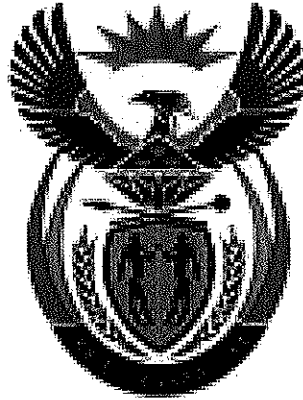


Client's extra copy.

DMR 37



DEPARTMENT: MINERAL RESOURCES

REPUBLIC OF SOUTH AFRICA

FS 30/5/1/1/2/10020 MR

MINING RIGHT

Granted in terms of section 23(1) of the Mineral and Petroleum Resources Development Act, 2002

(Act No. 28 of 2002)

Handwritten signatures and initials

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Handwritten signature and initials 'MM' in the bottom right corner of the page.

Protocol No: 7 /2016
File Ref No FS30/5/1/2/2/10020 MR
Application No

LET IT HEREBY BE MADE KNOWN:

THAT on this 28th day of **September** in the year **2016**, before me, **Catherina Helena Preller** a Notary Public, duly sworn and admitted, residing and practising at **Wekom**, in the **Free State** Province of South Africa, and in the presence of the subscribing competent witnesses, personally came and appeared:

Lethukuthula Mthokozisi Mtshali, ^{Acting} Regional Manager, **Free State** Region of the Department of Mineral Resources, and as such in his / her capacity as the duly authorised representative of:

THE MINISTER OF MINERAL RESOURCES

The said ^{Acting} Regional Manager, being duly authorised thereto under and by virtue of a Power of Attorney granted by the **Deputy Director- General (Mineral Regulation)** of the Department of Mineral Resources on the **19th** day of **August** in the year **2016** in terms of the powers delegated by the Minister on the **12th** day of May 2004 in terms of section 103 (1) of the Act,

AND

(Handwritten signatures and initials)

Dr Stephen Jacobs in his capacity as the company's Representative, and as such, the duly authorised representative of Tja Naledi Beafase Investment Holdings (Pty) Ltd, Registration number:

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|--|
| 2 | 0 | 0 | 1 | / | 0 | 0 | 9 | 3 | 5 | 7 | / | 0 | 7 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|--|

(Hereinafter together with his successors in title and assigns referred to as "the Holder", he, the said representative, being duly authorised thereto under and by virtue of a resolution of Members of the Holder, signed or passed at Rivonia on the 26 day of September in the year 2016 which a certified copy of a resolution has this day been exhibited to me, the notary, and remain filed of record in my protocol with the minutes hereof.)

AND THE MINISTER AND HOLDER DECLARED THAT:

WHEREAS The State is the custodian of the Nation's mineral and petroleum resources in terms of section 3 of the Act.

AND WHEREAS The Holder has applied for a mining right in terms of section 22 of the Act,

AND WHEREAS The **Deputy Director- General** of the Department of Mineral Resources has by virtue of powers delegated to him, granted to the Holder, a mining right in terms of section 23(1) of the Act.

NOW THEREFORE THE MINISTER GRANTS A MINING RIGHT SUBJECT TO THE FOLLOWING TERMS AND CONDITIONS:

Definitions

In this mining right, the following words and expressions shall have the meanings assigned to them:

'**Act**' means the Mineral and Petroleum Resources Development Act, 2002 (Act 28 of 2002) and includes the Regulations, guidelines, circulars, directives and orders made in terms of that Act;

'**Effective date**' means **28th day of September** in the year **2016** (~~being the date on which the environmental management programme is approved in terms of section 39(4) of the Act~~);

'**Environmental Management Programme**' is as defined in the Act and includes any other Environmental Management Programme approved in terms of the previous mining legislation;

'**Financial year**' means a complete financial year of the Holder which, at the time of the granting of this mining right, commences on **01st day of March** in the year **2016**; and ends on **28th day of February** in the year **2017**;

'**Holder**' is as defined in the Act, and specifically in relation to this right, it means **Tja Naledi Beafase Investment Holdings (Pty) Ltd**, Registration No/~~Identification No~~ **200100935707**;

'**Mineral**' is as defined in the Act, and specifically in relation to this right means **Silica Sand**;

'**Mining Area**' is as defined in the Act and includes any additional area of environmental liability as may be reflected on the Environmental Management Programme relating to this right;

'**Mining right**' is as defined in the Act and includes all the Annexures to it, agreements and inclusions by reference;

'**Mining Work Programme**' is as defined in the Act and as reflected in the attached **Annexure A** to this mining right;

'**Minister**' means the Minister of Mineral Resources and includes the successors in title, the assignee or any person duly authorised to act in the Minister's place and stead;

'**Regional Manager**' is as defined in the Act and specifically in relation to this right means the Regional Manager for the **Free State** Region of the Department of Mineral Resources; and

'**Social and Labour Plan**', is as contemplated in regulation 46 of the Regulations to the Act and is as reflected in the attached **Annexure B** to this mining right.

1. Description of the Mining Area

The Mining Area shall comprise the following:

Certain: **Portion 04 of the farm Woodlands 407**

Situated: **Free State Magisterial/Administrative District of Parys**

Measuring: **437.8330** hectares in extent.

(In the case of various farms being involved, a list can be attached and referred to as **Annexure**);

Which Mining Area is described in detail on the attached ~~Diagram~~ plan marked **Annexure**

Handwritten signatures and initials, including "mm" and "P" with a circled "P".

2. Granting of Mining Right

Without detracting from the provisions of sections 5 and 25 of the Act, the Minister grants to the Holder the sole and exclusive right to mine, and recover the mineral/s in, on and under the mining area for the Holder's own benefit and account, and to deal with, remove and sell or otherwise dispose of the mineral/s, subject to the terms and conditions of this mining right, the provisions of the Act and any other relevant law in force for the duration of this right.

3. Commencement, Duration and Renewal

- 3.1. This mining right shall commence on **19th August 2016** and, unless cancelled or suspended in terms of this clause 13 of this right and or section 47 of the Act, will continue to be in force for a period of **Ten (10)** years ending on **18th August 2026**.
- 3.2. The Holder must commence with the mining operations within a year from the date on which the mining right becomes effective in terms of section 23 (5) of the Act, or any later date as may, upon a written request by the Holder, be authorised in writing by the Minister in terms of the Act, failing which this right may be cancelled or suspended.
- 3.3. Any application for renewal must be submitted to the Regional Manger not later than 60 working days prior to the date of expiry of this right.

4. Amendments, Variation and Abandonment

- 4.1. The terms of this right (including by extension of the area covered by it or by the addition of minerals or a share or shares or seams, mineralized bodies, or strata, which are not at the time the subject thereof) may not be amended or varied without the written consent of the Minister.
- 4.2. The Holder shall be entitled to abandon or relinquish the right or the area covered by the right entirely or in part. Upon abandonment or relinquishment of the mining area or any portion thereof, the Holder must:

Handwritten signatures and initials, including "mm" and "P" with a circled "P".

- 4.2.1. Furnish the Regional Manager with all prospecting and /or mining results and/or information, as well as the general evaluation of the geological, geophysical and borehole data in respect of such abandoned area in so far as it applies to the mineral or any other mineral/s obtained in respect of this right and,
- 4.2.2. Apply for a closure certificate in terms of section 43 (3) of the Act.
- 4.3 With effect from the date the Holder has abandoned or relinquished a portion or portions of the mining area, and subject to section 43 of the Act, the Minister is entitled to grant any right, permit, or permission referred to in the Act in, on, or under the portion/s, so abandoned or relinquished, to any person/s.

5. Payment of Royalties

- 5.1. The Holder shall as contemplated in section 25 (2) (g) pay to the State throughout the duration of this mining right, royalties payable in terms of any Act or Amendment to an Act of Parliament implemented.

6. Payment of Interest

If mining fees, any fees, any levy, royalties or consideration referred to in clause 5 are not paid punctually, the Holder shall be in mora and shall pay interest thereon at the rate prescribed in terms of section 80 of the Public Finance Management Act, 1999(Act 1 of 1999) reckoned from the date on which payment is due and payable, to the date of actual payment.

7. Restrictions and Obligations Imposed on the Holder

- 7.1 The Holder is entitled to the rights referred to in section 5(2), (3) and section 25 of the Act, and such other rights as may be contained in this mining right or such other right as may be granted to, acquired by or conferred upon the Holder by any other applicable law.
- 7.2 Mining operations in the mining area must be conducted in accordance with the Mining Work Programme and any amendment to such Mining Work Programme and an approved Environmental Management Plan.
- 7.3 The Holder shall not trespass or enter into any homestead, house or its curtilage nor interfere with or prejudice the interests of the occupiers and/or owners of the surface of the Mining Area except to the extent to which such interference or prejudice is necessary for the purposes of enabling the Holder to properly exercise the Holder's rights under this mining right.

Handwritten signature and initials in the bottom right corner of the page.

8. Conditions on disposal of Minerals and/ or Products Derived from Mining

It is a condition of the granting of this mining right that the Holder shall dispose of all minerals and/ or products derived from the exploitation of the mineral at competitive market prices which shall mean in all cases, non-discriminatory prices or non-export parity prices. If the minerals are sold to any entity, which is an affiliate or non-affiliated agent or subsidiary of the Holder, or is directly or indirectly controlled by the Holder, such purchaser must unconditionally undertake in writing to dispose of the minerals and any products produced from the minerals, at competitive market prices.

9. Mortgage, Cession, Transfer, Alienation

9.1 This mining right, a shareholding, an equity, an interest or participation in the right or joint venture, or a controlling interest in a company, close corporation or joint venture, may not be encumbered, ceded, transferred, mortgaged, let, sublet, assigned, alienated or otherwise disposed of without the written consent of the Minister, except in the case of a change of controlling interest in listed companies.

9.2 Any transfer, encumbrance, cession, letting, sub-letting, assignment, alienation or disposal of this right or any interest therein or any share or any interest in the Holder, without the consent of the Minister referred to in section 11(1) is of no force, no effect and is invalid.

10. Protection of Boreholes, Shafts, Edits and Openings.

All boreholes, shafts, edits, excavations, and openings sunk or made, by the Holder during the currency of this mining right shall be sealed, closed, fenced, made safe by the Holder in accordance with the approved Environmental Management Programme, the Mine Health and Safety Act, 1996 or any other applicable laws and Regulations.

11. Holder's liability for payment of Compensation for Loss or Damage

11.1. Subject to section 43 of the Act, the Holder shall, during the tenure of this right while carrying out the mining operations under this right, take all such necessary and reasonable steps to adequately safeguard and protect the environment, the mining area and any person/s using or entitled to use the surface of the mining area from any possible damage or injury associated with any activities on the mining area.

Handwritten signatures and initials in the bottom right corner, including a large signature and the initials 'MM'.

- 11.2. Should the holder fail to take reasonable steps referred to above, and to the extent that there is legal liability, the holder shall compensate such person or persons for any damage or losses, including but not limited to damage to the surface, to any crops or improvements, which such person or persons may suffer as a result of, arising from or in connection with the exercise of his/her rights under this mining right or of any act or omission in connection therewith.

12. Inspection of Mining Area

The Minister and/or any person duly authorised thereto in writing by the Minister shall be entitled to inspect the mining area, the Holder's mining operations and the execution of the approved Environmental Management Programme on the Mining Area as provided for in the Act, and any instruction conveyed in writing by the Minister to the Holder requiring the proper performance by the Holder of the Holder's obligations under this mining right shall be put into effect by the Holder in terms of the Act.

13. Cancellation or Suspension

- 13.1 Subject to section 47 of the Act, this mining right may be cancelled or suspended if the Holder:
- 13.1.1 Submits inaccurate, incorrect and or misleading information in connection with any matter required to be submitted under the Act;
- 13.1.2 Fails to honour or carry out any agreement, arrangement, or undertaking, including the undertaking made by the Holder in terms of the Broad Based Socio Economic Empowerment Charter and Social and Labour plan, on which the Minister relied for the granting of this right;
- 13.1.3 Breaches any material term and condition of this mining right;
- 13.1.4 Conducts mining operations in contravention of the provisions of the Act;
- 13.1.5 Contravenes the requirement of the approved Environmental Management Programme; or
- 13.1.6 Contravenes any provisions of this Act in any other manner.
- 13.2 Before the Minister cancels or suspends this right, the Minister shall:
- 13.2.1 Give written notice to the Holder indicating the intention to suspend or cancel this right;
- 13.2.2 Give reason/s why the Minister is considering the suspension or cancellation of this right;
- 13.2.3 Give the Holder 30 days to show reasons why the right should not be suspended or cancelled;
- 13.2.4 Notify, the mortgagee [if any], of the intention to suspend or cancel this right; and
- 13.2.5 Direct the Holder, where it is possible to remedy any contravention, breach or failure, to comply or to take such specified measures to remedy any contravention, breach or failure to comply.
- 13.3 If the Holder does not take the measures as specified by the Minister to remedy a contravention, breach or failure, the Minister may cancel or suspend this right after considering representations made by the Holder in terms of clause 13.2.3.

14. Records and Returns

- 14.1. The Holder shall maintain all such books, plans and records in regard to mining on the Mining Area as may be required by the Act and shall furnish to the office of the Regional Manager such reports and documents as may be relevant under this right.
- 14.2. The Holder shall furnish to the Regional Manager all such monthly returns contemplated in section 28 (2) A of the Act not later than the 15th day of the month following the month in respect of which it was reported.
- 14.3. The Holder shall furthermore at the end of each year following commencement of this mining right, inform the Regional Manager in writing of any new developments and of the future mining activities planned in connection with the exploitation/mining of the minerals on the Mining Area.

15. Minister's liability for Compensation

The Minister shall not at any time be liable or responsible for the payment of compensation of whatever nature to the Holder, the Holder's successors-in-title or assignee, or any person whomsoever as a result of the granting of this right.

16. Compliance with the Laws of the Republic

The granting of this Right, does not exempt the Holder and its successors in title and/or assigns from complying with the relevant provisions of the Mine Health and Safety Act, (Act No.29 of 1996) and any other law in force in the Republic of South Africa.

17. Provisions relating to section 2(d) and (f) of the Act

In the furthering of the objects of this Act, the Holder is bound by the provisions of an agreement or arrangement dated _____ entered into between the Holder/ empowering partner and **Joy Rabotapi ID No 5811145893082 held 26% (see annexure "D" attached)** (the empowerment partner) which agreement or arrangement was taken into consideration for purposes of compliance with the requirements of the Act and or Broad Based Economic Empowerment Charter developed in terms of the Act and such agreement shall form part of this right.

18. Social and Labour Plan

- 18.1 The holder must annually, not later than three months before the end of its financial year, submit detailed implementation plan to give effect to Regulation 46(e)(i),(ii)and (iii) in line with the Social and Labour Plan.

18.2 The holder must annually, not later than three months after finalisation of its audited annual report, submit a detailed report on the implementation of the previous year's social and labour plan.

19. Severability

Notwithstanding anything to the contrary, any provision of this mining right which is contrary to any provision of the Act or which is otherwise ultra vires, null and void, voidable, or unenforceable, shall be severable from the rest of this right, such rest thus being and remaining of full force, effect and enforceable.

20. Domicilia citandi et executandi

20.1. The parties hereto choose the following addresses as their *domicilia citandi et executandi* and for all purposes arising from this mining right, in particular for the purposes of serving of any notice in terms of this mining right, and any notice properly addressed to the under mentioned postal addresses of the parties shall be deemed to have been received by the addressee within 14 days if given in writing and posted by prepaid registered post addressed to the addressee at the relevant postal address:

20.1.1. In the case of the Minister.

| Physical Address | Postal Address |
|--|--|
| <p>Cnr Bok and 314 Stateway The Strip Building</p> <p>Code 9459 Tel 057 3911300 Fax 057 357 6003</p> | <p>Private Bag X 33 Welkom</p> <p>9459 057 391 1300 057 357 6003</p> |

20.1.2. In the case of the Holder.

| Physical Address | Postal Address |
|---|--|
| <p>Code 1645 Tel 011 606 3116 Fax 011 606 2056</p> | <p>P.O. Box 11 Modderfontein</p> <p>1645 011 606 3116 011 606 3116</p> |

- 20.2. Notwithstanding anything to the contrary herein contained, a written notice or communication actually received by a party at any place other than the chosen *domicilia citandi et executandi* shall constitute adequate notice or communication to the party notwithstanding that it was not sent to or delivered at such party's chosen *domicilium citandi et executandi*.
- 20.3 Either party shall be entitled from time to time to change the *domicilia citandi et executandi* or postal address furnished above after giving at least 14 days prior written notice of such change to the other party, failing which the above mentioned addresses will remain in force.
- 20.4. Any written notice or communication contemplated in this clause which is forwarded by one party to the other by registered post will be presumed to have been received by the addressee on the fourteenth day following the date of posting from an address within the Republic of South Africa to the addressee at the postal address of the addressee for the time being as determined in accordance with the provisions of this clause.

21. Costs

The Holder shall pay all costs and charges incurred in connection with the execution and registration of this prospecting right.

Thus done and signed at **Welkom** on the **28th** day of **September** in the year **2016** in the presence of the undersigned witnesses:

AS WITNESS:





For and on behalf of the **Minister**

AS WITNESS:

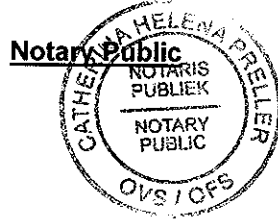




For and on behalf of the **Holder**







Three handwritten signatures or initials are located in the bottom right corner of the page. The first is a circular mark, the second is a stylized 'P', and the third is a stylized 'M'. Below the third signature, the letters "MM" are written in a simple, blocky font.

DR. S. JACOBS

VAT NR: 4700210430

TEL: (011) 608 1235 / 4528

FAX: (011) 608 2056 / 086 730 8642

PRAC NR: 1498231

E-MAIL: admin@mohealth.co.za

WEBSITE: www.mohealth.co.za

PO. BOX 11

MODDERFONTEIN

1645

0832817681

Datum / Date : 07/11/2012

PORTION 4 OF FARM WOODLAND 407

1. 440.8 Ha
 - a) Agricultural land for cultivating: \pm 180 ha.
 - b) Land for grazing: \pm 170 ha.
 - c) Swamp area (old mining area): \pm 20 ha.
 - d) Sand area: 50 ha.
 - e) Small holdings: \pm 20 ha.
2. Estimated sand reserve 1.4 million cubes
 - a) Sand lab results attached.
3. SABS bottled H₂O attached.
4. Separate company with a registered prospecting right for the total farm for sand and diamonds.
5. Mining permit (S. Jacobs) for the farm.

Kind regards

DR. STEPHEN JACOBS

Modderfontein Laboratory Services

(Pty) Ltd

reg.No. 1966/001741/07

P.O. Box 27
Modderfontein
1645
Tel: +27(011) 606 2274
Fax: +27(011) 606 2375

CUSTOMER: Dr Jacobs

Order/Tracking No: 12/04/2011

TEL:

Group ID No: 72903

FAX:

EMAIL:

ANALYTICAL REPORT

Semi-Quantitative XRF Scan, on the dried sample, of all the elements of atomic mass greater than and including Magnesium.

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---------|---------|---------|---------|---------|---------|---------|
| Silica as SiO ₂ | 92.10 % | 93.28 % | 91.13 % | 94.41 % | 92.97 % | 91.94 % | 90.86 % |
| Iron as Fe ₂ O ₃ | 2.61 % | 2.23 % | 2.70 % | 1.82 % | 2.24 % | 3.16 % | 2.72 % |
| Aluminium as Al ₂ O ₃ | 3.31 % | 2.45 % | 3.86 % | 2.05 % | 3.08 % | 2.98 % | 4.50 % |
| Potassium as K ₂ O | 0.93 % | 0.98 % | 1.13 % | 0.83 % | 0.76 % | 0.87 % | 0.91 % |
| Sodium as Na ₂ O | 0.12 % | 0.16 % | 0.13 % | 0.09 % | 0.10 % | 0.08 % | 0.09 % |
| Magnesium (MgO) | 0.08 % | 0.05 % | 0.09 % | 0.04 % | 0.06 % | 0.06 % | 0.11 % |
| Sulphur as SO ₃ | 0.03 % | 0.03 % | 0.04 % | 0.02 % | 0.03 % | 0.03 % | 0.03 % |
| Calcium as CaO | 0.08 % | 0.08 % | 0.08 % | 0.04 % | 0.05 % | 0.05 % | 0.04 % |
| Titanium as TiO ₂ | 0.31 % | 0.30 % | 0.49 % | 0.29 % | 0.26 % | 0.30 % | 0.37 % |
| Vanadium as V ₂ O ₅ | 0.03 % | 0.02 % | 0.03 % | 0.02 % | 0.03 % | 0.03 % | <0.01 % |
| Chromium as Cr ₂ O ₃ | 0.27 % | 0.25 % | 0.23 % | 0.23 % | 0.25 % | 0.29 % | 0.21 % |
| Manganese as MnO ₂ | 0.01 % | 0.01 % | 0.01 % | 0.02 % | 0.01 % | 0.06 % | 0.01 % |
| Zirconium as ZrO | 0.04 % | 0.05 % | 0.04 % | 0.06 % | 0.04 % | 0.04 % | 0.04 % |
| Barium as BaO | 0.03 % | 0.03 % | 0.01 % | 0.04 % | 0.03 % | 0.03 % | 0.03 % |
| Phosphorus as P ₂ O ₅ | 0.07 % | 0.06 % | 0.03 % | 0.06 % | 0.06 % | 0.06 % | 0.06 % |

Traces of copper, zinc strontium, rubidium, and chloride were also detected on all samples.

Analysed By: _____

Supervisor: _____

Directors: D. Gregory (Managing), WM Wilkie, GA Dickerson

\\Modlab-sq\alchemy reports\group grid report XRF Hellum.rpt

ANALYTICAL REPORT

ATTENTION: MR HENNIE REYNEKE/DR JACOBS
STELLA SILICA

DATE: 31 August, 2001

SAMPLE IDENTITY: SAND

| TEST | RESULT |
|---|-------------|
| SIEVING: | |
| Retained cumulative on 1000 μm sieve | 0,0% (m/m) |
| 710 μm sieve | 0,9% (m/m) |
| 500 μm sieve | 5,3 % (m/m) |
| 355 μm sieve | 15,3% (m/m) |
| 250 μm sieve | 39,5% (m/m) |
| 180 μm sieve | 69,4% (m/m) |
| 125 μm sieve | 89,7% (m/m) |
| 90 μm sieve | 95,0% (m/m) |
| 63 μm sieve | 98,0% (m/m) |
| Passing a 63 μm sieve | 2,0% (m/m) |
| MOISTURE | 0,1% (m/m) |
| LOSS ON IGNITION | 0,4% (m/m) |
| CARBONATE CONTENT as CO₃ | <0,1% (m/m) |

ANALYSED BY: P. van Eck

SECTION MANAGER: 

W. WILKIE

DATE: 31/08/01

Figures contained in this report are not absolute, but are subject to an analytical uncertainty of ± 2 Standard deviations, the value of which is available on request from the Chief Chemist.

Dr S Jacobs
 P O Box 15265
 RIVERFIELD
 1564

GENERAL ANALYTICAL CHEMISTRY

Your ref:
 Dated: 2004-06-21
 Our ref: 2415445
 Enquiries: CM Fouché
 ☎ (012) 428-6844
 Date: 2004-07-07
 Report No: 7212/X5150
 Page: 1 of 2

WATER REPORT

RESULTS OF ANALYSIS

Date received: 2004-06-21

Date commenced: 2004-06-21

| Method used | Test performed | P464 Water Sample S Jacorys |
|-------------|---|--------------------------------|
| SANS 5011 | pH at 25 °C (automated) | 8,1 |
| SANS 5213 | Dissolved solids at 180 °C in mg/l | 155 |
| SANS 11885 | Calcium (recoverable) as Ca in mg/l | 26,2 |
| | Magnesium (recoverable) as Mg in mg/l | 12,5 |
| SANS 11885 | Sodium as Na in mg/l | 5 |
| | Potassium as K in mg/l | <1 |
| SANS 5202 | Chloride as Cl in mg/l | 6 |
| SANS 6310 | Sulphate as SO ₄ in mg/l | 8 |
| SM 2320 | Total alkalinity as CaCO ₃ in mg/l | 90 |
| SANS 5210 | Nitrate and nitrite as N in mg/l | 8,1 |
| SANS 5205 | Fluoride as F in mg/l | 0,06 |
| SANS 11885 | Total Iron as Fe in mg/l | <0,01 |
| | Total aluminium as Al in mg/l | <0,07 |

1 Dr Lategan Road Groenkloof, Private Bag X191 Pretoria 0001, Tel: +27 (012) 428-7911,
 Fax: +27 (012) 344-1568.

This test was performed by Testing and Conformity Services (Pty) Ltd, an affiliate of the SABS.
 This report relates only to the specific sample(s) tested as identified herein. It does not imply SABS approval of the quality and/or performance of the item(s) in question and the test results do not apply to any similar item that has not been tested.
 (Refer also to the complete conditions printed on the back of the official test reports.)

S A N A S T0027



ACCREDITED
 LABORATORY

P.O. Box 82124
Southdale 2135
South Africa.
TEL: (011) 490-2228
FAX: (011) 496-2239



INSPECTORATE M&L (PTY) LTD.
(Reg. Number 07/0904/07)
Consulting Industrial Chemists, Analysts & Samplers
Confidential
Electronic Certificate / Report

Ref. No. : 06/1594L A
Issued at: Johannesburg
Date: 2005.09.30
MP/cvs Page 1 of 1

COMPANY NAME : BARRAGE SILICA MINING CC
SUBJECT : Analysis of 1 sample of SAND
MARKED : SAMPLE 1
INSTRUCTED BY : HEYNS WEYER
INSTRUCTION NO. : J5050
RECEIVED ON : 2005.09.22
LAB NO(S) : A71736
SAMPLED BY : Sample supplied by Barrage Silica Mining CC

Analysis on a Dry Basis:

Analysis on dry basis:

AFS Sizing Determination

| <u>Sieve No.</u> | <u>Mass/g</u> | <u>% Retained</u> | <u>AFS Value</u> |
|--------------------|---------------|-------------------|------------------|
| + 3.35mm | 0.0 | 0.0 | 0.0 |
| -1.700mm + 0.850mm | 1.03 | 1.1 | 0.11 |
| -0.850mm + 0.600mm | 4.56 | 4.9 | 0.98 |
| -0.600mm + 0.425mm | 13.97 | 15.0 | 4.50 |
| -0.425mm + 0.300mm | 18.31 | 19.7 | 7.88 |
| -0.300mm + 0.212mm | 29.55 | 31.8 | 15.9 |
| -0.212mm + 0.150mm | 14.87 | 16.0 | 11.2 |
| -0.150mm + 0.124mm | 3.44 | 3.7 | 3.7 |
| -0.124mm + 0.106mm | 3.54 | 3.8 | 3.8 |
| -0.106mm + 0.09mm | 1.02 | 1.1 | 1.54 |
| -0.090mm + 0.075mm | 0.98 | 1.1 | 1.54 |
| -0.075mm + 0.053mm | 0.97 | 1.1 | 2.20 |
| -0.053mm | 0.31 | 0.3 | 0.9 |
| | 92.9 | 100.0 | 54.25 |

Results reported relate only to items tested

Mehmoed Patel

Authorized Signature

Dōrean Environmental Services CC

CK 1991/032958/23

PO Box 41969, Moreleta Ridge, 0044
Tel/Fax: (012) 997 4867 Cell: 083 625 3792
E-mail: dorean@54.co.za

For attention: Mr Jerry du Preez

MINERAL ESTIMATION REPORT FOR THE PROPOSED SAND MINE SITUATED ON THE FARM WOODLANDS IN THE MAGISTERIAL DISTRICT OF PARYS.

Objective.

The main objective of the study is to predict the quantity of high quality silica sand reserves in the area described in green on the attached map of the abovementioned farm.

Background.

The farm Woodlands is situated on the southern banks of the Vaal River in the Free State Province. Portions of the farm is situated directly above the paleo-riverbed (the historical path that the Vaal river followed million of years ago) which is made up of the following elements, namely: A base layers of floor granites typical of the Vredefort dome area, paleo-riverbed gravel varying in size from boulders to pebbles and various layers of high quality silica sand. Being an ancient riverbed the sand layers are deepest in the middle of the paleo-river channel and these levels taper off towards the edges of the said channel. Previous tests done by an accredited test house namely SGS showed that the silica sand is on average 98% pure. Sand of this quality has a very good market price as it is used in foundries for making moulds.

Portions of the farm were mined in the past by various establishments, including the Provincial Administration of the Free State for road building purposes. The existing landowner operates a small to medium sand mining operation on these previously minded areas.

Methods.

The following modus operandi was followed:

- Various sites were chosen on the target area to give a representative sample of the sand layers overlying the paleo-river bed. A total of eight such sites were chosen.

- Test pits were made using an excavator. These pits were made to reach the paleo river gravel and the depth of each pit was recorded (please see attached photographs).
- The average depth of the pits were calculated and multiplied with the surface area of the target area. The result of this will give a reasonable estimation of the volume of sand reserves available for mining purposes.

Results

Figure 1 shows the area that makes up the subject of this study described in the text. The various positions of the test pits are shown on the transparent overlay.

Table 1 summarizes the results of the test pits made. It also includes the co-ordinates of the pits in the Cape datum. The average depth for the eight pits was 2.8m multiplied by 53ha gives a mineral reserve of approximately 1490625m³. At a constant mining production rate of 2000m³ per month the life of mine is estimated at 60 years.

Table 1: Position and depth of test pits.

| Pit number | South | East | Depth to gravel |
|------------|-------------|-------------|-----------------|
| 1 | 26°45'18.0" | 27°36'32.2" | 5m |
| 2 | 26°45'22.3" | 27°36'36.8" | 2m |
| 3 | 26°45'22.6" | 27°36'31.9" | 3m |
| 4 | 26°45'29.2" | 27°36'51.3" | 1,5m |
| 5 | 26°45'26.6" | 27°36'47.6" | 2m |
| 6 | 26°45'25.9" | 27°36'41.0" | 2m |
| 7 | 26°45'27.0" | 27°36'34.8" | 4m |
| 8 | 26°45'22.3" | 27°36'28.2" | 4m |

The going rate for silica sand is approximately (R200 per m³) at current prices and this relates to R298 125 000-00 in present money value terms. If the sand was sold at normal building sand prices at about R65 per m³, the present monetary value of the mineral reserve is R96 890 625-00. At a mining production rate of

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REVISION DATE May 1997
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AUTHORITY *DM*

FINENESS NUMBER (AFS) CALCULATION

The method of calculating the fineness number is as follows:

The Percentage of sand retained (see column 2 below) by each sieve in the mechanical analysis is multiplied by a sieve factor (see column 3 below) to give the "Product: (see column 4 below).

The fineness number is then obtained by dividing the sum of the products (column 4) by the total percentage of material retained by the sieves.

| Column 1 | Column 2. | Column 3. | Column 4. |
|-------------------------------|---------------------------------|-----------------|-----------|
| B. S. Sieves Microns (No.) | Percentage Material Retained | Sieve Factor | Product |
| 710 (25) | 0,5 | 16 | 8,0 |
| 500 (35) | 5,2 | 22 | 114,4 |
| 355 (45) | 18,2 | 30 | 546,0 |
| 250 (60) | 27,5 | 44 | 1210,0 |
| 212 (70) | 16,5 | 60 | 990,0 |
| 150 (100) | 22,7 | 72 | 1634,4 |
| 106 (140) | 8,5 | 100 | 850,0 |
| 75 (200) | 0,8 | 150 | 120,0 |
| PAN (PAN) | 0,1 | 200 | 20,0 |
| TOTAL | 100,0 | | 5492,80 |

$$\text{AFS No} = \frac{5492,8}{100}$$

$$= 54,93$$

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ISSUE DATE June 1989
REVISION DATE May 1997
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AUTHORITY *OSM*

Either B.S. or U.S. sieves can be used.

Standard procedure used at the Consol Philippi Operation is to use B.S. sieves as in the example above. Slight differences may be found from time to time using the different methods.

The sieves and factors to be used with the U.S. sieve method are as follows:-

| Column 1 | | Column 2 |
|-------------|-------|----------|
| U.S. Sieves | | Sieve |
| Microns | (No.) | Factor |
| 1700 | (12) | 5 |
| 850 | (20) | 10 |
| 600 | (30) | 20 |
| 425 | (40) | 30 |
| 300 | (50) | 40 |
| 212 | (70) | 50 |
| 150 | (100) | 70 |
| 106 | (140) | 100 |
| 75 | (200) | 140 |
| 53 | (270) | 200 |
| PAN | (PAN) | 300 |

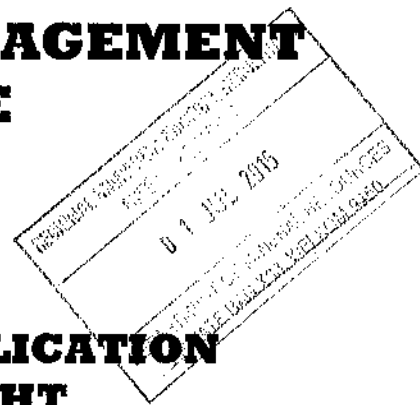
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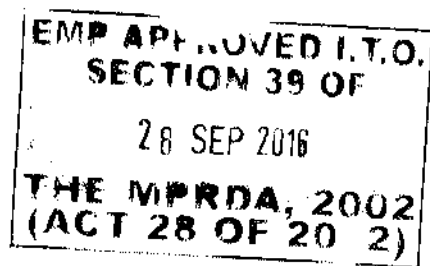
NAME OF APPLICANT: Tja Naledi Beafase Investment Holdings (Pty) Ltd

REFERENCE NUMBER: REF: FS 30/5/1/2/2/10020 MR

**ENVIRONMENTAL IMPACT
ASSESSMENT
AND
ENVIRONMENTAL MANAGEMENT
PROGRAMME**



**SUBMITTED FOR AN APPLICATION
FOR A MINING RIGHT
IN TERMS OF SECTION 39 AND OF
REGULATIONS 50 AND 51 OF THE MINERAL
AND PETROLEUM RESOURCES DEVELOPMENT
ACT, 2002,
(ACT NO. 28 OF 2002) (the Act)**

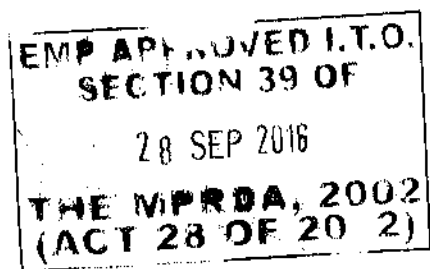


mineral resources

Department:
Mineral Resources
REPUBLIC OF SOUTH AFRICA

STANDARD DIRECTIVE

All applicants for mining rights are herewith, in terms of the provisions of Section 29 (a) and in terms of section 39 (5) of the Mineral and Petroleum Resources Development Act, directed to submit an environmental Impact Assessment, and an Environmental Management Programme strictly in accordance with the subject headings herein, and to compile the content according to all the sub items to the said subject headings referred to in the guideline published on the Departments website, within 30 days of notification by the Regional Manager of the acceptance of such application.



SECTION 1

ENVIRONMENTAL IMPACT ASSESSMENT

REGULATION 50 (a).

| |
|---|
| <p>EMP APPROVED I.T.O. SECTION 39 OF 28 SEP 2016 THE MPRDA, 2002 (ACT 28 OF 20 2)</p> |
|---|

1. Description of the baseline environment

- 1.1. Concise description of the environment on site relative to the environment in the surrounding area.

Geology - The underlying geology comprises quaternary deposits of river gravels and aeolean sand overlying the rocks forming a portion of the ring synclinorium surrounding the Vredefort Dome. On the farm Woodlands the rocks of the ring synclinorium consist of a sequential portion of the Transvaal Sequence from the Malani Dolomite at the bottom to the Black Reef Quartzite not being exposed at Woodlands, up to the Hekpoort Andesite. The sequence is as it outcrops on Woodlands has been complicated by a series of east to west trending strike faults that mean that the full sequence is not exposed and that in some cases portions of the sequence are repeated.

The identified mineral deposit is alluvial silica sand deposited by the Paleo-Vaal River over thousands of year. The silica is of a very high quality and is sought after by mainly foundries and tile adhesive manufacturers. This occurrence is not uniform as the sand tends to accumulate in pockets as determined by the topography of the area next to the river. The alluvial silica pockets occur widely on the southern bank of the Vaal River and stretches from below the Vaal dam wall along the river's southern bank for hundreds of kilometres. The deposits are on average 5 meters deep and underlain by floor granites, sandstone, and alluvial gravel and in some instances coal. The silica is extremely pure in the region of 98% and higher with some trace elements of iron.

Farm Geology: The farm Woodlands is situated on the southern banks of the Vaal River in the Free State Province. Most of the farm is situated directly above the paleo-riverbed (the historical path that the Vaal river followed million of years ago) which is made up of the following elements, namely: A base layer of floor granites typical of the Vredefort dome area, paleo-riverbed gravel varying in size from boulders to pebbles and various layers of high quality silica sand. Being an ancient riverbed the sand layers are deepest in the middle of the paleo-river channel and these levels taper off towards the edges of the said channel. Previous tests done by an accredited test house namely SGS showed that the silica sand is on average 98% pure. Portions of neighbouring farms were mined in the past by various establishments,

including the Provincial Administration of the Free State for road building purposes.

Climate - The climate is cool to temperate and is typical of the Free State Highveld. Rainfall (700 mm on average) mainly occurs as summer thundershowers and the evaporation is generally less than the rainfall. Please see Appendix 18 for concise climate data.

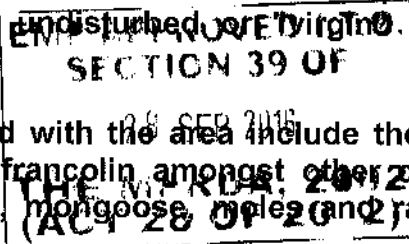
Topography - The local area is characterised by a sloping topography with the Vaal river to the North-East of the property. The area around the proposed mine has the mountains of the Vredefort Dome area to the West. The average altitude around the proposed site is about 1 500 meters above mean sea level. The removal of Sand and weathered Sand during the mining process will cause slight depressions that would change the natural topography of the area to a small extent.

Pre Mining Land Capability - The agricultural activities in the area are mainly focussed on livestock farming and dry land maize production. The carrying capacity in the area is 4 ha per large stock unit (LSU) according to the Department of Agriculture. Although irrigation does occur in the district, the soil conditions at the proposed mining area are not very suitable for irrigation due to the sandy nature of the soil.

Land Use - The land use in the area is almost exclusively for agricultural purposes. In a study on the declining soil quality in South Africa, Mills and Fey (2003) reported that the effect of erosion in the absence of cultivation is fairly easily explained because the exponential decrease in soil organic matter (SOM) concentration with depth means that relatively little topsoil need be lost to reduce substantially the total SOM content. They concluded that when plants are removed, soil deterioration begins at many fronts: At the surface, soil aggregates are exposed to the force of raindrops, clay disperses, pores become blocked, and runoff, soil loss and soil aridity are intensified. The pedoderm or first few centimetres of undisturbed topsoil holds disproportionately more humus, nutrients and salts than the underlying layers. Therefore the topsoil will be removed and stored separately and replaced over the disturbed areas during rehabilitation.

Flora - The mine site falls within the northern variation of the Cymbopogon-Themeda Veld (Acocks Veld Type No 48) which is a sparse tufted veld type. Grass species such as *Setaria flabellata*, *Themeda triandra*, *Heteropogon contortus*, *Eragrostis racemosa* and *Cymbopogon plurinodis* are common in this veld type. Trees such as Fire Thorn *Rhus pyroides*, Acacia's *Acacia* spp and Buffalo Thorn *Ziziphus mucronata* can also occur on the site. The site is impacted by the cultivation of grazing and no undisturbed *virgin* veldt is present on site.

Fauna - Birds commonly associated with the area include the guinea fowl, plovers, pigeons swainson's francolin amongst other common airborne species. Ground squirrels, mongoose, meles and rats also



occur on the farm. The specific habitat in the area of interest however is not necessarily typical of their presence. Some of the animals that are currently occurring on the farm might temporarily leave the immediate area of mining for the duration of the mining activities. Proper mitigation measures will ensure the return of the small animals after the mining activities have ceased. No threatened amphibians, reptiles or fish that are listed in the Red Data Book occur on or near the mine site. The following threatened bird and mammal species may occur in the area:

| | | |
|------------------------|-------------------------------|---------------|
| Grass Owl | <i>Tyto capensis</i> | Indeterminate |
| African Finch | <i>Podica senegalensis</i> | Indeterminate |
| Small spotted cat | <i>Felis nigripes</i> | Rare |
| African striped weasel | <i>Poecilogale albinucha</i> | Rare |
| South African Hedgehog | <i>Atelerix frontalis</i> | Rare |
| Antbear | <i>Orycteropus afer</i> | Vulnerable |
| White-tailed mouse | <i>Mystromys albicaudatus</i> | Vulnerable |

Surface water - The Vaal river forms the North Eastern boundary of the farm. No surface water will be used during the mining process as no washing or processing will take place. The property is situated in the upper catchment of the Vaal river just below the Barrage at Vanderbijlpark.

Ground water - The mining processes should not have any influence on the quality or quantity of ground water. A negative impact on groundwater usually occurs where subsurface water is pumped out of an excavation pit. This can lower the water table in the immediate surroundings of the excavation, which can negatively impact upon surrounding wetlands (specifically hill slope or seepage wetlands) and boreholes. The proposed method of mining will not entail deep excavations from which groundwater will need to be removed and there is no known wetlands on the farm. The only groundwater that will be used is from an existing farm borehole for domestic water supply and to control dust. This borehole was registered with DWAF by the previous owner of the farm. Records of this registration will be sourced and provided as soon as it can be obtained.

Air Quality and Noise

The project environment is located within an agricultural setting in which heavy equipment, e.g. tractors, already operate. Noise levels are relatively low in the surrounding properties. Air quality is already impacted negatively by the close proximity of the SASOL chemical plant and Mittal steelworks situated 20 kilometers to East North East and East South East of the mine respectively.

Sites of archaeological and cultural Interest

Local people that are very familiar with the area and specifically with the farm De Pont were consulted and confirmed that there are no structures, graves or any other item of archaeological or cultural

interest according to their knowledge of the farm. During the field investigation no graves that can potentially be related to sites of archaeological interest were found. Some of the buildings on the farm can have historical significance but mining will not affect these. A specialist study has been commissioned to identify and manage any archaeological or cultural sites if found or identified. A single stone tool was identified but the specialist is of the opinion that it was translocated by river action and not an indication of heritage sites or mounds.

Socio Economic Environment - please see Appendix 1

- 1.2. Concise description of each of the existing environmental aspects both on the site applied for and in the surrounding area which may require protection or remediation.

Alien invasive plant species,

Uncontrolled Veldt fires,

Alien invasive fauna

Indigenous fauna protection

Possible soil Erosion

The riverine environment on the banks of the Vaal River

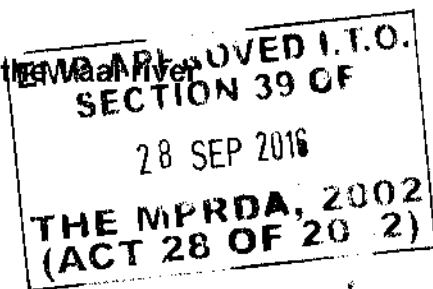
Poaching of animals

Collecting firewood.

Visual impact

Noise

Dust



- 1.3. Concise description of the specific land uses, cultural and heritage aspects and infrastructure on the site and neighbouring properties/farms in respect of which the potential exists for the socio-economic conditions of other parties to be affected by the proposed mining operation.

No traditional settlements are present in the area, land use is mostly residential and mixed farming and residential purposes. Population density is fairly low.

There is some existing infrastructure such as two houses, a barn and out buildings on the farm. An Eskom transmission line also crosses the property from North to South. A 100 meter exclusion zone will be allowed around the buildings and lines as required by the Mine Health and Safety Act. A dirt road and tar road services the farm and surrounding properties. Some of the concerns raised by the interested and affected parties verbally is the deterioration of the tar road due to the increased truck traffic in the area. This is a cumulative impact as there are two other sand mines in the area making use of the same road.

There are no tourism destinations in the immediate vicinity of the farm. In the larger region there are various tourism destinations within the

the Vredefort Dome area, but these will not be impacted by the proposed mining project.

- 1.4. Annotated map showing the spatial locality and aerial extent of all environmental, cultural/heritage, infrastructure and land use features identified on site and on the neighbouring properties and farms.

Please see Appendix 2

North - Low density property development in North West Province and on the banks of the Vaal river.

North and West - Sand mine and game farm owned by Goose Bay Developments

South - Mixed farming

East - Mixed farming by Mr Lawrence Sher.

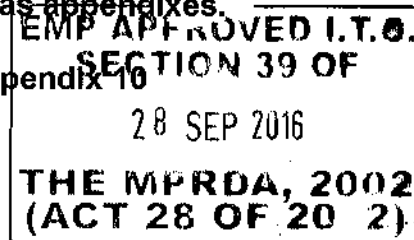
The Vaal Eden - Barage road runs to in an East-West direction thorough the property.

- 1.5. Confirmation that supporting documents in the form of specialist studies are attached as appendices.

Supporting documentation is attached as appendices.

Heritage assessment - Appendix 5

Comparative land use assessment - Appendix 10



2. The proposed mining operation.

- 2.1. The mineral to be mined.

Silica sand

- 2.2. The mining method to be employed at the level of opencast, underground, stoping, stooping, total extraction, bord and pillar, block caving, shrinking, dredging, pumping, monitoring, etc. and provide a concise description of the intended magnitude thereof, in terms of volumes, depth and aerial extent.

In order to satisfy the requirements of regulation 2(2) please see Appendix 9 - Mine plan

Mining will take place via a contractor who will get paid per cubic meter of sand mined and loaded. Sand will be loaded by means of a front end loader onto awaiting client's trucks. The sand will be mined in strips with no more than one strip being open at any given time. Maximum depth of the excavations will be 10 meters at places, but on average 5 meters.

The following mining method will be followed:

The mining area would be clearly demarcated along its boundaries and indicated on the layout plan. Please see Appendix 3. Topsoil would be removed and stored separately and would be replaced during rehabilitation. Earthmoving equipment will be used to remove the sand and load it onto the awaiting client's trucks. The disturbed areas will be

sloped, the topsoil replaced and then monitored in terms of re-vegetation.

Existing roads will be used for the transportation of material. No mine residue will be generated. Material that can not be sold will be used for rehabilitation of mining areas. No sand processing will take place on site therefore sand will be loaded directly onto the client's trucks. All the people that will work on site will be transported on a daily basis from Vanderbijlpark/Parys. No water courses will be disturbed during the mining activities.

- 2.3. List of the main mining actions, activities, or processes, such as, but not limited to, access roads, shafts, pits, workshops and stores, processing plant, residue deposition sites, topsoil storage sites, stockpiles, waste dumps, access roads dams, and any other basic mine design features.

One caravan will be on site for admin purposes and as a rest area for the contractor operator. A storage yard will be erected to store the equipment. Equipment to be used is one front end loader, one tractor and one water trailer for dust suppression. Existing access roads will be used on the property. No blasting will take place. No river diversions will take place. No mining will take place closer than 100 meters from the Vaal river banks. Mining method will be opencast strip mining.

- 2.4. Plan showing the location and aerial extent of the aforesaid main mining actions, activities, or processes as required to calculate the financial provision in accordance with the Department's published guideline. (Reg. 51 (b) (v)).

Please see Appendix 3 for the plan and Appendix 14 for the calculation of quantum of financial provision for rehabilitation. Exclusion zones have been indicated to keep excavations and active mining strips away from infrastructure and the banks of the Vaal river.

- 2.5. Listed activities (in terms of the NEMA EIA regulations) which will be occurring within the proposed project.

Apart from Activity 21 Mining, no other listed activities will take place on the farm.

- 2.6. Indication of the phases (construction, operational, decommissioning) and estimated time frames in relation to the implementation of these actions, activities or processes and infrastructure.

Construction : The mine area does not need any specific or extra work to prepare the area for the recovery of sand. Demarcation of the first active mining cell. One Week.

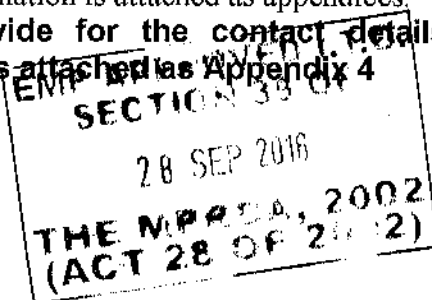
Operational: As soon as the mining right is granted, the mining of sand can start. Active cells will be marked out and topsoil removed and stored for later use in rehabilitation. Only one active cell will be open at any given time. Rehabilitation will be conducted concurrently and the open cell will be kept as small as practically possible.

Decommissioning: The primary objective is to obtain a closure certificate at the end of the life of the mine at minimum cost and in as short a time period as possible whilst still complying with the requirements of the Minerals and Petroleum Resources Development Act.

To realise this, the following objectives must be achieved:

- Remove all temporary infrastructure and waste from the site as per the requirements of this EMPR and of the Provincial Department of Mineral Regulation.
- Demolish / rehabilitate all roads with no post - mining use potential.
- Ensure that no threat to surface and underground water quality remains.
- Ensure that all permanent changes in topography are sustainable and do not cause erosion or the damming up of runoff.
- Shape and contour all disturbed areas in compliance with the EMPR.
- Make safe any dangerous excavations or subsidence on the surface.
- Rehabilitate all disturbed areas in compliance with the EMPR and of the Provincial Department of Mineral Regulation.
- Ensure that all rehabilitated areas are safe, stable and self sustaining in terms of vegetation.

- 2.7. Confirmation if any other relevant information is attached as appendices. **Since this form does not provide for the contact details of the applicant, detail of the applicant is attached as Appendix 4**



3. The potential impacts

- 3.1. List of the potential impacts, on environmental aspects separately in respect of each of the aforesaid main mining actions, activities, processes, and activities listed in the NEMA EIA regulations. (include all the items to be included in the list referred to in the concomitant section of the guideline posted on the official website of the Department)

Please see the complete EIA appended as Appendix 16

- 3.2. List of all potential cumulative environmental impacts.
Two other similar mining operations occur within the immediate vicinity of the study area. Rehabilitation would be done concurrently with mining; therefore no mine specific cumulative impacts are anticipated. Increased truck traffic on the Vaal Eden road would cause a cumulative impact on the road from the 3 mines.
- 3.3. State specifically whether or not there is a risk of acid mine drainage or potential groundwater contamination associated with the mineral to be mined. (If

such a risk is associated with the mineral to be mined provide a summary of the findings and recommendations of a specialist geo-hydrological report in that regard).

There is no potential for acid mine drainage as only silica sand will be mined. The relative shallow depth of the excavations means that the water table will not be affected by mining.

REGULATION 50 (b)

4. The alternative land use or developments that may be affected

- 4.1. Concise description of the alternative land use of the area in which the mine is proposed to operate.

The 'No Go' option for development was considered. However, this was adjudged to not be the best land-use option for the following reasons: The grazing value of the land is at present considered to be extremely low due to the high level of disturbance, resulting in the area being characterized by non-palatable grasses and low biomass.

The proposed rehabilitation of the area that includes:

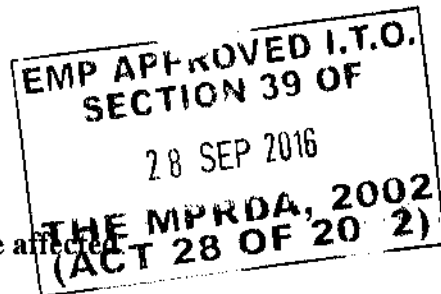
- the preservation of the topsoil to cover disturbed areas.
- implementation of measures to monitor the natural establishment of plants growth and to re-vegetate with representative seed mixes in the case of poor plant establishment.
- the proposed program to combat invader weeds on a regular base.
- will ensure that the land use will remain almost the same when mining operations cease.

Not proceeding with the proposed operation will entail that a mineral which if mined will contribute towards the local and provincial social and economic structures of the area, will not be mined, and that this opportunity will be lost. It is important to note that as previously discussed, that execution of the mining operation will not leave the land unproductive, so that the proposed mining operation can be considered to be a sustainable land-use option for the area.

If the mining project does not go ahead the farm will be used for cultivating grazing and mixed farming. This is also the current use of the land in question.

- 4.2. List and description of all the main features and infrastructure related to the alternative land uses or developments.

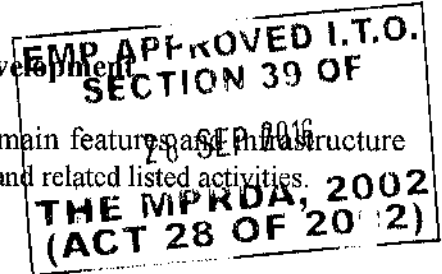
The land is currently under cultivated grazing and mixed farming. Two farm houses, a barn and outbuildings are currently present on site. These buildings will not be impacted by mining and are situated in the exclusion zones on the mining plan.



- 4.3. Plan showing the location and aerial extent of the aforesaid main features of the alternative land use and infrastructure related to alternative land developments identified during scoping.

Please see Appendix 2 - Regional setting

5. **The potential impacts of the alternative land use or development**
- 5.1. List of the potential impacts of each of the aforesaid main features and infrastructure related to the alternative land use or development and related listed activities.
- Overgrazing,
Soil erosion,
Loss of income/ return on investment,
Loss of secondary and tertiary project income.**
- 5.2. Description of all potential cumulative impacts of the main features and infrastructure related to the identified alternative land uses or developments.



Various development projects in Gauteng are dependant on this mining project to progress. These were also listed in the approved Social and labour plan.

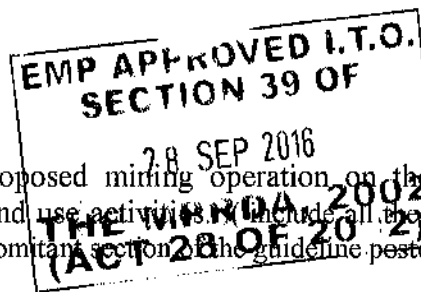
The 'No Go' option for development was considered. However, this was adjudged to not be the best land-use option for the following reasons:

The grazing value of the land is at present considered to be extremely low due to the high level of disturbance, resulting in the area being characterized by non-palatable grasses and low biomass. The potential of the area to support these land uses will be greater after the mining operation has rehabilitated the area, than what it is at present. Implementation of the proposed mining operation will therefore facilitate better and more sustainable future land-use options compared to the 'No Go' option, which implies that the status quo will be maintained.

Not proceeding with the proposed operation will entail that a mineral which if mined will contribute towards the local social and economic features of the area, will not be mined, and that this opportunity will be lost. It is important to note that as previously discussed, that execution of the mining operation will not leave the land unproductive, so that the proposed mining operation can be considered to be a sustainable land-use option for the area.

REGULATION 50 (c)

6. **Identification of potential social and cultural impacts.**



- 6.1. List of potential impacts of the proposed mining operation on the socio-economic conditions of other parties' land use activities. (Include all the items to be included in the list referred to in the concomitant section of the guideline posted on the official website of the Department)

The social impact of the proposed development was considered at the macro (provincial) meso (district) and micro (farm) levels. This was investigated thoroughly as part of the social and labour plan as contemplated in regulation 46 of the Minerals and Petroleum Resources Development Act (28 of 2002) that makes out part of this application. Please see appendix 11

Macro (provincial) level

The relative small extent of the proposed mining operations implies that the development will not have a significant social impact at the macro level. The financial gain from any such mining operation always has the possibility to contribute positively towards the socio-economic aspect at any level. The mine have a very large beneficial impact on the development projects in Gauteng and the Vaal Triangle.

Meso (district) level

As for the macro level, the relative small extent of the proposed mining operations implies that the development will not have a significant social impact at the meso level. The financial gain from any mining operation always has the potential to contribute positively towards the socio-economic aspect at any level.

Micro (farm) level

No local labourers will work in the mining operation or will be sourced from the immediate area. As such the proposed development will not contribute to the Micro (farm) level. Little to no impact will occur on neighbouring properties socio-economic conditions. Due to the small scale of the operation, no influx of workers are expected

- 6.2. Description of the cultural aspect that will potentially be affected, and describe the potential impact on such cultural aspect. (In cases where such features are not applicable the applicant must still include the item in the list and describe it as not applicable).

No cultural aspects were identified that could be impacted upon by the mining operation. Not applicable.

- 6.3. Description of heritage features and the potential impact on such heritage feature. (In cases where such features are not applicable the applicant must still include the item in the list and describe it as not applicable).

The specialist report on hertigae features did indicate a single stone age tool and old buildings that would require protection. No mining

will take place near the buildings and the recommendations of the report will be followed should any heritage features be discovered as part of the mining operations. Please see Appendix 5.

6.4. Quantification of the impact on the socio-economic conditions of directly affected persons, as determined by the findings and recommendations of a specialist report in that regard.

6.4.1. The amount of the quantified potential impact on property or infrastructural assets.

The mining project will not cause longterm property or infrastructure devaluation. Please see appendix 10.

6.4.2. State the amount of the quantified potential impact on commercial, economic or business activity which will be impacted upon as a result of the mining activity.

The properties surrounding the mine does not operate businesses apart from farming on the properties so direct impact on generation of income to neighbouring properties is zero.

6.4.3. The sum of the amounts, referred to in paragraphs 6.6.1 and 6.6.2 above.
Zero

7. Assessment and evaluation of potential impacts.

7.1. List of each potential impact identified in paragraphs 3 and 6 above. (Include all the items to be included in the list referred to in the concomitant section of the guideline posted on the official website of the Department)

Please see the EIA appended as Appendix 16

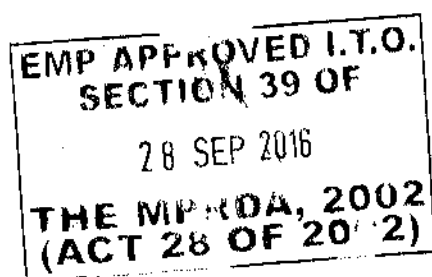
7.2. Concomitant impact rating for each potential impact listed in paragraph 7.1 above in terms of its nature, extent, duration, probability and significance. (Provide a definition of the criteria used for each of the variables used for rating potential impacts and ensure that the potential impacts are rated specifically with the assumption that no mitigation measures are applied).

Please see Appendix 16

7.3. Indication of the phases (construction, operational, decommissioning) and estimated time frames in relation to the potential impacts rated.

Please see Appendix 16

REGULATION 50 (d)



8. Identification of the alternative land uses which will be impacted upon. (Include all the items to be included in the list referred to in the concomitant section of the guideline posted on the official website of the Department)

Alternatives and the 'No Go' option were considered. An evaluation of the different options was based on the environmental guideline standard, the Best Practical Environmental Option (BPEO).

The sand contained within the area makes mining a reasonable land use. The only other reasonable alternatives are:

- Grazing**
- Planting crops**

Rehabilitation of the mining activities will entail the establishment of planted pastures, natural veldt or crops. The proposed land-use of mining is therefore a temporary change of land use, with the alternative of grazing or growing crops being realized once the mining operation has ceased and the area has been rehabilitated.

Alternative land uses on the property is grazing for livestock or dry land grain production. These will not be permanently impacted by the mining operations.

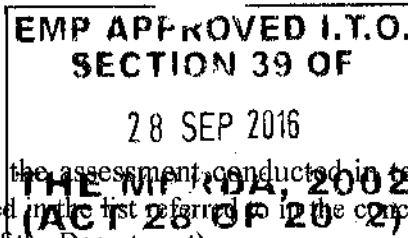
9. Listed results of a specialist comparative land use assessment. (Refer to the concomitant section of the guideline posted on the official website of the Department and attach the specialist study as an appendix)

Please see Appendix 10

REGULATION 50 (e)

10. List of all the significant impacts as identified in the assessment conducted in terms of Regulation 50 (c) (Include all the items to be included in the list referred to in the concomitant section of the guideline posted on the official website of the Department)

Please see Appendix 10



REGULATION 50 (f)

11. **Identification of interested and affected parties.** (Including the community, and list as identified according to the scoping report guideline and identified in the scoping report)

The following interested and affected parties were identified to have possible interest in the environmental consequences of the project:

Inspector of Mines - Department of Mineral Regulation

Department of Agriculture: Directorate Land Use and Soil Management

Department of Water Affairs

Department of Tourism, Environment and Economic Affairs, Free State Region

Ngwathe Municipality

Mark van Wyk - owner of the Farm Woodlands

Robert Schimpers - Farm Manager Woodlands

C Tereblanche - owner of the farm Vaaldraai

Mr P van Rensburg - Farm manager

Mr I van Rensburg - Foreman

12. **The details of the engagement process.** (Including the community, and list as identified according to the scoping report guideline and identified in the scoping report and any further consultation since the compilation of the scoping report)

Direct neighbours were personally visited to inform them of the proposed project and they were given consultation letters. A background information document (Project summary) was given to them highlighting the possible impacts from the proposed project and informing them that the EIA and EMPR is available at the Parys Library for perusal.

A site notice was placed at the entrance to the farm and an advert in the Parys Gazette to inform the general public to view the EIA and EMPR and to invite comments or to be registered as an interested and affected party. Please see Appendix 12

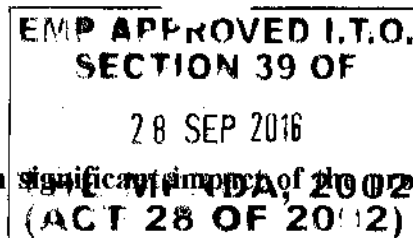
13. **Details regarding the manner in which the issues raised were addressed.** (Include all the items to be included in the list referred to in the concomitant section of the guideline posted on the official website of the Department)

Although various means of consultation was used to consult and get interested and affected parties to register as such, only one letter was received back indicating no objection to the proposed mine from the neighbouring farm manager. Two phone calls were recieved on the first day after the placement of the advertisement these two calls related to a person looking for sand to buy (potential client) and a person looking for employment (Potential employee).

REGULATION 50 (g)

14. **The appropriate mitigatory measures for each significant impact of the proposed mining operation.**

- 14.1. Adequacy of predictive methods utilised.
Predictive methods are adequate as the methodology has been tested through various previous projects to reflect actual practice.
- 14.2. Adequacy of underlying assumptions
Assumptions made are done on the maximum reasonable amount of information available at the time of the preparation of the EMPr.
- 14.3. Uncertainties in the information provided.
Very few uncertainties exist. Predictions made were done assuming data provided by the client is correct.

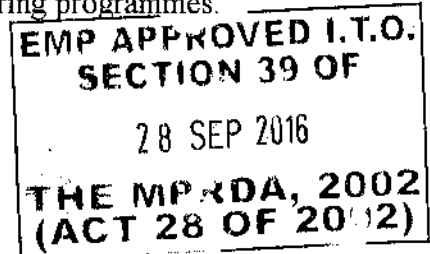


REGULATION 50 (h)

15. Arrangements for monitoring and management of environmental impacts.

- 15.1. List of identified impacts which will require monitoring programmes.

Erosion
Dust
Noise
Alien invasive plants
Revegetation of rehabilitated areas
Surface water drainage



- 15.2. Functional requirements for the said monitoring programmes

Monitoring will be done on three time intervals, namely Weekly, Monthly and Annual Monitoring. The Operations Manager or the person responsible (Consultant) for the state of the environment on the mine will make sure that he understands this document and its requirements and commitments before any construction work on mine will take place.

Weekly monitoring:

- Confirm that the demarcating beacons are firmly erected and maintained;
- Ensure that operations only take place within this demarcated area;
- Ensure that topsoil is being kept separate from overburden;
- Ensure that dust control measures are adequate;
- Ensure that non-biodegradable refuse such as glass bottles, plastic bags, etc. are stored in a container at a collecting point;
- Ensure that non-biodegradable refuse is being collected on a regular basis and disposed off responsibly;
- Ensure that disposal bins are available for biodegradable refuse and is cleaned at regular intervals;
- Ensure that hazardous substances if any are stored within a securely fenced area

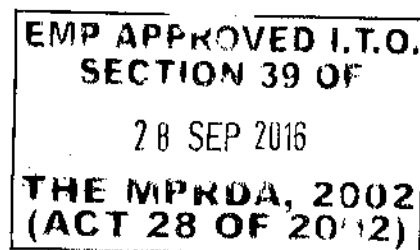
Monthly monitoring:

- Ensure that layout plans are updated and available on site.
- Ensure that rehabilitation is done concurrently with mining.
- Ensure that access roads are build and maintained according to Appendix 17 of this document.
- Ensure that storm water control measures are in place for a 1:100 year flood event over a period of 24 hours.
- Ensure that chemical toilet facilities function properly, is not abused and does not pose any harm to the environment.
- Ensure that pollution control measures are adequate and well maintained, e.g. bund walls, drip pans and concrete slabs, in order to prevent soil and water pollution.
- Ensure that fallout dust monitoring is conducted on a monthly basis via dust buckets.

Annual monitoring:

- Monitor the vegetation establishment at rehabilitated areas is according to expectations.
- If not, then ensure that re-vegetation is done with a local or adapted indigenous seed mix.
- Ensure compliance to all conditions in this report

- 15.3. Roles and responsibilities for the execution of the monitoring programmes.
Please see above
- 15.4. Time frames for monitoring and reporting.
Please see above

REGULATION 50 (i)

16. **Technical and supporting information.**
Please see the attached Appendixes

(Include all the items to be included in the list referred to in the concomitant section of the guideline posted on the official website of the Department)

SECTION 2**ENVIRONMENTAL MANAGEMENT PROGRAMME****Regulation 51 (a)****1. Description of environmental objectives and specific goals for mine closure.****1.1. Environmental aspects that describe the pre-mining environment.**

Geology - The underlying geology comprises quaternary deposits of river gravels and aeolean sand overlying the rocks forming a portion of the ring synclorium surrounding the Vredefort Dome. On the farm De Pont the rocks of the ring synclorium consist of a sequential portion of the Transvaal Sequence from the Malani Dolomite at the bottom to the Black Reef Quartzite not being exposed at De Pont, up to the Hekpoort Andesite. The sequence is as it outcrops on Woodlands has been complicated by a series of east to west trending strike faults that mean that the full sequence is not exposed and that in some cases portions of the sequence are repeated.

The identified mineral deposit is alluvial silica sand deposited by the Paleo-Vaal River over thousands of year. The silica is of a very high quality and is sought after by mainly foundries and tile adhesive manufacturers. This occurrence is not uniform as the sand tends to accumulate in pockets as determined by the topography of the area next to the river. The alluvial silica pockets occur widely on the southern bank of the Vaal River and stretches from below the Vaal dam wall along the river's southern bank for hundreds of

kilometres. The deposits are on average 5 meters deep and underlain by floor granites, sandstone, and alluvial gravel and in some instances coal. The silica is extremely pure in the region of 98% and higher with some trace elements of iron.

Farm Geology: The farm De Pont is situated on the southern banks of the Vaal River in the Free State Province. Most of the farm is situated directly above the paleo-riverbed (the historical path that the Vaal river followed million of years ago) which is made up of the following elements, namely: A base layer of floor granites typical of the Vredefort dome area, paleo-riverbed gravel varying in size from boulders to pebbles and various layers of high quality silica sand. Being an ancient riverbed the sand layers are deepest in the middle of the paleo-river channel and these levels taper off towards the edges of the said channel. Previous tests done by an accredited test house namely SGS showed that the silica sand is on average 98% pure. Portions of neighbouring farms were mined in the past by various establishments, including the Provincial Administration of the Free State for road building purposes.

Climate - The climate is cool to temperate and is typical of the Free State Highveld. Rainfall (700 mm on average) mainly occurs as summer thundershowers and the evaporation is generally less than the rainfall. Please see Appendix 18 for concise climate data.

EMP APPROVED I.T.O.
Section 3 of the
Mines Act 2002
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THE MP & DA, 2002
(ACT 28 OF 2002)

Topography - The local area is characterised by a gentle slope from the Vaal river to the North-East of the property. The area around the proposed mine has the mountains of the Vredefort Dome area to the West. The average altitude around the proposed site is about 1 500 meters above mean sea level. The removal of Sand and weathered Sand during the mining process will cause slight depressions that would change the natural topography of the area to a small extent.

Pre Mining Land Capability - The agricultural activities in the area are mainly focussed on livestock farming and dry land maize production. The carrying capacity in the area is 4 ha per large stock unit (LSU) according to the Department of Agriculture. Although irrigation does occur in the district, the soil conditions at the proposed mining area are not very suitable for irrigation due to the sandy nature of the soil.

Land Use - The land use in the area is almost exclusively for agricultural purposes. In a study on the declining soil quality in South Africa, Mills and Fey (2003) reported that the effect of erosion in the absence of cultivation is fairly easily explained because the exponential decrease in soil organic matter (SOM) concentration with depth means that relatively little topsoil need be lost to reduce substantially the total SOM content. They concluded that when plants are removed, soil deterioration begins at many fronts: At the surface, soil aggregates are exposed to the force of raindrops, clay disperses, pores become blocked, and runoff, soil loss and soil aridity are intensified. The pedoderm or first few centimetres of undisturbed topsoil holds disproportionately more humus, nutrients and salts than the underlying layers. Therefore the topsoil will be removed and stored separately and replaced over the disturbed areas during rehabilitation.

Flora - The mine site falls within the northern variation of the Cymbopogon-Themeda Veld (Acocks Veld Type No 48) which is a sparse tufted veld type.

Grass species such as *Setaria flabellata*, *Themeda triandra*, *Heteropogon contortus*, *Eragrostis racemosa* and *Cymbopogon plurinodis* are common in this veld type. Trees such as Fire Thorn *Rhus pyroides*, *Acacia*'s *Acacia* spp and Buffalo Thorn *Ziziphus mucronata* can also occur on the site. The site is impacted by the cultivation of grazing and no undisturbed or "virgin" veldt is present on site.

Fauna - Birds commonly associated with the area include the guinea fowl, plovers, pigeons swainson's francolin amongst other common airborne species. Ground squirrels, mongoose, moles and rats also occur on the farm. The specific habitat in the area of interest however is not necessarily typical of their presence. Some of the animals that are currently occurring on the farm might temporarily leave the immediate area of mining for the duration of the mining activities. Proper mitigation measures will ensure the return of the small animals after the mining activities have ceased. No threatened amphibians, reptiles or fish that are listed in the Red Data Book occur on or near the mine site. The following threatened bird and mammal species may occur in the area:

| | | |
|------------------------|-------------------------------|---------------|
| Grass Owl | <i>Nolocapensis</i> | Indeterminate |
| African Finfoot | <i>Poocia senegalensis</i> | Indeterminate |
| Small spotted cat | <i>Felis nigripes</i> | Rare |
| African striped weasel | <i>Poecilogale albinucha</i> | Rare |
| South African Hedgehog | <i>Ateleris frontalis</i> | Rare |
| Antbear | <i>Prystoropus afer</i> | Vulnerable |
| White-tailed mouse | <i>Mystromys albicaudatus</i> | Vulnerable |

Surface water - There are no surface water resources on the farm. No surface water will be used during the mining process as no washing or processing will take place. The property is situated in the upper catchment of the Vaal river just below the Barrage at Vanderbijlpark

Ground water - The mining processes should not have any influence on the quality or quantity of ground water. A negative impact on groundwater usually occurs where subsurface water is pumped out of an excavation pit. This can lower the water table in the immediate surroundings of the excavation, which can negatively impact upon surrounding wetlands (specifically hill slope or seepage wetlands) and boreholes. The proposed method of mining will not entail deep excavations from which groundwater will need to be removed and there is no known wetlands on the farm. The only groundwater that will be used is from an existing borehole for domestic water supply and to control dust.

Air Quality and Noise

The project environment is located within an agricultural setting in which heavy equipment, e.g. tractors, already operate. Noise levels are relatively low in the surrounding properties. Air quality is already impacted negatively by the close proximity of the SASOL chemical plant and Mittal steelworks situated 20 kilometers to East North East and East South East of the mine respectively.

Sites of archaeological and cultural Interest

Local people that are very familiar with the area and specifically with the farm De Pont were consulted and confirmed that there are no structures, graves or any other item of archaeological or cultural interest according to their knowledge of the farm. During the field investigation no graves or structures

that could potentially be related to sites of archaeological interest were found. A specialist study has been commissioned to identify and manage any archaeological or cultural sites if found or identified. Please see appendix 5.

Socio Economic Environment - please see Appendix 1

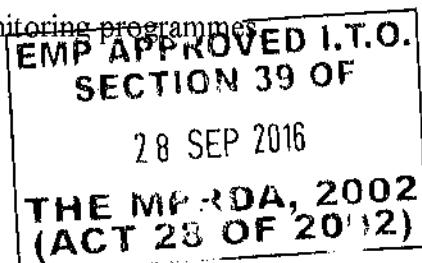
1.2. Measures required to contain or remedy any causes of pollution or degradation or the migration of pollutants, both for closure of the mine and post-closure.

Since no mineral beneficiation will be done on site, no production chemicals will be used in the mining process. Any possible spill of hydrocarbons during the refilling or servicing of the mine equipment will be dealt with as an emergency as per the emergency procedures.

2. **Description of environmental objectives and specific goals for the management of identified environmental impacts emanating from the proposed mining operation.** (As informed by the information provided in the EIA in terms of Regulation 50 (h)).

2.1. List of identified impacts which will require monitoring programmes

Erosion
Dust
Noise
Alien invasive plants
Revegetation of rehabilitated areas
Surface water drainage



2.2. List of the source activities that are the cause of the impacts which require to be managed.

Topsoil storage - erosion
Loading and hauling - Dust and noise
Rehabilitation of mined out areas - Revegetation rate and alien invasive plants
Design and maintenance of storm water berms and drain as well as final voids of worked out areas - Surface water drainage.

2.3. Management activities which, where applicable, will be conducted daily, weekly, monthly, quarterly, annually or periodically as the case may be in order to control any action, activity or process which causes pollution or environmental degradation.

Please see the information under paragraph 8.1 and Appendix 17

2.4. The roles and responsibilities for the execution of the monitoring and management programmes.

Please see the information under paragraph 8.1 and Appendix 17

3. **Description of environmental objectives and specific goals for the socio-economic conditions as identified in the social and labour plan.** (Include all the items to be included in the list referred to in the concomitant section of the guideline posted on the official website of the Department)

No socio economic impact was identified in the SLP except the positive impact of Local economic development projects and bursaries offered by the mine.

4. Description of environmental objectives and specific goals for historical and cultural aspects.

No cultural or historic aspects were identified and no management is required. Should any be identified during the project it will be communicated to the DMR and managed appropriately.

4.1. Environmental objectives and goals in respect of historical and cultural aspects identified in specialist studies conducted during the EIA phase.

No cultural or historic aspects were identified and no management is required. Should any be identified during the project it will be communicated to the DMR and managed appropriately.

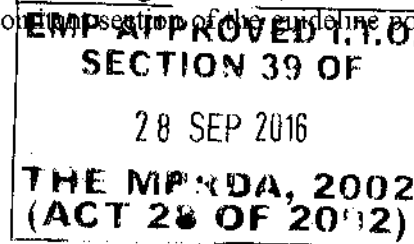
Regulation 51 (b) – Outline of the implementation programme

5. The appropriate technical and management options chosen for each environmental impact, socio-economic condition and historical and cultural aspect in each phase of the mining operation, as follows;

5.1. Actions, activities or processes, including any NEMA EIA Regulation listed activities, which cause pollution or environmental degradation. (Include all the items to be included in the list referred to in the concomitant section of the guideline posted on the official website of the Department)

Activity 21 Mining

Please see appendix 17



5.2. Concomitant list of appropriate technical or management options chosen to modify, remedy, control or stop any action, activity, or process which will cause significant impacts on the environment, socio-economic conditions and historical and cultural aspects as identified. (attach detail of each technical or management option as appendices)

Please see the EMP appended as appendix 17

6. Action plans to achieve the objectives and specific goals contemplated in Regulation 50 (a).

17. Time schedules of deadlines for each action to be undertaken to implement each technical or management option chosen. (Include all the items to be included in the list referred to in the concomitant section of the guideline posted on the official website of the Department)

Please see appendix 17

7. Procedures for environmentally related emergencies and remediation

(An environmental emergency plan that includes all the items referred to in the concomitant section of the guideline posted on the official website of the Department)

Please see appendix 13

8. Planned monitoring and environmental management programme performance assessment.

8.1. Description of planned monitoring of the aspects of the environment which may be impacted upon. (Include all the items referred to in the concomitant section of the guideline posted on the official website of the Department)

Monitoring will be done on three time intervals, namely Weekly, Monthly and Annual Monitoring. The Operations Manager or the person responsible (Consultant) for the state of the environment on the mine will make sure that he understands this document and its requirements and commitments before any work on mine will take place.

Weekly monitoring:

- Confirm that the demarcating beacons are firmly erected and maintained;
- Ensure that operations only take place within this demarcated area;
- Ensure that topsoil is being kept separate from overburden;
- Ensure that dust control measures are adequate;
- Ensure that non-biodegradable refuse such as glass bottles, plastic bags, etc. are stored in a container at a collecting point;
- Ensure that non-biodegradable refuse is being collected on a regular basis and disposed off responsibly;
- Ensure that disposal bins are available for biodegradable refuse and is cleaned at regular intervals;
- Ensure that hazardous substances if any are stored within a securely fenced area

Monthly monitoring:

- Ensure that layout plans are updated and available on site.
- Ensure that rehabilitation is done concurrently with mining.
- Ensure that access roads are build and maintained according to appendix 17 of this document.
- Ensure that storm water control measures are in place for a 1:100 year flood event over a period of 24 hours.
- Ensure that chemical toilet facilities function properly, is not abused and does not pose any harm to the environment.
- Ensure that pollution control measures are adequate and well maintained, e.g. bund walls, drip pans and concrete slabs, in order to prevent soil and water pollution.
- Ensure that fallout dust monitoring is conducted on a monthly basis via dust buckets.

Annual monitoring:

- Monitor the vegetation establishment at rehabilitated areas is according to expectations.
- If not, then ensure that re-vegetation is done with a local or adapted indigenous seed mix.
- Ensure compliance to all conditions in this report

Biennially (every two years or at an interval determined by the Regional manager) a performance assessment report will be submitted to the DMR which will include, but not be limited to, the following:

- An independent environmental performance assessment of the mine.
- An EMP review.
- A certified copy of the up to date financial provision together with a financial audit.
- A dust & noise monitoring report if requested by the Principal Inspector of Mines.
- The scope of the assessment.
- The procedure used for the assessment.
- Interpreted information gained from monitoring the approved environmental management programme or plan.
- Evaluation criteria used during the assessment.
- Results of the assessment.
- Recommendations on how and when deficiencies that are identified and/or aspects of non-compliance will be rectified.

In the case of non-compliance found during monitoring, the following will be done:

Immediate correction actions from the Operations manager:

- If he/she is unable to correct the non-compliance, a specialist will be appointed to provide guidance on how to rectify the situation;
- Any non-compliance will be reported to the responsible person on-site and to the relevant regulatory authorities if required.

8.2. Provide a description as to how the implementation of the action plans contemplated in regulation 51 (b) (ii) as described will be monitored as described in paragraph 6 of the EMP will be monitored.

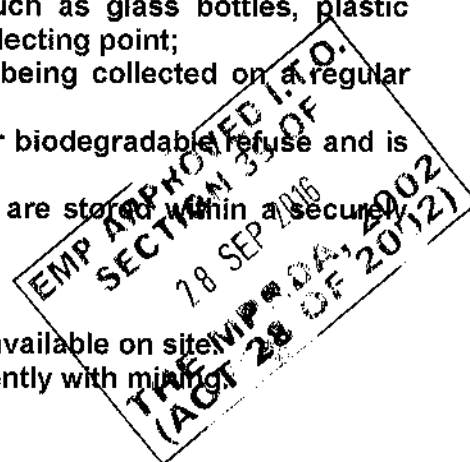
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- Ensure that non-biodegradable refuse is being collected on a regular basis and disposed off responsibly;
- Ensure that disposal bins are available for biodegradable refuse and is cleaned at regular intervals;
- Ensure that hazardous substances if any are stored within a securely fenced area

Monthly monitoring:

- Ensure that layout plans are updated and available on site;
- Ensure that rehabilitation is done concurrently with mining



- Ensure that access roads are build and maintained according to Appendix 17 of this document.
- Ensure that storm water control measures are in place for a 1:100 year flood event over a period of 24 hours.
- Ensure that chemical toilet facilities function properly, is not abused and does not pose any harm to the environment.
- Ensure that pollution control measures are adequate and well maintained, e.g. bund walls, drip pans and concrete slabs, in order to prevent soil and water pollution.
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Annual monitoring:

- Monitor the vegetation establishment at rehabilitated areas is according to expectations.
- If not, then ensure that re-vegetation is done with a local or adapted indigenous seed mix.
- Ensure compliance to all conditions in this report

Biennially (every two years or at an interval determined by the Regional manager) a performance assessment report will be submitted to the DMR which will include, but not be limited to, the following:

- An independent environmental performance assessment of the mine.
- An EMP review.
- A certified copy of the up to date financial provision together with a financial audit.
- A dust & noise monitoring report if requested by the Principal Inspector of Mines.
- The scope of the assessment.
- The procedure used for the assessment.
- Interpreted information gained from monitoring the approved environmental management programme or plan.
- Evaluation criteria used during the assessment.
- Results of the assessment.
- Recommendations on how and when deficiencies that are identified and/or aspects of non-compliance will be rectified.

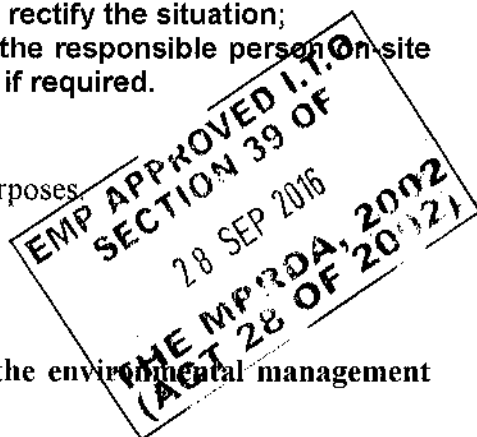
In the case of non-compliance found during monitoring, the following will be done:

Immediate correction actions from the Operations manager:

- If he/she is unable to correct the non-compliance, a specialist will be appointed to provide guidance on how to rectify the situation;
- Any non-compliance will be reported to the responsible person on-site and to the relevant regulatory authorities if required.

- 8.3. Frequency of proposed reporting for assessment purposes.
Please see paragraph 8.2

9. Financial provision in relation to the execution of the environmental management programme:-



- 9.1. Plan showing the location and aerial extent of the aforesaid main mining actions, activities, or processes anticipated. (Include all the items referred to in the concomitant section of the guideline posted on the official website of the Department)

Please see Appendix 3

- 9.2. Annual forecasted financial provision calculation (Refer to the concomitant section of the EIA and EMP guideline)

The annual forecast for environmental management according to the approved Mining Work Programme is: R138 000 per annum for year one increasing to R233 148.10 for year 10. Cumulative total for the first ten years is R1 848 949.71

- 9.3. Confirmation of the amount that will be provided should the right be granted.

Please see Appendix 14. Based on the methodology specified in the DMR guidelines for the determination of financial provision the amount required for rehabilitation is R 190 987.94. This will be reviewed on an annual basis and adjusted as and when necessary.

- 9.4. The method of providing financial provision contemplated in Regulation 53.

A bank guarantee was ceded to the DMR for the required amount

10. Environmental Awareness Plan (Section 39 (3) (c))

(Include all the items referred to in the concomitant section of the guideline posted on the official website of the Department)

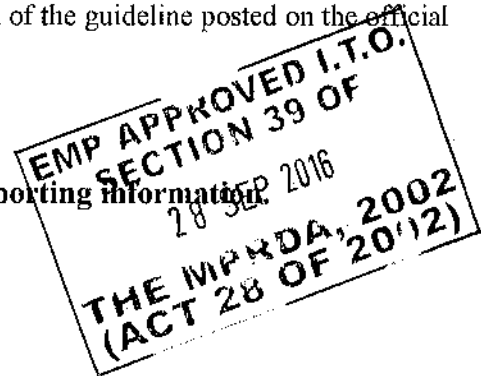
Please see Appendix 15

11. Attachment of specialist reports, technical and supporting information

(Provide a List)

Heritage assessment

Comparative land use assessment.



12. SECTION 39 (4) (a) (iii), Capacity to manage and rehabilitate the environment

(Include all the items referred to in the concomitant section of the guideline posted on the official website of the Department)

Please see the excerpts from the mining work programme highlighting the budget for environmental management as well as the cost of the social and labour plan.

The cost of the social and labour plan is R922 655.60 for the first ten years. This is made up of LED project costs

Bursaries makes up R500 000 for the first ten years.

Outsourced Environmental technical costs R1 848 949.71

Day tot day environmental cost - Chemical toilet, waste disposal, ongoing rehabilitation is carried by the operational budget.

13. UNDERTAKING

13.1. The Environmental Management Programme will, should it comply with the provisions of section 39 (4) (a) of the Act and the right be granted, be approved and become an obligation in terms of the right issued. As part of the proposed Environmental Management Programme, the applicant is required to provide an undertaking that it will be executed as approved and that the provisions of the Act and regulations thereto will be complied with.

Please see Appendix 19

14. IDENTIFICATION OF THE REPORT

| | |
|--|----------------|
| Herewith I, the person whose name and identity number is stated below, confirm that I am the person authorised to act as representative of the applicant in terms of the resolution submitted with the application, and confirm that the above report comprises EIA and EMP compiled in accordance with the guideline on the Departments official website and the directive in terms of sections 29 and 39 (5) in that regard. | |
| Full Names and Surname | Stephen Jacobs |
| Identity Number | 6109295009081 |

-END-

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Appendix 1: Socio Economic Background

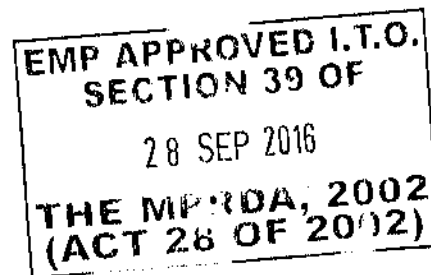
The social and economic background to and key economic activities in the area in which Tja Naledi Beafase Investment Holdings (Pty) Ltd operates

Tja Naledi Beafase Investment Holdings (Pty) Ltd has the Ngwathe Local Municipality (Parys) as its main labour sending area. Due to the size of the Tja Naledi Beafase Investment Holdings operation, the company's mining activities have an insignificant socio-economic impact on this area.

Introduction

The Free State Province is situated between the Orange and Vaal Rivers. Bloemfontein is the capital city. It is a province of great contrasts from Highveld Grassland and Kalahari Sandveld country to majestic mountains, wilderness areas and farming land. The Free State Province is a strongly rural province. The provincial government's growth strategy is focused on addressing infrastructure backlogs, poverty alleviation and social development. The Free State is the third-largest province in South Africa. However, it has the second-smallest population and the second-lowest population density. The province is favourably situated for economic co-operation with other parts of southern Africa as it shares a border with Lesotho. The Free State Province is divided into five District Municipalities and these are:-

- The Xhariep District
- The Motheo District
- The Lejweleputswa District
- The Thabu Mofutsanyane District
- The Fezile Dabi District



Economy

In 2011, the provincial economy was 5.5% of National Gross Domestic Product (GDP). This relates to a regional GDP of R 145 405 million per annum.

The focus for the Provincial Government, in conjunction with its partners, has two main elements - development and growth.

- Development involves meeting basic needs, tackling poverty, opening up access to opportunity and redistributing wealth among the people and communities of our province.
- Growth entails providing a competitive and entrepreneurial environment by maximising our physical, economic and human resources to attract and grow business and investment.

Population and languages

The 2011 Census recorded the population of the Free state Province at 2.745 million which represented 5.3% of the total population. The estimated growth rate of 1.7% per annum and the population density are the second lowest among the provinces. The most popular home languages of the province include Sesotho 64.2%, Afrikaans 12.72%, IsiXhosa 7.524%.

Population figures according to race:

| Population group | People | Percentage |
|------------------|---------|------------|
| Black African | 2405533 | 87.61% |
| White | 239026 | 8.71% |
| Coloured | 83844 | 3.05% |
| Indian or Asian | 10398 | 0.38% |
| Other | 6790 | 0.25% |

The gender breakdown is as follows (2011 Census)

| Gender | People | Percentage |
|--------|---------|------------|
| Female | 1416623 | 51.60% |
| Male | 1328967 | 48.40% |

The detailed language breakdown for the province is as follows (Census 2011).

| First language | People | Percentage |
|-----------------------|--------|------------|
| Sesotho | 316408 | 67.32% |
| Afrikaans | 64990 | 13.83% |
| isiXhosa | 28036 | 5.96% |
| isiZulu | 26497 | 5.64% |
| English | 11759 | 2.50% |
| Sign language | 6695 | 1.42% |
| Setswana | 4797 | 1.02% |
| Other | 3367 | 0.72% |
| Sepedi | 2986 | 0.64% |
| isiNdebele | 1640 | 0.35% |
| Xitsonga | 1427 | 0.30% |
| Tshivenda | 842 | 0.18% |
| SiSwati | 570 | 0.12% |
| <i>Not applicable</i> | 18022 | |

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Education and employment

Education Attainment - The 2011 October Household Survey demonstrated a distinct pattern of educational attainment by race and gender in the Free State, the direct result of the apartheid-based education systems of the past. Occupation types and numbers are as follows (Census 2011):

Dwellings

Bloemfontein, in the Central Free State, is the provincial capital and judicial capital of South Africa. Other major towns and cities are Bethlehem, Harrismith (in the Eastern Free State), Kroonstad, Sasolburg (in the Northern Free State) and Welkom (in the Goldfields).

The official and functional rates of urbanization are 54% and 74% respectively, a situation that is placing great strain on the built form and infrastructure of the Province's urban settlements. In common with the rest of the country, the Free State's urban settlements are characterized by spatial distortions according to race and class, urban sprawl, inefficient transport, land market inefficiency, informal settlements, and the concentration of the poor in relatively high density peripheral areas.

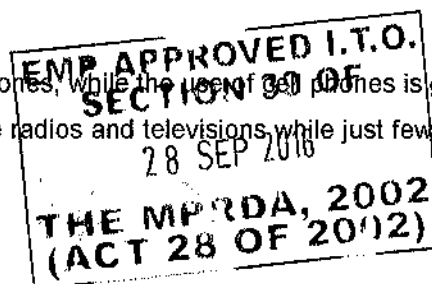
In many ways, economic success depends on urban success. More efficient and sustainable urban settlements are crucial to Government strategies for growth, poverty alleviation and the creation of a more equitable society. The challenge to the Free State Government is to support and assist municipalities in strengthening urban economies and overcoming apartheid-based dysfunctional structures. Opportunities exist to build on the identified areas of growth potential, and to initiate focused corridor-type developments.

Energy and water sources

The main energy sources for cooking include electricity, paraffin and wood. Electricity is by far the most widely used form of energy. Sources of water supply include piped water in dwelling, piped water inside the yard and piped water on a community stand. Other sources include boreholes, spring water, dam's pools, and rivers and streams.

Telephones and selected household goods

A large section of the population communicates via public telephones, while the use of cell phones is gaining rapidly in popularity. The most popular household goods include radios and televisions, while just fewer than 40% of households have refrigerators.



Toilets

Toilet facilities vary greatly in the province from flush toilets to Pit latrines. About 23% of the population have no access to toilet facilities. A detailed breakdown of access to the various types of sanitation is as follows:

Refuse removal

Solid waste production in the Free State comprises industrial, domestic and hazardous waste. The Free State Government maintains an overview on the adequacy of existing infrastructure, including mining dumps, availability of landfill sites, number of households with access to adequate waste disposal facilities, and subsequent health and hygiene issues.

Agriculture

The Free State is the agricultural powerhouse of South Africa. Commercial agricultural production contributed 14,7% of the total agricultural sector in the RSA. Agriculture creates more jobs per R1 million value added than any other sector of the economy. This sector has also recorded the highest level of increase in export earnings since 1993. The figure of 74,4% is outstanding by all standards if it is borne in mind that the manufacturing sector was the closest rival at only 23,4%. Despite its impressive share in the national agricultural economy, the agricultural sector remains highly dualistic: the large farm sector comprising 9 500 large scale commercial farmers controls 98.2% of the land and accounts for nearly all the

marketed output. Although agriculture is a major employer, accounting for 14% of the labour force, access to agricultural resources (land, water, services) remains inequitable.

Small scale Farming

Small scale farmers produce mainly for subsistence with the exception of a few cases of small and medium sized farms owned by emerging farmers. There is definitely potential for expansion, but particular problems exist in developing this sector due to land availability and availability of credit.

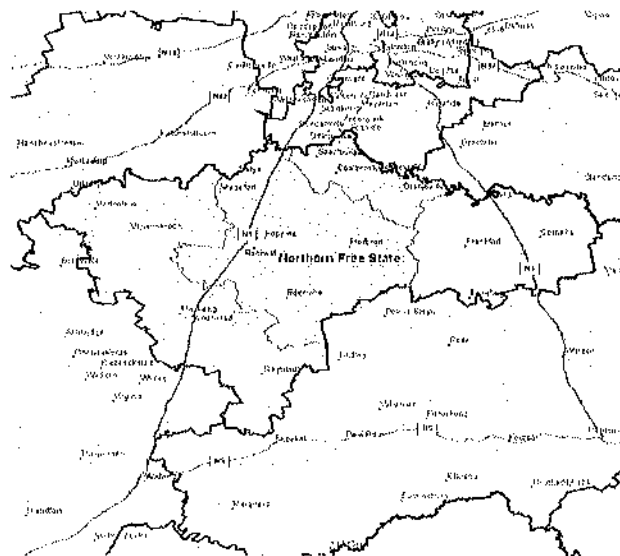
Mining Industry

Gold mining has suffered in the Free State due to the downturn in the gold price, industry restructuring and difficult geological conditions. It is estimated that from 1997 to 1998 jobs in the mining industry in the Goldfields have gone down by approximately 25% in direct mining and around 50% in indirect mining. Due to its labour intensity and vulnerable employment structure, the Goldfields area has borne the brunt of the impact. However, these job losses also have a ripple effect on other regions because some of the miners being retrenched are in fact migrant labourers. Opportunities do exist to strengthen this sector across the province. These include:

- promoting small scale mining projects
- achieving greater value added to production via beneficiation of raw materials output
- establishing new international markets for gold and other minerals
- Manufacturing

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Socio-Economic profile of the Fezile Dabi District Municipality



This district is an important agricultural production area, particularly for maize, and is known as the grain basket of South Africa. The Vaal Dam is the main source of water for Gauteng, and offers a wide profile of sport and leisure facilities. The district also has other attractions such as the Vredefort Dome, which is the third largest meteorite site in the world (200km in diameter), and various San paintings. The most important towns are Sasolburg and Kroonstad. Sasolburg has significant strategic importance for South Africa, as it is

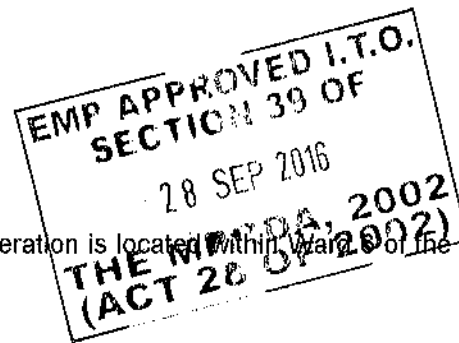
the location of large chemical and synthetic fuel plants (i.e. the Sasol plant). Kroonstad is an important agricultural and administrative centre in the district.

Fezile Dabi District Municipality (DC20) is situated within the northern portion of Free State Province. The service focal points in the district are the major towns of Kroonstad, Parys and Sasolburg. It consists of 4 Local Municipalities. The geographical area of the province is 21301.006 square kilometres. The District Municipality borders Mpumalanga Province in the east, North-West Province in the west and Gauteng Province in the north. Commercial agriculture is an integral part of this part of the province, and cattle ranching and maize farming are very popular. Various chemical industries such as SASOL and its associated industries are found in this region. The provinces largest coal mines are also found in this district.

The following Local Municipalities are found within the area of the Fezile Dabi District Municipality:

- Moqhaka Municipality
- Ngwathe Municipality
- Metsimaholo Municipality
- Mafube Municipality

Tja Naledi Beafase Investment Holdings (Pty) Ltd operation is located within Ward 6 of the Ngwathe Local Municipality.



Economy

Within the Fezile Dabi District, the most important mining town is Sasolburg. Mining and Chemical industries are the primary economic activities in the region and as such, is the largest contributor to the Province's GDP. A far greater portion of the land is used for agriculture.

Population and languages

According to Census 2011, the Fezile Dabi District Municipality has a population of 460 276 with 75.4% being in rural areas. Of the total population, 68% speak Sesotho and 13.56% speak Afrikaans. Black Africans make up 85.71% of the population and Whites constitute only 12.19%.

Education and Employment

The District Municipality is also faced with the high levels of illiteracy and innumeracy. Census 2001 indicates that 13.77% of the population haven't had any schooling. Only 6.32% have higher education. These low levels of education are experienced within the female population. This is translated into 40.37% of the available workforce being economically inactive, 35% being employed and 24.58% being unemployed. Most of the males have employment in craft and related trades industries, as machine operators and assemblers and in elementary occupations. Almost all the women have employment in elementary occupations.

Dwellings

Dwelling statistics indicate that 70% of the population lives in houses or some form of brick structure. Only 17% live in informal settlements.

Energy and water sources

Electricity and gas are the most common forms of energy used for heating and cooking purposes. 80% of the population have access to electricity whilst 17% uses candles for lighting. About 15% of the population has piped water in their dwellings. About 90% of the regional population has access to piped water.

Telephones and selected household goods

About 42% of the population has access to a public telephone nearby. Land based and cellular telephones are available to 38% of the regional population. Radio seems to be the most popular medium used followed by television.

Toilets

Census 2001 shows that 11% of the population uses pit latrines without ventilation and 62% having flushing toilets.

Refuse removal

The refuse removal statistics support the toilet statistics in that 62% of the population have weekly refuse removal and 20% of the population have their own refuse dump.

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Key statistics for the Ngwathe Local Municipality

Introduction

Ngwathe Local Municipality is situated in the northern part of the FezileDabi District Municipality, in the northern part of the Free State Province. It is composed of 5 towns, namely: Parys, Vredefort, Heilbron, Koppies and Edenville town areas as well as the rural areas as demarcated by the Demarcation Board of South Africa and is further divided into 19 wards. Parys is named after the French capital city Paris due to its proximity to a large river (Vaal River). The Ngwathe local Municipality has a growth rate of 0.4%.

Population Group

Ngwathe Local Municipality has 120520 people in its boundaries. Black Africans make up 86.5% of the population with the White people making up 10.3% as the second largest ethnic group.

Ngwathe Population Group

| Group | Percentage |
|---------------|------------|
| Black African | 86,5% |
| Coloured | 2,6% |
| Indian/Asian | 0,3% |
| White | 10,3% |
| Other | 0,3% |

Language and Ethnic Group

Table 15 gives a detailed breakdown of the ethnic and language diversity of the Ngwathe Local Municipality. Sesotho is the most spoken language in the Municipality followed by Afrikaans.

Ngwathe Language & Ethnic Groups

| Languages | |
|------------------|-------------------|
| Language | Percentage |
| Afrikaans | 13,2% |
| English | 1,9% |
| IsiNdebele | 0,3% |
| IsiXhosa | 8,4% |
| IsiZulu | 3,4% |
| Sepedi | 0,2% |
| Sesotho | 67,8% |
| Setswana | 1% |
| Sign Language | 1,5% |
| SiSwati | 0,1% |
| Tshivenda | 0,1% |
| Xitsonga | 0,2% |
| Other | 0,80% |
| Not Applicable | 1,2% |

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Education, Labour Force and Employment

According to Census 2011 (Tables 16, 17), 12.4% of the population within the Local Municipality have Grade 12 or higher education. On the other side of the spectrum, 3.3% of the population within the Local Municipality haven't had any schooling. As in Table 17, Employment levels in the local Municipality are as follows, 34.07% are employed, 18.5% unemployed and 342.29% economically inactive. Employment sectors are mining and agricultural. Tja Naledi Beafase Investment Holdings (Pty) Ltd currently employs 1 person as at 30 April 2014.

Ngwathe: Education Status

| Group | Percentage |
|---------------------|------------|
| No Schooling | 3,3% |
| Some Primary | 44,5% |
| Completed Primary | 6,1% |
| Some Secondary | 32,3% |
| Completed Secondary | 11,5% |
| Higher Education | 0,9% |
| Not Applicable | 1,4% |

Ngwathe: Employment Distribution

| Employment status 15-64 | |
|--------------------------------|---------------|
| Employment Status | Number |
| Employed | 25635 |
| Unemployed | 13920 |

| | |
|-------------------------|-------|
| Discouraged Work Seeker | 3865 |
| Not Economically Active | 31823 |

Dwelling Type

Of the total population, 74% in Ward 6 live in some form of formal structure. On the Municipality scale, 33% of the population live in informal settlements, mostly in shacks.

Services

Access to clean drinking water, together with effective sanitation services and refuse removal, are generally accepted as basic services and of critical importance to all communities. According to the 2011 census, most of the residents have access to either piped water in their homes, or to distances greater than 200m from their dwellings. Key statistics are listed below.

| <u>Settlement type</u> | |
|------------------------|------------|
| Area | Percentage |
| Urban | 91,5% |
| Tribal/Traditional | 0% |
| Farm | 8,5% |

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| <u>Household goods</u> | | |
|------------------------|-------|-------|
| Item | Yes | No |
| Cellphone | 87% | 13% |
| Computer | 14,8% | 85,2% |
| Television | 80,2% | 19,8% |
| Satellite Television | 20,6% | 79,4% |
| Radio | 76,6% | 23,4% |
| Landline / Telephone | 10,7% | 89,3% |
| Motor Car | 24,7% | 75,3% |
| Refrigerator | 75,7% | 24,3% |
| Electric / Gas-Stove | 87,5% | 12,5% |

| <u>Energy source for cooking</u> | | | |
|----------------------------------|---------|---------|----------|
| Energy Source | Cooking | Heating | Lighting |
| Electricity | 88,1% | 69,3% | 92% |
| Gas | 2,4% | 2,6% | 0,1% |
| Paraffin | 5,2% | 2,7% | 0,5% |
| Solar | 0,2% | 0,2% | 0,4% |
| Candles | 0% | 0% | 6,7% |
| Wood | 2,5% | 6,1% | 0% |
| Coal | 0,9% | 8% | 0% |
| Animal Dung | 0,4% | 0,6% | 0% |
| Other | 0,1% | 0% | 0% |
| None | 0,3% | 10,6% | 0,2% |

| <u>Access to the internet</u> | |
|-------------------------------|------------|
| Access | Percentage |
| From Home | 5,1% |
| From Cellphone | 15,1% |
| From Work | 2,1% |

| | |
|----------------|-------|
| From Elsewhere | 5,1% |
| No Access | 72,7% |

| Tenure status | |
|----------------------------|------------|
| Tenure Status | Percentage |
| Rented | 17,6% |
| Owned and fully paid off | 60,1% |
| Owned but not yet paid off | 6,2% |
| Occupied rent free | 12,8% |
| Other | 3,3% |

| Source of water | |
|---|------------|
| Source of water | Percentage |
| Regional/Local water scheme (operated by municipality or other water services provider) | 88,4% |
| Borehole | 8,2% |
| Spring | 0,1% |
| Rain water tank | 0,6% |
| Dam/Pool/Stagnant water | 0,1% |
| River/Stream | 0,1% |
| Water vendor | 0,4% |
| Water tanker | 1,2% |
| Other | 0,8% |

| Refuse disposal | |
|---|------------|
| Refuse Disposal | Percentage |
| Removed by local authority/private company at least once a week | 81,9% |
| Removed by local authority/private company less often | 2,6% |
| Communal refuse dump | 1,3% |
| Own refuse dump | 10,6% |
| No rubbish disposal | 3% |
| Other | 0,6% |

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Appendix 2

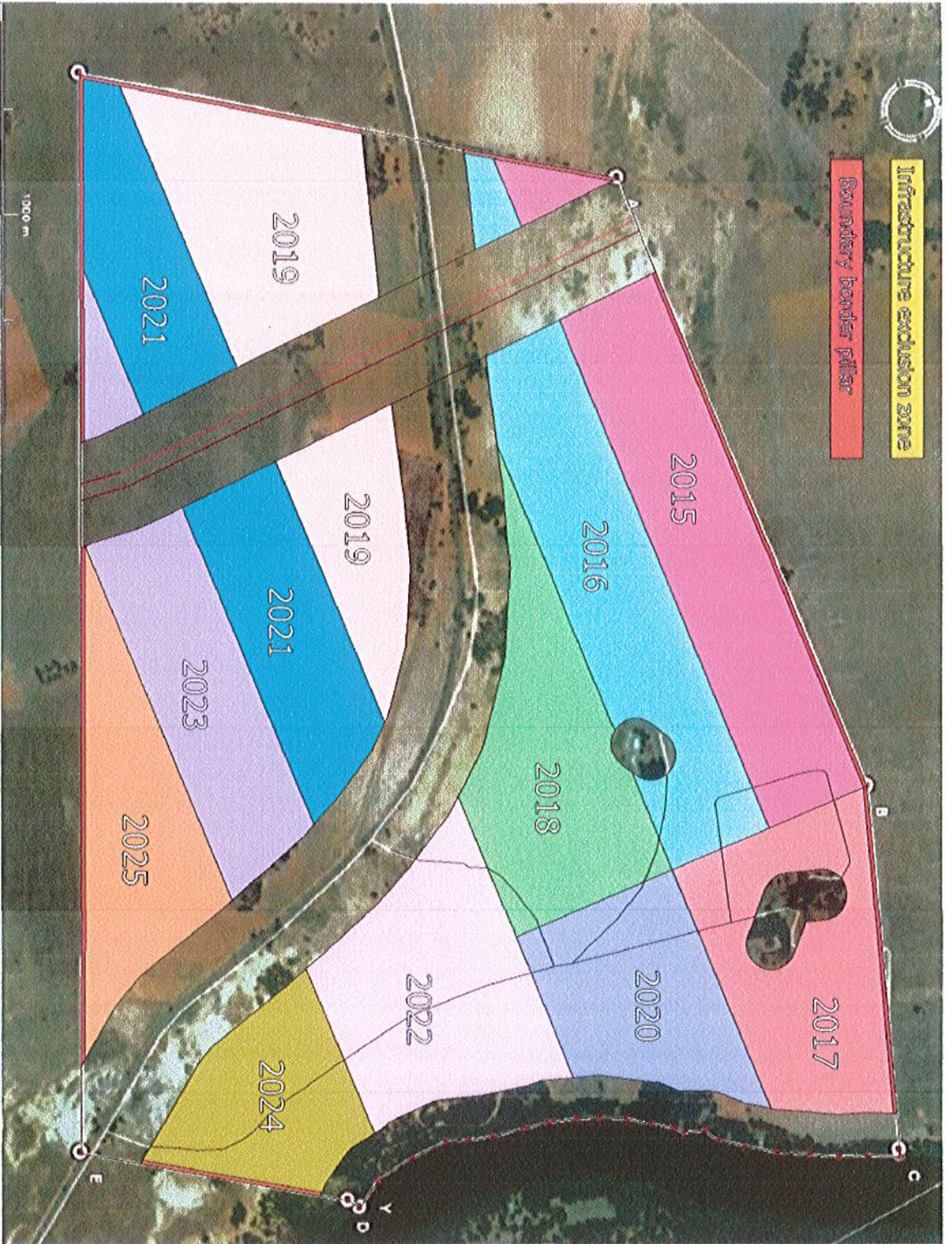


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Appendix 3: Mine design map



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Appendix 4 Applicant details

1.1 Mining company, mine owner and mine manger

1.1.1 Name and address of mine

Tja Naledi Beafase Investment Holdings (Pty) Ltd.

1.1.2 Name and address of mine owner

Contact person: Dr S Jacobs

Postal Address: P O Box 15265,
Riversfield,
1564,

Cell: 083 281 7631

E-mail: admin@mohealth.co.za

1.1.3 Name of mine manger / responsible person

Responsible person: Dr S Jacobs

As listed under 1.1.2

1.2 Applicant for the mining right

Name: Tja Naledi Beafase Investment Holdings (Pty) Ltd.

As listed under 1.1.2

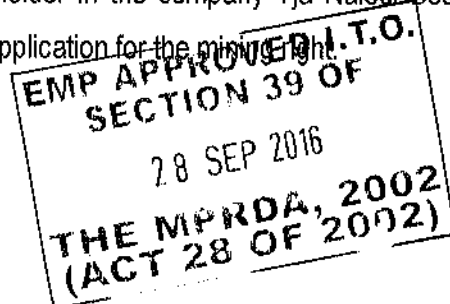
1.3 Land owner and title deed description

The Remaining extent of the farm Fu Pont 228, Magisterial District of Parys

Name: Dr S Jacobs

Postal Address: As listed under 1.1.2

Dr S Jacobs is a director and shareholder in the company Tja Naledi Beafase Investment Holdings (Pty) Ltd who is making the application for the mining right.



Appendix 5 - Heritage assessment

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Heritage Impact Assessment Report

HERITAGE IMPACT ASSESSMENT FOR THE MINING
RIGHTS APPLICATION FOR SUBDIVISION 4 OF THE
FARM WOODLANDS 407

PREPARED BY:
G&A HERITAGE



PREPARED FOR:
**DOREAN ENVIRONMENTAL
SERVICES CC**

CREDIT SHEET

Project Director

STEPHAN GAIGHER (BA Hons, Archaeology, UP)

Principal Investigator for G&A Heritage

Member of ASAPA (Site Director Status)

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Website: www.gaheritage.co.za

Report Author

STEPHAN GAIGHER

Disclaimer; Although all possible care is taken to identify all sites of cultural importance during the investigation of study areas, it is always possible that hidden or sub-surface sites could be overlooked during the study. G&A Heritage and its personnel will not be held liable for such oversights or for costs incurred as a result of such oversights.

SIGNED OFF BY: STEPHAN GAIGHER



MANAGEMENT SUMMARY

Site name and location: *Subdivision 4 of the Farm Woodlands 407.*

Municipal Area: Ngwathe Local Municipality

Developer: *Tja Naledi Beafase Investment Holdings (Pty) Ltd.*

Consultant: G&A Heritage, PO Box 522, Louis Trichardt, 0920, South Africa.
38A Vorster Street, Louis Trichardt, 0920

Date of Report: 27 May 2015

Tja Naledi Beafase Investment Holdings (Pty) Ltd is proposing the development of a new sand mining operation on the farm *Woodlands 407* in the *Free State Province*. As part of the mining rights application being submitted for the mining permit, this report looks at the heritage component of the environmental impact assessment process.

Findings;

The area investigated lies on a developed farm. Most of the sand deposits have been mined extensively in the recent past resulting in extensive alteration to the topography of the study area. Some farming related buildings could be identified within the study area and some of these could be of historic significance. An old homestead is located on the northern boundary of the property and these structures are to be protected. A single Later Stone Age tool was noted at another site, however this was found to be displaced. The area around the old farmworkers compound should be investigated for unmarked graves if it is to be mined.

Recommendations;

Due to the scattered occurrence of sand deposits over the study area, it is not anticipated that any of the historic structures will be damaged. It is recommended that the structures remain *in situ* and if it is required that they be removed, further studies will be necessary as well as permits for their demolition from SAHRA and the provincial heritage authority.

Fatal Flaws;

No fatal flaws were identified.

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PROJECT RESOURCES

HERITAGE IMPACT REPORT

FIRST PHASE HERITAGE IMPACT ASSESSMENT REPORT FOR THE MINING RIGHTS APPLICATION FOR SUBDIVISION 4 OF THE FARM WOODLANDS 407.

INTRODUCTION

Legislation and methodology

G&A Heritage was appointed by *Dorean Environmental Services CC* and *Tja Naledi Beafase Investment Holdings (Pty) Ltd.* to undertake a first phase heritage impact assessment for the mining rights application for *Subdivision 4 of the Farm Woodlands 407* near Parys in the *Free State Province*. Section 38(1) of the South African Heritage Resources Act (25 of 1999) requires that a heritage study be undertaken for:

- (a) Construction of a road, wall, power line, pipeline, canal or other similar form of linear development or barrier exceeding 300 m in length;
- (b) Construction of a bridge or similar structure exceeding 50 m in length; and
- (c) Any development, or other activity which will change the character of an area of land, or water –
 - (1) Exceeding 10 000 m² in extent;
 - (2) Involving three or more existing erven or subdivisions thereof; or
 - (3) Involving three or more erven, or subdivisions thereof, which have been consolidated within the past five years; or
- (d) The costs of which will exceed a sum set in terms of regulations; or
- (e) Any other category of development provided for in regulations.

While the above describes the parameters of developments that fall under this Act, Section 38 (8) of the NHRA is applicable to this development. This section states that;

- (8) The provisions of this section do not apply to a development as described in subsection (1) if an evaluation of the impact of such development on heritage resources is required in terms of the Environment Conservation Act, 1989 (Act 73 of 1989), or the integrated environmental management guidelines issued by the Department of Environment Affairs and Tourism, or the Minerals Act, 1991 (Act 50 of 1991), or any other legislation: Provided that the consenting authority must ensure that the evaluation fulfils the requirements of the relevant heritage resources authority in terms of subsection (3), and any comments and recommendations of the relevant heritage resources authority with regard to such development have been taken into account prior to the granting of the consent.

In regards to a development such as this that falls under Section 38 (8) of the NHRA, the requirements of Section 38 (3) applies to the subsequent reporting, stating that;

- (3) The responsible heritage resources authority must specify the information to be provided in a report required in terms of subsection (2) (a): Provided that the following must be included:
 - (a) The identification and mapping of all heritage resources in the area affected;
 - (b) An assessment of the significance of such resources in terms of the heritage assessment criteria set out in section 6 (2) or prescribed under section 7;
 - (c) An assessment of the impact of the development on such heritage resources;
 - (d) An evaluation of the impact of the development on heritage resources relative to the

- sustainable social and economic benefits to be derived from the development;
- (e) The results of consultation with communities affected by the proposed development and other interested parties regarding the impact of the development on heritage resources;
- (f) If heritage resources will be adversely affected by the proposed development, the consideration of alternatives; and
- (g) Plans for mitigation of any adverse effects during and after the completion of the proposed development.

A heritage impact assessment is not limited to archaeological artefacts, historical buildings and graves. It is far more encompassing and includes intangible and invisible resources such as places, oral traditions and rituals. A heritage resource is defined as any place or object of cultural significance i.e. of aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technological value or significance. This includes the following:

- (a) Places, buildings, structures and equipment;
- (b) Places to which oral traditions are attached or which are associated with living heritage;
- (c) Historical settlements and townscapes;
- (d) Landscapes and natural features;
- (e) Geological sites of scientific or cultural importance;
- (f) Archaeological and paleontological sites;
- (g) Graves and burial grounds, including –
 - (1) Ancestral graves,
 - (2) Royal graves and graves of traditional leaders,
 - (3) Graves of victims of conflict (iv) graves of important individuals,
 - (4) Historical graves and cemeteries older than 60 years, and
 - (5) Other human remains, which are not covered under the Human Tissues Act, 1983 (Act No.65 of 1983 as amended);
- (h) Movable objects, including;
 - (1) Objects recovered from the soil or waters of South Africa including archaeological and paleontological objects and material, meteorites and rare geological specimens;
 - (2) Ethnographic art and objects;
 - (3) Military objects;
 - (4) Objects of decorative art;
 - (5) Objects of fine art;
 - (6) Objects of scientific or technological interest;
 - (7) Books, records, documents, photographic positives and negatives, graphic, film or video material or sound recordings; and
 - (8) Any other prescribed categories, but excluding any object made by a living person;
- (i) Battlefields;
- (j) Traditional building techniques.

A 'place' is defined as:

- (a) A site, area or region;
- (b) A building or other structure (which may include equipment, furniture, fittings and articles associated with or connected with such building or other structure);
- (c) A group of buildings or other structures (which may include equipment, furniture, fittings and articles associated with or connected with such group of buildings or other structures); and
- (d) An open space, including a public square, street or park; and in relation to the management of a place, includes the immediate surroundings of a place.

'Structures' means any building, works, device, or other facility made by people and which is fixed to land and any fixtures, fittings and equipment associated therewith older than 60 years.

'Archaeological' means:

- (a) Material remains resulting from human activity, which is in a state of disuse and is in or on land and is older than 100 years, including artefacts, human and hominid remains

and artificial features and structures;

(b) Rock art, being a form of painting, engraving or other graphic representation on a fixed rock surface or loose rock or stone, which was executed by human agency and is older than 100 years including any area within 10 m of such representation; and

(c) Wrecks, being any vessel or aircraft, or any part thereof, which was wrecked in South Africa, whether on land or in the maritime cultural zone referred to in section 5 of the Maritime Zones Act 1994 (Act 15 of 1994), and any cargo, debris or artefacts found or associated therewith, which are older than 60 years or which in terms of national legislation are considered to be worthy of conservation;

(d) Features, structures and artefacts associated with military history, which are older than 75 years and the sites on which they are found.

'Paleontological' means any fossilised remains or fossil trace of animals or plants which lived in the geological past, other than fossil fuels or fossiliferous rock intended for industrial use, and any site which contains such fossilised remains or trace.

'Grave' means a place of interment and includes the contents, headstone or other marker of and any other structures on or associated with such place. The South African Heritage Resources Agency (SAHRA) will only issue a permit for the alteration of a grave if it is satisfied that every reasonable effort has been made to contact and obtain permission from the families concerned.

The removal of graves is subject to the following procedures as outlined by the SAHRA:

- Notification of the impending removals (using English, Afrikaans and local language media and notices at the grave site);
- Consultation with individuals or communities related or known to the deceased;
- Satisfactory arrangements for the curation of human remains and / or headstones in a museum, where applicable;
- Procurement of a permit from the SAHRA;
- Appropriate arrangements for the exhumation (preferably by a suitably trained archaeologist) and re-interment (sometimes by a registered undertaker, in a formally proclaimed cemetery);
- Observation of rituals or ceremonies required by the families.

The limitations and assumptions associated with this study are as follows;

- Sites were evaluated by means of description of the cultural landscape and analysis of written sources and available databases.
- It was assumed that layout as provided by *Dorean Environmental Services CC* was correct.
- We assumed that the public participation process performed as part of the Environmental Impact Assessment process would be sufficiently encompassing not to be repeated in the Heritage Impact Assessment.

Table 1. Impacts on the NHRA Sections

| Act | Section | Description | Possible Impact | Action |
|--|---------|--|-----------------|------------------------------------|
| National Heritage Resources Act (NHRA) | 34 | Preservation of buildings older than 60 years | Yes | Avoid possible historic structures |
| | 35 | Archaeological, paleontological and meteor sites | No impact | None |
| | 36 | Graves and burial sites | Possible Impact | Management plan |
| | 37 | Protection of public monuments | No impact | None |
| | 38 | Does activity trigger a HIA? | Yes | HIA |

Table 2. NHRA Triggers

| Action Trigger | Yes/No | Description |
|--|--------|--|
| Construction of a road, wall, power line, pipeline, canal or other linear form of development or barrier exceeding 300m in length. | No | N/A |
| Construction of a bridge or similar structure exceeding 50m in length. | No | N/A |
| Development exceeding 5000 m ² | Yes | Proposed Subdivision 4 of the Farm Woodlands 407 Sand Mine |
| Development involving more than 3 erven or sub divisions | No | N/A |
| Development involving more than 3 erven or sub divisions that have been consolidated in the past 5 years | No | N/A |
| Re-zoning of site exceeding 10 000 m ² | Yes | Possible rezoning |
| Any other development category, public open space, squares, parks or recreational grounds | No | N/A |

PROJECT LOCATION

The proposed Subdivision 4 of the Farm Woodlands 407 sand mining operation is located close to Parys in the Free State Province.

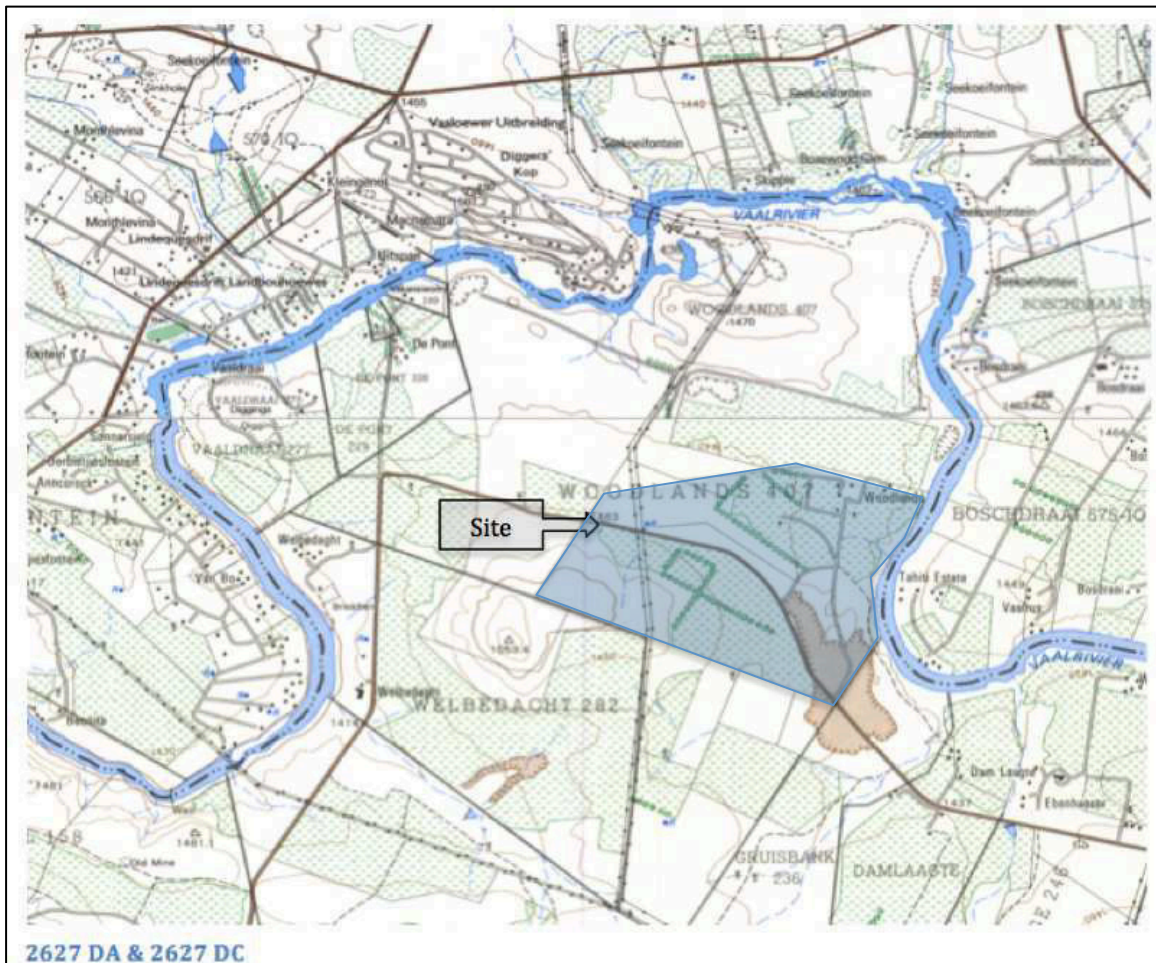


Figure 1. Location Map

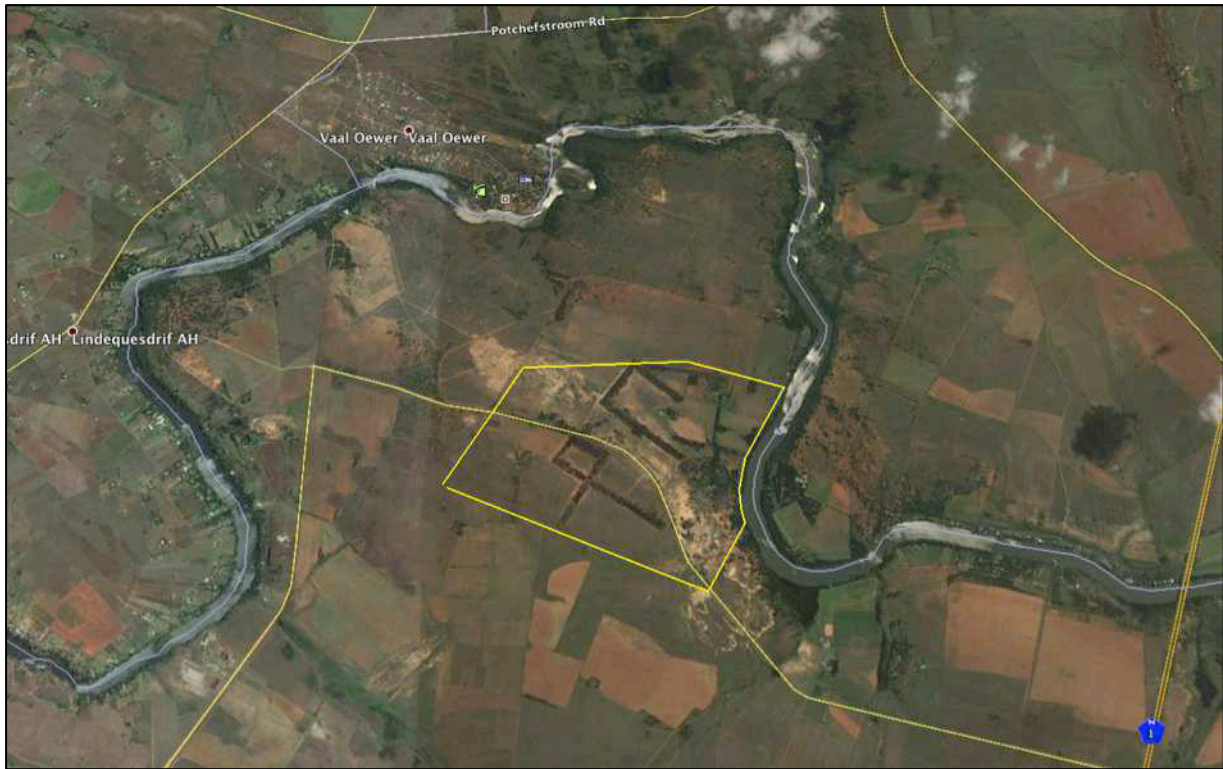


Figure 2. Aerial view of the study area

METHODOLOGY

This study defines the heritage component of the Environmental Impact Assessment process. It is described as a first phase Heritage Impact Assessment (HIA). This report attempts to evaluate both the accumulated heritage knowledge of the area as well as information derived from direct physical observations.

EVALUATING HERITAGE IMPACTS

A combination of document research as well as the determination of the geographic suitability of areas and the evaluation of aerial photographs determined which areas could and should be accessed.

After plotting of the site on GPS the areas were accessed using suitable combinations of vehicle access and access by foot.

Sites were documented by digital photography and geo-located with GPS readings using the WGS 84 datum.

Further techniques included interviews with local inhabitants, visiting local museums and information centres and discussions with local experts. All this information was combined with information from an extensive literature study as well as the result of archival studies based on SAHRA provincial databases.

ASSESSING VISUAL IMPACT

Visual impacts of developments result when sites that are culturally celebrated are visually affected by a development. The exact parameters for the determination of visual impacts have not yet been rigidly defined and are still mostly open to interpretation. CNdV and DEAP (2006) have developed some guidelines for the management of the visual impacts of wind turbines in the Western Cape, although these have not yet been formalized. In these guidelines they recommend a buffer zone of 1km around significant heritage sites to minimize the visual impact.

PREVIOUS STUDIES IN THE AREA

Parys Area:

- Dreyer, C. 2007. First Phase Archaeologist and Cultural Heritage of the Proposed New Prison at Parys, Free State.
- Huffman, T. 2005. Archaeological Assessment of the Parys Golf Island and Feesgronde, FS Province.
- Van Der Walt, J. 2012. Archaeological Impact Assessment for the Proposed Jumanji Estate Development, Parys, Free State Province.
- Van Ryneveld, K. 2007. Archaeological Impact Assessment: Tumahole Ext 7 Residential Development, Parys, Free State, South Africa.
- Van Schalkwyk, J. 2006. Heritage Impact Assessment for the Proposed Waterford Golf and River Estate, Parys Are, Free State.
- Dreyer, C. 2005. Archaeological and Cultural Assessment of the Proposed Upgrading of the Road (R59) Between Parys & N1, Free State.
- Dreyer, C. 2005. First Phase Archaeological and Historical Investigation of the Proposed Developments on the Farm Geluk 196 & Ladiesfontein 255 – Parys, Free State.
- Kusel, U. 2009. Cultural Heritage Resources Assessment of Portion 6 of the Farm Daskop 1103 Parys, Free State Province.
- Van Der Walt, J. 2010. Archaeological Impact Assessment for a residential development on a portion of the Farm Doornhoek 1000, District Parys, Free State Province.
- Van Der Walt, J. 2008. Archaeological Impact Assessment: Subdivision 2 of the Farm Palmietfontein 99, Parys, Free State Province.

Vredefort Dome Area:

- Du Pisani, J. 2008. Vredefort Dome World Heritage Site (VDWHS) Integrated Management (IMP) Cultural Heritage Plan (CHP).
- Dreyer, C. 2010. First Phase Archaeological and Heritage Assessment of the site proposed for the Vodacom mast at the farm Buffelskloof 511 IQ, Vredefort Dome, North West Province.
- Dreyer, C. 2008. First Phase Archaeological and Cultural Heritage Assessment of the proposed residential developments at the farm Buffelskloof 511 IQ, Vredefort Dome, Potchefstroom, North West Province.
- Henderson, Z. Koortzen, C. 2007. Assessment of the Proposed Eskom Line Alternatives within the Zeus-Mercury-Vredefort Dome Extended Study Area, in terms of Archeological and other Heritage Sites.
- Pelser, A. 2003. Askoppies: Late Iron Age Sotho-Tswana Settlement on the Vredefort Dome.
- Pelser, A. 2004. Human Skeletal Remains from Askoppies, a Late Iron Age Tswana Settlement on the Vredefort Dome.
- Pelser, A. 2005. The Archaeological Investigation of a Possible Copper Smythy on Askoppies, a Late Iron Age Tswana Site on the Vredefort Dome, North West Province.
- Dreyer, C. 2004. Archaeological and Historical Assessment of the Proposed Tourist Accommodation Facilities on the Farm Buffelskloof 511 IQ in the Vredefort Dome Conservancy.

HERITAGE INDICATORS WITHIN THE RECEIVING ENVIRONMENTS

REGIONAL CULTURAL CONTEXT

PALAEONTOLOGY

The proposed mining activities will be limited to the extraction of alluvial surface sand and as a result there will be no intrusion into the underlying bedrock. For this reasons no specific paleontological study was undertaken.

STONE AGE

During the Middle Stone Age, 200 000 years ago, modern man or Homo sapiens emerged, manufacturing a wider range of tools, with technologies more advanced than those from earlier periods. This enabled skilled hunter-gatherer bands to adapt to different environments. From this time onwards, rock shelters and caves were used for occupation and reoccupation over very long periods of time (Mitchell 2002).

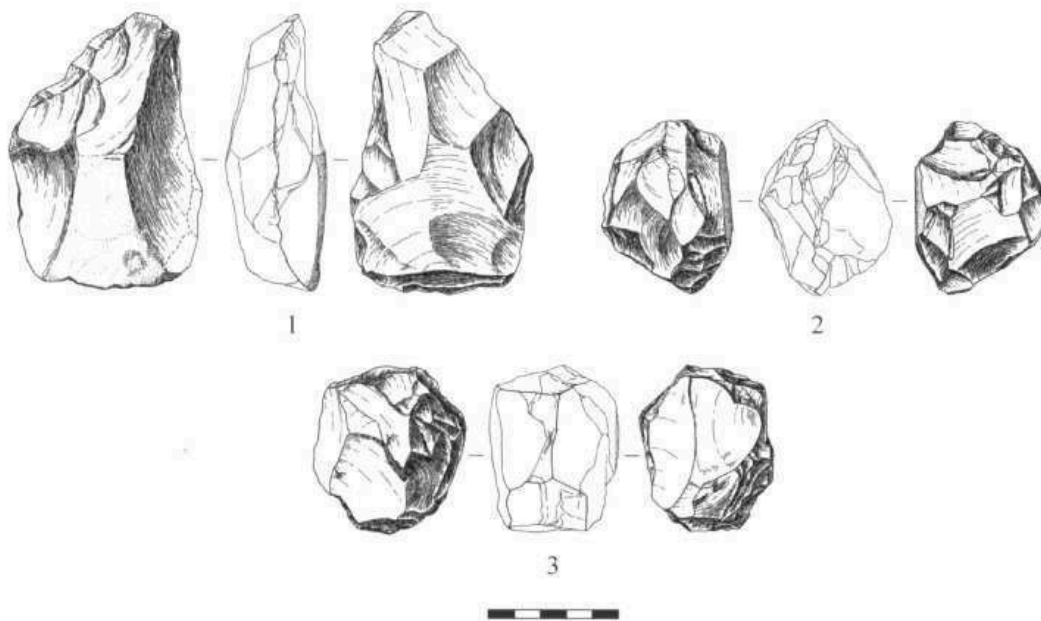


Figure 3. (1) handaxe on flake; (2) thick discoidal core; (3) polyhedral core (Pollarolo, Kuman, Bruxelles, 2010)

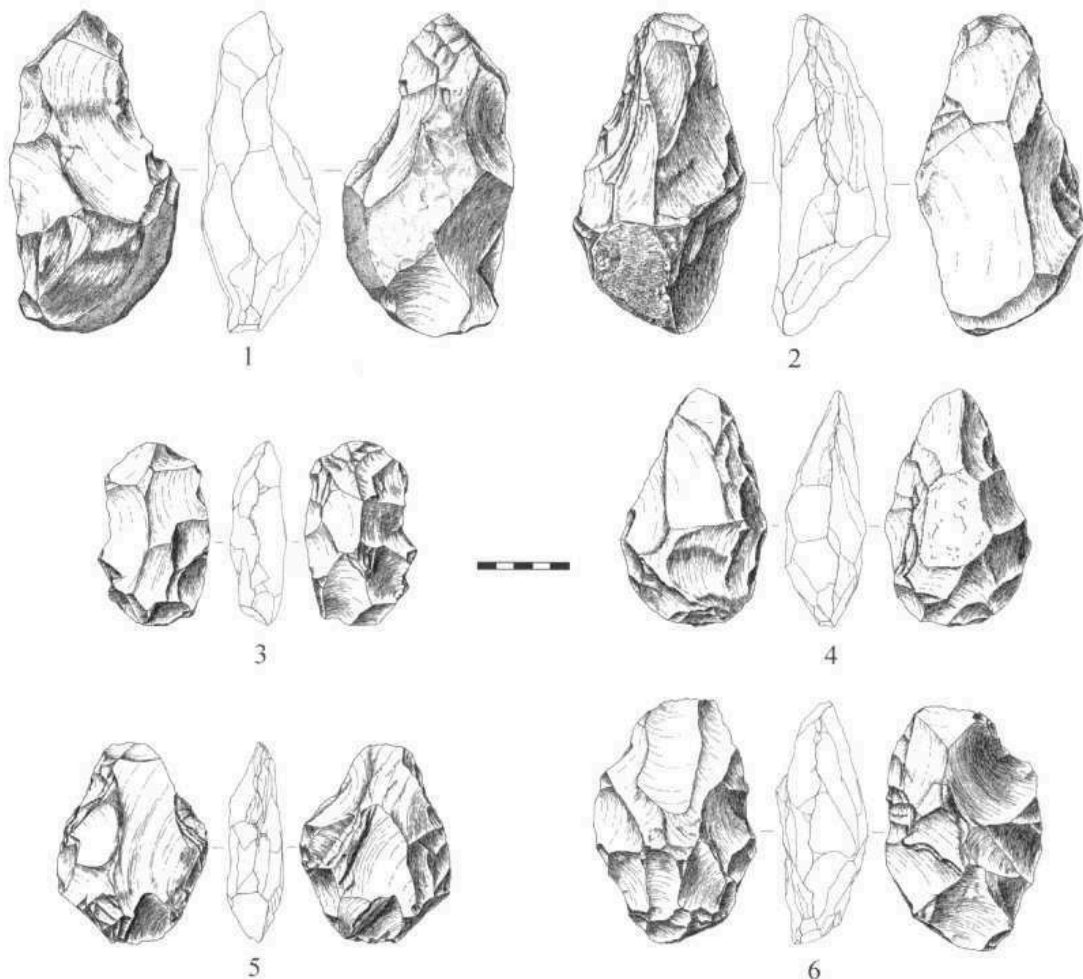


Figure 4. (1,2) Handaxes with large side removal; (3-6) handaxes (Pollarolo, Susino, Kuman, Bruxelles, 2010)

The Late Stone Age, considered to have started some 20 000 years ago, is associated with the predecessors of the San and Khoi Khoi. San hunter-gatherer bands with their small (microlithic) stone tools may have lived the Parys area. Stone Age hunter-gatherers lived well into the 19th century (Morris 2004).

A REVIEW OF THE SOUTH AFRICAN STONE AGE

The above description of the Stone Age sequences of southern Africa has been predominant for most of the last 80 years. In 2011 the first extensive review of this theory was performed by a group of leading Stone Age experts at a workshop in Gauteng. As a result many of the more accepted ideas around the Stone Age sequence has been revised and a possible new sequence or industry complex has been added (Lombard, Wadley, Deacon, Wurz, Parsons, Mohapi, Swart & Michell, 2012).

The resultant overview of the South African / Lesotho Stone Age now look as follows;

Later Stone Age

- **Age Range:** recent to 20-40 thousand years ago
- **General characteristics:** expect variability between assemblages, a wide range of formal tools, particularly scrapers (microlithic and macrolithic), backed artefacts, evidence of hafted stone and bone tools, borers, bored stones, upper and lower grindstones, grooved stones, ostrich eggshell (OES) beads and other ornaments, undecorated/decorated OES fragments, flasks/flask fragments, bone tools (sometimes with decoration), fishing equipment, rock art, and ceramics in the final phase.

Ceramic or Final Later Stone Age

- Generally < 2 thousand years ago

- MIS 1
- Contemporaneous with, and broadly similar to, final Later Stone Age, but includes ceramics
- Economy may be associated with hunter-gatherers or herders

Typo/technological characteristics

- *Stone tool assemblages are often microlithic (for definition of 'microlithic' see Elston & Kuhn 2002)*
- *In some areas they are dominated by long end scrapers and few backed microliths; in others formal tools are absent or rare*
- *Grindstones are common, ground stone artefacts, stone bowls and boat-shaped grinding grooves may occur*
- *Includes grit- or grass-tempered pottery*
- *Ceramics can be coarse, or well-fired and thin-walled; some times with lugs, spouts and conical bases; sometimes with decoration; sometimes shaped as bowls*
- *Ochre is common*
- *OES is common*
- *Metal objects, glass beads and glass artefacts also occur*

Final Later Stone Age

- 100 – 4000 years ago
- MIS 1
- Hunter-gatherer economy

Typo/technological characteristics

- *Much variability can be expected*
- *Variants include macrolithic (similar to Smithfield [Sampson 1974]) and/or microlithic (similar to Wilton) assemblages*
- *Assemblages are mostly informal (Smithfield)*
- *Often characterised by large untrimmed flakes (Smithfield)*
- *Sometimes microlithic with scrapers, blades and bladelets, backed tools and adzes (Wilton-like)*
- *Worked bone is common*
- *OES is common*
- *Ochre is common*
- *Iron objects are rare*
- *Ceramics are absent*

Wilton

- 4000 – 8000 years ago
- MIS 1
- At some sites continues into the final Later Stone Age as regional variants (e.g. Wilton Large Rock Shelter and Cave James)

Typo/technological characteristics

- *Fully developed microlithic tradition with numerous formal tools*
- *Highly standardised backed microliths and small convex scrapers (for definition of standardisation see Eerkens & Bettinger 2001)*
- *OES is common*
- *Ochre is common*
- *Bone, shell and wooden artefacts occur*

Oakhurst

- 7000 – 12 000 years ago
- MIS 1
- Includes Albany, Lockshoek and Kuruman as regional variants

Typo/technological characteristics

- *Flake based industry*

- *Characterised by round, end, and D-shaped scrapers and adzes*
- *Wide range of polished bone tools*
- *Few or no microliths*

Robberg

- 12 000 to 18 000 years ago
- MIS 2

Typo/technological characteristics

- *Characterised by systematic bladelet (<26mm) production and the occurrence of outils ecailles or scaled pieces*
- *Significant numbers of unretouched bladelets and bladelet cores*
- *Few formal tools*
- *Some sites have significant macrolithic elements*

Early Late Stone Age

- 18 000 – 40 000 years ago
- MIS 2-3
- Informal designation
- Also known as transitional MSA-LSA
- Overlapping in time with final Middle Stone Age

○ *Typo/technological Characteristics*

- *Characterised by unstandardised, often microlithic, pieces and includes the bipolar technique*
- *Described at some sites, but not always clear whether assemblages represent a real archaeological phase or a mixture of LSA/MSA artefacts*

Middle Stone Age

- Age Range: 20 000 – 30 000 years ago
- General characteristics: Levallois or prepared core techniques (for definitions see Van Peer 1992; Boeda 1995; Pleurdeau 2005) occur in which triangular flakes with convergent dorsal scars, often with faceted striking platforms, are produced. Discoidal systems (for definition see Inizan et al. 1999) and intentional blade production from volumetric cores (for definition see Pleurdeau 2005) also occur; formal tools may include unifacially and bifacially retouched points, backed artefacts, scrapers, and denticulates (for definition see Bisson 2000); evidence of hafted tools; occasionally includes marine shell beads, bone points, engraved ochre nodules, engraved OES fragments, engraved bone fragments, and grindstones.
- In the sequence below we highlight differences or characteristics that may be used to refine interpretations depending on context.

Final Middle Stone Age

- 20 000 – 40 000 years ago
- MIS 3
- Informal designation partly based on the Sibudu sequence
- *Typo/technological characteristics*
 - *Characterised by high regional variability that may include, e.g. bifacial tools, bifacially retouched points, hollow-based points*
 - *Triangular flake and blade industries (similar to Strathalan and Melikane)*
 - *Small bifacial and unifacial points (similar to Sibudu and Rose Cottage Cave)*
 - *Sibudu point characteristics: short, stout, lighter in mass compared to points from the Sibudu technocomplex, but heavier than those from the Still Bay*
 - *Can be microlithic*
 - *Can include bipolar technology*
 - *Could include backed geometric shapes such as segments, as well as side scrapers*

Sibudu

- 45 000 – 58 000 years ago

- MIS 3
- Previously published as informal late Middle Stone Age and post-Howieson's Poort at Sibudu
- Formerly known post-Howieson's Poort, MSA 3 generally, and MSA III at Klasies River
- *Typo/technological characteristics*
 - *Most points are produced using Levallois technique*
 - *Most formal retouch aimed at producing unifacial points*
 - *Sibudu unifacial point (type fossil) characteristics: faceted platform; shape is somewhat elongated with a mean length of 43.9 mm), a mean breadth of 26.8 mm and mean thickness of 8.8 mm (L/B ratio 1.7); their mean mass is 11.8 g (Mohapi, 2012)*
 - *Some plain butts*
 - *Rare bifacially retouched points*
 - *Some side scrapers are present*
 - *Backed pieces are rare*

Howieson's Poort

- 58 000 – 66 000 years ago
- MIS 3-4
- *Typo/technological characteristics*
 - *Characterised by blade technology*
 - *Includes small (<4 cm) backed tools, e.g. segments, scrapers, trapezes and backed blades*
 - *Some denticulate blades*
 - *Pointed forms are rare or absent*

Still Bay

- 70 000 – 77 000 years ago
- MIS 4-5a
- *Typo/technological characteristics*
 - *Characterised by thin (<10 mm), bifacially worked foliate or lanceolate points*
 - *Semi-circular or wide-angled pointed butts*
 - *Could include blades and finely serrated points (Lombard et al. 2010)*

Pre-Still Bay

- 72 000 – 96 000 years ago
- MIS 4-5
- *Typo/technological characteristics*
 - *Characteristics currently being determined / studied*

Mossel Bay

- 77 000 to —105 000 years ago
- MIS 5a-4
- *Also known as MSA II at Klasies River or MSA 2b generally*
- *Typo/technological characteristics :*
 - *Characterised by recurrent unipolar Levallois point and blade reduction*
 - *Products have straight profiles; percussion bulbs are prominent and often splintered or ring-cracked*
 - *Formal retouch is infrequent and restricted to sharpening the tip or shaping the butt*

Klasies River

- 105 000 to —130 000 years ago
- MIS 5d-5e
- *Also referred to as MSA I at Klasies River or MSA 2a generally*

- *Typo/technological characteristics:*
 - *Recurrent blade and convergent flake production*
 - *End products are elongated and relatively thin, often with curved profiles*
 - *Platforms are often small with diffused bulbs*
 - *Low frequencies of retouch*
 - *Denticulate pieces*

Early Middle Stone Age

- Suggested age MIS 6 to MIS 8 (130 000 to —300 000 years ago)
- Informal designation
-
- *Typo/technological characteristics:*
 - *This phase needs future clarification regarding the designation of cultural material and sequencing*
 - *Includes discoidal and Levallois flake technologies, blades from volumetric cores and a generalised toolkit*

Earlier Stone Age

- Age range: >200 000 to 2 000 000 years ago
- General characteristics: early stages include simple flakes struck from cobbles, core and pebble tools; later stages include intentionally shaped handaxes, cleavers and picks; final or transitional stages have tools that are smaller than the preceding stages and include large blades.
- In the sequence below we highlight differences or characteristics that may be used to refine interpretations depending on context.

ESA-MSA transition

- 200 to —600 thousand years ago
- MIS 7-15
- *Typo/technological characteristics:*
 - *Described at some sites as Fauresmith or Sangoan*
 - *Relationships, descriptions, issues of mixing and ages yet to be clarified*
 - *Fauresmith assemblages have large blades, points, Levallois technology, and the remaining ESA components have small bifaces*
 - *The Sangoan contains small bifaces (<100 mm), picks, heavy and light-duty denticulated and notched scrapers*
 - *The Sangoan is less well de scribed than the Fauresmith*

Acheulean

- 300 thousand to —1.5 million years ago
- MIS 8-50
- *Typo/technological characteristics:*
 - *Bifacially worked handaxes and cleavers, large flakes > 10 cm*
 - *Some flakes with deliberate retouch, sometimes classified as scrapers*
 - *Gives impression of being deliberately shaped, but could indicate result of knapping strategy*
 - *Sometimes shows core preparation*
 - *Generally found in disturbed open-air locations*

Oldowan

- 1.5 to >2 million years ago
- MIS 50-75
- *Typo/technological characteristics*
 - *Cobble, core or flake tools with little retouch and no flaking to predetermined patterns*
 - *Hammerstones, manuports, cores*
 - *Polished bone fragments/tools*

Although the above classification clarifies the last eighty years of Stone Age research it is clear that much work is still to be done before a definitive classification scale can be produced.

IRON AGE

Not much is known regarding the Iron Age ethno-history of the Parys area before the Ndebele under Mzilikasi invaded the area during the time referred to as the Difaqane in and around 1823 (Rasmussen, 1975). Most of the relevant work before this time was performed by Legassick (1969), who was able to reconstruct much of the pre-Difaqane Iron Age sequence. As a result we know that Tswana-speaking Rolong and Khudu from Parys had to flee westwards during the Ndebele raids. Maggs (1976) argues that Fokeng and Kwena communities most probably inhabited Type N settlements which are related to Taylor's Group I (Taylor 1979). According to Legassick (1969), these Type N inhabitants would most probably have been Kwena or Fokeng who have inhabited this area since the 16th century. Maggs (1976) also argues that groups related to the Rolong lived in his Type Z settlements and Taylor equates this type with his Group II settlements Taylor concludes that the material cultural expression of Group I is a result of Group I people being influenced by Group II Rolong. This is a plausible interpretation considering the fluid ward system of the Tswana whereby foreigners are incorporated into patrilineal decision-making groups (Schapera 1935). We know, for example, that in 1823 foreign client families occupied a series of settlement under the chieftainship of the Rolong paramount Sehundelo (Cope 1977). (Loubser, 1985).

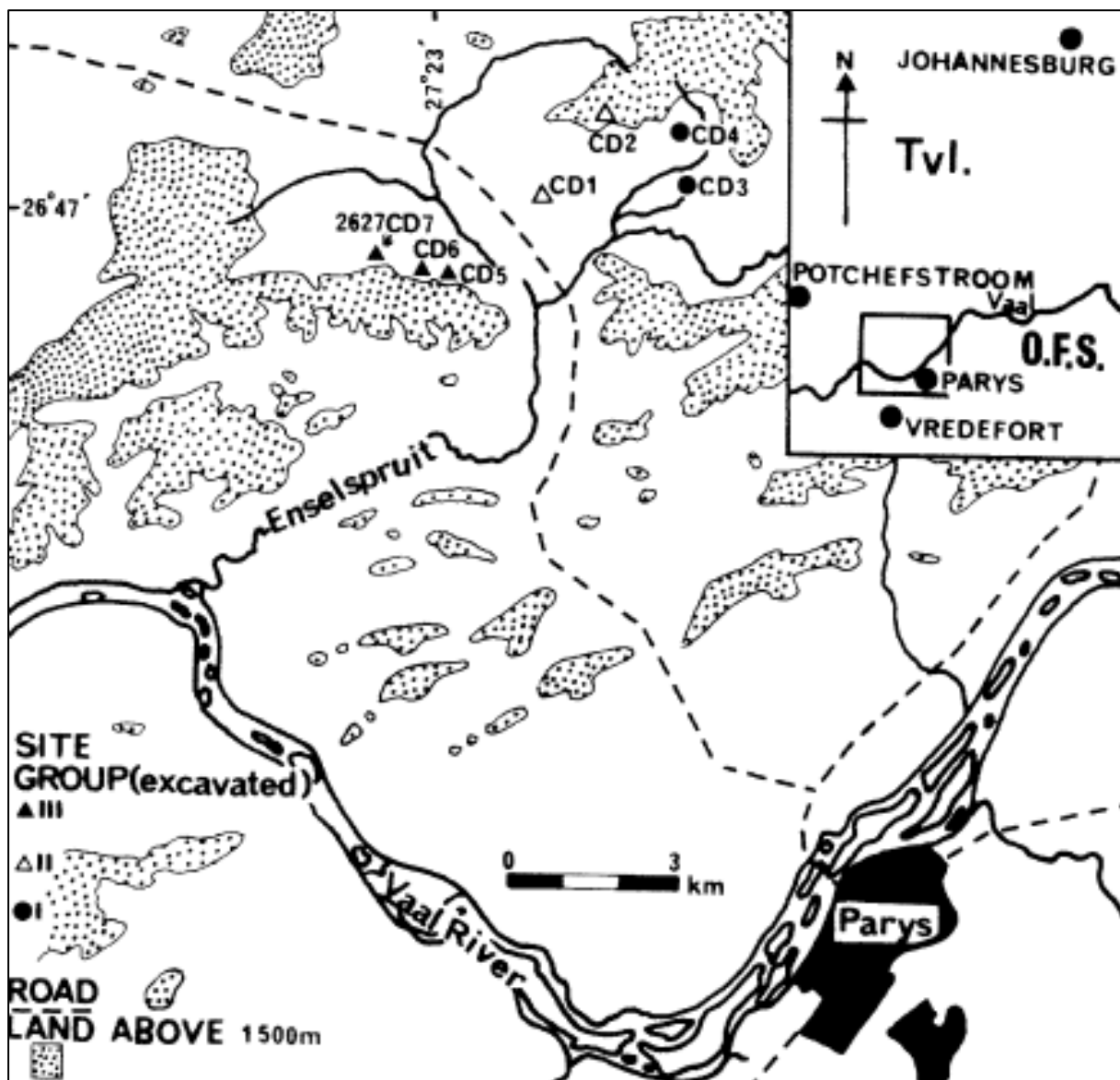


Figure 5. Location of excavated Iron Age Site in the Parys area (Loubser, 1985)

THE HISTORIC ERA

| DATE | DESCRIPTION |
|------------------------|---|
| 2000 Million Years Ago | The unique surrounding in which the town of Parys is situated, had its origin roughly around 2000 million years ago when a giant meteorite struck the earth just south east of Vredefort in the Free State Province. The impact structure that was subsequently formed has come to be known as the Vredefort Dome, the oldest and largest meteorite impact site on earth, measuring about 200km in diameter. |
| 1870's | <p>In the early 1870's, towns in the northern Free State were set very far apart, and members of the different churches had far to travel to participate in their religious services. It was then decided by the Ring of the Dutch Reformed Church to implant the idea of a congregation north of the Rhenoster River into the minds of residents of the farm Klipspruit, on the Vaal River, which was owned by three Van Coller brothers (Hans, Dolf and Philip) as well as their brother-in-law, William Davel.</p> <p>Mr. Wouter De Villiers (father of G.F. De Villiers, who later became the Mayor of Parys), Mr. J.G. Luyt (an attorney of Heilbron and afterwards a member of O.V.S. Parliament) and Mr. Fleck (a land surveyor) were sent to owners of Klipspruit to propose they lay out the farm as a township.</p> <p>They found the Van Collers and Davel disinclined to listen to any arguments put forward. The three men then went to the adjoining farm, Vischgat (present day Vredefort) that lay some ten miles South-East of Klipspruit. The owner of Vischgat (a Mr. Geere) was cooperative and the township of Vredefort was established.</p> <p>Thereafter the Van Coller brothers and William Davel realized that an opportunity was missed and in 1876 the township was laid out. On the 14th of June 1876 a Mr. Wouter de Villiers held the first sale of seven erven at £25 each.</p> |
| 1870's | Mr. Schillbach who had served on the Franco-Prussian War and had taken part of the siege of Paris named the town "Parys" because he compared the Vaal River to the Seine. The town adjoining farms were named Issy and Versailles, after the two forts that were outside the French Capital. |
| 1882 | Sir John Brand acceded to request for a nearer fountain of Justice than the town of Heilbron, forty-four miles away, and appointed a special Justice of the Peace to reside in Parys. The first, and only holder of the office, was J. P. Steyler, who held it until 1897, when a Resident-Landdros was appointed. |
| 1883 | A Village Management Board was appointed in 1883. |
| 1886 | Gold was discovered in the Witwatersrand which caused major developments to the town of Parys, being a on the route between Bloemfontein and the goldfields. |
| 1887 | In 1887 the Village Management Board was elevated to Municipal status. |
| 1889 to 1902 | <p>The outbreak of the Anglo-Boer war caused a standstill to the development of the town and caused much destruction. All able bodied males over the age of twelve enrolled in the Heilbron Commando.</p> <p>The first incident in the Parys area occurred during the retreat from Kroonstad to Pretoria. A section with several wagons had stopped for the night on a farm between Vredefort and Parys. One of the wagons was loaded with ammunition and was driven by two brothers, Hans and Franz Jooste. The British started shelling and a lucky shot hit the wagon. Franz was killed in the explosion. Hans was captured tow months later and banned to St Helena as a prisoner of war.</p> |

| | |
|----------------------|---|
| | <p>On the 20th of April 1900 Driscoll's Scouts passed through Parys. They must have been reconnoitring the area in preparation for the British advance. General French's cavalry crossed over the Drift onto Golf Island sometime in May 1900.</p> <p>During most of this period the British had a large camp down at what is now the Koppieskraal road but also maintained a small H. Q. in the Parys Hotel.</p> <p>Due to the town's surroundings it became an ideal place for guerilla warfare and snipers made good use of the natural advantages of the hills and the river around the town. Most of the buildings were destroyed and by 1902 when the war was over, the inhabitants had to make a fresh start.</p> |
| 1902 to 1912 | <p>At the time there were many men who had been ruined because of the war, and had no means of existence. In order to provide work for these men, a railway line was started as a relief work. A large camp of engineers and workers was established near the town and the work of building the line, and that of surveying the dam site and the country to be irrigated, was carried on from the camp. The engineer in charge of everything was Mr. J. E. Adamson.</p> <p>At the end of 1905, when the line was declared open, the Lieut. Governor Sir Hamilton Gould Adams officiated.</p> |
| Early 1900's to 1912 | <p>Because of the abundance of water, many irrigation canals were built. The town council (with Mr. J. L. Moll as the Mayor at that time) implemented an electric lights scheme, using the water of the irrigation scheme to generate electricity. Mr. Ferdinand Saunders was the consulting engineer to the electricity scheme. By Christmas in 1912, the first electric lights glowed in Parys.</p> |
| 1913 - 1915 | <p>Residents of the town had felt for quite some time that a bridge across the Vaal River was no more than its just due. A ferry service crossed on to an island, and from there another ferry completed the crossing. Farmers on the Transvaal side preferred to go to Potchefstroom, thirty miles away, rather than face the trouble and expenses of a ferry crossing. Towards the end of 1913, tenders were asked for a reinforced concrete bridge over the Vaal, the length of the whole plan being 1600 feet, in 40 sections of 40 feet each. The contract was finally awarded to a Mr. Warren of Potchefstroom and the contract price was about 16 000 pounds.</p> <p>The work was started in May 1914, but the outbreak of the First World War three months later, caused long delays and the bridge was only finished and opened for traffic around Christmas 1915.</p> <p>With the completion of the bridge, came an increase of trade from the Transvaal side of the river. The farmers from Lindequesdrift to Venterskroon and as far afield as Buffelshoek now found Parys easy access, and considerably nearer than Potchefstroom. With the increase trade, the town began to grow and many new buildings went up. At the Rooibult (Pomona) portion of the town, the greater number of sold Morgen lots had not immediately been brought under cultivation, but gradually, one by one, they were cultivated, with the result that the water was insufficient for all the new ground under cultivation.</p> |
| 1915 - 1930 | <p>The council meetings at that time were largely taken up in hearing complaints about the shortage of water from Property owners and the position became quite acute. After much deliberation the council agreed to raise the level of the weir by four feet and install another turbine and pump. Mr. Hancock, of Potchefstroom, drew up the plans for the weir, and tenders were requested from qualified persons. Mr. Reed was accepted, and he set to work.</p> <p>A flood breached the wall and new plans were drawn up and a much stronger structure was devised and built departmentally. Mr. Gibbons was the engineer in charge and Mr. McKenzie, who was then chief of the Water and Electrical departments, did the work.</p> |

| | |
|------|---|
| 1974 | In 1974 an officer of the Parys Voortrekker Commando, Ben Nel and other members of the Commando decided to build a monument in the crater in honour of Franz Jooste. The monument was unveiled on 26 October 1974 by the Commandant of the Voortrekker Commando, Rev. Andries Myburg. The story of the Jooste Incident was documented and placed inside the monument to ensure that Franz Jooste will be remembered. |
| 1986 | The Town Hall (built in 1904) was proclaimed a provincial heritage site in 1986. |
| 1999 | Staycold (manufacturer of commercial refrigeration), one of the main industries in Parys, is a world-class facility. Staycold manufactures for both the local and international markets. It is currently exporting to countries such as the United Kingdom, France, Spain, Ireland, Singapore, Hong Kong, New Zealand, Australia and almost the whole of the African continent. In October 1999 Staycold received the Premiers Award For Export Excellence by Mr. Alec Erwin (Minister of trade and industry) and was allocated the Standard Bank Trophy as overall Exporter of the Year. |
| 2005 | The Vredefort Dome is currently described as the World's oldest and largest impact structure declared South Africa's seventh World Heritage site in July 2005. |

Sources:

- “Chronological order of town establishment in South Africa based on Floyd (1960:20-26)”
- <http://www.parys.co.za/parys/history-about-parys.html>
- <http://www.parys.info/index.php/about/history-of-parys>
- <http://www.parys.co.za/parys/about-parys.html>
- Harry Hunt. “A Stoep Story”

THE CULTURAL LANDSCAPE

The main cultural landscape is associated with farming activities. This cultural identity has grown to such an extent that it overshadows any previous cultural identity that the area might have had in past history. The site has been subjected to informal sand mining since at least 1966 (see section on historic maps).



Figure 6. Old sand mining activity on site

HISTORIC MAPS AND BUILT ENVIRONMENT

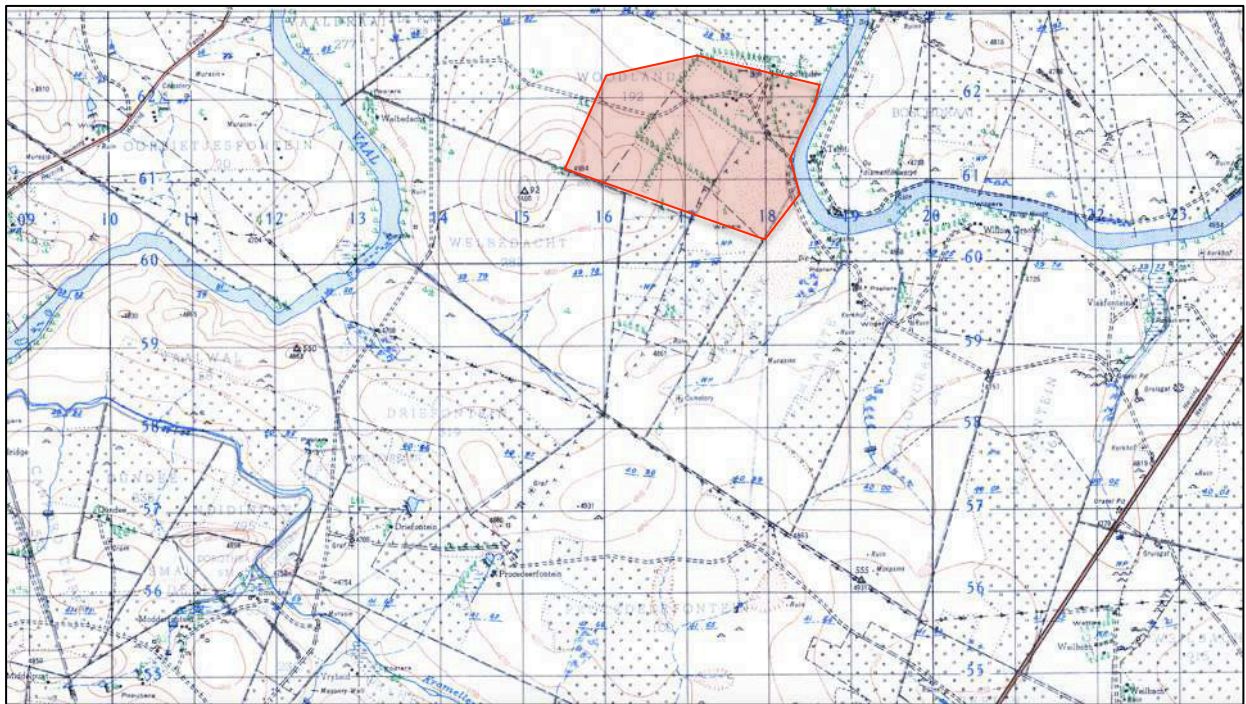


Figure 7. 2627DC 1945 Topographic map

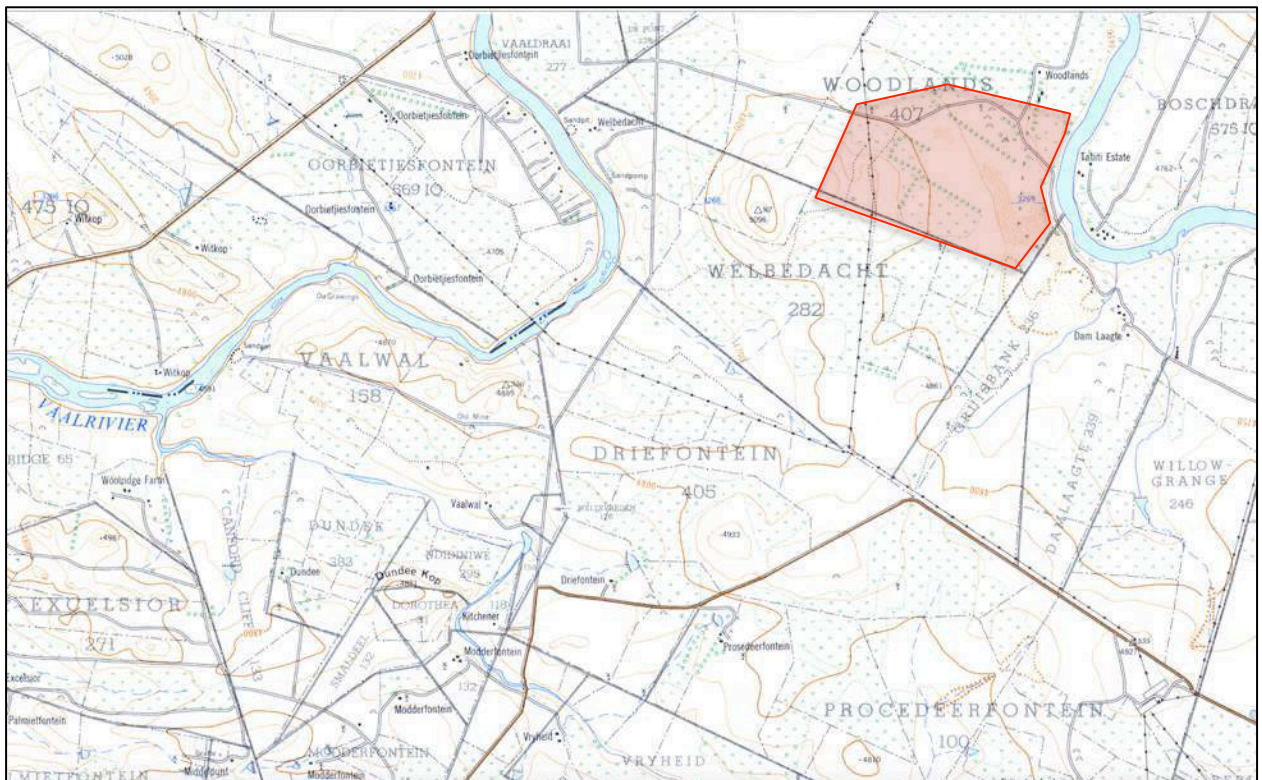


Figure 8. 2627DC 1966 Topographic map

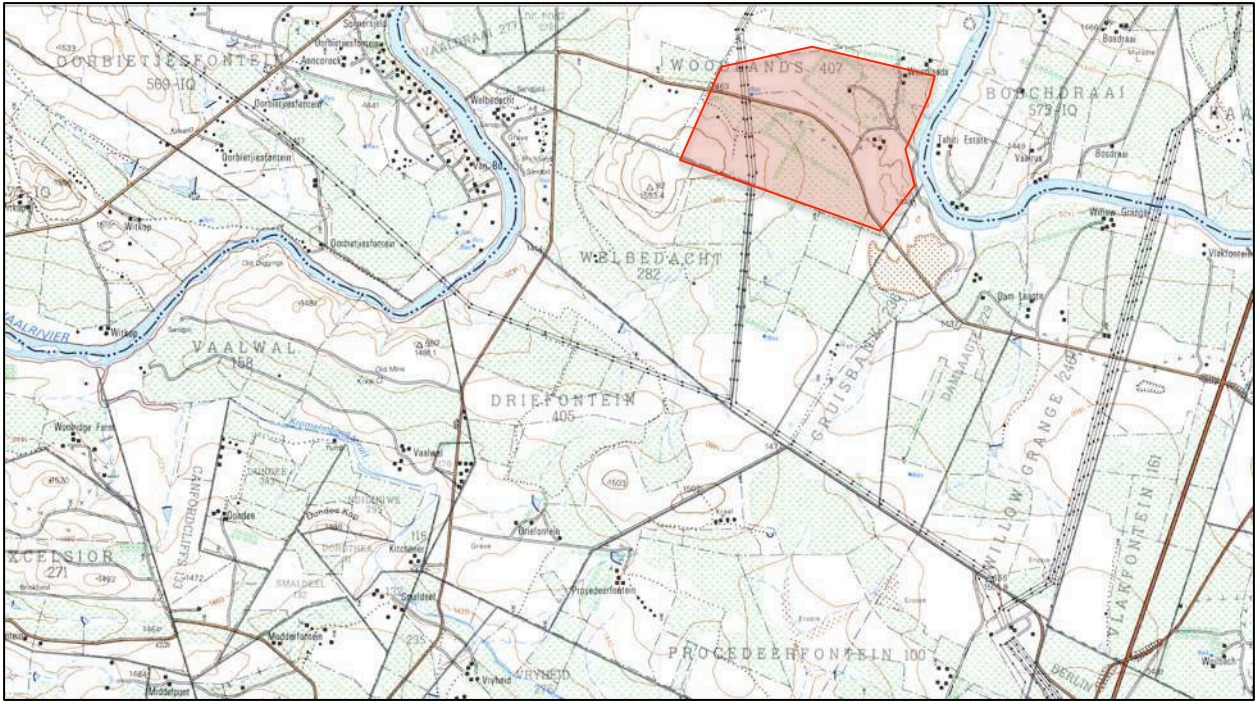


Figure 9. 2627DC 1977 Topographic map

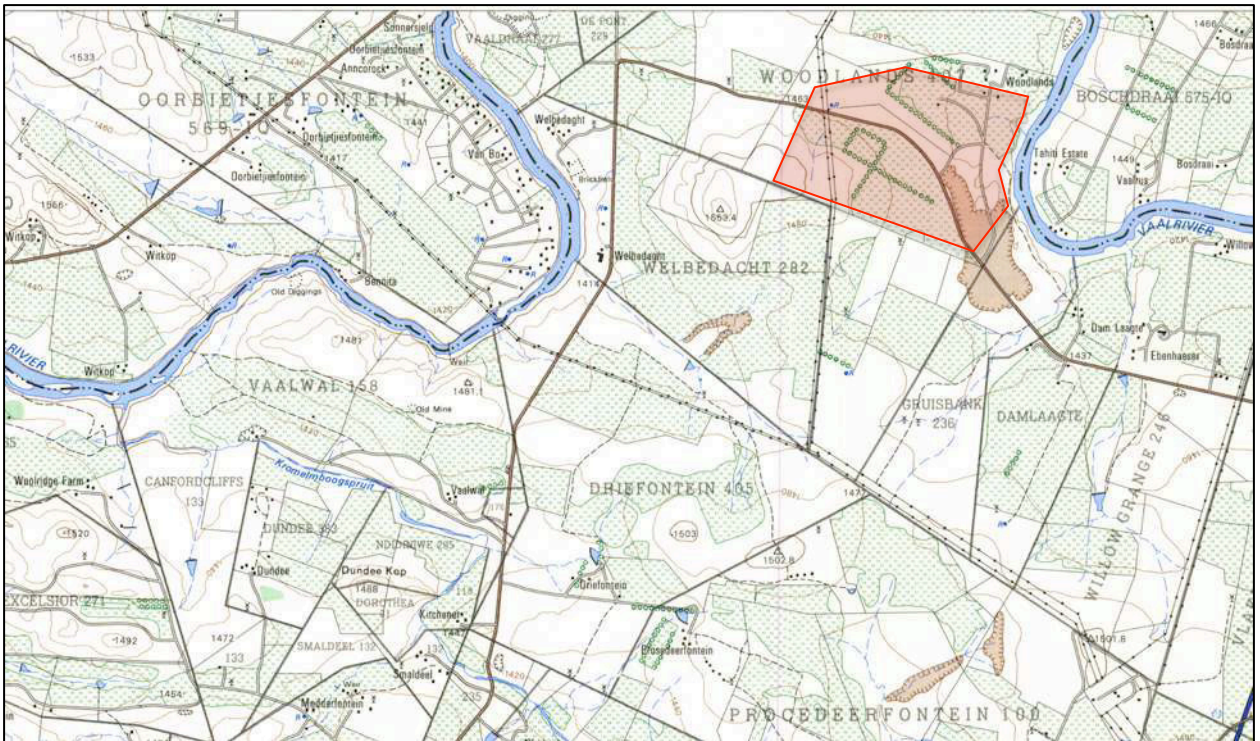


Figure 10. 2627DC 1991 Topographic map

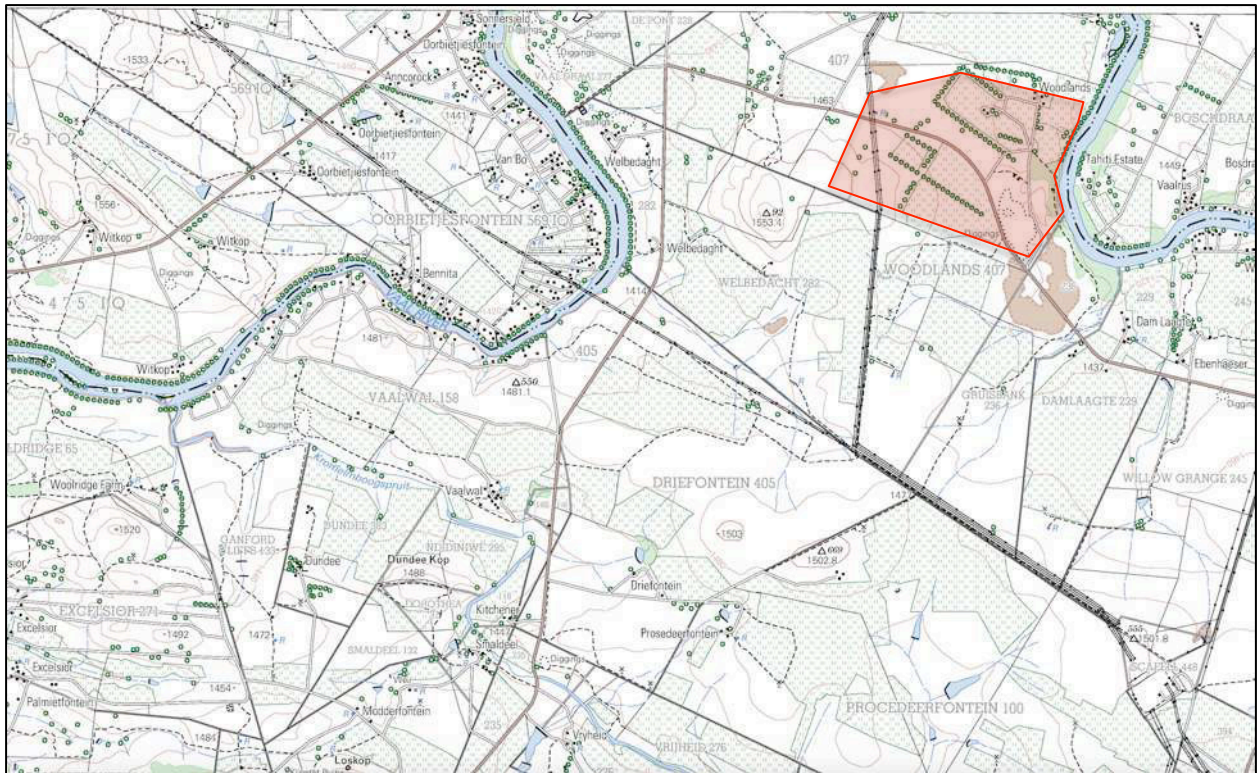


Figure 11. 2627DC 2006 Topographic map

From the above maps it can be seen that the farming structures in the northern part of the study area is at least older than 1945. The newer structures seem to date from around 1977.

RESULTS OF THE SURVEY

The results of this survey will be relayed in sub headings of Palaeontology, Archaeology, Meteorites and Built Environment. Since only Built Environment and Archaeological sites were identified these are the only component to be discussed here.

ARCHAEOLOGY

SITE 001

GPS 26° 45' 58,8" S
27° 37' 17,2" E

A single stone tool was found on the surface at this location. No further deposits could be associated with this single tool. The tool could be placed within the *Final Late Stone Age* and shows association with both the *Wilton* and *Smithfield* Industries.



Figure 12. Single Stone Tool at Site 001



Figure 13. Stone tool in situ

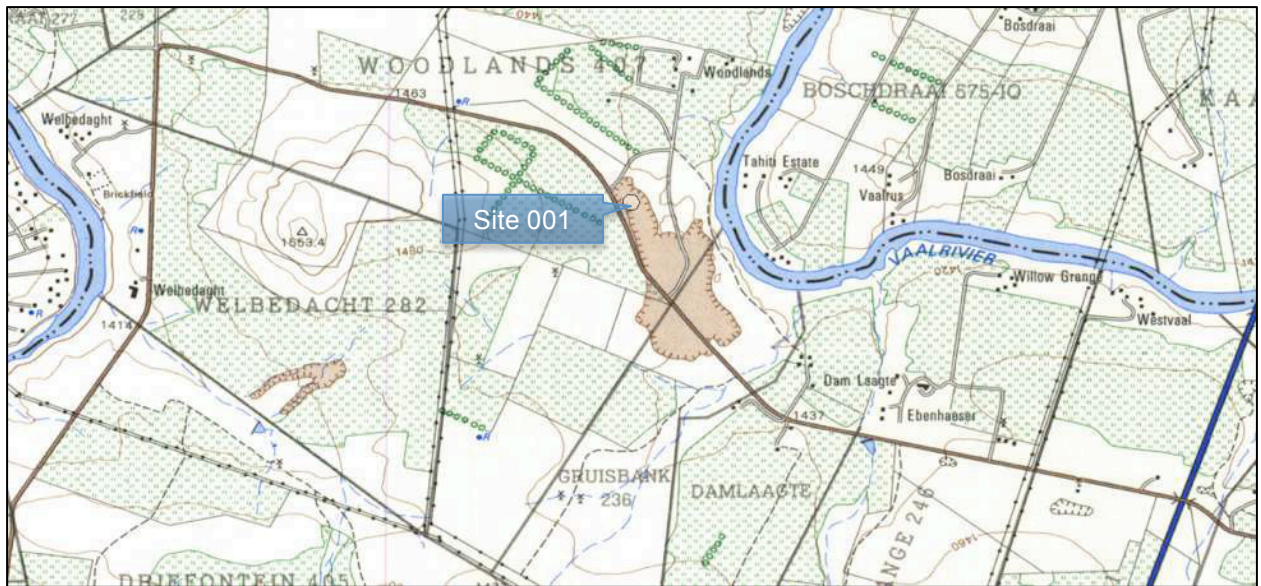


Figure 14. Location of Site 001

SITE 002

GPS 26° 45' 31,3" S
27° 37' 34,4" E

This site consists of the original Woodlands farm structures. During archival research it became evident that at least some of these structures are older than 60 years and therefore protected under the NHRA.



Figure 15. Farming structures at Site 002



Figure 16. The "Barn" structure at Site 002



Figure 17. Associated structures at Site 002



Figure 18. Structures at Site 002

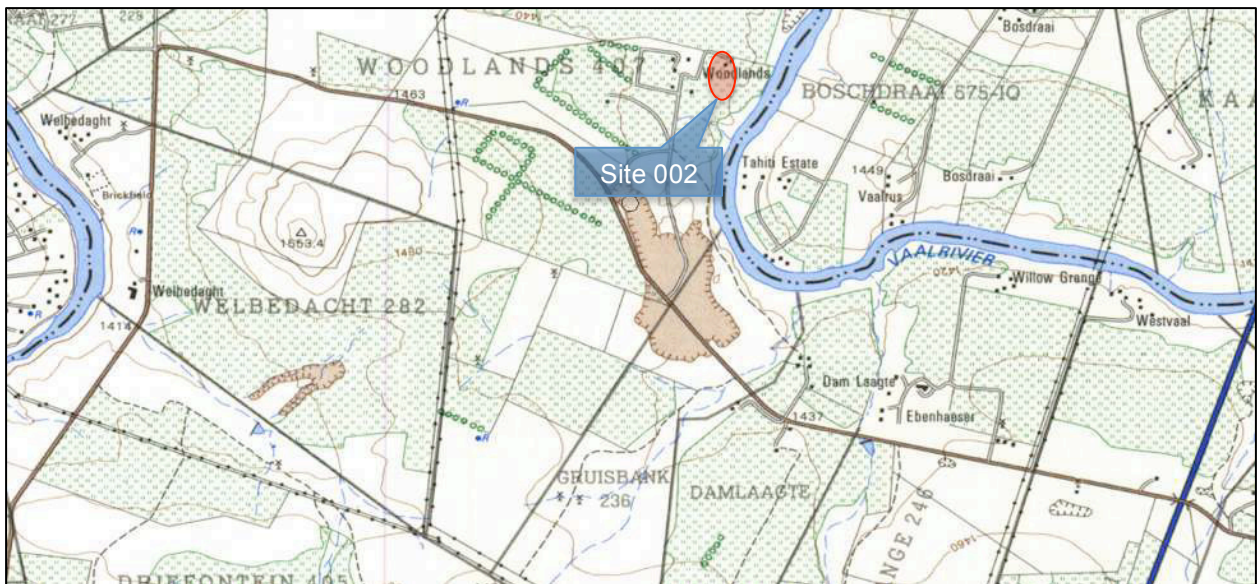


Figure 19. Location of structures at Site 002

SITE 003

GPS 26° 45' 53,7" S
27° 37' 23,4" E

At this location the remains of an old farmworker compound is located. Some of the structures are still being inhabited. Although these structures have little or no heritage significance it is important to note that unmarked graves could be associated with the structures. Should mining be planned for this area this should be kept in mind.



Figure 20. Ruins at Site 003



Figure 21. Ruins at Site 003

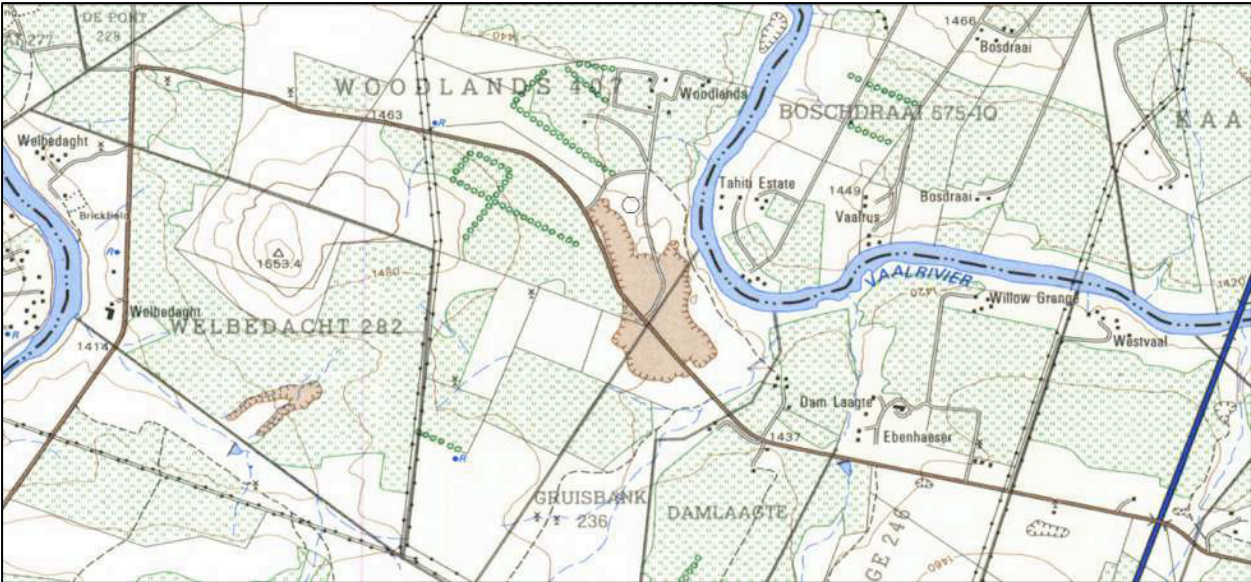


Figure 22. Location of structures at Site 003

MEASURING AND EVALUATING THE CULTURAL SENSITIVITY OF THE STUDY AREA

In 2003 the South African Heritage Resource Agency (SAHRA) compiled the following guidelines to evaluate the cultural significance of individual heritage resources;

TYPE OF RESOURCE;

- Place
- Archaeological Site
- Structure
- Grave
- Paleontological Feature
- Geological Feature

TYPE OF SIGNIFICANCE

1. HISTORIC VALUE

It is important in the community, or pattern of history

- Important in the evolution of cultural landscapes and settlement patterns
- Important in exhibiting density, richness or diversity of cultural features illustrating the human occupation and evolution of the nation, province, region or locality.
- Important for association with events, developments or cultural phases that have had a significant role in the human occupation and evolution of the nation, province, region or community.
- Important as an example for technical, creative, design or artistic excellence, innovation or achievement in a particular period.

It has strong or special association with the life or work of a person, group or organisation of importance in history;

- Importance for close associations with individuals, groups or organisations whose life, works or activities have been significant within the history of the nation, province, region or community.

It has significance relating to the history of slavery

- Importance for a direct link to the history of slavery in South Africa.

2. AESTHETIC VALUE

It is important in exhibiting particular aesthetic characteristics valued by a community or cultural group.

- Important to a community for aesthetic characteristics held in high esteem or otherwise valued by the community.
- Importance for its creative, design or artistic excellence, innovation or achievement.
- Importance for its contribution to the aesthetic values of the setting demonstrated by a landmark quality or having impact on important vistas or otherwise contributing to the identified aesthetic qualities of the cultural environs or the natural landscape within which it is located.
- In the case of an historic precinct, importance for the aesthetic character created by the individual components which collectively form a significant streetscape, townscape or cultural environment.

3. SCIENTIFIC VALUE

It has potential to yield information that will contribute to an understanding of natural or cultural

Heritage.

- Importance for information contributing to a wider understanding of natural or cultural history by virtue of its use as a research site, teaching site, type locality, reference or benchmark site.
- Importance for information contributing to a wider understanding of the origin of the universe or of the development of the earth.
- Importance for information contributing to a wider understanding of the origin of life; the development of plant or animal species, or the biological or cultural development of hominid or human species.
- Importance for its potential to yield information contributing to a wider understanding of the history of human occupation of the nation, Province, region or locality.
- It is important in demonstrating a high degree of creative or technical achievement at a particular period
- Importance for its technical innovation or achievement.

4. SOCIAL VALUE

- It has strong or special association with a particular community or cultural group for social, cultural or spiritual reasons
- Importance as a place highly valued by a community or cultural group for reasons of social, cultural, religious, spiritual, symbolic, aesthetic or educational associations.
- Importance in contributing to a community's sense of place.

DEGREES OF SIGNIFICANCE

In 2006 SAHRA prescribed classification standards for determining the heritage significance of sites within the SADC region. These recommendations were subsequently approved by ASAPA and are reproduced here to indicate the measuring standards for heritage sensitivity used in this report;

| Field Rating | Grade | Significance | Mitigation |
|------------------------------|----------|--------------|--|
| National Significance (NS) | Grade 1 | - | Conservation; National Heritage Site nomination |
| Provincial Significance (PS) | Grade 2 | - | Conservation; Provincial Heritage Sites nomination |
| Local Significance (LS) | Grade 3A | High | Conservation; mitigation not advised |
| Local Significance (LS) | Grade 3B | High | Mitigation with part of site retained in original |
| Generally Protected A (GP.A) | - | High/Medium | Mitigation before destruction |
| Generally Protected B (GP.B) | - | Medium | Recording before destruction |
| Generally Protected C (GP.C) | - | Low | Destruction |

Table 3. SAHRA Assigned Heritage Site Significance Grading

Assessment of Heritage Potential

Assessment Matrix

Determining Heritage Sensitivity

In addition to guidelines provided by the National Heritage Resources Act (Act No. 25 of 1999), a set of criteria based on Deacon (J) and Whitelaw (1997) for assessing archaeological significance has been developed for Northern Cape settings (Morris 2007a). 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 4 (below) is a classification of landforms and visible archaeological traces used for estimating the potential of archaeological sites (after J. Deacon and, 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, could be of exceptional

significance. In light of this, estimation of potential will always be a matter for archaeological observation and interpretation.

Table 4. Classification of landforms and visible archaeological traces for estimating the potential for archaeological sites (after J. Deacon, NMC as used in Morris)

| 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 features such as hill/dune | 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 | Loping floor or small area | Flat floor, high ceiling |
| Class | Archaeological traces | Type 1 | Type 2 | Type 3 |
| A1 | Area previously excavated | Little deposit remaining | More than half deposit remaining | High profile site |
| A2 | Shell of bones visible | Dispersed scatter | Deposit <0.5 m thick | Deposit >0.5 m thick; shell and bone dense |
| A3 | Stone artefacts or stone walling or other feature visible | Dispersed scatter | Deposit <0.5m thick | Deposit >0.5 m thick |

Table 5. Site attributes and value assessment (adapted from Whitelaw 1997 as used in Morris)

| Class | Landforms | 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 |

Assessing site value by attribute

Table 5 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.

SIGNIFICANCE EVALUATION

As the criteria set out in the National Heritage Resources Act tend to approach heritage from the level of 'national' significance and few heritage sites and features fall within this category, a second set of criteria are used to determine the regional and local significance of heritage sites. Three sub-categories are used to determine this significance:

- (a) Historical significance – this category determines the social context in which a heritage site and resource need to be assessed. These criteria focus on the history of the 'place' in terms of its significance in time and the role they played in a particular community (human context).
- (b) Architectural significance – The objective of this set of criteria is to assess the artefactual significance of the heritage resource, its physical condition and meaning as an 'object'.
- (c) Spatial significance – focuses on the physical context in which the object and place exists and how it contributed to the landscape, the region, the precinct and neighbourhood.

HISTORIC SIGNIFICANCE

| No | Criteria | Significance Rating |
|----|--|---------------------|
| 1 | Are any of the identified sites or buildings associated with a historical person or group? No | - |
| 2 | Are any of the buildings or identified sites associated with a historical event? No | - |
| 3 | Are any of the identified sites or buildings associated with a religious, economic social or political or educational activity? No | - |
| 4 | Are any of the identified sites or buildings of archaeological significance? Yes. The farmyard barn and storage areas | GP.A |
| 5 | Are any of the identified buildings or structures older than 60 years? Yes. The farmyard barn and storage areas | GP.A |

ARCHITECTURAL SIGNIFICANCE

| No | Criteria | Rating |
|----|---|--------|
| 1 | Are any of the buildings or structures an important example of a building type? No | - |
| 2 | Are any of the buildings outstanding examples of a particular style or period? No | - |
| 3 | Do any of the buildings contain fine architectural details and reflect exceptional craftsmanship? No | - |
| 4 | Are any of the buildings an example of an industrial, engineering or technological development? No | - |
| 5 | What is the state of the architectural and structural integrity of the building? Poor | GP.A |
| 6 | Is the building's current and future use in sympathy with its original use (for which the building was designed)? Yes | - |
| 7 | Were the alterations done in sympathy with the original design? N/A | - |
| 8 | Were the additions and extensions done in sympathy with the original design? | |

| | | |
|---|---|---|
| | N/A | - |
| 9 | Are any of the buildings or structures the work of a major architect, engineer or builder? No | - |

SPATIAL SIGNIFICANCE

Even though each building needs to be evaluated as single artefact the site still needs to be evaluated in terms of its significance in its geographic area, city, town, village, neighbourhood or precinct. This set of criteria determines the spatial significance.

| No | Criteria | Rating |
|----|--|--------|
| 1 | Can any of the identified buildings or structures be considered a landmark in the town or city? No | - |
| 2 | Do any of the buildings contribute to the character of the neighborhood? No | - |
| 3 | Do any of the buildings contribute to the character of the square or streetscape? No | - |
| 4 | Do any of the buildings form part of an important group of buildings? No | - |

IMPACT EVALUATION

This HIA Methodology assists in evaluating the overall effect of a proposed activity on the heritage environment. The determination of the effect of a heritage impact on a heritage parameter is determined through a systematic analysis of the various components of the impact. This is undertaken using information that is available to the heritage practitioner through the process of the heritage impact assessment. The impact evaluation of predicted impacts was undertaken through an assessment of the significance of the impacts.

DETERMINATION OF SIGNIFICANCE OF IMPACTS

Significance is determined through a synthesis of impact characteristics, which include context, and intensity of an impact. Context refers to the geographical scale i.e. site, local, national or global whereas Intensity is defined by the severity of the impact e.g. the magnitude of deviation from background conditions, the size of the area affected, the duration of the impact and the overall probability of occurrence.

Significance is an indication of the importance of the impact in terms of both physical extent and time scale, and therefore indicates the level of mitigation required. The total number of points scored for each impact indicates the level of significance of the impact.

IMPACT RATING SYSTEM

Impact assessment must take account of the nature, scale and duration of effects on the heritage environment whether such effects are positive (beneficial) or negative (detrimental). Each issue / impact is also assessed according to the project stages:

- planning
- construction
- operation
- decommissioning

Where necessary, the proposal for mitigation or optimisation of an impact will be detailed. A brief discussion of the impact and the rationale behind the assessment of its significance has also been included.

RATING SYSTEM USED TO CLASSIFY IMPACTS

The rating system is applied to the potential impact on the receiving environment and includes an objective evaluation of the mitigation of the impact. Impacts have been consolidated into one rating. In assessing the significance of each issue the following criteria (including an allocated point system) is used:

| NATURE | | |
|--|----------------------------|---|
| Include a brief description of the impact of the heritage parameter being assessed in the context of the project. This criterion includes a brief written statement of the heritage aspect being impacted upon by a particular action or activity. | | |
| GEOGRAPHICAL EXTENT | | |
| This is defined as the area over which the impact will be expressed. Typically, the severity and significance of an impact have different scales and as such bracketing ranges are often required. This is often useful during the detailed assessment of a project in terms of further defining the determined. | | |
| 1 | Site | The impact will only affect the site |
| 2 | Local/district | Will affect the local area or district |
| 3 | Province/region | Will affect the entire province or region |
| 4 | International and National | Will affect the entire country |
| PROBABILITY | | |
| This describes the chance of occurrence of an impact | | |
| 1 | Unlikely | The chance of the impact occurring is extremely low (Less than a 25% chance of occurrence). |
| 2 | Possible | The impact may occur (Between a 25% to 50% chance of occurrence). |
| 3 | Probable | The impact will likely occur (Between a 50% to 75% chance of occurrence). |
| 4 | Definite | Impact will certainly occur (Greater than a 75% chance of occurrence). |
| REVERSIBILITY | | |
| This describes the degree to which an impact on a heritage parameter can be successfully reversed upon completion of the proposed activity. | | |
| 1 | Completely reversible | The impact is reversible with implementation of minor mitigation measures |
| 2 | Partly reversible | The impact is partly reversible but more intense mitigation measures are required. |
| 3 | Barely reversible | The impact is unlikely to be reversed even with intense mitigation measures. |
| 4 | Irreversible | The impact is irreversible and no mitigation measures exist. |
| IRREPLACEABLE LOSS OF RESOURCES | | |
| This describes the degree to which heritage resources will be irreplaceably lost as a result of a proposed activity. | | |

| | | |
|---|-------------------------------|---|
| 1 | No loss of resource. | The impact will not result in the loss of any resources. |
| 2 | Marginal loss of resource | The impact will result in marginal loss of resources. |
| 3 | Significant loss of resources | The impact will result in significant loss of resources. |
| 4 | Complete loss of resources | The impact is result in a complete loss of all resources. |
| DURATION | | |
| This describes the duration of the impacts on the heritage parameter. Duration indicates the lifetime of the impact as a result of the proposed activity | | |
| 1 | Short term | The impact and its effects will either disappear with mitigation or will be mitigated through natural process in a span shorter than the construction phase (0 – 1 years), or the impact and its effects will last for the period of a relatively short construction period and a limited recovery time after construction, thereafter it will be entirely negated (0 – 2 years). |
| 2 | Medium term | The impact and its effects will continue or last for some time after the construction phase but will be mitigated by direct human action or by natural processes thereafter (2 – 10 years). |
| 3 | Long term | The impact and its effects will continue or last for the entire operational life of the development, but will be mitigated by direct human action or by natural processes thereafter (10 – 50 years). |
| 4 | Permanent | The only class of impact that will be non-transitory. Mitigation either by man or natural process will not occur in such a way or such a time span that the impact can be considered transient (Indefinite). |
| CUMULATIVE EFFECT | | |
| This describes the cumulative effect of the impacts on the heritage parameter. A cumulative effect/impact is an effect, which in itself may not be significant but may become significant if added to other existing or potential impacts emanating from other similar or diverse activities as a result of the project activity in question. | | |
| 1 | Negligible Cumulative Impact | The impact would result in negligible to no cumulative effects |
| 2 | Low Cumulative Impact | The impact would result in insignificant cumulative effects |
| 3 | Medium Cumulative impact | The impact would result in minor cumulative effects |
| 4 | High Cumulative Impact | The impact would result in significant cumulative effects |
| INTENSITY / MAGNITUDE | | |
| Describes the severity of an impact | | |
| 1 | Low | Impact affects the quality, use and integrity of the system/component in a way that is barely perceptible. |
| 2 | Medium | Impact alters the quality, use and integrity of the system/component but system/ component still continues to function in a moderately modified way and maintains general integrity (some impact on integrity). |

| | | |
|---|-----------|--|
| 3 | High | Impact affects the continued viability of the system/component and the quality, use, integrity and functionality of the system or component is severely impaired and may temporarily cease. High costs of rehabilitation and remediation. |
| 4 | Very high | Impact affects the continued viability of the system/component and the quality, use, integrity and functionality of the system or component permanently ceases and is irreversibly impaired (system collapse). Rehabilitation and remediation often impossible. If possible rehabilitation and remediation often unfeasible due to extremely high costs of rehabilitation and remediation. |

SIGNIFICANCE

Significance is determined through a synthesis of impact characteristics. Significance is an indication of the importance of the impact in terms of both physical extent and time scale, and therefore indicates the level of mitigation required. This describes the significance of the impact on the heritage parameter. The calculation of the significance of an impact uses the following formula:

(Extent + probability + reversibility + irreplaceability + duration + cumulative effect) x magnitude/intensity.

The summation of the different criteria will produce a non weighted value. By multiplying this value with the magnitude/intensity, the resultant value acquires a weighted characteristic which can be measured and assigned a significance rating.

| Points | Impact Significance Rating | Description |
|----------|----------------------------|--|
| 6 to 28 | Negative Low impact | The anticipated impact will have negligible negative effects and will require little to no mitigation. |
| 6 to 28 | Positive Low impact | The anticipated impact will have minor positive effects. |
| 29 to 50 | Negative Medium impact | The anticipated impact will have moderate negative effects and will require moderate mitigation measures. |
| 29 to 50 | Positive Medium impact | The anticipated impact will have moderate positive effects. |
| 51 to 73 | Negative High impact | The anticipated impact will have significant effects and will require significant mitigation measures to achieve an acceptable level of impact. |
| 51 to 73 | Positive High impact | The anticipated impact will have significant positive effects. |
| 74 to 96 | Negative Very high impact | The anticipated impact will have highly significant effects and are unlikely to be able to be mitigated adequately. These impacts could be considered "fatal flaws". |
| 74 to 96 | Positive Very high impact | The anticipated impact will have highly significant positive effects. |

ANTICIPATED IMPACT OF THE DEVELOPMENT

SITE 001

| IMPACT TABLE FORMAT | | |
|--|--|-------------------------------|
| Heritage component | <i>Single Late Stone Age tool</i> | |
| Issue/Impact/Heritage Impact/Nature | <i>Mining of sand</i> | |
| <i>Extent</i> | <i>Local (2)</i> | |
| <i>Probability</i> | <i>Unlikely (1)</i> | |
| <i>Reversibility</i> | <i>Partly Reversible (2)</i> | |
| <i>Irreplaceable loss of resources</i> | <i>No loss of resources (1)</i> | |
| <i>Duration</i> | <i>Short term (1)</i> | |
| <i>Cumulative effect</i> | <i>Negligible cumulative effect (1)</i> | |
| <i>Intensity/magnitude</i> | <i>Low (1)</i> | |
| <i>Significance Rating of Potential Impact</i> | <i>8 points. The impact will have a low negative impact effect rating.</i> | |
| | Pre-mitigation impact rating | Post mitigation impact rating |
| Extent | 2 | 2 |
| Probability | 1 | 1 |
| Reversibility | 2 | 1 |
| Irreplaceable loss of resource | 1 | 1 |
| Duration | 1 | 2 |
| Cumulative effect | 1 | 1 |
| Intensity/magnitude | 1 | 1 |
| Significance rating | 8 (low negative) | 8 (low negative) |
| Mitigation measure | <i>Although the single stone tool is associated with the Later Stone Age it is not part of a Stone Age deposit on site. It could be the result of alluvial displacement. It is not anticipated that any further impacts will be had on Stone Age deposits.</i> | |

SITE 002

| IMPACT TABLE FORMAT | | |
|--|---|-------------------------------|
| Heritage component | <i>Farmyard barn and associated storage structures</i> | |
| Issue/Impact/Heritage Impact/Nature | <i>Mining of sand</i> | |
| <i>Extent</i> | <i>Local (2)</i> | |
| <i>Probability</i> | <i>Unlikely (1)</i> | |
| <i>Reversibility</i> | <i>Partly Reversible (2)</i> | |
| <i>Irreplaceable loss of resources</i> | <i>Complete loss of resources (4)</i> | |
| <i>Duration</i> | <i>Medium term (2)</i> | |
| <i>Cumulative effect</i> | <i>Negligible cumulative effect (1)</i> | |
| <i>Intensity/magnitude</i> | <i>Very high (4)</i> | |
| <i>Significance Rating of Potential Impact</i> | <i>48 points. The impact will have a medium negative effect rating.</i> | |
| | Pre-mitigation impact rating | Post mitigation impact rating |
| Extent | 2 | 2 |
| Probability | 1 | 1 |

| | | |
|--------------------------------|---|------------------|
| Reversibility | 2 | 1 |
| Irreplaceable loss of resource | 4 | 1 |
| Duration | 2 | 2 |
| Cumulative effect | 1 | 1 |
| Intensity/magnitude | 4 | 1 |
| Significance rating | 48 (high negative) | 8 (low negative) |
| Mitigation measure | <i>Due to the fragmented nature of the sand deposits in the study area the site with the historic built structures on it does not have any sand deposits. For this reason it is not anticipated that any mining will occur in this area. These structures will therefor also not be in danger of being impacted on. It is important that the developer take cognisance of the historic significance of these buildings and that they incorporate this into the development plan for the property.</i> | |

SITE 003. POSSIBLE UNMARKED GRAVES

| IMPACT TABLE FORMAT | | |
|--|--|-------------------------------|
| Heritage component | <i>Possible Graves</i> | |
| Issue/Impact/Heritage Impact/Nature | <i>Development of the sand mine</i> | |
| <i>Extent</i> | <i>Local (2)</i> | |
| <i>Probability</i> | <i>Definite (4)</i> | |
| <i>Reversibility</i> | <i>Irreversible (4)</i> | |
| <i>Irreplaceable loss of resources</i> | <i>Total loss of resources (5)</i> | |
| <i>Duration</i> | <i>Medium term (2)</i> | |
| <i>Cumulative effect</i> | <i>Negligible cumulative effect (1)</i> | |
| <i>Intensity/magnitude</i> | <i>Very high (4)</i> | |
| <i>Significance Rating of Potential Impact</i> | <i>72 points. The impact will have a high negative impact rating.</i> | |
| | Pre-mitigation impact rating | Post mitigation impact rating |
| Extent | 2 | 2 |
| Probability | 4 | 1 |
| Reversibility | 4 | 1 |
| Irreplaceable loss | 5 | 1 |
| Duration | 2 | 2 |
| Cumulative effect | 1 | 1 |
| Intensity/magnitude | 4 | 1 |
| Significance rating | 72 (high negative) | 8 (low negative) |
| Mitigation measure | <i>Should any unmarked graves be disturbed during the mining activities it is important that the procedures outlined in tis report is followed for the mitigation of the graves.</i> | |

RESOURCE MANAGEMENT RECOMMENDATIONS

Although unlikely, sub-surface remains of heritage sites could still be encountered during the construction and mining activities associated with the project. Such sites would offer no surface indication of their presence due to the high state of alterations in some areas as well as heavy plant cover in other areas. The following indicators of unmarked sub-surface sites and graves could be encountered;

- Ash deposits (unnaturally grey appearance of soil compared to the surrounding substrate)
- Bone concentrations, either animal or human
- Ceramic fragments such as pottery shards either historic or pre-contact
- Stone concentrations of any formal nature

Although no sites of heritage significance were identified within the proposed study area, the following recommendations are given should any sub-surface remains of heritage sites be identified as indicated above;

- All operators of excavation equipment should be made aware of the possibility of the occurrence of sub-surface heritage features and the following procedures should they be encountered.
- All construction in the immediate vicinity (50m radius of the site should cease).
- The heritage practitioner should be informed as soon as possible.
- In the event of obvious human remains the SAPS should be notified.
- Mitigative measures (such as refilling etc.) should not be attempted.
- The area in a 50m radius of the find should be cordoned off with hazard tape.
- Public access should be limited.
- The area should be placed under guard.
- No media statements should be released until such time as the heritage practitioner has had sufficient time to analyse the finds.

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Appendix 11: Social and labour plan



Tja Naledi Beafase Investment Holdings (Pty) Ltd

SOCIAL AND LABOUR PLAN 2014

26 July 2014

Organizing structure of this document

The organization of this document follows directly from Regulation 46 (a) to (f) – ‘Contents of the Social and Labour Plan’ – of the regulations of the Mineral and Petroleum Resources Development Act (Act 28 of 2002).

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Abbreviations and Acronyms

| | |
|-------|---|
| ABET | Adult Basic Education and Training |
| AIDS | Acquired Immune Deficiency Syndrome |
| ART | Antiretroviral Therapy |
| BBSEE | Broad-Based Socio-Economic Empowerment |
| BEE | Black Economic Empowerment |
| BBBEE | Broad-Based Black Economic Empowerment |
| CIF | Critical Infrastructure Fund (DTI) |
| CSI | Corporate Social Investment |
| DMR | Department of Mineral Regulation |
| DoH | Department of Housing |
| DoL | Department of Labour |
| EE | Employment Equity |
| EIA | Environmental Impact Assessment |
| EMP | Environmental Management Programme |
| EMPR | Environmental Management Programme Report |
| GDP | Gross Domestic Product |
| HDP | Historically Disadvantaged Person |
| HDSA | Historically Disadvantaged South African |
| HIV | Human Immunodeficiency Virus |
| HRD | Human Resources Development |
| IAP | Interested and Affected Parties |
| IDC/P | Individual Development Charter/Plans |
| IDP | Integrated Development Plan |
| LED | Local Economic Development |
| MDG | Millennium Development Goals |
| MMSD | Mining, Minerals and Sustainable Development |
| MPRDA | Mineral and Petroleum Resources Development Act |
| MQA | Mining Qualifications Authority |
| NGO | Non-governmental Organization |
| NQF | National Qualifications Framework |
| PAYE | Pay As You Earn |
| PRSP | Poverty Reduction Strategy Papers |
| SADC | Southern African Development Community |

| | |
|--------|---|
| SAMPPF | South African Mining Preferential Procurement Forum |
| SED | Socio-economic Development |
| SIMRAC | Safety in Mines Research Advisory Committee |
| SMME | Small, Micro and Medium Enterprise |
| SPTSF | Social Plan Technical Support Facility |
| STD | Sexually Transmitted Disease |
| UIF | Unemployment Insurance Fund |
| VAT | Value-Added Tax |
| VCT | Voluntary Counselling and Testing |
| WSP | Workplace Skills Plan |
| WSSD | World Summit on Sustainable Development |

Glossary

| | |
|---|---|
| Black | Africans, Indians and Coloureds |
| Broad-Based Socio-Economic Empowerment (BBSEE) | Refers to a social or economic strategy, plan, principle, approach or act, which is aimed at: <ul style="list-style-type: none"> a) Redressing the results of past or present discrimination based on race, gender or disability of historically disadvantaged persons in the minerals and petroleum industry, related industries and in the value chain of such industries; and b) Transforming such industries so as to assist in, provide for, initiate, facilitate or benefit from: <ul style="list-style-type: none"> i) Ownership participation in existing or future mining, prospecting, exploration and beneficiation operations; ii) Participation in or control of management of such operations; iii) Development of management, scientific, engineering or other skills of HDSA's; iv) Involvement or participation in the procurement chains of operations; and v) Integrated Socio-economic Development of host communities, major labour-sending areas and areas that (due to unintended consequences of mining) are becoming ghost towns, by mobilizing all stakeholder resources. |
| Community | A coherent social group of persons with interests in or rights on a particular area of land. The members hold or exercise these interests or rights communally in terms of an agreement, custom or law. |
| Community housing | Housing that the mine provides or facilitates provision of in informal settlements. |
| Company controlled accommodation | Housing supplied by Tja Naledi Beafase Investment Holdings (Pty) Ltd |
| Employee | An employee is defined as any full-time person who directly works for the owner of a mining right and production right and who is entitled to receive any direct remuneration from the holder of any of the above-mentioned rights. |
| Ghost towns | Areas where economies were dependent on mining and could not survive beyond the closure or significant downsizing of mining activities. |
| Historically Disadvantaged Person (HDP) | <ul style="list-style-type: none"> a) Any person, category of person or community, disadvantaged by unfair discrimination before the Constitution of the Republic of South Africa, 1993 (Act No. 200 of 1993) took effect; b) Any association, a majority of whose members are persons contemplated in Paragraph (a); and c) Any juristic person other than an association, in which persons contemplated in Paragraph (a) own and control a majority of the issued capital or members interest and are able to control a majority of the members votes. |
| Historically Disadvantaged South African (HDSA) | Refers to any person, category of persons or community, disadvantaged by unfair discrimination before the Constitution of the Republic of South Africa, 1993 (Act No. 200 of 1993) came into operation. |
| HDSA company | A company that is owned or controlled by Historically Disadvantaged South Africans. |
| HDSA management participation % | The number of HDSA's in management divided by the total number of management positions. |

| | |
|-----------------------------------|---|
| Integrated Development Plan (IDP) | A plan aimed at the integrated development and management of a municipal area as contemplated in the Municipal Structures Act (Act 117 of 1998). For the purposes of this Social and Labour Plan, IDP is taken to mean the IDP for the Sasolburg Municipality. |
| Labour-sending areas | Municipalities from which current employees have been recruited Free State Province – Ngwathe/Parys |
| Local labour | Those employees recruited locally from within the mine community. |
| Local business development (LBD) | The development of HDSA companies as potential suppliers in the locality of the mining operations. |
| Major labour-sending areas | As far as this Social and Labour Plan is concerned, major labour-sending areas are those municipalities from which the MINE sources the majority of its labour. Special consideration is given to these municipalities because of the MPRDA's requirements for the mine to co-ordinate its Local Economic Development (LED) programme with the municipalities' Integrated Development Programmes (IDPs). |
| Management | This is equivalent to Peromnes Grade 4 – 7 for Tja Naledi . |
| Mine community | The mine community is defined as those towns, villages and tribal settlements that fall within the local municipality of. Mine community issues that are directly and indirectly required by the regulations to be addressed in this Social and Labour Plan are: a) Existing and expected patterns of human settlements and villages within this community; b) Patterns of labour sourcing for the mine; c) Common commuting habits to and from the mine on a daily or weekly basis for the purpose of work; d) Spending patterns of the mine's employees; e) The use of social amenities, recreational facilities and infrastructure; f) Commercial and industrial linkages; g) Provincial and municipal boundaries; h) Existing and proposed functional boundaries, including magisterial districts; i) Existing and expected land use, transport modes and routes; j) The need for co-ordinated social development programmes and services, including the need for housing, nutrition and healthcare; and k) The need to rationalize the delivery of sustainable services and other socio-economic programmes as committed to in this Social and Labour Plan, particularly with respect to pragmatic delivery, financial viability and the mine's administrative capacity. |
| Municipality | For the purposes of this Social and Labour Plan, a municipality is defined as a local municipality that shares municipal executive and legislative authority in its area with a district municipality within whose area it falls and which is described in section 155 (1) of the Constitution as a category B municipality. |
| Ownership of a business | Ownership can be achieved through: a) A majority shareholding position (50% equity plus one share); b) Strategic joint ventures or partnerships (25 per cent plus 1 vote); or b) Broad-based ownership (such as HDSA-dedicated mining unit trusts, or employee share ownership schemes). |
| | Tja Naledi Beafase Investment Holdings (Pty) Ltd is a company. |
| Total procurement spend | Expenditure on capital goods, consumables and services. This includes both discretionary and non-discretionary expenditure. |

Regulation 46(a) - Preamble

Executive Summary

Tja Naledi Beafase Investment Holdings (Pty) Ltd intends to operate one mining operation in the Parys District in South Africa. The Company is fairly new and has been formed by a partnership of Stephen Jacobs, Joy Rabotapi and Catharina Jacobs.

The intention of Tja Naledi is to operate a sand mine supplying silica sand to various projects including foundries in the Vaal Triangle, Gauteng and North West areas. The operation is situated approximately 20 km from Vanderbijlpark and 23 km from Sasolburg in the Free State Province. The mining operation intends to extract silica sand and load it onto the awaiting client's trucks. **As a start only one contractor and one employee will be employed on the mine.** As the market and demand for sand increases more employees will be appointed as and when required. **Therefore this SLP speak to the future. The HRDP will apply to the future employees as and when they are employed.**

Human Resources Development Programme

Tja Naledi Beafase Investment Holdings (Pty) Ltd plans to implement a human resources development programme with emphasis on career progression, skills development and mentoring, as per the requirements of the Social and Labour Plan.

ABET

The single employee and single contractor used in the mining have Grade 12 qualifications. An Adult Basic Education and Training (ABET) programmes is not required at this stage but will be made available if and when required.

Mentorship for Employees

In line with career pathing and succession planning, informal mentorship will be afforded to all employees with emphasis on HDSA candidates as and when the need arises.

Women Participation

The company plans to give women preference in the workplace when appointing new employees.

Local Economic Development Programme

Although Tja Naledi Beafase Investment Holdings (Pty) Ltd is a small company, it would support the local Ngwathe Municipality's IDP financially. We also support local government housing projects with sand if and when needed.

Housing

Tja Naledi Beafase Investment Holdings (Pty) Ltd currently provides company accommodation for its single female employee off site.

Health and Nutrition

All employees will be educated regularly by the Tja Naledi's contracted Clinic Sister on the importance of nutrition and a balanced diet. With regard to HIV/AIDS, all future employees will be encouraged to know their HIV status, through completing a HIV/AIDS Voluntary Counselling and Testing (VCT).

Preferential Procurement

The mine is not in operation yet but once the mining right is approved preferential procurement spent with HDSA suppliers will constitute 40% in 2015. Tja Naledi intends increasing its discretionary procurement spent with HDSA suppliers to 50% by 2019.

Downscaling and retrenchment - Future Forum

Tja Naledi commits itself to setting up a Future Forum to assist with the successful implementation of the Social and Labour Plan as well as post-implementation monitoring.

Saving jobs and avoiding job losses and decline in employment

In the event of possible job losses and a decline in permanent employment, Tja Naledi will redeploy the employee and future employees in one or more of the many businesses belonging to the partners.

Providing alternative solutions and procedures for creating job security where job losses cannot be avoided

Where job losses are unavoidable, Tja Naledi will redeploy the employee and future employees in one or more of the many businesses belonging to the partners.

Ameliorating the social and economic impact on individuals, regions and economies where retrenchment or closure of the mine is certain.

Planning for closure takes place throughout the life of the mine, from exploration through to post-closure rehabilitation. Tja Naledi Beafase Investment Holdings (Pty) Ltd intends to use its best endeavours in order that the livelihood of its employee and future employees are sustained despite closure of the mine. Closure initiatives include re-employment programmes. Tja Naledi Beafase Investment Holdings (Pty) Ltd will also develop a closure plan that considers the optimum use of mine land and infrastructure during the operational and closure phase of the mine's life. Tja Naledi Beafase Investment Holdings (Pty) Ltd will attempt to find alternatives uses for the mining area that will be acceptable to all stakeholders.

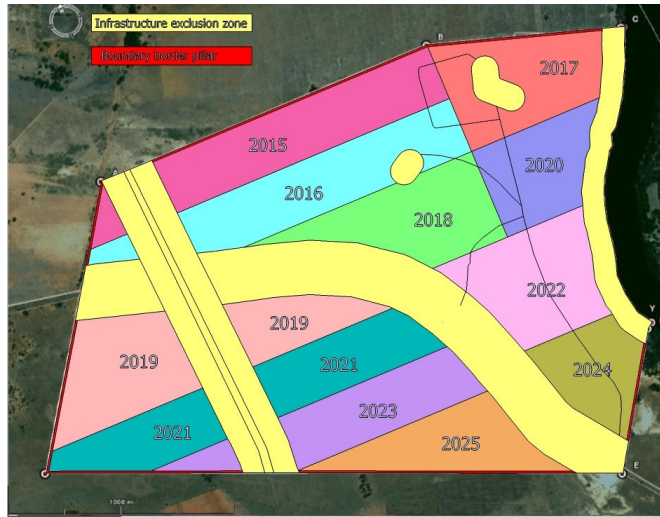
Financial Provision

In order to provide financially for the implementation of the Social and Labour Plan, Tja Naledi Beafase Investment Holdings (Pty) Ltd envisages spending up to 10% of its future annual payroll on Human Resources Development and Local Economic Development for the foreseeable future, subject to business performance and the state of the South African economy. All financial provisions will be made from ongoing operational cash-flows of Tja Naledi in line with the requirements of this plan. Since we only have one employee at present it is difficult to predict and exact amount for the implementation of this SLP.

1 Preamble and background information on the Tja Naledi Beafase Investment Holdings (Pty) Ltd Mine

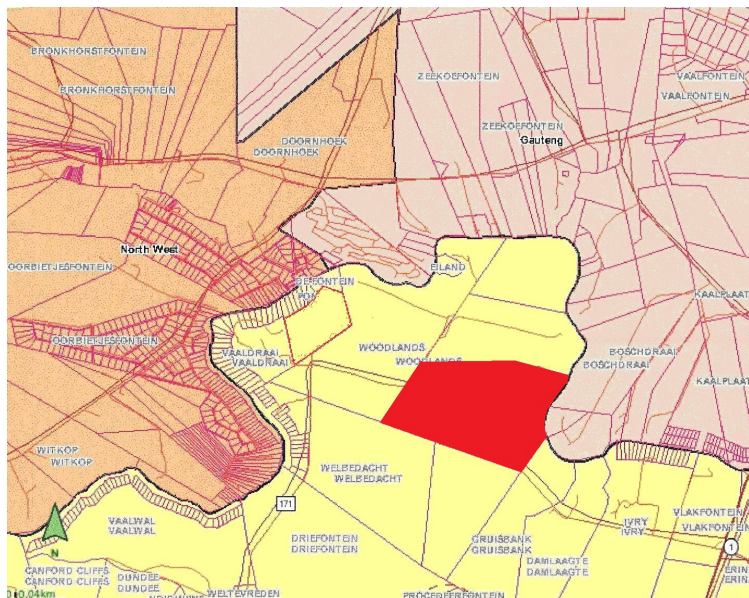
This section outlines the location of Tja Naledi (Pty) Ltd, as well as key data on its operation, its future spending, its current and future workforce and its socio-economic impact. The demographics of the workforce are explained, as well as the geographic distribution of the mine's labour sending areas, giving a basis on which the various impacts of the operation are explored in this Social and Labour Plan.

Figure 1 Tja Naledi Beafase Investment Holdings (Pty) Ltd Operation



1.1 Location of Tja Naledi Beafase Investment Holdings (Pty) Ltd Mine

Tja Naledi Beafase Investment Holdings (Pty) Ltd is located in the Parys / Ngwathe Local Municipality in the Free State Province.



| | |
|------------------------------------|--|
| 1. Name of company | Tja Naledi Beafase Investment Holdings (Pty) Ltd |
| 2. Name of mine | Tja Naledi Beafase Investment Holdings (Pty) Ltd |
| 3. Physical address | Subdivision 4 of the farm Woodlands 407, Magisterial District of Parys |
| 4. Postal address | PO Box 11 Modderfontein 1645 |
| 5. Telephone | (011) 606-3116 |
| 6. Facsimile | (011) 608 2056 |
| 7. Location | Subdivision 4 of the farm Woodlands 407, Magisterial District of Parys |
| 8. Commodities mined | Silica Sand |
| 9. Life of mine | The expected life of mine is 10 years. |
| 10. Financial year | 28 February of every year |
| 11. Reporting year | 31 March of every year |
| 12. Responsible person | Stephen Jacobs |
| 13. Geographic origin of employees | All of the employees are from Parys |

List Of Farms On Which Tja Naledi Conducts Its Mining Operation

| | |
|--------------------------------|-------------|
| Farm name 1: | Woodlands |
| Farm number and | 407 |
| Registration division: | |
| Magisterial district: | Parys |
| Farm subdivision name: | Deo Juvante |
| Farm subdivision number: | 4 |
| SG 21-digit code (if known): | |
| Offshore area (if applicable): | |

1.2 Ownership

Tja Naledi Beafase Investment Holdings (Pty) Ltd is owned by Stephen Jacobs, Joy Rabotapi and Catharina Jacobs.

1.3 Commodities mined

Silica sand

1.4 Key statistics for Tja Naledi (Pty) Ltd

| | |
|--|--|
| Planned commencement | 2015 |
| Planned closure | 10yrs (2025) |
| Average, current direct permanent employment | 1 person currently |
| Current Wage payments | R 72 000 per year |
| Total Current Preferential HDSA Procurement Spend (2014) | Zero since the mine is not yet operational. |
| Royalties (State) | 5.54% of turnover as per Royalty Act requirement |

1.5 The demographics of the Tja Naledi Beafase Investment Holdings (Pty) Ltd workforce

1.5.1 Defining the mine's labour

In the context of this Social and Labour Plan, the mine's labour is defined as those workers who are employed directly by Tja Naledi Beafase Investment Holdings (Pty) Ltd.

Table 1 Villages and Towns from which Tja Naledi Beafase Investment Holdings (Pty) Ltd Sources its Labour

| TOWNS NEAR THE MINE | LOCAL MUNICIPALITY | NUMBER OF EMPLOYEES (%) |
|---------------------|--------------------|-------------------------|
| Parys | Ngwathe | 100% |

1.5.2 Geographical distribution of Tja Naledi Beafase Investment Holdings (Pty) Ltd sources of labour¹

a) Provincial distribution

The Free State province supplies all of the labour to Tja Naledi .

b) Municipal distribution

Tja Naledi Beafase Investment Holdings (Pty) Ltd labour complement of 1 employee is sourced from Parys (see Table 1).

1.5.3 Defining the mine community

The mine community is defined as those towns, villages and tribal settlements that fall within the Ngwathe Local Municipality. It is this municipality, therefore, that is regarded as:

- a) The focus of Tja Naledi Beafase Investment Holdings (Pty) Ltd Local Economic Development (LED) projects;
- b) The municipality whose Integrated Development Plan (IDP) the mine must consider when developing and implementing its LED projects; and
- c) The area in which the mine's economic impact is assessed.

1.5.4 Profile of the average Tja Naledi Beafase Investment Holdings (Pty) Ltd employees

a) Dependants

Tja Naledi 's current employee records show that the household of the employee has 5 dependants. Future appointment will be assessed to determine the average dependant numbers.

b) Language diversity of the Tja Naledi (Pty) Ltd's workforce

The current single employee speaks Sesotho as a first language. Other languages spoken include Afrikaans and English. Future employees language diversity will be recorded and taken into account.

c) Age and service profile

There is no age and service statistics for this project since it has not commenced yet.

Regulation 46(b) Human Resources Development Programme

2 Human Resources Development Programmes

2.1 Overview

This section deals with the information required under Regulation 46 (b) with regard to Human Resources Development. Of particular importance is the need to develop and transform the South African mining/quarrying industry, with the specific requirement being to fast-track the development of Historically Disadvantaged South Africans (HDSA's). The HRD-related objectives of the Mining Charter are to:

- Substantially and meaningfully expand opportunities for HDSA's, including women, to enter the mining and minerals industry and to benefit from the exploitation of the nation's mineral resources;
- Utilize the existing skills base for the empowerment of HDSA's;
- Expand the skills base of HDSA's to serve the community;
- Promote employment and advance the social and economic welfare of mining communities and major labour-sending areas; and
- Promote beneficiation of South Africa's mineral commodities.

The Mining Charter commits all stakeholders to creating an enabling environment for the empowerment of HDSA's by providing a comprehensive Skills Development Plan that addresses the HDSA mining skills deficits within the industry. The Mining Charter calls for stakeholders to work together in addressing this skills gap by:

- a) Interfacing with statutory bodies, such as the Mining Qualifications Authority (MQA), through the standing consultative arrangements in the formulation of comprehensive skills development strategies including a skills audit;
- b) Interfacing with education authorities and providing scholarships to promote mining-related educational advancement, especially in the fields of mathematics and science at school level;
- c) Providing skills training opportunities, through the MQA, to workers during their employment to improve their earning capacity after mine closure;
- d) Providing access to training courses in mining entrepreneurial skills through the MQA and in collaboration with academic institutions, Department of Mineral Regulation (DMR) associated institutions, NGOs and the Gender Commission;
- e) Offering every employee the opportunity of becoming functionally literate and numerate;
- f) Implementing and accelerating career paths for HDSA employees to progress in their chosen careers; and
- g) Developing systems through which empowerment groups can be mentored as a means of capacity-building.

2.2 Human Resources Development at Tja Naledi Beafase Investment Holdings (Pty) Ltd

The future Tja Naledi HRD strategy will take cognisance of the growing shortage of critical skills in the Mining industry in South Africa. Development of future HDSA's leadership is a key strategic focus area. The HRD will be managed at Tja Naledi once a mining right is received. This is seen as a critical component of achieving the mine's employment equity and gender equity targets. Consequently, the mine's HRD programmes will be aligned with the Workplace Skills Plans (WSP) and integrated with the long-term business plan. These programmes will be constantly assessed, reviewed and revised to address the organization's short-term, medium-term and long-term human capital development requirements. Once a mining right is received a skills development facilitator will be appointed. Should no suitable candidate for the Skills Development Facilitator be found in house, an external specialist will be appointed for the position. A detailed Workplace Skills Plan and Annual Training Report will be submitted within one year of the mining right being issued.

2.3 Strategy and objectives

This section of the Social and Labour Plan is structured according to Regulation 46 (b), and Tja Naledi 's HRD strategy and objectives follow this structure as outlined below:

- Regulation 46 (b) (i) Skills Development Plan
- Regulation 46 (b) (ii) A Career Progression Plan and its implementation in line with the Skills Development Plan
- Regulation 46 (b) (iii) A Mentorship Plan and its implementation in line with a Skills Development Plan and the needs of the empowerment groups
- Regulation 46 (b) (iv) An Internship and Bursary Plan and its implementation in line with the Skills Development Plan

2.4 Skills Development Plan

Tja Naledi is committed to ensuring that its current worker and any future employees are given the opportunity of acquiring skills and competencies to achieve both individual and organizational goals in the context of the mine's operational and Local Economic Development (LED) objectives. The mine is currently in process of registering with the MQA and will offer the training courses as outlined by the MQA. Within three months of the receipt of the mining right, proof of registration will be submitted to the DMR.

Strategy and objectives

The purpose of the Skills Development Plan is to address the future skills and competency gaps at the mine and also provide for the training needs of HDSA's, the future fast-tracking of individuals within the talent pool, and the various future career pathing and mentoring programmes as required to achieve the business objectives.

2.5 Skills levels of the Tja Naledi Beafase Investment Holdings (Pty) Ltd workforce

The overall education levels for the Tja Naledi workforce is given in Table 6 (Form Q) which reflects that the workforce is regarded as literate. In line with the future Workplace Skills Plan Tja Naledi has identified its strategic skills development priorities. These are shown below in Table 2.

Table 2 Skills Development Priorities

| PRIORITY NUMBER | PRIORITY DESCRIPTION |
|-----------------|--|
| 1 | Skills to improve business processes (Functional skills) |
| 2 | Health and Safety skills |
| 3 | Environmental Skills |
| 4 | Basic Business Skills (computer skills) |
| 5 | Basic understanding of legislation |

Table 3 Number of Future Training Interventions for future HDSA Candidates

| MQA course # | Course name | 2015 | 2016 | 2017 | 2018 | 2019 |
|--------------|---|------|------|------|------|------|
| 54 | Bulk Materials Loading | 1 | 1 | 1 | 1 | 1 |
| 55 | Monitor and Operate Plant and Equipment | | 1 | 2 | 1 | 1 |
| 56 | Generic Engineering | | 2 | 2 | 2 | 2 |

Table 4 Number of planned Learner ships for future HDSA Candidates

| Learner ship number | Course name | Level | 2015 | 2016 | 2017 | 2018 | 2019 |
|---------------------|-----------------------------|-------|------|------|------|------|------|
| 37 | Diesel Mechanic (Open Cast) | 3 | | 1 | 1 | 1 | 1 |
| | | | | | | | |

Table 5 Planned Portable skills to be developed for future employees

The proposed identified service provider is SAG Training CC based in Carletonville. They are accredited with the Department of Labour (Registration number 8P4226).

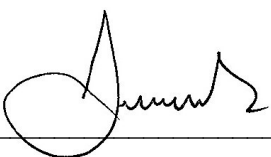
| Portable skill | 2015 | 2016 | 2017 | 2018 | 2019 |
|-----------------------|------|------|------|------|------|
| Bricklaying | | 1 | 1 | 1 | 1 |
| Plastering and Tiling | | | | | |
| Plumbing | | | | | |
| Electrical | | | 1 | 1 | 1 |
| Code 10 Driving | | | 1 | 1 | 1 |

Regulation 46(f) Undertaking

22 An undertaking by the holder of the mining right to ensure compliance with the Social and Labour Plan and to make it known to employees

I, Stephen Jacobs, the undersigned and duly authorized thereto by Tja Naledi Beafase Investment Holdings (Pty) Ltd on behalf of Tja Naledi Beafase Investment Holdings (Pty) Ltd, undertake to adhere to the information, requirements, commitments and conditions as set out in the Social and Labour Plan.

Signed at Modderfontein on this the 27th day of November 2014

Signature of responsible person  _____

Designation: Director

Approved

Signed at Welkom on this _____ day of _____ 2014

Signature: _____

Designation: _____

Appendix 12: Consultation and public participation

Newspaper Advertisement

PARYS GAZETTE

Tja Naledi Beafase Investment Holdings (Pty) Ltd - ENVIRONMENTAL MANAGEMENT PROGRAMME.

Tja Naledi Beafase Investment Holdings is proposing to develop a new small open cast sand mine, to supply silica sand to the building industry. The mine will be developed on subdivision 4 of Woodlands 407 in the Parys District, Free State Province.

Following a round of consultation via letters submitted by hand to neighbours of the proposed mine, and a round of advertisements in this newspaper, notice is hereby given that Tja Naledi Beafase Investment Holdings is applying for approval of an environmental management programme, in terms of the Mineral and Petroleum Resources Development Act, No. 28 of 2002, by the Department of Mineral Resources. This EMP makes out part of an application for a mining right Reference Number **(FS) 30/5/1/2/2/10020MR**

Interested and Affected Parties (I&APs) are invited to participate by providing comments and raising issues of concern. A Scoping Report will be available for public review from 28 November 2014 to 5 January 2015 at the following public places:

- Parys Public Library

To register as an I&AP, and to receive copy of the EMPR, please contact:

Monty van Eeden
Dorean Environmental Services CC
083 294 3422 Cell / 086 690 4878 Fax
dorean@54.co.za

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Attendance register

| <u>Tja Naledi Beafase Investment Holdings (Pty) Ltd</u> Registration number: 2001009357-07, P.O. Box 15265, Riversfield, 1564 Tel: 083 635 2781, Directors: S Jacobs, C F Jacobs, J Rabeothan | | | |
|---|--------------------------------------|-----------------|--------------------------|
| Consultation Register | | | |
| NAME (print) | Address | Contact details | Signature |
| P. Van Rensburg | Woodlands 401 Parys | 013 793 2781 | <i>P. Van Rensburg</i> |
| P. van Rensburg | Woodlands 401 Parys Winneke point | 083 504 4440 | <i>P. van Rensburg</i> |
| R.P. Schimpeels | Woodlands 607 | 076 522 3937 | <i>R.P. Schimpeels</i> |
| M. W. VAN HEERDEN | Welbedacht 232 Woodlands 401 | 083 371 2555 | <i>M. W. Van Heerden</i> |
| H. van Aswegen | Groensbank | 082 554 9030 | <i>H. van Aswegen</i> |
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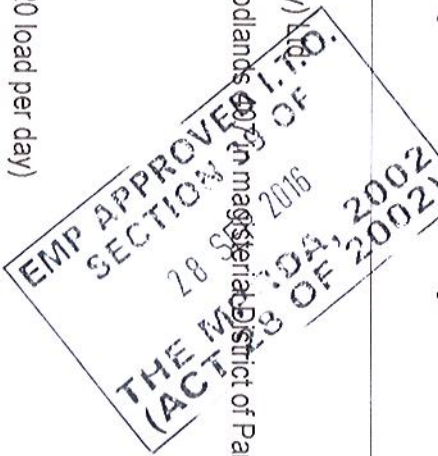
Posters



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TNB Project Summary

| Project summary | |
|--|--|
| <p>Applicant: Tja Naledi Beefase Investment Holdings (Pty) Ltd</p> <p>Farm: Subdivision 4 (Deo Juvante) of the farm Woodlands 407 in the Maseru District of Parys</p> <p>Mineral mined: Silica Sand</p> <p>Mining method: Opencast mining by means of a contractor.</p> <p>Life of mine: 10 Years</p> <p>Peak production rate: 40 truck loads of Sand per day (average of 20 load per day)</p> <p>Hours of Operation: 08:00 to 16:00 Monday to Friday. No after hours work, no public holidays and no weekend work will take place.</p> <p>Infrastructure: One caravan and one chemical toilet on site.</p> <p>No workers will live on site.</p> <p>No sand processing will take place on site.</p> <p>No servicing of machines will take place on site except in an emergency if there is a breakdown.</p> <p>Number of personnel: 2 on site.</p> | <p style="text-align: center;">Initial Identified Potential Impacts</p> <p>1. Possible dust and noise from the Front end loader</p> <p>2.a) Possible dust and noise from the stripping process b) Possible sterilisation of topsoil</p> |
| <p style="text-align: center;">Proposed Management Actions</p> <p>1. Dust from the trucks should be minimal as the soil is extremely sandy. If it poses a problem in the long run a water cart will be used to dampen the access road. All vehicles will be fitted with standard factory fitted silencers.</p> <p>2. Dust and noise from the stripping process will be short term (less than a day and no alternative management options are available as this action is required to ensure effective rehabilitation) Care shall be taken not to store the topsoil deeper than 1,5 meters to prevent compaction. Topsoil shall be turned once in six months to aerate and re-instate it.</p> | <p style="text-align: center;">Proposed Management Actions</p> |



| | |
|---|--|
| <p>3 a) Possible dust and noise from the loading process.</p> <p>b) Possible soil pollution from hydraulic hose failures</p> <p>c) Possible surface water runoff into the excavation</p> | <p>3 a) Dust from the loading should be minimal as the sand falls out quickly. All vehicles will be fitted with standard factory fitted silencers</p> <p>b) Any accidental spillage will be cleaned up (contaminated soil removed to a H:H waste disposal site)</p> <p>c) Due to the sandy nature of the mineral surface water will seep away quickly.</p> |
| <p>4 Possible dust and noise from the loading process</p> | <p>4. Dust from the loading should be minimal as the sand falls out quickly. All vehicles will be fitted with standard factory fitted silencers</p> |
| <p>5. Possible dust and noise from the trucks</p> | <p>5. Dust from the trucks should be minimal as the soil is extremely sandy</p> |
| <p>6. Possible dust and noise from the stripping process Dust and noise from the levelling process.</p> | <p>6. Dust from the stripping and placing process will be short term (one week). The re-grassing process of the mined out section should not cause an impact</p> |
| <p>7. Because the access roads are situated on the border pillars no transportation of sand will take place on the rehabilitated surfaces.</p> | <p>7. This is a positive impact as no driving will take place on those areas where grass has been re-established.</p> |
| <p>8a) Possible dust and noise from loading process. b) Possible soil pollution from hydraulic hose failures</p> | <p>8a). Dust from the loading should be minimal as the sand falls out quickly. All vehicles will be fitted with standard factory fitted silencers b) Any accidental spillage will be cleaned up (contaminated soil removed to a H:H waste disposal site)</p> |
| <p>9. Possible dust and noise from the levelling process.</p> | <p>9. Dust from the re-instatement and placing process will be short term (one week).</p> |
| <p>10. Rehabilitation of the access roads.</p> | <p>10. Roads will be ripped, fertilized and planted with Eragrostis teff seed.</p> |
| <p>11. The auxiliary activities associated with the mining process will take place off the mining area. Refilling and service of the front end loader will take place off site. Ablution facilities for the employees are supplied along with their existing housing on the farm. Offices and workshops are situated at the farm house.</p> | <p>11 Ensuring the employees use the provided ablutions, reporting hose failures or any other environmental incident.</p> |

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Appendix 13: Emergency measures

Procedures for environmental related emergencies and remediation

1. Oil / Fuel / Chemical spills:

- If any spills take place the contaminant together with the soil will be removed and placed in acceptable containers to be removed with industrial waste to a recognized licensed facility or licensed company.
- If the spill is larger than 100 litres the Department of Environmental Affairs and Tourism will be notified by fax and/or phone within 24 hours of the event.
- Bioremediation will be done on site to the satisfaction of DEAT.
- A spill cleanup kit is available at the storage yard
- All personnel will be trained on spill cleanup methodologies.

2. Damage to water pollution control structures:

- After a heavy rainstorm or at least every 3 months all water pollution control structures like storm water berms and trenches will be checked for signs of damage or change in its capacity.
- Any damage to any water pollution retaining structures will be repaired immediately.
- Any of the above actions will be included in the performance assessment report to the Department of Mineral Regulation.

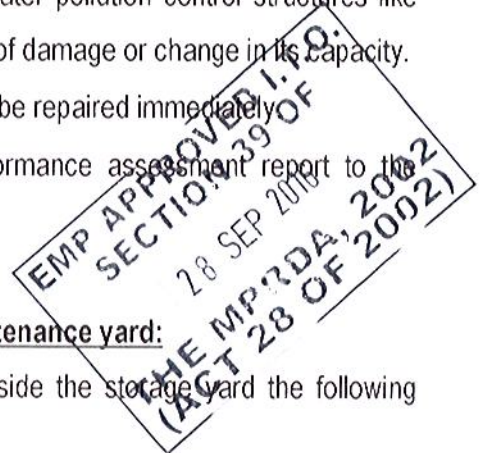
3. Breakdown of vehicles or equipment outside vehicle maintenance yard:

If any equipment or vehicles break down inside the pit or outside the storage yard the following emergency procedures will be followed:

- Drip pans will be placed at all point where diesel, oil or any hydraulic fluid can drip and contaminate the soil.
- All efforts will be made to remove the vehicle or equipment to the storage area.
- If the vehicle or equipment cannot be removed the broken part will be drained of all fluids and the specific part removed to the service area.
- No repairs will be allowed to take place outside the maintenance yard or service area.
- Any spills will be managed as described in paragraph 1

4. Fire:

- Management (Farm owner) has joined the closest Fire Protection Association.
- Fire breaks will has been established and will be maintained around the mining area for the duration of the project.
- Fire fighting equipment will be made available on the vehicles and at the storage yard.



APPENDIX 14: Quantum of financial provision



Dörëan Environmental Services CC

501 Railway Street Extension, Brits, South Africa, PO Box 4643, Brits, 0250
Cell: +27 +83 294 3422 Tel (012) 252 2545, Fax 0866 904 878, E-mail: dorean@54.co.za
CK no: 1991/032958/23, Member: C E van Eeden (Monty).

Applicant: Tja Naledi Beafase Investment Holdings (Pty) Ltd

Farm: Deo Juvante, Sub division 4 of the farm Woodlands 407

Administrative District: Parys

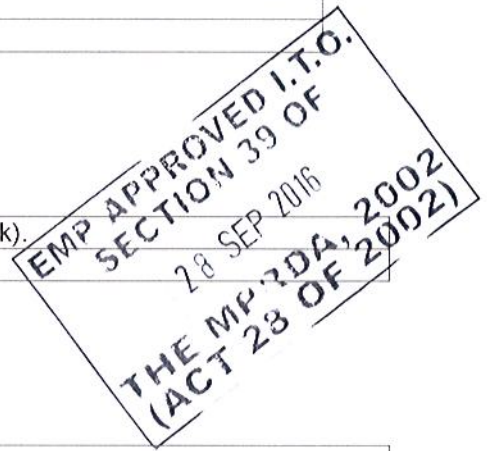
1 Calculation of the Quantum for financial provision according to Section B Working Manual

2 Mine type and saleable mineral by-product
According to Tables B.12, B.13 and B.14.

| | |
|-----------------------------|------|
| Mine type | Sand |
| Saleable mineral by-product | None |

3 Risk ranking
According to Tables B.12, B.13 and B.14

| | |
|--|---------------|
| Primary risk ranking (either Table B.12 or B.13) | C (Low risk). |
| Revised risk ranking (B.14) | N/A |



4 Environmental sensitivity of the mine area
According to Table B.3

| | |
|--|--------|
| Environmental sensitivity of the mine area | Medium |
|--|--------|

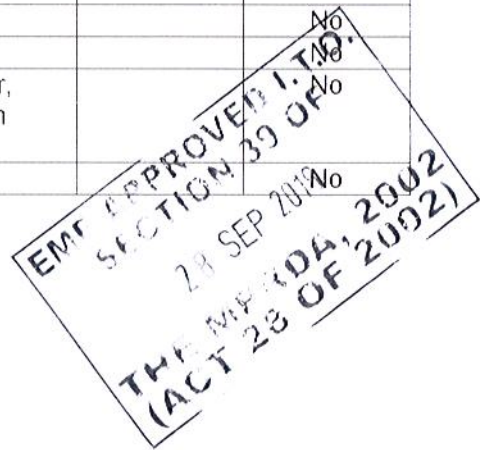
5 Level of information
According to Section 4.4.1:

| | |
|--------------------------------|---------|
| Level of information available | Limited |
|--------------------------------|---------|

6 Identify closure components
According to Table B.4 and site-specific conditions

(

| Component No. | Main description | Applicability of closure components (Circle Yes or No) | |
|---------------|---|---|----|
| 1 | Dismantling of processing plant and related structures (including overland conveyors and power lines) | | No |
| 2(A) | Demolition of steel buildings and structures | | No |
| 2(B) | Demolition of reinforced concrete buildings and structures | | No |
| 3 | Rehabilitation of access roads Comment: Only the access road from the existing road to the mine area. | Yes | |
| 4(A) | Demolition and rehabilitation of electrified railway lines | | No |
| 4(B) | Demolition and rehabilitation of non-electrified railway lines | | No |
| 5 | Demolition of housing and facilities | | No |
| 6 | Opencast rehabilitation including final voids and ramps | | No |
| 7 | Sealing of shafts, adits and inclines | | No |
| 8(A) | Rehabilitation of overburden and spoils | | No |
| 8(B) | Rehabilitation of processing waste deposits and evaporation ponds (basic, salt-producing) | | No |
| 8(C) | Rehabilitation of processing waste deposits and evaporation ponds (acidic, metal-rich) | | No |
| 9 | Rehabilitation of subsided areas | | No |
| 10 | General surface rehabilitation, including grassing of all denuded areas | | No |
| 11 | River diversions | | No |
| 12 | Fencing | | No |
| 13 | Water management (Separating clean and dirty water, managing polluted water and managing the impact on groundwater) | | No |
| 14 | 2 to 3 years of maintenance and aftercare | | No |



7 Unit rates for closure components

According to Table B.5 Master rates and multiplication factors for applicable closure components.

| Component No. | Main description | Master rate | Multiplication factor |
|---------------|---|-------------|-----------------------|
| 1 | Dismantling of processing plant and related structures (including overland conveyors and powerlines) | | |
| 2(A) | Demolition of steel buildings and structures | | |
| 2(B) | Demolition of reinforced concrete buildings and structures | | |
| 3 | Rehabilitation of access roads | 17 | 1 |
| 4(A) | Demolition and rehabilitation of electrified railway lines | | |
| 4(B) | Demolition and rehabilitation of non-electrified railway lines | | |
| 5 | Demolition of housing and facilities | | |

| | | | |
|------|--|-------|------|
| 6 | Opencast rehabilitation including final voids and ramps | 99600 | 0.04 |
| 7 | Sealing of shafts, adits and inclines | | |
| 8(A) | Rehabilitation of overburden and spoils | | |
| 8(B) | Rehabilitation of processing waste deposits and evaporation ponds (basic, salt-producing) | | |
| 8(C) | Rehabilitation of processing waste deposits and evaporation ponds (acidic, metal-rich) | | |
| 9 | Rehabilitation of subsidied areas | | |
| 10 | General surface rehabilitation , including grassing of all denuded areas | | |
| 11 | River diversions | | |
| 12 | Fencing | | |
| 13 | Water management (Separating clean and dirty water, managing polluted water and managing the impact on groundwater) | | |
| 14 | 2 to 3 years of maintenance and aftercare | | |

8 Determine weighting factors

According to Tables B.6 and B.7

| | |
|---|---|
| Weighting factor 1: Nature of terrain/accessibility | 1 |
| Weighting factor 2: Proximity to urban area where goods and services are to be supplied | 1 |

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9 Calculation of closure costs

Table B.9: Template for Level 2: "Rules-based" assessment of the quantum for financial provision

| CALCULATION OF THE QUANTUM | | | | | | | | |
|--|---|-------------------------------|--------------------------------------|---------------------|-------------------------------|----------------------------|-------------------------------------|--|
| Mine: | | Sweet Sensation 168 (Pty) Ltd | | | Location: | | The remaining extent of De Pont 228 | |
| Evaluators: | | C E van Eeden | | | Date: | | 2014/03/14 | |
| No | Description | Unit | A Quantity | B Master rate | C Multiplication factor | D Weighting factor 1 | E=A*B*C*D Amount (rands) | |
| | | | Step 4.1 | Step 4.2 | Step 4.3 | Step 4.4 | | |
| 1 | Dismantling of processing plant and related structures (including overland conveyors and power lines) | m ³ | 0 | 2 | 1 | 1 | R 0.00 | |
| 2(A) | Demolition of steel buildings and structures | m ² | 0 | 95 | 1 | 1 | R 0.00 | |
| 2(B) | Demolition of reinforced concrete buildings and structures | m ² | 0 | 140 | 1 | 1 | R 0.00 | |
| 3 | Rehabilitation of access roads | m ² | 3000 | 17 | 1 | 1 | R 5100.00 | |
| 4(A) | Demolition and rehabilitation of electrified railway lines | m | 0 | 165 | 1 | 1 | R 0.00 | |
| 4(B) | Demolition and rehabilitation of non-electrified railway lines | m | 0 | 90 | 1 | 1 | R 0.00 | |
| 5 | Demolition of housing and/or administration facilities | m ² | 0 | 190 | 1 | 1 | R 0.00 | |
| 6 | Opencast rehabilitation including final voids and ramps | ha | 7 | 99600 | 0.04 | 1 | R 27 888.00 | |
| 7 | Sealing of shaft, adits and inclines | m ³ | 0 | 51 | 1 | 1 | R 0.00 | |
| 8(A) | Rehabilitation of overburden and spoils | ha | 0 | 66400 | 1 | 1 | R 0.00 | |
| 8(B) | Rehabilitation of processing waste deposits and evaporation ponds (basic, salt-producing waste) | ha | 0 | 82700 | 1 | 1 | R 0.00 | |
| 8(C) | Rehabilitation of processing waste deposits and evaporation ponds (acidic, metal-rich waste) | ha | 0 | 240200 | 1 | 1 | R 0.00 | |
| 9 | Rehabilitation of subsided areas | ha | 0 | 55600 | 1 | 1 | R 0.00 | |
| 10 | General surface rehabilitation | ha | 0 | 50000 | 1 | 1 | R 0.00 | |
| 11 | River diversions | ha | 0 | 52600 | 1 | 1 | R 0.00 | |
| 12 | Fencing | ha | 0 | 60 | 1 | 1 | R 0.00 | |
| 13 | Water Management | ha | 0 | 20000 | 1 | 1 | R 0.00 | |
| 14 | 2 to 3 years of maintenance and aftercare | ha | 7 | 7000 | 1 | 1 | R 49 000 | |
| 15(A) | Specialists study | Sum | 0 | | 1 | 1 | R 0.00 | |
| 15(B) | Specialists study | Sum | 0 | | 1 | 1 | R 0.00 | |
| Sub Total 1 | | | | | | | R 127 888.00 | |
| (Sum of items 1 to 15 above) | | | | | | | | |
| 1 | Preliminary and General | 12.5% of Subtotal 1 | Weighting factor 2 (step 4.4) | | | 1.0 | R 15 986.00 | |
| 2 | Administration and supervision costs | | | | 6.0% of Subtotal 1 | | R 7 673.28 | |
| 3 | Engineering drawings and specifications | | | | 2.0% of Subtotal 1 | | R 0.00 | |
| 4 | Engineering and procurement of specialist work | | | | 2.5% of Subtotal 1 | | R 0.00 | |
| 5 | Development of a closure plan | | | | 2.5% of Subtotal 1 | | R 0.00 | |
| 6 | Final groundwater modeling | | | | 2.5% of Subtotal 1 | | R 3 197.20 | |
| Sub Total 2 | | | | | | | R 154 744.48 | |
| (Subtotal 1 plus sum of management and administrative items, 1 to 6 above) | | | | | | | | |
| 7 | Contingency | | | | 10.0% of Subtotal 1 | | R 12 788.28 | |
| (Subtotal 2 plus contingency) Sub Total 3 | | | | | | | R 167 533.28 | |
| Vat (14%) | | | | | | | R 23 454.66 | |
| GRAND TOTAL | | | | | | | R 190 987.94 | |
| (Subtotal 3 plus VAT) | | | | | | | | |

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 (ACT 28 OF 2002)
 28 SEP 2016

Based on the above prescribed methodology the quantum of the financial provision required for rehabilitation at closure comes to **R 190 987.94**

Please feel free to contact the writer should you have any further questions with regards to this closure cost calculation.

Regards



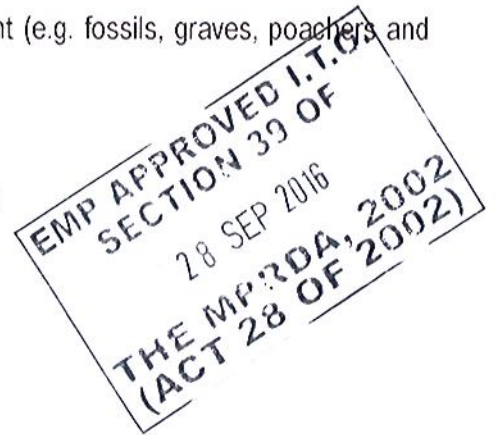
C E van Eeden – B.Sc(Biol), B.Sc(Hons) Zoology, MEM (UOVS)
Dōrëan Environmental Services CC
24 July 2014

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Appendix 15: Environmental Awareness

The operations manager must make sure that he/she understands the EMPR and its requirements and commitments before any mining takes place. Operators of earth moving equipment should be informed of the requirements for the following:

- Mining within demarcated areas;
- No-go areas;
- Establishment of access roads;
- Handling of hazardous waste and their storage facilities;
- Handling of biodegradable and non-degradable waste;
- Vehicle maintenance;
- Mining methods to be followed;
- Handling and storing of topsoil;
- Sloping of excavations;
- Speed control in order to reduce dust;
- Emergency procedure awareness.
- Labourers should be informed of the following during monthly “toolbox talks”:
 - Reporting of unusual observations to management (e.g. fossils, graves, poachers and wood collectors etc.);
 - Reporting of spills to management;
 - Felling or damaging trees for firewood not allowed;
 - Making fires prohibited;
 - Hunting and killing of animals not allowed;
 - Setting of traps not allowed
 - Demarcated areas for mining;
 - Establishing of access roads and erection of gates in fence lines;
 - Status of gates of farm owner;
 - Toilet facilities and hygiene measures;
 - Handling of waste;
 - Vehicle maintenance and secure storage area;
 - Handling of topsoil;
 - Emergency procedures awareness.



Appendix 16 : Impact assessment

ENVIRONMENTAL IMPACT ASSESSMENT

The methodology that will be used is a synthesis of the product of duration, intensity, extent and probability of identified impacts, as discussed hereunder.

SIGNIFICANCE

Significance is the product of **probability** and **severity**

PROBABILITY

Probability is the likelihood of an impact actually occurring, and which is rated as follows:

Improbable: Low possibility of impact to occur due to design on history

Rating: 2

Possible: Possibility that impact may occur

Rating: 3

Probable: Impact will occur but temporary in nature

Rating: 4

Definite: Impact will occur regardless of prevention measures

Rating: 5



| | | | |
|------------|----------|----------|----------|
| Improbable | Possible | Probable | Definite |
|------------|----------|----------|----------|

SEVERITY RATING

Severity rating is calculated from the factors and values allocated to intensity and duration

The intensity and duration values are awarded to each impact, as described below, namely:

DURATION

Duration is assessed and a value awarded in accordance with the following:

Short term: < 1 to 5 years

Factor: 2

Medium term: 5 to 15 years

Factor: 3

Long term: impact will only cease after the operational live of the activity has ended, either because of natural processes or through human intervention

Factor: 4

Permanent: impact not considered as transient, despite mitigation by either natural process or human intervention

Factor: 5



INTENSITY FACTOR

The intensity factor is awarded to each impact in accordance with the following:

Low intensity:

Nature or man made processes/functions slightly affected
(minor process/human/wildlife damage may occur)

Factor: 1

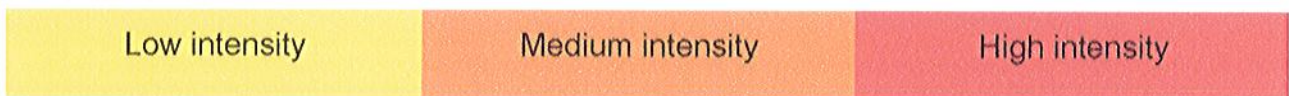
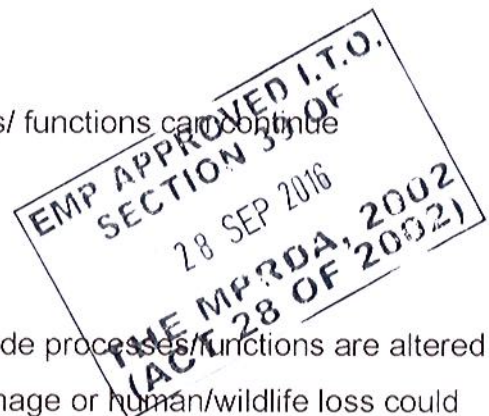
Medium intensity:

Environment affected but natural/ man made processes/ functions can continue
(some process/human/wildlife damage will occur)

Factor: 2

High intensity:

Environment affected to the extent that natural/man made processes/functions are altered on a temporary or permanent basis (major process damage or human/wildlife loss could occur) Factor: 3



SEVERITY RATING

The **severity rating** is obtained from the product of **severity factor X duration factor**

Table 2. Severity rating

| Factor | Rating |
|------------------------|-----------------------------|
| Product values 2 to 4 | Low Severity |
| Product values 5 to 8 | Medium Severity (Rating: 3) |
| Product values 9 to 12 | High Severity |

| | | |
|---|--------------------|--------------------|
| Product values 13 to 16 | Very High Severity | (Rating: 5) |
| Factors below 3 = No Significant Impact | | |
| Low severity | Medium severity | High severity |
| | | Very high severity |

SIGNIFICANCE RATING

A **significance rating** is obtained from the product of **severity rating x probability rating**. The significance rating should influence the proposed development project as follows, namely:

LOW SIGNIFICANCE (Calculated significance rating 4 to 6)

Positive and negative impacts of low significance should have no significant influence on the proposed development.

MEDIUM SIGNIFICANCE (Calculated significance rating 7 to 12)

Positive Impact: Weighs towards a decision to continue

Negative Impact: Impact should be mitigated before the project may proceed

HIGH SIGNIFICANCE (Calculated significance rating 13 to 18)

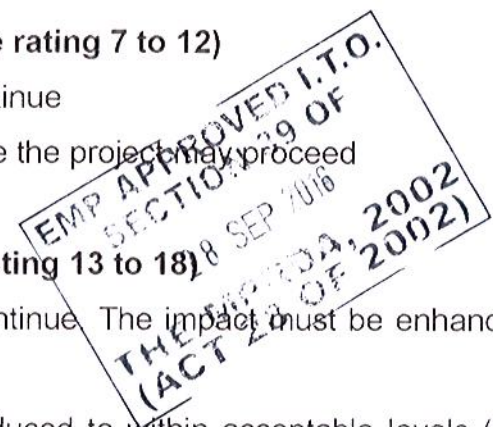
Positive Impact: Weighs towards a decision to continue. The impact must be enhanced as far as possible during final design

Negative Impact: Impact must be mitigated or reduced to within acceptable levels (low significance rating) before the project may proceed

VERY HIGH SIGNIFICANCE (Calculated significance rating 19 to 25)

Positive Impact: Project/development to continue

Negative Impact: If mitigation cannot be implemented effectively, the project/development must be terminated



| | | | |
|------------------|---------------------|-------------------|------------------------|
| Low significance | Medium significance | High significance | Very high significance |
|------------------|---------------------|-------------------|------------------------|

1.1 ASSESSMENT OF IMPACTS AND MITIGATORY MEASURES

1.1.1 Geology and Soil

1.1.1.1 Potential impact:

NEGATIVE. The geology of the area might be changed due to the Sand and weathered Sand mining.

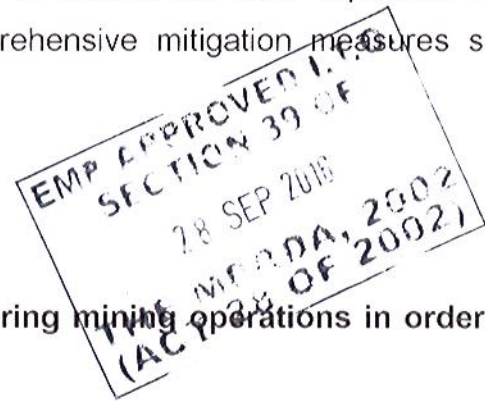
Soil might become less fertile and reduce the carrying capacity of the veldt after rehabilitation. Erosion of soil might occur. Due to the mining method that will be used, the rehabilitation of the disturbed area and the relatively small area involved, the impact on the geology and soil will be site specific and very limited.

Table 3a. - Assessment of impacts

| Probability | Duration | Intensity | Severity | Severity Rating | Significance |
|-------------|----------|-----------|----------|-----------------|--------------|
| 4 | 3 | 2 | 6 | 3 | 12 |

Significance rating: Medium Significance

Mitigation: Topsoil will be removed before mining activities commence and stored outside active mining cell. The necessary measures will be put in place to limit erosion from the stockpiles and to divert storm water away from the stockpiles. Rehabilitation would be done in such a way to ensure the least impact on the geology and soil characteristics. (For comprehensive mitigation measures see Appendix 18).



1.1.2 Vegetation

1.1.2.1 Potential impact:

NEGATIVE. Vegetation will be removed during mining operations in order to expose the Sand for mining.

Due to the mining method that will be used, the rehabilitation of the disturbed areas and the relatively small area involved, the impact on the vegetation will be site specific and limited to the mining area. Literature indicated that there are various alien weeds and invasive plants in the area, which may occur because of the disturbance of the natural environment.

Table 3b(i) - Assessment of impacts

| Probability | Duration | Intensity | Severity | Severity Rating | Significance |
|-------------|----------|-----------|----------|-----------------|--------------|
| 4 | 3 | 1 | 3 | 2 | 8 |

Significance rating: Medium Significance

Mitigation: Topsoil will be removed before mining operations commence. Restoring of topsoil during rehabilitation would encourage natural re-vegetation of the area. Re-vegetation with indigenous seeds would be done if it is necessary. (For comprehensive mitigation measures see Appendix 18).

1.1.2.2 Potential impact:

NEGATIVE. Invader species encroachment commonly associated with disturbed areas.

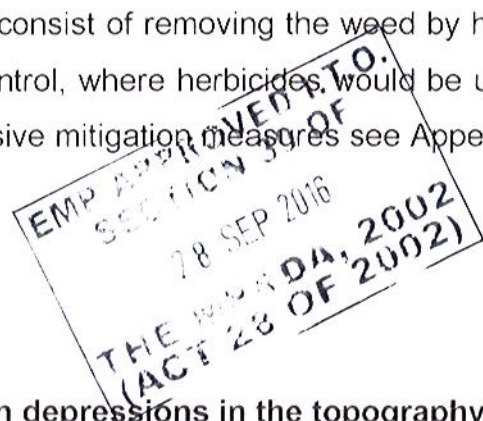
Due to the fact that the vegetation would be removed, opportunistic invader species often forms the pioneer vegetation if not controlled properly.

Table 3b(ii) - Assessment of impacts

| Probability | Duration | Intensity | Severity | Severity Rating | Significance |
|-------------|----------|-----------|----------|-----------------|--------------|
| 4 | 3 | 1 | 3 | 2 | 8 |

Significance rating: Medium Significance

Mitigation: A weed control plan that would consist of removing the weed by hand on a monthly basis as well as chemical control, where herbicides would be used to combat invader species. (For comprehensive mitigation measures see Appendix 18).



1.1.3 Topography

1.1.3.1 Potential impact:

NEGATIVE. Mining activities may result in depressions in the topography.

Table 3c. - Assessment of impacts

| Probability | Duration | Intensity | Severity | Severity | Significanc |
|-------------|----------|-----------|----------|----------|-------------|
| 2 | 3 | 1 | 3 | 2 | 4 |

Significance rating: Low Significance

Mitigation: Excavated areas will be sloped during rehabilitation to even out depressions. (For comprehensive mitigation measures see Appendix 18).

1.1.4 Land use

1.1.4.1 Potential impact:

NEGATIVE. Degrading of grazing potential for livestock farming.

Table 3d(i) - Assessment of impacts

| Probability | Duration | Intensity | Severity | Severity | Significanc |
|-------------|----------|-----------|----------|----------|-------------|
| 3 | 3 | 1 | 3 | 2 | 6 |

Significance rating: Low Significance

Mitigation: Should it be found after the mining operations have ceased, that the natural re-vegetation of the area is unacceptable, the area would be re-vegetated with an indigenous grass seed mix. (For comprehensive mitigation measures see Appendix 18).

1.1.4.2 Potential impact:

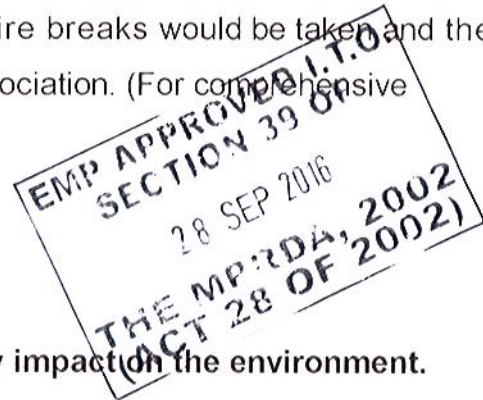
NEGATIVE. Veldt fires might seriously impact on surrounding land-use (livestock/ irrigation of neighbouring farmers).

Table 3d(ii) - Assessment of impacts

| Probabi | Durati | Intensit | Sever | Severity | Signific |
|---------|--------|----------|-------|----------|----------|
| 4 | 3 | 2 | 6 | 3 | 12 |

Significance rating: Medium Significance

Mitigation: Precautionary measures such as fire breaks would be taken and the company will join the local Fire Protection Association. (For comprehensive mitigation measures see Appendix 18).



1.1.5 Visual Aspects

1.1.5.1 Potential impact:

NEGATIVE. Mining operations could visually impact on the environment.

Table 3e - Assessment of impacts

| Probability | Duration | Intensity | Severity | Severity | Significanc |
|-------------|----------|-----------|----------|----------|-------------|
| 4 | 4 | 1 | 4 | 2 | 8 |

Significance rating: Medium Significance

Mitigation: Area would be properly rehabilitated as mining activities progress in order to reduce the visual aspects as much as possible. (For comprehensive mitigation measures see Appendix 18).

1.1.6 Sites of Archaeological and Cultural Interest

1.1.6.1 Potential impact:

NEGATIVE. No known sites of Archaeological and Cultural Interest exist within the proposed mining area.

Table 3f - Assessment of impacts

| Probability | Duration | Intensity | Severity | Severity Rating | Significance |
|-------------|----------|-----------|----------|-----------------|--------------|
| 2 | 3 | 1 | 3 | 2 | 4 |

Significance rating: Low Significance

Mitigation: If any sites of Archaeological and Cultural Interest are found during the mining activities, it will be demarcated and mining activities will cease in that demarcated area. The applicable department will be informed of the find. The

measures out lined in Appendix 5 will be implemented. (For comprehensive mitigation measures see Appendix 18).

1.1.7 Social Impact

1.1.7.1 Potential impact:

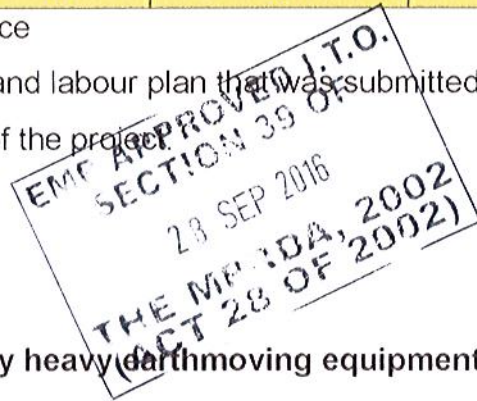
POSITIVE. Financial gain on different levels.

Table 3g - Assessment of impacts

| Probability | Duration | Intensity | Severity | Severity | Significanc |
|-------------|----------|-----------|----------|----------|-------------|
| 4 | 3 | 2 | 6 | 3 | 12 |

Significance rating: Medium Significance

Mitigation: The comprehensive social and labour plan that was submitted as part of the application manages this aspect of the project.



1.1.8 Noise

1.1.8.1 Potential impact:

NEGATIVE. Noise will be generated by heavy earthmoving equipment.

Table 3h - Assessment of impacts

| Probability | Duration | Intensity | Severity | Severity Rating | Significance |
|-------------|----------|-----------|----------|-----------------|--------------|
| 4 | 3 | 2 | 6 | 2 | 8 |

Significance rating: Medium Significance

Mitigation: The use of earthmoving equipment will be limited to office hours. Vehicles will be fitted with silencing devices (For comprehensive mitigation measures see Appendix 18).

1.1.9 Dust

1.1.9.1 Potential impact:

NEGATIVE. Dust will be generated heavy earthmoving equipment- Loading and hauling

Table 3i - Assessment of impacts

| Probability | Duration | Intensity | Severity | Severity | Significanc |
|-------------|----------|-----------|----------|----------|-------------|
| 4 | 3 | 2 | 6 | 2 | 8 |

Significance rating: Medium Significance

Mitigation: The sandy nature of the soil will result in little dust. Working times will be strictly controlled. Dust form the haul roads will be controlled with a water cart. (For comprehensive mitigation measures see Appendix 18).

1.1.10 Animal Life

1.1.10.1 Potential impact:

NEGATIVE. Fauna that are currently occurring on the farm might relocate when mining activities commence.

Table 3j - Assessment of impacts

| Probability | Duration | Intensity | Severity | Severity | Significanc |
|-------------|----------|-----------|----------|----------|-------------|
| 4 | 3 | 2 | 6 | 2 | 8 |

Significance rating: Medium Significance

Mitigation: Mining will only take place on designated areas, and will be restricted to office hours. No traps or hunting of any animals will be allowed. Mining will be done with the least possible habitat destruction. Mining activities are only temporary. (For comprehensive mitigation measures see Appendix 18)



1.1.11 Surface water

1.1.11.1 Potential impact:

NEGATIVE. The operation might have a negative impact on surface water runoff.

Table 3k - Assessment of impacts

| Probability | Duration | Intensity | Severity | Severity Rating | Significance |
|-------------|----------|-----------|----------|-----------------|--------------|
| 2 | 3 | 1 | 3 | 2 | 4 |

Significance rating: Low Significance

Mitigation: Although the Vaal River forms the one boundary (North East) no surface water will be used or impacted upon. A 100 meter exclusion zone will be established from the high edge of the river to prevent an impact on the riverine environment. Proper diversion of runoff water, measures to prevent erosion, good housekeeping and waste management will prevent the contamination of any surface water. (For comprehensive mitigation measures see Appendix 18).

1.1.12 Groundwater

1.1.12.1 Potential impact:

NEGATIVE. Quality and quantity of groundwater could be adversely affected by mining activities.

Table 3l - Assessment of impacts

| Probability | Duration | Intensity | Severity | Severity Rating | Significance |
|-------------|----------|-----------|----------|-----------------|--------------|
|-------------|----------|-----------|----------|-----------------|--------------|

| | | | | | |
|---|---|---|---|---|---|
| 2 | 3 | 1 | 3 | 2 | 4 |
|---|---|---|---|---|---|

Significance rating: Low Significance

Mitigation: Groundwater will only be used for domestic purposes and will not be directly affected by mining activities (For comprehensive mitigation measures see Appendix 18).

1.1.13 Cumulative Impacts

1.1.13.1 Potential impact:

NEGATIVE. Various mining activities in close vicinity of each other could cause various synergistic or antagonistic effects. Specifically to increased traffic on the roads

Table 3m - Assessment of impacts

| Probability | Duration | Intensity | Severity | Severity | Significance |
|-------------|----------|-----------|----------|----------|--------------|
| 3 | 3 | 1 | 3 | 2 | 6 |

Significance rating: Low Significance

Mitigation: There are two similar mining activities within close vicinity of the proposed mine, the cumulative effect of increased traffic and possible damage to the tar road to the Barrage will be managed after consultation with the Provincial Administration of the Free State (Roads Department) in order to find a solution where the 3 mines can co-operate to fix of fund the fixing of potholes on the road. On the mine, rehabilitation would be done concurrently with mining activities and therefore very little cumulative impacts are expected.

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1.2 Decommissioning phase

There are no additional impacts predicted during the decommissioning phase because there are no buildings or other infrastructure that needs to be removed other than access roads. No mine residue deposits will remain that need to be removed or rehabilitated.

1.3 Residual impacts after closure

No significant residual impacts are predicted as the closure objective of the operation is to return all disturbed areas back to natural grazing.

Appendix 17 - Management plan

The environment affected by the mining operations will be rehabilitated, as far as is practicable, to its natural state or to a predetermined and agreed to standard or land use which conforms with the concept of sustainable development. The affected environment will be maintained in a stable condition that will not be detrimental to the safety and health of humans and animals and that will not pollute the environment or lead to the degradation thereof. This will be done by complying with the conditions in this environmental management program and relevant statutory requirements. The contractor and employee will be made aware of their environmental responsibilities and will be empowered to execute the work program in compliance with the requirements of this EMP.

1.1 Construction phase

No construction activities will be necessary to start up the operation.

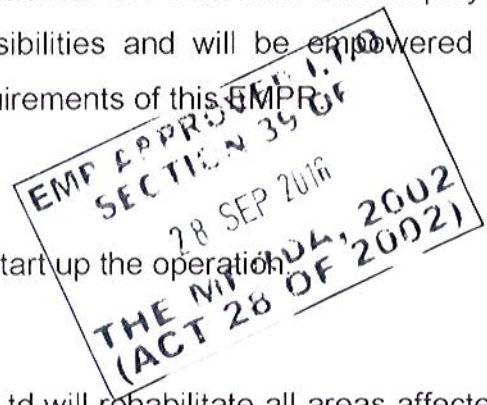
1.2 Operational phase

Tja Naeldi Beafase Investment Holdings (Pty) Ltd will rehabilitate all areas affected by the mining activities on an ongoing concurrent basis. This is the cheapest form of rehabilitation. This aims not only to minimise final rehabilitation costs during the decommissioning phase, but also to reduce the cumulative effect of impacts by addressing them sooner rather than later.

Environmental management during the operational phase:

1.2.1 Geology and Soil

- In all areas where the topsoil (growth medium) will be impacted on, it will be removed and stockpiled near the excavation. The maximum height of stockpiles will be 2.5 meters.
- The first 300mm of topsoil and then the subsoil will be stockpiled separately as to prevent the destruction of the natural soil profile for each area.
- The topsoil will be used during the rehabilitation of any impacted areas, in order to re- establish the same land capability. No rectification of topsoil is expected, as no soil should be contaminated during mining.
- If any soil is contaminated during the life of the mine or during closure, it will be removed together with the contaminant and placed in acceptable

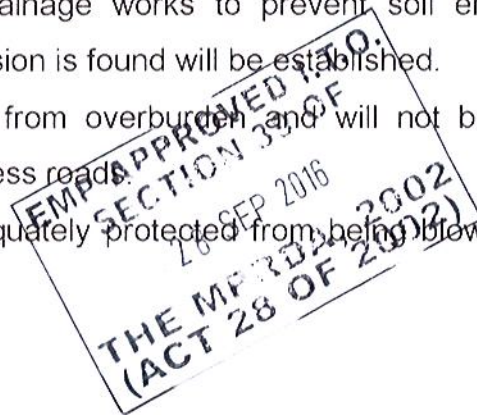


containers to be removed with the industrial waste to a licensed facility and by a licensed waste company. No contaminated soil will be treated on site.

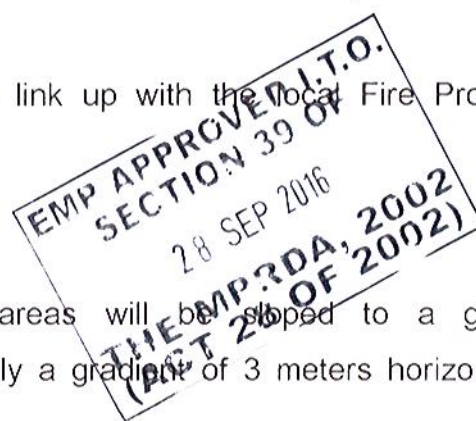
- Sampling and analysis of selected topsoil areas will again be done after rehabilitation to determine if soil amelioration (cultivation) will be necessary.
- Erosion control in the form of re-vegetation and contouring of slopes will be implemented on mined areas and where found necessary during the rehabilitation of the mining areas.
- Where the soil is compacted it will be ripped to a depth of 300mm and levelled in order to re-establish a growth medium.
- Topsoil will be replaced immediately (within 14 days) on an area when removal of Sand is completed.
- Vehicle movement will be confined to established roads (no braiding of roads allowed) as to prevent the disturbance and compaction of soils.
- Temporary and permanent drainage works to prevent soil erosion with mitigation measures where erosion is found will be established.
- 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.

1.2.2 Vegetation

- The mining areas will be rehabilitated concurrently with mining operations and the rate of rehabilitation will be monitored.
- If the rate of re-establishment of the natural vegetation is found to be too slow, the site shall be seeded with a local, adapted indigenous seed mix.
- Management will also take responsibility to control declared invader or exotic species on the rehabilitated areas. The following control methods will be used:
 - The plants will be uprooted, felled or cut off and can be destroyed completely.
 - The plants will be treated with a herbicide that is registered for use in connection therewith and in accordance with the directions for the use of such a herbicide.
- All new vegetated areas will be protected against grazing cattle, sheep or goats.



- 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 the dry lands technique requiring no irrigation.
- Monitoring of the rehabilitation area will take place every six months until mine closure. Special attention will be given to basal and crown cover, species diversity and the vitality of the vegetation. Photo's will be taken at fixed points and included in the three monthly decommissioning reports.
- The contractor and employee on site will have strict instructions that any collection of wood for fire is not allowed.
- No fires will be allowed in. If required by applicable legislation and the Fire Protection Association, a firebreak will be cleared around the perimeter of the mine.
- A representative of the mine will link up with the local Fire Protection Association.



1.2.3 Topography

- The slopes around excavated areas will be sloped to a gradient representative of the area. Typically a gradient of 3 meters horizontal for every 1 meter vertical.
- Sampling and analysis of the growth medium stockpiles will be done during rehabilitation and if necessary, soil amelioration will be done. Compacted areas will be ripped and levelled in order to re-establish vegetation.
- All temporary structures like the office, containers and topsoil stockpiling will be removed during the decommissioning phase, the area ripped and the topsoil returned to its original depth to provide a growth medium.

1.2.4 Land use

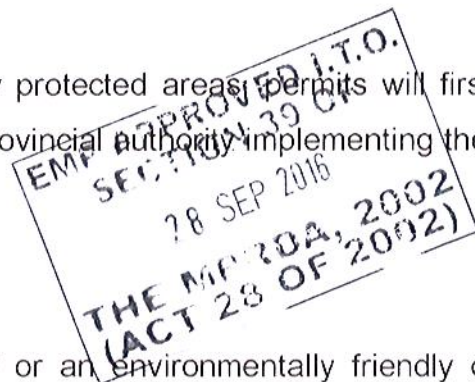
- Rehabilitation will be done to such a standard as to ensure that land use reverts back to its pre-mining use.
- Access roads to the mining area will be established in consultation with the landowner and existing roads will be used as far as practicable.
- All new roads will be selected as far as possible that the minimum number of bushes or trees are felled and existing fence lines will be followed as far as possible. Watercourses and steep gradients will be avoided as far as is

practicable. Adequate drainage and erosion protection in the form of cut-off berms or trenches will be provided where necessary.

- The erection of gates in fence lines and the open or closed status of gates in new and existing positions will be clarified in consultation with the landowner and maintained throughout the operational period.

1.2.5 Sites of Archaeological and Cultural interest

- A comprehensive Heritage assessment was conducted by specialists. The report has been appended as Appendix 5.
- If any artefacts of archaeological or cultural interest are found, the area will be marked and all activities in that vicinity would cease with immediate effect. The recommendations of the Heritage impact assessment will be adhered to if and when any artefacts or graves are discovered as part of the mining operation.
- Grave sites would be clearly marked and no mining will take place within that area.
- Where mining is contemplated in any protected areas, permits will first be obtained from SAHRA, through the Provincial Authority implementing the SA Heritage Act.



1.2.6 Dust

- All roads will be sprayed with water or an environmentally friendly dust-allaying agent that contains no PCB's (e.g. DAS products/ Pro-base) at regular intervals to ensure that dust is adequately suppressed on the mining and road areas.
- All disturbed or exposed areas will be re-vegetated as soon as possible during mining to prevent any dust source from being created.
- A fall-out and nuisance dust monitoring programme could be submitted to the Principal Inspector of Mines (DMR-Welkom) on an annual basis if required. If any complaints are received from the public or state department regarding dust levels, the fall-out and nuisance dust levels will again be monitored at prescribed monitoring points. The results will then be compiled into monthly reports and forwarded to the Director - Occupational Hygiene.
- Fallout dust will be monitored via a fallout dust bucket system on the boundaries of the mining area.

1.2.7 Animal life

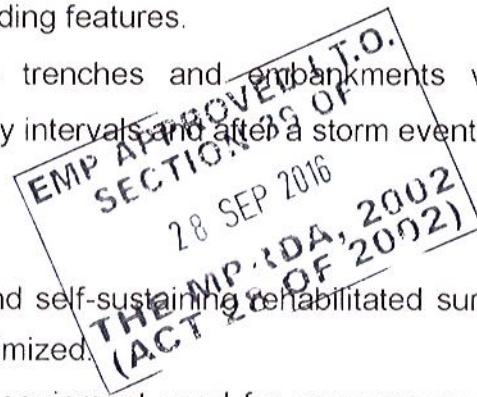
- Any form of poaching by the contractor or worker on the mine will result in the maximum form of punishment as allowed for by common law. Any form of snares or traps will be removed as and when they are encountered on the farm. Any trespassers poaching or collecting wood will be reported to the mine management/security.

1.2.8 Surface water

- A system consisting of trenches will be put in place that will be able to divert run-off from the peak precipitation event of 1:100 years recurrence interval around the mining areas.
- No vehicle repairs will take place on site and all waste products from small services will be disposed of in a 200 litre container/bin found inside the secure storage area.
- All refuelling will take place in the secure storage area. If this is found not to be feasible drip pans will be used whenever refuelling takes place.
- All infrastructures will be properly designed to allow for proper drainage and run-off without resulting in eroding features.
- These structures and ones like trenches and embankments will be inspected and evaluated at monthly intervals and after a storm event.

1.2.9 Groundwater

- Care will be taken that a stable and self-sustaining rehabilitated surface is created and surface impact be minimized.
- The maintenance of vehicles and equipment used for any purpose during the mining operation will only take place within the secure storage area.
- If any equipment or vehicles break down outside the secure storage area the following emergency procedures will be followed: Drip pans will be placed at all points where diesel, oil or any hydraulic fluid can drip and contaminate the soil. All effort will be made to remove the vehicle or equipment to the secure storage area. If the vehicle or equipment cannot be removed the broken part will be drained of all fluids and the specific part removed to the secure storage area. No repairs will be allowed to take place outside the secure storage area.



- All the pollution control measures as described in this document will be implemented and monitored on a monthly basis to determine if they are functioning correctly. If evidence of uncontained pollution is detected remedial action will be taken without delay.
- The full legal requirements of Government Notice No.704, aimed at the protection of water resources, as described in the Operational Guideline Document No. M6.1 from DWAF will be followed and complied with.

1.2.10 Cumulative impacts

This refers to the cumulative effects of all of the above mentioned impacts, which could either be synergistic or antagonistic. There are two similar mining activities in the area and the impact of increased traffic on the road could have a cumulative impact on the Vaal Eden - Barrage road. The mine will in conjunction with the Provincial Administration work at a financing plan to fix potholes on the road as and when they occur.

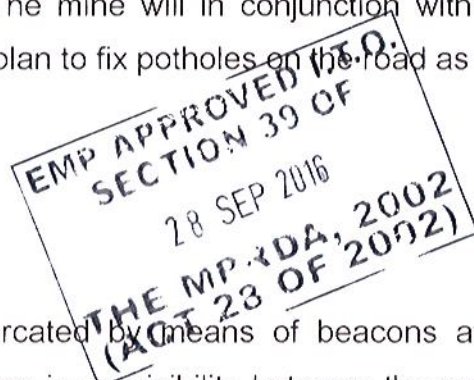
1.2.11 The mine area

Demarcating the mining area:

- The mining area will be clearly demarcated by means of beacons at its corners, and along its boundaries if there is no visibility between the corner beacons.
- Permanent beacons will be firmly erected and maintained in their correct position throughout the life of the operation.
- Mining and resultant operations shall only take place within this demarcated area.

Layout plan:

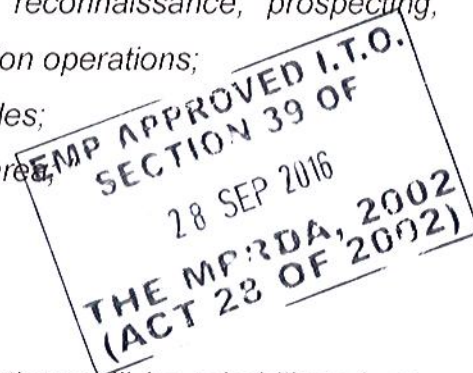
- A copy of the layout plan will be available at the mining site for scrutiny. Please see Appendix 3
- The plan will be updated on a regular basis with regard to the actual progress of the establishment of surface infrastructure, mining operations and rehabilitation (a copy of the updated plan shall be forwarded to the Regional Manager on a regular basis).



- A final layout plan will be submitted at closure of the mine or when operations have ceased. **NOTE:** Regulation 2.2 of the regulations promulgated in terms of the Act requires:

"An application contemplated in sub-regulation (1) must be accompanied by a plan that must contain –

- (a) *the co-ordinates of the land or area applied for;*
- (b) *the north point;*
- (c) *the scale to which the plan has been drawn;*
- (d) *the name, number and location of the land or area covered by the application; and*
- (e) *in relation to farm boundaries and surveyed points-*
 - (i) *the size and shape of the proposed area;*
 - (ii) *the boundaries of the land or area comprising the subject of the application concerned;*
 - (iii) *the layout of the proposed reconnaissance, prospecting, exploration mining or production operations;*
 - (iv) *surface structures and servitudes;*
 - (v) *the topography of the land or area;*



Responsibility:

- The environment affected by the mining operations will be rehabilitated, as far as is practicable, to its natural state or to a predetermined and agreed to standard or land use which conforms with the concept of sustainable development. The affected environment will be maintained in a stable condition that will not be detrimental to the safety and health of humans and animals and that will not pollute the environment or lead to the degradation thereof.
- Ensuring that the manager on the site, the contractor and the employee are capable of complying with all the statutory requirements that must be met in order to mine, which includes the implementation of this EMP.
- Where operations are to be conducted in an area that has already been disturbed, a specific agreement will be reached with the Regional Manager concerning the responsibilities imposed upon himself/herself pertaining to the

rehabilitation of the area and the pollution control measures to be implemented.

1.2.12 Access roads

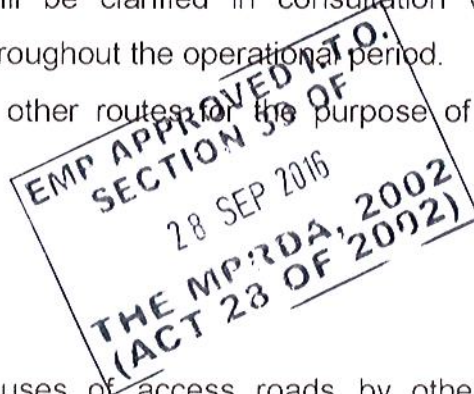
Establishing access roads on the site:

- The access road to the mining area and the site office will be established in consultation with the landowner and existing roads will be used as far as practicable.
- Should a portion of the access road be newly constructed the following will be adhered to:
 - The route will be selected that a minimum number of bushes or trees are felled and existing fence lines will be followed as far as possible.
 - Watercourses and steep gradients will be avoided as far as is practicable.
 - Adequate drainage and erosion protection in the form of cut-off berms or trenches will be provided where necessary.
- If imported material is used in the construction or upgrading of the access road this will be declared.
- The erection of gates in fence lines and the open or closed status of gates in new and existing positions will be clarified in consultation with the landowner/tenant and maintained throughout the operational period.
- Vehicles or personnel will use no other routes for the purpose of gaining access to the site.

Maintenance of access roads:

- In the case of dual or multiple uses of access roads by other users, arrangements for multiple responsibilities will be made with the other users. If not, the maintenance of access roads will be the responsibility of Tja Naeldi Beafase Investment Holdings (Pty) Ltd.
- Newly constructed access roads if required will be adequately maintained so as to minimise dust, erosion or undue surface damage.

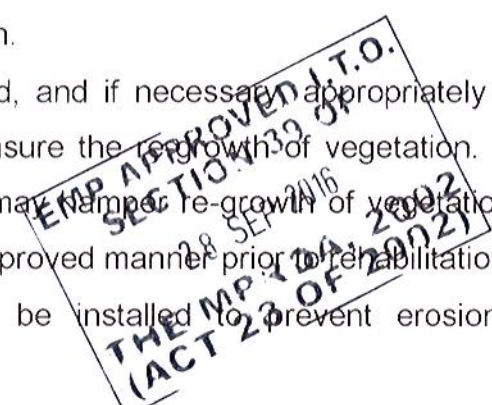
Dust control on the access and haul roads:



- The liberation of dust into the surrounding environment will be effectively controlled by the use of, inter alia, water spraying and/or other dust-allaying agents. The speed of haul trucks and other vehicles will be strictly controlled to avoid dangerous conditions, excessive dust or excessive deterioration of the road being used.
- Working times will be adhered to strictly.

Rehabilitation of access roads:

- Whenever the mining right is suspended, cancelled or abandoned or if it lapses and Tja Naeldi Beafase Investment Holdings (Pty) Ltd does not wish to renew the right, any access road or portions thereof, constructed by Sweet Sensation and which will no longer be required by the landowner, will be removed and rehabilitated to the satisfaction of the Regional Manager.
- Any gate or fence erected by Tja Naeldi Beafase Investment Holdings (Pty) Ltd which is not required by the landowner, will be removed and the situation restored to the pre mining situation.
- Roads will be ripped or ploughed, and if necessary, appropriately fertilised (based on a soil analysis) to ensure the regrowth of vegetation. Imported road construction materials that may hamper re-growth of vegetation will be removed and disposed of in an approved manner prior to rehabilitation.
- Structures such as berms will be installed to prevent erosion of the rehabilitated roads.
- If a reasonable assessment indicates that the re-establishment of vegetation is unacceptably slow, at the request of the Regional Manager, the soil will be analysed and any deleterious effects on the soil arising from the mining/prospecting operation, will be corrected and the area be seeded with a seed mix to the Regional Manager's specification.



1.2.13 Toilet facilities, waste water & refuse disposal

- A chemical toilet will be provided for the employee and contractor. Proper hygiene measures will be established.

Waste disposal:

- Suitable covered receptacles will be available at all times and conveniently placed for the disposal of waste.

- Non-biodegradable refuse such as glass bottles, plastic bags, metal scrap, etc., will be stored in a container at the rest area and collected on a regular basis and disposed of at the Parys landfill site. Specific precautions shall be taken to prevent refuse from being dumped on or in the vicinity of the rest area.
- Biodegradable refuse generated from the office, storage area or any other area will be handled as indicated above.
- All spills would be cleaned up immediately to the satisfaction of the Regional Manager by removing the spillage together with the polluted soil and by disposing of it at a recognised facility.

1.2.14 Storage areas

Establishing a secured storage area:

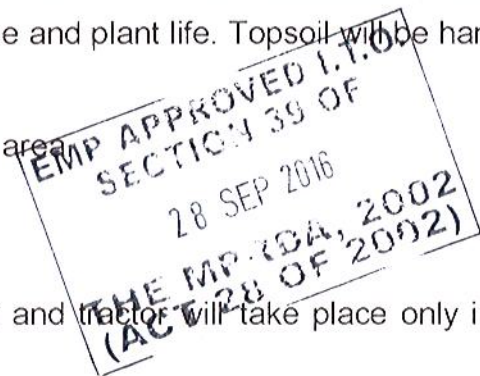
- The area chosen for these purposes will be the minimum reasonably required and involve the least disturbance to tree and plant life. Topsoil will be handled as described above.
- Fuel and oil will be stored in a secured area.

Maintenance of vehicles and equipment:

- Minor services of the front end loader and tractor will take place only in the storage area.
- Equipment used in the mining process will be adequately maintained so that during operations it does not spill oil, diesel, fuel, or hydraulic fluid.
- Machinery or equipment used on the mining area will not constitute a pollution hazard in respect of the above substances. The Regional Manager may order such equipment to be repaired or withdrawn from use if he or she considers the equipment or machinery to be polluting and irreparable.

Rehabilitation of the secured storage area:

- On completion of mining operations, the above areas will be cleared of any contaminated soil, which will be disposed of as referred to in the section above.
- The surface will then be ripped or ploughed to a depth of at least 300 mm and the topsoil previously stored adjacent the site, will be spread evenly to its



original depth over the whole area. The area will then be fertilised if necessary (based on a soil analysis).

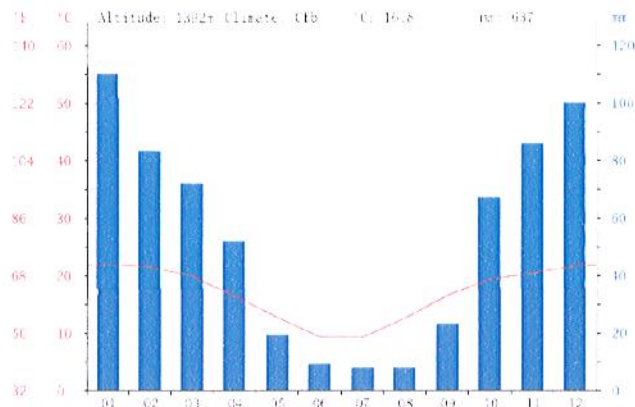
- The site will be seeded with a vegetation seed mix adapted to reflect the local indigenous flora.
- If a reasonable assessment indicates that the re-establishment of vegetation is unacceptably slow, at the request of the Regional Manager, the soil will be analysed and any deleterious effects on the soil arising from the mining operation, will be corrected and the area be seeded with a seed mix to the Regional Manager's specification.

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28 SEP 2016
THE MPORDA, 2002
(ACT 28 OF 2002)

Appendix 18 - Climate

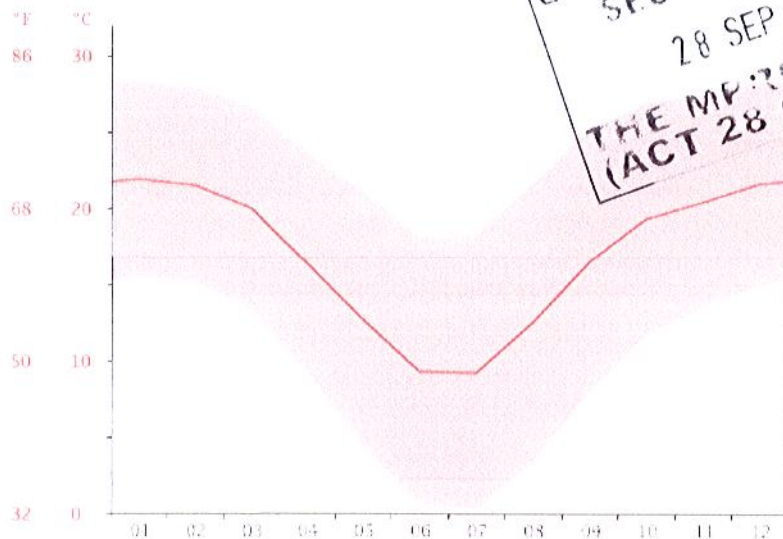
Parys's climate is classified as warm and temperate. The rainfall in Parys is significant, with precipitation even during the driest month. According to Köppen and Geiger, this climate is classified as Cfb. The temperature here averages 16.8 °C. Precipitation here averages 637 mm.

Climate graph



The least amount of rainfall occurs in July. The average in this month is 8 mm. In January, the precipitation reaches its peak, with an average of 110 mm.

Temperature graph



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28 SEP 2016
THE MP RDA, 2002
(ACT 28 OF 2002)

The temperatures are highest on average in January, at around 21.9 °C. At 9.2 °C on average, July is the coldest month of the year.

Climate table

| month | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|----------|------|------|------|------|------|------|------|------|------|------|------|------|
| mm | 110 | 83 | 72 | 52 | 19 | 9 | 8 | 8 | 23 | 67 | 86 | 100 |
| °C | 21.9 | 21.5 | 20.0 | 16.4 | 12.7 | 9.3 | 9.2 | 12.5 | 16.5 | 19.3 | 20.4 | 21.6 |
| °C (min) | 15.5 | 15.1 | 13.3 | 9.2 | 4.4 | 0.6 | 0.2 | 3.3 | 7.9 | 11.6 | 13.5 | 14.9 |
| °C (max) | 28.4 | 27.9 | 26.7 | 23.7 | 21.1 | 18.1 | 18.3 | 21.7 | 25.2 | 27.0 | 27.4 | 28.3 |
| °F | 71.4 | 70.7 | 68.0 | 61.5 | 54.9 | 48.7 | 48.6 | 54.5 | 61.7 | 66.7 | 68.7 | 70.9 |
| °F (min) | 59.9 | 59.2 | 55.9 | 48.6 | 39.9 | 33.1 | 32.4 | 37.9 | 46.2 | 52.9 | 56.3 | 58.8 |
| °F (max) | 83.1 | 82.2 | 80.1 | 74.7 | 70.0 | 64.6 | 64.9 | 71.1 | 77.4 | 80.6 | 81.3 | 82.9 |

The variation in the precipitation between the driest and wettest months is 102 mm. The variation in annual temperature is around 12.7 °C.

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28 SEP 2002
THE MPR 04, 2002
(ACT 28 OF 2002)

APPENDIX 19: Undertaking

Tja Naledi Beafase Investment Holdings (Pty) Ltd

Registration number: 2001/009357/07, P O Box 15265, Riversfield, 1564,
Tel: 083 635 2781, Directors: S Jacobs, C F Jacobs, S C H Preller, J Rabothapi

Undertaking

I, Stephen Jacobs, the undersigned and duly authorised thereto by Tja Naledi Beafase Investment Holdings (Pty) Ltd hereby declare that the above information is true, complete and correct. I have studied and understand the contents of this document in it's entirety and hereby duly undertake to adhere to the conditions as set out therein.

I understand that this undertaking is legally binding and that failure to give effect hereto will render me liable for prosecution in terms of Section 98 (b) and 99 (1)(g) of the Mineral and Petroleum Resources Development Act, 2002 (Act 28 of 2002). I am also aware that the Regional Manager may, at any time but after consultation with me, make such changes to this plan as he/she may deem necessary.

Signed at Johannesburg this 5th day of May 2015



S Jacobs
Director

