

**MAREETSANE BATHO-BATHO SOLAR PV FACILITY**  
**ENVIRONMENTAL FEASIBILITY ASSESSMENT**

SEF Reference No. 504744

**Prepared for:**

**Kgatelopele Private Equity and Venture  
Capital (Pty) Ltd**  
Tel. No.: 083 254 5210  
E-mail: Keobakiles@kgatelopele.co.za



**Prepared by:**

**Strategic Environmental Focus (Pty) Ltd**  
P.O. Box 74785  
Lynnwood Ridge  
0040  
Tel. No.: (012) 349-1307  
Fax No.: (012) 349-1229  
E-mail: sef@sefsa.co.za



**S · E · F**

**STRATEGIC ENVIRONMENTAL FOCUS**

**January 2013**

---

**COPYRIGHT WARNING**

Copyright in all text and other matter, including the manner of presentation, is the exclusive property of the author. It is a criminal offence to reproduce and/or use, without written consent, any matter, technical procedure and/or technique contained in this document. Criminal and civil proceedings will be taken as a matter of strict routine against any person and/or institution infringing the copyright of the author and/or proprietors.

## TABLE OF CONTENT

LIST OF FIGURES .....	2
LIST OF TABLES .....	2
LIST OF PHOTOGRAPHS .....	2
LIST OF ABBREVIATIONS.....	3
1. INTRODUCTION .....	4
2. METHODOLOGY .....	4
2.1. Phase 1: Desktop Survey .....	4
2.1.1. Locality and Land Use.....	5
2.1.2. Regional Vegetation.....	5
2.1.3. Listed Ecosystems .....	5
2.1.4. Protected Areas .....	6
2.1.5. Biodiversity Corridors and Biodiversity Nodes .....	6
2.1.6. Watercourses.....	7
2.1.7. National Freshwater Ecosystem Priority Areas.....	7
2.1.8. Critically Important Areas and Hyperdiversity .....	8
2.1.9. Important Heritage Resources.....	9
2.1.10. Faunal and Floral Species Occurrence.....	9
2.1.11. Plants and animals of Conservation Concern (Red Listed Plants and Animals).....	9
2.1.12. Species Protected by Legislation (Threatened or Protected Species (TOPS) and Provincially Protected species) .....	10
2.1.13. Nationally Protected Trees.....	10
2.2. Phase 2: Field Scan/ Site Visit.....	10
3. LIMITATIONS .....	10
4. DISCUSSION .....	12
4.1. Phase 1: Desktop Survey .....	12
4.1.1. Locality and Land Use.....	12
4.1.2. Vegetation Types and Ecosystem Status .....	12
4.1.3. Hydrological Features .....	16
4.1.4. Protected Areas .....	18
4.1.5. Heritage Resources .....	18
4.1.6. Biodiversity Features.....	19
4.1.7. Composite Ecological Sensitivity of the Study Area.....	23
4.2. Phase 2: Field Scan.....	25
4.2.1. Biodiversity and ecosystem status of the proposed site.....	25
4.2.2. Species and their Conservation Concern .....	27
4.2.3. Ecologically Sensitive areas identified within the proposed solar site .....	28
5. SUMMARY AND CONCLUSION .....	31
5.1. Implications for the development of the proposed PV Solar Farm.....	31
5.2. Proposed Way Forward in terms of the Applications for Environmental Authorisations.....	32
6. REFERENCES .....	34
7. APPENDICES .....	36

## LIST OF FIGURES

Figure 1: Locality Map of the study area and proposed site. ....	13
Figure 2: Vegetation types within the study area (Mucina & Rutherford, 2006). ....	14
Figure 3: Map showing the Ecosystem Status of vegetation types within the study area (DEA, 2011). ....	15
Figure 4: Rivers and wetlands within the study area. ....	17
Figure 5: Heritage Resources within the study area. ....	18
Figure 6: Biodiversity Nodes overlapping the study area and proposed site.....	19
Figure 7: Core Biodiversity Corridors together with their buffer areas (North-West DACE, 2009).....	20
Figure 8: Areas of significant Hyperdiversity within the study area (North-West DACE, 2009). ....	21
Figure 9: Combined Ecological Sensitivity of the study area. ....	24
Figure 10: Locations of potentially sensitive areas identified during the field scan. ....	29
Figure 11: Potential hydrological link (catchment area) for the non-perennial river to the west of the proposed solar site. ....	30

## LIST OF TABLES

Table 1: Ecological and conservation status of the Mareetsane and Morokwa Rivers according to the NSBA (Nel <i>et al.</i> , 2004). ....	16
Table 2: Summary of the number or presence of Ecosystem level features and species of conservation concern within the study area and proposed site.....	22
Table 3: Floral species observed during the field scan.....	27
Table 4: Faunal species observed during the field scan.....	28

## LIST OF PHOTOGRAPHS

Photograph 1: Overgrazed grassland (left) and dense tree and shrub clumps (right).....	25
Photograph 2: Grazing cattle (left) and wood harvesting (right) was noted.....	26
Photograph 3: Drainage channels (left) and degraded wetlands (right) were found throughout the proposed site. ....	26
Photograph 4: A graveyard (left) with the oldest grave dated "1961" faintly visible on the gravestone (right). ....	27

**LIST OF ABBREVIATIONS**

<b>CSIR</b>	Council for Scientific and Industrial Research
<b>DAFF</b>	Department of Agriculture, Forestry and Fisheries
<b>DWAF</b>	Department of Water Affairs and Forestry
<b>EIA</b>	Environmental Impact Assessment
<b>GIS</b>	Geographical Information Systems
<b>ICAS</b>	Informal Conservation Areas System
<b>NBA</b>	National Biodiversity Assessment
<b>NEMA</b>	National Environmental Management Act, 1998 (Act No. 107 of 1998)
<b>NEMBA</b>	National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004)
<b>NFEPA</b>	National Freshwater Ecosystems Priority Areas
<b>NPAES</b>	National Protected Areas Expansion Strategy
<b>NWA</b>	National Water Act, 1998 (Act No. 36 of 1998)
<b>POSA</b>	Plants of Southern Africa
<b>QDGC</b>	Quarter Degree Grid Cell
<b>SANBI</b>	South African National Biodiversity Institute
<b>SANParks</b>	South African National Parks
<b>SAFAP</b>	South African Frog Atlas Project
<b>SARCA</b>	South African Reptile Conservation Assessment
<b>S&amp;EIR</b>	Scoping and Environmental Impact Reporting
<b>TOPS</b>	Threatened or Protected Species
<b>WESSA</b>	Wildlife and Environment Society of South Africa
<b>WULA</b>	Water Use License Application

## 1. INTRODUCTION

Strategic Environmental Focus (Pty) Ltd was appointed by Kgatelopele Private Equity and Venture Capital (Pty) Ltd to undertake an Environmental Feasibility Study for the proposed 30MW Mareetsane Batho-Batho Solar PV Facility.

This report highlights the ecological sensitivity and biodiversity risks within a 16km buffer around the proposed development site (i.e. the study area). A larger study area was selected in order to include areas that may be impacted on by associated infrastructure, such as powerlines connecting the proposed PV Facility to the nearest Eskom Substation.

Historically, planning of developments did not include the natural environment, which consequently led to the wasteful exploitation and destruction of sensitive habitats, all of which could have been avoided or mitigated through responsible environmental management measures. In recent years, the South African legislation has enforced strict environmental controls, and now requires that an environmental process (e.g. Environmental Impact Assessment (EIA)) and evaluation be undertaken prior to the approval of developments. This ensures that future developments are planned in a way that optimises the use of natural resources, and avoids environmentally sensitive areas.

This Environmental Feasibility Study specifically aims to highlight those areas deemed to be sensitive from an environmental and/or heritage point of view. Feasibility studies are largely desktop studies mapping existing environmental data, however this study also included a brief site scan to confirm desktop information and (at a glance) identify additional sensitive environments that are not revealed through the desktop analysis. The study culminates in a composite sensitivity map that highlights those areas within the study area and proposed site as being potentially sensitive to development. This study cannot provide definitive boundaries to potentially environmentally sensitive areas or the extent of the development footprint, as detailed fieldwork was not conducted – however, it does provide an overall impression of the sensitivities that may constrain development. These potential development constraints must then be taken into account when decisions are made in terms of whether or not to continue with development and/or the detailed studies and EIA process.

## 2. METHODOLOGY

The methodology employed involved two phases. The first phase included a desktop survey of available data, and the second phase included a quick field scan/ site visit to supplement the GIS data.

### 2.1. Phase 1: Desktop Survey

Relevant literature and Geographical Information System (GIS) layers were reviewed to determine the following concerning the study area and proposed site:

### 2.1.1. Locality and Land Use

The locality and current land use determines whether the vegetation on the study site is in a largely natural or transformed state. In addition, sites in close proximity to development nodes or towns will result in a concentration of impacts instead of fragmenting natural landscapes. From an ecological point of view, it is therefore likely that sites close to towns and within already, transformed areas will be less sensitive – depending on the occurrence of threatened vegetation, water bodies and ridges.

Reviewed datasets include:

- Department of Environmental Affairs and Tourism (2001).
- Satellite Application Centre (2000).

### 2.1.2. Regional Vegetation

The regional vegetation gives an indication of the vegetation that is expected to occur within the site, in the absence of severe transformation e.g. cultivation. Each vegetation type is different with regards to plant species composition, soil, topography and the climatic conditions in which it occurs. Due to increased human pressure on the natural environment, many vegetation types are being disturbed or replaced by food crops, mines or urban settlements. The vegetation types occurring in the study area and at the proposed site were identified and described.

Reviewed datasets include:

- Mucina and Rutherford (2006).

### 2.1.3. Listed Ecosystems

The National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) [NEMBA] provides for the listing of threatened or protected ecosystems. These ecosystems are based on the vegetation types described in Mucina and Rutherford (2006) and are grouped into Critically Endangered, Endangered, Vulnerable and Protected Ecosystems. The purpose of listing ecosystems is primarily to reduce the rate of ecosystem and species extinction, including the prevention of further degradation and loss of structure, function and composition of threatened ecosystems. Therefore, it aims to conserve a representative sample of all components of biodiversity. Listed ecosystems have development implications and must be included as sensitive areas in Environmental Impact Assessments (EIAs). However, it is important to note that while the original extent of the listed ecosystems have been mapped, a Basic Assessment Report in term of the EIA regulations is only required when development falls within the remaining *natural* habitat of each ecosystem and not in portions where the natural habitat has been irreversibly lost (i.e. cannot be successfully rehabilitated).

Reviewed datasets include:

- Mucina and Rutherford (2006).
- Department of Environmental Affairs (2011).

#### 2.1.4. Protected Areas

Protected Areas (PAs) are defined as areas of land or sea that are formally protected by national law and managed mainly for biodiversity conservation. It does not include:

- Informal conservation areas (e.g. conservancies); and
- Non-natural areas within Protected Environments.

It is important to differentiate PAs from conservation areas (informal). Conservation areas are areas of land not formally protected by law but informally protected by the current owners and users and managed at least partly for biodiversity conservation. These different forms of statutory protection or conservation tenure may arguably meet the global definition of PAs, but do not meet the limited national definition, i.e. they are not formally proclaimed in terms of national PA legislation. These are termed 'Conservation Areas' (CAs) in the draft strategy document of South Africa's National Protected Area Expansion Strategy. The Informal Conservation Areas System (ICAS) is an important complementary mechanism for achieving national conservation objectives. It also provides for the physical linkage with formal PAs to achieve landscape conservation objectives. In some large-scale landscape conservation initiatives (e.g. Trans-Frontier Conservation Areas, Mega-Reserves, Biosphere Reserves), the formal PAs (e.g. National Parks, Provincial Nature Reserves) usually form the 'core' of these informal CAs.

South Africa's PA network currently falls far short of sustaining biodiversity and ecological processes. The goal of the National Protected Area Expansion Strategy (NPAES) is to achieve cost effective protected area expansion for ecological sustainability and increased resilience to climate change. The NPAES sets targets for PA expansion, provides maps of the most important areas for PA expansion, and makes recommendations on mechanisms for PA expansion. The NPAES uses two factors, importance and urgency, to identify priority areas for PA expansion in the terrestrial environment. Although not currently protected, these areas should be considered as being of high development constraint for development projects and/or infrastructure proposed to be located within or in close proximity to these areas.

Databases reviewed for protected areas, including national parks, formal and informal protected areas and focus areas for the future:

- Department of Environmental Affairs and Tourism (2009).

#### 2.1.5. Biodiversity Corridors and Biodiversity Nodes

The North-West Province Biodiversity Conservation Assessment Technical Report (North-West Department of Agriculture, Conservation, Environment and Rural Development 2009) outlines a provincial-level biodiversity corridor network with an aim to retain the connectivity between all geographic areas with minimal financial cost and maximum biodiversity preservation. These corridors are interconnected areas through the landscape that were identified as important for conservation through a series of systematic biodiversity assessments. Biodiversity Nodes were also identified through a systematic process to coincide with areas where important or intact biodiversity remains, however, unlike Biodiversity Corridors, these nodes are isolated from each other. These areas were

often identified as the last remaining areas for the proclamation of reserves and may contribute significantly to biodiversity conservation goals.

Reviewed datasets include:

- North-West Department of Agriculture, Conservation, Environment and Rural Development (2009).

### **2.1.6. Watercourses**

In a South African legal context, the term *watercourse* is often used rather than the terms *wetland*, or *river*. The National Water Act, 1998 (Act No. 36 of 1998) [NWA] includes *wetlands* and *rivers* into the definition of the term *watercourse* in the following definition.

Watercourse means:

- a) A river or spring;
- b) A natural channel in which water flows regularly or intermittently;
- c) A wetland, lake or dam into which, or from which, water flows, and
- d) Any collection of water which the Minister may, by notice in the Gazette, declare to be a watercourse, and a reference to a watercourse includes, where relevant, its bed and banks.

The NWA further defines a wetland as “land which is transitional between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is periodically covered with shallow water, and which land in normal circumstances supports or would support vegetation typically adapted to life in saturated soil.”

Local government policies require that protective river and wetland buffer zones are calculated from the outer edge of the riparian and temporary zone of a wetland.

The Department of Water Affairs and Forestry have further identified areas where groundwater recharge is high, with rainfall and geological permeability being the two main factors on which recharge is dependant. Groundwater is essential for sustaining river flows during dry seasons. An area where recharge is high is considered to be a recharge hotspot and the disturbance of natural vegetation in these areas could have an influence on the healthy functioning of groundwater dependant ecosystems which are in the immediate vicinity or several kilometres away from the recharge area (DWAF, 2005).

Reviewed datasets include:

- Department of Rural Development & Land Reform (2009).

### **2.1.7. National Freshwater Ecosystem Priority Areas**

Freshwater ecosystems provide a valuable natural resource, with economic, aesthetic, spiritual, cultural and recreational value. Yet the integrity of freshwater ecosystems in South Africa is declining. This



crisis is largely a consequence of a variety of challenges that are practical (managing vast areas of land to maintain connectivity between freshwater ecosystems), socio-economic (competition between stakeholders for utilisation) and institutional (building appropriate governance and co-management mechanisms).

The National Freshwater Ecosystem Priority Areas (NFEPA) project responds to the reported degradation of freshwater ecosystem condition and associated biodiversity, both globally and in South Africa. NFEPA should form part of a comprehensive approach to sustainable development of South Africa's scarce water resources. In this regard, the applications developed are directly applicable to the NWA, and will support integrated catchment management and Water Resource Classification. The project is also directly relevant to the NEMBA, informing both the listing of threatened river ecosystems and the process of bioregional planning required under this Act.

The NFEPA project represents a multi-partner project between the Council for Scientific and Industrial Research (CSIR), South African National Biodiversity Institute (SANBI), Water Research Commission (WRC), Department of Water Affairs (DWA), Department of Environmental Affairs (DEA), Worldwide Fund for Nature (WWF), South African Institute of Aquatic Biodiversity (SAIAB) and South African National Parks (SANParks). More specifically, the NFEPA project aims to:

- Identify Freshwater Ecosystem Priority Areas (hereafter referred to as 'FEPAs') to meet national biodiversity goals for freshwater systems; and
- Develop a basis for enabling effective implementation of measures to protect FEPAs, including free-flowing rivers.

The project further aims to maximize synergies and alignment with other national level initiatives such as the National Biodiversity Assessment (NBA) and the Cross-Sector Policy Objectives for Inland Water Conservation.

For the purpose of the present biodiversity assessment, the status and proximity of the site to areas identified in the NFEPA project is briefly discussed in terms of NFEPA.

Databases reviewed to determine the presence and nature of freshwater systems include:

- Nel *et al.* (2011).

#### **2.1.8. Critically Important Areas and Hyperdiversity**

Hyperdiversity is a measure of the areas of overlap in which the highest diversity of fauna occurs in the province. Critically Important Areas are areas where threatened ecosystems which are vulnerable to transformation and should be prioritised for conservation.

Reviewed datasets include:

- North-West Department of Agriculture, Conservation, Environment and Rural Development (2009).

### 2.1.9. Important Heritage Resources

Heritage Resources are protected under the National Heritage Resource Act, 1999 (Act No. 25 of 1999). This Act protects heritage resources as defined in the Act, which have cultural significance or special value for the present community or for future generations and includes places, building, equipment, historical settlements, landscapes and natural features and disturbance of any of such resources requires a permit.

Reviewed datasets include:

- Department of Environmental Affairs and Tourism (2001).

### 2.1.10. Faunal and Floral Species Occurrence

Lists of species that may occur in the study area and/or the proposed site were obtained from various GIS layers as well as from online sources. The scale at which data was available is indicated in brackets:

- Flora – <http://posa.sanbi.org/searchspp.php> (QDGC);
- Mammals - GIS Mammals Layer (Site specific);
- Frogs - <http://vmus.adu.org.za/> (QDGC);
- Butterflies- <http://vmus.adu.org.za/> (QDGC);
- Reptiles - <http://vmus.adu.org.za/> (QDGC); and
- Birds - <http://sabap2.adu.org.za/> (Pentad).

### 2.1.11. Plants and animals of Conservation Concern (Red Listed Plants and Animals)

Plants of conservation concern (previously termed Red Data Plants) are those plants that are important for South Africa's conservation decision making processes as they have been assessed using a prescribed scientific method and are considered to be at risk of extinction and include all plants that are Threatened (Critically Endangered, Endangered and Vulnerable), Extinct in the wild, Data deficient, Near Threatened, Critically Rare, Rare and Declining.

The conservation status of faunal and floral species was obtained from the following resources:

- Flora: The South African National Red List online ([www.sanbi.redlist.org](http://www.sanbi.redlist.org));
- Butterflies: Virtual Museum, South African Butterfly Conservation Assessment (<http://vmus.adu.org.za/>);
- Avifauna: Barnes (2000);
- Reptiles and Amphibians: The International Union for Conservation of Nature online (<http://www.iucn.org>); and
- Mammals: Friedmann and Daly (2004).

### **2.1.12. Species Protected by Legislation (Threatened or Protected Species (TOPS) and Provincially Protected species)**

Species Listed on the NEMBA: Publication of lists of Critically Endangered, Endangered, Vulnerable and Protected Species (Department of Environmental Affairs and Tourism, 2007) are all nationally protected by legislation and hunting, killing, collecting, plucking, picking of parts, chopping, damaging, importing, exporting, destroying or any other prescribed activity of any specimen of a listed threatened or protected plant or animal species is governed by this Act and requires a permit from the Department of Environmental Affairs. Certain species are also specifically protected within each province.

The gazetted national and provincial conservation status of species were obtained from the following sources:

- NEMBA: Publication of lists of Critically Endangered, Endangered, Vulnerable and Protected Species (Department of Environmental Affairs and Tourism, 2007); and
- Bophuthatswana Nature Conservation Act, 1973 (Act No. 3 of 1973).

### **2.1.13. Nationally Protected Trees**

The National Forest Act, 1998 (Act No. 84 of 1998) enforces the protection of a number of indigenous trees. The removal, thinning or relocation of protected trees will require a permit from the relevant authority.

Reviewed datasets include:

- The National Forest Act, 1998 (Act No. 84 of 1998).

## **2.2. Phase 2: Field Scan/ Site Visit**

The purpose of the field scan is to supplement information obtained from the Phase 1: Desktop Survey. Only those areas highlighted as sensitive (e.g. potential wetlands, etc.) or disturbed within the proposed site boundary were explored in order to more accurately discuss on-site conditions. The field scan was conducted over two days, 21 – 22 January 2013.

## **3. LIMITATIONS**

In order to obtain a comprehensive understanding of the dynamics of vegetation communities, animal populations and the status of endemic, rare or threatened species in an area, on-site ecological studies should be undertaken and replicated over several seasons and over a number of years, where possible. However, as the present study was conducted at a desktop level together with a quick field scan (no detailed field surveys were conducted) it does not address detailed information pertaining to the study site in terms of species lists and habitat condition. However, sensitive sections are highlighted and it should be stressed that these areas must be sufficiently ground-truthed in order to determine the present ecological state of each area. Consequently, the following limitations apply:

- No plant studies or field surveys were conducted;

- No faunal studies were conducted; and
- No wetland delineations or riparian delineations and assessments were conducted.

Although the datasets used in this assessment were from the most recently released information, many of these datasets are outdated by a few years. Furthermore, many of the species lists generated are at a coarse scale and may be an over or underestimate of species occurring in the study area. The exact impact of the proposed Solar Facility can only be assessed during the EIA phase and once the specifications of the infrastructure as well as the construction methodology is known.

## 4. DISCUSSION

### 4.1. Phase 1: Desktop Survey

#### 4.1.1. Locality and Land Use

The larger study area overlaps QDGC 2625AA, 2625AB, 2625AC, 2526AD, 2625BA and 2625BC. This area has soils with poor suitability for agriculture; nevertheless, land use includes cultivated land, subsistence farming, residential, forestry, as well as patches of natural land.

The proposed solar site is situated approximately 10km south west of the Batho- Batho Village in the Ngaka Modiri Molema Municipality in the North-West Province and falls within the Quarter Degree Grid Cell 2625AB (Figure 1). Two large drainage areas traverse the study area diagonally from east to west. The extent of the proposed site is approximately 140ha.

Two high voltage Eskom substations and associated high and medium voltage powerlines are located in the northern half of the study area, while the southern half is largely void of any electrical network. The substations are approximately 10-12km from the proposed site. The local community of Batho-Batho (proposed to benefit from this development) is located approximately 10km to the north-east. A railway line traverses through the centre of the study area, along the south-eastern boundary of the proposed development site.

Aerial images indicate that the vegetation is largely natural but overgrazed and land use data indicates poor soil potential for intensive agriculture since these are sandy, eutrophic red soils (thus, a Geotechnical Study would be required to discuss foundation requirements for any development on these types of soils). The predominant land use is that of grazing.

#### 4.1.2. Vegetation Types and Ecosystem Status

The following three vegetation types are located in the study area:

- Klerksdorp Thornveld (Not Threatened);
- Western Highveld Sandy Grassland (Critically Endangered); and
- Mafikeng Bushveld (Vulnerable).

The proposed site is located within the Western Highveld Sandy Grassland vegetation type (Figure 2). This vegetation type has flat to gently undulating plains and comprises of short, dry grassland with some woody species occurring in bush clumps. It is classified as Critically Endangered (DEA, 2011) (Figure 3) with only a small portion statutorily conserved with less than 22% of the natural area remaining (SANBI & DEAT, 2009). A description of each vegetation type can be found in Appendix A.



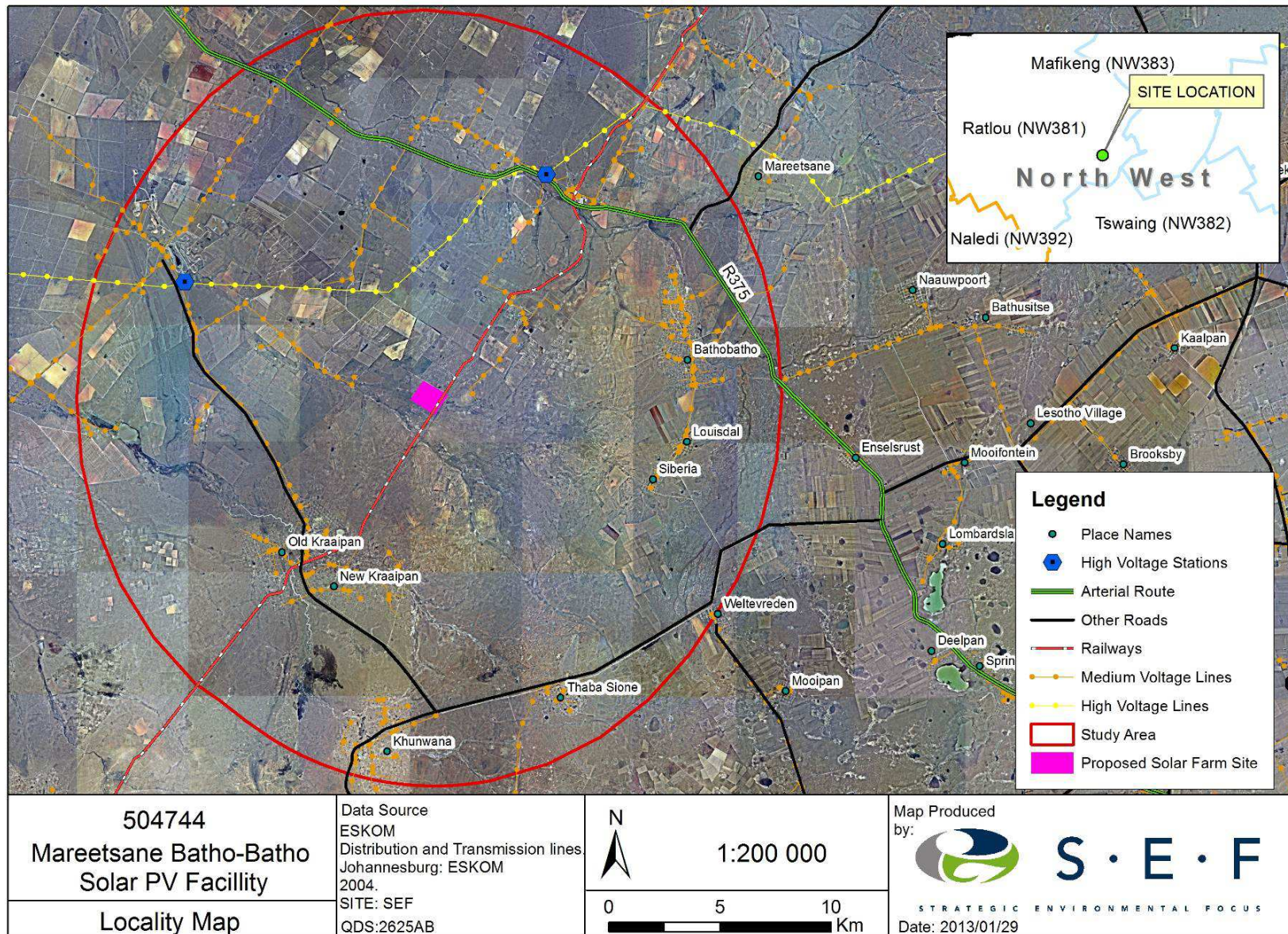


Figure 1: Locality Map of the study area and proposed site.



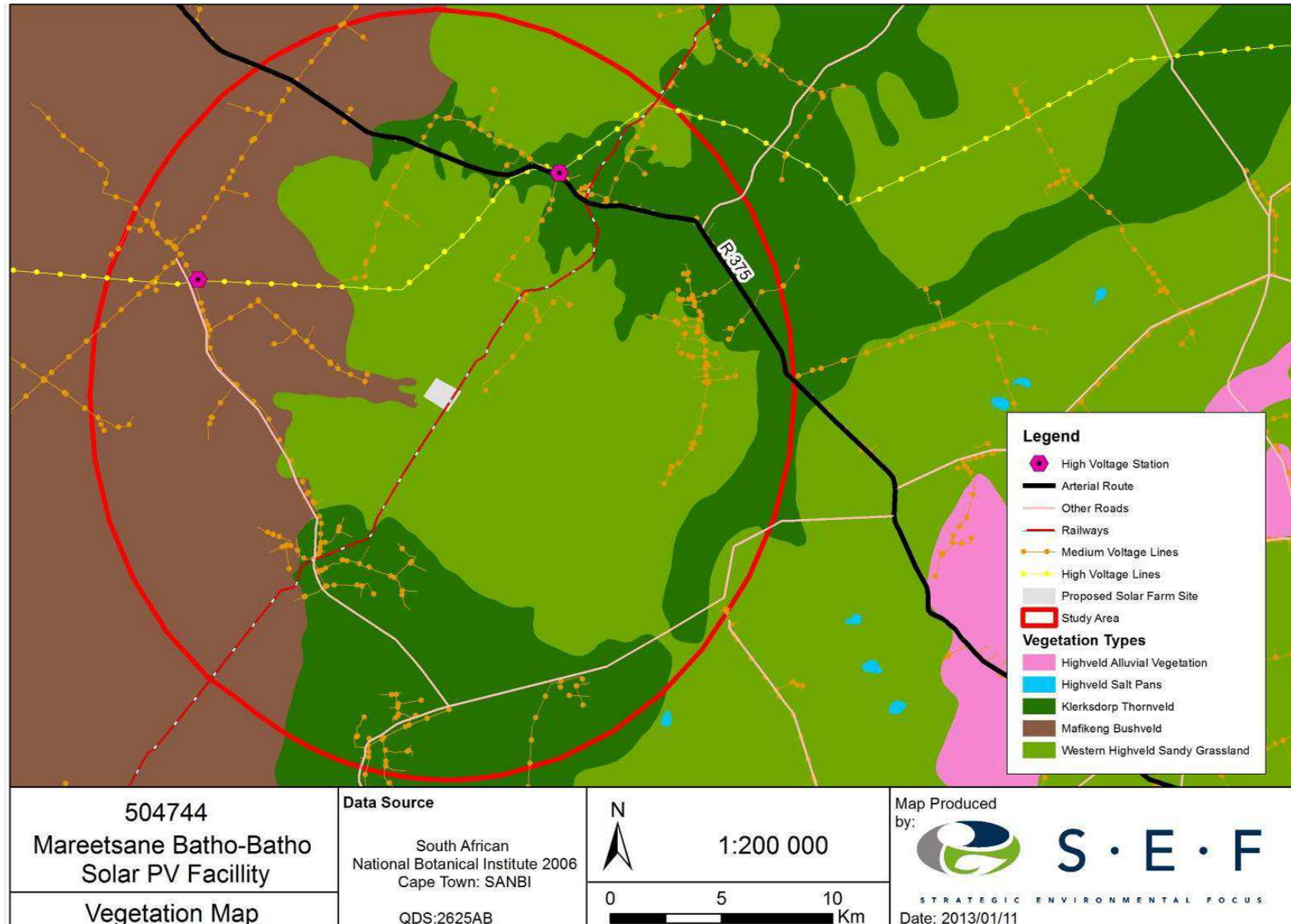


Figure 2: Vegetation types within the study area (Mucina & Rutherford, 2006).

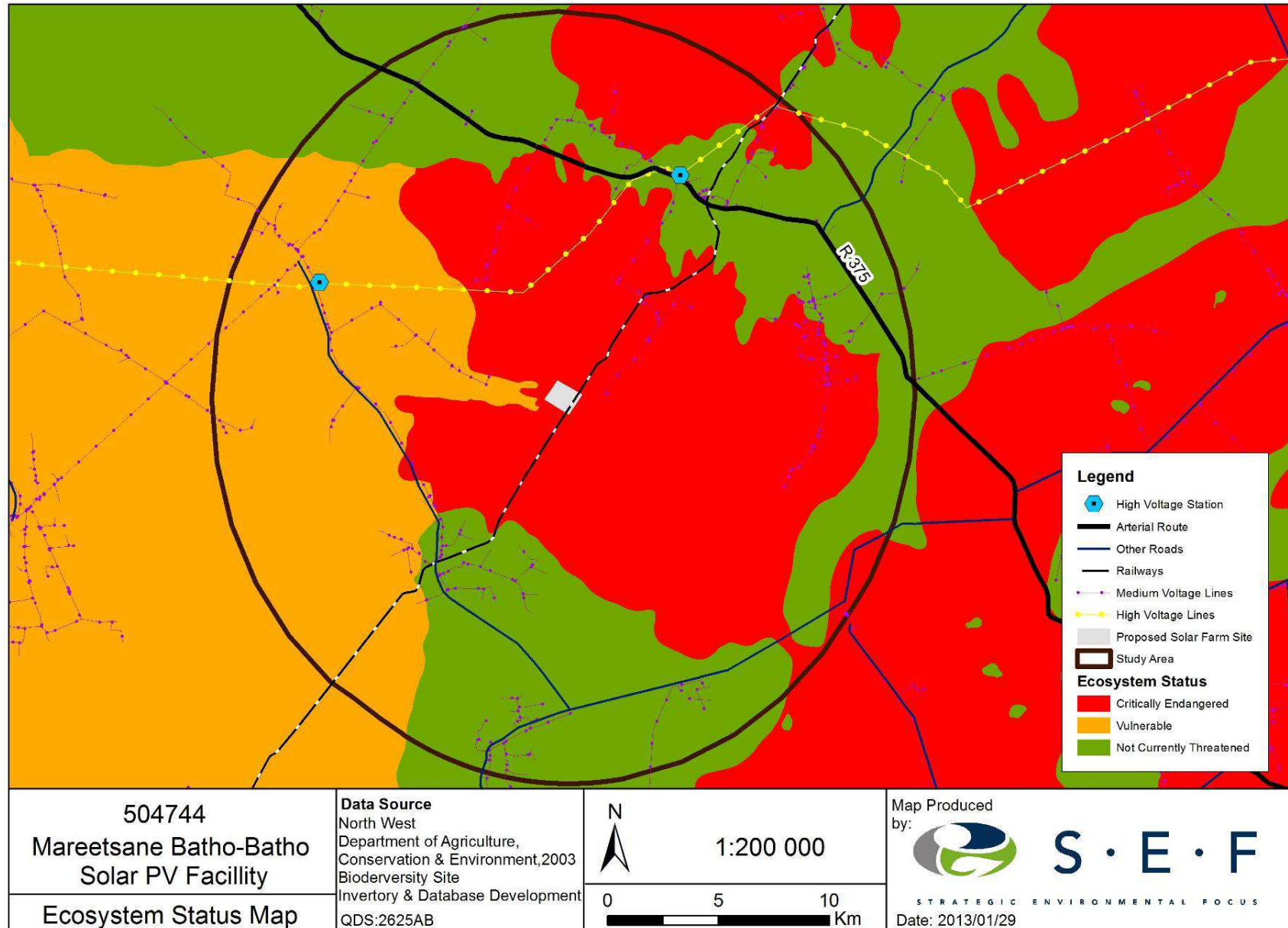


Figure 3: Map showing the Ecosystem Status of vegetation types within the study area (DEA, 2011).



### 4.1.3. Hydrological Features

#### Watercourses and Wetlands

The study area and proposed site are located within Quaternary Catchment D41B within the Lower Vaal Water Management Area (WMA) and Molopo sub-management area (Figure 4). The main rivers of this WMA are the Molopo, Harts and Vaal.

All rivers associated with the study area are classified as non-perennial. The Mareetsane River flows through the north of the study area, while the Morokwa River flows through the central region. To the south, several small rivers flow into the study area including; the Mosime, Tlhakajeng, Makgelejane, Mosime, Thalatau, Sepane and Sebengi Rivers. Only the Mareetsane and Morokwa Rivers are listed on the National Spatial Biodiversity Assessment (Nel *et al.*, 2004) and a summary of their ecological and conservation status is listed in Table 1.

**Table 1: Ecological and conservation status of the Mareetsane and Morokwa Rivers according to the NSBA (Nel *et al.*, 2004).**

River name	Signature	Ecological Status	Conservation Status
Mareetsane	Kalahari Basin	Class B: Largely natural	Not threatened
Morokwa	Kalahari Basin	Class B: Largely natural	Not threatened

Only the Morokwa River flows through the proposed site. The non-perennial Morokwa River is situated just to the south of the site and has associated wetland areas that are classified as channelled valley-bottom wetlands. Several depression wetlands (depressions in the landscape that allows for the accumulation of surface water) are associated with the larger site.

#### National Freshwater Ecosystem Priority Areas (NFEPA) Project

Several NFEPA wetlands are located within the study area, and two wetland clusters (groups of wetlands embedded in a relatively natural landscape) are located to the south of the Tlhakajeng River (Figure 4) and on the south-east edge of the larger study area boundary; however, none occur within the proposed site. Wetland clusters allow for the ecological processes such as frog and invertebrate migrations between wetlands. No NFEPA wetlands or FEPA Fish Support Areas were identified within the proposed site.

The study area and proposed site fall within the boundaries of an Upstream Management Area (Nel *et al.*, 2011). These areas are defined as those requiring management to ensure that human activities do not degrade downstream FEPAs, Fish Sanctuaries and Fish Migration Corridors. It may be acceptable for certain rivers or streams in an Upstream Management Area to be impacted on, but only where these practices do not deteriorate the condition of the downstream FEPA (Driver *et al.*, 2011).

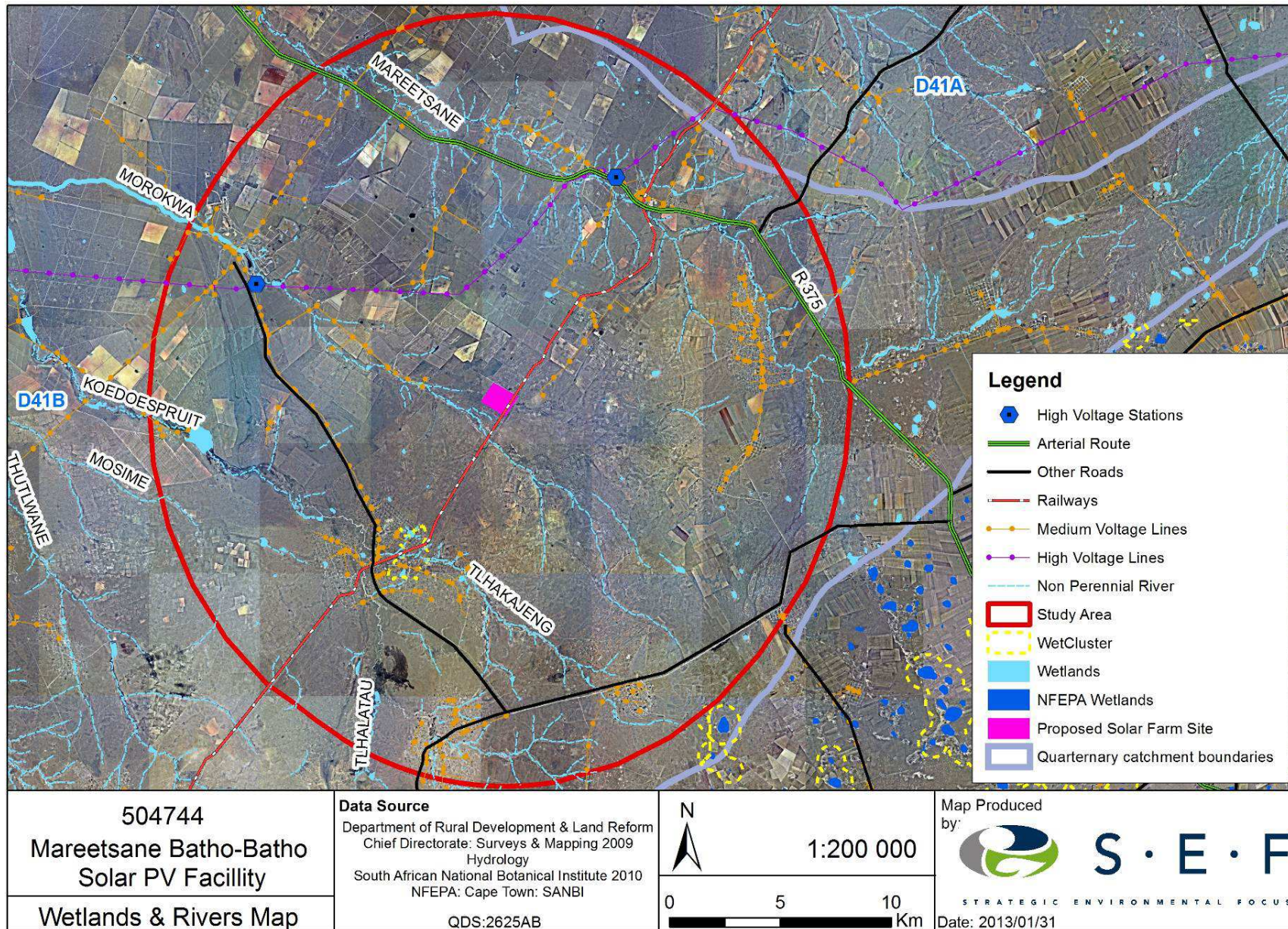


Figure 4: Rivers and wetlands within the study area.



**4.1.4. Protected Areas**

No formally or informally, Protected Areas were recorded within the study area or the proposed site. The study area and proposed site did not fall within the boundaries of any National Protected Areas Expansion Strategy focus areas for protected area expansion.

**4.1.5. Heritage Resources**

Two important cultural areas occur within the larger study area namely the Kraaipan Battlefield and Maritzani (Figure 5). The first battle of the Second Boer War was fought at Kraaipan when the Orange Free State declared War on the British in 1899, while Maritzani used to be a farming store area in the 1900's (<http://www.wikipedia.org/>). No important heritage areas appear to occur within the proposed site itself.

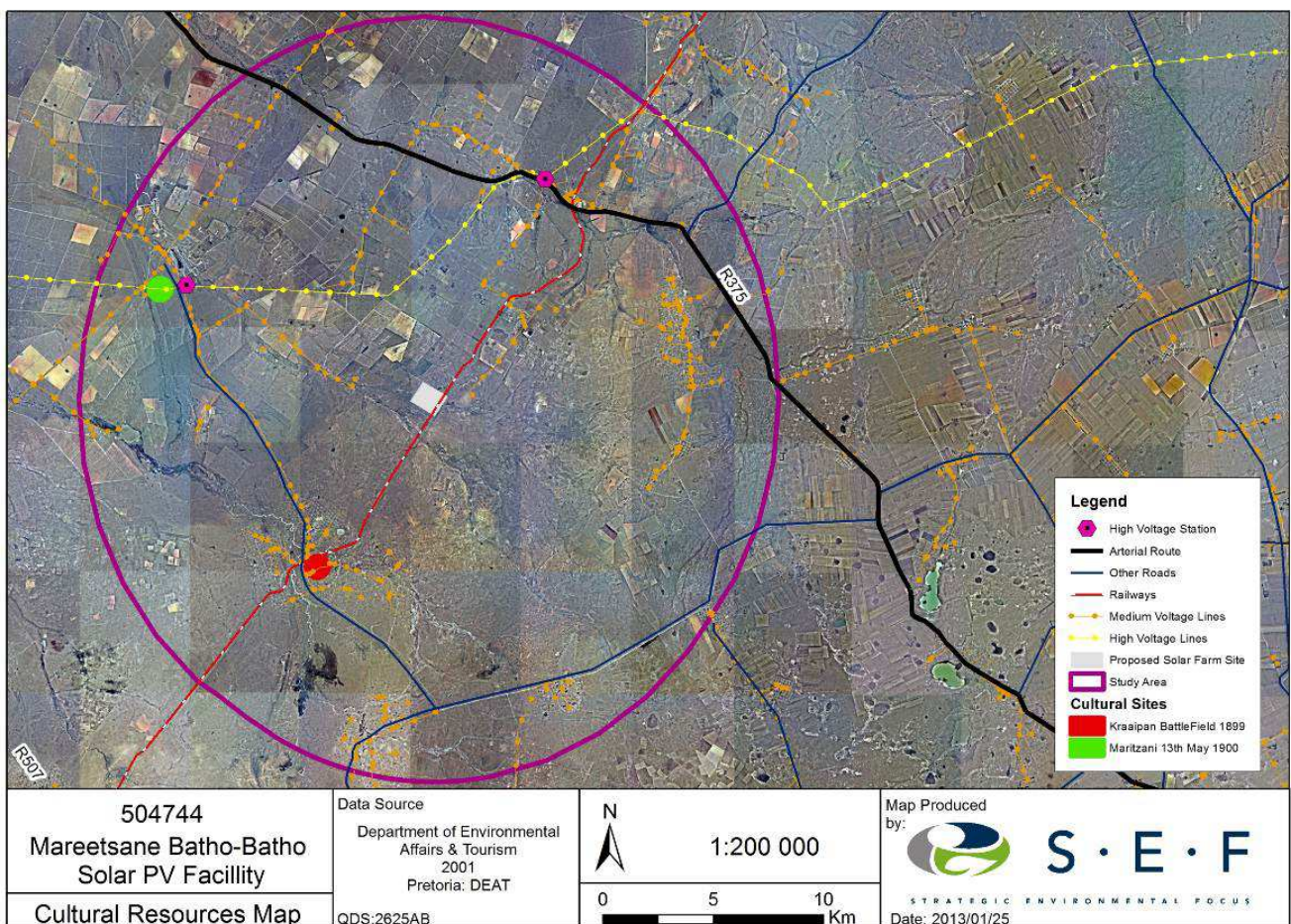


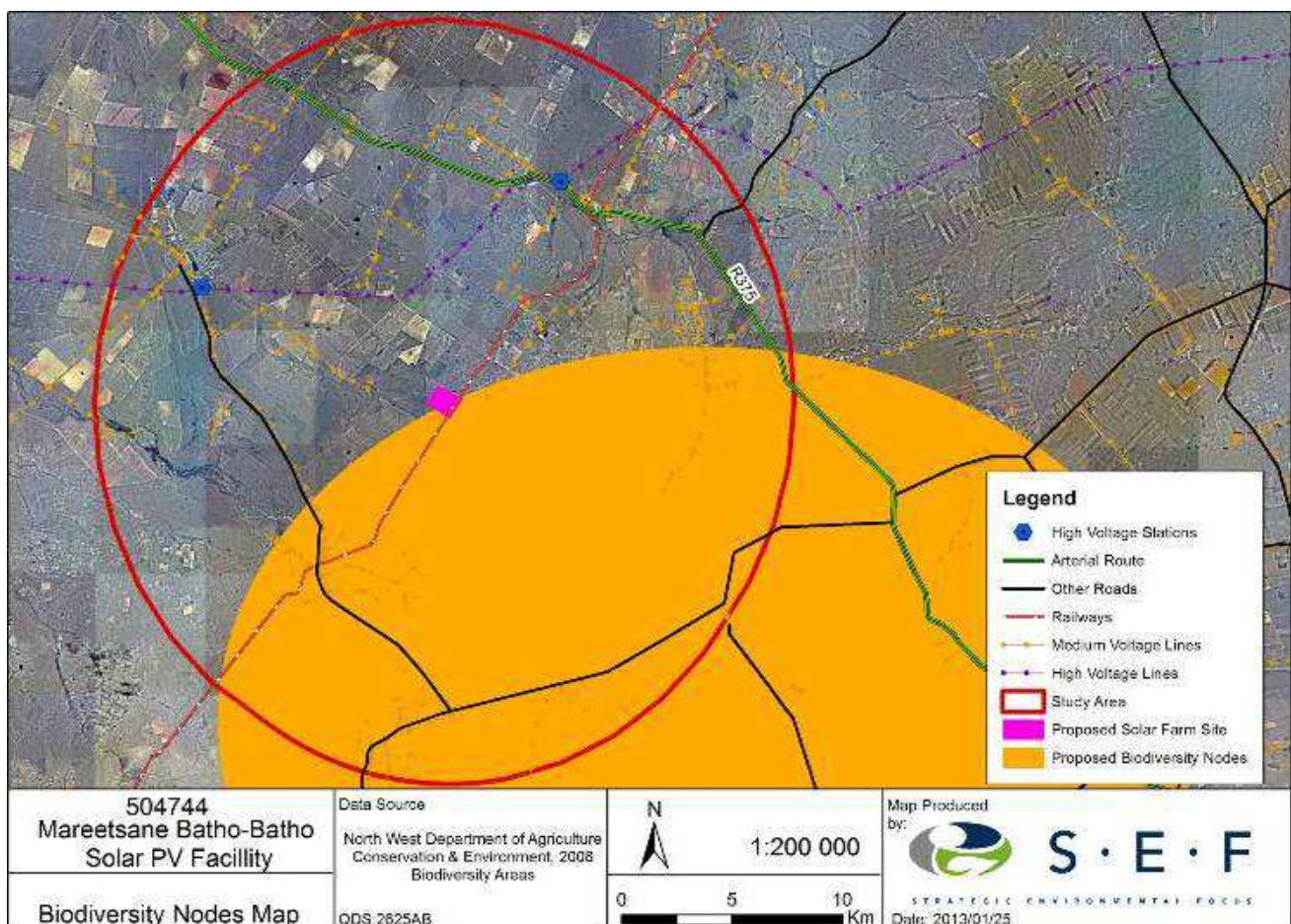
Figure 5: Heritage Resources within the study area.



#### 4.1.6. Biodiversity Features

##### Biodiversity Corridors and Nodes

The southern portions of both the study area and proposed site fall within a Biodiversity Node (Figure 6). These areas have been identified as areas that are still intact and contain one of the last remaining areas of Western Highveld Sandy Grassland. Core Biodiversity Corridors traverse the larger study area and the buffer zone around these corridors covers a large proportion of this region (Figure 7). The proposed site falls within the Core Biodiversity Corridor's immediate buffer and 3000m buffer.



**Figure 6: Biodiversity Nodes overlapping the study area and proposed site.**

##### Critically Important / Hyperdiversity Areas

Several patches of Critically Important Areas, which are highly sensitive hyperdiversity areas, occur within the larger study area, many of which appear to be associated with riverine and wetland areas. The majority of the study area appears to have medium hyperdiversity sensitivity (Figure 8). No areas of high or medium-high hyperdiversity hot spots seem to occur within the proposed site itself.



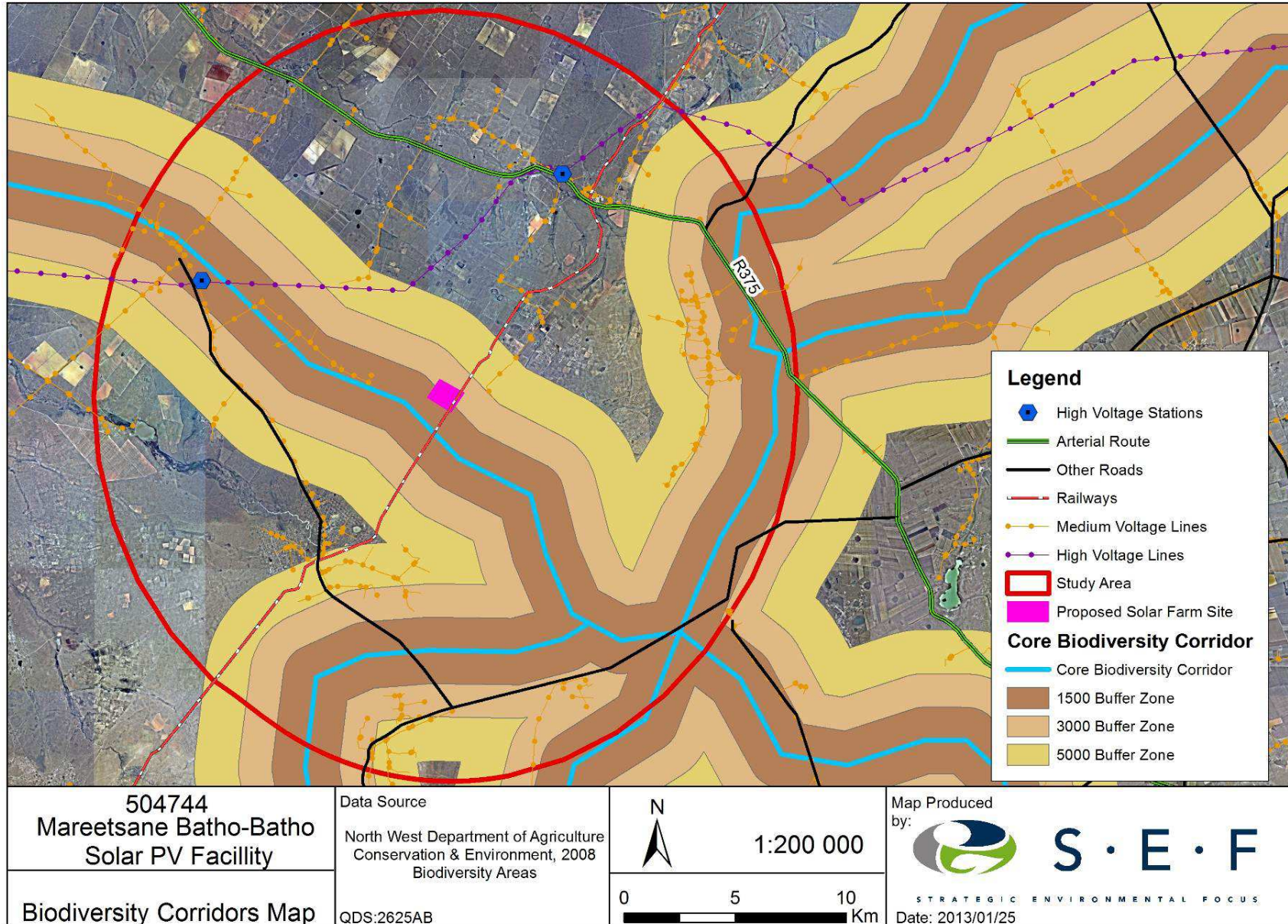


Figure 7: Core Biodiversity Corridors together with their buffer areas (North-West DACE, 2009).



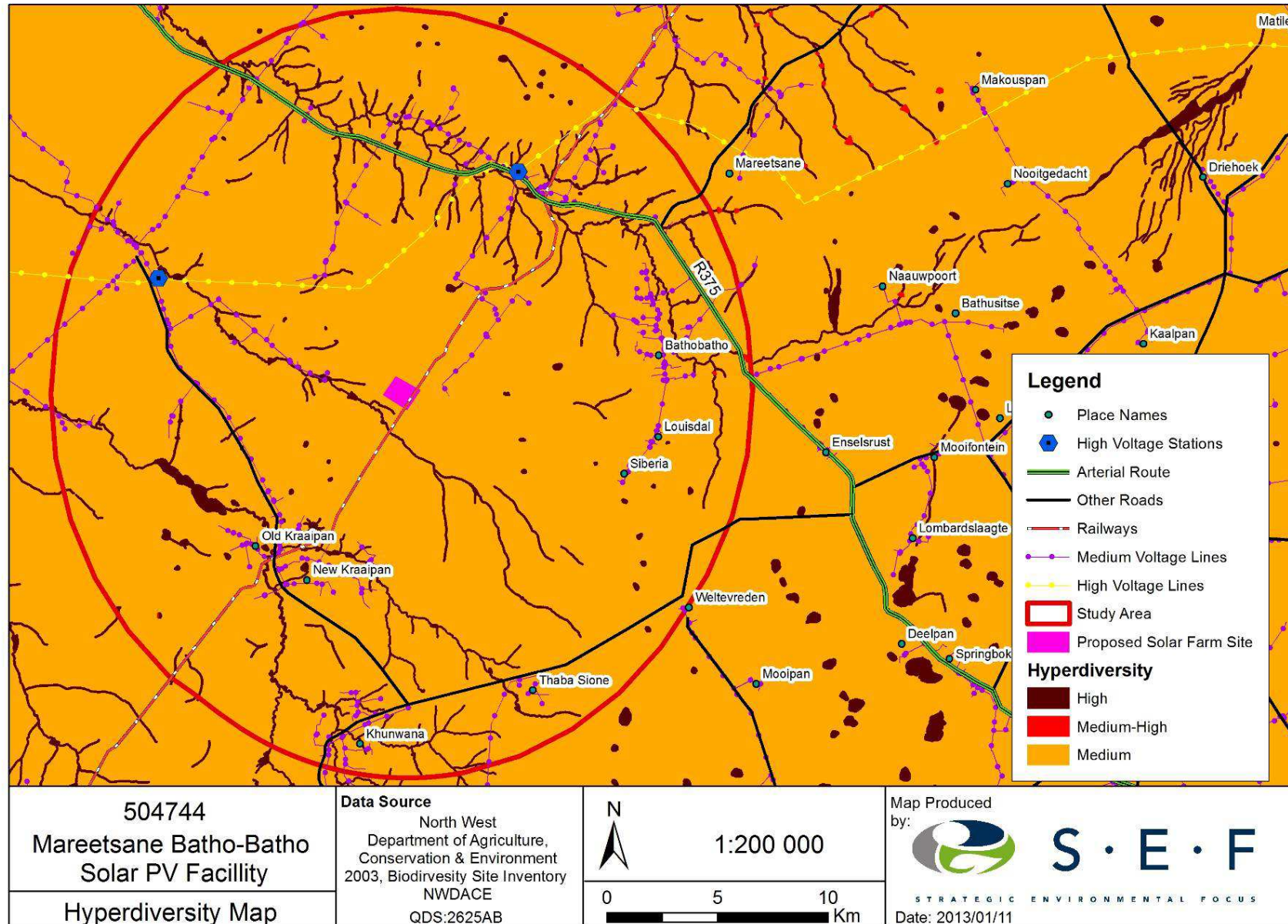


Figure 8: Areas of significant Hyperdiversity within the study area (North-West DACE, 2009).

### Species Diversity, Lists and Conservation Status

The North-West DACE Biodiversity data highlights the following for the study area:

- Flora – Medium diversity;
- Mammals, amphibians and reptiles – Low-medium diversity; and
- Avifauna and Lepidoptera – Low diversity.

Results obtained from species list queries are summarised in Table 2 and discussed in the sections to follow.

**Table 2: Summary of the number or presence of Ecosystem level features and species of conservation concern within the study area and proposed site**

Surveyed Feature	Study Area	Proposed Solar Site
Intersect Biodiversity Corridors	Yes	Yes
Intersect Biodiversity Nodes	Yes	Yes
Threatened plant species	1	1
Threatened mammal species	12	12
Threatened frog species	None	None
Threatened bird species	19	1
Threatened reptile species	None	None
Provincially protected plant species	3	2
Provincially protected mammal species	8	8
Provincially protected amphibian species	None	None
Provincially protected bird species	153	17
Provincially protected reptile species	None	None
Nationally protected plant species (TOPS)	None	None
Nationally protected tree species	None	None
Nationally protected mammal species (TOPS)	7	7
Nationally protected amphibian species (TOPS)	1	None
Nationally protected bird species (TOPS)	7	1
Nationally protected reptile species (TOPS)	None	None

#### *Plants of Conservation Concern, Threatened or Protected Species (TOPS) and Provincially Protected Species*

According to Plants of Southern Africa (POSA), only one plant species, endemic to South Africa and listed on the South African National Red List, Critically Endangered *Brachystelma canum*, may be found within the study area and proposed site. This species is also Provincially Protected along with *Babiana bainesii* (a short herbaceous plant with a strong sweet spicy smell and attractive flowers is endemic to South Africa) which has only been recorded from the larger study area. *Brachystelma*

*canum* population decline is thought to be largely due to severe overgrazing in the areas in which it was last seen ([www.redlist.sanbi.co.za](http://www.redlist.sanbi.co.za)).

A full list of species obtained from POSA is included in Appendix B.

#### *Nationally Protected Trees*

None of the woody species recorded on the POSA checklist for the QDGC in which the study area and proposed site occur are listed in terms of the National Forest Act, 1998 (Act No. 84 of 1998).

#### *Fauna of Conservation Concern (Red Listed Animals), Threatened or Protected Species (TOPS) and Provincially Protected Species*

Twelve mammal species of conservation concern have been recorded from the larger study area and proposed site (Appendix C). However, only eight of these species are likely to occur. These included:

- *Atelerix frontalis frontalis* (South African Hedgehog)- Near Threatened;
- *Felis nigripes* (Black footed Cat)- Vulnerable;
- *Lemniscomys rosalia* (Single-striped Grass Hare)- Data Deficient;
- *Mystromys albicaudatus* (White-tailed Mouse)- Endangered;
- *Poecilogale albinucha* (African Side-stripe Weasel)- Data Deficient;
- *Rhinolophus clivosus* (Geoffroy's Horseshoe Bat)- Near Threatened;
- *Rhinolophus darlingi* (Darling's Horseshoe Bat)- Near Threatened;
- *Rhinolophus denti* (Dent's Horseshoe Bat)- Near Threatened; and
- *Suncus varilla* (Lesser Dwarf Shrew)- Data Deficient.

No Provincially Protected or Red Listed amphibians, butterflies or reptiles have been recorded from both areas (Appendix D, E and G); however, one amphibian species *Pyxicephalus adspersus* (Giant Bullfrog) is listed on TOPS.

153 Provincially Protected bird species were recorded in the study area of which 17 have been confirmed in the proposed site (Appendix F); these include *Afrotis afroides* (Northern Black Korhaan), *Bubo lacteus* (Verreaux's Eagle-Owl) and *Cercotrichas paeaan* (Kalahari Scrub-Robin). 20 Red Listed bird species have been recorded from the larger region including 7 Vulnerable and 12 Near Threatened species (Appendix F). The Vulnerable *Gyps africanus* (White-backed Vulture) was the only Red Listed bird recorded within the pentad of the proposed site and the only bird listed on TOPS.

#### **4.1.7. Composite Ecological Sensitivity of the Study Area**

The majority of the land within the study area was classified as highly sensitive (Figure 10) due to the presence of the Biodiversity Node, Biodiversity Corridors, Critically Important / Hyperdiversity Areas, important heritage resources, NFEPAs, wetlands, and wetland clusters. Areas of low diversity are centred on built up areas (e.g. residential areas), while areas of medium diversity occurred to the west and north of the study area.



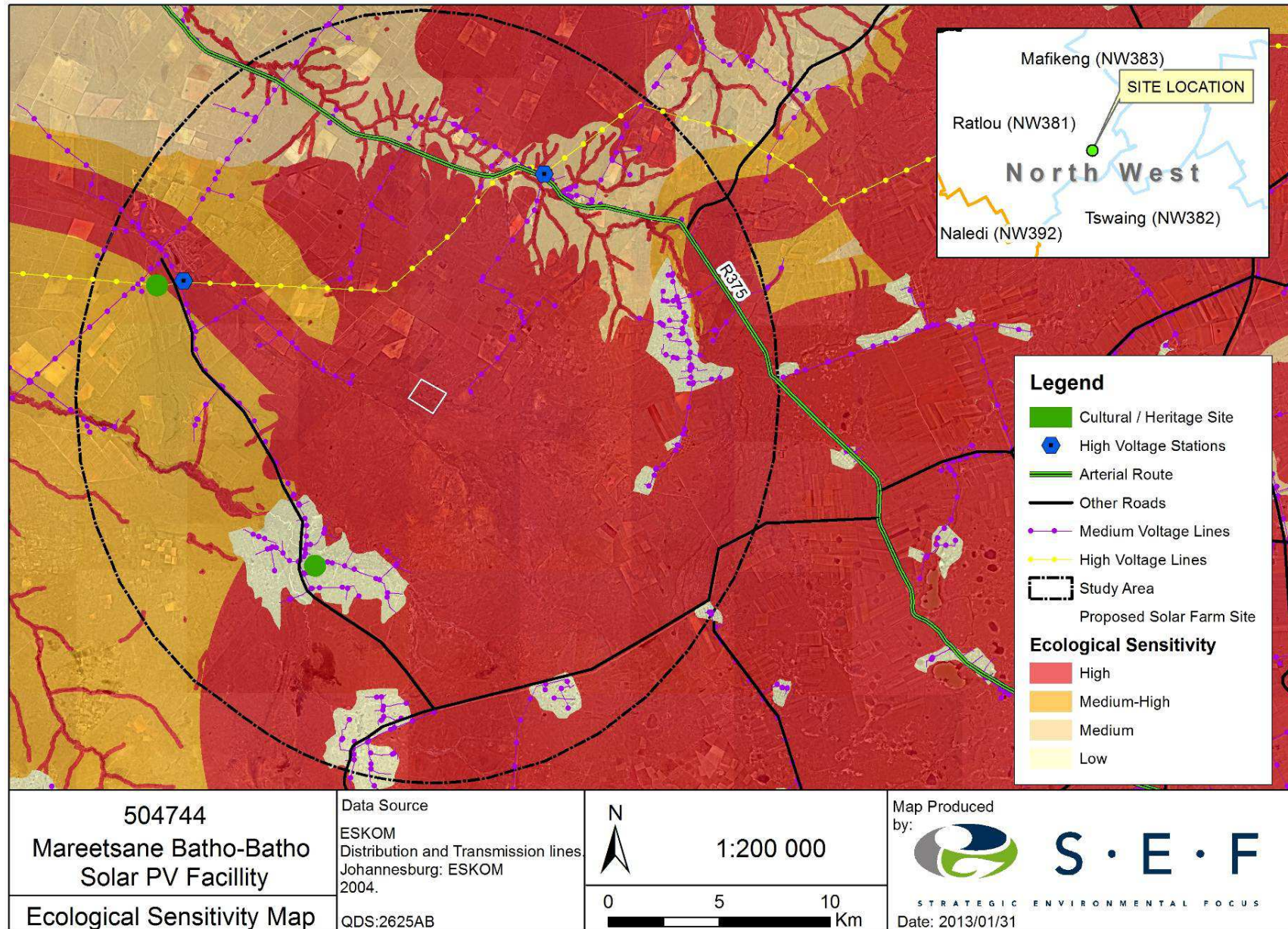


Figure 9: Combined Ecological Sensitivity of the study area.



## 4.2. Phase 2: Field Scan

The field scan only involved a scan of the proposed site and the observations discussed below are strictly to supplement the findings of the desktop study (discussed above) and does NOT represent a detailed specialist assessment of the site. Figure 9 graphically illustrates where various sensitive species/ areas that were confirmed on site.

### 4.2.1. Biodiversity and ecosystem status of the proposed site

#### Vegetation

Vegetation and geology appeared to resemble certain characteristics of the Western Highveld Sandy Grassland, as described in Mucina and Rutherford (2006), with flat topography, sandy soils and Clovelly and Hutton soils. The landscape was composed of plains of overgrazed grassland (Photograph 1) with woody species such as *Acacia hebeclada* and *Terminalia sericea* forming dense thickets in the west and southern corners of the proposed site (Figure 10). A few isolated patches of exotic species, such as *Opuntia* sp. and *Agave* sp. were observed.



Photograph 1: Overgrazed grassland (left) and dense tree and shrub clumps (right).

#### Land Use

Cattle were seen grazing (Photograph 2) throughout the proposed site and indications of wood harvesting was noted.

#### Watercourses and NFEPA's

Although the proposed site was dry at the time of the field scan, evidence of wetlands and streams were visible (Photograph 3). Many of these wetland areas appeared to be degraded by cattle.



**Photograph 2: Grazing cattle (left) and wood harvesting (right) was noted.**



**Photograph 3: Drainage channels (left) and degraded wetlands (right) were found throughout the proposed site.**

### Heritage Resources

Although no heritage areas were found during the desktop survey, a graveyard with 4 visible graves was observed just 20m outside of the northern boundary of the proposed site (Figure 10). The oldest of these graves was dated “1961” (Photograph 4) while the youngest was dated “2006”. A broken fence surrounded the graveyard.





Photograph 4: A graveyard (left) with the oldest grave dated "1961" faintly visible on the gravestone (right).

#### 4.2.2. Species and their Conservation Concern

##### Observed flora

The following plant species (Table 3) were confirmed on site. Several of these species were not accounted for in the desktop survey, such as the Protected Tree *Acacia erioloba* (Camel Thorn) and Declining *Boophane disticha* (Poison Bulb) (Figure 10). *Boophane disticha* was recorded predominantly within the short, overgrazed grassland sections of the proposed site in the east, while *Acacia erioloba* was found in the dense bushveld section in the western half of the proposed site. This highlights the fact that the data available for flora is grossly underestimated, that many more species of conservation concern may occur within the proposed site boundaries. Indigenous species, not reflected in the desktop data (Appendix B), are highlighted in green in Table 3.

Table 3: Floral species observed during the field scan.

Scientific name	SA Red List Status	Provincially Protected	TOPS	Nationally Protected Trees
<i>Acacia erioloba</i>	Least Concern	Not listed	Not listed	Protected
<i>Acacia hebeclada</i>	Least Concern	Not listed	Not listed	
<b>Agave sp.</b>	<b>Exotic</b>	<b>Not listed</b>	<b>Not listed</b>	
<i>Boophane disticha</i>	<b>Declining</b>	Not listed	Not listed	
<i>Bulbine sp.</i>		Genus Not listed	Not listed	
<i>Commelina africana</i>	Least Concern	Not listed	Not listed	
<i>Ledebouria sp.</i>		Genus Not listed	Not listed	
<i>Hibiscus pusillus</i>	Least Concern	Not listed	Not listed	
<i>Hypoxis sp.</i>		Genus Not listed		
<b>Opuntia sp.</b>	<b>Exotic</b>	<b>Not listed</b>	<b>Not listed</b>	
<i>Osteospermum muricatum</i>	Least Concern	Not listed	Not listed	
<i>Terminalia sericea</i>	Least Concern	Not listed	Not listed	

### Observed fauna

An abundance of butterflies and locusts were observed at the time of the site scan. Several birds and signs of mammal species were also seen and these species are listed in Table 4. The Provincially Protected *Afrotis afroides* (Northern Black Korhaan) was confirmed on site.

**Table 4: Faunal species observed during the field scan.**

Fauna	Scientific Name	Common name	SA Red List Status	Provincially Protected	TOPS
Avifauna	<i>Afrotis afroides</i>	Northern Black Korhaan	LC	Protected	Not listed
Mammal	<i>Cynictis penicillata</i>	Yellow Mongoose	LC		Not listed
Mammal	<i>Xerus</i> sp.	Ground Squirrel			Not listed

#### 4.2.3. Ecologically Sensitive areas identified within the proposed solar site

During the field scan, numerous areas were identified to be ecologically sensitive for one reason or the other. The proposed solar site is effectively cut-in-half by the Biodiversity Corridor Buffers (1 500m and 3 000m buffers) associated with the main vein of the corridor passing to the south of the site. The more sensitive core/ immediate buffer traverses the south-western extent of the proposed site and seems to be associated with dense bushveld (Figure 10). On viewing the proposed site (on Google Earth) in context of the immediate surrounding landscape on Google Earth, there is a clearly visible band of vegetation (dense bushveld - significantly different to that of the north-eastern half of the site) linked to the downstream non-perennial river to the west of the proposed site (Figure 11). Due to the presence of small (possibly) isolated wetlands identified along the south-western corner boundary of the site (Figure 10), this further supports the likelihood that the south-western half of the site is, most likely, hydrologically connected to the non-perennial river to the west. Patches of isolated wetlands were also identified throughout the sensitive core buffer area (1 500m buffer), with a few less within the wider 3 000m buffer zone (or north-eastern half of the proposed site).

In addition to the south-western half of the proposed site potentially being hydrologically linked to the non-perennial stream to the west, numerous individual trees of the Protected Tree, *Acacia erioloba*, were identified within the dense bushveld area. Isolated, but thriving populations of the Provincially Protected *Boophone disticha* (Poison Bulb) were also identified – however, these populations are located within the northern half of the site along the north-western and eastern boundaries of the site (Figure 10), a small patch was identified in the centre of the northern half of the site.

The Provincially Protected endemic bird, *Afrotis afroides* (Northern Black Korhaan), was confirmed on site within the overgrazed portions of the proposed site (i.e. the northern half of the proposed site). The Northern Black Korhaan favours overgrazed grassland (Hockey *et al.*, 2005) and this may be because overgrazing may make insects more visible. Males are known to be very territorial, with territories ranging between 200-300m<sup>2</sup> (Hockey *et al.*, 2005). *A. afroides* breed year round, however, they lay 1-3 eggs directly on the ground between grass tufts and shrubs instead of building nests. A decrease in the population has been recorded due to habitat loss in cultivated areas and incidents of trading for falconry have also been recorded (Hockey *et al.*, 2005).



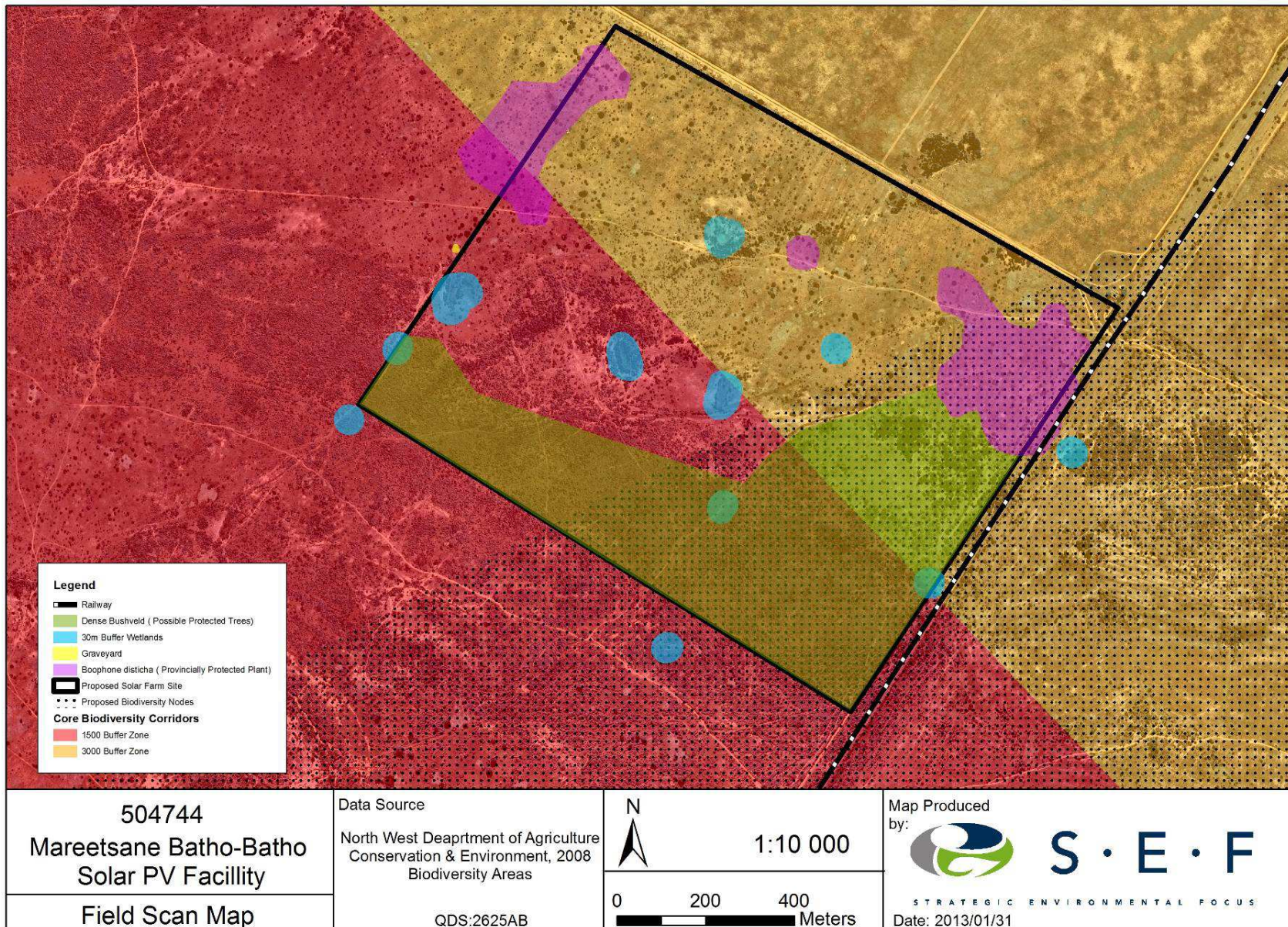
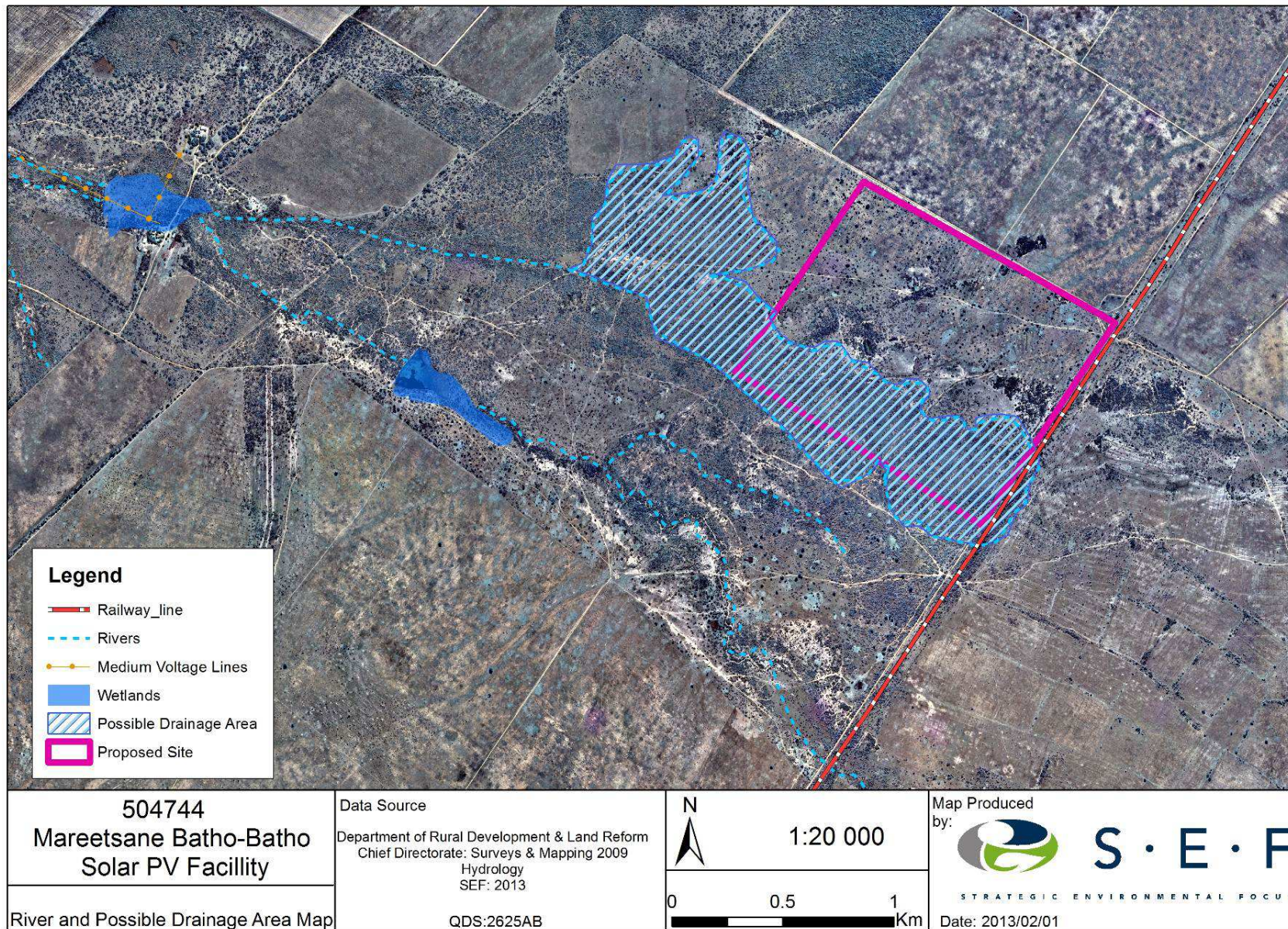


Figure 10: Locations of potentially sensitive areas identified during the field scan.





**Figure 11: Potential hydrological link (catchment area) for the non-perennial river to the west of the proposed solar site.**



## 5. SUMMARY AND CONCLUSION

The study area and proposed solar farm site coincide with areas that are known or expected to contain Threatened Ecosystems, protected watercourses (including wetlands) and Threatened (Provincially and Nationally Protected) floral and faunal species. Only the larger study area encompasses Critically Important / Hyperdiversity Areas, known FEPA wetlands and wetland clusters as well as important heritage/ cultural resource areas. A Biodiversity Node and associated Biodiversity Corridors traverse the majority of the study area and the proposed site falls within these Corridor buffer zones.

The overhead powerlines required to connect the proposed solar farm to the existing Eskom substations will traverse areas of high environmental sensitivity according to the available data (Figure 9), thus it is recommended that these powerline corridors are located within or immediately adjacent to the existing medium volt powerlines within the study area. However, given the desktop sensitivity of the environment, specialist studies will have to be conducted to identify any environmentally sensitive “hot spots” within new and/or existing powerline corridors. To this end, the following specialist studies will have to include an investigation of the powerline corridor and/or any alternative corridors in order to assess the impact of the proposed powerline on the natural, historical, visual and agricultural environments:

- Ecological Assessment;
- Wetland Delineation and Functional Assessment;
- Phase 1: Heritage Impact Assessment;
- Visual Impact Assessment; and
- Agricultural Impact Assessment.

### 5.1. Implications for the development of the proposed PV Solar Farm

Based on the proposed development footprint exceeding 20ha, the proposed development of a 30M PV Solar Farm on the identified site will require Environmental Authorisation, by way of a Scoping and Environmental Impact Reporting (S&EIR) process, in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA).

Additional to a NEMA Environmental Authorisation and depending on the exact location and extent of the proposed development relative to the sensitive areas and plants identified on site, the following authorisations will also be required:

- Biodiversity Permit in terms of NEMBA for the Provincially Protected Plant – *Boophone disticha*;
- Protected Trees Permit in terms of National Forest Act, 1998 (Act No. 84 of 1998);
- A Permit for disturbing the Provincially Protected Bird (*Afrotis afroides* (Northern Black Korhaan)) should be obtained, as it is highly likely that numerous males may have established territories and are breeding on site; and
- Water Use License for development within 500m of a wetland and/or possible destruction of a wetland.



Based on the ecological sensitive areas identified and given that no site alternatives exist for the proposed 30MW Solar Farm, SEF recommends the following:

- The development footprint of the proposed Solar Farm should be restricted to the northern half of the site (estimated at roughly 70-80ha) – the exact size and boundaries of the developable portion of land will have to be determined through the following detailed specialist assessments:
  - Detailed Ecological Assessment (Flora, Fauna including Avifauna) – this study must also comment on the removal and transplanting of protected plants as well as the *in-situ* conservation of the Northern Black Korhaan;
  - Detailed Wetland Delineation and Functional Assessment – this assessment must comment on the possible need for a Geohydrological Assessment in order to determine the significance of the site in terms of groundwater flows and linkages to other catchment/ drainage areas.
  - Phase 1 Heritage Impact Assessment – there may be additional heritage resources on site that may or may not be linked to the nearby graveyard;
- Additional specialist assessments required to support Environmental Authorisation for proposed solar farm developments include:
  - Visual Impact Assessment; and
  - Agricultural Impact Assessment.
- A Permit must be obtained for the removal and destruction of any Protected Tree individuals found within the development footprint; and
- A Permit for the removal and relocation of any additional Provincially Protected Plants identified on site. These plants should then be removed to an area of similar vegetation type and condition that will not be developed in future.

## 5.2. Proposed Way Forward in terms of the Applications for Environmental Authorisations

Should it be deemed feasibility to continue with the proposed development – given that the development footprint may be significantly reduced compared to the original extent of the site, the following are recommended:

- Commission the detailed Ecological (Flora, Fauna including Avifauna); and
- Wetland Delineation & Functional Assessments.

The above mentioned studies must be conducted as soon as possible. Best practice dictates that ecological studies take place during the summer season, beginning November to end April. The findings of these studies will more accurately inform the development proposal and footprint extent. If the project is then deemed feasible, the Application for Environmental Authorisation in terms of NEMA can then commence. This Application process takes approximately 10 months provided no delays are experienced – refer to the process flow diagram in Appendix H.

The Water Use License Application (WULA) can run concurrently with the S&EIR process – when the Draft Environmental Impact Report (EIR) is compiled, the relevant WULA documentation will also be compiled and both reports submitted to Registered Interested and Affected Parties (I&APs) for review

and comment. On completion of this review period the Final EIR will then be submitted to the Department of Environmental Affairs (DEA) will the Final WULA will be submitted to the relevant Regional Office of the Department of Water Affairs (DWA).

## 6. REFERENCES

- Barnes, K.N., (2000): The ESKOM Red Data Book of Birds of South Africa, Lesotho and Swaziland, Birdlife South Africa.
- Department of Environmental Affairs (2011): National Environmental Management: Biodiversity Act: National list of ecosystems that are threatened and in need of protection, (G 34809, GoN 1002).
- Department of Environmental Affairs and Tourism (2009): National Protected Area Expansion Strategy, priorities for expanding the protected area network for ecological sustainability and climate adaptation.
- Department of Rural Development & Land Reform (2009): Chief Directorate: Surveys & Mapping: Hydrology. Cape Town: CDSM.
- Driver, A., Nel, J.L., Snaddon, K., Murray, K., Roux, D.J., Hill, L., Swartz, E.R., Manuel, J. and Funke, N. (2011): Implementation Manual for Freshwater Ecosystem Priority Areas, Water Research Commission.
- DWAF, 2005. Groundwater Resource Assessment II: Recharge Literature Study Report 3A. Department of Water Affairs and Forestry, Pretoria, South Africa.
- Friedmann, Y. & Daly, B. (eds) (2004): *Red Data Book of the Mammals of South Africa: A Conservation Assessment*, Conservation Breeding Specialist Group (CBSG) Southern Africa (SSC/IUCN), Endangered Wildlife Trust, South Africa.
- Hockey PAR, Dean WRJ and Ryan PG (eds) 2005. Roberts - *Birds of southern Africa*, VIth ed. The Trustees of the John Voelcker Bird Book Fund, Cape Town.
- Mucina, L. & Rutherford, M.C. (2006): The vegetation of South Africa, Lesotho and Swaziland. *Strelitzia 19. South African National Biodiversity Institute*, Pretoria.
- Nel, J., Maree, G., Roux, D., Moolman, J., Kleynhans, N., Silberbauer, M. & Driver, A. 2004. South African National Spatial Biodiversity Assessment 2004: Technical Report. Volume 2: River Component. CSIR Report Number ENV-S-I-2004-063. Stellenbosch: Council for Scientific and Industrial Research.
- Nel, J.L., Murray, K.M., Maherry, A.M., Petersen, C.P., Roux, D.J., Driver, A., Hill, L., van Deventer, H., Funke, N., Swartz, E.R., Smith-Adao, L.B., Mbona, N., Downsborough, L. and Nienaber, S. (2011): Technical Report for the National Freshwater Priority Areas project, Water Resource Commission.
- North-West Department of Agriculture, Conservation, Environment and Rural Development. (2009). North-West Provincial Biodiversity Conservation Assessment Technical Report, Version 1.2., March 2009. North-West Department of Agriculture, Conservation, Environment and Rural Development, Mmbatho.

SANBI & DEAT. 2009. Threatened Ecosystems in South Africa: Descriptions and Maps. DRAFT for Comment. South African National Biodiversity Institute, Pretoria, South Africa.

WESSA North-west Birding Route South Africa, ([http://www.birdingroutes.co.za/north\\_west/nwbr-habitats.html](http://www.birdingroutes.co.za/north_west/nwbr-habitats.html))

### Internet References

- POSA (Accessed January 2013): <http://posa.sanbi.org/searchspp.php>
- SAFAP & SARCA Databases: [http://vmus.adu.org.za/vm\\_projects](http://vmus.adu.org.za/vm_projects)
- South African Bird Atlas Project Database (Accessed January 2013): <http://sabap2.adu.org.za/coverage.php>
- South African National Red List (Accessed January 2013): <http://redlist.sanbi.org/>

### National Legislation

- Bophuthatswana Nature Conservation Act, 1973 (Act No. 3 of 1973).
- Government Gazette No 32689, 2009: Draft National List of Threatened Ecosystems in terms of the National Environmental Management Act, 2004 (Act No. 10 of 2004). Department of Environmental Affairs, Notice 1477 of 2009 in Government Gazette No 32689, 6 November 2009.
- National Environmental Management Act, 1998 (Act No. 107 of 1998) [NEMA];
- National Environmental Management: Protected Areas Act, 2003 (Act No. 57 of 2003) [NEMPAA];
- National Forest Act, 1998 (Act No. 84 of 1998);
- National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) [NEMBA];
- National Water Act, 1998 (Act No. 36 of 1998) [NWA]; and
- National Freshwater Ecosystem Priority Areas Project.

### Sources of GIS layers

- Department of Environmental Affairs and Tourism 2001, ENPAT. Pretoria: DEAT
- Satellite Application Centre, 2000. Landcover. Pretoria SAC.
- Department of Environmental Affairs and Tourism 2001, ENPAT. Pretoria: DEAT.
- Department of Rural Development & Land Reform. Chief Directorate: Surveys & Mapping 2009: Hydrology. Cape Town: CDSM.
- South African National Botanical Institute 2010. NFEPA. Cape Town: SANBI.
- Department of Water Affairs & Forestry. Date unknown. Quaternary Catchments of South Africa. Pretoria: DEAT.
- Department of Environmental Affairs and Tourism 2001, ENPAT. Pretoria: DEAT.

## 7. APPENDICES

<b>Appendix A</b>	Description of Vegetation types
<b>Appendix B</b>	Floral species lists generated during the desktop survey
<b>Appendix C</b>	Mammal species lists generated during the desktop survey
<b>Appendix D</b>	Amphibian species lists generated during the desktop survey
<b>Appendix E</b>	Reptile species lists generated during the desktop survey
<b>Appendix F</b>	Avifaunal species lists generated during the desktop survey
<b>Appendix G</b>	Butterfly species lists generated during the desktop survey

**APPENDIX A: VEGETATION TYPES**

Area	Vegetation Type (Mucina and Rutherford, 2006)	Vegetation Description (Mucina and Rutherford, 2006)	Conservation Status (Mucina and Rutherford, 2006)
<b>Proposed Site &amp; Study Area</b>	Western Highveld Sandy Grassland	Flat to gently undulating plains and comprises of short, dry grassland with some woody species occurring in bush clumps.	Critically Endangered. Only 22% of the natural area remains.
<b>Study Area</b>	The Highveld Alluvial Vegetation	Flat area with riparian thickets that is dominated by <i>Acacia karoo</i> . Grasslands are seasonally flooded and are often invaded by alien plants.	Least Threatened. Almost 10% is conserved in Barberspan Nature Reserve.
<b>Study Area</b>	Highveld Salt Pans	These are depressions in the landscape that are seasonally wet with either surface floating vegetation or terrestrial vegetation in dry pans which form a characteristic zonation pattern.	Least Threatened. A small portion is conserved in several reserves, 4% have been transformed so far.
<b>Study Area</b>	Klerksdorp Thornveld	Plains or slightly undulating plains with <i>Acacia karoo</i> in dense to open clumps in dry grassland.	Least Threatened. Only 2.5% is conserved in 3 reserves in the area, threatened by grazing and subsequent invasion by <i>A. karoo</i> into grassland.
<b>Study Area</b>	Mafikeng Bushveld	Well developed tree, shrub and grass layers occurring in an area with very dry winters on flat sandy plains.	Vulnerable. 0% conserved and 25% is already transformed for cultivation and urbanisation.

**APPENDIX B****Floral species lists generated during the desktop survey****CR= Critically Endangered; VU = Vulnerable; NT = Near-threatened; EN = Endangered**

Plant species list generated from POSA showing the species that may occur in the study area and proposed site. Species that may occur at both the proposed site and study area are highlighted in **bold**. This list was generated at the QDGC scale. Protected species are highlighted in **RED**.

Scientific name	SA Red List Status	Provincially Protected	TOPS	Nationally Protected Trees
<i>Acacia hereroensis</i>	LC			
<i>Aristida canescens</i> subsp. <i>canescens</i>	LC			
<b><i>Aristida congesta</i> subsp. <i>congesta</i></b>	<b>LC</b>			
<b><i>Aristida mollissima</i> subsp. <i>mollissima</i></b>	<b>LC</b>			
<b><i>Aristida stipitata</i> subsp. <i>graciliflora</i></b>	<b>LC</b>			
<i>Asparagus laricinus</i>	LC			
<b><i>Babiana bainesii</i> (Endemic)</b>	<b>LC</b>	Protected		
<b><i>Bewsia biflora</i></b>	<b>LC</b>			
<b><i>Boscia foetida</i> subsp. <i>minima</i></b>	<b>LC</b>			
<b><i>Brachiaria marlothii</i></b>	<b>LC</b>			
<i>Brachiaria nigropedata</i>	LC			
<b><i>Brachystelma canum</i> (Endemic)</b>	<b>CR</b>	Protected		
<b><i>Bulbine abyssinica</i></b>	<b>LC</b>			
<i>Bulbostylis burchellii</i>	LC			
<i>Cenchrus ciliaris</i>	LC			
<i>Chaenostoma patrioticum</i>	LC			
<i>Chamaecrista biensis</i>	LC			
<b><i>Chascanum hederaceum</i> var. <i>hederaceum</i></b>	<b>LC</b>			
<i>Cheilanthes hirta</i> var. <i>brevipilosa</i>				
<i>Chenopodium glaucum</i>	NE			
<i>Chlorophytum angulicaule</i>	LC			

Scientific name	SA Red List Status	Provincially Protected	TOPS	Nationally Protected Trees
<i>Crotalaria spartioides</i>	LC			
<i>Cymbopogon pospischilii</i>	NE			
<i>Cymbopogon prolixus</i>	LC			
<i>Cynodon dactylon</i>	LC			
<i>Cyperus decurvatus</i>				
<b><i>Cyperus margaritaceus var. margaritaceus</i></b>	LC			
<b><i>Cyperus usitatus</i></b>	LC			
<i>Datura inoxia</i>	NE			
<i>Dicerocaryum senecioides</i>	LC			
<i>Digitaria argyrograpta</i>	LC			
<i>Digitaria eriantha</i>	LC			
<i>Elionurus muticus</i>	LC			
<i>Enneapogon scoparius</i>	LC			
<i>Eragrostis biflora</i>	LC			
<i>Eragrostis chloromelas</i>	LC			
<b><i>Eragrostis lehmanniana var. lehmanniana</i></b>	LC			
<b><i>Eragrostis obtusa</i></b>	LC			
<b><i>Eragrostis pallens</i></b>	LC			
<i>Eragrostis rigidior</i>	LC			
<i>Eragrostis superba</i>	LC			
<i>Eragrostis trichophora</i>	LC			
<i>Eragrostis x pseud-obtusa</i>	NE			
<i>Euphorbia duseimata</i>	LC			
<b><i>Eustachys paspaloides</i></b>	LC			
<i>Evolvulus alsinoides</i>	LC			
<i>Fockea angustifolia</i>	LC			
<b><i>Gomphrena celosioides</i></b>	NE			



Scientific name	SA Red List Status	Provincially Protected	TOPS	Nationally Protected Trees
<i>Grewia flava</i>	LC			
<i>Gymnosporia tenuispina</i>	LC			
<i>Helichrysum dregeanum</i>	LC			
<i>Hermannia quartiniana</i>	LC			
<i>Hermannia stellulata</i>	LC			
<i>Heteropogon contortus</i>	LC			
<i>Hyparrhenia hirta</i>	LC			
<i>Ipomoea bolusiana</i>	LC			
<i>Ipomoea oblongata</i>	LC			
<i>Ipomoea oenotherae</i> var. <i>oenotherae</i>	LC			
<b><i>Lapeirousia sandersonii</i></b>	LC	Protected		
<b><i>Lippia scaberrima</i></b>	LC			
<b><i>Lotononis crumanina</i></b>	LC			
<i>Malva pusilla</i>	NE			
<i>Melhania prostrata</i>	LC			
<b><i>Melinis nerviglumis</i></b>	LC			
<b><i>Melinis repens</i> subsp. <i>repens</i></b>	LC			
<i>Melolobium candicans</i>	LC			
<i>Melolobium microphyllum</i>	LC			
<i>Mundulea sericea</i> subsp. <i>sericea</i>	LC			
<i>Ochna pretoriensis</i>	LC			
<b><i>Ozoroa paniculosa</i> var. <i>paniculosa</i></b>	LC			
<b><i>Panicum coloratum</i> var. <i>coloratum</i></b>	LC			
<i>Panicum maximum</i>	LC			
<i>Pavetta zeyheri</i> subsp. <i>zeyheri</i>	LC			
<b><i>Pavonia burchellii</i></b>	LC			
<i>Pentarrhinum insipidum</i>	LC			

Scientific name	SA Red List Status	Provincially Protected	TOPS	Nationally Protected Trees
<i>Perotis patens</i>	LC			
<i>Plectranthus neochilus</i>	LC			
<b><i>Plumbago zeylanica</i></b>	<b>NE</b>			
<i>Pogonarthria squarrosa</i>	LC			
<i>Pollichia campestris</i>	LC			
<i>Polygala leptophylla</i> var. <i>leptophylla</i>	LC			
<i>Polygonum plebeium</i>	LC			
<i>Pomaria burchellii</i> subsp. <i>burchellii</i>	LC			
<i>Prosopis velutina</i>	NE			
<i>Ranunculus multifidus</i>	NE			
<i>Raphionacme velutina</i>	LC			
<i>Rhynchosia totta</i>	LC			
<b><i>Rhynchosia venulosa</i></b>	<b>LC</b>			
<i>Rothea uncinata</i>	LC			
<i>Salvia disermas</i>	LC			
<i>Schizachyrium sanguineum</i>	LC			
<b><i>Schmidtia pappophoroides</i></b>	<b>LC</b>			
<b><i>Searsia leptodictya</i> forma <i>leptodictya</i></b>	<b>NE</b>			
<i>Searsia magalismontana</i> subsp. <i>magalismontana</i>	LC			
<i>Searsia pyroides</i> var. <i>pyroides</i>	LC			
<b><i>Searsia tenuinervis</i></b>	<b>LC</b>			
<i>Senna italica</i> subsp. <i>arachoides</i>	LC			
<i>Sericorema remotiflora</i>	LC			
<i>Setaria nigrirostris</i>	LC			
<i>Setaria sphacelata</i> var. <i>sphacelata</i>	LC			
<i>Spergularia media</i>	NE			
<i>Sporobolus fimbriatus</i>	LC			

Scientific name	SA Red List Status	Provincially Protected	TOPS	Nationally Protected Trees
<b>Sporobolus nitens</b>	LC			
<i>Sporobolus stapfianus</i>	LC			
<b>Stipagrostis uniplumis var. neesii</b>	LC			
<b>Syntrichia laevipila</b>				
<i>Tarchonanthus camphoratus</i>	LC			
<i>Teucrium trifidum</i>	LC			
<i>Themeda triandra</i>	LC			
<i>Tortella xanthocarpa</i>				
<i>Trachyandra laxa</i> var. <i>rigida</i>	LC			
<i>Tragus berteronianus</i>	LC			
<b>Tragus koelerioides</b>	LC			
<i>Trichoneura grandiglumis</i>	LC			
<i>Trifolium campestre</i> var. <i>campestre</i>	NE			
<i>Tripteris aghillana</i> var. <i>aghillana</i>	LC			
<i>Triraphis andropogonoides</i>	LC			
<b>Urelytrum agropyroides</b>	LC			
<b>Urochloa brachyura</b>	LC			
<i>Vangueria infausta</i> subsp. <i>infausta</i>	LC			
<i>Vangueria parvifolia</i>				
<b>Viscum rotundifolium</b>	LC			
<i>Waltheria indica</i>	LC			
<i>Withania somnifera</i>	LC			
<i>Zannichellia palustris</i>	LC			
<i>Ziziphus zeyheriana</i>	LC			

## APPENDIX C

### Mammal species lists generated during the desktop survey

CR= Critically Endangered; VU = Vulnerable; NT = Near-threatened; EN = Endangered

Mammal species list generated through the desktop survey indicating the species which may occur in the study area and proposed site. Species that may occur at both the proposed site and study area are highlighted in **bold**. Protected species are highlighted in **RED**.

Scientific Name	Common name	IUCN Red List Status	SA Red List Status	Provincially Protected	TOPS
<i>Aethomys ineptus</i>	Tete Veld Aethomys	LC	LC		
<i>Aethomys namaquensis</i>	Namaqua Rock Rat	LC	LC		
<i>Alcelaphus buselaphus caama</i>	Red Hartebeest	LC	LC	Protected	
<i>Antidorcas marsupialis</i>	Springbok	LC	LC		
<i>Aonyx capensis</i>	African Clawless Otter	LC	LC		
<i>Atelerix frontalis frontalis</i>	Southern African Hedgehog	LC	NT		
<i>Atilax paludinosus</i>	Marsh Mongoose	LC	LC		
<i>Canis mesomelas mesomelas</i>	Black-backed Jackal	LC	LC		
<i>Caracal caracal</i>	Caracal	LC	LC		
<i>Ceratotherium simum simum</i>	Southern White Rhino	NT	LC		Protected
<i>Connochaetes gnou</i>	Black Wildebeest	LC	LC	Protected	Protected
<i>Connochaetes taurinus taurinus</i>	Common Wildebeest	LC	LC		
<i>Crocidura cyanea</i>	Reddish-gray Musk Shrew	LC	DD		
<i>Crocuta crocuta</i>	Spotted Hyaena	LC	NT		Protected
<i>Cynictis penicillata</i>	Yellow Mongoose	LC	LC		
<i>Desmodillus auricularis</i>	Cape Short-eared Gerbil	LC	LC		
<i>Diceros bicornis minor</i>	Southern-central Black rhino	CR	VU		Protected
<i>Elephantulus myurus</i>	Eastern Rock Elephant Shrew	LC	LC		
<i>Eptesicus hottentotus</i>	Long-tailed House Bat	LC	LC		
<i>Equus quagga</i>	Plains Zebra	LC			

Scientific Name	Common name	IUCN Red List Status	SA Red List Status	Provincially Protected	TOPS
<i>Felis nigripes</i>	Black-footed Cat	VU	LC		Protected
<i>Felis silvestris</i>	Wild Cat	LC	LC		
<i>Genetta genetta</i>	Common Genet	LC	LC		
<i>Gerbilliscus brantsii</i>	Highveld Gerbil	LC			
<i>Gerbilliscus leucogaster</i>	Bushveld Gerbil	LC			
<i>Gerbillurus paeba</i>	Hairy-footed Gerbil	LC	LC		
<i>Giraffa camelopardalis giraffa</i>	Giraffe	LC	LC	Protected	
<i>Graphiurus microtis</i>	Small-eared Dormouse	LC			
<i>Herpestes sanguineus</i>	Slender Mongoose	LC			
<i>Hyaena brunnea</i>	Brown Hyaena	NT	NT		
<i>Hystrix africaeaustralis</i>	Cape Porcupine	LC	LC		
<i>Ictonyx striatus</i>	Zorilla, Striped Polecat	LC	LC		
<i>Lemniscomys rosalia</i>	Single-striped Grass Hare	LC	DD		
<i>Lepus capensis</i>	Cape Hare	LC	LC		
<i>Lepus microtis</i>	African Savanna Hare	LC			
<i>Lepus saxatilis</i>	Scrub Hare	LC	LC		
<i>Malacothrix typica</i>	Gerbil Mouse	LC	LC		
<i>Mastomys coucha</i>	Southern African Mastomys	LC	LC		
<i>Mellivora capensis</i>	Honey Badger	LC	NT		Protected
<i>Mus indutus</i>	Desert Pygmy Mouse	LC	LC		
<i>Mus musculus</i>	House Mouse	LC			
<i>Mystromys albicaudatus</i>	White-tailed Mouse	EN	EN		
<i>Orycteropus afer</i>	Aardvark, Antbear	LC	LC	Protected	
<i>Oryx gazella</i>	Gemsbok	LC	LC	Protected	
<i>Otocyon megalotis megalotis</i>	Bat-eared Fox	LC	LC		
<i>Papio ursinus ursinus</i>	Southern Chacma Baboon	LC	LC		



Scientific Name	Common name	IUCN Red List Status	SA Red List Status	Provincially Protected	TOPS
<i>Pedetes capensis</i>	Springhaas, Springhare	LC	LC		
<i>Pipistrellus capensis</i>	Cape Serotine Bat	LC	LC		
<i>Poecilogale albinucha</i>	African Striped Weasel	LC	DD		
<i>Proteles cristata cristatus</i>	Aardwolf	LC	LC	Protected	
<i>Raphicerus campestris campestris</i>	Steenbok	LC	LC	Protected	
<i>Rhabdomys pumilio</i>	Four-striped Grass Mouse	LC	LC		
<i>Rhinolophus clivosus</i>	Geoffroy's Horseshoe Bat	LC	NT		
<i>Rhinolophus darlingi</i>	Darling's Horseshoe Bat	LC	NT		
<i>Rhinolophus denti</i>	Dent's Horseshoe Bat	LC	NT		
<i>Saccostomus campestris</i>	Pouched Mouse	LC	LC		
<i>Sauromys petrophilus</i>	Roberts's Flat-headed Bat	LC	LC		
<i>Smutsia temminckii</i>	Cape Pangolin	LC			
<i>Steatomys krebsii</i>	Kreb's Fat Mouse	LC	LC		
<i>Suncus varilla</i>	Lesser Dwarf Shrew	LC	DD		
<i>Suricata suricatta</i>	Meerkat	LC	LC		
<i>Sylvicapra grimmia</i>	Common Duiker	LC	LC		
<i>Syncerus caffer caffer</i>	African Buffalo	LC	LC	Protected	
<i>Tadarida aegyptiaca</i>	Egyptian Free-tailed Bat	LC			
<i>Thallomys paedulcus</i>	Acacia Rat	LC	LC		
<i>Tragelaphus oryx</i>	Common Eland, Eland	LC	LC		
<i>Vulpes chama</i>	Cape Fox, Silver Fox	LC	LC		Protected
<i>Xerus inauris</i>	South African Ground Squirrel	LC	LC		

## APPENDIX D

### Amphibian species lists generated during the desktop survey

**CR= Critically Endangered; VU = Vulnerable; NT = Near-threatened; EN = Endangered** the species which may occur in the study area and proposed site. Species that may occur at both the proposed site and study area are highlighted in **bold** the species which may occur in the study area and proposed site. Species that may occur at both the proposed site and study area are highlighted in **bold**. This list was generated at the QDGC scale. Protected species are highlighted in **RED**.

Scientific name	Common name	IUCN Red List Status	Provincially Protected	TOPS
<b><i>Bufo garmani</i></b>		LC	Not Listed	
<i>Breviceps adspersus</i>	Common Rain Frog	LC	Not Listed	
<i>Pyxicephalus adspersus</i>	African Bullfrog	LC	Not Listed	Protected
<b><i>Phrynomantis bifasciatus</i></b>	Banded Rubber Frog	LC	Not Listed	
<b><i>Cacosternum boettgeri</i></b>	Boettger's Dainty Frog	LC	Not Listed	
<b><i>Schismaderma carens</i></b>	African Split-skin Toad	LC	Not Listed	
<b><i>Tomopterna cryptotis</i></b>	Common Sand Frog	LC	Not Listed	
<i>Amietophrynus garmani</i>		LC	Not Listed	
<b><i>Kassina senegalensis</i></b>		LC	Not Listed	

\* Lists were generated at the QDS level.

## APPENDIX E

### Reptile species lists generated during the desktop survey

CR= Critically Endangered; VU = Vulnerable; NT = Near-threatened; EN = Endangered

Reptile species list generated from the Virtual Museum online checklist showing the species which may occur in the study area and proposed site. Species that may occur at both the proposed site and study area are highlighted in **bold**. This list was generated at the QDGC scale. Protected species are highlighted in **RED**.

Scientific name	Common name	Red List Status	Provincial Protection	TOPS
<i>Afroablepharus wahlbergii</i>	Wahlberg's Snake-eyed Skink	Not Evaluated	Not listed	
<i>Afroablepharus wahlbergii</i>	Wahlberg's Snake-eyed Skink	Not Evaluated	Not listed	
<i>Afroablepharus wahlbergii</i>	Wahlberg's Snake-eyed Skink	Not Evaluated	Not listed	
<i>Agama aculeata aculeata</i>	Common Ground Agama	Not Evaluated	Not listed	
<i>Aparallactus capensis</i>	Black-headed Centipede-eater	Not Evaluated	Not listed	
<i>Aparallactus capensis</i>	Black-headed Centipede-eater	Not Evaluated	Not listed	
<i>Boaedon capensis</i>	Brown House Snake	Not Evaluated	Not listed	
<i>Crotaphopeltis hotamboeia</i>	Red-lipped Snake	Not Evaluated	Not listed	
<i>Crotaphopeltis hotamboeia</i>	Red-lipped Snake	Not Evaluated	Not listed	
<i>Crotaphopeltis hotamboeia</i>	Red-lipped Snake	Not Evaluated	Not listed	
<i>Dasypeltis scabra</i>	Rhombic Egg-eater	Not Evaluated	Not listed	
<i>Dasypeltis scabra</i>	Rhombic Egg-eater	Not Evaluated	Not listed	
<i>Ichnotropis squamulosa</i>	Common Rough-scaled Lizard	Not Evaluated	Not listed	
<i>Ichnotropis squamulosa</i>	Common Rough-scaled Lizard	Not Evaluated	Not listed	
<i>Lycophidion capense capense</i>	Cape Wolf Snake	Not Evaluated	Not listed	
<i>Lycophidion capense capense</i>	Cape Wolf Snake	Not Evaluated	Not listed	
<i>Lycophidion capense capense</i>	Cape Wolf Snake	Not Evaluated	Not listed	
<i>Nucras holubi</i>	Holub's Sandveld Lizard	Not Evaluated	Not listed	
<b><i>Pachydactylus capensis</i></b>	<b>Cape Gecko</b>	<b>Not Evaluated</b>	<b>Not listed</b>	
<i>Psammobates oculifer</i>	Serrated Tent Tortoise	Not Evaluated	Not listed	



<b><i>Psammophis trinasalis</i></b>	<b>Fork-marked Sand Snake</b>	<b>Not Evaluated</b>	<b>Not listed</b>	
<i>Psammophylax tritaeniatus</i>	Striped Grass Snake	Not Evaluated	Not listed	
<i>Psammophylax tritaeniatus</i>	Striped Grass Snake	Not Evaluated	Not listed	
<b><i>Pseudaspis cana</i></b>	<b>Mole Snake</b>	<b>Not Evaluated</b>	<b>Not listed</b>	
<i>Rhinotyphlops lalandei</i>	Delalande's Beaked Blind Snake	Not Evaluated	Not listed	
<i>Stigmochelys pardalis</i>	Leopard Tortoise	Not Evaluated	Not listed	
<i>Stigmochelys pardalis</i>	Leopard Tortoise	Not Evaluated	Not listed	
<i>Stigmochelys pardalis</i>	Leopard Tortoise	Not Evaluated	Not listed	
<i>Telescopus semiannulatus semiannulatus</i>	Eastern Tiger Snake	Not Evaluated	Not listed	
<i>Telescopus semiannulatus semiannulatus</i>	Eastern Tiger Snake	Not Evaluated	Not listed	
<i>Trachylepis capensis</i>	Cape Skink	Not Evaluated	Not listed	
<i>Trachylepis capensis</i>	Cape Skink	Not Evaluated	Not listed	
<i>Trachylepis punctatissima</i>	Speckled Rock Skink	Not Evaluated	Not listed	
<i>Trachylepis sp. (Transvaal varia)</i>	Skink sp. 1	Not listed	Not listed	
<i>Trachylepis varia</i>	Variable Skink	Not Evaluated	Not listed	
<b><i>Xenocalamus bicolor bicolor</i></b>	<b>Bicoloured Quill-snouted Snake</b>	<b>Not Evaluated</b>	<b>Not listed</b>	

## APPENDIX F

### Avifaunal species lists generated during the desktop survey

CR= Critically Endangered; VU = Vulnerable; NT = Near-threatened; EN = Endangered

Avifaunal species list generated from the South African Bird Atlas Project online checklist showing the species which may occur in the study area and proposed site. Species that may occur at both the proposed site and study area are highlighted in **bold**. This list was generated at the scale of a pentad (9km X 8km grid cells). Protected species are highlighted in **RED**

Scientific name	Common name	SA Red List Status	Provincial Protection	TOPS
<i>Acridotheres tristis</i>	Common Myna	LC		
<i>Acrocephalus baeticatus</i>	African Reed-Warbler	LC		
<i>Acrocephalus gracilirostris</i>	Lesser Swamp-Warbler	LC		
<i>Actitis hypoleucos</i>	Common Sandpiper	LC	Protected	
<i>Afrotis afra</i>	Southern Black Korhaan	LC	Protected	
<b><i>Afrotis afraoides</i></b>	<b>Northern Black Korhaan</b>	LC	<b>Protected</b>	
<i>Alcedo cristata</i>	Malachite Kingfisher	LC	Protected	
<i>Alopochen aegyptiacus</i>	Egyptian Goose	LC		
<i>Amadina erythrocephala</i>	Red-headed Finch	LC		
<i>Amadina fasciata</i>	Cut-throat Finch	LC		
<i>Anas capensis</i>	Cape Teal	LC	Protected	
<i>Anas erythrorhyncha</i>	Red-billed Teal	LC	Protected	
<i>Anas smithii</i>	Cape Shoveler	LC		
<i>Anas undulata</i>	Yellow-billed Duck	LC		
<i>Anhinga rufa</i>	African Darter	LC		
<i>Anthoscopus minutus</i>	Cape Penduline-Tit	LC		
<i>Anthus cinnamomeus</i>	African Pipit	LC		
<i>Anthus leucophrys</i>	Plain-backed Pipit	LC		
<i>Anthus vaalensis</i>	Buffy Pipit	LC		
<i>Apalis thoracica</i>	Bar-throated Apalis	LC		

<i>Apus affinis</i>	Little Swift	LC	Protected	
<i>Apus caffer</i>	White-rumped Swift	LC	Protected	
<i>Ardea cinerea</i>	Grey Heron	LC	Protected	
<i>Ardea goliath</i>	Goliath Heron	LC	Protected	
<i>Ardea melanocephala</i>	Black-headed Heron	LC	Protected	
<i>Ardeola ralloides</i>	Squacco Heron	LC	Protected	
<i>Ardeotis kori</i>	Kori Bustard	VU		Protected
<i>Asio capensis</i>	Marsh Owl	LC	Protected	
<i>Batis pririt</i>	Pirit Batis	LC		
<b><i>Bostrychia hagedash</i></b>	<b>Hadeda Ibis</b>	LC	<b>Protected</b>	
<i>Bradornis infuscatus</i>	Chat Flycatcher	LC	Protected	
<i>Bradornis mariquensis</i>	Marico Flycatcher	LC	Protected	
<i>Bubalornis niger</i>	Red-billed Buffalo-Weaver	LC		
<i>Bubo africanus</i>	Spotted Eagle-Owl	LC	Protected	
<b><i>Bubo lacteus</i></b>	<b>Verreaux's Eagle-Owl</b>	LC	<b>Protected</b>	
<b><i>Bubulcus ibis</i></b>	<b>Cattle Egret</b>	LC	<b>Protected</b>	
<i>Buphagus erythrorhynchus</i>	Red-billed Oxpecker	NT	Protected	
<b><i>Burhinus capensis</i></b>	<b>Spotted Thick-knee</b>	LC		
<i>Buteo vulpinus</i>	Steppe Buzzard	LC	Protected	
<i>Calamonastes fasciolatus</i>	Barred Wren-Warbler	LC		
<i>Calandrella cinerea</i>	Red-capped Lark	LC		
<i>Calendulauda africanoides</i>	Fawn-coloured Lark	LC		
<i>Calendulauda sabota</i>	Sabota Lark	LC		
<i>Calidris ferruginea</i>	Curlew Sandpiper	LC	Protected	
<i>Calidris minuta</i>	Little Stint	LC		
<i>Camaroptera brevicaudata</i>	Grey-backed Camaroptera	LC		
<i>Campethera abingoni</i>	Golden-tailed Woodpecker	LC	Protected	
<i>Caprimulgus pectoralis</i>	Fiery-necked Nightjar	LC	Protected	

<i>Caprimulgus rufigena</i>	Rufous-cheeked Nightjar	LC	Protected	
<i>Centropus burchellii</i>	Burchell's Coucal	LC	Protected	
<i>Cercomela familiaris</i>	Familiar Chat	LC	Protected	
<i>Cercotrichas leucophrys</i>	White-browed Scrub-Robin	LC	Protected	
<b><i>Cercotrichas paena</i></b>	<b>Kalahari Scrub-Robin</b>	LC	<b>Protected</b>	
<i>Certhilauda chuana</i>	Short-clawed Lark	NT		
<i>Ceryle rudis</i>	Pied Kingfisher	LC	Protected	
<i>Chalcomitra amethystina</i>	Amethyst Sunbird	LC		
<i>Charadrius hiaticula</i>	Common Ringed Plover	LC	Protected	
<i>Charadrius leschenaultii</i>	Greater Sand Plover	LC	Protected	
<i>Charadrius pecuarius</i>	Kittlitz's Plover	LC	Protected	
<i>Charadrius tricollaris</i>	Three-banded Plover	LC	Protected	
<i>Chersomanes albofasciata</i>	Spike-heeled Lark	LC		
<i>Chlidonias hybrida</i>	Whiskered Tern	LC		
<i>Chlidonias leucopterus</i>	White-winged Tern	LC		
<b><i>Chrysococcyx caprius</i></b>	<b>Diderick Cuckoo</b>	LC	<b>Protected</b>	
<i>Ciconia abdimii</i>	Abdim's Stork	LC	Protected	
<i>Ciconia ciconia</i>	White Stork	LC	Protected	
<i>Ciconia nigra</i>	Black Stork	NT	Protected	Protected
<i>Cinnyris mariquensis</i>	Marico Sunbird	LC		
<i>Cinnyris talatala</i>	White-bellied Sunbird	LC		
<i>Circaetus cinereus</i>	Brown Snake-Eagle	LC	Protected	
<i>Circaetus pectoralis</i>	Black-chested Snake-Eagle	LC	Protected	
<i>Circus pygargus</i>	Montagu's Harrier	LC		
<i>Cisticola aridulus</i>	Desert Cisticola	LC		
<i>Cisticola chiniana</i>	Rattling Cisticola	LC		
<i>Cisticola fulvicapilla</i>	Neddicky Neddicky	LC		
<i>Cisticola juncidis</i>	Zitting Cisticola	LC		



<i>Cisticola rufilatus</i>	Tinkling Cisticola	LC		
<i>Cisticola textrix</i>	Cloud Cisticola	LC		
<i>Cisticola tinniens</i>	Levaillant's Cisticola	LC		
<i>Clamator glandarius</i>	Great Spotted Cuckoo	LC	Protected	
<i>Clamator jacobinus</i>	Jacobin Cuckoo	LC	Protected	
<i>Clamator levaillantii</i>	Levaillant's Cuckoo	LC	Protected	
<i>Colius colius</i>	White-backed Mousebird	LC		
<i>Colius striatus</i>	Speckled Mousebird	LC		
<i>Columba guinea</i>	Speckled Pigeon	LC	Protected	
<i>Columba livia</i>	Rock Dove	LC		
<i>Coracias caudatus</i>	Lilac-breasted Roller	LC	Protected	
<i>Coracias garrulus</i>	European Roller	LC	Protected	
<i>Coracias naevius</i>	Purple Roller	LC	Protected	
<i>Corvinella melanoleuca</i>	Magpie Shrike	LC	Protected	
<i>Corvus albus</i>	Pied Crow	LC		
<i>Corvus capensis</i>	Cape Crow	LC		
<i>Corythaixoides concolor</i>	Grey Go-away-bird	LC		
<i>Cossypha caffra</i>	Cape Robin-Chat	LC	Protected	
<i>Cossypha humeralis</i>	White-throated Robin-Chat	LC	Protected	
<i>Coturnix coturnix</i>	Common Quail	LC	Protected	
<i>Cretophora cinerea</i>	Wattled Starling	LC		
<i>Crithagra atrogularis</i>	Black-throated Canary	LC		
<i>Crithagra flaviventris</i>	Yellow Canary	LC		
<i>Crithagra mozambicus</i>	Yellow-fronted Canary	LC		
<i>Cuculus gularis</i>	African Cuckoo	LC	Protected	
<i>Cursorius temminckii</i>	Temminck's Courser	LC	Protected	
<i>Cypsiurus parvus</i>	African Palm-Swift	LC	Protected	
<i>Delichon urbicum</i>	Common House-Martin	LC	Protected	

<i>Dendrocygna viduata</i>	White-faced Duck	LC	Protected	
<b><i>Dendroperdix sephaena</i></b>	<b>Crested Francolin</b>	LC		
<i>Dendropicos fuscescens</i>	Cardinal Woodpecker	LC	Protected	
<i>Dicrurus adsimilis</i>	Fork-tailed Drongo	LC		
<i>Dryoscopus cubla</i>	Black-backed Puffback	LC		
<i>Egretta ardesiaca</i>	Black Heron	LC	Protected	
<i>Egretta garzetta</i>	Little Egret	LC	Protected	
<i>Elanus caeruleus</i>	Black-shouldered Kite	LC	Protected	
<i>Emberiza flaviventris</i>	Golden-breasted Bunting	LC		
<i>Emberiza tahapisi</i>	Cinnamon-breasted Bunting	LC		
<i>Eremomela icteropygialis</i>	Yellow-bellied Eremomela	LC		
<i>Eremomela usticollis</i>	Burnt-necked Eremomela	LC		
<i>Eremopterix leucotis</i>	Chestnut-backed Sparrowlark	LC		
<i>Eremopterix verticalis</i>	Grey-backed Sparrowlark	LC		
<i>Estrilda astrild</i>	Common Waxbill	LC		
<i>Estrilda erythronotos</i>	Black-faced Waxbill	LC		
<i>Euplectes afer</i>	Yellow-crowned Bishop	LC		
<i>Euplectes albonotatus</i>	White-winged Widowbird	LC		
<i>Euplectes orix</i>	Southern Red Bishop	LC		
<i>Euplectes progne</i>	Long-tailed Widowbird	LC		
<i>Eurocephalus anguitemens</i>	Southern White-crowned Shrike	LC	Protected	
<i>Falco amurensis</i>	Amur Falcon	LC	Protected	
<i>Falco biarmicus</i>	Lanner Falcon	NT	Protected	
<i>Falco naumanni</i>	Lesser Kestrel	VU	Protected	Protected
<i>Falco peregrinus</i>	Peregrine Falcon	NT	Protected	
<i>Falco rupicoloides</i>	Greater Kestrel	LC	Protected	
<i>Falco rupicolus</i>	Rock Kestrel	LC	Protected	
<i>Falco vespertinus</i>	Red-footed Falcon	LC	Protected	

<i>Fulica cristata</i>	Red-knobbed Coot	LC		
<i>Gallinula chloropus</i>	Common Moorhen	LC	Protected	
<i>Glareola nordmanni</i>	Black-winged Pratincole	NT		
<i>Glaucidium perlatum</i>	Pearl-spotted Owlet	LC	Protected	
<i>Granatina granatina</i>	Violet-eared Waxbill	LC		
<b><i>Gyps africanus</i></b>	<b>White-backed Vulture</b>	<b>VU</b>	<b>Protected</b>	<b>Protected</b>
<i>Gyps coprotheres</i>	Cape Vulture	VU	Protected	
<b><i>Halcyon albiventris</i></b>	<b>Brown-hooded Kingfisher</b>	LC	<b>Protected</b>	
<i>Halcyon chelicuti</i>	Striped Kingfisher	LC	Protected	
<i>Halcyon senegalensis</i>	Woodland Kingfisher	LC	Protected	
<i>Haliaeetus vocifer</i>	African Fish-Eagle	LC	Protected	
<i>Himantopus himantopus</i>	Black-winged Stilt	LC	Protected	
<i>Hippolais icterina</i>	Icterine Warbler	LC		
<i>Hirundo abyssinica</i>	Lesser Striped Swallow	LC	Protected	
<i>Hirundo albigularis</i>	White-throated Swallow	LC		
<i>Hirundo cucullata</i>	Greater Striped Swallow	LC	Protected	
<i>Hirundo rustica</i>	Barn Swallow	LC		
<i>Hirundo semirufa</i>	Red-breasted Swallow	LC	Protected	
<i>Hirundo spilodera</i>	South African Cliff-Swallow	LC	Protected	
<i>Indicator minor</i>	Lesser Honeyguide	LC	Protected	
<i>Lagonosticta rhodopareia</i>	Jameson's Firefinch	LC		
<i>Lagonosticta senegala</i>	Red-billed Firefinch	LC		
<i>Lamprotornis australis</i>	Burchell's Starling	LC		
<b><i>Lamprotornis nitens</i></b>	<b>Cape Glossy Starling</b>	LC		
<b><i>Laniarius atrococcineus</i></b>	<b>Crimson-breasted Shrike</b>	LC	<b>Protected</b>	
<b><i>Lanius collaris</i></b>	<b>Common Fiscal Shrike</b>	LC		
<i>Lanius collurio</i>	Red-backed Shrike	LC	Protected	
<i>Lanius minor</i>	Lesser Grey Shrike	LC	Protected	

<i>Larus cirrocephalus</i>	Grey-headed Gull	LC	Protected	
<i>Leptoptilos crumeniferus</i>	Marabou Stork	NT	Protected	
<i>Lophotis ruficrista</i>	Red-crested Korhaan	LC	Protected	
<i>Lybius torquatus</i>	Black-collared Barbet	LC	Protected	
<i>Macronyx capensis</i>	Cape Longclaw	LC		
<i>Malcorus pectoralis</i>	Rufous-eared Warbler	LC		
<i>Melierax canorus</i>	Southern Pale Chanting Goshawk	LC	Protected	
<i>Melierax gabar</i>	Gabar Goshawk	LC	Protected	
<i>Merops apiaster</i>	European Bee-eater	LC	Protected	
<i>Merops bullockoides</i>	White-fronted Bee-eater	LC	Protected	
<i>Merops hirundineus</i>	Swallow-tailed Bee-eater	LC	Protected	
<i>Merops persicus</i>	Blue-cheeked Bee-eater	LC	Protected	
<i>Merops pusillus</i>	Little Bee-eater	LC	Protected	
<i>Milvus aegyptius</i>	Yellow-billed Kite	LC	Protected	
<i>Mirafra africana</i>	Rufous-naped Lark	LC		
<b><i>Mirafra apiata</i></b>	<b>Cape Clapper Lark</b>	LC		
<b><i>Mirafra fasciolata</i></b>	<b>Eastern Clapper Lark</b>	LC		
<b><i>Monticola brevipes</i></b>	<b>Short-toed Rock-Thrush</b>	LC	Protected	
<b><i>Motacilla capensis</i></b>	<b>Cape Wagtail</b>	LC	Protected	
<b><i>Muscicapa striata</i></b>	<b>Spotted Flycatcher</b>	LC	Protected	
<i>Mycteria ibis</i>	Yellow-billed Stork	NT	Protected	
<b><i>Myrmecocichla formicivora</i></b>	<b>Anteating Chat</b>	LC	Protected	
<i>Netta erythrophthalma</i>	Southern Pochard	LC		
<i>Nilaus afer</i>	Brubru Brubru	LC		
<b><i>Numida meleagris</i></b>	<b>Helmeted Guineafowl</b>	LC		
<i>Nycticorax nycticorax</i>	Black-crowned Night-Heron	LC	Protected	
<i>Oena capensis</i>	Namaqua Dove	LC	Protected	
<i>Oenanthe monticola</i>	Mountain Wheatear	LC		



<i>Oenanthe pileata</i>	Capped Wheatear	LC		
<b><i>Ortygospiza atricollis</i></b>	<b>African Quailfinch</b>	LC		
<i>Oxyura maccoa</i>	Maccoa Duck	LC	Protected	
<b><i>Parisoma subcaeruleum</i></b>	<b>Chestnut-vented Tit-Babbler</b>	LC	<b>Protected</b>	
<i>Parus cinerascens</i>	Ashy Tit	LC		
<b><i>Passer diffusus</i></b>	<b>Southern Grey-headed Sparrow</b>	LC		
<i>Passer domesticus</i>	House Sparrow	LC		
<i>Passer melanurus</i>	Cape Sparrow	LC		
<i>Passer melanurus</i>	Cape Sparrow	LC		
<i>Pelecanus onocrotalus</i>	Great White Pelican	NT	Protected	
<i>Pelecanus rufescens</i>	Pink-backed Pelican	VU	Protected	Protected
<i>Peliperdix coqui</i>	Coqui Francolin	LC		
<i>Petronia supercilialis</i>	Yellow-throated Petronia	LC		
<i>Phalacrocorax africanus</i>	Reed Cormorant	LC		
<i>Phalacrocorax carbo</i>	White-breasted Cormorant	LC		
<i>Philetairus socius</i>	Sociable Weaver	LC		
<i>Philomachus pugnax</i>	Ruff Ruff	LC	Protected	
<i>Phoenicopterus minor</i>	Lesser Flamingo	NT	Protected	
<i>Phoenicopterus ruber</i>	Greater Flamingo	NT	Protected	
<i>Phoeniculus purpureus</i>	Green Wood-Hoopoe	LC	Protected	
<i>Platalea alba</i>	African Spoonbill	LC	Protected	
<i>Plectropterus gambensis</i>	Spur-winged Goose	LC		
<i>Plegadis falcinellus</i>	Glossy Ibis	LC	Protected	
<b><i>Plocepasser mahali</i></b>	<b>White-browed Sparrow-Weaver</b>	LC		
<b><i>Ploceus velatus</i></b>	<b>Southern Masked-Weaver</b>	LC		
<i>Podiceps cristatus</i>	Great Crested Grebe	LC	Protected	
<i>Polemaetus bellicosus</i>	Martial Eagle	VU	Protected	Protected
<i>Polihierax semitorquatus</i>	Pygmy Falcon	LC	Protected	

<i>Porphyrio madagascariensis</i>	African Purple Swamphen	LC		
<i>Prinia flavicans</i>	Black-chested Prinia	LC		
<i>Prinia subflava</i>	Tawny-flanked Prinia	LC		
<i>Psophocichla litsipsirupa</i>	Groundscraper Thrush	LC	Protected	
<i>Pternistis adspersus</i>	Red-billed Spurfowl	LC		
<b><i>Pternistis swainsonii</i></b>	<b>Swainson's Spurfowl</b>	LC		
<i>Pterocles burchelli</i>	Burchell's Sandgrouse	LC		
<i>Pterocles namaqua</i>	Namaqua Sandgrouse	LC		
<i>Ptilopus granti</i>	Southern White-faced Scops-Owl	LC	Protected	
<i>Pycnonotus nigricans</i>	African Red-eyed Bulbul	LC		
<i>Pycnonotus tricolor</i>	Dark-capped Bulbul	LC		
<i>Pytilia melba</i>	Green-winged Pytilia	LC		
<i>Quelea quelea</i>	Red-billed Quelea	LC		
<i>Recurvirostra avosetta</i>	Pied Avocet	LC	Protected	Protected
<i>Rhinopomastus cyanomelas</i>	Common Scimitarbill	LC		
<b><i>Rhinoptilus africanus</i></b>	<b>Double-banded Courser</b>	LC	Protected	
<i>Riparia cincta</i>	Banded Martin	LC	Protected	
<i>Riparia paludicola</i>	Brown-throated Martin	LC	Protected	
<i>Riparia riparia</i>	Sand Martin	LC	Protected	
<i>Sagittarius serpentarius</i>	Secretarybird Secretarybird	NT	Protected	
<i>Sarkidiornis melanotos</i>	Comb Duck	LC	Protected	
<i>Saxicola torquatus</i>	African Stonechat	LC	Protected	
<i>Scleroptila levaillantoides</i>	Orange River Francolin	LC		
<i>Scopus umbretta</i>	Hamerkop Hamerkop	LC	Protected	
<b><i>Sigelus silens</i></b>	<b>Fiscal Flycatcher</b>	LC	Protected	
<i>Spizocorys conirostris</i>	Pink-billed Lark	LC		
<i>Sporopipes squamifrons</i>	Scaly-feathered Finch	LC		
<i>Stenostira scita</i>	Fairy Flycatcher	LC	Protected	

<b><i>Streptopelia capicola</i></b>	<b>Cape Turtle-Dove</b>	LC		
<b><i>Streptopelia semitorquata</i></b>	<b>Red-eyed Dove</b>	LC	<b>Protected</b>	
<b><i>Streptopelia senegalensis</i></b>	<b>Laughing Dove</b>	LC		
<b><i>Struthio camelus</i></b>	<b>Common Ostrich</b>	LC		
<i>Sylvietta rufescens</i>	Long-billed Crombec	LC		
<i>Tachybaptus ruficollis</i>	Little Grebe	LC	Protected	
<i>Tadorna cana</i>	South African Shelduck	LC	Protected	
<i>Tchagra australis</i>	Brown-crowned Tchagra	LC		
<i>Tchagra senegalus</i>	Black-crowned Tchagra	LC		
<i>Telophorus zeylonus</i>	Bokmakierie Bokmakierie	LC	Protected	
<i>Terpsiphone viridis</i>	African Paradise-Flycatcher	LC	Protected	
<i>Threskiornis aethiopicus</i>	African Sacred Ibis	LC	Protected	
<i>Tockus erythrorhynchus</i>	Red-billed Hornbill	LC	Protected	
<i>Tockus leucomelas</i>	Southern Yellow-billed Hornbill	LC	Protected	
<i>Tockus nasutus</i>	African Grey Hornbill	LC	Protected	
<i>Torgos tracheliotus</i>	Lappet-faced Vulture	VU	Protected	Protected
<b><i>Trachyphonus vaillantii</i></b>	<b>Crested Barbet</b>	LC	<b>Protected</b>	
<b><i>Tricholaema leucomelas</i></b>	<b>Acacia Pied Barbet</b>	LC	<b>Protected</b>	
<i>Tringa glareola</i>	Wood Sandpiper	LC	Protected	
<i>Tringa nebularia</i>	Common Greenshank	LC	Protected	
<i>Tringa stagnatilis</i>	Marsh Sandpiper	LC	Protected	
<i>Turdoides bicolor</i>	Southern Pied Babbler	LC	Protected	
<i>Turdoides jardineii</i>	Arrow-marked Babbler	LC	Protected	
<i>Turdus libonyanus</i>	Kurrichane Thrush	LC	Protected	
<i>Turdus smithi</i>	Karoo Thrush	LC	Protected	
<i>Tyto alba</i>	Barn Owl	LC	Protected	
<i>Upupa africana</i>	African Hoopoe	LC	Protected	
<i>Uraeginthus angolensis</i>	Blue Waxbill	LC		

<b><i>Urocolius indicus</i></b>	<b>Red-faced Mousebird</b>	LC		
<i>Vanellus armatus</i>	Blacksmith Lapwing	LC	Protected	
<b><i>Vanellus coronatus</i></b>	<b>Crowned Lapwing</b>	LC	<b>Protected</b>	
<i>Vidua chalybeata</i>	Village Indigobird	LC		
<i>Vidua macroura</i>	Pin-tailed Whydah	LC		
<i>Vidua paradisaea</i>	Long-tailed Paradise-Whydah	LC		
<i>Vidua regia</i>	Shaft-tailed Whydah	LC		
<i>Zosterops pallidus</i>	Orange River White-eye	LC		
<i>Zosterops virens</i>	Cape White-eye	LC		



**APPENDIX G****Butterfly species lists generated during the desktop survey****CR= Critically Endangered; VU = Vulnerable; NT = Near-threatened; EN = Endangered**

Butterfly species list generated from the South African Butterfly Conservation Assessment online checklist showing the species which may occur in the study area and proposed site. Species that may occur at both the proposed site and study area are highlighted in **bold**. This list was generated at the scale of a QDGC. Protected species are highlighted in **RED**

Scientific name	Common name	SA Red List Status	Provincial Protection	TOPS
<i>Eretis umbra umbra</i>	Small marbled elf	Least Concern (endemic)	Not Listed	Not Listed
<b><i>Acraea anemosa</i></b>	<b>Broad-bordered acraea</b>	<b>Least Concern</b>	Not Listed	Not Listed
<b><i>Acraea horta</i></b>	<b>Garden acraea</b>	<b>Least Concern</b>	Not Listed	Not Listed
<b><i>Acraea natalica</i></b>	<b>Natal acraea</b>	<b>Least Concern</b>	Not Listed	Not Listed
<b><i>Acraea neobule neobule</i></b>	<b>Wandering donkey acraea</b>	<b>Least Concern</b>	Not Listed	Not Listed
<i>Alaena amazoula ochroma</i>	Yellow zulu	Least Concern	Not Listed	Not Listed
<i>Aloeides damarensis damarensis</i>	Damara copper	Least Concern	Not Listed	Not Listed
<i>Aloeides molomo molomo</i>	Molomo copper	Least Concern (endemic)	Not Listed	Not Listed
<i>Aloeides taikosama</i>	Dusky copper	Least Concern	Not Listed	Not Listed
<i>Aloeides trimeni trimeni</i>	Trimen's copper	Least Concern	Not Listed	Not Listed
<b><i>Anthene definita definita</i></b>	<b>Common hairtail</b>	<b>Least Concern</b>	Not Listed	Not Listed
<b><i>Axiocerses tjoane tjoane</i></b>	<b>Eastern scarlet</b>	<b>Least Concern</b>	Not Listed	Not Listed
<b><i>Belenois aurota</i></b>	<b>Brown-veined white</b>	<b>Least Concern</b>	Not Listed	Not Listed
<b><i>Byblia ilithyia</i></b>	<b>Spotted joker</b>	<b>Least Concern</b>	Not Listed	Not Listed
<b><i>Catopsilia florella</i></b>	<b>African migrant</b>	<b>Least Concern</b>	Not Listed	Not Listed
<b><i>Charaxes candiope</i></b>	<b>Green-veined charaxes</b>	<b>Least Concern</b>	Not Listed	Not Listed
<b><i>Charaxes jahlusa rex</i></b>	<b>Pearl-spotted charaxes</b>	<b>Least Concern</b>	Not Listed	Not Listed
<b><i>Chilades trochylus</i></b>	<b>Grass jewel</b>	<b>Least Concern</b>	Not Listed	Not Listed
<b><i>Cigaritis natalensis</i></b>	<b>Natal bar</b>	<b>Least Concern</b>	Not Listed	Not Listed
<i>Cnodontes penningtoni</i>	Pennington's buff	Least Concern	Not Listed	Not Listed

<b><i>Colias electo electo</i></b>	<b>African clouded yellow</b>	<b>Least Concern</b>	Not Listed	Not Listed
<b><i>Colotis annae annae</i></b>	<b>Scarlet tip</b>	<b>Least Concern</b>	Not Listed	Not Listed
<i>Colotis evagore antigone</i>	Small orange tip	Least Concern	Not Listed	Not Listed
<i>Colotis evenina evenina</i>	Orange tip	Least Concern	Not Listed	Not Listed
<i>Colotis lais</i>	Kalahari orange tip	Least Concern	Not Listed	Not Listed
<b><i>Danaus chrysippus orientis</i></b>	<b>African monarch, Plain tiger</b>	<b>Least Concern</b>	Not Listed	Not Listed
<b><i>Eurema brigitta brigitta</i></b>	<b>Broad-bordered grass yellow</b>	<b>Least Concern</b>	Not Listed	Not Listed
<b><i>Gegenes niso niso</i></b>	<b>Common hottentot</b>	<b>Least Concern</b>	Not Listed	Not Listed
<b><i>Gegenes pumilio gambica</i></b>	<b>Dark hottentot</b>	<b>Least Concern</b>	Not Listed	Not Listed
<b><i>Hamanumida daedalus</i></b>	<b>Guinea-fowl butterfly</b>	<b>Least Concern</b>	Not Listed	Not Listed
<b><i>Heteropsis perspicua perspicua</i></b>	<b>Eyed bush brown</b>	<b>Least Concern</b>	Not Listed	Not Listed
<b><i>Junonia oenone oenone</i></b>	<b>Blue pansy</b>	<b>Least Concern</b>	Not Listed	Not Listed
<b><i>Lampides boeticus</i></b>	<b>Pea blue</b>	<b>Least Concern</b>	Not Listed	Not Listed
<i>Lepidochrysops patricia</i>	Patricia blue	Least Concern	Not Listed	Not Listed
<i>Leucochitonea levubu</i>	White-cloaked skipper	Least Concern	Not Listed	Not Listed
<b><i>Metisella willemi</i></b>	<b>Netted sylph</b>	<b>Least Concern</b>	Not Listed	Not Listed
<b><i>Mylothris rueppellii haemus</i></b>	<b>Twin dotted border</b>	<b>Least Concern</b>	Not Listed	Not Listed
<b><i>Neptis saclava marpessa</i></b>	<b>Spotted sailer</b>	<b>Least Concern</b>	Not Listed	Not Listed
<b><i>Papilio demodocus demodocus</i></b>	<b>Citrus swallowtail</b>	<b>Least Concern</b>	Not Listed	Not Listed
<b><i>Parosmodes morantii morantii</i></b>	<b>Morant's orange</b>	<b>Least Concern</b>	Not Listed	Not Listed
<b><i>Pelopidas mathias</i></b>	<b>Black-banded swift</b>	<b>Least Concern</b>	Not Listed	Not Listed
<b><i>Phalanta phalantha aethiopica</i></b>	<b>African leopard</b>	<b>Least Concern</b>	Not Listed	Not Listed
<b><i>Platylesches neba</i></b>	<b>Flower-girl hopper</b>	<b>Least Concern</b>	Not Listed	Not Listed
<i>Spialia delagoae</i>	Delagoa sandman	Least Concern	Not Listed	Not Listed
<b><i>Spialia diomus ferax</i></b>	<b>Common sandman</b>	<b>Least Concern</b>	Not Listed	Not Listed
<i>Spialia mafa mafa</i>	Mafa sandman	Least Concern	Not Listed	Not Listed
<b><i>Spialia spio</i></b>	<b>Mountain sandman</b>	<b>Least Concern</b>	Not Listed	Not Listed
<i>Stugeta bowkeri henningi</i>	Bowker's marbled sapphire	Least Concern (endemic)	Not Listed	Not Listed

<b><i>Telchinia serena</i></b>	<b>Dancing acraea</b>	<b>Least Concern</b>	Not Listed	Not Listed
<i>Teracolus agoye bowkeri</i>	Speckled sulphur tip	Least Concern	Not Listed	Not Listed
<i>Teracolus subfasciatus</i>	Lemon traveller	Least Concern	Not Listed	Not Listed
<b><i>Zintha hintza hintza</i></b>	<b>Hintza pierrot</b>	<b>Least Concern</b>	Not Listed	Not Listed
<b><i>Zizeeria knysna knysna</i></b>	<b>African grass blue</b>	<b>Least Concern</b>	Not Listed	Not Listed
<b><i>Zizula hylax</i></b>	<b>Tiny grass blue</b>	<b>Least Concern</b>	Not Listed	Not Listed

## **APPENDIX H: SCOPING AND ENVIRONMENTAL IMPACT REPORTING PROCESS**

- See attached PDF document.