



Scoping phase report towards the
Environmental Impact Assessment for the

COZA IRON ORE PROJECT

Soils and Agricultural Potential

By

A.B. Oosthuizen & D.G. Paterson

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ARC-Institute for Soil, Climate and Water,
Private Bag X79, Pretoria 0001, South Africa
Tel (012) 310 2500 Fax (012) 323 1157

Declaration of Independence

I, D.G. Paterson, hereby state that I am a registered Practicing Natural Scientist (*Soil Science* – Registration No. 400463/04) was responsible for supervising the compilation of this report in an impartial manner to acceptable scientific norms and standards.

Furthermore, I state that both myself and ARC-Institute for Soil, Climate and Water are independent of any of the parties involved in this study.

A handwritten signature in black ink, appearing to be 'D.G. Paterson', is written on a light-colored, textured background.

March 2013

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1. TERMS OF REFERENCE

The ARC-Institute for Soil, Climate and Water (ARC-ISCW) was contracted by Synergistics Environmental Services (Pty) Ltd to undertake a soil investigation near Postmasburg in the Northern Cape Province. The purpose of the investigation is to contribute to the scoping phase of the Environmental Impact assessment (EIA) process for the proposed COZA Iron Ore Project.

The objectives of the study are;

- To classify the soils in the specified areas
- To assess broad agricultural potential as well as
- Determine the prevailing land capability and land use

2. SITE CHARACTERISTICS

2.1 Location

The COZA Iron Ore Project is located approximately 10 km NNW of Postmasburg on the farms Driehoekspan 435 (remaining Extent) and Doornpan 445 (Portion 1) as indicated on the accompanying map. Also see photos 1 to 4 of the proposed sites for infrastructure and pit areas.

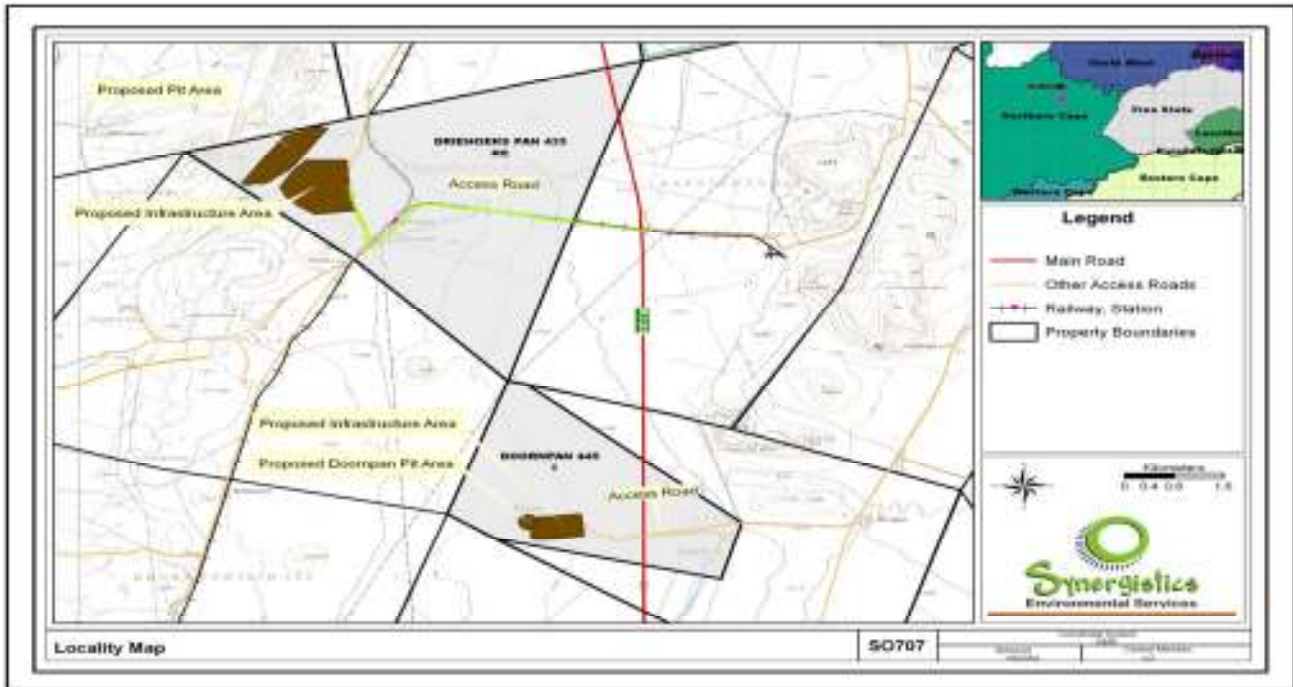


Figure 1 Locality map (study areas in green)



Photo 1 Driehoekspan Infrastructure area (SE direction)



Photo 2 Driehoekspan Pit area (W direction)



Photo 3 Doornpan Infrastructure area (E direction)



Photo 4 Doornpan Pit area (NW direction)

2.2 Topography

The topography varies from a hilly area, (approximate slopes 4 – 20%) and altitude 1 500 meters above sea level, in the northwest, to a lower-lying, flat to gently undulating area to the east with slopes of approximately 2% - 3 % and about 1 400 meters above sea level. No permanently wet drainage ways are present and only some small, mostly north – south aligned, non-perennial channels traverse the area.

2.3 Climate

The climate of the study area (Koch & Kotze, 1986) can be regarded as warm to hot with rain in summer and dry winters. The long-term average annual rainfall (\bar{R}) in this region of the Northern Cape is only 336 mm. Rainfall is

erratic, both locally and seasonally and therefore cannot be relied on for agricultural practices.

Temperatures vary from an average monthly maximum and minimum of 36.7°C and 11.4°C for January to 23.2°C and -2.9°C for July respectively. The extreme high temperature that has been recorded is 41.6°C and the extreme low -7.5°C. **See Table 1** below for climate zone 5S data compiled from various weather stations in a triangle from Kathu in the north to Postmasburg in the south and Olifantshoek in the west. The Manganore weather station (No. 14495 from ISCW weather station database) is located 2.7 km east of the study area with 38 years of rainfall data.

Table 1 Climate data

| Month | Rainfall(mm) Zone 5S | | Temperature(°C) Zone 5S | | | | | Rainfall(mm) Manganore 38 yr | | |
|-------|-------------------------|--------------|----------------------------|------|------|------|------|---------------------------------|-------|--------------|
| | R̄m | | TX | TN | TM | TXH | TNL | R̄m | | |
| Jan | 58.6 | | 32.0 | 17.8 | 25.0 | 36.7 | 11.4 | 65.1 | | |
| Feb | 59.7 | | 30.8 | 17.1 | 24.1 | 35.2 | 12.4 | 73.9 | | |
| Mrt | 65.7 | | 28.4 | 15.1 | 21.9 | 33.0 | 8.9 | 65.1 | | |
| April | 34.7 | | 25.1 | 10.9 | 18.0 | 29.8 | 4.2 | 46.3 | | |
| May | 15.6 | | 21.1 | 6.4 | 13.8 | 26.4 | 0.2 | 17.9 | | |
| Jun | 5.6 | | 18.2 | 2.8 | 10.5 | 22.6 | -2.4 | 6.9 | | |
| Jul | 2.9 | | 18.3 | 2.5 | 10.4 | 23.2 | -2.9 | 3.3 | | |
| Aug | 5.4 | | 20.9 | 4.6 | 12.8 | 27.0 | -1.3 | 10.3 | | |
| Sept | 6.2 | | 24.5 | 8.3 | 16.4 | 31.1 | 1.3 | 6.9 | | |
| Oct | 17.1 | | 27.8 | 12.1 | 20.0 | 34.0 | 4.4 | 21.7 | | |
| Nov | 26.8 | | 29.7 | 14.9 | 22.3 | 35.2 | 8.6 | 30.7 | | |
| Dec | 38.1 | | 31.6 | 16.9 | 24.3 | 36.2 | 11.6 | 43.9 | | |
| RH | RL | R̄ | ETX | ETN | | | | RH | RL | R̄ |
| 407.5 | 251.7 | 336.5 | 41.6 | -7.5 | | | | 847.2 | 174.6 | 385.9 |

(Abbrev. **RH** – highest mean annual rainfall, **RL** – lowest mean annual rainfall, **R̄m** – mean of mean monthly totals, **TX** – mean daily maximum temperature, **TN** – mean daily minimum temperature, **TM** – monthly mean temp., **TXH** – mean monthly max. temp., **TNL** – mean monthly minimum temp., **ETX** – highest maximum temp., **ETN** – lowest minimum temp..)

2.4 Parent Material

The area is mainly underlain by dolomitic limestone with subordinate coarsely crystalline dolomite, chert and lenses of limestone that forms part of the Ghaap Plateau Formation, Campbell Group. The steeper hilly areas consist of shale, flagstone, quartzite and conglomerate of the Gamagara Formation, Postmasburg Group (Geological Survey, 1977).

3. METHODOLOGY

A reconnaissance field investigation was done and randomly placed soil observations (41 in total, see Table 3) were made throughout the study area with a hand soil auger to verify the dominant soil forms and soil depth. A **very broad** soil map was compiled. The soils were classified according to the South African soil classification system (Soil Classification Working Group, 1991). Soil samples were collected and chemically analysed to assist in determining the morphological, chemical and physical properties of the soils. With this information, a class of general agricultural potential and land capability could then be established.

4. SOILS

A soil-rock complex of rock with lithosols (soils of the Mispah and Coega form) and a shallow phase (<300 mm depth) of the Hutton soil form, underlain by rock and sporadic limestone, dominates the survey area (see photo **A2**: map unit **Ms2**) with deeper Hutton and Oakleaf soils being confined to the drainageways (see photo **A23**: map unit **Hu3**). The steeper north-south stretching hills that occur in the north western part of the survey area are dominated by rock outcrops and stony lithosols (Mispah and Glenrosa soils) on the crests and upper midslopes with stony Hutton and Oakleaf soils (with varying depths to underlying rock) on the lower midslopes and upper footslopes (see photo **A17**: map unit Oa1). A non-perennial river cuts through the south-eastern corner of the survey area and consists of sandy, calcareous alluvium (Dundee soil form).



Photo A2: map unit **Ms2** (S direction)



Photo A23: map unit **Hu3** (SW direction)



Photo A11: map unit Oa1 (NW direction)

A general soil description of the map units is given in **Table 2** and a list of soil observations in **Table 3**.

Table 2 Soil legend

| Map unit | Dominant Soil form/family > 40% | Subdominant Soil form/family < 40% | Other soilforms < 15% | Effective depth (mm) | GENERAL DESCRIPTION |
|----------|---------------------------------|------------------------------------|-----------------------|----------------------|---|
| Ms1 | Ms1100 | Rock, Gs1211 | Hu3100 | 100 - 150 | Rock outcrops in association with very shallow, stony, reddish-brown, fine-grained, sandy Mispah, Glenrosa and Hutton soils underlain by rock, occurring on the crests and steeper upper midslopes. |
| Ms2 | Ms1100 | Rock, Hu3100 | Cg1000, Py1000 | 100 - 300 | Soil - rock complex. Very shallow, dark reddish-brown, fine-grained sands on underlying rock (including limestone) in some places. Sporadic occurrence of deeper sandy Hutton soils (400- 700 mm) was found in the vicinity of the weakly developed drainage lines. |
| Hu1 | Hu3100 | Ms1100 | Rock | 100 - 400 | Very shallow, dark reddish-brown, fine grained, Hutton and Mispah soils on underlying rock. |
| Hu2 | Hu3100 | Oa1210 | Rock | 300 - 750 | Shallow, dark reddish-brown, fine sand to loamy sand Hutton and Oakleaf soils, derived from local alluvium/colluvium on underlying rock. Surface limestone occurs sporadically. |
| Hu3 | Hu3100 | Oa1210 | | 600 - 1000 | Moderately deep, dark reddish-brown, fine sand to loamy sand Hutton and Oakleaf soils derived from local alluvium/ colluvium, underlain by rock or stones and occurring in the lower footslopes and valley bottoms. |
| Oa1 | Oa1210 | Hu3100 | Rock, Ms1100 | 400 -900+ | Shallow to moderately deep, very stony, dark reddish-brown, fine-grained, sandy Hutton and Oakleaf soils, derived from local colluvium and/or <i>in situ</i> rock. Soils are underlain by rock and occur on the lower midslopes and upper footslopes. |
| Du1 | Du2220 | | | 600 - 1000 | Moderately deep, reddish-brown, fine-grained, calcareous, sandy Dundee soils derived from alluvium, underlain by rock or stones. |

Randomly selected soil observations were made along access roads through the survey area and are listed in Table 3.

| Table 3 Soil observations | | | | | | |
|----------------------------------|------------------|------------------------|--------------------------------|-----------------------|------------------------|---------------------|
| Obs. No. | Soil form | Soil depth (mm) | Depth Limiting material | Latitude (° S) | Longitude (° E) | Comment |
| A1 | Ms1100 | 100 | Rock | -28.15055081 | 23.07128370 | |
| A2 | Ms1100 | 100 | Rock | -28.14896830 | 23.05951953 | |
| A3 | Ms1100 | 80 | Rock | -28.14771839 | 23.04921448 | |
| A4 | Hu3100 | 500 | Rock | -28.14302453 | 23.05488467 | |
| A5 | Ms1100 | 100 | Rock | -28.13424834 | 23.06248605 | |
| P6 | Hu3100 | 450 | Rock | -28.13725241 | 23.06069970 | |
| A7 | Oa1210 | 600+ | | -28.15791079 | 23.03940296 | Stony soils |
| P8 | Hu3100 | 300 | Rock | -28.14717122 | 23.03855538 | |
| A9 | Ms1100 | 100 | Rock | -28.14580866 | 23.03618968 | |
| A10 | Hu3100 | 250 | Rock | -28.14453193 | 23.03386688 | |
| P11 | Oa1210 | 700+ | | -28.14184972 | 23.03458035 | Very stony soils |
| A12 | Hu3100 | 400 | Rock | -28.13879737 | 23.03576589 | Very stony soils |
| A13 | Ms1100 | 100 | Rock | -28.13541778 | 23.03658664 | |
| A14 | Ms1100 | 100 | Rock | -28.13663014 | 23.03454280 | |
| A15 | Hu3100 | 400 | Rock | -28.13829311 | 23.03323925 | Very stony soils |
| A16 | Hu3100 | 250 | Rock or stones | -28.13806781 | 23.03162992 | |
| A17 | Oa1210 | 900+ | Rock | -28.13737043 | 23.02990794 | Very stony soils |
| A18 | Gs1211 | 400 | Hard lithocutanic B | -28.13797125 | 23.02858293 | Stony soil |
| A19 | Oa1210 | 750+ | | -28.13894221 | 23.02779973 | Very stony soils |
| A20 | Ms1100 | 100 | Rock | -28.13748845 | 23.02715600 | |
| A21 | Ms1100 | 100 | Rock | -28.13568064 | 23.02686095 | Very shallow Hutton |
| A22 | Oa1210 | 750 | Stones or rock | -28.14177998 | 23.03066969 | Hutton soil form |
| A23 | Hu3100 | 750 | Rock or stones | -28.14563700 | 23.03055704 | Oakleaf soil form |
| A24 | Gs1211 | 150 | Hard lithocutanic B | -28.20888885 | 23.06488931 | |
| P25 | Oa1210 | 900+ | | -28.20974180 | 23.06691706 | Very stony soils |
| P26 | Hu3100 | 750 | Rock | -28.20928582 | 23.06913257 | Oakleaf soil form |
| P27 | Ms1100 | 150 | Rock | -28.20831486 | 23.07146072 | |
| A28 | Ms1100 | 100 | Rock/limestone | -28.21151742 | 23.07620823 | Coega soil form |
| A29 | Hu3100 | 150 | Rock | -28.21157106 | 23.08084309 | |
| A30 | Ms1100 | 100 | Rock | -28.21083614 | 23.08454990 | |
| A31 | Hu3100 | 700 | Rock | -28.20939847 | 23.09533238 | |

| | | | | | | |
|------------|--------|-------|----------------|--------------|-------------|-------------------|
| A32 | Du2220 | 900 | Rock | -28.20955404 | 23.09386253 | |
| P33 | Ms1100 | 100 | Rock | -28.20983835 | 23.09097648 | |
| P34 | Hu3100 | 450 | Rock | -28.13969859 | 23.04542184 | |
| A35 | Hu3100 | 600 | Rock | -28.13254782 | 23.04194033 | Oakleaf soil form |
| A36 | Hu3100 | 500 | Stones or rock | -28.15138229 | 23.04257870 | Oakleaf soil form |
| A37 | Oa1210 | 1100+ | | -28.15287360 | 23.04179549 | |
| A38 | Hu3100 | 500 | Rock | -28.14208039 | 23.03993404 | |
| A39 | Hu3100 | 150 | Rock | -28.15785178 | 23.04872096 | |
| A40 | Ms1100 | 100 | Rock | -28.15960594 | 23.05679977 | |
| A41 | Hu3100 | 900 | Rock | -28.16263148 | 23.06622505 | Isolated |
| | | | | | | |

4.1 SOIL ANALYSIS

A total of twelve soil samples were collected from eight locations within the study area (marked as P) on the soil map. The samples represent either the A horizon topsoil (eg P6_A) or, where present, the B horizon subsoil (eg P11_B).

The samples were analyzed and the analysis results are given in Table 4 below.

Table 4 Soil analysis results

| Sample No. | P6_A | P8_A | P11_A | P11_B | P25_A | P25_B | P26_A | P26_B | P27_A | P33_A | P34_A | P34_B |
|--|--------|-------|--------|----------|-------|----------|-------|---------|-------|--------|-------|---------|
| Depth (mm) | 0-100 | 0-100 | 0-300 | 300-700+ | 0-250 | 250-750+ | 0-250 | 250-750 | 0-150 | 0-100 | 0-200 | 200-450 |
| Clay (%) | 10 | 14 | 14 | 16 | 14 | 16 | 12 | 12 | 8 | 10 | 14 | 10 |
| Silt (%) | 4 | 8 | 8 | 6 | 6 | 6 | 2 | 4 | 2 | 4 | 4 | 6 |
| Sand (%) | 86 | 78 | 78 | 78 | 80 | 78 | 86 | 84 | 90 | 86 | 82 | 84 |
| Org. C (%) | 0.22 | 0.29 | 1.50 | 0.39 | 0.31 | 0.24 | 0.21 | 0.15 | 0.19 | 0.58 | 0.13 | 0.12 |
| pH (H ₂ O) | 6.9 | 6.49 | 6.46 | 7.10 | 6.16 | 5.92 | 6.24 | 6.67 | 6.73 | 7.32 | 6.47 | 6.41 |
| Na (cmol(+))kg ⁻¹ | 0.070 | 0.079 | 0.082 | 0.080 | 0.068 | 0.074 | 0.076 | 0.069 | 0.076 | 0.076 | 0.072 | 0.090 |
| K (cmol(+))kg ⁻¹ | 0.555 | 0.461 | 0.999 | 0.534 | 0.369 | 0.196 | 0.418 | 0.495 | 0.345 | 0.436 | 0.388 | 0.226 |
| Ca (cmol(+))kg ⁻¹ | 4.233 | 3.035 | 7.913 | 5.468 | 1.760 | 2.062 | 2.802 | 3.265 | 3.942 | 10.330 | 4.007 | 4.721 |
| Mg (cmol(+))kg ⁻¹ | 1.425 | 1.212 | 1.822 | 1.274 | 0.665 | 0.827 | 0.800 | 0.929 | 1.168 | 0.859 | 1.528 | 2.380 |
| S Value | 6.283 | 4.786 | 10.816 | 7.356 | 2.862 | 3.160 | 4.096 | 4.758 | 5.531 | 11.701 | 5.995 | 7.416 |
| CEC* | 10.310 | 7.886 | 11.546 | 8.793 | 4.244 | 4.658 | 5.128 | 5.330 | 6.263 | 6.708 | 7.661 | 7.830 |

* - Cation Exchange Capacity (cmol(+))kg)

% C – Walkley Black

The soils generally have a light texture, which varies from loamy fine sand to sandy loam. Coupled with the low rainfall (Table 1), this means that the soils are susceptible to wind and water erosion if vegetation is disturbed or removed. The organic carbon is also relatively low. The pH (H₂O) values show that the soils are mainly slightly acid with calcium (Ca) as the dominant cation. Only two samples are slightly alkaline. According to the S-value and the clay content, the soils have a high base status and have suffered little or no leaching.

4.2 Soil limitations

The suitability of soils for the production of crops in a specific locality depends mainly on the inherent chemical, physical and morphological properties of the soils, combined with prevailing climate and crop requirements.

The soil limitations that were noted are the following:

- Extremely restricted soil depth to underlying rock (eg limestone)
- Low clay content of topsoils and upper subsoils, giving rise to low water-holding capacity as well as wind and water erosion susceptibility
- Coarse fragments in topsoil or subsoil that decreases the water retention capacity of soils.
- Presence of free carbonates (mainly CaCO₃), indicating a low degree of leaching, giving rise to high pH values and low trace element status.

5. AGRICULTURAL POTENTIAL and LAND CAPABILITY

5.1 Agricultural potential

The main limiting factor that influences the agricultural potential rating is the soil with above-mentioned limitations and the low average annual rainfall. No evidence of irrigation occurs in this area. Although map unit **Hu3** (with deeper soils) might be used for irrigation, it is not viable because of the scarcity of available water.

Accordingly, the agricultural potential for the survey area is low. The only agricultural activities noted were livestock and/or game farming. The average

grazing capacity for this area is 22-25 ha per animal unit and the long-term annual average NDVI (Normalized Difference Vegetation Index) is moderate to low (Schoeman *et al.*, 2004).

5.2 Land Capability

The Land capability system for South Africa (Schoeman *et al.*, 2004), was used to get a general idea of the land capability and land use for this area.

The study area falls within land capability class VII, with land use options largely restricted to grazing, woodland or wildlife.

Concept: Land in class VII has very severe limitations that make it unsuited to cultivation and that restrict use largely to grazing, woodland or wildlife; restrictions are more severe than those for Class VI because of one or more continuing limitations that cannot be corrected, such as very steep slopes, erosion, **shallow soil, stones**, wet soils, salts or sodicity and **unfavourable climate**.

6 CONCLUSIONS

Taking the above-mentioned factors into account, the general agricultural potential rating is low, which agrees with the land capability rating of Class VII. The main adjacent land use activities are livestock grazing and mining that is confined to the nearby hills.

The overall impacts on the soils of the area are expected to be moderate to low due to the current land use as well as the fact that the survey area does not constitute an area of high agricultural potential, but the proposed infrastructure areas will be situated in the vicinity of the map units with deeper soils, with a slightly better soil potential. The impacts of previous mining activities on the soil, can be seen on the map in the Driehoekspan area and adequate mitigation and management measures have to be put in place.

These will include the requirement that any removal of surface vegetation will be restricted to as small a footprint as possible. In addition, due to the wind erosion hazard in this area, wind protection measures should be taken wherever possible. Such measures will potentially include windbreaks (either natural vegetation or constructed (fencing, netting etc) perpendicular to the direction of the prevailing wind, and may need to be undertaken with the cooperation of an engineering specialist.

While the water erosion hazard in the area is low, care should also be taken not to disturb any drainage line, where cumulative effects, extending downstream, could occur.

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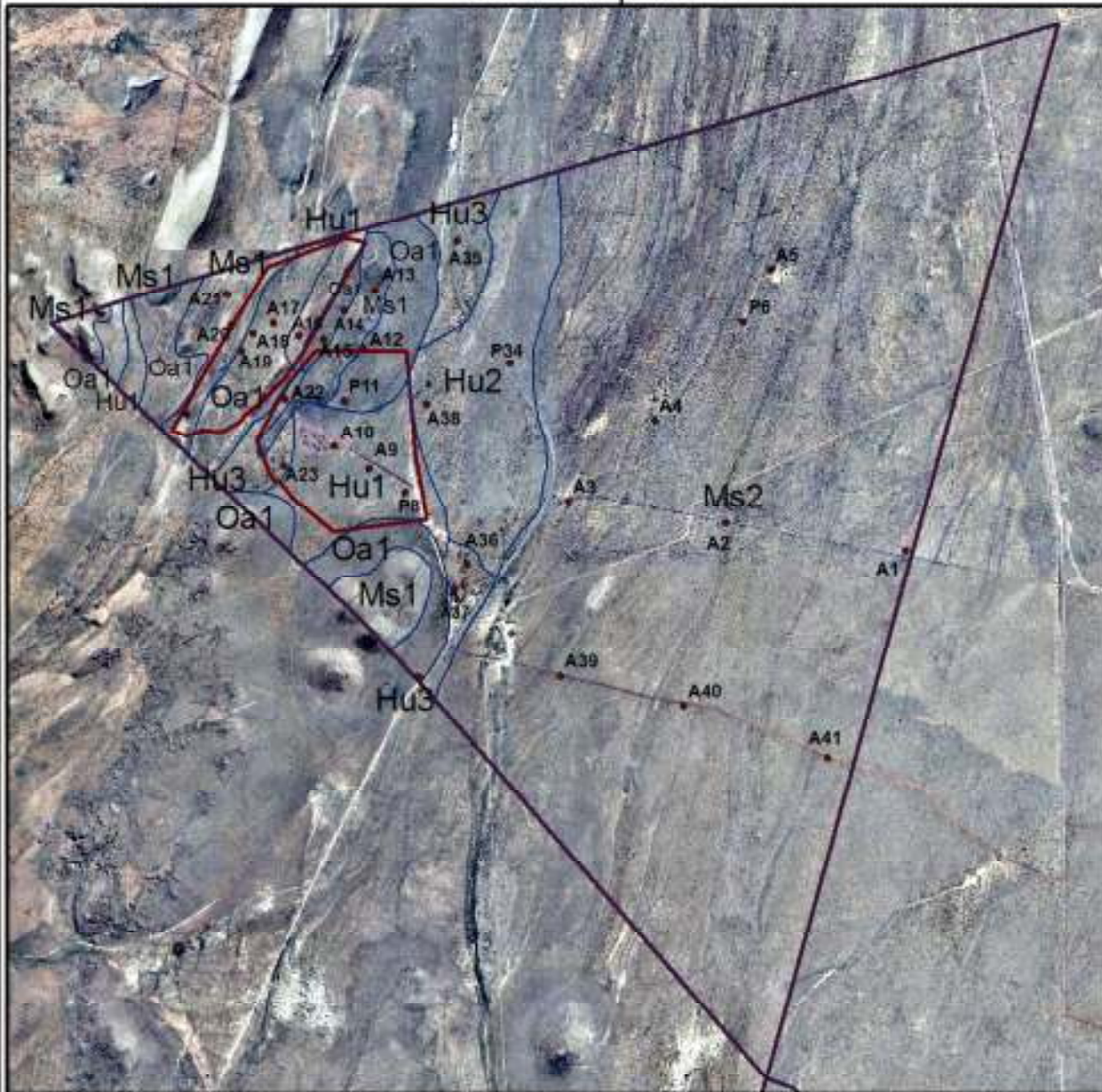
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SOIL MAPS

Driehoekspan

Scale 1:25,000



LEGEND

- Map units
- Footprints
- A1 Observations
- P6 Sample points



| Map unit | Division Soil form/Family (40%) | Subdivision Soil form/Family (40%) | Other soil forms (10%) | Effective depth (mm) | GENERAL DESCRIPTION |
|----------|---------------------------------------|--|------------------------------|-------------------------|---|
| Mu1 | Mu100 | Red, Ga121 | Hu100 | 100-150 | Rock outcrop in association with very shallow, stony, reddish-brown, fine grained, sandy Mispah-, Glenrosa and Hutton soils underlain by rock, occurring on the crests and steeper upper mid-slopes. |
| Mu2 | Mu100 | Red, Hu100 | Gg100, Fu200 | 100-300 | Soil - rock complex, very shallow, dark reddish brown, fine grained, sands with underlying rock and limestone in some places. Sporadic occurrence of deeper sandy Hutton soils (400-700 mm) was found in the vicinity of the weakly developed drainage lines. |
| Hu1 | Hu100 | Mu100 | Rock | 100-400 | Very shallow, dark reddish brown, fine grained, Hutton- and Mispah soils with underlying rock. |
| Hu2 | Hu100 | Oa110 | Rock | 300-750 | Shallow, dark reddish brown, fine sand to loamy sand Hutton- and Oudekalf soils, derived from local alluvium/colluvium with underlying rock and sporadic occurrence of limestone. |
| Hu3 | Hu100 | Oa110 | | 400-1000 | Moderately deep, dark reddish brown, fine sand to loamy sand Hutton- and Oudekalf soils derived from local alluvium/colluvium, underlain by rock or stores and occurs in the lower footslopes and valley bottoms. |
| Oa1 | Oa110 | Hu100 | Red, Mu100 | 400-900 | Shallow to moderately deep, very stony, dark reddish brown, fine grained sandy Hutton- and Oudekalf soils, derived from local colluvium and/or rocky rock. Soils underlain by rock and occurs on the lower mid-slope and upper footslopes. |
| Oa2 | Oa110 | | | 400-1000 | Moderately deep, reddish brown, fine grained and calcareous sandy Dundee soils derived from alluvium, underlain by rock or stores. |

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Doornpan

Scale 1:20,000



LEGEND

- Map units
- Footprints
- A1 Observations
- P6 Sample points



| Map unit | Division Soil form/Family (40%) | Subdivision Soil form/Family (40%) | Other soil forms (10%) | Effective depth (mm) | GENERAL DESCRIPTION |
|----------|---------------------------------------|--|---------------------------|-------------------------|---|
| Mu1 | Mu100 | Red, Ga121 | Hu100 | 100-150 | Rock outcrop in association with very shallow, stony, reddish-brown, fine grained, sandy Mispah-, Glenrosa and Hutton soils underlain by rock, occurring on the crests and steeper upper middleslopes. |
| Mu2 | Mu100 | Red, Hu100 | Gg100, Fu200 | 100-300 | Soil - rock complex, very shallow, dark reddish brown, fine grained, sands with underlying rock and limestone in some places. Sporadic occurrence of deeper sandy Hutton soils (400-700 mm) was found in the vicinity of the weakly developed drainage lines. |
| Hu1 | Hu200 | Mu100 | Rock | 100-400 | Very shallow, dark reddish brown, fine grained, Hutton- and Mispah soils with underlying rock. |
| Hu2 | Hu200 | Oa110 | Rock | 300-750 | Shallow, dark reddish brown, fine sand to loamy sand Hutton- and Oadleaf soils, derived from local alluvium/colluvium with underlying rock and sporadic occurrence of limestone. |
| Hu3 | Hu300 | Oa110 | | 400-1000 | Moderately deep, dark reddish brown, fine sand to loamy sand Hutton- and Oadleaf soils derived from local alluvium/colluvium, underlain by rock or stores and occurs in the lower footslope and valley bottoms. |
| Oa1 | Oa110 | Hu100 | Red, Mu100 | 400-900 | Shallow to moderately deep, very stony, dark reddish brown, fine grained sandy Hutton- and Oadleaf soils, derived from local colluvium and/or rocky rock. Soils underlain by rock and occurs on the lower middle slope and upper footslope. |
| Du1 | Du100 | | | 400-1000 | Moderately deep, reddish brown, fine grained and calcareous sandy Dundee soils derived from alluvium, underlain by rock or stores. |

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LNR-INSTITUUT VIR GROND, KLIMAAT EN WATER

Private Bag/Privaatsak X79, Pretoria 0001, SOUTH AFRICA/SUID-AFRIKA
Tel: (012) 310 2500 Int: + 27-12 310 2500
Fax/Faks: (012) 323 1157 Int: + 27-12 323 1157
e-mail: iscwinfo@arc.agric.za website: www.arc-iscw.agric.za

Specialist Name: Dr DG Paterson

Company: ARC-Institute for Soil, Climate and Water

Address: Private Bag X79, Pretoria 0001

Contact number: 012 310 2601

Date: 01/12/2015

**SPECIALIST REPORTING REQUIREMENTS AS PER APPENDIX 6 OF THE EIA
REGULATIONS 2014**

This letter has been prepared to report on the compliance of ARC-Institute for Soil, Climate and Water as part of the specialist reporting requirements listed in Appendix 6 of the Environmental Impact Assessment Regulations, 2014 from the National Environmental Management Act, 1998 (Act no. 107 of 1999).

1. (a)(i) Details of the specialist who prepared the report

Dr DG Paterson – PhD (Soil Science)

1. (a).(ii) The expertise of that specialist to compile a specialist report including a curriculum vitae

| | | | |
|-------------------------------|--|--------------|--------------|
| Company of Specialist: | ARC-Institute for Soil, Climate and Water | | |
| Name / Contact person: | Dr DG Paterson | | |
| Postal address: | Private Bag X79, Pretoria | | |
| Postal code: | 0001 | Cell: | 083 556 2458 |
| Telephone: | 012 310 2601 | Fax: | 012 323 1157 |
| E-mail: | garry@arc.agric.za | | |
| Qualifications | PhD (Soil Science), 2014, University of Pretoria | | |

**Registration /
Associations**

SACNASP (Reg. No. 400463/04)
Soil Science society of SA

1. (b) a declaration that the specialist is independent in a form as may be specified by the competent authority

I, DG Paterson, declare that -

- I act as the independent specialist in this application;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the relevant legislation and any guidelines that have relevance to the proposed activity;
- I will comply with the applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- All the particulars furnished by me in this form are true and correct



Signature of the Specialist

1. **(c) an indication of the scope of, and the purpose for which, the report was prepared**

See report Section 1.

1. **(d) the date and season of the site investigation and the relevance of the season to the outcome of the assessment**

| |
|--|
| Site visit/investigation: soil sampling and characterisation |
| Date: April 2013 |
| Season: Autumn |
| Relevance of the season to the outcome of the assessment: Not relevant |

1. **(e) A description of the methodology adopted in preparing the report or carrying out the specialised process**

See report Section 3

1. **(f) The specific identified sensitivity of the site related to the activity and its associated structures and infrastructure**

See report Section 5.

1. **(g) An identification of any areas to be avoided, including buffers**

See report Section 6.

1. **(h) A map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers**

Not done, as no areas of sensitive soils were identified

1. **(i) A description of any assumptions made and any uncertainties or gaps in knowledge**

None identified

1. **(j) A description of the findings and potential implications of such findings on the impact of the proposed activity, including identified alternatives on the environment**

See report Section 5.

1. **(k) Any mitigation measures for inclusion in the EMPr**

See report Section 6.

1. **(l) Any conditions for inclusion in the environmental authorisation**

None identified

1. (m) Any monitoring requirements for inclusion in the EMPr or environmental authorisation

Monitoring mentioned in Section 6, but no specific plan provided.

1. (n)(i) A reasoned opinion as to whether the proposed activity or portions thereof should be authorised

No significant limiting factors, fatal flaws or other reasons (from a soils point of view) that would preclude authorisation.

1. (n)(ii) A reasoned opinion if the opinion is that the proposed activity or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan

See report sections 5 and 6.

1. (o) A description of any consultation process that was undertaken during the course of preparing the specialist report;

Consultation with interested and affected parties was undertaken as part of the environmental impact assessment and environmental management programme process conducted by SLR Consulting (Africa) (Pty) Ltd.

1. (p) A summary and copies of any comments received during any consultation process and where applicable all responses thereto

Comments and responses that were raised by interested and affected parties are included in the issues table, an Appendix of the EIA report.

1. (q) any other information requested by the competent authority.

No information requested

If you have any queries regarding the above, please do not hesitate to contact me.

Yours Sincerely,



DG Paterson (Dr)