



MYEZO ENVIRONMENTAL MANAGEMENT SERVICES

Environmental Stewardship

ESKOM - GILEAD - SPECIALIST REPORTS

SPECIALIST REPORTS COMPILED AS PART OF SPECIALIST STUDIES UNDERTAKEN IN SUPPORT OF THE ENVIRONMENTAL AUTHORISATION APPLICATION (BASIC ASSESSMENT PROCESS) IN TERMS OF THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT, (ACT NO. 107 OF 1998), UNDER REGULATIONS R982 OF 2014, AS AMENDED IN 2017, FOR THE PROPOSED CONSTRUCTION ACTIVITIES OF THE DEVIATION (APPROXIMATELY ONE (1) KM) OF AN EXISTING GILEAD POWERLINE AT GILEAD SUBSTATION, LOCATED WITHIN MOGALAKWENA LOCAL MUNICIPALITY, WATERBERG DISTRICT MUNICIPALITY IN LIMPOPO PROVINCE.

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Heritage Impact Assessment Report



**HERITAGE IMPACT ASSESSMENT FOR
THE PROPOSED CONSTRUCTION OF
DEVIATION ACTIVITIES OF AN
EXISTING 66KV CHLOE-GILEAD
POWERLINE AT GILEAD SUBSTATION
LOCATED ON PORTION R/2 OF FARM
GILLIMBERG 861LR, WITHIN
MOGALAKWENA LOCAL MUNICIPALITY,
WATERBERG DISTRICT MUNICIPALITY,
LIMPOPO PROVINCE.**

DEVELOPED FOR



FEBRUARY :2021

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DOCUMENT INFORMATION

DOCUMENT INFORMATION ITEM	DESCRIPTION
Proposed development and location	Eskom intends to deviate approximately one (1) km of the existing 66kV Chloe-Gilead powerline and have it connected to the new 66kV feeder as well as dismantling the existing 66kV Chloe-Gilead powerline at Gilead Substation located on Portion R/2 of Farm Gillimberg 861LR, within Mogalakwena Local Municipality, Waterberg District Municipality, Limpopo Province.
Purpose of the study	To carry out a Desktop Phase 1 Heritage Impact Assessment to determine the presence/absence of archaeological remains, assess their archaeological significance in terms of the NHRA of 1999 and SHARA guidelines.
Topography	Flat terrain
Municipalities	Mogalakwena Local Municipality.
Predominant land use of surrounding area	Farms
Applicant	Eskom Holdings (SOC) Limited
Site Coordinates	See Table 1-4 Below
Client Details	Myezo Environmental Management Services (Pty) Ltd
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EXECUTIVE SUMMARY

The Applicant, Eskom Holdings (SOC) Limited proposes to deviate approximately one (1) km of the existing 66kV Chloe-Gilead powerline and have it connected to the new 66kV feeder as well as dismantling the existing 66kV Chloe-Gilead powerline at Gilead Substation located on Portion R/2 of Farm Gillimberg 861LR, within Mogalakwena Local Municipality, Waterberg District Municipality, Limpopo Province. Eskom Holdings (SOC) Limited identified the need to upgrade the infrastructure between the two substations in order to improve the reliability of the existing electricity supply and also where possible provide new supply for any additional customers. Subsequently, a 66kV powerline was constructed between Chloe and Gilead Substations. For the proposed project, Eskom seeks to deviate one km of the existing 66kV Chloe-Gilead powerline and have it connected to a new 66kV feeder as well as dismantling the existing 66kV Chloe-Gilead powerline.

Myezo Environmental Management Services (Pty) Ltd (hereafter referred to as "the EAP") have been appointed as the independent Environmental Assessment Practitioner (EAP) to undertake the Basic Assessment for the proposed development. Environmental Impact Assessment (EIA) studies are widely known as a suitable approach for assessing the impacts of development projects on the environment (Glasson *et al.*, 2012). Furthermore, all countries in the world including South Africa have some form of legal or administrative requirement for EIA (Morgan, 2012).

The scope of work for this Heritage Impact Assessment was to assess written materials and manuscripts about the broader cultural landscape to be affected by the proposed development. It also included a field based archaeological survey of the proposed development footprint (*see Methodology section*). The proposed development area exceeds 5000 m² therefore it triggers section 38(1) (a) of the National Heritage Resources Act (NHRA- Act No. 25 of 1999) :- Subject to the provisions of subsections (7), (8) and (9), any person who intends to undertake a development categorised as— (a) the construction of a road, wall, powerline, pipeline, canal or other similar form of linear development or barrier exceeding 300 m in length; (b) the construction of a bridge or similar structure exceeding 50 m in length. The objective of the report is to fulfil the requirements of SAHRA in the in terms of Section 38(1) of the NHRA.

A review of a range of cultural heritage information was undertaken as part of the heritage assessment process. This review included archival information, historical housing and planning documents, research documents and unpublished manuscripts speaking to the general cultural landscape of the proposed development area (*see Cultural Landscape Assessment section*). The National heritage

databases lists and registers, other documented information (including Heritage Impact Assessment reports and a range of ethno-historic and archaeological sources at both local and regional levels) were also consulted for information regarding other heritage resources within the vicinity of the study area.

From this literature review, the following were noted: the proposed development site lies within a region that has a high significant heritage value from the early human origins to the colonial period. Mokopane, is home of one of the world's most important archaeological sites: Makapansgat. There, in a deep and large limestone cave, have been found the remains of some of the earliest hominids yet identified, the species *Australopithecus africanus*, who lived more than three million years ago; and also *Homo erectus*, who lived a million years ago. Several Late Iron Age settlements are known to occur within the broader study area, these sites are associated with early Northern Ndebele and Tswana occupation of the Makopane region. However no Iron Age sites or features were recorded in the survey footprint.

❖ ***Reasoned Opinion: -***

It is the reasoned opinion of the author of this report that no visible material remains pertaining to heritage resources occur within the proposed development footprint. Subject to adherence of the recommendations and approval by SAHRA the proposed development may be allowed to continue. Should skeletal remains be exposed during development and construction phases, all activities must be suspended and the relevant heritage resources authority contacted. Section 36 (6) of the National Heritage and Resources Act, 25 of 1999 also states that should culturally significant material be discovered during the course of the said development, all activities must be suspended pending further investigation by a qualified archaeologist.

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ABBREVIATIONS

Acronyms	Description
AIA	Archaeological Impact Assessment
ASAPA	Association of South African Professional Archaeologists
CRM	Cultural Resource Management
DEA	Department of Environmental Affairs
EAP	Environmental Assessment Practitioner
EIA	Environmental Impact Assessment
ESA	Early Stone Age
ECO	Environmental Control Officer
EMPr	Environmental Management Programme
GIS	Geographic Information System
GPS	Global Positioning System
GP	Generally Protected
HIA	Heritage Impact Assessment
ICOMOS	International Council on Monuments and Sites
kV	Kilovolt
km	Kilometre
LSA	Late Stone Age
LIA	Late Iron Age
LTD	Limited
L S	Local Significance

MIA	Middle Iron Age
MSA	Middle Stone Age
Mm	Millimetre
NEMA	National Environmental Management Act, 1998(Act No.107 of 1998)
NHRA	National Heritage Resources Act of 1999
N S	National Significance
SAHRA	South African Heritage Resources Agency
SADC	Southern African Development Community

GLOSSARY

Achievement	✚ Something accomplished, esp. by valour, boldness, or superior ability
Aesthetic	✚ Relating to the sense of the beautiful or the science of aesthetics.
Community	✚ All the people of a specific locality or country
Culture	✚ The sum total of ways of living built up by a group of human beings, which is transmitted from one generation to another.
Cultural	✚ Of or relating to culture or cultivation.
Diversity	✚ The state or fact of being diverse; difference; unlikeness.
Geological (geology)	✚ The science which treats of the earth, the rocks of which it is composed, and the changes which it has undergone or is undergoing.
High	✚ Intensified; exceeding the common degree or measure; strong; intense, energetic
Importance	✚ The quality or fact of being important.
Influence	✚ Power of producing effects by invisible or insensible means.

Potential	✚ Possible as opposed to actual.
Integrity	✚ The state of being whole, entire, or undiminished.
Religious	✚ Of, relating to, or concerned with religion.
Significant	✚ Important; of consequence
Social	✚ Living, or disposed to live, in companionship with others or in a community, rather than in isolation.
Spiritual	✚ Of, relating to, or consisting of spirit or incorporeal being.
Valued	✚ Highly regarded or esteemed

1.0 INTRODUCTION

1.1 Project Background

Tsimba Archaeological Footprints (Pty) Ltd was requested Myezo Environmental Management Services (Pty) Ltd to conduct a Heritage Impact Assessment (HIA) for the proposed upgrade of infrastructure between at Gilead substation located within Mogalakwena Local Municipality, in the Limpopo Province. Eskom Holdings (SOC) Limited identified the need to upgrade the infrastructure between the two substations in order to improve the reliability of the existing electricity supply and also where possible, provide new supply for any additional customers. Subsequently, a 66kV powerline was constructed between Chloe and Gilead Substations.

This HIA is designed to assist statutory authorities in identifying and preventing the approval of aggressive developments, understood as the development that destroys the cultural significance of heritage properties. The HIA structures an evaluation of the potential damage or benefits that may accrue to the significance of the cultural heritage assets.

The Environmental Impact Assessments (EIA) conducted by Myezo is an analytic approach for evaluating the impacts of development, widely adopted as part of the land use planning system in many countries (Glasson and Therivel, 2013). Whenever relevant, EIA also include cultural heritage as a factor to be evaluated. Both EIA and HIA adopt a similar approach. In brief, first, the overall scope of the study is defined. Second, a baseline survey is carried out to provide a reference point against which impacts can be measured, including a desktop study and/or a field research.

1.2 The Terms of Reference for this HIA study are:

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Heritage impact assessments (hereinafter referred to as HIA) are applied to cultural heritage assets. This is a recent notion grounded in the requirements to perform environmental assessments at the project or more strategic levels. The practice of performing an impact analysis is not new, however. As Clark (2001, p. 22) observes, "Impact analysis is not a particularly special, unusual or complex process; it is simply a codification of the basic analysis undertaken by any competent conservation adviser". The HIA exists to:

- Review existing theories and models of cultural heritage resources interpretation and how to develop effective methods of archaeological interpretation for future generations to assist and assist SAHRA in their deliberations;
- Clarify the extent and ways in which current site context archaeological findings may affect the interpretation of cultural sites for present and future generations;
- Shed light on the potential challenges and opportunities brought about by the existence of archaeological sites and other conflicting views of the values of a site;
- Set out the ethical considerations on the interpretation and preservation of archaeological findings given the varied range of approaches available;
- Explain that the issue of archaeological preservation and conservation is relevant not only National Heritage or Provincial Heritage properties, but also for any significant cultural site;
- Focus on best practice of interpretation and preservation of archaeological findings.

1.3 The aim: - There are two interlinked aims for this HIA. The first is to identify and document cultural heritage sites, cultural resources, sites associated with oral histories (intangible heritage), graves, cultural landscapes, and any structures of historical significance (tangible heritage) that may be affected within the development footprint. The second aim of this HIA is to assess the archaeological significance of the findings and make recommendations based on the best archaeological practice of interpretation and preservation of archaeological findings

1.4 The findings: - The findings of this report have been informed by desktop data review and impact assessment reporting which include recommendations to guide heritage authorities in making decisions with regards to the proposed project. This study was conducted before any activities took place on the proposed development area. The impact assessment study also includes detailed recommendations on how to mitigate and manage negative impacts while enhancing positive effects on the project area.

1.5 Legislative Frameworks used

The South African Heritage Resources Agency (SAHRA) aims to conserve and control the management, research, alteration and destruction of cultural resources of South Africa and to prosecute if necessary. It is therefore crucially important to adhere to heritage resource legislation contained in the Government Gazette of the Republic of South Africa (Act No.25 of 1999), as many heritage sites are threatened daily by development. Conservation legislation requires an impact assessment report to be submitted for development authorisation that must include a HIA if triggered. The following legislative frameworks were used in compiling this HIA report;

- The Australia International Council on Monuments and Sites (ICOMOS) charter for places of cultural significance (the Burra Charter).
- The Principles for the analysis, conservation and structural restoration of architectural heritage (2003)
- The National Heritage and Resources Act of South Africa No.25 of 1999
- The Athens Charter, the Restoration of Historic Monuments (1931)
The International Council on Monuments and Sites (1965)
- The World Heritage Convention(1972)
- The Washington Charter (1987)
- The International Charter for the Conservation and Restoration of Monuments and sites (the Venice charter 2006).
- The Organisation of World Heritage Cities (1993).

2.0 DESCRIPTION OF THE RECEIVING ENVIRONMENT

2.1 Location

Table 1: Site 1 Description

Site 1: Gilead Substation	
Coordinates	23° 39' 19,119" S 28° 51' 50,192" E
Ownership	Eskom Holdings (SOC) Limited
Land Use	Previously Agricultural activities however it is now used as an electricity substation.
Zoning	Farming / Agricultural
Description	Deviation of one km of the existing 66kV Chloe-Gilead powerline and have it connected to the new 66kV feeder as well as dismantling the existing 66kV Chloe-

Gilead powerline.

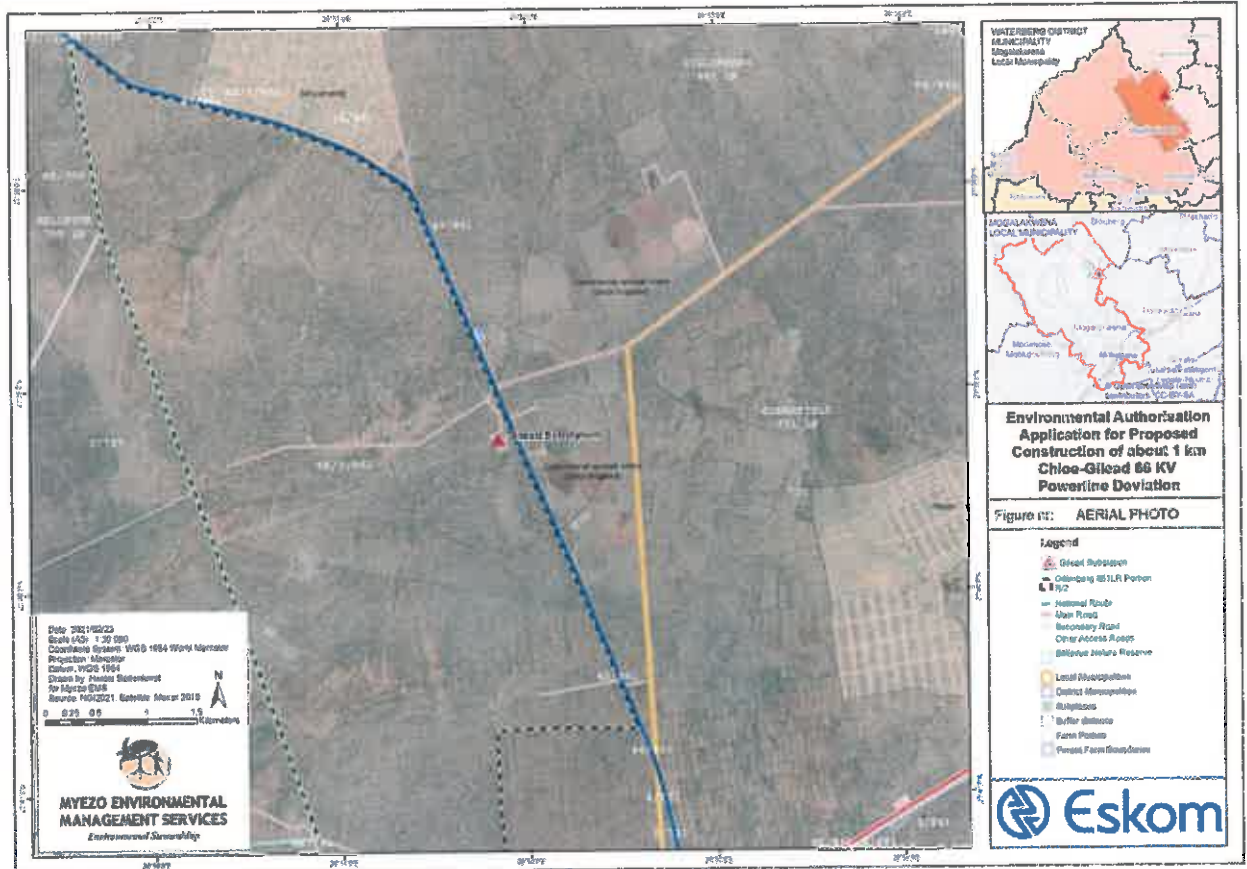


Figure 1: Aerial photograph of the proposed development site (Myezo)





Figure 3: Google earth image showing the existing power line and the proposed deviation (Tsimba)

2.2 Geo-spatial Context

The Bushveld Complex (surrounding area) is a massive body of igneous origin and it is intrusive in the Transvaal Supergroup (Kent, 1980). The Bushveld Complex extends over 440 km east-west, from Burgersfort to Nietverdiend; and for nearly 350 km north-south from Villa Nora to Bethal. It covers an area of 65 000 km² and is chrome and platinum rich (Visser, 1989). The age is Vaalian (2,100 – 1,920 Ma). The layered rocks of the Bushveld Complex are generally believed to be the result of crystals settling out of magma during slow cooling. The magmatic events petrogenetically related to and generally considered part of the whole magmatic evolution of the Complex are, the diabase sills and the Rooiberg Group. The Complex consists of three main units or suites of which the Rustenburg Layered Suite is one (Kent, 1980), the other two are the Rasehoop Granophyre Suite and Lebowa Granite Suite (Visser, 1989). The region will be covered by 'Bushveld' vegetation (see Appendix E).

3.0 METHODOLOGY

3.1 Literature review

The methodology used in this HIA is based on a comprehensive understanding of the current or baseline situation; the type, distribution and significance of heritage resources as revealed through desk-based study and additional data acquisition, such as archaeological investigations, previous heritage impact assessments reports and intangible heritage. This is systematically integrated by the use of matrices with information on the nature and extent of the proposed engineering and other works to identify potential. The following tasks were also undertaken in relation to the cultural heritage and are described in this report:

The background information search of the proposed development area was conducted following the site maps from the client. Sources used in this study included:

- Published academic papers and HIA and PIA studies conducted in and around the region where the proposed infrastructure development will take place;
- Available archaeological literature on the broader Mokopane area was consulted;
- The SAHRIS website and the National Data Base were consulted to obtain background information on previous heritage surveys and assessments in the area; and other planning documents.
- Map Archives - Historical maps of the proposed area of development and its surrounds were assessed to aid information gathering of the proposed area of development and its surrounds

3.3 Archaeological Field Survey

The archaeological reconnaissance of the study area was conducted by Mr. Roy Muroyi (Principal Archaeologist – Tsimba) and Mr. Manasah Thabani Dzwani (Assistant Archaeologist - Tsimba) through an unsystematic pedestrian site survey. A systematic pedestrian survey was not possible due to extremely dense vegetation. However, our team was accompanied by Miss Prisca Thobejane (Environmentalist – Myezo) and an Eskom Holdings representative who both provided valuable input in terms of possible site locations and general site conditions.

3.4 Data Consolidation and Report Writing

Data captured on the development area (during the field survey) by means of a desktop study and physical survey is used as a basis for this HIA. This data is also used to establish assessment for any possible current and future impacts within the development footprint. This includes the following:

- ✦ Assessment of the significance of the cultural resources in terms of their archaeological, built environment and landscape, historical, scientific, social, religious, aesthetic and tourism value;
- ✦ A description of possible impacts of the proposed development, especially during the construction phase, in accordance with the standards and conventions for the management of cultural environments;
- ✦ Proposal of suitable mitigation measures to minimize possible negative impacts on the cultural environment and resources that may result during construction;
- ✦ Review of applicable legislative requirements that is the National Environmental Management Act (NEMA) (read together with the 2014 EIA Regulations) and the NHRA of 1999
- ✦ The consolidation of the data collected using the various sources as described above;
- ✦ Acknowledgement of impacts on heritage resources (such as unearthed graves) predicted to occur during construction; and
- ✦ Geological Information Systems mapping of known archaeological sites and maps in the region
- ✦ A discussion of the results of this study with conclusions and recommendations based on the available data and study findings.

4.0 LEGISLATIVE FRAMEWORK

This HIA is informed and conducted to fulfil the requirements of the National Heritage Resources Act (No. 25 of 1999) 38(1) (a) of the National Heritage Resources Act (NHRA- Act No. 25 of 1999) (1) Subject to the provisions of subsections (7), (8) and (9), any person who intends to undertake a development categorised as—any development or other activity which will change the character of a site—(i) exceeding 5 000 m² in extent; and 4) No person may, without a permit issued by the responsible heritage resources authority— (a) destroy, damage, excavate, alter, deface or otherwise disturb any archaeological or palaeontological site or any meteorite.

4.1 Scope of the Phase 1 HIA

A Phase 1 HIA is a pre-requisite for development in South Africa as prescribed by SAHRA and stipulated by legislation. The overall purpose of heritage specialist input is to:

- ✚ Identify any heritage resources, which may be affected within the broader cultural landscape;
- ✚ Assess the nature and degree of significance of such resources;
- ✚ Establish heritage informants/constraints to guide the development process through establishing thresholds of impact significance;
- ✚ Assess the negative and positive impact of the development on these resources; and
- ✚ Make recommendations for the appropriate heritage management of these impacts.

4.2 Cultural Heritage Resources Management Policy Objectives

- a. To preserve representative samples of the National archaeological resources for the scientific and educational benefit of present and future generations;
- b. To ensure that development proponents consider archaeological resource values and concerns in the course of project planning; and
- c. To ensure where decisions are made to develop land, the proponents adopt one of the following actions:
 - Avoid archaeological sites wherever possible;
 - Implement measures which will mitigate project impacts on archaeological sites; or
 - Compensate the local communities for unavoidable losses of significant archaeological value.

5.0 CULTURAL LANDSCAPE ASSESSMENT

5.1 Introduction

Recent heritage management research has shown that it is important to have a clear framework of criteria in order to be able to interpret the cultural heritage significance of any particular landscape. This interpretation will be based on established practice from other works that have been carried out within the existing cultural landscape. It will be based on a wide range of criteria (archaeological background of the area, historical background of the area, the settlement pattern in the area and degree of apparent human influence, among others) and it will define the degree of significance of the existing cultural landscape.

The question of the value of cultural landscape receptors will need careful consideration. By its very nature the work is concerned with designated cultural landscapes of national value for their cultural heritage values but the cultural landscapes within designated areas do nevertheless vary in their character and quality. It may therefore be appropriate to make a fine grained assessment of the value

of the cultural landscape character areas affected in the designated area. This will draw on statements about the special qualities contributing to the cultural heritage value of individual designated areas, on established criteria such as landscape quality and condition, scenic quality, historic/ heritage value, perceptual aspects and associations, and on other information such as the extent and setting of heritage assets including registered cultural heritage sites, burial grounds and archaeological sites.

5.2 Methodology

The methodology employed in carrying out the cultural landscape assessment of the proposal for this proposed development has been drawn from best practice guidelines and the Landscape Institute and the Institute of Environmental Management & Assessments "Guidelines for Landscape and Visual Impact Assessment" Second Edition (Spon Press 2002). The aim of these guidelines is to set high standards for the scope and contents of landscape and visual assessments and to establish certain principles that will help to achieve consistency, credibility and effectiveness in cultural landscape impact assessment. Guidance is contained in this publication on some approaches and techniques, which have been found to be effective and useful in practice by landscape professionals. However, the guidelines are not intended as a prescriptive set of rules, and have been adapted to the specific project.

Stage 1: Through a desktop and archival research process the heritage specialist is required to identify those landscape character types/areas of National, Provincial and Regional heritage significance which may be affected by the proposed development. The specialist should also locate information relevant to assessing landscape value for example written historical statements of special qualities.

Stage 2: Initial identification of potential effects the proposed development will bring to the broader regional area and design options to mitigate potential effects;

Stage 3: Design the development taking account of identified potential mitigation measures to avoid negative effects.

Stage 4: Assessment of effects the proposed developments has on the broader cultural landscape and considers its residual effects;

Stage 5: Fitting the cultural landscape assessment into the whole HIA.

5.3 Previous studies in the broader study region

Author	Project	Archaeological Findings	Heritage Findings
Digby Wells (2013)	Platreef mining project, Mokopane, Limpopo	Remains found during the project include Stone Age artefacts dating to the MSA, Iron Age stone-walling, potsherds, grinding stones and an Iron Age smelting site etc.	55 burial grounds and 25 isolated surface occurrences and 3 archaeological sites.
PGS Heritage 2013	Mogalakwena Water Supply Infrastructure Project	N/A	N/A
Nzumbululo Cultural Heritage and Development	Borutho-Nzhelele 400kv power lines	N/A	The dominance of these resources is largely burial grounds and graves – making approximately 98% of the total number of sites identified, recorded and mapped. In terms of the site density
Vhubvo Consultancy (2019)	New tomato farming and Processing facilities on portions of the farms Platdoorns, Davidspoort and Grasiaagte at Lebowakgomo	N/A	(3) Grave sites within the area proposed for development. Some of the noted graves are over 60 years of age and thus protected against any form of alteration by the National Heritage Resources Act (Act 25 of 1999)
Francois P Coetzee Heritage Consultant	Lapalala Wilderness Reserve, Lephale Local Municipality	N/A	N/A

5.4 Archaeological background

Local museums such as the Arend Diepkirk Museum in Mokopane, and Polokwane Museum in the Limpopo Province, and the Origins Centre at the University of the Witwatersrand in Johannesburg, maintain a strong interest in local heritage issues, and provide most of the information regarding the archaeological sequence of the area under investigation.

Mokopane, is home of one of the world's most important archaeological sites: Makapansgat. There, in a deep and large limestone cave, have been found the remains of some of the earliest hominids yet identified, the species *Australopithecus africanus*, who lived more than three million years ago; and also *Homo erectus*, who lived a million years ago (Taylor, Hinde and Holt-Biddle 2003).

The first substantial evidence of hominid habitation relates to people of the Middle Stone Age (MSA). There are extensive remains of MSA occupations in the Waterberg; until specific research is conducted in the Waterberg it will not be possible to know precisely when the Waterberg MSA occupations occurred and at present we can only say that the occupations would have been somewhere between 200 000 and 25 000 years ago. People living in the MSA lived in rock shelters or open camps, sometimes near pans, lakes or rivers, though they were not as dependent on close sources of water as their ancestral Early Stone Age (ESA)

counterparts. This independence from water suggests that they had water containers that could have been made of skin or ostrich eggshell.

People in the MSA were efficient hunters and gatherers. They hunted with spears tipped with stone. We know this because some South African sites like Klasies River Mouth (near Storms River) had stone spear-tips embedded in animal bones (Mitchell 2012). In addition, researchers have found microscopic traces of blood and animal remains on stone points. Stone points were hafted onto handles because microscopic analysis has revealed resins on their bases, in addition to micro-chipping where twine would have been used to attach the stones to shafts (Wadley *et al.* 2004).

5.5 Ethno- Historical Context of Colonial Conquest

Correspondence from Boer Commandant-general P.J. Potgieter and a report written by Commandant-general M.W Pretorius¹ provide the basic details of the murders of the Trekboers around the Makopane area². Oral testimonies recorded and written later contribute the bulk of the more colourful narrative popularised by Preller in the 1900s. According to the primary sources a party of Trekboers passed through the Makapanspoort in September of 1854. About 10km south of the present day town of Mokopane at a point where the Mokgalakwena River was shallow enough to cross, members of Mugombane's Chieftdom murdered the party. The Trekker party of approximately 12 men, women and

¹ Although Pretorius may have exaggerated extent to which the bodies were dismembered and discarded all of the oral testimonies mention dismemberment. See for example the version captured by Montanha in his diary a year after the siege (Ferreira 2002: 204).

² S.S.6, R684/54: P.J. Potgieter – M.W. Pretorius, Waterberg, 29 September 1854.

children were viciously attacked and their bodies dismembered around the same time M.A. Venter and his son arrived at Mugombane's headquarters at Pruissen allegedly to trade and were also gruesomely murdered³.

Seemingly at the same time Mankopane murdered Hermanus Potgieter and his hunting party at his capital, Fothane. Although, there were no witnesses to the attack on the hunting party most versions suggest that the Langa Ndebele lured the party to Fothane. Following the murder of the trekkers by Mankopane and Mugombane, the Boers sent for reinforcements from Rustenburg and the Zoutpansberg. In the time it took for the commandos to arrive, Mugombane and his people had retreated into the Historic Cave and Mankopane had taken refuge in the hills. The Boers discovered the Kekana hideout, and over a period of about a month implemented various strategies to dislodge the AmaNdebele group. Boer Commandant-general Piet Potgieter was shot dead during the course of the month, but by the end of the month the AmaNdebele resistance ceased and the Boers entered the cave. The surviving women and children were dispersed among Boers, and their aides⁴

The siege event featured in a number of subsequent traveller, missionary and trader diaries, and was retold in a number of history books and popular articles⁵. Over time the number of Kekana killed, as well as the factors that led to the demise of the besieged AmaNdebele, were altered or twisted to suit the circumstance of the storyteller. One particular version, recounted by Gustav Preller, was accorded iconic status in Afrikaner public history, and became a central prop of the ideology of Apartheid. Preller constructed an elaborate mythology that produced heroes, portrayed the Trekboers as the 'chosen people' and Africans as treacherous and uncivilized, thereby producing a rationale and imperative for the separation of 'races'⁶.

The first dedicated study of the relationship between the early Trekboers, Chief Mugombane and the Langa Chief Mankopane was carried out by De Waal in 1978. This thesis provides an exhaustive investigation of archival documents and written histories. In 1987 Naidoo analysed the written accounts of the siege and in particular questioned the veracity of M.W. Pretorius' version, which he believed was

³ SS7 R733/54. Verslag van M.W. Pretorius 6 Des. 1854.

⁴ The Portuguese trader João Albasini who provided the Boers with VhaTsonga marksmen, took a woman by the name of Aia (De Vaal 1953: 21). Paul Kruger who would become the ZAR President, allegedly took a woman by the name of Matlhodi Kekana (Paulina). He later allegedly allowed her to marry 'Kgosi Mokgalle' in exchange for bride wealth (Morton 2005: 203). The Bafokeng Chief occupied a portion of Kruger's farm and provided him with a military resource and labour (Ibid.).

⁵ See for example João Albasini's diary (De Vaal 1953) and Montanha's diary (Ferreira 2002)

⁶ Paul Kruger long time President of the Republic allegedly retrieved the body of Piet Potgieter after he had been shot by Kekana marksmen, a feat of bravery memorialized in a panel at the foot of Kruger's statue in Pretoria

intentionally trumped up. During the late 1980s and early 1990s, Hofmeyr (1993) recorded several oral accounts related by elders and members of the descendant Kekana chieftdom. These recounts focussed mainly on the restoration of chiefly lineage following the alleged suicide of Chief Mugombane in 1855. It should also be noted that a series of trekker family oral narratives were recorded by Preller in the early part of the 20th century, and although these do not provide much comment on the siege itself they offer invaluable insight into the experiences and activities of the trekkers in the 1850s and the background to the siege⁷.

5.6 Cultural Landscape Assessment of Significance

Significance is not absolute and can only be identified in relation to each individual development and its unique location. It is important that any assessment of significance adopts an informed and well-reasoned judgement, supported through a clear justification as to how the conclusions about significance for each effect have been derived. It should be emphasised that whilst this methodology is designed to be robust and transparent, professional judgement is ultimately applied to determine the level of significance applied to each effect.

The two principal criteria determining the significance of effects are the scale or magnitude of effect, and the cultural heritage sensitivity of the location or receptor. With regard to visual receptors, a **HIGH** significance of effect would be from **HIGH** sensitivity receptors such as Regional to National significance old buildings and heritage sites with a local rating where they would receive a major change in the view. A low significance of effect would be from the least sensitive low significance old buildings and heritage sites with a Local rating would be affected for a smaller period of time as they would experience transient views. Where no change is identified the significance is assessed as neutral. These thresholds will be determined by combining sensitivity and magnitude, with reference to any general terminology accepted for the whole Heritage Impact Assessment.

5.8 Significance of Cultural Landscape Impacts

- ❖ *This project is given a Low adverse significance to the cultural landscape. This is due to the fact that the proposed development landscape has very minimal known cultural heritage significance. Given below is a table that shows the ICOMOS assessment of significance of cultural landscapes.*

⁷ See for example, Theal (1908), Preller (1931); Bulpin (1965)

		Landscape receptor sensitivity			
		High	Medium	Low	
Assessment of significance of the cultural landscape impacts		Landscape with National heritage significance Status sites and cultural Landscapes with Provincial heritage Significance Status	Regional or Local Significance Heritage sites valued characteristics reasonably tolerant of changes of the type proposed.	A relatively unimportant cultural landscape with few features of value or interest, potentially tolerant of substantial change of the type proposed.	
<ul style="list-style-type: none">Red cells represent significant adverse impactsYellow cells represent significant beneficial impactsBlue cells represent impacts that are not significant					
Magnitude of landscape impact	Major adverse	Significant adverse changes, over a significant area, to key characteristics or features or to the landscape's character or distinctiveness for more than 2 years	High adverse significance	High/Medium adverse significance	Medium adverse significance
	Moderate adverse	Noticeable but not significant adverse changes for more than 2 years or significant adverse changes for more than 6 months but less than 2 years, over a significant area, to key characteristics or features or to the landscape's character or distinctiveness.	High/Medium adverse significance	Medium adverse significance	Low adverse significance
	Slight adverse	Noticeable adverse changes for less than 2 years, significant adverse changes for less than 6 months, or barely discernible adverse changes for any length of time.	Medium adverse significance	Low adverse significance	Neutral
	Neutral	Any change would be negligible, unnoticeable or there are no predicted changes.	Neutral	Neutral	Neutral
	Slight benefit	Noticeable beneficial changes for less than 2 years, significant beneficial changes for less than 6 months, or barely discernible beneficial changes for any length of time.	Medium beneficial significance	Low beneficial significance	Neutral
	Moderate benefit	Noticeable but not significant beneficial changes for more than 2 years or significant beneficial changes for more than 6 months but less than 2 years, over a significant area, to key characteristics or features or to the landscape's character or distinctiveness.	High/Medium beneficial significance	Medium beneficial significance	Low beneficial significance
	Major benefit	Significant beneficial changes, over a significant area, to key characteristics or features or to the landscape's character or distinctiveness for more than 2 years	High beneficial significance	High/Medium beneficial significance	Medium beneficial significance

Figure 4: ICOMOS guideline for assessing significance of cultural landscape impacts

6.0 DISCUSSION OF THE FINDINGS

6.1 Limitations

The vegetation at the Gilead substation is extremely dense and limited movement to a great extent .The proposed development area is largely inaccessible. Visibility was extremely poor during the time of surveying as a result of dense vegetation. The general area within the Gilead substation boundaries are disturbed as a result of a close by man-made dam, its tributary man-made channels, as well as roads in areas with less dense vegetation.



Figure 5: A view of a man -made water pond along the existing powerline



Figure 6: A view of the existing powerline with access roads



Figure 7: Dense vegetation cover within the proposed development footprint.



Figure 8: View of a man- made trench that serves as a tributary to the pond.



Figure 9: View of the proposed development footprint in relation to the existing substation features

7.0 HERITAGE ASSESSMENT OF SIGNIFICANCE

Site significance classification standards prescribed by SAHRA (2006), and acknowledged by ASAPA for the SADC region, were used for the purposes of this report.

- ❖ The main aim in assessing significance is to produce a succinct statement of significance, which summarises an item's heritage values. The statement is the basis for policies and management structures that will affect the item's future.

Table 2: SAHRA's Site Significance classification minimum standards

FILED RATING	GRADE	CLASSIFICATION	RECOMMENDATION
National Significance (NS)	Grade 1		Conservation; National Site nomination
Provincial	Grade 2		Conservation; Provincial

Significance (PS)			Site nomination
Local Significance (LS)	Grade 3A	High Significance	Conservation; Mitigation not advised
Local Significance (LS)	Grade 3B	High Significance	Mitigation (Part of site should be retained)
Generally Protected A (GP.A)		High/ Medium Significance	Mitigation before destruction
Generally Protected B (GP.B)		Medium Significance	Recording before destruction
Generally Protected C (GP.A)		Low Significance	Destruction

Site significance is calculated by combining the following concepts in the given formula.

$$S = (E + D + M) P$$

S = Significance weighting

E = Extent

D = Duration

M = Magnitude

P = Probability

The significance weightings for each potential impact are as follows:

Table 3: The significance weightings for each potential impact

ASPECT	DESCRIPTION	WEIGHT
Probability	Improbable	1
	Probable	2
	Highly Probable	4
	Definite	5
Duration	Short term	1
	Medium term	3
	Long term	4
	Permanent	5
Scale	Local	1

	Site	2
	Regional	3
Magnitude/Severity	Low	2
	Medium	6
	High	8

Table 4: Impact of Significance

<p>IT PROVIDES AN INDICATION OF THE IMPORTANCE OF THE IMPACT IN TERMS OF BOTH TANGIBLE AND INTANGIBLE CHARACTERISTICS. (S) IS FORMULATED BY ADDING THE SUM OF NUMBERS ASSIGNED TO EXTENT (E), DURATION (D), AND INTENSITY (I) AND MULTIPLYING THE SUM BY THE PROBABILITY.</p> <p>$S = (E+D+M) P$</p>		
<30	Low	Mitigation of impacts is easily achieved where this impact would not have a direct influence on the decision to develop in the area.
30-60	Medium	Mitigation of impact is both feasible and fairly easy. The impact could influence the decision to develop in the area unless it is effectively mitigated.
>60	High	Significant impacts where there is difficult. The impact must have an influence on the decision process to develop in the area.

NATURE: DURING THE CONSTRUCTION PHASE ACTIVITIES RESULTING IN DISTURBANCE OF SURFACES AND/OR SUB-SURFACES MAY DESTROY, DAMAGE, ALTER, OR REMOVE FROM ITS ORIGINAL POSITION ARCHAEOLOGICAL MATERIAL OR OBJECTS.

	Without Mitigation	With Mitigation
Extent	Local (1)	Local (1)
Duration	Permanent (5)	Permanent (5)
Magnitude	Low (2)	Low(2)
Probability	Not Probable (2)	Not probable (2)
Significance	Low (16)	Low(16)
Status	Negative	Negative
Reversibility	Not irreversible	Not irreversible
Irreversible loss of resources	No resources were recorded	No resources were recorded
Can impacts be mitigated?	Yes, a chance find procedure should be implemented.	Yes

Mitigation: Impacts are rated as <30 (Low) Mitigation of impacts is easily achieved where this impact would not have a direct influence on the decision to develop in the area.

Due to the lack of apparent significant heritage resources no further mitigation is required prior to construction. A Chance Find Procedure should be implemented for the project should any sites be identified during the construction process.

6.2 Conclusions

- ✚ This report is an independent view and makes recommendations to The Provincial Heritage Authority based on its findings. The authority will consider the recommendations and make a decision based on conservation principles.

- **Stone Age sites**

No Stone Age settlements, structures, features, assemblages or artefacts were recorded during the survey.

- **Rock art sites**

Although several rock art sites are known in the general region, none were recorded near the survey area.

- ***Iron Age Settlements***

Several Late Iron Age settlements are known to occur within the broader study area, these sites are associated with early Northern Ndebele and Tswana occupation of the Mokopane region. However no Iron Age sites or features were recorded in the survey footprint.

6.3 Recommendations

The proposed powerline deviation associated infrastructure may proceed as there is no objection from a heritage perspective. Archaeological deposits usually occur below ground level. Should archaeological artefacts or skeletal material be revealed in the area during development activities, such activities should be halted, and an archaeologist should be notified in order for an investigation and evaluation of the find(s) to take place (see NHRA (Act No. 25 of 1999), Section 36 (6)).

8.0 REFERENCES

- Clark, K., 2001. Planning for the past: heritage services in local planning authorities in England. Cultural trends, 11(43-44), pp.61-94.
- Glasson, J. et al. (2012), Introduction to Environmental Impact Assessment: Principles and Procedures, Process, Practice and Prospects, Oxon: Routledge.
- Glasson, J. and Therivel, R., 2013. Introduction to environmental impact assessment. Routledge.

- Morgan, R.K. (2012), "Environmental impact assessment: the state of the art", Impact Assessment and Project Appraisal, 30(1), pages 5-14
- Theal, G.M., 1908. History of South Africa since September 1795. Vol. III: Cape Colony from 1846 to 1860, Natal from 1845 to 1857, British Kaffraria from 1847-1860, and the Orange River Sovereignty and the Transvaal Republic from 1847-1854.
- Preller, H., 1931. Die Geschichte der Nachkriegszeit und ihre Behandlung im Geschichtsunterricht an höheren Schulen. BG Teubner.
- Bulpin, T.V., 1965. To the Banks of the Zambezi. Nelson.
- De Vaal, J.B. 1953. Die Rol van João Albasini in die Geskiedenis van die Transvaal. Agrief-jaarboek vir Suid-Afrikaanse Geskiedenis 16 (1). Elsieirivier: Nasionale Handelsdrukkery vir die Staatsdrukker
- De Waal, J.J. 1978. Die verhouding tussen die blankes en die hoofmanne Mokopane en Mankopane in die omgewing van Potgietersrus (1836-1869). Verhandeling voorgelê vir die graad Magister Artium in die Department Geskiedenis, Fakulteit Lettere en Wysbegeerte.
- Grootjans, A.P., Jansen, A.J.M., de Hullu, P.C., Joosten, H., Bootsma, A. and Grundling, P.L., 2015. In search of spring mires in Namibia: the Waterberg area revisited. Mires and Peat, 15(10), pp.1-11.
- Ferreira, O.J.O. 2002. Montanha in Zoutpansberg. 'n Portugese handelsending van Inhambane se besoek aan Schoemansdal, 1855-1856. Pretoria: Protea Boekhuis
- Hofmeyr, I. 1993. "We spend our years as a tale that is told" Oral historical Narrative in a South African Chieftdom. Johannesburg: Witwatersrand University Press.
- Morton, F. 2005. Female Inboekeling in the South African Republic, 1850-1880.
- Slavery and Abolition, 26 (2): 199-215. Mitchell, P. 2012. South African and Lesotho Stone Age Sequence Update (I). The South African Archaeological Bulletin. Vol 67 (195): 123-144.
- Naidoo, J. 1987. The siege of Makapansgat: a massacre? And a trekker victory? History in Africa, 14: 173-187.
- Wadley, L., Williamson, B. and Lombard, M., 2004. Ochre in hafting in Middle Stone Age southern Africa: a practical role. World Archaeology, 26, pp.19-34.
- Watson, D., 2003. Guidelines for landscape and visual impact assessment.

APPENDIX A: DEFINITION OF TERMS ADOPTED IN THIS HIA

- The terminology adopted in this document is mainly influenced by the NHRA of South Africa (1999) and the Burra Charter (1979).

Adaptation: Changes made to a place so that it can have different but reconcilable uses.

Artefact: Cultural object (made by humans).

Buffer Zone: Means an area surrounding a cultural heritage which has restrictions placed on its use or where collaborative projects and programs are undertaken to afford additional protection to the site.

Co-management: Managing in such a way as to take into account the needs and desires of stakeholders, neighbours and partners, and incorporating these into decision making through, amongst others, the promulgation of a local board.

Conservation: In relation to heritage resources, includes protection, maintenance, preservation and sustainable use of places or objects so as to safeguard their cultural significance as defined. These processes include, but are not necessarily restricted to preservation, restoration, reconstruction and adaptation.

Contextual Paradigm: A scientific approach which places importance on the total context as catalyst for cultural change and which specifically studies the symbolic role of the individual and immediate historical context.

Cultural Resource: Any place or object of cultural significance

Cultural Significance: Means aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technological value or significance of a place or object for past, present and future generations.

Feature: A coincidental find of movable cultural objects.

Grading: The South African heritage resource management system is based on a grading system, which provides for assigning the appropriate level of management responsibility to a heritage resource.

Heritage Resources Management: The utilization of management techniques to protect and develop cultural resources so that these become long term cultural heritage which are of value to the general public.

Heritage Resources Management Paradigm: A scientific approach based on the Contextual paradigm, but placing the emphasis on the cultural importance of archaeological (and historical) sites for the community.

Heritage Site Management: The control of the elements that make up the physical and social environment of a site, its physical condition, land use, human visitors, interpretation etc. Management may be aimed at preservation or, if necessary at minimizing damage or destruction or at presentation of the site to the public.

Historic: Means significant in history, belonging to the past; of what is important or famous in the past.

Historical: Means belonging to the past, or relating to the study of history.

Maintenance: Means the continuous protective care of the fabric, contents and setting of a place. It does not involve physical alteration.

Object: Artefact (cultural object)

Paradigm: Theories, laws, models, analogies, metaphors and the epistemological and methodological values used by researchers to solve a scientific problem.

Preservation: Refers to protecting and maintaining the fabric of a place in its existing state and retarding deterioration or change, and may include stabilization where necessary. Preservation is appropriate where the existing state of the fabric itself constitutes evidence of specific cultural significance, or where insufficient evidence is available to allow other conservation processes to be carried out.

Protection: With reference to cultural heritage resources this includes the conservation, maintenance, preservation and sustainable utilization of places or objects in order to maintain the cultural significance thereof.

Place : Means a geographically defined area. It may include elements, objects, spaces and views. Place may have tangible and intangible dimensions.

Reconstruction: To bring a place or object as close as possible to a specific known state by using old and new materials.

Rehabilitation: The repairing and/ or changing of a structure without necessarily taking the historical correctness thereof into account.

Restoration: To bring a place or object back as close as possible to a known state, without using any new materials.

Site: A large place with extensive structures and related cultural objects. It can also be a large assemblage of cultural artefacts, found on a single location.

Sustainable: Means the use of such resource in a way and at a rate that would not lead to its long-term decline, would not decrease its historical integrity or cultural significance and would ensure its continued use to meet the needs and aspirations of present and future generations of people.

APPENDIX B: CEMETERY BYLAWS & GRAVE REQUIREMENTS TO BE ADOPTED IN THE CONSTRUCTION OF THE CEMETRY.

Dimension of Graves:

- The excavation of a grave for an adult shall be at least 1820mm deep, 2300mm long and 760mm wide.
- The excavation of a grave for a child shall be at least 1370mm deep, 1520mm long and 610mm wide.
- In an event that a grave of a greater depth, length or width than those specified above is required, application in respect thereof, together with extra prescribed fees that are due, shall be made to the caretaker with the application to obtain permission for a burial.
- The excavation of an extra deep grave for the burial of two corpses shall be at least 2400mm deep, 2300mm long and 760mm wide.
- Deviations from measurements of graves shall be as follows:
 - Extra wide: 2300mm long and 840 mm wide
 - Extra-long: 2530mm long and 760mm wide
 - Rectangular small: 2300mm long and 900mm wide
 - Brick nogging: 2600 mm long and 1050mm wide
- The area of a rectangular grave for an adult shall be 1500mm wide by 2600 mm long.
- The area of a grave for an adult shall be 1210mm wide by 2430mm long.
- The area of a grave of a child shall be 1210mm wide by 1520mm long. If a coffin is too large, an adult grave shall be used.

Covering of Earth

- There shall be at least 1 200mm of soil between the top of the adult coffin and the ground surface, and at least 900mm of the top of a child coffin and the ground surface.

Number of Bodies in One Grave

- Only one corpse may be buried in a grave with measurements as contemplated in this bylaw.
- Only two corpses may be buried in a grave with measurements as set out in sub-section 15(4): Provided that the application for the burial of two corpses has been made to the caretaker in writing by completing and submitting the required application form before the first corpse is buried.

APPENDIX C: DEFINITION OF VALUES

Value	Definition
Historic Value	Important in the community or pattern of history or has an association with the life or work of a person, group or organization of importance in history.
Scientific Value	Potential to yield information that will contribute to an understanding of natural or cultural history or is important in demonstrating a high degree of creative or technical achievement of a particular period.
Aesthetic Value	Important in exhibiting particular aesthetic characteristics valued by a community or cultural group.
Social Value	Have a strong or special association with a particular community or cultural group for social, cultural or spiritual reasons.
Rarity	Does it possess uncommon, rare or endangered aspects of natural or cultural heritage?
Representivity	Important in demonstrating the principal characteristics of a particular class of natural or cultural places or object or a range of landscapes or environments characteristic of its class or of human activities (including way of life, philosophy, custom, process, land-use function, design or technique) in the environment of the nation, province region or locality.

APPENDIX D: RESOURCE LIKELY TO OCCUR WITHIN THESE CONTEXTS AND LIKELY SOURCES OF HERITAGE IMPACTS/ISSUES

HERITAGE CONTEXT	HERITAGE RESOURCES	SOURCES OF HERITAGE IMPACTS/ISSUES
A. PALAEOLOGICAL LANDSCAPE CONTEXT	Fossil remains. Such resources are typically found in specific geographical areas, e.g. the Karoo and are embedded in ancient rock and limestone/concrete formations.	Road cuttings Quarry excavation
B. ARCHAEOLOGICAL LANDSCAPE CONTEXT	Archaeological remains dating to the following periods: <ul style="list-style-type: none"> ▪ ESA ▪ MSA ▪ LSA ▪ LSA - Herder ▪ Historical ▪ Maritime history 	<ul style="list-style-type: none"> ▪ Subsurface excavations including ground leveling, landscaping, foundation preparation. ▪ In the case of maritime resources, development including land reclamation, harbor/marina/water front developments, marine mining, engineering and salvaging.
	Types of sites that could occur include: <ul style="list-style-type: none"> ▪ Shell middens 	
	<ul style="list-style-type: none"> ▪ Historical dumps 	
	<ul style="list-style-type: none"> ▪ Structural remains 	
C. HISTORICAL BUILT URBAN LANDSCAPE CONTEXT	<ul style="list-style-type: none"> • Historical townscapes/streetscapes. • Historical structures; i.e. older than 60 years • Formal public spaces. • Formally declared urban conservation areas. • Places associated with social identity/displacement. 	<p>A range of physical and land use changes within this context could result in the following heritage impacts/issues:</p> <ul style="list-style-type: none"> • Loss of historical fabric or layering related to demolition or alteration work. • Loss of urban morphology related to changes in patterns of subdivision and incompatibility of the scale, massing and form of new development. • Loss of social fabric related to processes of gentrification and urban renewal.

APPENDIX E: PALEONTOLOGICAL IMPACT ASSESSMENT

Exemption Letter – The Proposed Construction Activities at the Existing Gilead Substation in Mokopane

Heidi Fourie – Palaeontological Impact Assessment

Mogalakwena Local Municipality, Waterberg District Municipality, Limpopo Province.
Farm: Ham 899-LR, Gilead 729-LR

Protocol for a Chance Fossil Find is included.

The applicant, Eskom SOC Holdings Ltd proposes to upgrade the infrastructure between the Chloe substation and the Gilead substation in order to improve the reliability of the existing electricity supply and also where possible provide new supply for any additional customers. Subsequently, a 66 kV powerline was constructed between Chloe and Gilead Substations.

Summary

This letter serves as a Letter of Exemption. It is in compliance with The Minimum Standards for Palaeontological Components of Heritage Impact Assessment Reports, SAHRA APMHOB, Guidelines 2012. The development is underlain by the rocks of the Bushveld Complex, Hout River Gneiss and Matlala Granite; Mokolian, Vaalian and Randian in age respectively, with a **VERY LOW** Palaeontological Sensitivity (Groenewald and Groenewald 2014*). This development will take place on igneous rocks, therefore, the impact will be **VERY LOW**.

Eskom seek to deviate one km of the existing 66 kV Chloe-Gilead powerline and have it connected to the new 66 kV feeder as well as dismantling the existing 66 kV Chloe-Gilead powerline.

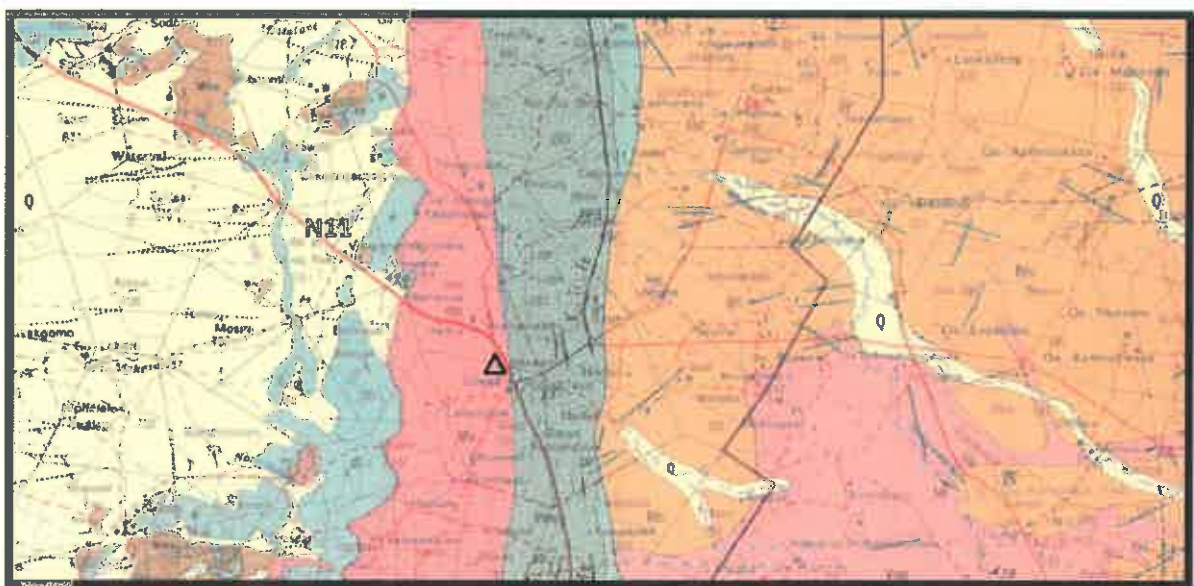


Figure 1: Geology of area (1:250 000 2328 Pietersburg, Brandl, G. 1985).

Legend to Map and short Explanation:

Mn – Coarse-grained red hornblende granite (**red**). Nebo Granite, Lebowa Granite Suite, Bushveld Complex. Mokolian.

Vmo – Magnetite gabbro, gabbro, anorthosite, olivine diorite; magnetite layer (**green**). Molendraai Magnetite Gabbro, Rustenburg Layered Suite, Bushveld Complex. Vaalian.

Vmt – Fine-grained grey to pink biotite granite; coarse-grained and in places porphyritic [**xx**] (**dark orange**). Matlala Granite.

Rhr – Leucocratic migmatite and gneiss, grey and pink hornblende-biotite gneiss, grey biotite gneiss; minor muscovite-bearing granite, pegmatite and gneiss (**orange**). Hout River Gneiss.

--- - - Concealed geological boundary.

---f--- - Fault

⊥ 20° - Strike and dip.

Δ – Approximate position of substation.

The Bushveld Complex (surrounding area) is a massive body of igneous origin and it is intrusive in the Transvaal Supergroup (Kent, 1980). The Bushveld Complex extends over 440 km east-west, from Burgersfort to Nietverdiend; and for nearly 350 km north-south from Villa Nora to Bethal. It covers an area of 65 000 km² and is chrome and platinum rich (Visser, 1989). The age is Vaalian (2,100 – 1,920 Ma). The layered rocks of the Bushveld Complex are generally believed to be the result of crystals settling out of magma during slow cooling. The magmatic events petrogenetically related to and generally considered part of the whole magmatic evolution of the Complex are, the diabase sills and the Rooiberg Group. The Complex consists of three main units or suites of which the Rustenburg Layered Suite is one (Kent, 1980), the other two are the Raseop Granophyre Suite and Lebowa Granite Suite (Visser, 1989). The region will be covered by 'Bushveld' vegetation. The weathering product is known as 'black turf' (Kent, 1980; Visser, 1989). There is a presence of mining past and present with iron ore and the Merensky Reef. Magnesite mines provide magnesium carbonate for making heat-resistant bricks (Norman and Whitfield 2006). The Layered Suite, the source of an immense wealth of platinum, chrome and vanadium, comprises six quite distinct zones.

The Matlala Granite is an almost rounded pluton, north of Mokopane with an age of $2\,236 \pm 55$ to $2\,458 \pm 60$ my. (Visser 1989). Stretching from Mokopane in the south to the Soutpansberg in the north is the Hout River Gneiss. It contains inclusions from the Pietersburg Group with an age of 2 750 my. (Visser 1989).



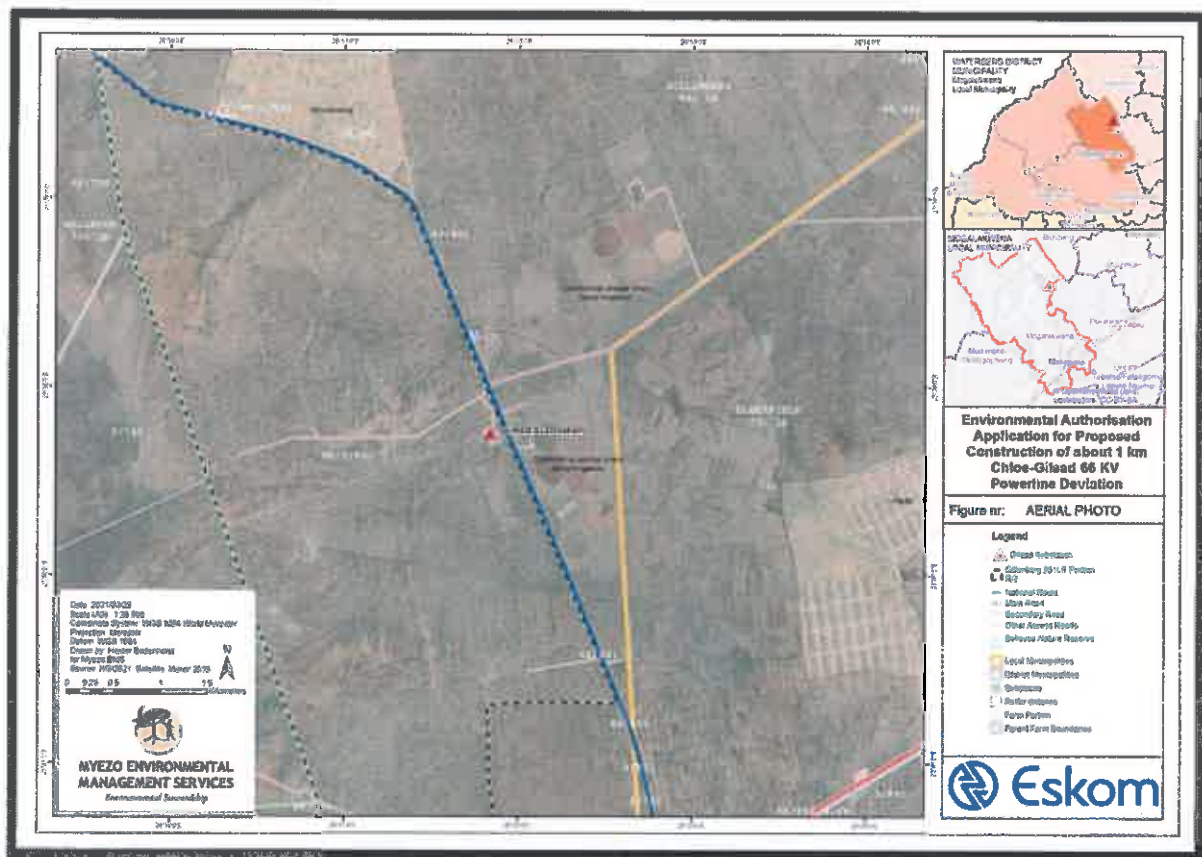


Figure 3: Aerial view (Myezo).

Palaeontological Sensitivity

[illegible]

*Groenewald, G. and Groenewald, D., 2014. SAHRA Palaeotechnical Report: Palaeontological Heritage of the Limpopo Province (Pp 22), South African Heritage Resources Agency.

No fossils recorded due to the igneous nature.

Recommendation

That Exemption from a Desktop Study for the proposed Eskom Gilead Development be granted to the applicant taking into consideration all the above stated information.

Declaration (disclaimer)

I, Heidi Fourie, declare that I am an independent consultant and have no business, financial, personal or other interest in the proposed development project for which I was appointed to do a

DEVELOPED FOR MYEZO ENVIRONMENTAL MANAGEMENT SERVICES (PTY) LTD

palaeontological assessment. There are no circumstances that compromise the objectivity of me performing such work.

I accept no liability, and the client, by receiving this document, indemnifies me against all actions, claims, demands, losses, liabilities, costs, damages and expenses arising from or in connection with services rendered, directly or indirectly by the use of the information contained in this document.

It may be possible that the Exemption Letter may have missed palaeontological resources in the project area as outcrops are not always present or visible on geological maps while others may lie below the overburden of earth and may only be present once development commences.

This report may not be altered in any way and any parts drawn from this report must make reference to this letter.



Heidi Fourie
2021/02/28

Protocol for Chance Finds and Management plan

This section covers the recommended protocol for a Phase 2 Mitigation process as well as for reports where the Palaeontological Sensitivity is **LOW**; this process guides the palaeontologist / paleobotanist / ECO on site and should not be attempted by the layman / developer.

- As part of the Environmental Authorisation conditions, an Environmental Control Officer (ECO) will be appointed to oversee the construction/prospecting/mining activities in line with the legally binding Environmental Management Programme (EMPr) so that when a fossil is unearthed they can notify the relevant department and specialist to further investigate.
- All fossil finds must be placed in a safe place for further investigation.
- The ECO should familiarise him- or herself with the applicable formations and its fossils.
- Most Universities and Museums have good examples of fossils.
- The EMPr already covers the conservation of heritage and palaeontological material that may be exposed during construction/prospecting/mining activities. For a chance fossil find, the protocol is to cease all construction activities, construct a 30 m no-go barrier, and contact SAHRA for further investigation.
- It is recommended that the EMPr be updated to include the involvement of a palaeontologist when necessary, either for pre-construction training of ECO or for pre-determined site visits. The ECO must visit the site after clearing, drilling, excavations and blasting and keep a photographic record.
- The developer may be asked to survey the areas affected by the development and indicate on plan where the construction / development / mining will take place. Trenches may have to be dug to ascertain how deep the sediments are above the bedrock (can be a few hundred

metres). This will give an indication of the depth of the topsoil, subsoil, and overburden, if need be trenches should be dug deeper to expose the interburden.

The palaeontological impact assessment process presents an opportunity for identification, access and possibly salvage of fossils and add to the few good localities. Mitigation can provide valuable onsite research that can benefit both the community and the palaeontological fraternity. A Phase 2 study is very often the last opportunity we will ever have to record the fossil heritage within the development area. Fossils excavated will be stored at a National Repository.

Habitat, Biodiversity and Wetland Assessment Report

A rapid assessment of the Habitat, Biodiversity and Wetlands Gilead Substation – diversion power line



Myezo EMS



BIOASSETS
biological assessments

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EXECUTIVE SUMMARY

BioAssets CC was appointed by Myezo Environmental Management Services (Pty) Ltd to do a rapid assessment of the Habitat, Biodiversity and Wetlands referred to as the "Gilead Substation diversion power line Assessment".

The objectives were:

BioAssets CC was appointed by Myezo Environmental Management Services (Pty) Ltd to do a general habitat, biodiversity and wetland desktop assessment and rapid field survey in order to determine the

legal obligations for an application for an Environmental Authorisation for the proposed power line construction. The need is to replace the link of the existing Chloe/Gilead power line to the Gilead substation. A new link from the west of the substation will link to the existing power line (Figure 2).

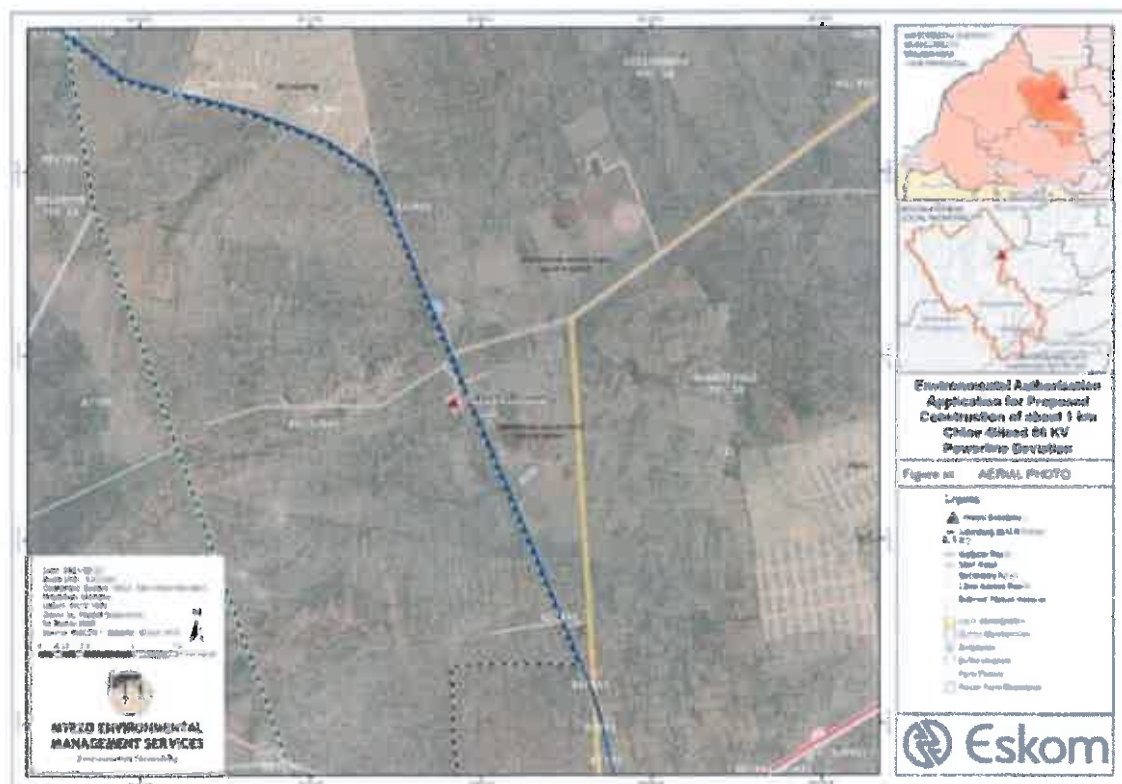
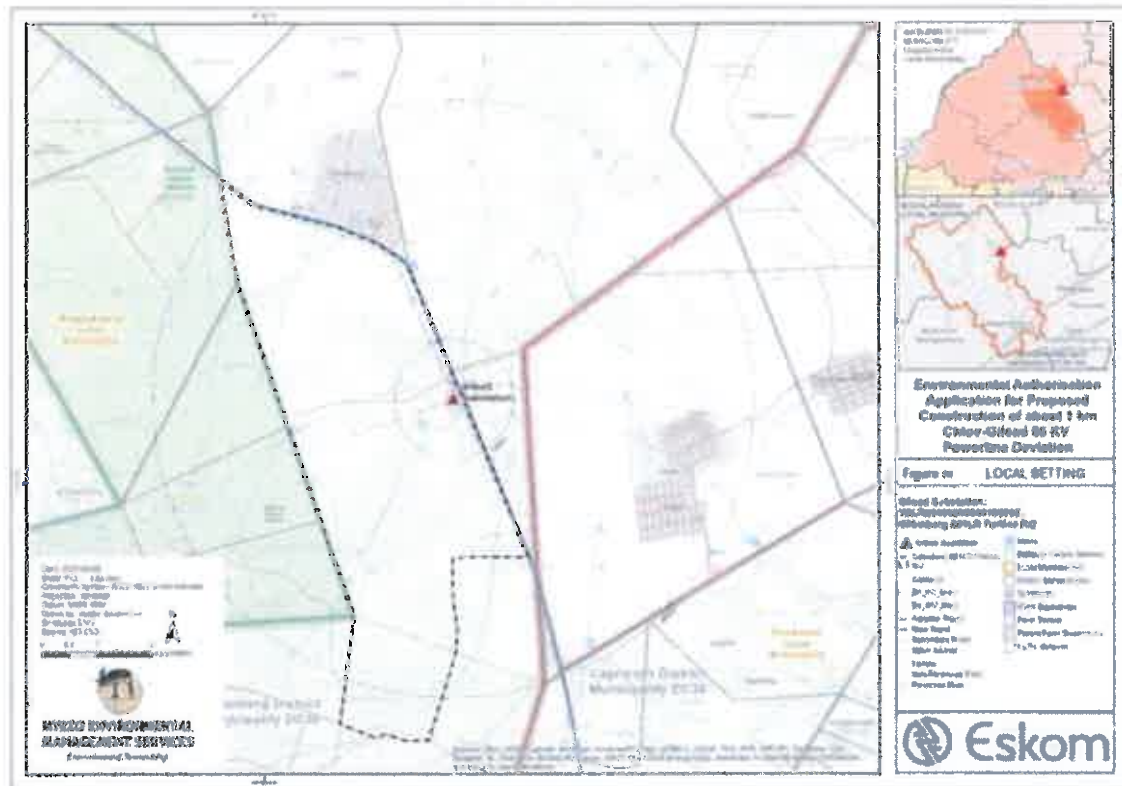
The survey was done to confirm the presence of the wetlands and other related biological and habitat elements for the study area and included:

- Confirmation of the information provided in the Department of Environmental Affairs screening tool pertaining to the conservation status and vegetation types using the desktop maps for illustration of information and a site survey
- Confirmation of information pertaining to whether the study falls under any of these areas and using such reference material which provides such confirmation that such as South African National Biodiversity Institute National Biodiversity Assessment 2011 (NBA 2011):
 - A protected area identified in terms of NEMPAA, excluding conservancies
 - National Protected Area Expansion Strategy Focus areas
 - Sensitive areas as identified in an Environmental Management Framework as contemplated in Chapter 5 of the Act and as adopted by the competent authority
 - Critical biodiversity areas or ecosystem service areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans
 - Core areas in biosphere reserves
 - Areas within 10 kilometres from National Parks or World Heritage sites or 5 kilometres from any other protected area identified in terms of NEMPAA or from the core area of a Biosphere Reserve
 - The presence or absence of any “Critical Biodiversity Areas and Ecological Support Areas”

Recommendations

- The wetland (ephemeral drainage line) identified is in a fair condition – roads, grazing, wood harvesting and construction had some impacts on the system.
- No further detailed mammal, herpetological and amphibian studies are needed – no red data species present and the *Pyxicephalus edulis* will not be affected by the new proposed power line.
- The vegetation will not be negatively impacted, as the current vegetation along the proposed corridor is modified – mostly *Dichrostachys cinerea* in a dense stand, indicating some encroachment.

- It is recommended that the client must have alien vegetation management as part of the management strategy.
- With regards to the avifauna, the study area consists of two (2) habitat types observed during the site survey: 1) the larger area associated with the existing development (substation) and 2) the associated infrastructure (powerlines).
 - During the site survey one (1) threatened bird species was observed (*Torgos tracheliotus*).
 - Some other threatened species that were not observed during the site survey and has a high likeliness of occurring in and surrounding the study area, especially for foraging purposes are species including but are not limited to *Falco biarmicus* and *Coracias garrulus*.
 - Although the one (1) threatened species was observed during the site survey and with other threatened species with a high possibility of occurring in the area, this proposed project will not have a significant impact on the avifaunal species, as the alignment of the proposed project powerline will run parallel with existing infrastructure (powerlines).
 - It is however recommended that minimum impact to the bushveld vegetation during clearing must be affected. It is thus proposed that the clearance area be minimized to limit impacts.



Declaration of Independence

The Environmental Impact Assessment Regulations (Regulation 17 of Government Notice No R354 of 2010), requires that certain information is included in specialist reports. The terms of reference, purpose of the report, methodologies, assumptions and limitations, impact assessment and mitigation (where relevant to the scope of work) and summaries of consultations (where applicable) are included within the main report. Other relevant information is set out below:

Expertise of author:

- Working in the field of ecology since 1996 and in specific vegetation related assessments since 2000.
- Worked in the field of freshwater ecology and wetlands since 2000.
- Involved with visual assessments since 2009.
- Is registered as a Professional Natural Scientist with the South African Council for Natural Scientific Professions (Reg. No. 400109/95).

Declaration of independence:

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

Disclosure:

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

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



Dr Wynand Vlok

26 February 2021

Date



Assumptions and limitations

Availability of baseline information

Baseline information for the study of the site was obtained from historic maps, photographs and reports. The desktop survey provided adequate baseline information for the area and therefore this was not a constraint.

Constraints

The survey was conducted during the early summer season and is was a daytime survey only. Most of the different habitats at the site were investigated and it was therefore possible to complete a rapid survey and obtain information on the habitats that are present and the site, or that are likely to occur there. Access to portions of the nature reserve were not possible.

Bio-physical constraints

Weather conditions during the period were warm with a moderate wind blowing. The region has received little rainfall prior to the site visit and the vegetation was still dry (representing the late winter conditions). There was no standing water in the veld during the time of the survey, but the wetlands (seeps, channels and the Wilge River) had water. This will have obvious implications on the biodiversity that are likely to occur in the area. The late winter/early spring survey is not ideal for a more detailed biodiversity survey, but it gave a good indication of the current habitat changes and impacts. Information gathered during the field survey will assist in the rapid survey for the clients need related to the feasibility assessment with regards to the prospecting application and possible future exploration at the site.

Confidentially constraints

There were no confidentially constraints.

Implications for the study

Apart from the prevailing weather conditions at the site and the winter/early spring (limited rainfall) conditions, there were no other significant constraints that would negatively impact upon the assessment for the client (feasibility study to conduct prospecting on site). Access to most areas of the study site was possible, but if the client decides to continue, a detailed biodiversity study and wetland assessment and delineation must be done. There is sufficient good quality data available in the literature that partially negates the negative effect that the type of survey (prospecting feasibility assessment) had on the quality of the evaluation.

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1 INTRODUCTION

The client expressed the need for an assessment on the farm Gilead 729 LR (Figure 1) with regard to the vegetation, general faunal, avifaunal, wetland and general habitat on the site (Figure 2). This was done after the evaluation of the screening tool outputs (DEA), bioregional plans and critical biodiversity areas assessments and the desktop assessment was followed by the site survey on 12 February 2021.

1.1 Terms of Reference

BioAssets CC was appointed by Myezo Environmental Management Services (Pty) Ltd to do a general habitat, biodiversity and wetland desktop assessment and rapid field survey in order to determine the legal obligations for an application for an Environmental Authorisation for the proposed power line construction. The need is to replace the link of the existing Chloe/Gilead power line to the Gilead substation. A new link from the west of the substation will link to the existing power line (Figure 2).

The survey was done to confirm the presence of the wetlands and other related biological and habitat elements for the study area and included:

- Confirmation of the information provided in the Department of Environmental Affairs screening tool pertaining to the conservation status and vegetation types using the desktop maps for illustration of information and a site survey
- Confirmation of information pertaining to whether the study falls under any of these areas and using such reference material which provides such confirmation that such as South African National Biodiversity Institute National Biodiversity Assessment 2011 (NBA 2011):
 - A protected area identified in terms of NEMPAA, excluding conservancies
 - National Protected Area Expansion Strategy Focus areas
 - Sensitive areas as identified in an Environmental Management Framework as contemplated in Chapter 5 of the Act and as adopted by the competent authority
 - Critical biodiversity areas or ecosystem service areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans
 - Core areas in biosphere reserves
 - Areas within 10 kilometres from National Parks or World Heritage sites or 5 kilometres from any other protected area identified in terms of NEMPAA or from the core area of a Biosphere Reserve
 - The presence or absence of any "Critical Biodiversity Areas and Ecological Support Areas"

1.2 Objectives of the Survey

The objectives were:

- To do a rapid desktop assessment to determine the relevant information contained in reports and related documents for the project area
- To do a rapid survey to determine the presence and extent of wetlands that will be affected by the proposed activity

- To assess the current state of the habitat on the property (farm Gilead 729 LR)
- To determine the current impacts on the vegetation on the property
- To do a avifaunal survey to determine the potential impacts of the deviation power line on the bird community
- To look for any other important biological component that can be affected by the development

1.3 The Study Area

The locality map for the study area is depicted in Figure 1 and 2, approximately 60km northwest of Mokopane in the Mogalakwena Municipal area, Limpopo Province.



Figure 1: Map of the study area – north of Mokopane in the Limpopo Province.



Figure 2: Aerial view of the study area the blue line represent the existing Cloe-Gilead power line with the red line the proposed diversion.

2 METHODOLOGY

2.1 Wetland Assessment

2.1.1 Desktop Assessment

A preliminary assessment was conducted to determine the presence of any wetlands of concern associated with the proposed deviation of the power line corridor. From the maps and other records, it was noted that an ephemeral drainage line is associated with the area to the northeast of the Gilead substation (Figure 1).

2.1.2 Field Investigation

The field investigation was undertaken on 15 February 2021 to assess and corroborate the delineated Wetland Zones present on the survey area.

The field procedure for the wetland delineation was mainly based on visual observations as access current state of the drainage line. As this was identified as an unchannelled valley bottom the assessment was done using "A practical field procedure for identification and delineation of wetlands and riparian areas (DWAF, 2005).

The riparian area is identified (where applicable) using the following indicators:

- the topography associated with the watercourse;
- vegetation; and
- alluvial soils and deposited material.

The following procedure was followed during the delineation of the drainage line:

- a desktop delineation was undertaken using 1:50 000 maps and satellite imagery of the study site;
- some areas for verification were identified; and □ once on site, the identified areas were visited.

2.1.3 Mapping

In addition to the information on the maps and aerial image, the outline and extent of the drainage line was confirmed.

2.1.4 Wetland Classification

SANBI's "Further development of a proposed National Classification System for South Africa" will be used to verify the classification of the wetlands within the study area (SANBI, 2009 – Table 1). The wetlands are classified up to level four, which includes the system, regional setting, landscape unit and hydrogeomorphic unit.

In addition the NFEPA classification indicate the area around to be listed as a Phase 2 FEPA (Figure 3). It is important to note that river FEPAs currently in an A or B ecological category may still require some rehabilitation effort, e.g. clearing of invasive alien plants and/or rehabilitation of river banks. From a

biodiversity point of view, rehabilitation programmes should therefore focus on securing the ecological structure and functioning of FEPAs before embarking on rehabilitation programmes in Phase 2 FEPAs or other areas. Phase 2 FEPAs were identified in moderately modified rivers (C ecological category), only in cases where it was not possible to meet biodiversity targets for river ecosystems in rivers that were still in good condition (A or B ecological category). River condition of these Phase 2 FEPAs should not be degraded further, as they may in future be considered for rehabilitation once FEPAs in good condition (A or B ecological category) are considered fully rehabilitated and well managed. Phase 2 FEPAs and their associated sub-quaternary catchments are shown in dark green with white dots (Nel et al, 2011).

The area associated with the substation falls into the Limpopo River Water Management area and the streams from the site drains into the Matlala River to the north. This river is a tributary of the Mogalakwena River (Sub Water Management Area) that is an important tributary of the Limpopo River.

Table 1: Wetland classification level 1 – 4 (SANBI, 2009).

Level 1: System	Level 2: Regional setting	Level 3: Landscape unit	Level 4: Hydrogeomorphic (HGM) unit			
Connectivity to open ocean	Ecoregion	Landscape setting	HGM type	Longitudinal zonation landform	Drainage outflow	Drainage inflow
			A	B	C	D
INLAND	DWAf Level 1 Ecoregions	SLOPE	Channel (river)	Mountain headwater stream	Not applicable	Not applicable
				Mountain stream	Not applicable	Not applicable
				Transitional river	Not applicable	Not applicable
				Rejuvenated bedrock fall	Not applicable	Not applicable
			Hillslope seep	Not applicable	With channel inflow	Not applicable
					Without channel inflow	Not applicable
			Depression	Not applicable	Exorheic	With channel inflow
						Without channel inflow
					Endorheic	With channel inflow
						Without channel inflow
					dammed	With channel inflow
						Without channel inflow
		VALLEY FLOOR	Channel (river)	Mountain stream	Not applicable	Not applicable

				Transitional river	Not applicable	Not applicable
				Rejuvenated bedrock fall	Not applicable	Not applicable
				Upper foothill river	Not applicable	Not applicable
				Lower foothill river	Not applicable	Not applicable
				Lowland river	Not applicable	Not applicable
				Rejuvenated foothill river	Not applicable	Not applicable
				Upland floodplain river	Not applicable	Not applicable
Level 1: System	Level 2: Regional setting	Level 3: Landscape unit	Level 4: Hydrogeomorphic (HGM) unit			
			Channelled valley-bottom wetland	Valley-bottom depression	Not applicable	Not applicable
				Valley-bottom flat	Not applicable	Not applicable
			Unchannelled valley-bottom wetland	Valley-bottom depression	Not applicable	Not applicable
				Valley-bottom flat	Not applicable	Not applicable
			Floodplain wetland	Floodplain depression	Not applicable	Not applicable
				Floodplain flat	Not applicable	Not applicable
					Exorheic	With channel inflow
						Without channel inflow
			Depression	Not applicable	Endorheic	With channel inflow
						Without channel inflow
					dammed	With channel inflow
						Without channel inflow
			Valleyhead seep	Not applicable	Not applicable	Not applicable
		PLAIN	Channel (river)	Lowland river	Not applicable	Not applicable
				Upland floodplain river	Not applicable	Not applicable
			Floodplain wetland	Floodplain depression	Not applicable	Not applicable
				Floodplain flat	Not applicable	Not applicable
			Unchannelled valley-bottom wetland	Valley-bottom depression	Not applicable	Not applicable
				Valley-bottom flat	Not applicable	Not applicable
			Depression	Not applicable	Exorheic	With channel inflow
						Without channel inflow

					Endorheic	With channel inflow
						Without channel inflow
		BENCH (Hilltop/saddle/ shelf)	Flat	Not applicable	Not applicable	Not applicable
			Depression	Not applicable	Exorheic	With channel inflow
						Without channel inflow
					Endorheic	With channel inflow
						Without channel inflow
			Flat	Not applicable	Not applicable	Not applicable

2.2 Biodiversity and associated Habitat Assessment

2.2.1 Desktop Assessment

For this assessment to determine the impact of the proposed deviation power line to the east and south of the Gilead substation (Figure 2) a general literature survey was conducted with regards to the mammals, amphibians, reptiles and birds associated with the area (quarter degree square – 2328DB). No red data mammals, reptiles or amphibians are listed but a number of red data bird species are present and most are associated with the bushveld habitats.

The area surrounding the Gilead substation is listed as a biodiversity important area in the Limpopo Conservation Plan documents, with sections of the farm Gilead 729 LR included as an “Ecological Support (ESA)” (Figure 4). The vegetation unit for the area (Figure 5) indicate that it is referred to as the Makhado Sweet Bushveld (SVcb 20) (Mucina and Rutherford, 2006). This vegetation unit is associated with “lightly to moderately undulating plains sloping generally down to the north, with some hills in the southwest where the short and shrubby bushveld has a poorly developed grass layer. The plains are associated with an area south of the Soutpansberg, east of the Waterberg and on the apron surrounding the Blouberg and Lerataupje Mountains and north of the Polokwane Plateau and west of the escarpment, with extensions from Mokopane to the south and to the north near Vivo (altitude varies between 850 and 1 200 m). It is mentioned that this area is transitional between the higher-lying Polokwane Plateau and the lower-lying vegetation units of the Limpopo River Valley and is regarded as “Vulnerable” (Mucina and Rutherford, 2006).

The “NBB-DEFF Screening Report” was assessed as part of the background information available and actions that must be taken for the comprehensive studies. With regards to the “Terrestrial Biodiversity” the area is rated as of “High Sensitivity” importance.

2.2.2 Expected biota

Below are the only listed information regarding the biota associated with the area (FitzPatrick Institute of African Ornithology, 2021). It reflects the lists of expected frogs and reptiles in the quarter degree segment associated with the study site (2328DB).

2.2.3 Assumptions, gaps and limitations

The study was limited to a snapshot view during one site visit. The field investigation was undertaken on 15 February 2021 to assess and confirm the presence of any wetlands on site and to assess the possible impact of the proposed deviation of the power line on the habitat and the associated biota.

A rapid habitat assessment was conducted to determine the current state of the landscape and if any large negative impacts could be observed. This was done by a walk down through the farm portion (Gilead 729 LR – around the existing Gilead substation) and the immediate surrounding areas to the north, west and south. During the walk down, any sings of wild animals, frogs, reptiles and rare birds was noted and included visual observations, signs of habitation, tracks and scats/droppings.

Table 2: List of expected frogs at the Gilead substation site (FitzPatrick Institute of African Ornithology, 2021).

Family	Genus and species	Common name	Conservation status
Brevicipitidae	<i>Breviceps adspersus</i>	Bushveld Rain Frog	Least Concern
Hyperoliidae	<i>Kassina senegalensis</i>	Bubbling Kassina	Least Concern
Microhylidae	<i>Phrynomantis bifasciatus</i>	Banded Rubber Frog	Least Concern
Ptychadenidae	<i>Ptychadena anchietae</i>	Plain Grass Frog	Least Concern
Pyxicephalidae	<i>Cacosternum boettgeri</i>	Common Caco	Least Concern
Pyxicephalidae	<i>Pyxicephalus edulis</i>	African Bull Frog	Least Concern
Pyxicephalidae	<i>Tomopterna cryptotis</i>	Tremelo Sand Frog	Least Concern

Table 3: List of expected reptiles at the Gilead substation site (FitzPatrick Institute of African Ornithology, 2021).

Family	Genus and species	Common name	Conservation status
Agamidae	<i>Acanthocercus atricollis</i>	Southern Tree Agama	Least Concern
Agamidae	<i>Agama aculeata distanti</i>	Distant's Ground Agama	Least Concern
Chamaeleonidae	<i>Chamaeleo dilepis</i>	Common Flap-neck Chameleon	Least Concern
Colubridae	<i>Dasypeltis scabra</i>	Rhombic Egg-eater	Least Concern
Colubridae	<i>Thelotornis capensis capensis</i>	Southern Twig Snake	Least Concern
Cordylidae	<i>Platysaurus guttatus</i>	Dwarf Flat Lizard	Least Concern
Gekkonidae	<i>Lygodactylus capensis</i>	Common Dwarf Gecko	Least Concern
Gekkonidae	<i>Pachydactylus capensis</i>	Cape Gecko	Least Concern
Lacertidae	<i>Heliobolus lugubris</i>	Bushveld Lizard	Least Concern
Lacertidae	<i>Ichnotropis capensis</i>	Ornate Rough-scaled Lizard	Least Concern
Lacertidae	<i>Nucras holubi</i>	Holub's Sandveld Lizard	Least Concern
Lacertidae	<i>Nucras intertexta</i>	Spotted Sandveld Lizard	Least Concern
Leptotyphlopidae	<i>Leptotyphlops incognitus</i>	Incognito Thread Snake	Least Concern
Scincidae	<i>Panaspis wahlbergi</i>	Wahlberg's Snake-eyed Skink	Least Concern
Scincidae	<i>Trachylepis varia sensu lato</i>	Common Variable Skink	Least Concern

Table 4: List of red data species and CITES species in Limpopo Province (LEDET State of the Environment Report, 2004). The probability of occurrence is obtained from Skinner and Chlmimba (2005).

Category	Common Name	Scientific Name	Does suitable habitat occur on site? (Yes/No)	Probability of the species occurring on site? (high/medium/low)
Critically Endangered	Black rhinoceros	<i>Diceros bicornis</i>	No	Very low
	Juliana's golden mole	<i>Neamblysomus julianae</i>	No	Very low

Endangered	African wild dog	<i>Lycaon pictus</i>	No	Very low
Vulnerable	African elephant	<i>Loxodonta africana</i>	Yes No	Very low
	Gunning's golden mole	<i>Neamblysomus gunningi</i>	Yes	Very low
	Cheetah	<i>Acinonyx jubatus</i>	Yes	Very low
	Lion	<i>Panthera leo</i>	No	Very low
	Black-footed cat	<i>Felis nigripes</i>		Very low
Near Threatened	White rhinoceros	<i>Ceratotherium simum</i>	Yes	Very low
CITES Appendix	Common Name	Scientific Name	Does suitable habitat occur on site? (Yes/No)	Probability of the species occurring on site? (high/medium/low)
Appendix 1	Black-footed cat	<i>Felis nigripes</i>	No	Very low Low
	Leopard	<i>Panthera pardus</i>	Limited	Very low
	Cheetah	<i>Acinonyx jubatus</i>	Yes	Very low
	Black rhinoceros	<i>Diceros bicornis</i>	No	
Appendix 2	African elephant	<i>Loxodonta africana</i>	Yes	Very low
	Chacma baboon	<i>Papio ursinus</i>	Yes	Medium
	Vervet monkey	<i>Cercopithecus aethiops</i>	Limited	Low
	Samango monkey	<i>Cercopithecus mitis</i>	No	Very low
	Greater galago	<i>Otolemur crassicaudatus</i>	No	Very low
	South African galago	<i>Galago moholi</i>	Yes	Medium
	Spotted-necked otter	<i>Lutra maculicollis</i>	No	Very low
	African clawless otter	<i>Aonyx capensis</i>	No	Low
	Caracal	<i>Caracal caracal</i>	Yes	Low
	Serval	<i>Leptailurus serval</i>	No	Very low
	African wild cat	<i>Felis sylvestris</i>	No	Very low
	Lion	<i>Panthera leo</i>	Yes No	Very low
	Hippopotamus	<i>Hippopotamus amphibious</i>	Yes	Very low
	White rhinoceros	<i>Ceratotherium simum</i>	Yes	Very low
	Pangolin	<i>Manis temminckii</i>		Very low

2.3 Avifaunal

A desktop study and literature review of the study area was conducted to gather information prior to the site assessment. The following literature was consulted and is also considered key references for the assessment:

- Hockey et al. (2005), was used for general information of relevant bird species. This also provided basic information with regards to the breeding, location, and preferred nesting habitat of relevant bird species. Where necessary, species were verified using Sasol Birds of Southern Africa (Sinclair et al., 2011);
- The conservation status of the threatened bird species observed or that could potentially occur on the study area was categorised using the National Red List Categories (IUCN, 2014) of IUCN (International Union for Conservation of Nature); and
- Distributional data was collected from the South African Bird Atlas Project 1 and 2 (SABAP2; 2020). The distribution of bird species is very important especially based on their preferred habitat and climate. The main difference between SABAP 2, which started in 2007 from SABAP 1, is that sampling is done on a more detailed scale in terms of pentad grids (5minute x 5minute), were as a total of nine (9) pentads (15minute x 15minute) equals to one (1) Quarter

Degree Grid Cell (QDGC). Therefore, the data collected in SABAP2 is more site-specific. The study area falls within the 2335_2850 pentad grid.

2.3.1 Field survey and data collection

A list of expected species was obtained from SABAP2 and used as reference during the field survey. This ensured that bird species, especially threatened species, could be focussed on during the survey. The site survey was conducted during the summer on the 15 February 2021 and a total of 2 hours was specifically focussed on identification of species. All recognisable habitats were identified on site and assessed to observe any associated avifauna species present in the specific habitat. Besides visual observations, bird species were identified by means of their calls and other signs such as nest, droppings, and feathers.

A comprehensive species list for the study area was compiled, using all the species previously recorded in and around the 2335_2850 QDGC (Southern African Bird Atlas Project 2, 2020). The geographical position of each bird species observed during the site survey will be logged using the Bird Lasser Smart Phone Application.

All bird observations during the site survey will be processed and submitted to the SABAP2. The project protocol allows for two types of surveys/cards to be submitted and include the "Full Protocol" and the "Ad-hoc Protocol":

- **Full Protocol:** This protocol requires at least two (2) hours of active surveying within a specific pentad.
- **Ad-hoc Protocol:** This protocol includes surveying of less than two (2) hours within a pentad.

2.3.2 Avifauna sensitivity (Threatened and Near Threatened bird species)

The SABAP2 (Southern African Bird Atlas Project 2, 2020) data base was consulted to determine if any threatened or non-threatened species occur within the 2335_2850 QDGC. The threatened species previously recorded within the QDGC was examined prior to the site survey (Roberts VII, Hockey et al. 2005; Taylor et al., 2015) and special attention was applied to identify these listed threatened species. A full array of observation methods, such as visual sightings, nesting sites, bird calls and possible habitat was utilised during the assessment. As seen in Figure 6 the Gilead substation is to east of the Water Berg Important Bird Areas (IBA) of South Africa.

2.3.3 Avifauna sensitivity scale

- **High** – This is regarded as a sensitive ecosystem with a high vulnerability towards disturbing factors and important features with regards to protecting and maintaining the existing ecosystem on the specific site. These areas usually represent important bird features such as bird fly paths, high bird diversity and/or suitable habitat for threatened bird species. This area should be protected and be classified as a no-go area;
- **Medium** - These areas are slightly lower than the high category in terms of sensitivity and may therefore occur along a sensitive ecosystems or ecological area. These areas should also be protected through implementing adequate mitigation measures. This will prevent the area from any potential threats introduced to the area; and

- **Low** – This area may be highly disturbed or degraded and therefore have little ecological function. This may be categories as a low disturbance area with regards to the specific project.

2.3.4 Limitations and assumptions

- Most of the data obtained from references such as SABAP1 and 2 and other research platforms where assumed to be true and accurate. The specific pentad used in SABAP2 only had four (4) historical cards (1 Full protocols and 3 Ad-hoc protocols) submitted, excluding the full protocol done for this specific survey. The pentad only had a total list of approximately 92 species (including the card submitted for this study) that can potentially occur within the pentad. Therefore, the QDGC was used which includes all adjacent pentads of the pentad 2335_2850.
- There were no nocturnal surveys conducted. Therefore, excluding the possibility of sighting nocturnal species such as some owl and nightjar species.
- A one-day field assessment was conducted and this potentially resulted in not recording all species within the study area or pentad.



Figure 3: The Gilead substation site (blue circle with arrow) indicate the area around to be classified as a Phase 2 FEPA (Nel et al, 2011) with the drainage line east of the road (ephemeral channel) draining north towards the Matlala River.



Figure 4: Extract of the study area on the Limpopo Province Biodiversity Plan indicating the study area (blue circle) falls within the Ecological Support Area (ESA – light green).



Figure 5: The vegetation map indicating the area of the survey site (farm Gilead 729 LR) falling into the Makhado Sweet Bushveld (SVcb 20) (light blue coloured circle) (Mucina and Rutherford, 2006).



Biodiversity assessment

Dr Wynand Vlok (Pr. Sci. Nat. 400109/95)



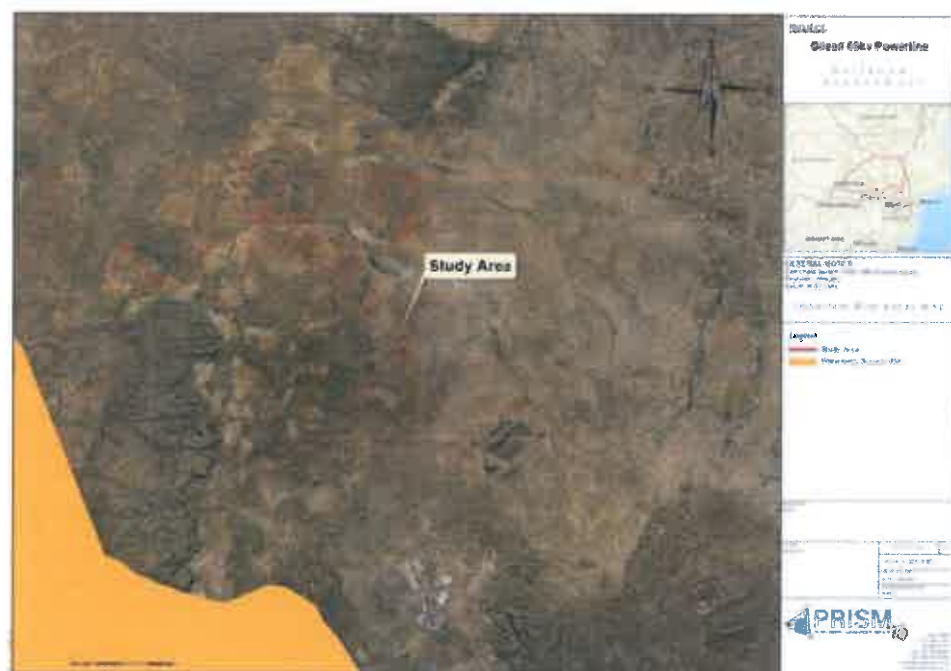


Figure 6: Important Bird Areas – associated with the study area – the Waterberg System IBA to the east.

Biodiversity assessment



Dr Wynand Vlok (Pr. Sci. Nat. 400109/95)



3 RESULTS

3.1 Wetland Delineation

3.1.1 Desktop Assessment

During the desktop investigation, one (1) possible area where wetlands could occur was identified on or in close proximity to the study site that would be affected by the proposed development activities.

The National Wetland Map version 5 (NWM5) as presented by SANBI was scrutinised and no wetland area was identified on or in close proximity to the study site that could be affected by the proposed activities. The only water resource noted was the ephemeral drainage line flowing in a south to north direction into the Matlala River to the northeast of the study site. According to the SANBI Classification (2009) (Table 1) this ephemeral drainage line looks to be an “Unchannelled valley-bottom set on a Plain”.

3.1.2 Field Assessment

The field investigation was undertaken on 15 February 2021 to assess and confirm the absence or presence of any other water resources associated within or near the proposed corridor of the power line. Just to the south of the substation, a farm dam in the ephemeral system was noted. This was probably constructed as a cattle drinking facility many years ago (prior to 2005). This depression will not be impacted by the deviation power line, as it will join the existing Cloe/Gilead power line north of the depression, at the boundary of the substation. It is recommended to ensure that the power line is constructed as close to the substation as legally possible.

When looking at the indicators with regards to identifying and mapping the riparian zone the following is noted:

3.1.2.1 Topography associated with the water course

The area associated with the drainage line flowing in a southerly to northerly direction is on a flat plains area. To the west and southwest, some high ground (approximately 5.5km away) drain towards the northeast and water will flow towards the Matlala River. In the vicinity of the substation, the terrain is very flat with no steeper slopes that one can detect. The channel of the drainage line is not well defined and during the site visit it is clear that recent activities (roads and construction) have an impact on the flow of surface water after rain events. Therefore no clear channels can be identified, but from the historic images and the site investigation, it is clear that water from the substation terrain drains to the northeast and east into the drainage line which in turn drains to the northeast, across the N11 towards the Matlala River.

3.1.2.2 Vegetation

During the field survey, there was no clear indication of vegetation indicating a riparian zone on the eastern section near the N11. Some larger trees around the farm dam and the drainage line to the southwest is visible, but very opaque to the northeast, indicating the flow of water was disrupted since



the construction of the impoundment. The new deviation line will have no direct impact on the vegetation associated with the impoundment of the drainage line.

3.1.2.3 Alluvial soils and deposited material

During the field survey, no alluvial soils that can be associated with the ephemeral channel was observed. As mentioned, the changes to the general habitat with historic activities (agricultural – presumed grazing) and the construction of the N11 and substation had some minor impacts on the habitat. The new power line deviation will have no visible impacts (unless aggravated erosion occur) on the ephemeral channel in its current state.

Table 5 gives a summary of the wetland (ephemeral drainage line) classification.

Table 5: Wetland Classification of the ephemeral stream at the Gilead Substation.

Level 1: System	Level 2: Regional setting	Level 3: Landscape unit	Level 4: Hydrogeomorphic (HGM) unit	
Connectivity to open ocean	Ecoregion	Landscape setting	HGM type	Longitudinal zonation / landform
			A	B
INLAND	DWAF Level 1 Ecoregions	VALLEY FLOOR	Unchannelled valley-bottom wetland	Valley-bottom flat





Figure 7: View of the ephemeral stream (blue line) and the farm dam – 2005 Google Earth image.





Figure
8:
View of the ephemeral stream (blue line) and the farm dam – 2018 Google Earth image.



3.2 Biodiversity and Habitat Assessment

The assessment of the habitat on the farm Gilead 729 LR indicate some historical agricultural activities (mostly grazing and the construction of the farm dam in the drainage line) (Figure 7 and 8). In general the habitat around the substation is moderately modified. This relates to the old substation that was replaced with the new facility, numerous power line corridors, the N11 road, wood harvesting and the grazing and trampling related to the agricultural activities.

The new power line corridor (Figure 2) will have a negligible impact on the habitat in general. Limited clearing is recommended, including leaving the basal layer (grass layer) intact to prevent erosion and intrusion of alien invasive vegetation.

3.2.1 Vegetation

The vegetation unit (Makhado Sweet Bushveld (SVcb 20) – Figure 5, Section 2.2.1).

The woody species in the proposed corridor is dominated by *Dichrostachys cinerea* as a result of bush encroachment (result of disturbances) with *Vachellia tortilis* a secondary encroacher. Other woody species in or adjacent to the corridor include *Grewia flava*, *Ehretia rigida* and *Ziziphus mucronata*. Outside the corridor in the surrounding landscape other woody species noted were *Grewia monticola*, *Boscia foetida*, *Sclerocarya birrea*, *Peltophorum africanum*, *Senegalia nigrescens*, *S. mellifera*, *Vachellia rehmanniana* and *Terminalia sericea*.

With regards to the basal layer the following graminoides dominated: *Antheophora pubescens*, *Aristida stipitata* subsp. *graciliflora*, *Enneapogon scoparius*, *Brachiaria nigropedata*, *Eragrostis trichophora*, *Panicum maximum*, *Schmidtia pappophoroides* and *Urochloa mosambicensis*.

A number of alien invasives are present and include: *Cereus jamacaru*, *Melia azedarach*, *Tagetes minuta* and *Agave sisalana*.

There are no red data or protected species associated with the proposed new corridor of the deviation power line.

3.2.2 Faunal/herpetological/amphibian assessment

The rapid survey and time of the year must be taken into consideration when reporting on the survey. During the field survey, no signs were noted of the presence of any wild mammals - e.g. tracks or scats.

With regards to the amphibians, some tadpoles of *Pyxicephalus edulis* and *Cacosternum boettgeri* were observed in the farm impoundment. It must be emphasised that the new proposed deviation power line will not affect or impact on the amphibians.

During the field survey, only two lizards were noted dashing into the long grass. No clear observation was possible, but it was in both cases representatives of the *Nucras* spp. probably *Nucras holubi*.



3.3 Species richness and summary statistics

According to the SABAP2 (2021), a total of 184 bird species and 11 threatened and near threatened species have been recorded in the 2335_2850 QDGC (Appendix 1: Expected and observed bird species). This equals to 46% of approximate 399 species listed for this region (Hockey *et al.*, 2005).

Despite the high bird diversity in this region, the proposed project site is limited with regards to habitat diversity. This due to the study area having a habitat type of Bushveld which covers most of the study area. Based on the habitat that is present and observed during the site assessment, only a total of 40 species which includes 1 threatened bird species was confirmed during the investigation, keeping in made the limitation. This equals to 22% of the expected number of bird species and 10% of the expected threatened and near threatened species obtained from SABAP2.

Table 6 list the number of observed species inclusive of the red listed species is very low in comparison with the total number of expected species for the study area. This is due to the listed limitations for the site assessment. Limitations included the lack of cards submitted in the QDGC and the total time spend on the study area. The study area also provides possible habitat in terms of foraging and nesting grounds for other expected species and red listed species. Table 7 is a summary of the “Threatened” and “Near-Threatened” bird species that could occur within the proposed site area based on their distribution and suitable habitat.

Table 6: A summary table of the total number of species and red listed species expected to occur and observed within the proposed study area.

	Expected (SABAP2, 2021)	Observed	Observed percentage (%)
Total number of species	184	40	22
Number of Red Listed Species	11	1	9

3.4 Avifaunal sensitivity

3.4.1 Areas of low avifaunal sensitivity

Areas with low sensitivity includes “Transformed and Disturbed” areas and the surrounded associated Bushveld. Although this area has been regarded as low sensitivity it does not mean that it this area does not inhabit any foraging or breeding areas for no threatened and threatened bird species. Threatened bird species such as the Lanner Falcon (*Falco biarmicus*) would still use this area as suitable foraging and breeding habitat (Palons). Species such as European Roller (*Coracias garrulus*) will use the area only for foraging purposes.



Table 7: Threatened and near-threatened bird species that could occur within the proposed site area based on their distribution and suitable habitat.

Species	Global Conservation Status (Bird Life SA, 2016)	Regional Conservation Status (Bird Life SA, 2016)	Recorded during SABAP 2	Recorded during site assessment	Preferred Habitat (Hockey, <i>et al.</i> , 2005)	Likelihood of occurrence
<i>Oxyura maccoa</i> (Maccoa Duck)	Vulnerable	Near Threatened	Yes	No	Prefers permanent wetlands in open grassland.	Unlikely, lack of preferred habitat. Only recorded once in 2013.
<i>Aquila verreauxii</i> (Verreaux's Eagle)	Least Concern	Vulnerable	Yes	No	Prefers mountains and rocky areas with cliffs.	Unlikely, lack of preferred habitat. Only recorded once in 2013.
<i>Leptoptilos crumeniferus</i> (Marabou Stork)	Least Concern	Near Threatened	Yes	No	Favouring open areas. Common at wetlands, dams, pans, and rivers.	Unlikely, due to lack of preferred habitat.
<i>Mycteria ibis</i> (Yellow-billed Stork)	Least Concern	Endangered	Yes	No	Shorelines of most inland freshwater bodies.	Unlikely, due to lack of preferred habitat.
<i>Falco biarmicus</i> (Lanner Falcon)	Least Concern	Vulnerable	Yes	No	Favours open grassland or woodland. Breeding sites near cliffs or pylons.	Likely, for foraging purposes and breeding site.
<i>Coracias garrulus</i> (European Roller)	Least Concern	Near Threatened	Yes	No	Open woodlands, perching on open dead branches. Do not breed in South Africa	Likely, for foraging purposes. Non breeder to South Africa.
<i>Sagittarius serpentarius</i> (Secretarybird)	Vulnerable	Vulnerable	Yes	No	Favours open grassland with scattered trees or shrubs. Nest usually placed on flat thorn trees.	Likely, for foraging purposes and potential breeding habitat. Only recorded once in 2013.
<i>Ciconia nigra</i> (Black Stork)	Least Concern	Vulnerable	Yes	No	Associated with mountains regions, but not restricted to them.	Unlikely, only foraging purposes. Only recorded once in 2013. No, breeding habitat.
<i>Gyps caprotheres</i> (Cape Vulture)	Endangered	Endangered	Yes	No	Linked to cliff breeding areas.	Unlikely, might be for foraging purposes. No, breeding habitat. Only recorded once in 2013.
<i>Torgos trachellatus</i> (Lappet-faced Vulture)	Endangered	Endangered	Yes	Yes	Favours semi-arid open woodlands. Nest placed on crown of isolated flattopped tree.	Likely, to be seen as a flyby. Unlikely, lack of breeding habitat.



<i>Gyps africanus</i> (White-backed Vulture)	Critical Endangered	Critical Endangered	Yes	No	Woodland and Bushveld	Likely, to be seen as a flyby. Unlikely, lack of breeding habitat. Only recorded once in 2013.
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4 REASONED OPINION AND RECOMMENDATIONS

- The **wetland** (ephemeral drainage line) identified is in a fair condition – roads, grazing, wood harvesting and construction had some impacts on the system.
- No further detailed **mammal, herpetological and amphibian studies** are needed – no red data species present and the *Pyxicephalus edulis* will not be affected by the new proposed power line.
- The **vegetation** will not be negatively impacted, as the current vegetation along the proposed corridor is modified – mostly *Dichrostachys cinerea* in a dense stand, indicating some encroachment.
- It is recommended that the client must have **alien vegetation** management as part of the management strategy.
- With regards to the **avifauna**, the study area consists of two (2) habitat types observed during the site survey: 1) the larger area associated with the existing development (substation) and 2) the associated infrastructure (powerlines).
 - During the site survey one (1) threatened bird species was observed (*Torgos tracheliotus*).
 - Some other threatened species that were not observed during the site survey and has a high likeliness of occurring in and surrounding the study area, especially for foraging purposes are species including but are not limited to *Falco biarmicus* and *Coracias garrulus*.
 - Although the one (1) threatened species was observed during the site survey and with other threatened species with a high possibility of occurring in the area, this proposed project will not have a significant impact on the avifaunal species, as the alignment of the proposed project powerline will run parallel with existing infrastructure (powerlines).
 - It is however recommended that minimum impact to the bushveld vegetation during clearing must be affected. It is thus proposed that the clearance area be minimized to limit impacts.

5 REFERENCES

- Acocks, J.P.H. 1953. Veld types of South Africa. *Mem. Bot. Surv. S. Afr.* No. 40:1-128.
- BirdLife South Africa. 2016. BirdLife South Africa official Checklist of Birds in South Africa 2016. <http://www.birdlife.org.za/publications/checklists>
- Department of Water Affairs and Forestry. 2006. *Notice of list of protected tree species under the national forests act, 1998 (Act no. 84 of 1998); as amended.* Government Gazette no. 29062, notice 897, 8 September 2006.



Hockey, P.A.R., Dean, W.R.J. and Ryan, P.G. (eds.) 2005. *Roberts – Birds of Southern Africa, VIIth Ed.*
The Trustees of the John Voelker Bird Book Fund, Cape Town.

IUCN Red List of Threatened Species. Version 2014. <https://www.iucnredlist.org/>

Low, A.B. and Rebelo, A.G. (eds). 1996. *Vegetation of South Africa, Lesotho and Swaziland. A companion to the vegetation map of South Africa, Lesotho and Swaziland.* Dept. of Environmental Affairs and Tourism, Pretoria.

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

NEMBA. 2004. *National Environmental Management: Biodiversity Act, 2004.* Act No. 10 of 2004.

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 Ecosystem Priority Areas project.* WRC Report No. 1801/2/11. Pretoria.

Sinclair I., & Hockey P and Tarboton, W. 2011. *Sasol Birds of Southern Africa.* Struik, Cape Town.

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

South African National Biodiversity Institute. 2019. *Précis information on red data species.* Pretoria.

Southern African Bird Atlas Project 2. South Africa, Lesotho, Botswana, Namibia, Mozambique, Swaziland, Zimbabwe, Zambia. 2016. Animal Demography Unit. University of Cape Town. www.sabap2.adu.org.za. accessed in February 2021.

Van Deventer, H. et al., 2019. *National Wetland Map 5 - and improved spatial extent and representation of inland aquatic and estuarine ecosystems in South Africa.* Water SA, 46(1), pp. 66-79.





Figure 9: General view of the area where the proposed deviation will exit the Gilead Substation to the west.





Figure 10: The condition of the basal layer along the corridor to the west.



Figure 11: The view of the southern corridor following the fence of the Gilead Substation.



Figure 12: A view of the view of the corridor (southern boundary of the substation) to the link with the exiting Chloe/Gilead power line.





Figure 13: A view of the Impoundment – not affected by the new deviation power line.





Figure 14: A view of some of the bull frog tadpoles.





Figure 15: A *Pyxicephalus edulis* tadpole.

Appendix 1: Expected and observed bird species.



	Common group	Common species	Genus	Species	(n)	Latest Record	Survey Observed	Status (Regional and Global)	Threatened & Near Threatened Categories
1	Apalis	Bar-throated	Apalis	thoracica	1	2013/05/01		LC	Critical/Endangered CR
2	Babbler	Arrow-marked	Turdoides	jardineii	2	2021/02/15	Yes	LC	Endangered EN
3	Babbler	Southern Pied	Turdoides	bicolor	1	2013/12/14		LC	Vulnerable VU
4	Barbet	Acacia Pied	Tricholaema	leucomelas	1	2013/12/14		LC	Near Threatened NT
5	Barbet	Black-collared	Lybius	torquatus	1	2013/05/01		LC	Least Concerns LC
6	Barbet	Crested	Trachyphonus	vallentii	1	2015/07/01		LC	
7	Batis	Chin-spot	Batis	mollitor	1	2021/02/15	Yes	LC	
8	Bee-eater	European	Merops	apiaster	1	2013/12/14		LC	
9	Bee-eater	Little	Merops	pusillus	1	2013/05/01		LC	
10	Bee-eater	Southern Carmine	Merops	nubicoides	1	2013/12/14		LC	
11	Bishop	Southern Red	Euplectes	orix	1	2013/12/14		LC	
12	Boubou	Southern	Laniarius	ferrugineus	2	2018/11/10		LC	
13	Brubru	Brubru	Nilaus	afer	1	2013/12/14		LC	
14	Buffalo-weaver	Red-billed	Bubalornis	niger	1	2015/07/01		LC	
15	Bulbul	African Red-eyed	Pycnonotus	nigricans	1	2015/07/01		LC	
16	Bulbul	Dark-capped	Pycnonotus	tricolor	2	2021/02/15	Yes	LC	
17	Bunting	Golden-breasted	Emberiza	flaviventris	2	2021/02/15	Yes	LC	
18	Bunting	Lark-like	Emberiza	impetuanii	1	2013/05/01		LC	
19	Bush-shrike	Grey-headed	Malaconotus	blanchoti	1	2013/12/14		LC	



20	Bush-shrike	Orange-breasted	Telophorus	sulfureopectus	2	2018/11/10		LC
21	Buzzard	Steppe	Buteo	vulpinus	2	2021/02/15	Yes	LC
22	Camaroptera	Grey-backed	Camaroptera	brevicaudata	1	2015/07/01		LC

23	Canary	Black-throated	Crithagra	atrogularis	1	2013/05/01		LC
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24	Canary	Yellow	Crithagra	flaviventris	1	2013/05/01		LC
25	Canary	Yellow-fronted	Crithagra	mozambicus	1	2013/12/14		LC
26	Cisticola	Desert	Cisticola	aridulus	1	2013/12/14		LC
27	Cisticola	Rattling	Cisticola	chiniana	2	2021/02/15	Yes	LC
28	Cisticola	Zitting	Cisticola	juncidis	1	2013/12/14		LC
29	Cliff-chat	Mocking	Thamnolaea	cinnamomeiventris	1	2013/05/01		LC
30	Coot	Red-knobbed	Fulica	cristata	1	2013/12/14		LC
31	Coucal	Burchell's	Centropus	burchellii	1	2013/12/14		LC
32	Crombec	Long-billed	Sylvietta	rufescens	2	2021/02/15	Yes	LC
33	Crow	Cape	Corvus	capensis	1	2013/05/01		LC
34	Crow	Pied	Corvus	albus	1	2013/12/14		LC
35	Cuckoo	Black	Cuculus	clamosus	1	2013/12/14		LC
36	Cuckoo	Diderick	Chrysococcyx	caprius	2	2021/02/15	Yes	LC
37	Cuckoo	Jacobin	Clemator	jacobinus	2	2021/02/15	Yes	LC
38	Cuckoo	Klaas's	Chrysococcyx	klaas	1	2013/12/14	Yes	LC
39	Cuckoo	Levaillant's	Clemator	levaillantii	1	2013/12/14		LC
40	Cuckoo	Red-chested	Cuculus	solitarius	1	2014/12/18		LC
41	Cuckoo-shrike	Black	Campephaga	flava	1	2013/12/14		LC
42	Dove	Laughing	Streptopelia	senegalensis	1	2013/12/14		LC
43	Dove	Namaqua	Oena	capensis	1	2013/12/14		LC
44	Dove	Red-eyed	Streptopelia	semitorquata	1	2021/02/15	Yes	LC
45	Dove	Rock	Columba	livia	1	2013/12/14		LC
46	Drongo	Fork-tailed	Dicrurus	adsimilis	1	2013/12/14		LC



47	Duck	Maccoa	Oxyura	maccoa	1	2013/05/01		PP, VU
48	Duck	White-faced	Dendrocygna	vidua	1	2013/05/01		LC
49	Duck	Yellow-billed	Anas	undulata	1	2013/05/01		LC
50	Eagle	Verreaux's	Aquila	verreauxii	1	2013/05/01		VU, LC
51	Eagle	Wahlberg's	Aquila	wahlbergi	1	2013/12/14		LC
52	Egret	Cattle	Bubulcus	ibis	1	2015/07/01		LC
53	Eremomela	Burnt-necked	Eremomela	usticollis	2	2021/02/15	Yes	LC
54	Eremomela	Yellow-bellied	Eremomela	icteropygia	1	2013/05/01		LC
55	Falcon	Lanner	Falco	biarmicus	1	2013/12/14		VU, LC
56	Finch	Cut-throat	Amadina	fasciata	1	2015/07/01		LC
57	Finch	Red-headed	Amadina	erythrocephala	1	2013/05/01		LC
58	Finch	Scaly-feathered	Sporopipes	squamifrons	1	2021/02/15	Yes	LC
59	Firefinch	Jameson's	Lagonosticta	rhodopareia	1	2021/02/15	Yes	LC
60	Fiscal	Common (Southern)	Lanius	collaris	1	2013/05/01		LC
61	Flycatcher	Marico	Bradornis	maricensis	1	2021/02/15	Yes	LC
62	Flycatcher	Southern Black	Melanerpes	pammelaia	1	2018/11/10		LC
63	Flycatcher	Spotted	Muscicapa	striata	2	2021/02/15	Yes	LC
64	Francolin	Coqui	Pellipardix	coqui	1	2013/12/14		LC
65	Francolin	Crested	Dendroperdix	sephrena	1	2013/12/14		LC
66	Go-away-bird	Grey	Corythaeoides	concolor	1	2021/02/15	Yes	LC
67	Goose	Egyptian	Alopochen	aegyptiacus	1	2013/05/01		LC
68	Goshawk	Gabar	Mellerax	gabar	1	2013/12/14		LC
69	Grebe	Little	Tachybaptus	ruficollis	1	2013/12/14		LC

70	Greenbul	Yellow-bellied	Chlorocichla	flaviventris	1	2014/12/18		LC
71	Guineafowl	Helmeted	Numida	meleagris	1	2013/12/14		LC
72	Helmet-shrike	White-crested	Prionops	plumatus	1	2015/07/01		LC
73	Heron	Grey	Ardea	cinerea	1	2013/05/01		LC
74	Honeyguide	Lesser	Indicator	minor	1	2013/05/01		LC
75	Hoopoe	African	Upupa	africana	1	2015/07/01		LC
76	Hornbill	African Grey	Tockus	nasutus	1	2015/07/01		LC
77	Hornbill	Southern Red-billed	Tockus	rufirostris	1	2015/07/01		LC
78	Hornbill	Southern Yellowbilled	Tockus	leucomelas	1	2013/12/14		LC
79	House-martin	Common	Delichon	urbicum	1	2013/12/14		LC
80	Kestrel	Greater	Falco	rupicoloides	1	2013/05/01		LC
81	Kingfisher	Striped	Halcyon	chelicuti	1	2014/12/18		LC
82	Kingfisher	Woodland	Halcyon	senegalensis	1	2013/12/14		LC
83	Kite	Black-shouldered	Elanus	caeruleus	1	2013/05/01		LC
84	Kite	Yellow-billed	Milvus	aegyptius	1	-		LC
85	Korhaan	Red-crested	Lophotis	ruficrista	1	2013/12/14		LC
86	Lapwing	Blacksmith	Vanellus	armatus	1	2013/05/01		LC
87	Lapwing	Crowned	Vanellus	coronatus	1	2015/07/01		LC
88	Lark	Monotonous	Mirafra	passerina	1	2013/12/14		LC
89	Lark	Rufous-naped	Mirafra	africana	1	2013/12/14		LC
90	Lark	Sabota	Calendulauda	sabota	1	2013/12/14		LC



91	Lark	Short-clawed	Certhilauda	chuana	1	2013/05/01		LC
92	Masked-weaver	Southern	Ploceus	velatus	2	2021/02/15	Yes	LC
93	Mousebird	Red-faced	Urocolius	Indicus	1	2013/12/14		LC
94	Mousebird	Speckled	Colius	striatus	1	2015/07/01		LC
95	Myna	Common	Acridotheres	tristis	2	2021/02/15	Yes	LC
96	Neddicky	Neddicky	Cisticola	fulvicapilla	1	2013/12/14		LC
97	Oriole	Black-headed	Oriolus	lervatus	3	2018/11/10		LC
98	Owlet	Pearl-spotted	Glaucidium	perlatum	1	2021/02/15	Yes	LC
99	Oxpecker	Red-billed	Buphagus	erythrorhynchus	1	2013/12/14		LC

100	Palm-swift	African	Cypselurus	parvus	1	2013/05/01		LC
101	Paradiseflycatcher	African	Terpsiphone	viridis	1	2018/11/10		LC
102	Paradisewhydah	Long-tailed	Vidua	paradisaea	1	2013/12/14		LC
103	Petronia	Yellow-throated	Petronia	superciliaris	1	2013/12/14		LC
104	Pigeon	Speckled	Columba	guinea	1	2013/05/01		LC
105	Pipit	African	Anthus	cinnamomeus	1	2013/05/01		LC
106	Pipit	Striped	Anthus	lineiventris	1	2014/12/18		LC
107	Plover	Three-banded	Charadrius	tricoloris	1	2013/05/01		LC
108	Prinia	Black-chested	Prinia	flavicans	2	2021/02/15	Yes	LC
109	Prinia	Tawny-flanked	Prinia	subflava	2	2021/02/15	Yes	LC
110	Puffback	Black-backed	Dryoscopus	cubla	1	2015/07/01		LC
111	Pytilia	Green-winged	Pytilia	melba	2	2021/02/15	Yes	LC
112	Quelea	Red-billed	Quelea	quelea	1	2013/12/14		LC



113	Robin-chat	White-throated	Cossypha	humeralis	1	2021/02/15	Yes	LC
114	Roller	European	Coracias	garrulus	2	2013/12/14		NT,LC
115	Roller	Lilac-breasted	Coracias	caudatus	1	-		LC
116	Sandpiper	Wood	Tringa	glareola	1	2013/12/14		LC
117	Secretarybird	Secretarybird	Sagittarius	serpentarius	1	2013/05/01		VU,VU
118	Scimitarbill	Common	Rhinopomastus	cyanomelas	1	2015/07/01		LC
119	Scrub-robin	Kalahari	Cercotrichas	paena	1	2013/12/14		LC
120	Scrub-robin	White-browed	Cercotrichas	leucophrys	1	2013/12/14		LC
121	Shrike	Crimson-breasted	Lanius	atrocoeruleus	1	2013/12/14		LC
122	Shrike	Lesser Grey	Lanius	minor	1	2013/12/14		LC
123	Shrike	Maggie	Urolestes	melanoleucus	3	2013/12/14		LC
124	Shrike	Red-backed	Lanius	collurio	2	2021/02/15	Yes	LC

125	Shrike	Southern White-crowned	Eurocephalus	angulitimens	1	2013/05/01		LC
126	Snake-eagle	Black-chested	Circus	pectoralis	2	2018/11/10		LC
127	Snake-eagle	Brown	Circus	cinereus	1	2013/12/14		LC
128	Sparrow	Cape	Passer	melanurus	1	2021/02/15	Yes	LC
129	Sparrow	Great	Passer	motibensis	1	2013/05/01		LC
130	Sparrow	House	Passer	domesticus	1	2015/07/01		LC
131	Sparrow	Southern Grey-headed	Passer	diffusus	2	2021/02/15	Yes	LC
132	Sparrowweaver	White-browed	Ploceus	mehali	2	2013/12/14		LC
133	Spoonbill	African	Platalea	alba	1	2013/05/01		LC



134	Spurfowl	Natal	Pternistis	natalensis	1	2014/12/18		LC
135	Spurfowl	Swainson's	Pternistis	swainsonii	2	2021/02/15	Yes	LC
136	Starling	Cape Glossy	Lamprolornis	nitens	2	2021/02/15	Yes	LC
137	Starling	Red-winged	Onychognathus	morio	1	2021/02/15	Yes	LC
138	Starling	Violet-backed	Cinnyricinclus	leucogaster	1	2013/12/14		LC
139	Starling	Wattled	Crestophora	cinerea	1	2013/05/01		LC
140	Stilt	Black-winged	Himantopus	himantopus	1	2013/05/01		LC
141	Stork	Black	Ciconia	nilgra	1	2013/05/01		VU,LC
142	Stork	Marabou	Leptoptilos	crumeniferus	1	2013/12/14		NT,LC
143	Stork	Yellow-billed	Mycteria	ibis	1	2013/12/14		EN,LC
144	Sunbird	Amethyst	Chalcomitra	amethystina	1	2018/11/10		LC
145	Sunbird	Marico	Cinnyris	marquensis	2	2021/02/15	Yes	LC
146	Sunbird	White-bellied	Cinnyris	talatala	3	2021/02/15	Yes	LC
147	Swallow	Barn	Hirundo	rustica	1	2013/12/14		LC
148	Swallow	Greater Striped	Hirundo	cucullata	2	2021/02/15	Yes	LC
149	Swallow	Lesser Striped	Hirundo	abyssinica	1	2013/12/14		LC
150	Swallow	Red-breasted	Hirundo	semitrufa	1	2013/12/14		LC
151	Swift	African Black	Apus	barbatus	1	2013/12/14		LC
152	Swift	Alpine	Tachymarptis	melba	1	-		LC
153	Swift	Little	Apus	affinis	1	2021/02/15	Yes	LC
154	Swift	White-rumped	Apus	caffer	1	2014/12/18		LC
155	Tchagra	Black-crowned	Tchagra	senegalus	1	2013/12/14		LC
156	Tchagra	Brown-crowned	Tchagra	australis	1	2013/12/14		LC



157	Teal	Red-billed	Anas	erythrorhyncha	1	2013/05/01		LC
158	Tern	Whiskered	Chlidonias	hybrida	1	2013/05/01		LC
159	Thrush	Groundscraper	Psophodichia	litsipsirups	1	2015/07/01		LC
160	Thrush	Kurrichane	Turdus	libonyanus	1	2013/12/14		LC
161	Tinkerbird	Yellow-fronted	Pogonolus	chrysoconus	1	2013/05/01		LC
162	Tit	Ashy	Parus	clerascens	1	2013/12/14		LC
163	Tit	Southern Black	Parus	niger	1	2015/07/01		LC
164	Tit-babbler	Chestnut-vented	Parusoma	subcaeruleum	2	2021/02/15	Yes	LC
165	Tit-flycatcher	Grey	Myioperus	plumbeus	1	2014/12/18		LC
166	Turtle-dove	Cape	Streptopelia	capicola	1	2015/07/01		LC
167	Vulture	Cape	Gyps	coprotheres	1	2013/05/01		EN/EN
168	Vulture	Lappet-faced	Torgos	tracheliotus	1	2021/02/15	Yes	EN/EN
169	Vulture	White-backed	Gyps	africanus	1	2013/05/01		EN/EN
170	Wagtail	Cape	Motacilla	capensis	1	2013/05/01		LC
171	Warbler	Icterine	Hippolais	icterina	1	2014/12/18		LC
172	Warbler	Olive-tree	Hippolais	olivetorum	1	2013/12/14		LC
173	Warbler	Willow	Phylloscopus	trochilus	1	2013/12/14		LC
174	Waxbill	Black-faced	Estrilda	erythronotos	1	2021/02/15	Yes	LC
175	Waxbill	Blue	Uraeginthus	angolensis	2	2021/02/15	Yes	LC
176	Waxbill	Violet-eared	Granatina	granatina	1	2013/05/01		LC
177	Weaver	Spectacled	Ploceus	ocularis	2	2021/02/15	Yes	LC
178	Whitethroat	Common	Sylvia	communis	1	2021/02/15	Yes	LC
179	Whydah	Shaft-tailed	Vidua	regia	1	2013/05/01		LC



180	Widowbird	White-winged	Euplectes	albonotatus	1	2013/12/14		12
181	Wood-dove	Emerald-spotted	Turtur	chalcospilos	1	2013/12/14		12
182	Wood-hoopoe	Green	Phoeniculus	purpureus	1	2013/12/14		12
183	Woodpecker	Cardinal	Dendropicos	fuscescens	1	2021/02/15	Yes	12
184	Wren-warbler	Barred	Celemonastes	fasciolatus	1	2013/12/14		12

