# Specialist report

# RUSTENBURG STRENGTHENING PHASE 2

# (MARANG B)

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## Contents

## INTRODUCTION

### Project Description:

The brief for the project supplied by DIGES are:

- A new 3x 500MVA 400/132kV Main Transmission Substation (MTS), Marang B on approximately ±30 hectares; and
- ±2km of 400kV loop in loop out power lines which will feed off the existing 400 kV Bighorn-Marang, Medupi-Marang or Marang-Midas power lines and feed into the new substation.

The terms of reference was to compile an Ecological Report and determine if a Wetland Delineation was to be undertaken.

### Project Locality:

The project is located northeast of Rustenburg in the North West Province and the proposed project will be in close proximity to the existing 400/88kV Marang Main Transmission substation on Farm Klipgat 281 JQ and Portion 2 of the Farm Elandsheuvel 282 JQ (Figure 1).


Figure 1: Approximate locality map and study area.

## ASSUMPTIONS and LIMITATIONS

### Availability of baseline information:

Baseline information about the plant community of the site was obtained from Mucina and Rutherford (2006). The desktop survey provided adequate baseline information for the area and therefore this was not a constraint. The baseline information for the mammal survey was obtained from Skinner and Chimimba (2005) and information from North West Conservation services (2009) was used to determine the red data mammal list for the area.

### Constraints:

The survey was conducted October 2013 during daytime only. The study area is stretched out over a large area and access to all areas is not always possible. All the different habitats at the site was investigated and it was therefore possible to complete a rapid survey and obtain information on the biological community (excluding avifaunal) that are present and the site, or that are likely to occur there.

Bio-physical constraints:

Weather conditions during the surveys were moderate to hot (30 ºC during the survey). During both surveys it was sunny, with a mild wind blowing. It seems that the region has received good rainfall prior to the site visit as the vegetation was lush in places. There were signs of overgrazing. Some standing water was present away from the rivers and in some of the streams a few stagnant pools were present. This will have obvious implications on the biodiversity that are likely to occur in the area. Nevertheless, the conditions during the survey were ideal for a survey of this nature.

Confidentially constraints:

There were no confidentially constraints.

### Implications for the study:

Apart from the prevailing weather conditions at the site, there were no other significant constraints that would negatively impact upon the study. There is sufficient good quality data available in the literature that partially negates the negative effect that the type of survey had on the quality of the assessment.

The Environmental Impact Assessment Regulations (Section 32 of Government Notice R543 of 2010), requires that certain information is included in specialist reports. The terms of reference, purpose of the report, methodologies, assumptions and limitations, impact assessment and mitigation (where relevant to the scope of work) and summaries of consultations (where applicable) are included within the main report. Other relevant information is set out below:

**Expertise of author:**

- Working in the field of ecology since 1996 and in specific vegetation related assessments since 2000.
- Worked in the field of freshwater ecology and wetlands since 2000.
- Is registered as a Professional Natural Scientist with the South African Council for Natural Scientific Professions (Reg. No. 400109/95).
- Has been working with plants indigenous to South Africa since 2004.

**Declaration of independence:**

BioAssets in an independent consultant and hereby declare that it does not have any financial or other vested interest in the undertaking of the proposed activity, other than remuneration for the work performed in terms of the National Environmental Management Act, 1998 (Act 107 of 1998). In addition, remuneration for services provided by BioAssets is not subjected to or based on approval of the proposed project by the relevant authorities responsible for authorising this proposed project.

**Disclosure:**

BioAssets undertake to disclose, to the competent authority, any material information that has or may have the potential to influence the decision of the competent authority or the objectivity of any report, plan or document required in terms of the National Environmental Management Act, 1998 (Act 107 of 1998) and will provide the competent authority with access to all information at its disposal regarding the application, whether such information is favourable to the applicant or not.

Based on information provided to BioAssets by the client, and in addition to information obtained during the course of this study, BioAssets present the results and conclusion within the associated document to the best of the author's professional judgement and in accordance with best practise.

_____ 6 December 2013

Dr Wynand Vlok Date
Pr. Sci. Nat 400109/95

## Vegetation:

The vegetation of the study area falls mainly within the Savanna Biome and a single vegetation unit: the Marikana Thornveld (SVcb 6) (Figure 2 and 3). Previously the vegetation unit was referred to as Sourish Mixed Bushveld or Other Turf Thornveld (Acocks, 1953) and Clay Thorn Bushveld (Low and Rebelo, 1996). Two red data species are known in the ¼ ° square, but the required habitat is absent (Addendum 2). One protected tree, *Boscia albitrunca*, is listed, but no specimens were observed in the corridor. Two other protected trees were however observed: *Sclerocarya birrea* and *Combretum imberbe* (see text in discussion).

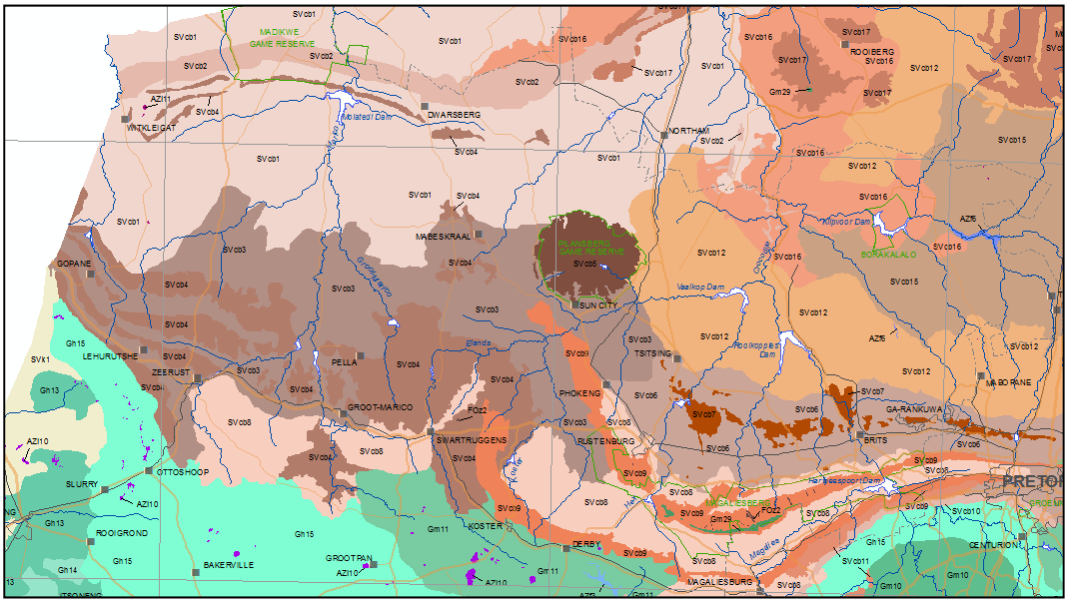


Figure 2: Map indicating the vegetation units associated with the Northwest Province (Mucina and Rutherford, 2006).

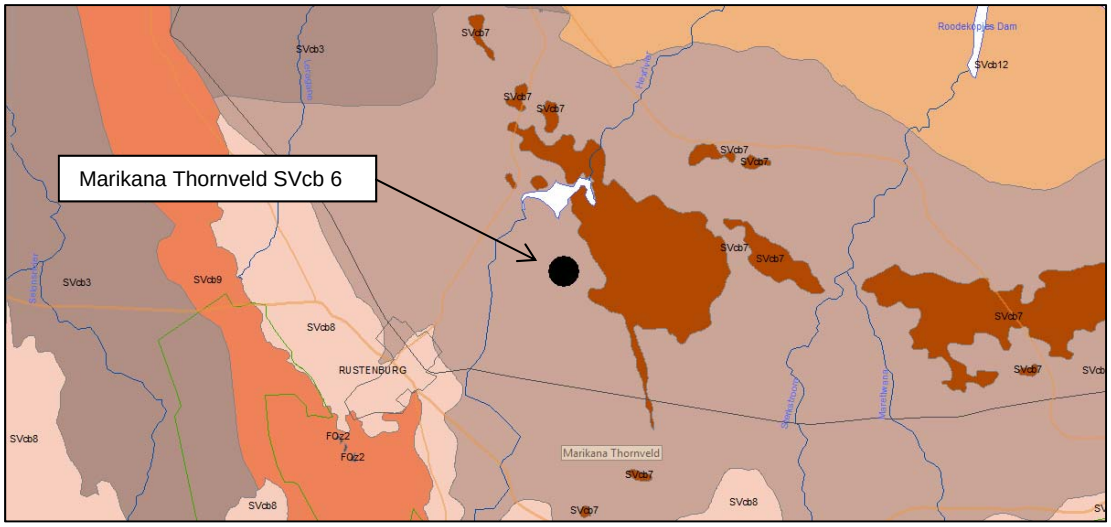


Figure 3: Map indicating the vegetation unit (arrow) associated with the study area (black circle) (Mucina and Rutherford, 2006).

The unit (Marikana Thornveld SVcb 6) is well represented in the study area. It occurs in the North-West and Gauteng provinces, mainly associated with the plains to the east of Rustenburg, around Marikana to Brits and Pretoria. The altitude ranges between 1 050 and 1 450m. The vegetation is dominated by the open *Acacia karroo* woodlands and occurs on the undulating plains, low valleys and lowland hills. The more dense shrubs are present along drainage lines, around the termitaria, rocky outcrops or areas protected from fire (Mucina and Rutherford, 2006).

**Geology:**

The complex geology is underlain by the mafic intrusive rocks of the Rustenburg Layered Suite of the Bushveld Igneous Complex with rocks that include gabbro, norite, pyroxenite and anorthosite. Some quartzites and shales associated with the Pretoria Group, part of the Transvaal Supergroup, are found and the soils are mainly clays with some well drained, deeper soils (Mucina and Rutherford, 2006).

**Climate:**

The area experiences dry winters with frequent frost and summer rainfall with the mean annual precipitation (MAP) varying between 660 and 700mm per annum. The temperatures in the study area range between 35.3˚C and -3.3˚C (Mucina and Rutherford, 2006).

**Conservation:**

The vegetation unit is considered to be endangered (Mucina and Rutherford, 2006) and only 1% of the targeted 19% is protected. Apart from urban development, grazing and cultivation, one must consider the mining activities as being responsible for more than 60% of the unit being transformed. Erosion is low to medium with alien invasive plants being a problem along most drainage lines.

## METHODOLOGY

Literature survey:

All available literature and database information pertaining to the vegetation and threatened species of the study area was obtained and reviewed.

Desktop study:

Prior to the site visit and field survey, Eskom and DIGES provided the specialists with information related to the relevant 1:50 000 map of the study site. The appropriate maps were used to identify the major habitat features such as roads, railways, drainage channels, old cultivated fields, wooded areas, wetlands, ridges etc. Prior to the site visit, a desk top study was conducted to generate lists of species historically recorded at or near the site, or that are likely to occur at the site.

Site visit:

The field survey was conducted in October 2013. During this field survey, most of the corridor was covered on foot. The dominant tree species were noted, general height and abundance was recorded and care was taken to look for any protected species, although none are listed in the literature. It is important to note that only a rapid survey was conducted and not a full plant survey. This will need 18 months to ensure all flowering plants are encountered.

Only limited sampling was undertaken as a result of the fact that a majority of the proposed corridor is situated within habitats that have already been transformed by various anthropogenic impacts.

## RESULTS and DISCUSSION

This report focuses on the biological aspects (excluding the avian component) and the associated habitat and the possible impacts as a result of the construction of the proposed power lines and new substation. Management and mitigating solutions will be discussed. Addendum 1 is a summary of possible impacts and issues and list management and mitigating options and strategies.

According to Mucina and Rutherford (2006) no trees listed as “protected” occur in the study area, although the SANBI Précis (2013) list *Boscia albitrunca* for the area. Addendum 2 is a summary of red data species in the area. Two plants are listed, but don’t occur because of a lack of habitat.

For the study, three sites were investigated for the new substation and the associated power lines (Figure 4)

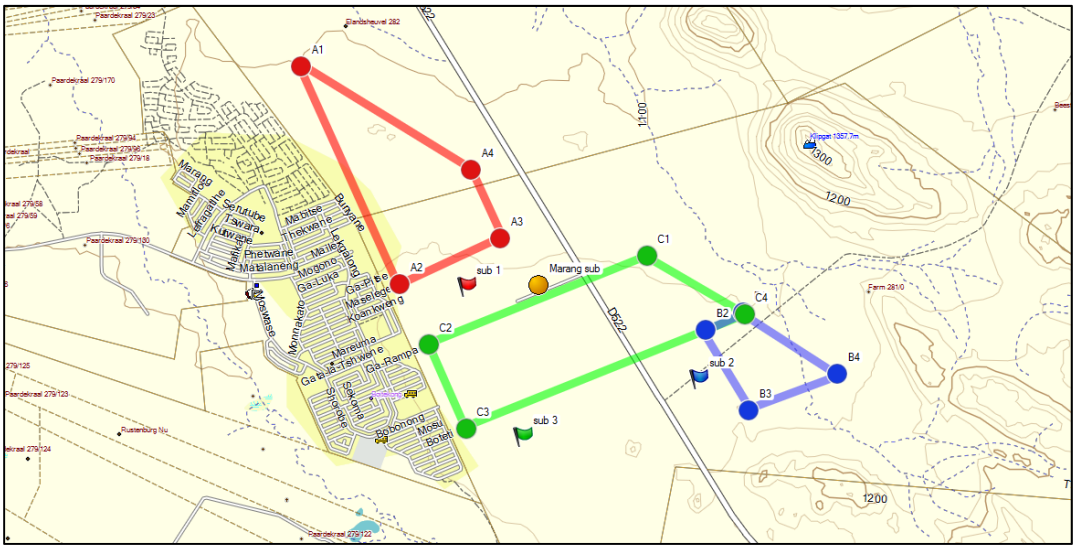


Figure 4: General corridor investigated for the new power lines between the new Marang Substation and the existing power lines. The red block = corridor 1 with the substation position indicated by the red flag, the blue block = corridor 2 with the substation position indicated by the blue flag and the green block = corridor 3 with the substation position indicated by the green flag.

The landscape associated with the corridors for the power line is severely modified. Activities include mining, cultivated lands, grazing, housing developments and associated infrastructure. The vegetation around the Marang substation and power line corridors are modified and only a few small shrubs, mostly *Acacia karroo* are present (Figure 5 - 7). Illegal dumping of household and building refuse is present.

Figure 5: View towards the existing substation.

Figure 6: Modified vegetation near the Marang substation.

Figure 7: Low shrubs dominate the tree community.

The three options are similar, but each will be discussed separately.

## Alternative 1:

This site for the new Marang substation is to the northeast of the existing substation (Figure 8 and 9). The larger area represents the proposed corridor for the new power lines that will be associated with the substation. The natural vegetation is severely modified and very few large trees are present. The trees are dominated by *Acacia mellifera, A. robusta, Searsia lancea, Ziziphus mucronata* and *Sclerocarya birrea* on the rock outcrops (Figure 10 – 12).

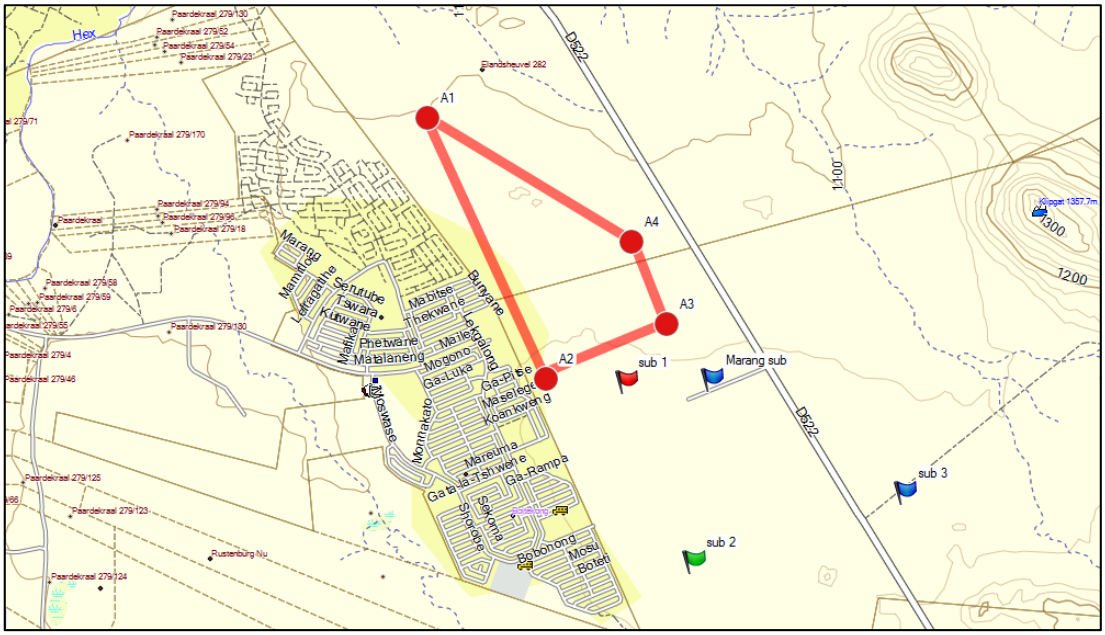


Figure 8: Site for Alternative 1 substation (red flag) and the corridor for power line (red box).

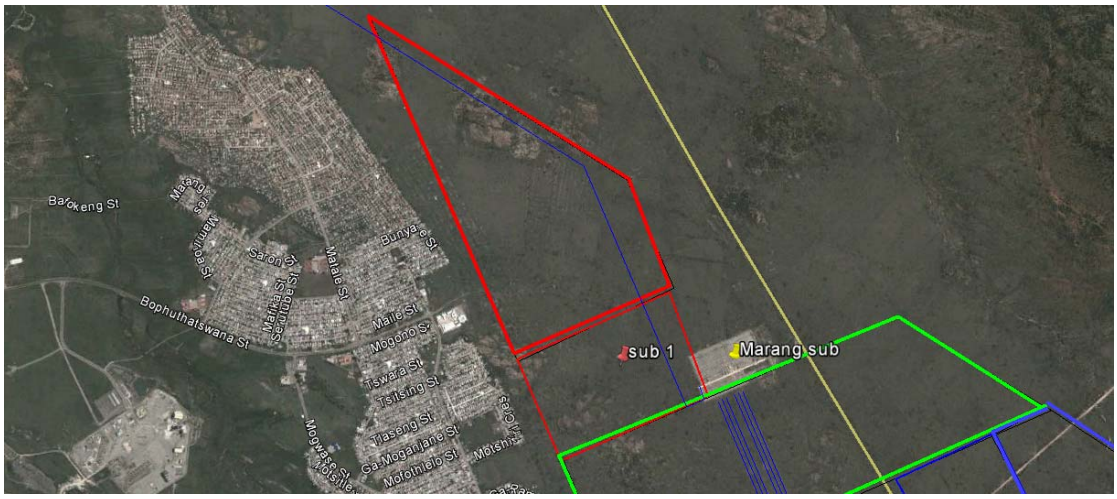


Figure 9: Aerial view of the site – Alternative 1.

Figure 10: General view of the corridor for the power lines.

Figure 11: View of the vegetation – corridor 1.

Figure 12: View of the substation site – Alternative 1.

The koppies to the north of the power line corridor are considered as important habitat and refuge areas for migrating biota and plant diversity. The new power lines must not cross over these outcrops, but rather link to the existing power lines to the east or west of the features.

**Alternative 2:**

This alternative is southeast of the existing Marang substation and east of the tar road (D522) (Figure 13 and 14). The corridor for the power lines is crossing over an important watercourse feeding water to Lake Bospoort approximately 4km north of the site. The site for the substation is about 500m from the stream and will not have a direct impact, but a small drainage line cuts through the proposed site. The area is close to the koppies to the south and this can have a negative impact, as the koppies and

stream is considered as an important migration corridor and refuge area for many species of birds and animals (Figure 15 – 17).

The vegetation in this area is modified due to grazing and wood harvesting. Trampling is a problem and the slight slopes near the stream show some erosion present. In addition, a major road to a mine cuts through the substation site.

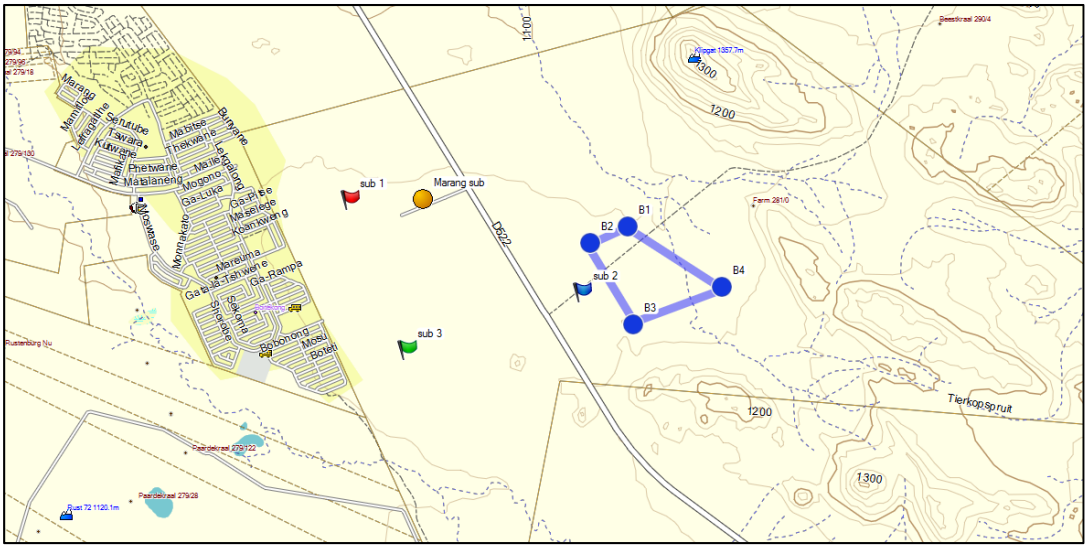


Figure 13: Position of Alternative 2, southeast of the Marang substation.

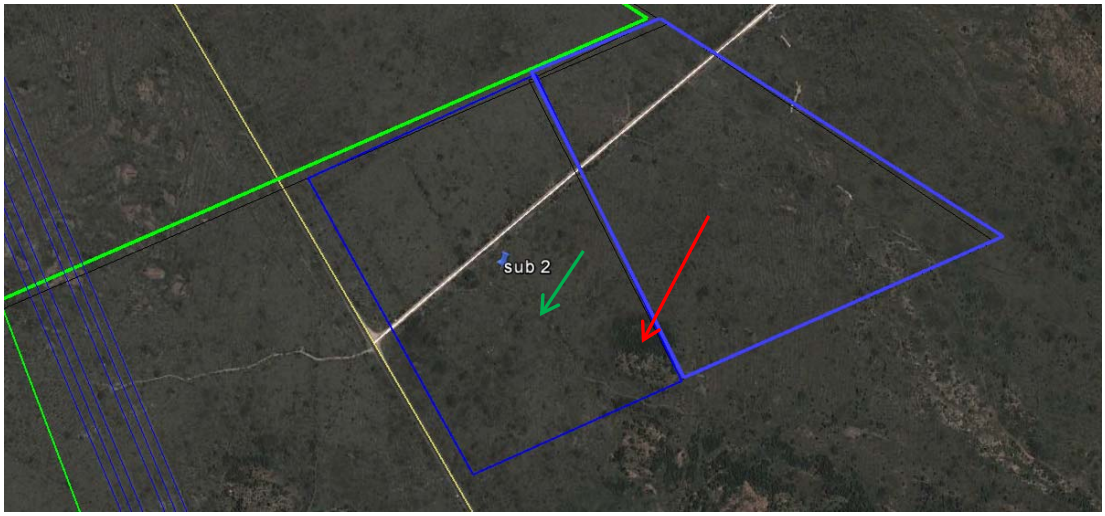


Figure 14: Aerial view of Alternative 2 – note koppie in southeast corner of the substation site (red arrow) and the drainage line (green arrow).

Figure 15: General view of the corridor area.

Figure 16: Example of koppies near the corridor and substation site.

Figure 17: View of the substation site west of the access road to the mine.

**Alternative 3:**

The corridor for the power lines and proposed new substation site is situated south of the existing Marang substation (Figure 18 and 19). The natural vegetation is modified and small trees and low shrubs dominate the area. It is clear that grazing and wood harvesting had severe negative impacts on the natural vegetation. There are no alien invasive infestations observed and limited erosion was noted (Figure 20 – 22).

A few rock outcrops (< 10m) is present in the corridor and is not considered as very important habitat due to the small size and exposed nature of these areas (Figure 20 and 21). The close proximity to the settlement (wood harvesting and grazing) and hunting with dogs result in the severe modification of the corridor and substation site.

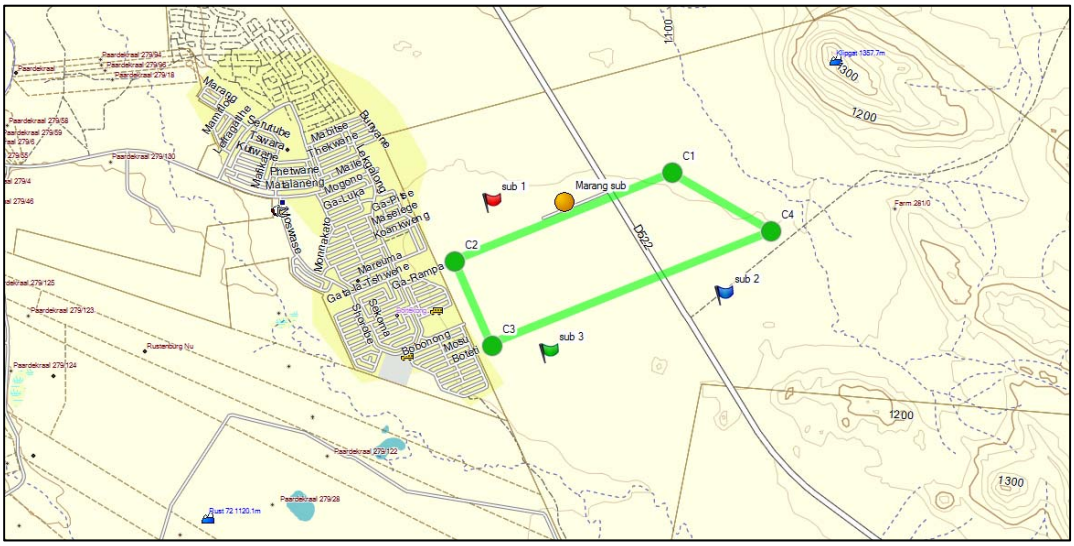


Figure 18: View of the corridor for the proposed future power lines (green box) and site for the substation (green flag).

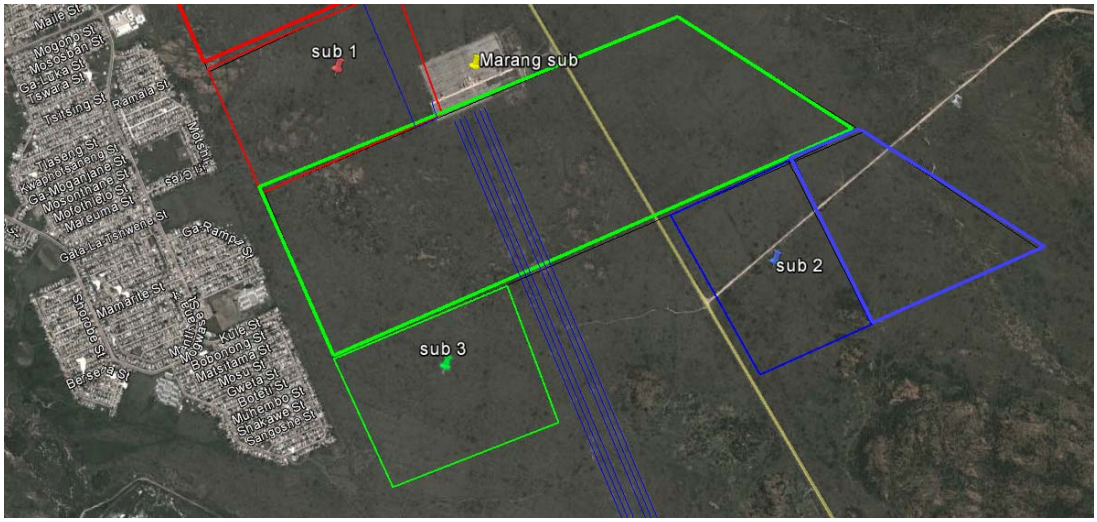


Figure 19: Aerial view of Alternative 3 (green) – note land use and some rock protrusions on the surface.

Figure 20: General view of the corridor for Alternative 3.

Figure 21: View of rock outcrops at the substation site.

Figure 22: View of natural vegetation in the corridor (Alternative 3).

**In conclusion, from an ecological perspective it is recommended that Alternative 2 is not considered for the new proposed substation site. This area north of the road is close to the koppies and mountains and the drainage line. These features are considered as important habitat and migration routes for birds and animals and in addition the plant communities are in a fair to good condition, compared to the natural vegetation on the open plains.**

**The other alternatives (1 and 3) are both viable for the development, as the existing impacts are high. The low rock outcrops in the area for Alternative 3 is not of major concern, however the koppies in the northern part of the corridor for power lines (Alternative 1) is more sensitive.**

**RECOMMENDATIONS:**

- With careful planning of construction activities impacts to the environment can be reduced. It is suggested that the pylons are placed at least 75m from the outcrops and koppies.
- The vegetation in the area is severely modified, therefore the project will have a very low impact.
- Ensure no oil or fuel spills occur during construction or installation of transformers.
- Build berms or containment dams around transformers to contain accidental spills.
- Prevent and rehabilitate erosion.
- During the finalisation on the power line, placement of structures near all streams must be confirmed to ensure the integrity of the habitat is not compromised.
- The corridor investigated had a vegetation cover in a “poor to fair state” with some impacts related to grazing and wood collection, while roads, mines and town developments have the biggest impacts in the area.
- From an ecological perspective, Alternative 3 is a viable option because of the limited need to clear large quantities of natural vegetation. The absence of koppies further contributes to the use of this option compared to the other two alternatives.
- Before any clearing or trimming commences, this specialist must accompany Eskom and the contractors to verify trees to be trimmed or cut.
- The following protected tree species are reported to be in the vegetation unit: *Sclerocarya birrea* - approximately 15 were observed in the corridors investigated during the “walk down” phase of the project. In addition two small (1m high) *Combretum imberbe* were seen. Permits for cutting/trimming must be acquired before the project can commence. No red book data plant species is recorded for the site. This must be confirmed once the final route and corridor is selected, as the cutting of trees are continuing and may be lost due to harvesting.

- Although some mammals can occur in the area (suitable habitat), no records on the property is found.
- Although there are some drainage lines and it can be considered as corridors for the limited migration of species. The corridor for the power line will have a very limited impact on these corridors and therefore will have no large scale effect on the species or area. the large area for the substation (Alternative 2) will have a negative impact on the small stream feeding water to the Bospoort impoundment.
- With regard to biodiversity patterns, little if any impacts will occur.
    - The vegetation type occurs over a very large area and the narrow corridor for the power line will have no large-scale negative impact on it. The clearing of vegetation for the substation site will have an impact of a local scale, but it will be negligible over the total area associated with the vegetation type.
    - No red data plant species occur – no impact (High confidence).
    - As stated, some drainage lines occur and impacts will occur if Alternative 2 is used (high confidence).
    - There were limited alien plant infestations observed on the site and in the near vicinity (town developments). Clearing of soil can always lead to some infestations from the available seed sources. It is suggested that the “maintenance plan” of the site must include regular inspections to ensure no alien or exotic plants establish itself on site.
    - Currently the vegetation on the study site is in a poor condition and apart from roads, mining, industrial sites and town developments other land-uses include grazing, cultivation of lands (very limited) and wood collection. Overgrazing occurred on or near the site.
    - The activity (power line and substation) will have no real impact on biodiversity processes. The only possible impact can be oil or fuel spillages that can occur during construction or the installation and maintenance of the transformers. It is always suggested that fuel and oil must not be stored on site during the construction phase and that containment dams or berms are constructed around

transformers. In addition, a clear plan how to manage accidental spills must be included in the EMP for the site.

As stated, the impact on the system is low. Yet, this development won't have a negative impact on the region with regard to plants, plant communities, water courses – when looking at it in a regional perspective.

**Because of the general poor status of the vegetation, the landscape in total is modified. Large destruction of the habitat due to mining, its associated infrastructure, town development, grazing and wood harvesting are present. The only really problem areas are the streams and drainage crossings and koppies in the area associated with Alternative 2. These areas can possible still act as a corridor for migrations.**

**Two red data species are listed, but don't occur due lack of there specific habitat needs.**

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Mucina, L. and Rutherford, M.C. (eds.) 2006. The vegetation of South Africa, Lesotho and Swaziland. *Strelitzia* 19. South African Biodiversity Institute, Pretoria.

Skinner, J.D and Chimimba, C.T. 2005. *The mammals of the southern African subregion*. 3rd Edition. Cambridge University Press.

South African National Biodiversity Institute. 2012. *Precis information on red data species*. Pretoria.

Addendum 1: List of impacts and suggested mitigating and management strategies.

| **Rustenburg strengthening phase 2 project** | | |
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| **Theme** | **Natural environment** | |
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| **Nature of issue** | Erosion | |
| **Stage** | Construction and maintenance | Possibility for erosion during construction possible due to soil types. |
| **Extent of impact** | Site, local and region | The impact will be moderate on-site (power line servitude and substation), but limited to low on a regional scale. Silt will have a negative impact in streams and rivers, but will be low to moderate for this project. |
| **Duration of impact** | Immediate | If not addressed on constant basis, permanent damage is a reality. |
| **Intensity** | Moderate/high | If not properly managed as part of operational plan, it will be high. |
| **Probability of occurrence** | High | Must be managed on daily basis. |
| **Status of the impact** | Project: negative<br><br>Environment: negative | If well managed, can be neutral for both. |

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| **Cumulative impact** | High. | If no maintenance is done, the impact will have a compounding impact on the environment. |
| **Level of significance** | Low-medium if controlled. | Will be high if not managed. |
| **Mitigation measures** | • Limited traffic during construction.<br>• Constant rehabilitation during construction.<br>• Must have maintenance strategy as part of EMP. | No driving through any streams except on existing roads. |
| **Level of significance after mitigation** | Low. | |
| **EMP requirements** | • No surface storm water generated at substation as a result of the development may be directed directly into any natural drainage system or wetland.<br>• A surface runoff and storm water management plan (Eskom engineer to do as part of planning of structure), indicating the management of all surface runoff generated as a result of the development (during both the construction and operational phases) prior to entering any natural drainage system or wetland, must be submitted (e.g. storm water and flood retention ponds).<br>• An onsite ecological management plan must be implemented for rivers including management recommendations as well as potential rehabilitation | |

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| | of severely disturbed areas. | |
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| **Nature of issue** | Construction – material, by products and construction sites. | This includes accommodation, storing of material and ablution facilities for all workers during construction. It is recommended that no workers stay on the construction sites or along the servitude for the power line at any time. |
| **Stage** | Construction and maintenance | Must have a strict environmental guidelines and management plan in place before clearing and construction can commence. |
| **Extent of impact** | Site, local and region | Can have a medium impact on site, related to pollution, but the impact in the region will be low. |
| **Duration of impact** | Immediate | If not addressed on constant basis, permanent damage is a reality. |
| **Intensity** | Low/moderate | If not properly managed as part of operational plan, it will be high. |
| **Probability of occurrence** | High | Must be managed on daily basis. |
| **Status of the impact** | Project: negative<br><br>Environment: negative | If well managed, can be neutral for both. |
| **Cumulative impact** | Marginal. | If no maintenance is done, the impact will have a compounding impact on the environment. |

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| **Level of significance** | Low-medium if controlled. | Will be very high if not managed. |
| **Mitigation measures** | • Proper ablution facilities on site.<br>• Constant management during construction.<br>• Contain oils and fuel in berm area.<br>• Must have rehabilitation strategy as part of EMP. | This refers to storage of material, oil and fuel spills, ablution facilities and rehabilitation of construction sites at the completion of the project. Build containment berms around oil and fuel storage areas, as well as around the transformers. All by products and materials must be disposed at approved sites. |
| **Level of significance after mitigation** | Low. | Will have to form part of the EMP to ensure low impact/significance at completion. |
| **EMP requirements** | • During the construction phase, workers must be limited to areas under construction and access to neighbouring undeveloped areas must be strictly regulated.<br>• Construction should be limited to the daylight hours preventing disturbances to the nocturnal activities of certain species and nearby human populations.<br>• All temporary stockpile areas, litter and rubble must be removed on completion of construction. All dumped material must be taken to an approved dump site in the area.<br>• Soil stockpiling areas and storage facilities must follow environmentally sensitive practices and be | |

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| | situated a sufficient distance away from drainage areas or drainage line.<br><br>• The careful position of soil piles, and runoff control, during all phases of development, and planting of some vegetative cover after completion (indigenous groundcover, grasses etc.) will limit the extent of erosion occurring on the site. | |
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| **Nature of issue** | Pollution | Includes oil and fuel spills, erosion, storage of by-products and ablution facilities. |
| **Stage** | Construction and maintenance | Must have a strict environmental guidelines and management plan in place before clearing and construction can commence. |
| **Extent of impact** | Site, local and region | Can be severe if not well managed. Must be done on a daily basis (part of the EMP). |
| **Duration of impact** | Immediate | If not addressed on constant basis, permanent damage is a reality. Water pollution can be a severe problem. |
| **Intensity** | Low/moderate | If not properly managed as part of operational plan, it will be high. |
| **Probability of occurrence** | High | Must be managed on daily basis. |
| **Status of the impact** | Project: negative | If well managed, can be neutral for both. |

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| | Environment: negative | |
| **Cumulative impact** | Marginal - compounding | If no maintenance is done, the impact will have a compounding impact on the environment. |
| **Level of significance** | Low-medium if controlled. | Will be very high if not managed. |
| **Mitigation measures** | • Proper ablution facilities on site.<br>• Constant rehabilitation of erosion problems.<br>• Berms to contain spills.<br>• Proper storage facilities of construction materials.<br>• Waste management is very important. Proper storage and removal strategy must be in place.<br>• Must have rehabilitation strategy as part of EMP. | This refers to storage of material, oil and fuel spills, ablution facilities and rehabilitation of construction sites at the completion of the project. Due to the nature of the slopes and soils, water pollution can be a problem if not properly managed. |
| **Level of significance after mitigation** | Low. | Will have to form part of the EMP to ensure low impact/significance at completion. |
| **EMP requirements** | • Proper strategy to prevent erosion – see above.<br>• Berms and containment measures for fuels and oils, also around transformers to prevent spills during accidents and maintenance.<br>• Cleanup plan/strategy if spills occur. | |

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| | • Proper facilities (ablution) to ensure no sewerage spills into streams and rivers.<br>• Proper storage of material during construction and cleanup after the construction is completed.<br>• Proper strategy to remove and dispose of oil from transformers. | |
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| **Nature of issue** | Alien vegetation | Includes all exposed areas – servitude for the power line and around the substation. |
| **Stage** | Construction and maintenance | Must have a strict environmental guidelines and management plan in place before clearing and construction can commence. |
| **Extent of impact** | Site, local and region | Can be severe if not well managed. Must be done on a daily basis (part of the EMP). |
| **Duration of impact** | Immediate | If not addressed on constant basis, permanent damage is a reality. Many exotics are present and can invade exposed areas during and after construction. |
| **Intensity** | Low/moderate | If not properly managed as part of operational plan, it will be very high. |
| **Probability of occurrence** | High | Must be managed on regular basis. |

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| **Status of the impact** | Project: negative<br><br>Environment: negative | If well managed, can be neutral for both. |
| **Cumulative impact** | Marginal - compounding | If no maintenance is done, the impact will have a compounding impact on the environment. |
| **Level of significance** | Low-medium if controlled. | Will be very high if not managed. |
| **Mitigation measures** | • Need to ensure all alien plants on construction sites are removed.<br><br>• Must clear alien vegetation on a regular basis.<br><br>• Must have rehabilitation strategy as part of EMP. | |
| **Level of significance after mitigation** | Low. | Will have to form part of the EMP to ensure low impact/significance at completion. |
| **EMP requirements** | • Proper strategy to prevent invasive alien plants from establishing and this will further prevent pollution and erosion – see above.<br><br>• Regular maintenance and inspections and removal of alien plants.<br><br>• Possible to link with Working for Water in this regard. | |
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| **Nature of issue** | Removal on natural vegetation | Includes servitude for the power line and substation site. |
| **Stage** | Construction and maintenance | Must have a strict environmental guidelines and management plan in place before clearing and construction can commence. |
| **Extent of impact** | Site, local and region | Limited removal of vegetation is needed along the power line corridor, but total clearing of the substation site is required. The impact on site will be low to moderate, with very low impact on local and regional level. Can be severe if not well managed. Must be monitored on a daily basis (part of the EMP) to ensure no illegal removing or cutting occur. |
| **Duration of impact** | Permanent | The removal of plants for the project will have permanent impact. The limited removal of some plants and the maintenance of the power line corridor will also have a permanent effect. |
| **Intensity** | Low/moderate | Although the duration of the impact is of a permanent nature, the intensity is low on a local and regional scale. The immediate habitat surrounding the servitude is in a poor condition. The protection of the environment is the function of local and provincial authorities and this will be important. The construction of the power line will have negligible impacts if well managed. |
| **Probability of occurrence** | High | Again, the impact will be confined to the site of the switching station. In the larger environment, the probability will be low. |

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| **Status of the impact** | Project: negative<br><br>Environment: neutral | If well managed, can be neutral for both. |
| **Cumulative impact** | Marginal | If poor maintenance is done, the impact will have a compounding impact on the environment. |
| **Level of significance** | Low-medium if controlled. | Will be very high if not managed. |
| **Mitigation measures** | • Only vegetation on the switching station site area to be cleared. Limited plants need to be removed when clearing the servitude for the new power line. Clear guidelines and proper plans must be given to the contractor. Daily inspections are needed to prevent problems.<br><br>• Must clear alien vegetation on a regular basis.<br><br>• Exposed areas should be rehabilitated with a grass mix that blends in with the surrounding vegetation. The grass mix should consist of indigenous grasses adapted to the local environmental conditions. The grass seeds should a variety of grass species including several pioneer species.<br><br>• Must have rehabilitation strategy as part of EMP. | A clear plan must be in place before the project commence. The contractor must clearly understand where to clear. The area should be marked. A policy should be in place to penalise the contractor. Eskom and conservation services should have an official on site to ensure no problems occur. |
| **Level of significance after mitigation** | Low. | Will have to form part of the EMP to ensure low impact/significance at completion. |

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| **EMP requirements** | • Proper strategy to prevent invasive alien plants from establishing and this will further prevent pollution and erosion – see above.<br>• Regular maintenance and inspections and removal of alien plants.<br>• Possible to link with Working for Water in this regard. | |
| | | |

Addendum 2: List of species in the ¼ degree grid listed as near threatened, threatened, vulnerable, critically rare and rare by SANBI (2013).

| **Family** | ***Genus and species*** | **Status** | **Area of occurrence, habitat type and description and impacts** | **Probability of occurring** |
|---|---|---|---|---|
| ASPHODELACEAE | *Aloe peglerae* | EN | Gauteng, North West - Magaliesberg and Witwatersberg<br><br>Grassland, in shallow, gravely quartzitic soils on rocky, north-facing slopes or summits of ridges<br><br>Habitat loss, Habitat degradation, Changes in native species dynamics, Harvesting<br><br>*Aloe peglerae* is a small, stemless aloe, which grows on the north facing slopes of the Magaliesberg and Witwatersrand. | Very low |
| MESEMBRYANTHEMACEAE | *Frithia pulchra* | Rare | Gauteng, North West - Magaliesberg.<br><br>Fynbos - Coarse, shallow, quartzitic soils on sandstones.<br><br>*Frithia pulchra* grows exclusively in the summer-rainfall region of South Africa has a restricted distribution. Populations of these miniature window plants occur in the Magaliesberg from Hartbeeshoek to the Rustenburg Nature Reserve (North-West Province and in Gauteng), where higher altitudes are favoured. | Very low. |

*Aloe peglerae*

*Frithia pulchra*

Addendum 3: List of possible red data animals in the area.

| Scientific names | Common names | SARDB | Endemic to area | Habitat preference | Does suitable habitat occur on site? (Yes/No) | Probability of the species occurring on site? (high/medium/low) |
|---|---|---|---|---|---|---|
| **ORDER Eulipotyphla** | | | | | | |
| *Myosorex varius* | Forest Shrew | LC | Yes | Banks of streams | No | Very low |
| *Suncus lixus* | Greater dwarf shrew | LC | | Riverine forest | No | Very low |
| *Suncus infinitesimus* | Least dwarf shrew | LC | | | | Not according to Skinner and Chimimba (2005) |
| *Crocidura maquassiensis* | Maquassie musk shrew | LC | | | | Not according to Skinner and Chimimba (2005) |
| *Atelerix frontalis* | South African hedgehog | LR/lc | | Good cover and food sources | No | Very low |
| **ORDER Afrosoricida** | | | | | | |
| *Chrysospalax villosus* | Rough-haired golden mole | VU | Yes | Sand and vleis | No | Not according to Skinner and Chimimba (2005) |
| *Amblysomus hottentotus* | Hottentot golden mole | LR/lc | Yes | | | Not according to Skinner and Chimimba (2005) |

| Scientific names | Common names | SARDB | Endemic to area | Habitat preference | Does suitable habitat occur on site? (Yes/No) | Probability of the species occurring on site? (high/medium/low) |
|---|---|---|---|---|---|---|
| *Neamblysomus julianae* | Juliana's golden mole | CR | Yes | | | Not according to Skinner and Chimimba (2005) |
| **ORDER Chiroptera** | | | | | | |
| *Myotis welwitschii* | Welwitsch's hairy bat | LC | | Grassland | No | Low |
| *Miniopterus schreibersii* | Schreiber's long-fingered bat | LC | | Caves | No | Low |
| *Rhinolophus blasii* | Peak-saddle horseshoe bat | NT | | Caves | No | Low |
| *Cloeotis percivalli* | Short-eared trident bat | VU | | Caves | No | Low |
| **ORDER Primates** | | | | | | |
| *Galago moholi* | South African galago | LR/lc | | Savanna | No | Low |
| **ORDER Rodentia** | | | | | | |
| *Pedetes capensis* | Springhare | LC | | Sandy soils | No | Low |
| *Dasymys incomtus* | African marsh rat | LC | | | | Not according to Skinner and Chimimba (2005) |
| *Rhabdomys pumilio* | Four-striped grass mouse | LC | | Grassland, sandy soils and rocky areas | No | Low |

| Scientific names | Common names | SARDB | Endemic to area | Habitat preference | Does suitable habitat occur on site? (Yes/No) | Probability of the species occurring on site? (high/medium/low) |
|---|---|---|---|---|---|---|
| *Mystromys albicaudatus* | White-tailed mouse | EN | Yes | Grassland, sandy soils and rocky areas | Very limited | Very low |
| **ORDER Carnivora** | | | | | | |
| *Proteles cristatus* | Aardwolf | LR/lc | | | No | Very low |
| *Parahyaena brunnea* | Brown hyaena | LR/lc | | | No | Very low |
| *Panthera pardus* | Leopard | LC | | | No | Very low |
| *Felis nigripes* | Black-footed cat | VU | | Very dry areas | No | Not according to Skinner and Chimimba (2005) |
| *Leptailurus serval* | Serval | LC | | | | Not according to Skinner and Chimimba (2005) |
| *Felis silvestris* | African wild cat | LC | | Riverine bush, rocky outcrops | No | Very low |
| *Aonyx capensis* | African clawless otter | LC | | Permanent water | No | |
| *Lutra maculicollis* | Spotted-necked otter | LC | | Permanent water | No | |
| *Mellivora capensis* | Honey badger | LR/lc | | Rocky areas | No | Low |
| *Poecilogale albinucha* | African striped weasel | LR/lc | | Moist grassland | No | Very low |

| Scientific names | Common names | SARDB | Endemic to area | Habitat preference | Does suitable habitat occur on site? (Yes/No) | Probability of the species occurring on site? (high/medium/low) |
|---|---|---|---|---|---|---|
| *Civettictis civetta* | African civet | LR/lc | | Forest, well watered savanna | No | Very low |
| **ORDER Tubulidentata** | | | | | | |
| *Orycteropus afer* | Aardvark | LC | | Grassland and sandy soils | No | Very low |
| **ORDER Ruminantia** | | | | | | |
| *Oreotragus oreotragus* | Klipspringer | LR/lc | | Extensive rocky areas | No | Very low |
| *Ourebia ourebi* | Oribi | LR/lc | | Open grassland, short and long grass, undisturbed | No | Very low |