	Porcupine
Orycteropus afer	-	Aardvark
Phacochoerus aethiopicus	-	Warthog
Manis temniinckii	-	Cape pangolin

Suricata suricatta	-	Meerkat
Sylvicapra grimmia	-	Common duiker
Raphicerus campestris	-	Steenbok
Tragelaphus strepsiceros	-	Kudu
Oryx gazella	-	Gemsbok
Antidorcas marsupialis	-	Springbok
Connocheatus taurinus	-	Blue wildebeest
Damaliscus dorcas phillipsi	-	Blesbok
Redunca fulvorufula	-	Mountain Reedbuck
Kobus ellipsiprymnus	-	Waterbuck
Aepycerus melampus	-	Impala

5.7.4 Endangered species

Endangered species that are found in the area according to the Red Data Book - Birds (Barnes, Keith N, 2000) and the Red Data Book - Mammals (Smithers 1989 & Branch 1988):

Mammals:	State
Aonyx capensis (Cape clawless otter)	- unknown
Felis lybica cafra (African Wild Cat)	-vulnerable
Manis temminckii (Cape pangolin)	-vulnerable
Orycteropus afer (Antbear)	-vulnerable
Rock-Catfish	-rare
Atelerix frontalis (Cape hedgehog)	-rare
Naja nigricollis woodi (Black spitting cobra)	- rare
Proteles cristatus cristatus (Aardwolf)	-rare
Felis nigripes nigripes (Small spotted cat)	-rare

Birds:	State
Cape Vulture – *Gyps coprotheres*	-vulnerable
African Whitebacked Vulture – *Gyps africanus*	-vulnerable
Lappetfaced Vultures – *Torgos tracheliotos*	vulnerable
Tawny Eagle – *Aquila rapax*	- vulnerable
Martial Eagle – *Polemactus bellicosus*	-vulnerable
Blue Crane – *Anthropoides paradiseus*	-vulnerable
Kori Bustard – *Ardeotis kori*	vulnerable
Ludwig's Bustard – *Neotis ludwigii*	vulnerable

(The above list is not complete and only includes the bird species most at risk of electrocution and collision with high rising structures)

Vulnerable means: Taxa of which all or most populations are decreasing because of overexploitation, extensive destruction or degradation of their habitat or other environmental disturbances. All this means that the specie is considered to facing a high risk of extinction in the wild.

Rare means: Taxa with small populations which are not presently endangered or vulnerable, but which are potentially at risk.

5.8 Water

5.8.1 Surface water

The Orange River is next to the application area in some places, no mining will take place within the 1:100 year floodline. Within the area concerned, there are some small streams, part of the dendritic drainage towards the Orange River. These are dry for most of the year and only flow for a short while following good rains. The only use of these streams during the few days that they do flow would be as a drinking source for any game or sheep in the area. The 1:50 year flood level of the river does not impinge on the proposed mining area.

Water Bacteriological Analysis

Heterotrophic Plate Count (HPC/ ml)	960
Coli-form bacteria (/100ml)	2
Faecal coli-form bacteria (/100 ml)	0

Water Chemical Analysis (Samples by AWS)

E.C.(mS/m)	20.0
pH	7.7
Turbidity	36.0
Ca (mg/l)	100
C.O.D. (mg/l)	69.0
Mg (mg/l)	110
Na (mg/l)	200
K (mg/l)	6.1
SO_4 (mg/l)	280

The salinity of the Orange River is 250 mS/m and the high sulphate (280mg/l), magnesium (110mg/l), chloride (370mg/l) and nitrate (29mg/l) content of the Orange River water indicates a fairly disturbed water body.

Aquatic environment

Although no activity is planned within the Orange River itself it was thought prudent to include some information on the present aquatic environment of the Orange River.

The overall health of the Orange River is poor. Numerous natural and anthropogenic influences have changed the structural, species compositional and functional characteristics of the river.

Aquatic microphytes: Diatoms and blue-green algae are found in the Orange River system with green algae normally dominating.

Aquatic macrophytes: The following aquatic macrophytes are found in the Orange system: *Azolla fulliculoides* (American Floating Water Fern), *Ceratophyllum demersum, Eicchornia crassipes* (Water hyacinth), *Myriophullum aquaticum*(Parrot's feather), *Potamogeton crispus, P. pectinatus* and *P. trichodes.*

The alien water hyacinth is the macrophyte that is of most concern and constitutes the most serious macrophyte threat to the river system.

Semi-aquatic macrophytes:

The following semi-aquatic macrophytes are found in the Orange River system: *Ludwigia stolonifera*, *Papyrus sp.*, *Phragmites australis* and Restio sp.

The river reed, *Phragmites australis*, is the predominant semi-aquatic macrophyte species in the Orange with its communities well developed on both midstream islands and along the shores. These reeds act as pioneering communities, because most of the older areas, which are presumably stabilized, also contain other semi-aquatic macrophytes, such as bulrush, *Typha sp.*, *Papyrus sp.* and *Restio sp.*, within and on the waterfront-edges of these reed beds. The reeds encroaches the river downstream of weirs and dams due to the lack of a strong current to remove the reed's rhizome and also in areas where sediment is being deposited. Once the reed beds have been established it further slows the river down.

AQUATIC ANIMALS

Freshwater invertebrates:

With the exception of economically important taxa, such as the Simuliidae (Black Flies) and gastropod snails (as potential intermediate hosts to *Schistosoma* [bilharzias] and turbellarian [liver fluke] parasites), the Orange River invertebrates has neither been properly studied nor has their distribution been properly documented. Two bivalve mollusc species, the small and quite abundant *Corbucola africana* and the much larger, but relatively rare, *Uniona caffer,* as well as freshwater sponges and the freshwater shrimp, *Caradina nilotica,* are known to potentially occur within this river. Because of the polluted condition of the river's water, Hirudinea (leeches) and a variety of fish parasites have also been recorded in this river system.

Freshwater fishes

The fish species occurring in the Orange River are listed in Table 8

TABLE 8: Freshwater fish species of the Orange River

FAMILY	SPECIES		Size	STATUS				
	Scientific Name	Common Name		E	I	T	R	A
Anguillidae	Anguilla mossambica	Longfin Eel	L		X			
Cyprinidae	*Barbus anoplus* B. tr*imaculatus* **Paludinosus** B. *kimberleyensis* *B. aenous* *Labeo umbratus* **capensis** **Cyprinus carpio**	Chubbyhead Barb Threespot barb Straightfin Barb Largemouth Yellow Smallmouth Yellow Moggel Orange River mudfish Carp	S S S L L L L L	 X X X	X X X	X X	 X	 X
Austroglanididae	Austroglanis sclateri	Rock catfish	M	X			X	
	Gehyroglanis sclateri	Rockbarbel/Klip-barber	M				X	
Clariidae	Clarias gariepinus	Sharptooth Catfish	L		X			
Poeciliidae	Gambuscia affinis	Mosquitofish	S					X
Cichlidae	Psedocrenilabrus philander Tilapia sparrmanii	Southern Mouthbrooder Banded Tilapia	S S		X X			

The rock catfish, rock barbel and the largemouth yellow fish are listed as vulnerable in the Red Data Book.

The fishes of the Northern Cape have, over long periods of natural selection (Gaigher, Hamman & Thorne, 1980), adapted to natural seasonal changes in environmental factors such as flow, temperature and turbidity their environment (Tomasson & Allanson, 1983) and are therefore mainly bottom feeders or predators (Du Plessis & Le Roux, 1965). They generally spawn from the onset of spring through to autumn, when the river is in its annual high flow period, utilizing the flooded river banks and floodplains, conditions conductive to growth and survival of the young (Tomasson & Allanson, 1983).

5.8.2 Wetlands

No natural wetlands occur on the proposed mining area except for the numerous reed beds along the banks of the Orange River. There are two pan structures within the proposed Mining Area "Valspan" on the farm Valspan 26 and "Kwartelspan" on the farm Kwartels pan 25. No mining will occur in these two areas as these areas are classified as sensitive areas.

5.8.3 Groundwater

The mean depth of the water table during summer is approximately 120 m and during winters 140 m.

Ground –Water Zone

It is not anticipated that ground water plays a significant role in the study area. The river is the primary source of water for most activities.

The area between Douglas and Prieska is criss-crossed by dolerite dykes which could act as barriers to water seepage from mine sites. These thin impersistant dykes in the proposed mine area will not affect ground–water movement significantly. The depth of the boreholes as indicated in 6.6.2 precludes ground water being an important factor in the area.

Processed water

The processed water and mine residue deposits will form part of a closed dirty water system and will not be allowed back into the Orange River. Water for processing operations will be sourced from the Orange River.

5.9 Air quality

With reference to the Scheduled processes under the Second Schedule to the Atmospheric Pollution Prevention Act, 1965 (Act No. 45 of 1965): No scheduled process relates to any proposed mining activity on the farm.

5.9.1 Existing sources

The current source of air pollution in the area stems from numerous mining operations along the Orange River and from vehicles traveling on the gravel roads of the area. Farming activity, especially ploughing of the irrigation fields, may generate dust during certain periods of the year.

5.9.2 New source

The source of air pollution on the farm will be nuisance dust generated by the opencast mining process, the loading of gravels onto the transport trucks, the dumping of gravels over each sites primary screen or feeder bins as well as from the movement of trucks and vehicles on the mining roads. Gas emissions from machinery will be kept within legal limits.

5.9.3 Areas of impact

The prevailing wind (occasionally slightly) is from the east (June & October) and the south-west (October - January) but the strongest winds are from the north-west. The average monthly wind speeds are generally below 6.3 m/s.
There is a potential for fall-out dust to impact on the surrounding farm properties – which can be described as the nearest potential area of impact. The dust management programme recommended should include daily dosing of access roads and stockpile areas.

If dust is generated, it is expected to be visible from the surrounding farmland or mines along the Orange River.

5.10 Noise

5.10.1 Existing sources:

Noise on site will come from the large vehicles (tip trucks, front-end loaders, back actors, bulldozers), from the working pans, and from the blasting activities. Noise impact from blasting is high, but is limited to very short, infrequent periods of occurrence. The Mine manager on site will inform all surrounding farmers and other interested and affected parties prior to any blasting activities taking place.

There are numerous mining operations on both sides of the mining operations as well as across the Orange River. Although these operations do generate noise the overall impact can be described as negligible.

5.11 Areas of cultural-historical or archaeological interest.

A site inspection conducted by Peter Beaumont (McGregor Museum) on Wouterspan indicated that although the rocky ridges and cliffs along the Orange River are very sensitive due to the numerous rock engravings, these sites are not normally found within the high-energy environment of a drainage line.

The only recognized site of archaeological or cultural interest on the mine lease area is a small graveyard, which will not be disturbed.

5.12 Sensitive Landscapes

"Sensitive environments" that have statutory protection are the following:
1. Limited development areas (section 23 of the Environment Conservation Act, 1989 (Act 73 of 1989).
2. Protected natural environments and national heritage sites.
3. National, provincial, municipal and private nature reserves.
4. Conservation areas and sites of conservation significance.
5. National monuments and gardens of remembrance.

6. Archaeological and palaeontological sites.
7. Graves and burial sites
8. Lake areas, offshore islands and the admiralty reserve.
9. Estuaries, lagoons, wetlands and lakes.
10. Streams and river channels, and their banks.
11. Dunes and beaches.
12. Caves and sites of geological significance.
13. Battle and burial sites.
14. Habitat and /or breeding sites of Red Data Book species.
15. Areas or sites of outstanding natural beauty.
16. Areas or sites of special scientific interest.
17. Areas or sites of special social, cultural or historical interest.
18. Declared national heritage sites
19. Mountain catchment areas
20. Areas with eco-tourism potential

The general area along the Orange River can be classified as a sensitive environment that has statutory protection under points 6, 7 & 13. If this classification is still relevant will be determined during the EIA investigation.

5.13 Visual Aspects

5.13.1 Visibility of the mine from existing roads

The proposed mining area is visible from the old Douglas to Prieska gravel road and not from the existing Douglas to Prieska tarred road. . It is the white of the tailings heap on the existing Saxendrift mine that stands out at present. It is also visible for a short distance as one travels along the minor road to the adjacent farm Brakfontein.

5.13.2 Visibility of the mine from residential areas

There are no residential areas within the surrounding area.

5.13.3 Visibility of dust being generated

Dust that is generated will be visible to the surrounding landowners and from across the Orange River.

5.13.4 Visibility of the mine from tourist routes

The mine is not located on any tourist route and will not be visible to the average tourist.

5.14 Socio-economic structure of the region

5.14.1 Population density, growth and location

The Northern Cape is the largest province and covers 29,7% of South Africa by area, but have only 2% of the total population (840 000- Census '96), of which 71,7% lives in urban areas and 28,3% in rural areas. The Northern Cape
Has a 49,1/50,9 male/female gender ratio. Kimberley is the provincial capital of the Northern Cape with an average summer temperature of 25,3° C and 10,8° C in the winter. The inhabitants of the Northern Cape have a life expectancy at birth of 62,7 years compared to the lowest of 59,7 years in the North West and the highest in the Western Cape of 67,7 years.

About 33% of the Northern Cape's population are African/ Black, 52% are Coloured, 0,3% are Indian/Asian and 13% are White. The province's Coloured population is the largest after that of the Western Cape. Among people aged 20 years and above, almost 21% have had no schooling at all, whilst more than 20% have had some primary education. Only 5,8% of the province's people have tertiary qualifications. More than 11% have a matric, almost 31% have had some secondary education and around 9% have completed their primary education.

Of all the people in the Northern Cape, 2,2% have sight disabilities, 0, 7% have hearing difficulties, 1,1% have physical disabilities, 0,5% have mental disabilities and 0,3% suffer from more than one disability.

The Herbert magisterial district is one of six in the Diamantveld district council. The Herbert district have 8 communities with a total population of 21048 of which 4800 lives in Rietvale & 4600 in Motswedmose ± 14 kilometers south-east of the mine. The other communities are Plooysburg with 93 people, Bongani - 3200 people, Breipaal - 4605 people, Campbell - 2100 people, Douglas - 1200 people and Salt Lake - 450 people. The population growth rate for these towns is between 0 and 3.8%.

5.14.2 Major economic activities and sources of employment

Most of the areas rural population is employed in the agriculture as farm workers as well as on the alluvial diamond mines along the Orange River.

5.14.3 Estimated unemployment

Being a farming area most people living in the immediate area are employed on the farms.

5.14.4 Housing-demand and availability

The demand for housing in the Northern Cape Province is critical as can be seen in the number of informal settlements being built on an almost daily basis in the nearby towns and Kimberley.

5.14.4 Social infrastructure: schools, hospitals, sport- and recreation facilities, shops, police and civil administration

There is no formal infrastructure such as schools, hospitals, sport- and recreation facilities and shops within the surrounding area. The town of Douglas is the nearest with infrastructure to the mine.

5.14.5 Water supply

Water is available to almost 50% of the population in the Northern Cape in the form of water piped to their dwelling. The next most used source of water supply is piped water on-site or in yards, which is available to around 33% of the population.

Surface water from the Riet-, Vaal- and Orange River is the major source of water in the region, although some smaller communities are totally dependent on groundwater for supply. The source for production and domestic water for the mine will be from the Orange River.

5.14.6 Power supply

The Mine will make use of Eskom power as a main power supply

6. ANTICIPATED IMPACTS

The following significance rating will be used to describe the anticipated impacts with a certainty rating of POSSIBLE (Only over 40% sure of a particular fact or of the likelihood of an impact occurring). As this is only a Scoping Report the duration of the impact is taken as occurring over a period of one year and will be rated as occurring only within the mine boundaries. The degree of certainty will improve as more information becomes available during the Environmental Impact Assessment study.

Very high	Of the highest order possible within the bounds of impacts 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 it was predicted. In the case of positive impacts, there is no real alternative to achieving the benefit.
High	Impacts of a 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 impacts, other means of achieving this benefit would be feasible, but these would be more difficult, expensive, time-consuming or some combination of these.
Moderate	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 both feasible and fairly easily possible. In the case of positive impacts, other means of achieving these benefits would be about equal in time, cost and effort.
Low	Impact would be of a 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 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.
Very low	Impact would be negligible. In the case of negative impacts, 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 to be better, in one or a number of ways, than this means of achieving the benefit.
No effect	There would be no impact at all - not even a very low impact on the system or any of its parts.

SCOPING MATRIX

ENVIRONMENTAL ASPECTS	SIGNIFICANCE	POSITIVE OR NEGATIVE IMPACT	COMMENTS
GEOLOGY	Moderate	Negative	
CLIMATE	No effect		
TOPOGRAPHY	Moderate	Negative	
SOIL	Moderate	Negative	
LAND USE	Moderate	Negative	
PLANTS	Low	Negative	
ANIMALS	Low	Negative	
SURFACE WATER	Moderate	Negative	
GROUNDWATER	Low	Negative	
AIR – DUST & NOISE	Low	Negative	
CULTURAL/ ARCHAEOLOGY	Low to Moderate	Negative	
SENSITIVE ENVIRONMENTS	Low to Moderate	Negative	
VISUAL	Low	Negative	
SOCIAL	High	Positive	

1. ALTERNATIVES

Alternatives will be identified by using a series of overlay maps that indicate the different environmental and social-economic factors, by using brainstorming, the nomical group technique and the Delphi technique. The alternatives will also be categorised into the following:

- Demand alternatives
- Activity alternatives
- Location alternatives
- Process alternatives
- Scheduling alternatives
- Input alternatives

2. LAND USE OR DEVELOPMENT ALTERNATIVES

Mining operations are currently taking place in the area and once rehabilitated the land use can revert back to grazing or agricultural potential.

3. ALTERNATIVE MINING METHODS

The mining method of open trenches with continued backfilling is the only economic viable method currently being used by the alluvial diamond fraternity. No alternative mining methods is viable.

4. CONSEQUENCE IF NOT PROCEEDING WITH THE OPERATION

The current operation makes provision for 201 job opportunities. This will be lost if the project does not proceed. Substantial tax benefits to the state and local government will also be lost.

5. MOST APPROPIATE PROCEDURE TO PLAN AND DEVELOP THE MINING OPERATION

a) All historical and potential impacts (environmental and social) will first be addressed to the satisfaction of the relevant state departments.
b) The social and labour plan of the mine will address and spread the economic benefits of the mining operation.
c) A rehabilitation plan will address the continual upgrading of the current state of the environment over the life of the mine.
d) A mining right (conversion of an old order right) must then be obtained over a long enough period to justify the capital expenditure of the new operations.
e) All statutory requirements will be satisfied before any mining commences.

7. INTERESTED AND AFFECTED PARTIES PROCESS

a) The consultation process with interested and affected parties (neighbouring farmers and land owners) was completed as this was a prerequisite prior to commencing the current prospecting/mining operations on site. The new areas owners will get a registered letter, in which they will be notified of the acceptance letter and will be invited to be registered as interested and affected parties.

b) Regular contact sessions are held with the neighbouring farmers and land owners which are currently affected by the mining operations.

c) Records are kept of the complaints and the mitigatory measures have already been implemented.

d) Correspondence of the proposed Mining right application will be forwarded to the I & AP`s informing them of the company's intention to consolidate all the current Prospecting Right operations into a single mining right.

e) An advertisement will placed in a newspaper to notify all other interested parties and affected parties to register as such.

8. FURTHER INVESTIGATIONS REQUIRED

ARCHAEOLOGY: A full investigation by an archaeologist will be done.