APPENDIX D: SPECIALIST REPORTS

ANNEXURE A:Terrestrial Ecology Report

DETAILS OF SPECIALIST AND DECLARATION OF INTEREST

	(For official use only)
File Reference Number:	
NEAS Reference Number:	
Date Received:	

Application for integrated environmental authorisation and waste management licence in terms of the-

(1) National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended and the Environmental Impact Assessment Regulations, 2010; and

(2) National Environmental Management Act: Waste Act, 1998 (Act No. 59 of 2008) and Government Notice 718, 2009

PROJECT TITLE

Proposed construction of a family homestead (Lathleka) and the upgrade of an existing river crossing, on the Remaining Extent 2 of the Farm Schoongezight 66 KU

Specialist:	Duncan McKenzie		
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4.2 The specialist appointed in terms of the Regulations_

I, **Duncan McKenzie** , declare that --

General declaration:

- I act as the independent specialist in this application;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, Regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- all the particulars furnished by me in this form are true and correct; and
- I realise that a false declaration is an offence in terms of regulation 71 and is punishable in terms of section 24F of the Act.

Signature of the specialist:

ECOREX Consulting Ecologists

Name of company (if applicable):

18/10/2021

Date:

Terrestrial Ecology Study

Schoongezicht, Mopani District, Limpopo

JUNE 2021

Prepared for: Steven Henwood
Henwood Environmental Solutions
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Prepared by: ECOREX Consulting Ecologists CC
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Reviewer: Warren McCleland (ECOREX, SACNASP Reg. No. 003973)

ECOREX

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Abbreviations

APNR	Associated Private Nature Reserves
BODATSA	Botanical Database of Southern Africa
DEA	Department of Environmental Affairs
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
EST	Environmental Screening Tool
GKNP	Greater Kruger National Park
IAP	Interested and Affected Party
IBA	Important Bird Area & Biodiversity Area
IUCN	International Union for Conservation of Nature
LEMA	Limpopo Environmental Management Act (No. 7 of 2003)
LPBCA	Limpopo Province Biodiversity Conservation Assessment
mamsl	Metres Above Mean Sea Level
NEMBA ToPS	National Environmental Management: Biodiversity Act Threatened or Protected Species Lists (No. 10 of 2004)
NFA	National Forest Act (No. 30 of 1998)
PRECIS	National Herbarium Pretoria (PRE) Computerised Information System
QDGS	Quarter Degree Grid Square, for example 2530 BD
SABAP2	Southern African Bird Atlas Project 2
SANBI	South African National Biodiversity Institute
SCC	Species of Conservation Concern

Terminology

Alien	Introduced from elsewhere: neither endemic nor indigenous.
Biodiversity	The structural, functional and compositional attributes of an area, ranging from genes to landscapes.
Disturbed	An ecosystem that is in a sub-climax ecological state, usually through impacts such as low levels of invasion by alien or indigenous pioneer plants, moderate overgrazing, poor burning regimes, etc. These systems still contain a large proportion of indigenous flora.
Degraded	An ecosystem that is in a poor ecological state, usually through impacts such as invasion by alien plants, severe overgrazing, poor burning regimes, etc. These systems contain a low proportion of indigenous flora.

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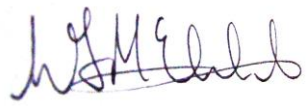
Geophyte	Plants that produce their growth points from organs stored below the ground, an adaption to survive frost, drought and / or fire.
Palaearctic	Ecozone consisting of North Africa, Europe and Asia north of the Himalayan foothills.
Transformed	Transformed ecosystems are no longer natural and contain little or no indigenous flora. Examples include agricultural lands, plantations, urban areas, etc.

Declaration of Independence

We declare that we have been appointed as independent consulting ecologists with no affiliation with or vested financial interests in the proponent, other than for work performed under the 2014 Environmental Impact Assessment Regulations (as amended in 2017). We have no conflicting interests in the undertaking of this activity and have no interests in secondary developments resulting from the authorisation of this project. Remuneration for our services by the proponent is not linked to approval by any decision-making authority responsible for authorising this development.



W.L. McCleland *14 June 2021*

D.R. McKenzie *14 June 2021*

Acknowledgements

Hannes Snyman is thanked for his logistical support during fieldwork.

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1. INTRODUCTION

The owners of Portion 23 of the farm Schoongezicht 66 KU, situated approximately 25 km east of Hoedspruit in the Maruleng Local Municipality, Mopani District, Limpopo Province, wish to construst five homesteads around existing infrastructure on the property. ECOREX Consulting Ecologists CC was appointed by Steven Henwood of Henwood Environmental Solutions (HES) to perform a terrestrial ecology survey (flora, mammals, avifauna and herpetofauna) of the receiving environment. This study will provide a basis for the assessment of the potential impacts of the development on the terrestrial ecology of the study area as well as providing a baseline of surrounding untransformed vegetation. The key deliverables for this study were a report on terrestrial ecosystems survey and an integrated ecological importance assessment.

The study team was as follows:

Duncan McKenzie (Terrestrial Ecologist). Duncan has been involved in biodiversity assessments for ECOREX for 13 years and countries of work experience include Lesotho, Swaziland, Mali, Mozambique, Sierra Leone, Morocco, Guinea, South Africa, Tanzania and Democratic Republic of the Congo. Duncan has previously worked as a Regional Coordinator for the Mondi Wetlands Project and has lectured on many aspects of conservation in Mbombela and the Kruger National Park. He is currently the Mpumalanga Regional Co-ordinator for the South African Bird Atlas Project, formerly served on the KZN Bird Rarities Committee, is co-author of The Birds of Mbombela and is lead author on the Wildflowers of the Kruger National Park and the Roberts Birds of the Kruger National Park projects. A more detailed CV is presented in Appendix 4.

Linda McKenzie (GIS Specialist). Linda is a GIS Specialist/GIS Analyst with over 15 years' experience in the industry. For the last five years she has operated her own GIS Consultancy called Digital Earth. She has extensive experience in both the private and public sector, as has worked on a wide variety of projects and GIS applications. These include, most recently, vegetation and sensitivity mapping, landcover data capture, municipal roads master planning, hydroelectric scheme and wind farm feasibility mapping and town planning, land surveyor and engineering support services. Linda formerly served as Vice Chairperson and Treasurer for GISSA Mpumalanga and is a registered Professional GISc Practitioner (PGP0170).

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2. OBJECTIVES

The objectives of the Ecological Survey are to:

- Provide a baseline ecological description of the terrestrial ecosystems that are likely to be impacted by the proposed developments;
- Provide an assessment of the ecological importance of potentially affected ecosystems; this would incorporate an assessment of the conservation importance and functional importance of the ecosystems;
- Provide an overview of key potential impacts of the project on terrestrial ecosystems;
- Make recommendations regarding infrastructure layout, where appropriate.

The primary deliverable will be a report on Terrestrial Ecosystems, including:

- Biodiversity Baseline Description;
- Ecological Importance Assessment;
- Broad-scale Vegetation Map;
- Ecological Importance Map;
- Overview of the key potential impacts on the environment;
- Recommendations regarding infrastructure layout, where relevant.

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3. STUDY AREA

The study area is situated on the Remainder of Portion 2 of the farm Schoongezicht 66 KU, situated approximately 25 km east of the town of Hoedspruit, Mopani District, Limpopo Province (Figure 1). The Klaserie and Timbavati Private Game Reserves, which form part of the Associated Private Nature Reserves (APNR), border the study area, although it is not open to them i.e it is still fenced off and large mammals cannot move in from the adjacent Greater Kruger National Park (GKNP). Most of the area around the site, approximately 15 ha of which was surveyed around the central proposed development area, was formerly agricultural lands that have now re-vegetated, and also includes an old homestead and associated infrastructure as well as a dam. Two episodic drainage lines, situated on either side of the homestead, enter the small dam. A second dam is situated *c.* 500 m upstream of the proposed development area. And a far smaller dam just below.

The study area is situated within the quarter-degree grid 2431 AC at an altitude of approximately 450 metres above mean sea level (mamsl). The Klaserie River is situated *c.* 800 m to the west of the study area. The topography of the general area is flat to gently undulating with shallowly incised drainage lines. Most of the study area contains secondary vegetation in various stages of succession.

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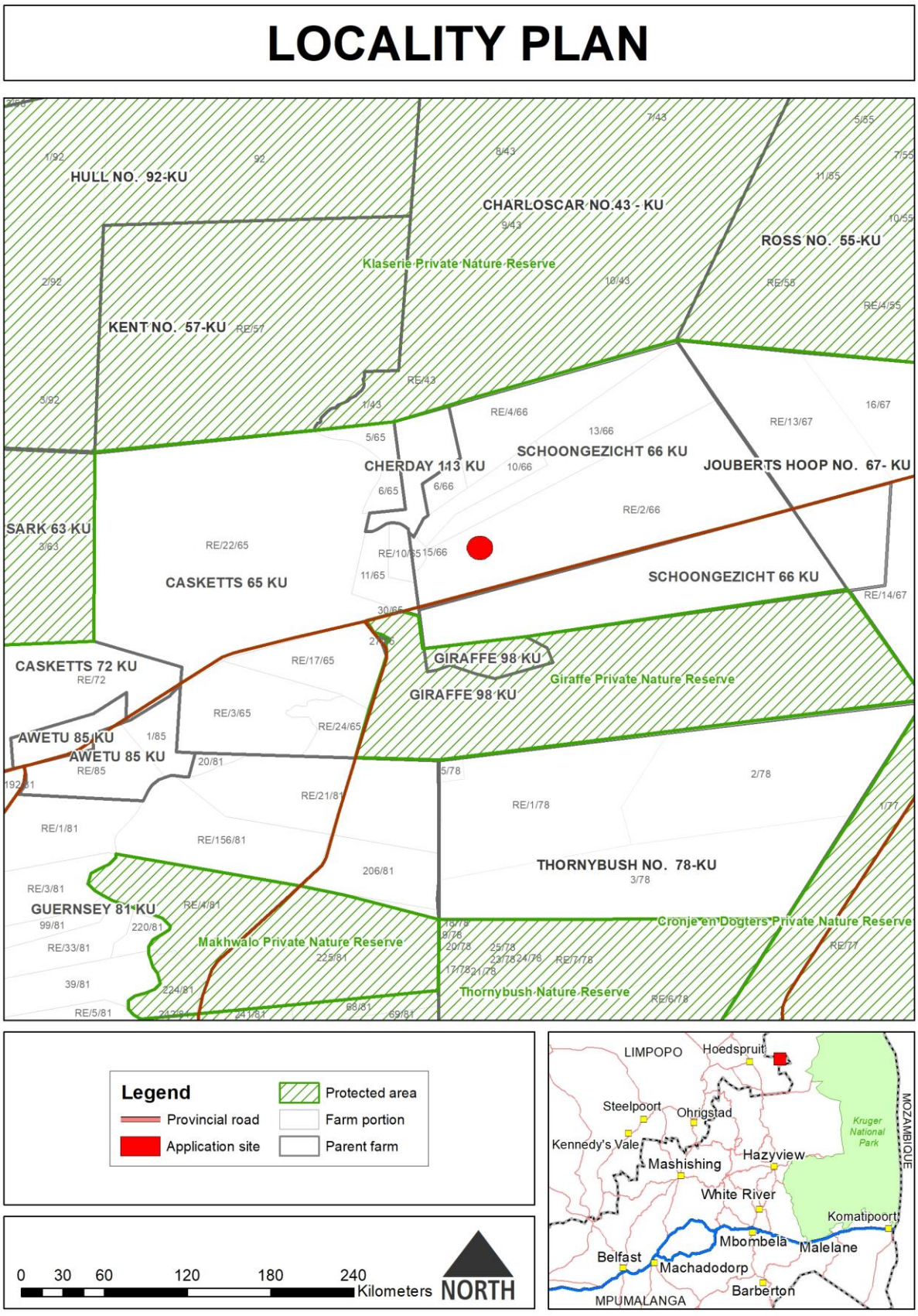

Figure 1. Location of Study Area

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4. SCOPE AND PURPOSE

The scope and purpose of this report is to provide a baseline description of the terrestrial ecology in the receiving environment (flora, mammals, avifauna, herpetofauna), an assessment of the current ecological state and an assessment of the significance of the potential impacts on the ecology associated with the project.

5. APPROACH AND METHODOLOGY

5.1 Environmental Screening Tool

An initial screening of the study area was undertaken using the Environmental Screening Tool (EST) of the Department of Environmental Affairs (DEA). This indicated that the study area had **Medium** Plant and Animal Themes and **Very High** Terrestrial Biodiversity Theme. More detail in this regard is provided in section 5.3.1 of this report. Some of the modelled or confirmed species have been identified as sensitive species by the South African National Biodiversity Institute (SANBI) and have been assigned a unique number in the screening report produced by the EST. These names have been withheld as the species may be prone to illegal harvesting and must be protected.

5.2 Desktop Assessment

5.2.1 Flora

The Botanical Database of Southern Africa (BODATSA)[1], which is curated by the South African National Biodiversity Institute (SANBI), was queried for a list of plant species that have been recorded from a 20 km radius of the study area. BODATSA contains records from the National Herbarium in Pretoria (PRE), the Compton Herbarium in Cape Town (NBG & SAM) and the KwaZulu-Natal Herbarium in Durban (NH). This list was used to produce a list of the most likely Species of Conservation Concern (SCC)[2], which were searched for during fieldwork. Records from the iNaturalist website (https://www.inaturalist.org) were also investigated for any additional flora species recorded in the 20 km buffer around the project area.

[1] http://newposa.sanbi.org/
[2] Raimondo *et al.* (2009), includes those with a status of Critically Rare, Rare, Near Threatened and Data Deficient as well as threatened species (Vulnerable, Endangered and Critically Endangered)

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5.2.2 Fauna

Lists of mammal, bird, reptile and frog SCC potentially occurring within the study area were prepared using data from Child *et al*. (2016), the Virtual Museum (http://vmus.adu.org.za/) and Southern African Bird Atlas Project 2 (http://sabap2.birdmap.africa/) projects of the Fitzpatrick Institute of African Ornithology, Taylor *et al.* (2016), Minter *et al*. (2004), Bates *et al*. (2014), Tolley *et al*. (2019) and the IUCN Red List of Threatened Species (https://www.iucnredlist.org/).

The above data were captured mostly at a quarter-degree spatial resolution but were refined by excluding species unlikely to occur within the study area due to unsuitable habitat characteristics (e.g., altitude and land-use). Bat species thought to only forage over the study area (i.e., mostly cave-roosting species) were not included in the assessment due to the lack of suitable caves within the study area. Potential occurrence of fauna in the study area was predicted based on the specialist's knowledge of habitat requirements of local fauna species.

5.3 Fieldwork

Fieldwork was conducted on a single day on the 11th of May 2021. The approximate location of the proposed development was supplied by HES, and pre-loaded onto a Samsung S10 smartphone using LocusMap Pro™ software. This area was sampled on foot using meandering transects. All plant species located within each vegetation community were recorded, with cover abundance assessed according to four categories, namely dominant, frequent, uncommon or rare. Specific attention in each locality was given to habitats that potentially host SCC[1]. These include species listed under SANBI's Red List of South African Plants, as well as the website of the International Union for the Conservation of Nature (IUCN). Within the context of this study, SCC also include range-restricted and endemic species as well as those protected under the following legislation:

- Limpopo Environmental Management Act (No. 7 of 2003) (LEMA)
- National Forests Act (No. 30 of 1998) (NFA)
- National Environmental Management: Biodiversity Act (No. 10 of 2004) Threatened and Protected Species Lists (GG Notice 256, 2015) (NEMBA ToPS)

[1] The same approach as Raimondo *et al*. (2009) has been followed here regarding species of conservation concern (i.e., those with a status of Declining, Near Threatened and Data Deficient) and threatened species (Vulnerable, Endangered and Critically Endangered)

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Birds were identified audially and visually using Nikon 10x42 binoculars. Observations were made incidentally during the time that the vegetation survey was conducted and limited to birds seen and heard within the application sites and immediate surrounds. Mammals, reptiles and frogs were recorded incidentally as they were encountered during the survey through direct evidence (sightings) and indirect evidence (spoor, dung).

In addition, the protected status of fauna species was provided by the following the LEMA and NEMBA ToPs.

5.4 Method for the determination of Site Ecological Importance (SEI)

A standardised method for assessing site-specific ecological importance in relation to a proposed project (including the project footprint and project activities), providing guidelines for biodiversity specialists in ESIAs, has been followed in this report (SANBI, 2020). This assessment does not replace the output of the National Web-based Environmental Screening Tool but is complementary to it, providing a more site-specific assessment that is linked to the proposed project footprint / activities.

SEI is one of the most important outcomes of a specialist ecological study and provides a basis for assessing the significance of impacts that a project may have on the receiving environment. SEI is a function of the Biodiversity Importance (BI) of the receptor (e.g. the species of conservation concern, vegetation/fauna community or habitat type) and its resilience to impacts (Receptor Resilience) as follows:

$$SEI = BI + RR$$

BI in turn is a function of Conservation Importance (CI) and the Functional Integrity (FI) of the receptor as follows:

$$BI = CI + FI$$

Conservation Importance is defined as “the importance of a site for supporting biodiversity features of conservation concern present e.g., populations of IUCN Threatened and Near-Threatened species (CR, EN, VU & NT), Rare, Range-restricted species, globally significant populations of congregatory species, and areas of threatened ecosystem types, through predominantly natural processes” (SANBI, 2020). The fulfilling criteria for CI are presented in Table 1.

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Table 1. Criteria for Determining Conservation Importance of a Receptor

Conservation Importance	Fulfilling Criteria
Very High	Confirmed or highly likely occurrence of CR, EN, VU or Extremely Rare or Critically Rare species Any area of natural habitat of a CR ecosystem type or large area (> 0.1 % of the total ecosystem type extent) of natural habitat of EN ecosystem type Globally significant populations of congregatory species (>10% of global population)
High	Confirmed or highly likely occurrence of CR, EN, VU species that have a global Extent of Occurrence of > 10 km^2. IUCN threatened species (CR, EN, VU) must be listed under any criterion other than A. If listed as threatened only under Criterion A, include if there are less than 10 locations or < 10 000 mature individuals remaining. Small area (>0.01% but < 0.1 % of the total ecosystem type extent) of natural habitat of EN ecosystem type or large area (> 0.1 %) of natural habitat of VU ecosystem type Presence of Rare species Globally significant populations of congregatory species (>1% but <10% of global population)
Medium	Confirmed or highly likely occurrence of populations of NT species, threatened species (CR, EN, VU) listed under A criterion only and which have more than 10 locations or more than 10 000 mature individuals. Any area of natural habitat of threatened ecosystem type with status of VU Presence of range-restricted species > 50 % natural habitat with potential to support SCC
Low	No confirmed or highly likely populations of Species of Conservation Concern No confirmed or highly likely populations of range-restricted species < 50 % of natural habitat with limited potential to support SCC
Very Low	No confirmed and highly unlikely populations of SCC No confirmed and highly unlikely populations of range-restricted species No natural habitat remaining

Functional Integrity (FI) of the receptor (e.g., the vegetation/fauna community or habitat type) is defined here as "a measure of the ecological condition of the impact receptor as determined by its remaining intact and functional area, its connectivity to other natural areas and the degree of current persistent ecological impacts". Fulfilling criteria for determining FI are given in Table 2.

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Table 2. Criteria for Determining Functional Integrity of a Receptor

Functional Integrity	Fulfilling Criteria
Very High	Very large (>100 ha) intact area for any conservation status of regional vegetation type or >5 ha for CR regional vegetation types High habitat connectivity serving as functional ecological corridors, limited road network between intact habitat patches No or minimal current ecological impacts with no signs of major past disturbance (e.g., ploughing)
High	Large (>20 ha but <100 ha) intact area for any conservation status of regional vegetation type or >10 ha for EN regional vegetation types Good habitat connectivity with potentially functional ecological corridors and a regularly used road network between intact habitat patches Only minor current ecological impacts (e.g., few livestock utilising area) with no signs of major past disturbance (e.g., ploughing) and good rehabilitation potential
Medium	Medium (>5 ha but <20 ha) semi-intact area for any conservation status of regional vegetation type or > 20 ha for VU regional vegetation types Only narrow corridors of good habitat connectivity or larger areas of poor habitat connectivity and a busy used road network between intact habitat patches Mostly minor current ecological impacts with some major impacts (e.g., established population of alien and invasive flora) and a few signs of minor past disturbance; moderate rehabilitation potential
Low	Small (>1 ha but <5 ha) area Almost no habitat connectivity but migrations still possible across some transformed or degraded natural habitat; a very busy used road network surrounds the area. Low rehabilitation potential Several minor and major current ecological impacts
Very Low	Very small (<1 ha) area No habitat connectivity except for flying species or flora with wind-dispersed seeds. Several major current ecological impacts

BI can be derived from a simple matrix of CI and FI as indicated in Table 3.

Table 3. Biodiversity Importance Two-way Matrix

Biodiversity Importance		Conservation Importance				
		Very High	High	Medium	Low	Very Low
Functional Integrity	Very High	Very High	Very High	High	Medium	Low
	High	Very High	High	Medium	Medium	Low
	Medium	High	Medium	Medium	Low	Very Low
	Low	Medium	Medium	Low	Low	Very Low
	Very Low	Medium	Low	Very Low	Very Low	Very Low

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Receptor Resilience (RR) is defined as "*the intrinsic capacity of the receptor to resist major damage from disturbance and / or to recover to its original state with limited or no human intervention".* The fulfilling criteria for RR are presented in Table 4.

Table 4. Criteria for Determining Receptor Resilience

Receptor Resilience	Fulfilling Criteria
Very High	Habitat that can recover rapidly (~ less than 5 years) to restore > 70 % of the original species composition and functionality of the receptor functionality, or species that have a very high likelihood of remaining at a site even when a disturbance or impact is occurring, or species that have a very high likelihood of returning to a site once the disturbance or impact has been removed
High	Habitat that can recover relatively quickly (~ 5-10 years) to restore > 70 % of the original species composition and functionality of the receptor functionality, or species that have a high likelihood of remaining at a site even when a disturbance or impact is occurring, or species that have a high likelihood of returning to a site once the disturbance or impact has been removed
Medium	Will recover slowly (~more than 10 years) to restore > 70 % of the original species composition and functionality of the receptor functionality, or species that have a moderate likelihood of remaining at a site even when a disturbance or impact is occurring, or species that have a moderate likelihood of returning to a site once the disturbance or impact has been removed
Low	Habitat that is unlikely to be able to recover fully after a relatively long period: > 15 years required to restore ~less than 50 % of the original species composition and functionality of the receptor functionality, or species that have a low likelihood of remaining at a site even when a disturbance or impact is occurring, or species that have a low likelihood of returning to a site once the disturbance or impact has been removed
Very Low	Habitat that is unable to recover from major impacts, or species that are unlikely to remain at a site even when a disturbance or impact is occurring, or species that are unlikely to return to a site once the disturbance or impact has been removed

Once BI and RR have been calculated using the above two matrices, SEI can be determined using the matrix in Table 5.

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Table 5. Site Ecological Importance Two-way Matrix

SEI		Biodiversity Importance				
		Very High	High	Medium	Low	Very Low
Receptor Resilience	Very Low	Very High	Very High	High	Medium	Low
	Low	Very High	High	Medium	Low	Low
	Medium	High	Medium	Medium	Low	Very Low
	High	Medium	Low	Low	Low	Very Low
	Very High	Low	Low	Very Low	Very Low	Very Low

Guidelines for how to interpret SEI of a project in terms of impact mitigation are given in Table 6.

Table 6. Guidelines for interpreting Site Ecological Importance of Receptors in terms of project impacts

Site Ecological Importance	Interpretation in relation to proposed development activities
Very High	Avoidance mitigation - No destructive development activities should be considered. Offset mitigation not acceptable/not possible (i.e., last remaining populations of species, last remaining good condition patches of ecosystems/unique species assemblages. Destructive impacts for species/ecosystems where <persistence target remains.
High	Avoidance mitigation wherever possible. Minimization mitigation – Changes to project infrastructure design to limit the amount of habitat impacted; limited development activities of low impact acceptable. Offset mitigation may be required for high impact activities.
Medium	Minimization & restoration mitigation - Development activities of medium impact acceptable followed by appropriate restoration activities
Low	Minimization & restoration mitigation - Development activities of medium to high impact acceptable followed by appropriate restoration activities
Very Low	Minimization mitigation - Development activities of medium to high impact acceptable and restoration activities may not be required

The SEI values for each vegetation community / proposed development site are indicated spatially in Figure 8.

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5.5 Assumptions, Limitations and Knowledge Gaps

5.5.1 Seasonality

The assessment was based on a single field visit over a single day at the end of the growing season. It is possible that plants which flower at other times of the year were underrepresented, although this is not seen as a limitation that could affect the Record of Decision as the specialist has extensive experience of local flora in the area and has assessed habitat suitability for potentially occurring threatened plant species.

5.5.2 Overlooked Species

Certain plant species, particularly geophytes, will only flower in seasons when conditions are optimal and may thus remain undetected, even over a survey that encompasses several seasons. Other plant species may be overlooked because of very small size and / or extreme rarity. A sampling strategy will always represent merely a subset of the true diversity of the study area. However, the level of sampling effort for this study was appropriate for the objectives of the study.

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6. BIODIVERSITY BASELINE DESCRIPTION

6.1 Flora

6.1.1 Regional Context

6.1.1.1 National Vegetation Types

According to the current National Vegetation Map (SANBI, 2018), the vegetation type present within the study area is Granite Lowveld. This occurs in a narrow strip from Phongola in northern KwaZulu-Natal in the south, through central Swaziland, and to Giyani in Limpopo Province in the north. Granite Lowveld originally covered about 19 838 km^2, of which 21% has been transformed, mostly through agriculture and urbanisation. Mucina & Rutherford (2006) assessed this community to be Vulnerable (VU), but it is not situated within any Threatened Ecosystems as listed in Government Gazette No. 34809 of 9 December 2011 (DEAT, 2011).

Typical Granite Lowveld is dominated by tall trees such as *Senegalia nigrescens* and *Sclerocarya birrea*, as well as a variety of smaller trees and shrubs such as *Combretum zeyheri* and *C. apiculatum*, *Terminalia sericea, Euclea divinorum* and *Peltophorum africanum*. Common herbaceous plants include *Waltheria indica, Aspilia mossambicensis, Commelina* species and *Kohautia virgata*. Dominant grasses are *Digitaria eriantha, Panicum maximum* and *Pogonarthria squarrosa* (Mucina & Rutherford, 2006).

6.1.1.2 Centres of Plant Endemism

The study area is not situated in any of southern Africa's floristic centres of endemism, which are areas that have an unusually high number of plants unique to that area (Van Wyk & Smith, 2001).

6.1.1.3 Threatened Ecosystems

The study area is not situated within any Threatened Ecosystems as listed in Government Gazette No. 34809 of 9 December 2011 (DEAT, 2011).

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6.1.2 Local Context – Plant Species Richness and Vegetation Assemblages

SANBI's Botanical Database of Southern Africa (BODATSA) lists 747 plant species from 110 families for a 20 km radius of the project area. This can be considered a fair representation of the botanical diversity of the area. Due to the predominantly seconday vegetation present within the study area, a relatively low total of 84 plants species from 30 families were recorded during May 2021 fieldwork, representing 11% of the BODATSA total. The true plant species diversity of the study area is likely to be slightly higher, with summer fieldwork potentially adding several herbaceous species. The full list of plant species confirmed to occur in the study area during fieldwork is provided in Appendix 1. The dominant plant families in the flora are Fabaceae (16 spp), Poaceae (13 spp) and Malvaceae (9 spp).

Three secondary vegetation communities were identified within the study area on the basis of distinctive vegetation structure (grassland, woodland, thicket, etc.), floristic composition (dominant and diagnostic species) and position in the landscape (mid-slopes, terrace, crest, etc.), in addition to transformed areas (Figure 4). The extensive garden around the old homestead was not sampled intensely as it contains many plant species not native to the area These communities are floristically described below. Representative photographs of the vegetation communities are displayed in Figure 2. Alien plant species are indicated in the text below by an asterisk.

6.1.2.1 Vachellia tortilis - Senegalia erubescens Secondary Woodland

This vegetation community occurs over the northern portion of the study area (Figure 4), on historical agricultural lands. Vegetation structure is mostly Low Closed Woodland (sensu Edwards, 1983) (Figure 2). This vegetation community covers approximately 8 ha, or 53% of the area surveyed.

A low diversity of savanna-adapted trees, including pioneer species, dominate the low canopy and include *Vachellia tortilis, V. nilotica, Senegalia erubescens, Dichrostachys cinerea* subsp*. africana, Combretum apiculatum, Peltophorum africanum* and *Ziziphus mucronata*. The ground layer is dominated by grasses such as *Panicum maximum, Aristida adscensionis, Brachiaria serrata* and *Eragrostis lehmanniana*, as well as the dwarf shrubs and herbs *Gossypium herbaceum, Abutilon austro-africanum, Justicia flava, Waltheria indica* and * *Achyranthes aspera*.

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A total of 47 species (56% of the entire list) was recorded from *Vachellia tortilis - Senegalia erubescens* Secondary Woodland (Appendix 1), the highest species list of the three communities present. Species fidelity, which is closely linked to community uniqueness, is very high with 29 species (62% of the community list) occurring nowhere else in the study area.

6.1.2.2 Dichrostachys cinerea - Aristida adscensionis Secondary Shrubland

Secondary shrubland, which represents recovering old lands, is situated in the southern portion of the study area (Figure 4). It is characterised by a sparse canopy layer and dense ground layer dominated by pioneer species. Vegetation structure is mostly Low to Short Closed Shrubland (*sensu* Edwards, 1983) (Figure 2). Secondary Shrubland covers approximately 4 ha, or 27% of the area surveyed.

The trees *Dichrostachys cinerea* subsp*. africana* and *Vachellia tortilis* dominate in shrub growth form, along with the dwarf shrubs *Gossypium herbaceum, Sida dregei, Solanum campylacanthum* and *Waltheria indica*. Grasses are well represented, and include *Aristida adscensionis, A. congesta* subsp*. barbicollis, Brachiaria serrata, Eragrostis lehmanniana, Panicum maximum* and *Urochloa mosambicensis*. Herbs located include *Amaranthus thunbergii, Ocimum americanum, * Alternanthera pungens* and *Dicoma tomentosa*.

A total of 35 species (42% of the entire list) was recorded from Secondary Shrubland (Appendix 1), the second highest species list of the three vegetation communities present. Species fidelity, which is closely linked to community uniqueness, is high, with 16 species (46% of the community list) occurring nowhere else in the study area.

6.1.2.3 Eriochloa meyeriana - Schoenoplectus corymbosus Secondary Wetland

This vegetation community occurs around the dam in the central portion of the study area (Figure 4). Vegetation structure is Low to Short Sparse Grassland (Edwards, 1983) (Figure 2). This vegetation community covers approximately 0.3 ha or 2% of the total area surveyed.

The dominant plants found in this community are the grass *Eriochloa meyeriana*, the sedge *Schoenoplectus corymbosus* and the herb *Sphaeranthus peduncularis*. Additional species found in the sparesly vgetated shoreline of the dam and adjacent drainage lines are the dwarf shrub *Aeschynomene indica*, the sedges *Cyperus denudatus* and *Cyperus sexangularis* and the herbs *Heliotropium ovalifolium* and *Ludwigia adscendens*.

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A total of 23 species (27% of the entire list) was recorded from Secondary Wetland (Appendix 1), the lowest species list of the three vegetation communities present. Species fidelity is very high, with 20 species (87% of the community list) occurring nowhere else in the study area.

Transformed areas, including the area around the small dam and homestead, measures approximately 2.7 ha, or just under 20% of the area surveyed.

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Figure 2. Photographs of Vegetation Communities present within the Study Area

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6.1.3 Plant Species of Conservation Concern

A total of 84 plant species in 30 families was recorded during fieldwork (Appendix 1). One of these is considered NT by Raimondo *et al*. (2009). This species is discussed below.

***Elaeodendron transvaalense* (Burtt Davy) R.H.Archer** Bushveld Saffron
This is a small to medium-sized evergreen tree occurring in northern and eastern South Africa, and further afield through Namibia, Botswana, Zimbabwe, Mozambique and Zambia. The species is heavily harvested in South Africa for traditional medicine and some sub-populations have declined as a result; as such it has been assessed as Near Threatened (NT, Williams *et al*., 2008a). A small copse of young plants was located within the Secondary Shrubland community (Figure 3).

Eight additional SCC potentially occur in the wider area, none of which are likely to occur within the study area due to unsuitable habitat present or regional rarity (Table 8).

Two plant species recorded during fieldwork are protected under the NFA, namely *Elaeodendron transvaalense* and *Adansonia digitata* (Table 7). The co-ordinates of the plant SCC and protected species located fieldwork are presenting in Table 9. These points are spatially presented in Figure 4.

6.1.4 Endemic Species

None of the plants recorded are endemic to Limpopo or any centre of plant endemism.

6.1.5 Invasive Alien Species

Nine alien plant species were recorded from the study area during fieldwork, three of which are listed as being invasive under the National Environmental Management: Biodiversity Act (Act No. 10 OF 2004, NEMBA) Alien and Invasive Species Lists, (2016) (Appendix 1). The most significant of these is * *Opuntia stricta* which occurs throughout the study area. The bare or disturbed soil resulting from clearing activities and frequent human access may encourage the establishment of additional invasive alien species.

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Table 7. Conservation-important plant species confirmed during fieldwork

Taxa	Growth Form	Red Data	Protected	Vegetation Communities		
				Secondary Woodland	Secondary Shrubland	Secondary Wetland
Family Celastraceae *Elaeodendron transvaalense* (Burtt Davy) R.H.Archer	tree	NT	NFA	r		
Family Malvaceae *Adansonia digitata* L. $	tree		NFA			
TOTAL	**2**		**2**	**1**	**0**	**0**

NFA - National Forests Act	r = rare
NT - Near Threatened	
$ - large specimen located within the garden	

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Table 8. Plant Species of Conservation Concern Potentially Occurring within the Study Area

Species	Red Data Status	Habitat Preference	Optimal Survey Time	Likelihood of Occurrence	Justification
Family Acanthaceae *Barleria oxyphylla*	EN	Lowveld savanna, often on sodic soils	Dec-May (flowering period, deciduous species)	Low	No suitable habitat present but none located during fieldwork
Family Apocynaceae Listed Sensitive Species (No. 1204)	VU	Lowveld savanna, often on sodic soils	Dec-May (flowering period, deciduous species)	Very Low	None located despite intensive searching, very rare in the area
Family Celastraceae *Elaeodendron transvaalense*	NT	Woodland	Throughout the year (even when sterile)	Confirmed	
Family Fabaceae *Dalbergia melanoxylon*	NT‡	Savanna	Throughout the year (even when sterile)	Low	Suitable habitat present but none located despite intensive searching
Family Hyacinthaceae *Bowiea volubilis* subsp. *volubilis*	VU	Scree slopes, rocky thickets	Oct-April (deciduous species)	Very low	No suitable habitat present
Drimia sanguinea	NT	Open veld and scrubby woodland in a variety of soil types.	Jul-Sep (spring-flowering, deciduous and grass-like species)	Low	Only secondary vegetation present, leading to a low likelihood of this plant
Family Lythraceae *Nesaea alata*	Rare	Edges of shallow pans in low-lying areas	Nov-Apr (flowering period)	Low	Some suitable habitat present but a rare plant with only three known localities in widely scattered populations
Family Orchidaceae *Ansellia africana*	VU‡	Riverine forest, tall woodland	Throughout the year (even when sterile)	Low	Suitable habitat present but none located despite intensive searching

NT = Near Threatened
VU = Vulnerable
CR = Critically Endangered
‡ - IUCN assessment

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Table 9. Co-ordinates and Numbers of SCC recorded during fieldwork within the Study Area

Species	Protected Status	Red Data	No. of Plants	GPS Co-ordinates	
				Lat	Long
Adansonia digitata	NFA		1	-24.339560	31.167374
Elaeodendron transvaalense	NFA	NT	3	-24.341160	31.167216

Elaeodendron transvaalense (NT)

Figure 3. Photographs of Species of Conservation Concern recorded during fieldwork

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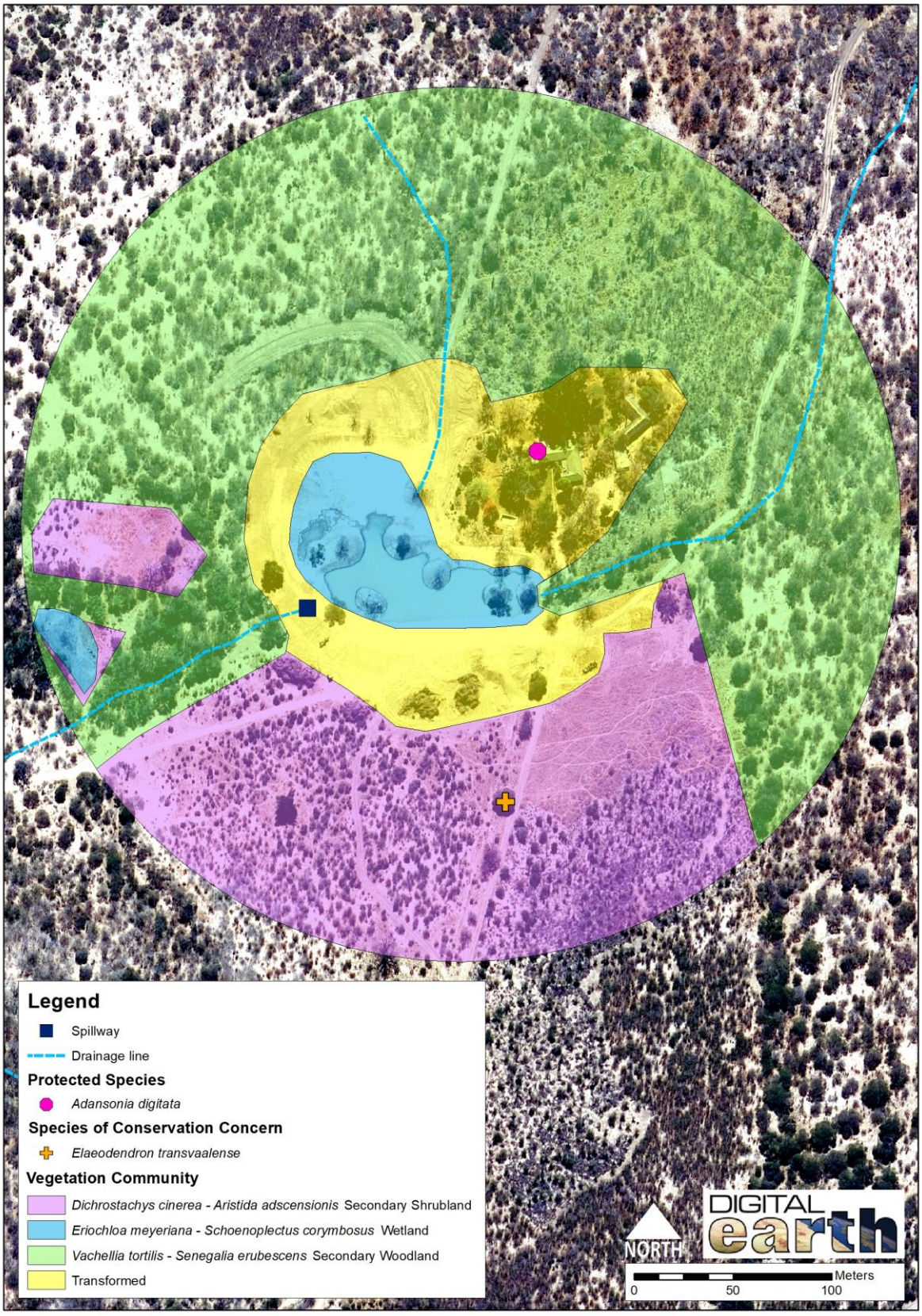

Figure 4. Vegetation Communities within the Study Area

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6.2 Terrestrial Fauna

6.2.1 Mammals

6.2.1.1 Regional Overview

The study area is situated in the savanna biome adjacent to the GKNP. The savanna biome has relatively low numbers of endemics and a relatively high number of Red Data species[4]. Although the property is managed as conservation land, mammal movement between it and the GKNP is restricted by a perimiter fence. This excludes many of the confirmed mammal SCC such as Savanna Elephant *Loxodonta africana* (Endangered EN) and Lion *Panthera leo* (VU). Therefore, mammal diversity is lower than that of the surrounding protected areas. Most of the surrounding area is formally conserved within the APNR with roads and lodges the primary types of development. Due to its proximity and perimeter fence, mammal populations are well protected and reasonably secure although limited hunting does take place[5]. A total of 61 mammals have been recorded in the QDGS 2431 AC in the Animal Demography Unit's Virtual Museum's database[6]. As all virtual museum submissions require the inclusion of at least one photograph of the mammal, the actual number of species present is likely to be significantly higher as many mammals are small, cryptic or nocturnal in habit and therefore difficult to photograph.

6.2.2.2 Confirmed Species

Six mammal species were recorded during fieldwork five of which were recorded from Closed Woodland, two from Open Shrubland and one from Wetland (Appendix 2). These included many common and widespread species such as Impala *Aepyceros melampus*, Greater Kudu *Tragelaphus strepsiceros* and Chacma Baboon *Papio ursinus*. Additional sampling, including small mammal trapping, bat sampling and camera traps, would result in additional species but would not change the findings of the report.

[4] Child *et al*., 2016
[5] Hannes Snyman *pers. comm*.
[6] http://vmus.adu.org.za/vm_sp_list.php accessed 25/05/2021

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6.2.1.3 Conservation-Important Species

An estimated 29 conservation-important mammals potentially occur within the project area (Appendix 3), which is an extremely high total, but this is due to the study area being situated adjacent to a large, formally protected conservation area (GKNP) in the savanna biome. Several cave-roosting bat species of conservation concern are likely to occur overhead, but these species are only likely to feed over the site because of the shortage of suitable roosting sites and have been excluded from this assessment.

Of the 29 potentially occurring species, 18 are considered to be SCC[7] with 12 considered threatened (Appendix 3). Of these, only one was confirmed during fieldwork and is discussed in more detail below:

Spotted Hyaena *Crocuta crocuta*

This large carnivore is dependent on conservation areas in South Africa for survival as it is frequently persecuted by stock farmers outside[8]. An estimated 7300 animals reside within the adjacent GKNP (Child *et al.,* 2016). A single animal was heard vocalising during fieldwork from Closed Woodland. This species is resident on the property[9].

Two threatened species are regarded as resident or regular on the property[10] and are discussed below.

Leopard *Panthera pardus*

Upgraded to VU in the latest Red Data assessment[11], leopards are severely threatened outside protected areas mainly due to habitat loss, direct and indirect persecution including hunting and extermination from wildlife ranchers and for traditional attire (Child *et al.*, 2016). The adjacent GKNP supports the largest population of these large cats in South Africa[12]. This species is fairly common in the adjacent APNR (*pers.obs*.) and regularly passes through the study area (Hannes Snyman *pers. comm*.).

[7] The same approach as Raimondo *et al*. (2009) has been followed here regarding species of conservation concern (i.e., those with a status of Near Threatened and Data Deficient) and threatened species (Vulnerable, Endangered and Critically Endangered)
[8] Child *et al*., 2016
[9] Hannes Snyman *pers. comm*.
[10] Hannes Snyman *pers. comm*.
[11] Child *et al.*, 2016
[12] Child *et al.*, 2016

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Giraffe *Giraffa camelopardalis*

Due to its abundance in most public and private reserves, the Giraffe is also considered as LC in South Africa[13], with an estimated 7,427–10,876 animals in the GKNP alone[14]. However, due to hunting, habitat loss and competition with domestic livestock for food, it is assessed as VU by the IUCN[15]. This species is locally common in the GKNP (*pers. obs.)* and is resident within the study area (Hannes Snyman *pers. comm*.).

The remaining potentially occurring threatened and NT species have a Low likelihood of occurrence due to general scarcity or absence in the study area. This is especially relevant as the property is fenced off from the adjacent GKNP (Appendix 3).

Twenty-five potentially occurring species are protected under either the LEMA or the NEMBA, two of which were confirmed during fieldwork (Appendix 2).

[13] Child *et al*., 2016
[14] Child *et al*., 2016
[15] Muller *et al*., 2018

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6.2.2 Birds

6.2.2.1 Regional Overview

The savanna biome supports the highest diversity of bird species within the Southern African sub-region. The GKNP supports the largest birdlist of all conservation areas in South Africa with an estimated 57% of the birds found within the entire southern African sub-region[16]. The study area is especially diverse with a total of 345 species from 411 full protocol cards[17] have been recorded from the nine pentads (mapping units) surrounding the study area during the second Southern African Bird Atlas Project (SABAP2)[18], which is currently in progress. At a finer scale, data from SABAP2 indicate that 264 bird species from 117 cards have been recorded from the pentad within which it is situated (2420_3110)[19]. A pentad covers an area of approximately 77 km^2, which is thus a better indication of which species occur in the study area. A map of these nine pentads is provided in Figure 5 below. This figure compares favourably with other well-sampled pentads in the general area and indicates a high level of avian diversity.

The study area falls within the Kruger National Park and Adjacent Areas Important Bird and Biodiversity Area (IBA), which qualifies as a Global IBA under criteria A1, A2, A3 and A4i. Eleven globally threatened species are resident within the GKNP, in addition to fourteen resident regionally threatened birds. Several migratory and vagrant threatened species also occur[20].

6.2.2.2 Local Avifaunal Assemblages

A total of 64 bird species were confirmed to occur in the study area during fieldwork and are listed in Appendix 2. Sufficient sampling was undertaken for assessing habitat suitability for potentially occurring threatened species, the primary objective of the ornithological component of this study, and to describe broad bird assemblages. Further fieldwork in summer is likely to increase the species richness of each assemblage but is unlikely to identify additional assemblages. Three assemblages were present and are dealt with below.

I. Closed Woodland Assemblage

[16] Taylor *et. al*., 2015
[17] Full protocol cards require at least two hours of coverage per card
[18] Data accessed from http://sabap2.birdmap.africa/coverage/group/459_Lhlk on 25/05/2021
[19] Data accessed from http://sabap2.birdmap.africa/coverage/pentad/2420_3110 on 25/05/2021
[20] Taylor *et al*., 2015

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This is by far the largest and most diverse bird assemblage in the general area. A number of common and conspicuous savanna species are present in this community, including Blue Waxbill *Uraeginthus angolensis,* White-browed Scrub Robin *Erythropygia leucophrys,* Grey Go-away-bird *Corythaixoides concolor*, Marico Sunbird *Cinnyris mariquensis*, Southern Yellow-billed Hornbill *Tockus leucomelas* and Arrow-marked Babbler *Turdoides jardineii*. Less common species encountered include Acacia Pied Barbet *Tricholaema leucomelas* and Stierling's Wren-Warbler *Calamonastes stierlingi*. Fifty-two species (81% of the total list) were recorded from this assemblage, by far the highest of the three assemblages (Appendix 2).

II. Open Shrubland Assemblage

Open shrubland, formerly agricultural lands, occurs in scattered pockets within the central and southern portions of the study area. It contains a modest diversity of birds favouring open, grassy habitats such as Swainson's Spurfowl *Pternistis swainsonii*, Ring-necked Dove *Streptopelia capicola*, Lilac-breasted Roller *Coracias caudatus*, Little Bee-eater *Merops pusillus*, Southern Grey-headed Sparrow *Passer diffusus* and Golden-breasted Bunting *Emberiza flaviventris*. Twenty-six species (41% of the total list) were recorded from this assemblage, the second highest of the three assemblages (Appendix 2).

III. Aquatic Assemblage

Limited aquatic habitat is present around the small dam in the central portion of the study area. Only three birds that can be considered as tied to wetland habitat were recorded from this assemblage, the remaining species merely foraging overhead. These are Blackmith Lapwing *Vanellus armatus*, Three-banded Plover *Charadrius tricollaris* and Wire-tailed Swallow *Hirundo smithii*. Eight species were recorded from or over the Aquatic Assemblage, or 13% of the entire list, the lowest of the three assemblages (Appendix 2).

6.2.2.3 Conservation-Important Species

An estimated 36 conservation-important birds potentially occur within the study area (Appendix 3). Twenty-six of these are considered threatened, one of which was confirmed to occur during fieldwork and is discussed below:

Bateleur *Terathopius ecaudatus*

The Bateleur is listed as EN in South Africa primarily due to habitat loss and is now mostly restricted to larger conservation areas, at least as a breeding species[21]. An estimated 550 –

[21] Taylor *et. al*., 2015

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650 breeding pairs are found within the GKNP[22]. A single adult bird was observed foraging over the study area and suitable nesting sites (tall trees such as *Senegalia nigrescens*) are present, although no nests were located during fieldwork. It is unlikely to nest near the proposed development site due to high human disturbance levels.

Eight additional threatened species have a moderate or high likelihood of occurring within the study area and are discussed below:

White-backed Vulture *Gyps africanus* (CR), Hooded Vulture *Necrosyrtes monachus* (CR), White-headed Vulture *Trigonoceps occipitalis* (CR), Lappet-faced Vulture *Torgos tracheliotos* (EN) and Cape Vulture *Gyps coprotheres* (EN)

These vultures are all threatened due to similar anthropogenic impacts and are discussed together. Factors such as such as habitat loss, poisoning, electrocution and collision with powerlines, drowning in concrete farm reservoirs and collection for the medicinal trade have contributed to the CR and EN assessments of all the species here[23]. All could potentially forage within the study area and suitable breeding trees are present for all but the Cape Vulture which breeds on nearby Manoutsa cliffs west of Hoedspruit. However, no nests were located and it is unlikely that any would breed close to the area around the small dam where the proposed development is to take place.

Tawny Eagle *Aquila rapax*

This large eagle is listed as EN due to continuing decline in the local population through habitat transformation, direct persecution, indirect poisoning and drowning in concrete reservoirs[24]. It is largely restricted to conservation areas in South Africa and the GKNP area supports an estimated 500 – 700 pairs (Barnes, 2000). Birds will probably regularly utilise the study area to forage in and suitable breeding habitat is present. Like most of the larger threatened bird species, it is unlikely to nest within close proximity to the study area due to high disturbance levels.

Southern Ground-Hornbill *Bucorvus leadbeateri*

This large, mostly terrestrial bird is listed as EN due to habitat loss, direct persecution, bush encroachment and collisions with windows[25]. They are mostly restricted to large conservation

[22] Barnes, 1998
[23] Taylor *et. al*., 2015
[24] Taylor *et. al*., 2015
[25] Taylor *et. al*., 2015

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areas in South Africa and their slow reproduction rate of one chick / 9.3 years per family group means they have a very slow recovery rate if bird mortalities occur[26]. Birds are resident in the adjacent APNR in low numbers and would probably occasionally forage within the study area. No suitable breeding habitat (cavities in large trees) is present.

Martial Eagle *Polemaetus bellicosus*

Africa's largest eagle is listed as EN due to many factors including habitat loss, direct persecution from small-stock farmers and indirect persecution from electrocution and reservoir drownings[27]. This species occupies very large territories (up to 150 km^2 in the Lowveld[28]) and probably regularly forages over the study area. An estimated 250 birds occur within the GKNP (Hockey *et al*., 2005), but no suitable large trees are present in the study area for breeding.

Ten NT species potentially occur in the general area around Schoongezicht 66 KU, with three of these having a moderate likelihood of occurring within the study area (Appendix 3). These species are discussed below:

Marabou Stork *Leptoptilos crumeniferus*

The largest of all Africa's storks, the Marabou favours a wide diversity of habitats and will readily scavenge around humans. It is listed as NT due to potential declines due to rubbish dump upgrades within the GKNP and disturbance at the sporadic breeding sites[29], but to date this assessment is not justified (*pers. obs*.). It is likely to occasionally forage within the study area, including at the small dam. This species does not regularly breed in South Africa but a few pairs breed in central Swaziland[30].

Greater Painted-snipe *Rostratula benghalensis*

This small, poorly known wader is a nomadic, breeding migrant to the subregion[31]. It is listed as NT due to widespread wetland destruction in South Africa[32]. It favours shallow, temporary wetland habitat and has a moderate likelihood of at least foraging around the small dam in the study area.

[26] Hockey *et al*., 2005
[27] Taylor *et. al*., 2015
[28] Hockey *et al*., 2005
[29] Taylor *et. al*., 2015
[30] Taylor *et. al*., 2015
[31] Hockey *et al*., 2005
[32] Taylor *et. al*., 2015

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European Roller *Coracias garrulous*

This Palaearctic migrant prefers open, grassy areas within savanna. It is listed as NT due to habitat loss over some of its breeding grounds, particularly in Europe[33]. Suitable foraging habitat is present in the Open Shrubland habitat and it is probably an annual non-breeding visitor.

The remaining SCC all have a low likelihood of occurring within the study area (Appendix 3). This is primarily due to a lack of suitable habitat or regional scarcity. Ten potentially occurring species are protected under the NEMBA, one of which were confirmed (Appendix 2).

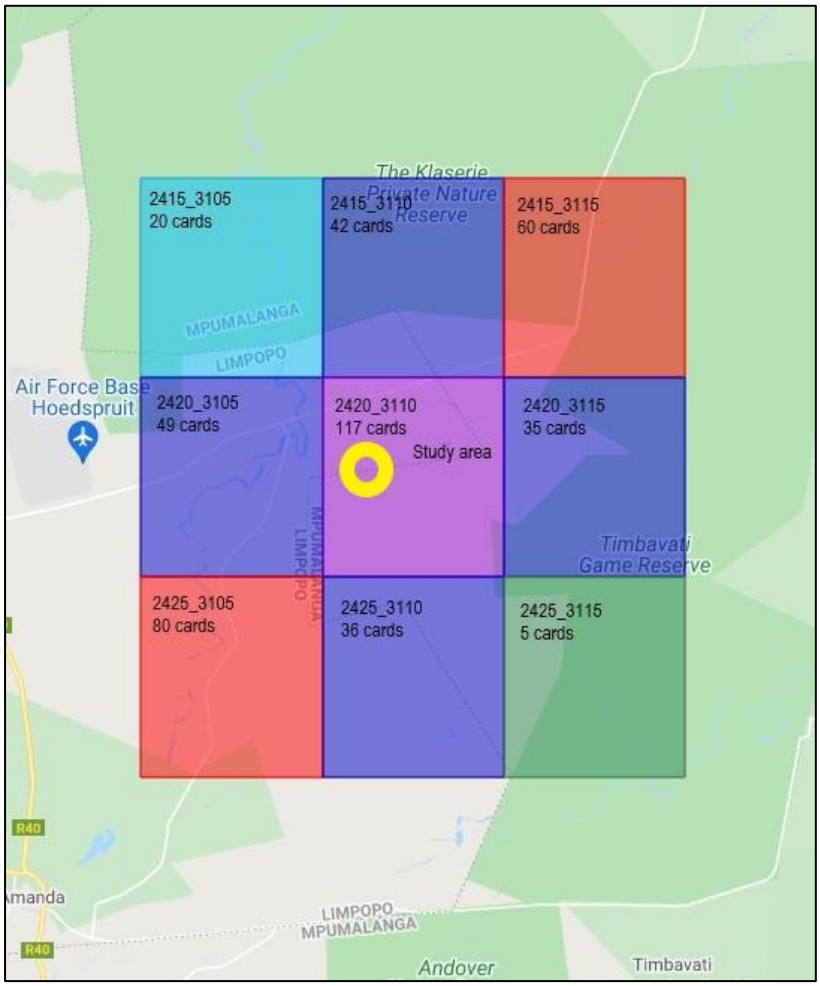

Figure 5. Codes and Card Quantities for the Pentads surrounding the Study Area

[33] Taylor *et. al*., 2015

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6.2.3 Reptiles

6.2.3.1 Regional Overview

The Lowveld of eastern Limpopo province supports a high diversity of reptile species with 102 species already recorded from the degree grid 2431[34]. Fifty-five species of reptiles have been recorded from the QDGS 2431 AC, in which the study area is situated, as listed on the Reptile Atlas of Southern Africa website (http://vmus.adu.org.za/), indicating that reptile diversity in the area is high. However, reptile endemicity is low which is to be expected as the area lies adjacent to Mozambique within the widespread savanna biome (Bates *et al.*, 2014). The two reptile groups showing the highest diversity include the lizards (20-41 species recorded) and snakes (20-44 species recorded) (Bates *et al.*, 2014).

6.2.3.2 Confirmed Species

No reptiles were recorded during fieldwork. Dedicated reptile surveys, including trapping, would no doubt have produced many additional species but are unlikely to have produced data that would change the recommendations in this report.

6.2.3.3 Conservation-Important Species

Of the potentially occurring species, only three conservation-important reptiles potentially occur (Appendix 3). Only two of these are considered a SCC, namely Listed Sensitive Species No. 2, which is also protected under NEMBA ToPS, and Natal Hinged Tortoise *Kinixyx natalensis*. Listed Sensitive Species No. 2, which is listed as VU due to degradation of aquatic environments, persecution and water pollution[35], was not recorded during fieldwork, although some habitat is present within the small dam. Small individuals may very occasionally wander up from the Klaserie River which is situated *c.* 800 m to the west of the study area. Due to high disturbance levels, these are not expected to remain long. Natal Hinged Tortoise has a Low likelihood of occurrence due to regional rarity and lack of suitable hilly habitat. Southern African Python *Python natalensis* is protected under the National Environmental Management: Biodiversity Act (No.10 of 2004) and is probably a breeding resident in the study area.

[34] http://vmus.adu.org.za/vm_sp_list.php accessed 25/05/2021
[35] Bates *et al*., 2014

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6.2.4 Frogs

6.2.4.1 Regional Overview

The Lowveld of Limpopo and adjacent Mpumalanga provinces supports one of the richest areas in South Africa for frog diversity (Minter *et al*. 2004). Twenty-seven species of frogs have been recorded in the QDGS 2431 AC, and 41 in the degree grid 2431, as listed on the Frogs of Southern Africa website[36]. However, frog endemicity is very low with no potentially occurring endemic species present in the general area (Minter *et. al,* 2004).

6.2.4.2 Confirmed Species

No frogs were recorded during fieldwork. Dedicated frog searches, including nocturnal surveys in spring at the onset of the rains, would have produced some species, particularly within the dam, but are unlikely to have produced data that would change the recommendations in this report

6.2.4.3 Conservation-Important Species

None of the potentially occurring frog species have a conservation-important status.

[36] http://vmus.adu.org.za/vm_sp_list.php accessed 25/05/2021

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6.3 Ecological Sensitivity

6.3.1 Environmental Screening Tool

A Screening Report was generated for the study area using the DEA's online EST. The result of the query indicated that the study area has **Medium** Sensitivity for Plants and Animal Themes and **Very High** Sensitivity for the Terrestrial Biodiversity Theme (Figure 6). These themes are discussed in more detail below.

Animal Theme

- Mammalia – *Lycaon pictus* – EN

  African Wild Dog has a low likelihood of occurring within the study area as is is excluded from the adjacent APNR by a perimeter fence around the atudy area, and may only occasionally wanders through.

- Mammalia – *Loxodonta africana* - EN

  Savanna Elephant is a resident species in the adjacent APNR but does not occur within the study area. It therefore has a Low likelihood of occurrence.

- Mammalia – *Acinonyx jubatus* - EN

  Cheetah has a low likelihood of occurring within the study area due to the exclusion fence, but is resident in the adjacent APNR. It may very occasionally wander through.

- Reptilia – *Kinixys natalensis* - VU

  Limited habitat is present for this tortoise species, which only has one recent record in the QDGS 2431 AC. Therefore, it has a low likelihood of occurrence.

- Reptilia – Sensitive Species No.2 - VU

  Limited habitat is present for this species, which is also sensitive to disturbance. Therefore, it has a low likelihood of occurrence.

Plant Theme

- Flora – Sensitive species 1252

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This species has low likelihood of occurrence due to lack of suitable habitat and distance from known localities.

Terrestrial Biodiversity Theme

- The study area is situated within a CBA1.
- The study area is situated within a Focus Areas for land-based protected areas expansion.

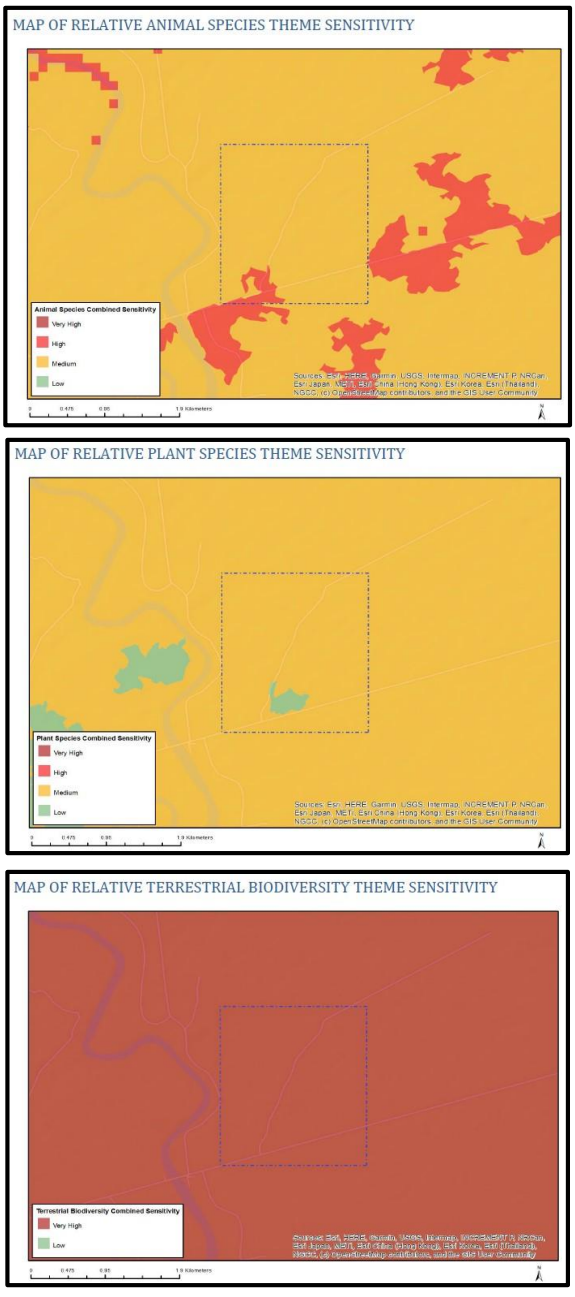

Figure 6. Environmental Screening Tool Themes relevant to Terrestrial Ecology

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6.3.2 Limpopo Province Biodiversity Conservation Assessment

The Limpopo Province Biodiversity Conservation Assessment (LPBCA) classifies most of the study area and general surroundings as a **Critical Biodiversity Area 1 & 2** (CBA1, CBA2) (Desmet *et al*., 2013). CBA's are described as **Irreplaceable** Sites that are required to meet biodiversity pattern and/or ecological processes targets. The primary land management objective for CBA's is to maintain them in a natural state with limited or no biodiversity loss and to rehabilitate degraded areas to a natural or near natural state. Compatible land uses for these areas include conservation activities such as eco-tourism and extensive game farming (Desmet *et al*., 2013). The proposed activities on Schoongezicht 66 KU therefore comply with these recommended land uses. Figure 7 spatially presents the LPBCA within the study area.

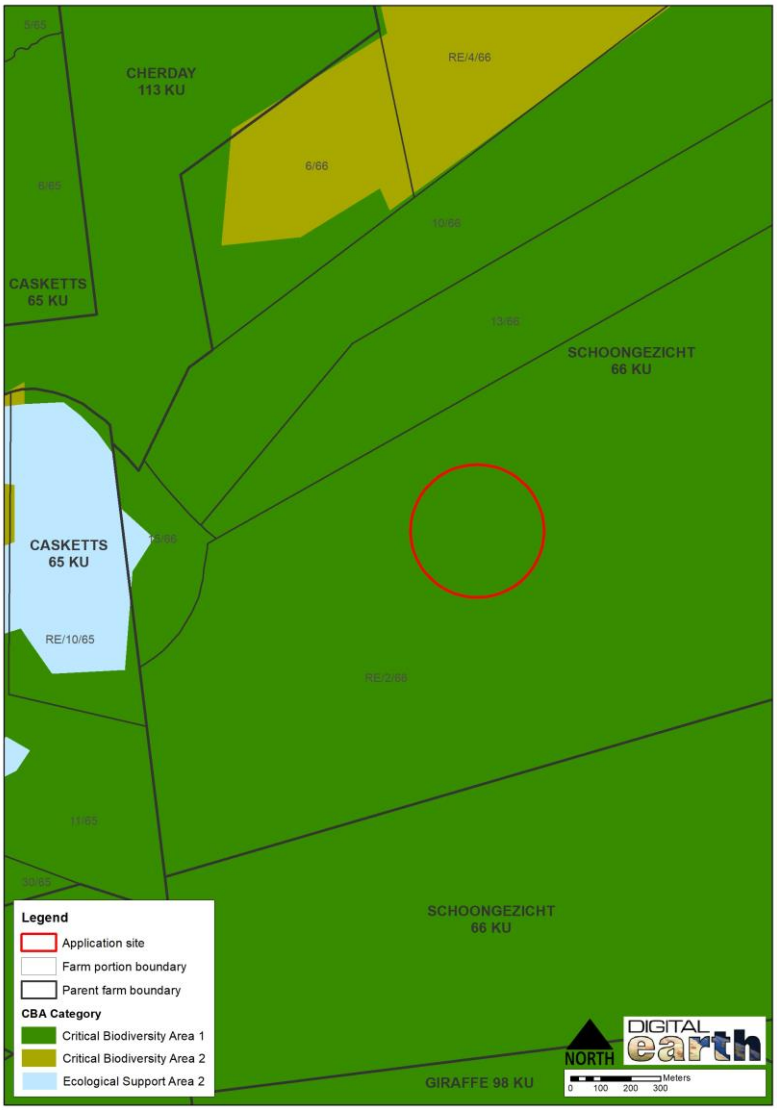

Figure 7. LPBCP Classification of Land Units within and adjacent to the Study Area

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6.3.3 Site-specific Ecological Sensitivity Analysis

An Ecological Importance analysis of the three vegetation communities represented in the study area was undertaken using the methodology described in Section 4.3. Table 10 shows the calculation of Ecological Importance of the study area, which is displayed in Figure 8 below.

The Closed Woodland and Secondary Shrubland communities are situated within an informally protected area adjacent to the GKNP which supports confirmed populations of CR, EN and VU mammal, bird and reptile species, some of which were confirmed during fieldwork. However, many species are also not present on the property, having been effectively fenced out. The Conservation Importance (CI) is therefore assessed as High. The Functional Integrity (FI) is Low as a result of historical agricultural activities leading to secondary vegetation being present. This results in a Biodiversity Importance (BI) of **Low**. Receptor Resilience (RR) is assessed as **High** as most savanna species regenerate moderately quickly during favourable climatic conditions and due to a high rate of growth of taxa. When integrated with the Low BI the SEI of both communities is assessed as **Low**.

The Wetland vegetation community is extremely small in size and fairly isolated. It has High CI as a result of the number of predicted occurrences of faunal SCC. Although the perimeter fence excludes larger mammals such as Savanna Elephant and White Rhinoceros, smaller species such as Leopard and Spotted Hyaena potentially visit to drink. The FI is Low due to the high levels of modification and artificial state of the habitat. The integration of High CI and Low FI results in a BI of **Low**. RR is Medium as many Lowveld wetland species regenerate only moderately quickly during favourable climatic conditions and due to the rate of growth of taxa. When integrated with the Medium BI the SEI of the vegetation community is assessed as **Low**.

Transformed areas, including within the homestead area, are assessed as having **Very Low** SEI.

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Table 10. Ecological Sensitivity of Vegetation Communities in the Study Area

Assessment Criteria	Closed Woodland	Secondary Shrubland	Wetland	Transformed
Conservation Importance	High	High	High	Low
Functional Integrity	Low	Low	Low	Very Low
Biodiversity Importance	Low	Low	Low	Very Low
Receptor Resilience	High	High	Medium	High
SITE ECOLOGICAL IMPORTANCE	**Low**	**Low**	**Low**	**Very Low**

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Figure 8. Site Ecological Importance of Vegetation Communities in the Study Area

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7. KEY POTENTIAL IMPACTS

While a detailed impact assessment was not part of the terms of reference for this report, key general impacts associated with the proposed developments on Schoongezicht 66 KU on the ecology of the are are discussed below.

- **Losses of portions of Critical Biodiversity Area 1 and Very High Terrestrial Biodiversity Theme –** the study area has been assessed as a Critical Biodiversity Area 1 by the LPBCA. The total area impacted is very small though and situated in an area that was historically cultivated. The significance of this impact of this is therefore **Low**.

- **Loss of plant species of conservation importance** – two species could be impacted during construction work. The tree *Elaeodendron transvaalense* is listed as NT but occurs in low number at only one locality. The trees *Adansonia digitata* and *Elaeodendron transvaalense* are protected under the NFA. Due to the low numbers present, the significance of this impact of this is **Low**.

- **Degradation of watercourses** – two episodic drainage lines are present within the study area. Due to the small catchments and level terrain, both will only flow after significant rainfall. However, construction within the drainage lines could lead to interruption of waterflow, destruction of the watercoure, failure of structures and local flooding. The significance of this impact on the drainage lines is therefore **Medium**.

- **Invasion of natural habitat by alien plants** – A total of nine alien plants were recorded during fieldwork, three of which are listed as invasive under the under the NEMBA Alien & Invasive Species list. These are scattered throughout the study area. Invasion into other areas is likely as construction activities introduce seeds which may thrive in bare soil resulting from building activities. The significance of this impact is considered **Medium**.

- **Loss of habitat for conservation-important fauna** – the study area supports populations of several EN and VU-listed fauna species such as Bateleur and Leopard and a number of threatened species potentially occur. However, the total area taken up by the proposed development site is very small and situated in an area already ecologically compromised. The significance of this impact is considered **Low**.

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- **Increase in poaching activities** – Unsupervised construction workers may participate in small-scale poaching through setting snares or traps for bushmeat. Medicinal plants may also be harvested for muthi. However, due to strict controls within the adjacent APNR, the impact is likely to be **Low.**

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8. CONCLUSION AND RECOMMENDATIONS

An assessment of 15 ha of the Remainder of Portion 2 of the farm Schoongezicht 66 KU, adjacent to the GKNP, was performed to determine the ecological importance thereof and to provide input into the application for environmental authorisation for five dwellings. Agriculture and tourism-related activities have been present in the study area for decades, leading to site-specific disturbance or degradation of natural vegetation. Existing infrastructure includes an old homestead and associated buildings, tracks and small dams. The study area is situated adjacent to a Protected Area, equivalent to a CBA in the LPBCA, and has a Medium Animal and Plant and Very High Terrestrial Biodiversity Themes in the EST. Three untransformed but secondary vegetation communities are present, namely Secondary Woodland, Secondary Shrubland and Wetland, all with Low SEI. Transformed areas have Very Low SEI. One NT plant and two nationally protected plants were recorded during fieldwork. No additional SCC are likely. One EN bird and one NT mammal were recorded, and several faunal SCC are likely to utilise the habitats within the study area on a regular basis. However, the study area is fenced off from the APNR and many faunal SCC are not likely to occur. Most of the impacts identified within the study area have been assessed as Low or Medium. The proposed activities are permitted in the LPBCA land use guidelines.

The preliminary recommendations and mitigation measures for the proposed developments on Schoongezicht 66 KU are listed below:

- The trees *Elaeodendron transvaalense* and *Adansonia digitata* should remain intact and unharmed.
- No trees with a diameter of 30 cm or more should be removed by any construction, whether protected or not. Protected trees with a diameter of less than 30 cm should also be avoided. Any development should be routed around these trees and the proposed buildings should be constructed around all larger trees.
- It is suggested that erosion control actions be implemented around all buildings to prevent stormwater damage. This may include the erection of water tanks to catch rain runoff and construction of mitre drains on access roads.
- In order to comply with the National Environmental Management: Biodiversity Act (Act No. 10 OF 2004), all listed invasive exotic plants as indicated in Appendix 1 should be targeted and controlled. This is especially applicable to * *Opuntia stricta*.

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- Weeds will inevitably establish around bare soil around the construction sites, and it is important that weed control, if involving herbicides, be managed correctly to reduce the impact on the adjacent natural vegetation.
- All existing and planned roads should contain adequate stormwater drainage and erosion control measures.
- No development to take place within the episodic drainage lines in the study area. A 5 m conservation buffer should be enforced around the drainage lines and no development should take place within this buffer.
- All waste and litter generated at the proposed development sites should be stored in hyaena and baboon-proof areas and should be removed and recycled on a regular basis. Additionally, the contractors should be encouraged to maintain the site free of litter and rubble.
- It is recommended that all construction labour teams are accommodated off-site, thereby reducing the risk of poaching during the night.
- Labour teams should be supervised during the day and no access to the natural habitat adjacent to the study area should be allowed.

Provided the recommendations suggested in this report are followed, and the developer complies with all relevant legislation pertaining to the development activities (such as the NEMBA), there is no objection to the proposed developments in terms of the terrestrial ecosystems of the study area. However, if the development was to proceed without the implementation of the recommendations given above then we would object to the development application.

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9. CONSULTATION PROCESS

The Environmental Authorisation (EA) administrative process to be followed includes a well-defined public participation process which is to be undertaken. This process is an on-going integrated process during which comments, concerns and issues pertaining to the project are raised by the public/ regulating authorities and subsequently addressed by the environmental assessment practitioner (EAP) and the associated specialists where relevant. The purpose of the consultation process is to provide the interested and affected parties (I&AP's) as well as the regulating authorities with sufficient and accessible information in an objective manner. This will assist the I&AP's and regulating authorities during the different phases of the project to raise issues and concerns and make recommendations where they deem relevant. HES, as the EAP, is assumed to have initiated the stakeholder engagement process with the I&AP's including with the information contained in this report and the formal Issues and Comments Register contained in the EIA documentation, fully documents the responses to all terrestrial ecology related issues and concerns.

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10. SPECIALIST REPORT CHECKLIST AND INFORMATION REQUESTED BY THE COMPETENT AUTHORITIES

A Specialist Report Checklist Table has been compiled in accordance with the guideline as set out in the EIA Regulations (GNR 982 of 04 December 2014) as amended; Appendix 6. The chapter which relays the specific information required as per the guideline is given in the second column of the Table.

Any additional information requested by the Competent Authorities will be included in this chapter.

Specialist Report Guideline: Appendix 6 GNR 982 EIA Regulations 4 December 2014 as amended	
Details to be Included in the Report	**Section in Report**
Details of	
Specialist who prepared the report	1
Expertise of the specialist	1
CV of the specialist	Appendix 4
Declaration that the Specialist is Independent in a form as may be specified by the CA	Appendix 6
An indication of the Scope of and the Purpose for which the report was prepared	4
An indication of the Quality and Age of base data used for the specialist report	5.3
A Description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change	6
The Duration, Date and Season of the site investigation and the relevance of the season to the outcome of the assessment	5.3
A Description of the Methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used	5.2, 5.3, 5.4
Details of an Assessment of the specific identified Sensitivity of the site related to the proposed activity or activities and its associated structures and infrastructure, inclusive of a site plan identifying site alternatives	6.3
An identification of any areas to be avoided including buffers	6.3
A Map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided including buffers	Fig 8
A Description of any Assumptions made and any Uncertainties or Gaps in Knowledge	5.5
A Description of the Findings and Potential implications of such findings on the Impact of the proposed activity, including identified Alternatives on the environment, or activities	6.1, 6.2, 6.3
Any Mitigation Measures for inclusion in the EMPr	8
Any Conditions for inclusion in the Environmental Authorisation	8
Any Monitoring Requirements for inclusion in the EMPr or Environmental Authorisation	8
Reasoned Opinion	
As to whether the proposed activity/ activities or portions thereof should be authorised	8
Regarding the acceptability of the proposed activity or activities	8
If the opinion is that the proposed activity or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr and where applicable the closure plan	8

A Description of any Consultation Process that was undertaken during the course of preparing the specialist report	9
A Summary and copies of any comments received during any consultation process and where applicable all responses thereto	10
Any other Information requested by the CA	10

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11. REFERENCES

Barnes, K.N. 2000. *The Eskom Red Data Book of Birds of South Africa, Lesotho & Swaziland.* BirdLife South Africa, Johannesburg.

Bates, M.F., Branch, W.R., Bauer, A.M., Burger, M., Marais, J., Alexander, G.J. & de Villiers, M.S. (eds). 2014. *Atlas and Red Data List of the Reptiles of South Africa, Lesotho and Swaziland.* Suricata 1. South African National Biodiversity Institute, Pretoria.

Child M.F., Roxburgh L., Do Linh San E., Raimondo D., Davies-Mostert H.T., editors. *The Red List of Mammals of South Africa, Swaziland and Lesotho*. South African National Biodiversity Institute and Endangered Wildlife Trust, South Africa.

DEA. 2014. National Environmental Management: Biodiversity Act 2004 (Act 10 of 2004) Alien and Invasive Species Lists. Government Gazette.

DEAT. 2011. *National List of Threatened Terrestrial Ecosystems in South Africa.* National Environmental Management: Biodiversity Act (Act 10 of 2004). Government Gazette.

Edwards, D. 1983. A broad-scale structural classification of vegetation for practical purposes. *Bothalia* 14:705-712.

Fitzpatrick Institute of African Ornithology Virtual Museum http://vmus.adu.org.za/ accessed on 25/05/2021.

Fitzpatrick Institute of African Ornithology Southern African Bird Atlas Project http://sabap2.adu.org.za/index.php accessed on 25/05/2021.

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

Marnewick M.D., Retief E.F., Theron N.T., Wright D.R., Anderson T.A. 2015. *Important Bird and Biodiversity Areas of South Africa*. Johannesburg: BirdLife South Africa.

Minter, L.R., Burger, M., Harrison, J.A., Braack, H.H., Bishop, P.J. & Kloepfer, D.2004. *Atlas and Red Data Book of the Frogs of South Africa, Lesotho and Swaziland*. SI/MAB Series No.9. Smithsonian Institution, Washington, DC.

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

Muller, Z., Bercovitch, F., Brand, R., Brown, D., Brown, M., Bolger, D., Carter, K., Deacon, F., Doherty, J.B., Fennessy, J., Fennessy, S., Hussein, A.A., Lee, D., Marais, A., Strauss, M., Tutchings, A. & Wube, T. 2018. *Giraffa camelopardalis* (amended version of 2016 assessment). The IUCN Red List of Threatened Species 2018: e.T9194A136266699. https://dx.doi.org/10.2305/IUCN.UK.2016-3.RLTS.T9194A136266699.en. Downloaded on 25 May 2021.

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Raimondo, D., Von Staden, L., Foden, W., Victor, J.E., Helme, N.A., Turner, R.C., Kamundi, D.A. & Manyama, P.A. (eds) 2009. *Red List of South African Plants 2009*. Strelitzia 25. South African National Biodiversity Institute, Pretoria.

South African National Biodiversity Institute. 2018 Vegetation Map App [Carry Map] 2018. Available from the Biodiversity GIS website, downloaded on 09 April 2019.

South African National Biodiversity Institute (SANBI). 2020. Species Environmental Assessment Guideline. Guidelines for the implementation of the Terrestrial Fauna and Terrestrial Flora Species Protocols for environmental impact assessments in South Africa. South African National Biodiversity Institute, Pretoria. Version 1.2020.

Taylor, M.R., Peacock, F., Wanless, R.W. (eds). 2015. *The Eskom Red Data Book of Birds of South Africa, Lesotho and Swaziland.* Birdlife South Africa, Johannesburg.

Van Wyk, A. E. & Smith, G. F. 2001. *Regions of floristic endemism in southern Africa: A review with emphasis on succulents*. Umdaus Press, Pretoria.

Williams, V.L., Raimondo, D., Crouch, N.R., Cunningham, A.B., Scott-Shaw, C.R., Lötter, M. & Ngwenya, A.M. 2008a. *Elaeodendron transvaalense* (Burtt Davy) R.H.Archer. National Assessment: Red List of South African Plants version 2017.1. Accessed on 2021/04/20.

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12. APPENDICES

Appendix 1. Checklist of Flora Recorded during Fieldwork

Taxa	Growth Form	Red Data	Protected	NEMBA Alien & Invasive Species	Vegetation Communities		
					Secondary Woodland	Secondary Shrubland	Secondary Wetland
Family Acanthaceae							
Justicia flava (Vahl) Vahl	herb				r	r	
Ruellia cordata Thunb.	herb					r	
Family Amaranthaceae							
* *Achyranthes aspera* L. var. *aspera*	herb				r		
* *Alternanthera pungens* Kunth	herb				r	r	
Amaranthus thunbergii Moq.	herb					f	
* *Gomphrena celosioides* Mart.	herb				r	u	
Kyphocarpa angustifolia (Moq.) Lopr.	herb				r	u	
Family Anacardiaceae							
Lannea schweinfurthii (Engl.) Engl. var. *stuhlmannii* (Engl.) Kokwaro	tree				r		
Family Asteraceae							
Dicoma tomentosa Cass.	herb					r	
* *Erigeron sumatrensis* Retz.	herb					r	
Sphaeranthus peduncularis DC.	herb						f
Family Boraginaceae							
Ehretia amoena Klotzsch	tree				r		
Heliotropium ovalifolium Forssk.	herb						u
Family Cactaceae							

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* *Opuntia stricta* Haw.	succulent			1b	u		
Family Capparaceae							
Capparis tomentosa Lam.	climber				r		
Maerua angolensis DC.	tree				r		
Family Celastraceae							
Elaeodendron transvaalense (Burtt Davy) R.H.Archer	tree	NT	NFA		r		
Gymnosporia senegalensis (Lam.) Loes.	shrub						r
Family Combretaceae							
Combretum apiculatum Sond.	tree				u		
Combretum hereroense Schinz	tree				r		
Family Cucurbitaceae							
Cucumis zeyheri Sond.	climber					u	
Family Cyperaceae							
Cyperus compressus L.	sedge						r
Cyperus denudatus L.f.	sedge						u
Cyperus dives Delile	sedge						r
Cyperus sexangularis Nees	sedge						u
Kyllinga sp.	sedge						r
Schoenoplectus corymbosus (Roth ex Roem. & Schult.) J.Raynal	sedge						d
Family Dracaenaceae							
Sansevieria hyacinthoides (L.) Druce	geophyte				r		
Family Ebenaceae							
Euclea natalensis subsp. *angustifolia* F.White	tree				r		
Family Euphorbiaceae							
Acalypha indica L. var. *indica*	herb					u	
Family Fabaceae							
Aeschynomene indica L.	dwarf shrub						u
Albizia harveyi E.Fourn.	tree				r		
Crotalaria sp.	herb					r	
Dichrostachys cinerea (L.) Wight & Arn. subsp. *africana* Brenan & Brummitt	tree				f	d	
Indigofera sp. (no flowers)	herb					r	
Ormocarpum trichocarpum (Taub.) Engl.	tree				r		
Peltophorum africanum Sond.	tree				u		
Schotia brachypetala Sond.	tree						r
Senegalia erubescens (Welw. ex Oliv.) Kyal. & Boatwr.	tree				d		
Senegalia nigrescens (Oliv.) P.J.H.Hurter	tree				r		

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* *Sesbania bispinosa* (Jacq.) W.Wight var. *bispinosa*	shrub						r
Tephrosia purpurea (L.) Pers.	herb					r	
Vachellia exuvialis (I.Verd.) Kyal. & Boatwr.	shrub				r		
Vachellia nilotica (L.) P.J.H.Hurter & Mabb. subsp. *kraussiana* (Benth.) Kyal. & Boatwr.	tree				d		
Vachellia tortilis (Forssk.) Gallaso & Banfi subsp. *heteracantha* (Burch.) Kyal. & Boatwr.	tree				d		
Vachellia xanthophloea (Benth.) P.J.H.Hurter	tree						r
Family Lamiaceae							
Ocimum americanum L. var. *americanum*	herb					f	
Family Malvaceae							
Abutilon austro-africanum Hochr.	dwarf shrub				r	r	
Adansonia digitata L.	tree		NFA		r		
Gossypium herbaceum L. subsp. *africanum* (Watt) Vollesen	dwarf shrub				f	f	
Grewia bicolor Juss. var. *bicolor*	shrub				r		
Grewia flavescens Juss.	climber				r		
Grewia hexamita Burret	tree				u		
Hibiscus micranthus L.f. var. *micranthus*	dwarf shrub				r		
Sida dregei Burtt Davy	dwarf shrub				r	f	
Waltheria indica L.	dwarf shrub				r	f	
Family Molluginaceae							
* *Mollugo nudicaulis* Lam.	herb						r
Family Nyctaginaceae							
Bougainvillea x	climber				r		
Family Oleaceae							
Jasminum fluminense Vell.	climber				r		
Family Onagraceae							
Ludwigia adscendens (L.) Hara subsp. *diffusa* (Forssk.) P.H.Raven	herb						u
Family Pedaliaceae							
Dicerocaryum senecioides (Klotzsch) Abels	herb					u	
Family Phyllanthaceae							
Flueggea virosa (Roxb. ex Willd.) Voigt subsp. *virosa*	shrub						r
Phyllanthus reticulatus Poir. var. *reticulatus*	shrub						r
Family Poaceae							
Aristida adscensionis L.	grass				f	d	
Aristida congesta Roem. & Schult. subsp. *barbicollis* (Trin. & Rupr.) De Winter	grass					f	
Brachiaria serrata (Thunb.) Stapf	grass				u	f	
Digitaria eriantha Steud.	grass					r	

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Eragrostis curvula (Schrad.) Nees	grass					r	r
Eragrostis lehmanniana Nees var. *lehmanniana*	grass				u	f	
Eragrostis rigidior Pilg.	grass						r
Eragrostis superba Peyr.	grass				r	r	
Eriochloa meyeriana (Nees) Pilg. subsp. *grandiglumis* (Stent & J.M.Rattray) Gibbs Russ.	grass						d
Panicum maximum Jacq.	grass				d	d	r
Sporobolus pyramidalis P.Beauv.	grass				u	u	r
Tragus berteronianus Schult.	grass					r	
Urochloa mosambicensis (Hack.) Dandy	grass				u	f	
Family Portulacaceae							
Portulaca sp. (no flowers)	herb					r	
Family Rhamnaceae							
Ziziphus mucronata Willd. subsp. *mucronata*	tree				u	u	
Family Sapotaceae							
Manilkara mochisia (Baker) Dubard	tree				r		
Family Solanaceae							
* *Datura stramonium* L.	dwarf shrub			1b		r	
Solanum campylacanthum A. Rich.subsp. *panduriforme*	dwarf shrub				r	f	
Solanum sp.	herb						r
Family Verbenaceae							
* *Verbena bonariensis* L.	herb			1b	r		
Family Vitaceae							
Cissus cactiformis Gilg	climber				r		
TOTAL	**84**		**2**	**3**	**47**	**35**	**23**

NFA - National Forests Act	d = dominant
NT - Near Threatened	f = frequent
* - exotic species	u = uncommon
	r = rare

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Appendix 2. Checklist of Fauna Recorded during Fieldwork

Common Name	Scientific Name	Red Data	Protected	Closed Woodland	Open Shrubland	Wetland
Mammals						
ORDER: PRIMATES						
Family Cercopithecidae (Old World monkeys)						
Chacma Baboon	*Papio ursinus*			x		
ORDER: LAGOMORPHA						
Family Leporidae (rabbits and hares)						
African Savanna Hare	*Lepus victoriae*				x	
ORDER: CARNIVORA						
Family Hyaenidae (hyaenas)						
Spotted Hyaena	*Crocuta crocuta*	NT	NEMBA (PR)	x		
ORDER: CETARTIODACTYLA						
Family Bovidae (antelope, cattle)						
African Buffalo	*Syncerus caffer*		LEMA	x	x	x
Impala	*Aepyceros melampus*			x		
Greater Kudu	*Tragelaphus strepsiceros*			x		
Subtotal	6	1	2	5	2	1
Birds						
ORDER: GALLIFORMES						
Family Phasianidae (pheasants, fowl and allies)						
Crested Francolin	*Dendroperdix sephaena*			x		
Natal Spurfowl	*Pternistis natalensis*			x		
Swainson's Spurfowl	*Pternistis swainsonii*				x	
ORDER: ACCIPITRIFORMES						
Family Accipitridae (kites, hawks and eagles)						
Bateleur	*Terathopius ecaudatus*	EN	NEMBA (EN)	over	over	over

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ORDER: CHARADRIIFORMES						
Family Charadriidae (plovers)						
Blacksmith Lapwing	*Vanellus armatus*					x
Three-banded Plover	*Charadrius tricollaris*					x
ORDER: COLUMBIFORMES						
Family Columbidae (pigeons and doves)						
Ring-necked Dove	*Streptopelia capicola*				x	
Laughing Dove	*Spilopelia senegalensis*			x	x	
Namaqua Dove	*Oena capensis*				x	
Emerald-spotted Wood Dove	*Turtur chalcospilos*			x		
African Green Pigeon	*Treron calvus*			x		
ORDER: MUSOPHAGIFORMES						
Family Musophagidae (turacos)						
Grey Go-away-bird	*Corythaixoides concolor*			x		
ORDER: APODIFORMES						
Family Apodidae (swifts)						
African Palm Swift	*Cypsiurus parvus*			over	over	over
African Black Swift	*Apus barbatus*			over	over	over
Little Swift	*Apus affinis*			over	over	over
Alpine Swift	*Tachymarptis melba*			over	over	over
ORDER: CORACIIFORMES						
Family Coraciidae (rollers)						
Lilac-breasted Roller	*Coracias caudatus*				x	
Family Alcedinidae (kingfishers)						
Brown-hooded Kingfisher	*Halcyon albiventris*			x		
Family Meropidae (bee-eaters)						
Little Bee-eater	*Merops pusillus*				x	
ORDER: BUCEROTIFORMES						
Family Phoeniculidae (wood-hoopoes)						
Common Scimitarbill	*Rhinopomastus cyanomelas*			x		
Family Bucerotidae (hornbills)						
African Grey Hornbill	*Lophoceros nasutus*			x		
Southern Red-billed Hornbill	*Tockus rufirostris*			x	x	
Southern Yellow-billed Hornbill	*Tockus leucomelas*			x	x	
ORDER: PICIFORMES						
Family Lybiidae (African barbets)						

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Black-collared Barbet	*Lybius torquatus*			x		
Acacia Pied Barbet	*Tricholaema leucomelas*			x		
Yellow-fronted Tinkerbird	*Pogoniulus chrysoconus*			x		
Family Picidae (woodpeckers)						
Cardinal Woodpecker	*Dendropicos fuscescens*			x		
Bearded Woodpecker	*Dendropicos namaquus*			x		
ORDER: PASSERIFORMES						
Family Platysteiridae (wattle-eyes and batises)						
Chinspot Batis	*Batis molitor*			x		
Family Malaconotidae (bushshrikes)						
Brown-crowned Tchagra	*Tchagra australis*			x		
Black-backed Puffback	*Dryoscopus cubla*			x		
Brubru	*Nilaus afer*			x		
Grey-headed Bushshrike	*Malaconotus blanchoti*			x		
Orange-breasted Bushshrike	*Chlorophoneus sulfureopectus*			x		
Family Laniidae (shrikes)						
Southern White-crowned Shrike	*Eurocephalus anguitimens*			x		
Family Oriolidae (figbirds and orioles)						
Black-headed Oriole	*Oriolus larvatus*			x		
Family Dicruridae (drongos)						
Fork-tailed Drongo	*Dicrurus adsimilis*			x	x	
Family Paridae (tits and chickadees)						
Southern Black Tit	*Melaniparus niger*			x		
Family Pycnonotidae (bulbuls)						
Dark-capped Bulbul	*Pycnonotus tricolor*			x		
Family Hirundinidae (swallows and martins)						
Wire-tailed Swallow	*Hirundo smithii*			x	x	x
Family Macrosphenidae (crombecs and African warblers)						
Long-billed Crombec	*Sylvietta rufescens*			x		
Family Cisticolidae (cisticolas and allies)						
Rattling Cisticola	*Cisticola chiniana*			x	x	
Tawny-flanked Prinia	*Prinia subflava*				x	
Yellow-breasted Apalis	*Apalis flavida*			x		
Stierling's Wren-Warbler	*Calamonastes stierlingi*			x		
Burnt-necked Eremomela	*Eremomela usticollis*			x		
Family Leiothrichidae (laughingthrushes)						

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Arrow-marked Babbler	*Turdoides jardineii*			x		
Family Sturnidae (starlings)						
Greater Blue-eared Starling	*Lamprotornis chalybaeus*			x		
Cape Starling	*Lamprotornis nitens*			x	x	
Burchell's Starling	*Lamprotornis australis*			x	x	
Family Buphagidae (oxpeckers)						
Red-billed Oxpecker	*Buphagus erythrorhynchus*			x	x	
Family Muscicapidae (chats and Old World flycatchers)						
White-browed Scrub Robin	*Erythropygia leucophrys*			x		
Grey Tit-Flycatcher	*Myioparus plumbeus*			x		
Family Nectariniidae (sunbirds)						
Scarlet-chested Sunbird	*Chalcomitra senegalensis*			x		
Marico Sunbird	*Cinnyris mariquensis*			x		
White-bellied Sunbird	*Cinnyris talatala*			x		
Family Passeridae (Old World sparrows)						
Southern Grey-headed Sparrow	*Passer diffusus*				x	
Family Ploceidae (weavers and widowbirds)						
Red-billed Buffalo Weaver	*Bubalornis niger*				x	
Red-billed Quelea	*Quelea quelea*				x	
Family Estrildidae (waxbills, munias and allies)						
Red-billed Firefinch	*Lagonosticta senegala*			x		
Blue Waxbill	*Uraeginthus angolensis*			x	x	
Green-winged Pytilia	*Pytilia melba*			x		
Family Fringillidae (finches and canaries)						
Yellow-fronted Canary	*Crithagra mozambica*			x	x	
Family Emberizidae (buntings and New World sparrows)						
Golden-breasted Bunting	*Emberiza flaviventris*				x	
Subtotal	64	1	1	52	26	8
TOTAL	**70**	**2**	**3**	**57**	**28**	**9**

PR - Protected
NT - Near Threatened
EN - Endangered
NEMBA - National Environmental Management: Biodiversity Act
LEMA - Limpopo Environmental Management Act

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Appendix 3. Potentially Occurring Fauna of Conservation Concern

Common Name	Scientific Name	Red Data	Protected	Habitat	SABAP2 Reporting Rate for Schoongezicht Area	Likelihood	Justification
Mammals							
Cheetah	*Acinonyx jubatus*	VU	NEMBA (VU)	Savanna, semi desert		Low	Rare in the area, may occasionally pass through
African Clawless Otter	*Aonyx capensis*	NT	MNCA	Rivers and streams		Low	Rare in the area, may occasionally pass through
Side-striped Jackal	*Canis adustus*		LEMA	Savanna, grassland		High	Suitable habitat present
White Rhinoceros	*Ceratotherium simum*	NT	NEMBA (PR)	Savanna, semi desert		Very Low	Not present in the area, but is found on adjacent properties
African Civet	*Civettictis civetta*		LEMA	Wide variety of habitats		High	Suitable habitat present
Blue Wildebeest	*Connochaetes taurinus*		NEMBA (PR)	Savanna, grassland		High	Suitable habitat present
Swamp Musk Shrew	*Crocidura mariquensis*	NT		Wetlands in savanna		Low	Very little suitable habitat present
Spotted Hyaena	*Crocuta crocuta*	NT	NEMBA (PR)	Wide variety of habitats		Confirmed	
Robert's Marsh Rat	*Dasymys robertsii*	VU		Marshes, wetlands		Low	Peripheral; prefers wetlands at higher altitudes, limited suitable habitat present
Black Rhinoceros	*Diceros bicornis minor*	EN	NEMBA (VU)	Thickets, dense woodland		Very Low	Not present in the area, but is found on adjacent properties
Burchell's Zebra	*Equus quagga burchelli*		NEMBA (PR)	Savanna, grassland		High	Suitable habitat present
African Wildcat	*Felis silvestris*		LEMA	Wide variety of habitats		High	Suitable habitat present
Southern Lesser Galago	*Galago moholi*		LEMA	Savanna		High	Suitable habitat present

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Giraffe	*Giraffa camelopardalis*	VU‡	LEMA	Savanna		High	Suitable habitat present
Hippopotamus	*Hippopotamus amphibius*	VU‡	LEMA	Wetlands		Low	Not present in the area, but is found on adjacent properties
Sable	*Hippotragus niger*	VU	NEMBA (VU)			Low	Rare in the area
Serval	*Leptailurus serval*	NT	NEMBA (PR)	Grassland, wetlands		Low	Limited suitable habitat present, rae in the area
Savanna Elephant	*Loxodonta africana*	EN‡	NEMBA (PR)	Wide variety of habitats		Low	Not present in the area, but is found on adjacent properties
African Wild Dog	*Lycaon pictus*	EN	NEMBA (EN)	Wide variety of habitats		Low	Not present in the area, but is found on adjacent properties, may occasionally pass through
Honey Badger	*Mellivora capensis*		LEMA	Wide variety of habitats		High	Suitable habitat present
Aardvark	*Orycteropus afer*		NEMBA (PR)	Wide variety of habitats		Low	Rare in the Lowveld, may occasionally pass through
Thick-tailed Greater Galago	*Otolemur crassicaudatus*		LEMA	Moist woodland and forest		High	Suitable habitat present
Lion	*Panthera leo*	VU‡	NEMBA (VU)	Wide variety of habitats		Low	Not present in the area, but is found on adjacent properties, may occasionally pass through
Leopard	*Panthera pardus*	VU	NEMBA (VU)	Wide variety of habitats		Moderate	Could occasionally pass through the study area but would not remain for long due to the small size
African Weasel	*Poecilogale albinucha*	NT		Wide variety of habitats		Very Low	Very rare in Mpumalanga
Aardwolf	*Proteles cristatus*		LEMA	Wide variety of habitats		Low	Rare in the Lowveld, may occasionally pass through
Steenbok	*Raphicerus campestris*		LEMA	Wide variety of habitats		High	Suitable habitat present
Ground Pangolin	*Smutsia temminckii*	VU	NEMBA (VU)	Wide variety of habitats		Low	Could rarely pass through the study area, rare in the Lowveld
African Buffalo	*Syncerus caffer*		LEMA	Wide variety of habitats		Confirmed	

Subtotal	29	18	26				
Birds							
Half-collared Kingfisher	*Alcedo semitorquata*	NT		Streams with overhanging vegetation	-	Very Low	Very rare in the Lowveld
Steppe Eagle	*Aquila nipalensis*	EN‡		Savanna	1.6%	Low	Very rare in the area
Tawny Eagle	*Aquila rapax*	EN	NEMBA (EN)	Savanna	33.3%	Moderate	Suitable habitat present
Verreaux's Eagle	*Aquila verreauxii*	VU		Arid, mountainous areas	0.2%	Very Low	No suitable habitat present
Kori Bustard	*Ardeotis kori*	NT	NEMBA (PR)	Open savanna	0.5%	Very Low	No suitable habitat present
Southern Ground-Hornbill	*Bucorvus leadbeateri*	EN	NEMBA (EN)	Savanna	27.5%	Moderate	Suitable habitat present, may occasionally wander through the study area
Curlew Sandpiper	*Calidris ferruginea*	NT‡		Mudflats, tidal wetlands	-	Very Low	Rare in the Lowveld
Abdim's Stork	*Ciconia abdimii*	NT		Wide variety of habitats	0.2%	Low	Occasional influxes possible but rare in the Lowveld
Black Stork	*Ciconia nigra*	VU		Forages in wetlands and breeds on cliffs	1.8%	Low	Suitable foraging habitat present but a rare species in the Lowveld, high disturbance levels
Pallid Harrier	*Circus macrourus*	NT		Open grassland and semi-desert	-	Very Low	No suitable habitat present, unrecorded from the area
African Marsh Harrier	*Circus ranivorus*	EN		Moist grassland and wetland	-	Very Low	No suitable habitat present, unrecorded from the area
European Roller	*Coracias garrulus*	NT		Savanna	23.6%	Moderate	Suitable habitat present
Saddle-billed Stork	*Ephippiorhynchus senegalensis*	EN		Large rivers, dams and pans	8.8%	Low	Suitable foraging habitat present but a rare species in the Lowveld, high disturbance levels
Lanner Falcon	*Falco biarmicus*	VU		Wide variety of habitats but nests on cliffs	0.7%	Very Low	Very rare in the area
White-backed Night-Heron	*Gorsachius leuconotus*	VU		Streams with overhanging vegetation	0.5%	Very Low	Some suitable habitat present but very rare in the area

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White-backed Vulture	*Gyps africanus*	CR	NEMBA (EN)	Savanna	72.7%	Moderate	Suitable habitat and prey present, confirmed from adjacent areas
Cape Vulture	*Gyps coprotheres*	EN	NEMBA (EN)	Wide variety of habitats	7.9%	Low	May only very occasionally forage within study area
Marabou Stork	*Leptoptilos crumeniferus*	NT		Wide variety of habitats	18.2%	Moderate	Suitable foraging habitat present
Bat Hawk	*Macheiramphus alcinus*	EN		Tall woodland along rivers	-	Low	No suitable habitat present, unrecorded from the area
Lesser Jacana	*Microparra capensis*	VU		Floating vegetation on tropical wetlands	-	Very Low	Unrecorded from the area
Yellow-billed Stork	*Mycteria ibis*	EN		Wide variety of wetlands	4.5%	Low	Suitable foraging habitat present but a rare species in the Lowveld, high disturbance levels
Hooded Vulture	*Necrosyrtes monachus*	CR	NEMBA (EN)	Wide variety of wetlands	24.1%	Moderate	Suitable habitat and prey present, confirmed from adjacent areas
African Pygmy Goose	*Nettapus auritus*	VU		Tropical wetlands with floating vegetation	-	Very Low	Unrecorded from the area
Great White Pelican	*Pelecanus onocrotalus*	VU		Large pools, rivers and lakes	-	Very Low	Unrecorded from the area
Pink-backed Pelican	*Pelecanus rufescens*	VU		Large pools, rivers and lakes	-	Very Low	Unrecorded from the area
Greater Flamingo	*Phoenicopterus roseus*	NT		Saline wetlands	0.2%	Very Low	No suitable habitat present
African Finfoot	*Podica senegalensis*	VU		Rivers and streams with overhanging vegetation	0.2%	Very Low	Limited suitable habitat present, high disturbance levels
Martial Eagle	*Polemaetus bellicosus*	EN	NEMBA (EN)	Wide variety of habitats	18.2%	Moderate	Suitable habitat and prey present, confirmed from adjacent areas

Greater Painted-snipe	*Rostratula benghalensis*	NT		Wetlands	0.7%	Moderate	Although it has a low reporting rate, this species is often overlooked. Suitable habitat present around the dam within the study area
African Skimmer	*Rynchops flavirostris*	NT‡		Open water; rivers and dams	-	Very Low	Although recently confirmed breeding within the APNR, it has not yet been found within the study area
Secretarybird	*Sagittarius serpentarius*	VU		Open savanna and grassland	0.7%	Low	Limited suitable habitat present, rare in the area
Pel's Fishing Owl	*Scotopelia peli*	EN		Rivers and streams with overhanging vegetation	-	Low	Limited suitable habitat present, high disturbance levels
Crowned Eagle	*Stephanoaetus coronatus*	VU		Forest	-	Low	No suitable habitat present, unrecorded from the area
Bateleur	*Terathopius ecaudatus*	EN	NEMBA (EN)	Savanna	58.1%	Confirmed	
Lappet-faced Vulture	*Torgos tracheliotos*	EN	NEMBA (EN)	Savanna	11,0%	Moderate	Suitable habitat and prey present, confirmed from adjacent areas
White-headed Vulture	*Trigonoceps occipitalis*	CR	NEMBA (EN)	Savanna	10.1%	Moderate	Suitable habitat and prey present, confirmed from adjacent areas
Subtotal	36	36	10				
Reptiles							
Listed Sensitive Species No. 2		VU	NEMBA (VU)	Wetlands		Low	Suitable habitat present but disturbance levels high
Natal Hinged Tortoise	*Kinixys natalensis*	VU		Dry rocky habitat in thornveld, valley bushveld, dry thicket or bushveld savanna		Low	Limited suitable habitat present, only one recent record for the adjacent area
Southern African Python	*Python natalensis*		NEMBA (PR)	Wide variety of habitats, but usually near water or rocky outcrops		High	Suitable habitat present
Subtotal	2	2	2				

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TOTAL	**67**	**56**	**38**				

CR - Critically Endangered EN - Endangered
VU - Vulnerable NT - Near Threatened
PR - Protected
NEMBA - National Environmental Management: Biodiversity Act
LEMA - Limpopo Environmental Management Act
‡ - IUCN assessment

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Appendix 4. Curriculum Vitae of Duncan McKenzie

Name: Duncan Robert McKenzie
Profession: Terrestrial Ecologist
Date of Birth: 9 Nov 1977
Name of Firm: ECOREX Consulting Ecologists cc
Position in Firm: Ecologist
Years with firm: 13
Nationality: South African
Qualifications:

- N.Dip. [Nature Conservation] — UNISA, RSA — 2007
- N.Cert. [Nature Guiding] — Drumbeat Academy, RSA — 2004

Membership in Professional Societies:

- BirdLife South Africa
- Animal Demography Unit, University of Cape Town
- South African Council for Natural Scientific Professions (Reg.No.122647)

Languages:

	Speaking	Reading	Writing
English (home):	Excellent	Excellent	Excellent
Afrikaans:	Good	Good	Good
isiZulu:	Good	Fair	Fair

Countries of Work Experience: Mozambique, South Africa, Swaziland, DRC, Mali, Lesotho, Zimbabwe, Botswana, Namibia, Tanzania, Guinea, Swaziland, Sierra Leone, Morocco.

OVERVIEW OF EXPERIENCE

- 13 years' experience in specialist species identification, conducting baseline surveys, data analysis and report writing in various biomes in southern Africa, particularly savannah, forest and grassland biomes
- 2 years' experience game reserve management (KwaZulu-Natal)
- 5 years' experience (part time) of wetland delineation and management
- 2 years' experience of plant propagation and use for rehabilitation
- Specialist knowledge of identification of vascular plants
- Specialist knowledge of identification of mammals, birds, reptiles and amphibians
- SABAP2 Regional Co-ordinator: Mpumalanga
- eBird Regional Reviewer - Mpumalanga

Employment Record:

2007 - present	ECOREX	Ecologist
2005 - 2006	Iglu (London, UK)	Specialist Travel Agent
1997 - 2005	Duncan McKenzie Bird Tours	Owner, Specialist Guide
2001	KZN Wildlife	District Conservation Officer, Reserve Manager
1999 - 2001	Institute of Natural Resources	Part-time Horticulturalist and Rehabilitation Officer
1997-2001	Mondi Wetlands Project	Part-time Field Assistant and Regional Co-ordinator
1996-1997	Natal Parks Board	Ranger

Appendix 5. South African Council of Natural Scientific Professions Certificates

SACNASP
South African Council for Natural Scientific Professions

herewith certifies that

Warren Lee McCleland

Registration Number: 003973

is a registered scientist

in terms of section 20(3) of the Natural Scientific Professions Act, 2003
(Act 27 of 2003)
in the following fields(s) of practice (Schedule 1 of the Act)

Ecological Science (Professional Natural Scientist)

Effective **19 February 2019** Expires **31 March 2022**

Chairperson

Chief Executive Officer

To verify this certificate scan this code

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SACNASP
South African Council for Natural Scientific Professions

herewith certifies that

Duncan McKenzie

Registration Number: 122647

is a registered scientist

in terms of section 20(3) of the Natural Scientific Professions Act, 2003
(Act 27 of 2003)
in the following fields(s) of practice (Schedule 1 of the Act)

Ecological Science (Certificated Natural Scientist)

Effective **5 May 2021** Expires **31 March 2022**

Chairperson

Chief Executive Officer

To verify this certificate scan this code

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Appendix 6. Specialists Declaration

10.4 The Specialist

Note: Duplicate this section where there is more than one specialist.

I …Duncan McKenzie…, as the appointed specialist hereby declare/affirm the correctness of the information provided as part of the application, and that I:

- in terms of the general requirement to be independent (tick which is applicable):

X	other than fair remuneration for work performed/to be performed in terms of this application, have no business, financial, personal or other interest in the activity or application and that there are no circumstances that may compromise my objectivity; or

	am not independent, but another EAP that is independent and meets the general requirements set out in Regulation 13 has been appointed to review my work (Note: a declaration by the review specialist must be submitted);

- have expertise in conducting specialist work as required, including knowledge of the Act, regulations and any guidelines that have relevance to the proposed activity;
- will ensure compliance with the EIA Regulations 2014;
- will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the application;
- will take into account, to the extent possible, the matters listed in regulation **18** of the regulations when preparing the application and any report, plan or document relating to the application;
- will disclose to the proponent or applicant, registered interested and affected parties and the competent authority all material information in my possession that reasonably has or may have the potential of influencing any decision to be taken with respect to the application by the competent authority or the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority (unless access to that information is protected by law, in which case I will indicate that such protected information exists and is only provided to the competent authority);
- declare that all the particulars furnished by me in this form are true and correct;
- am aware that it is an offence in terms of Regulation 48 to provide incorrect or misleading information and that a person convicted of such an offence is liable to the penalties as contemplated in section 49B(2) of the National Environmental Management Act, 1998 (Act 107 of 1998).

Signature of the specialist

ECOREX Consulting Ecologists CC

Name of company

14/06/2021

Date

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ANNEXURE B: Aquatic Ecology Report

DETAILS OF SPECIALIST AND DECLARATION OF INTEREST

	(For official use only)
File Reference Number:	
NEAS Reference Number:	
Date Received:	

Application for integrated environmental authorisation and waste management licence in terms of the-

(1) National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended and the Environmental Impact Assessment Regulations, 2010; and

(2) National Environmental Management Act: Waste Act, 1998 (Act No. 59 of 2008) and Government Notice 718, 2009

PROJECT TITLE

Proposed construction of a family homestead (Lathleka) on the Remaining Extent 2 of the Farm Schoongezight 66 KU

Specialist:	Aquatic Ecosystems		
Contact person:	Rob Palmer		
Postal address:	PO Box 4349, White River		
Postal code:	1240	Cell:	+27825744486
Telephone:	-	Fax:	-
E-mail:	rob@nepid.co.za		
Professional affiliation(s) (if any)	SACNASP (No 400108/95)		

Project Consultant:	Steven Henwood (Henwood Environmental Solutions)		
Contact person:	Steven Henwood		
Postal address:	PO Box 12340, Steiltes		
Postal code:	1213	Cell:	078 672 3645
Telephone:		Fax:	
E-mail:	sheneood@mweb.co.za		

4.2 The specialist appointed in terms of the Regulations_

I, **Robert William Palmer** , declare that --

General declaration:

- I act as the independent specialist in this application;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, Regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- all the particulars furnished by me in this form are true and correct; and
- I realise that a false declaration is an offence in terms of regulation 71 and is punishable in terms of section 24F of the Act.

Signature of the specialist:

Nepid Consultants CC

Name of company (if applicable):

2021-10-18

Date:

SCHOONGEZICHT 66KU

PROPOSED DEVELOPMENT OF FIVE FAMILY HOMES

EIA Specialist Report:
Aquatic Biodiversity Specialist Assessment and Risk Assessment

Field Survey: 21st July 2021
Report V1.0 3rd August 2021

Earth Dam at Schoongezicht 66 KU. [2021-07-21].

Prepared for:

Steven Henwood
Henwood Environmental Solutions (Pty) Ltd
PO Box 12340
STEILTES
1213

Email: shenwood@mweb.c

Prepared by:

Rob Palmer
Nepid Consultants CC
P O Box 4349
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SOUTH AFRICA

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Web: www.nepid.co.za

Disclaimer

This report was based on the author's best scientific and professional knowledge and information available at the time of writing. Although Nepid Consultants has tried to ensure that all information contained within this report is accurate, Nepid does not warrant or assume any legal liability or responsibility for the accuracy, completeness, or usefulness of the information presented in this report.

TERMS OF REFERENCE

"… aquatic assessment and risk assessment for the development of family homes at Lathleka and Inkasi".

[Email request from Steven Henwood, 2021-03-03].

ACKNOWLEDGMENTS

The following are gratefully acknowledged for assisting with the information presented in this report:

- Hannes Snyman, Schoongezicht, Hoedspruit
- Duncan McKenzie, Ecorex, Nelspruit
- Linda McKenzie, Digital Earth, Nelspruit

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GLOSSARY OF TERMS

Watercourse

a) a river or spring;
b) a natural channel or depression in which water flows regularly or intermittently;
c) a wetland, lake or dam into which, or from which, water flows; and
d) any collection of water which the Minister may, by notice in the Gazette, declare to be a watercourse.

[National Water Act (Act No. 36 of 1998)].

1. INTRODUCTION

1.1 Background

The owners of Portion 23 of the farm Schoongezicht 66KU intend to develop five family homes around an existing earth dam, referred to in this report as “Dam A”. This report forms part of the environmental authorisation process and concerns potential impacts of the proposed development on aquatic ecosystems. The report is based on a review of available data and a field survey undertaken in July 2021. The report classifies and delineates aquatic ecosystems and recommends mitigation and monitoring measures, where appropriate.

1.2 Aims of This Report

The aims of this report were:

- to classify and delineate aquatic ecosystems that could be affected by the proposed development;
- assess the ecological risks of the proposed development on aquatic ecosystems;
- provide a reasoned opinion as to whether the proposed activity should be authorised in terms of potential impacts on aquatic ecosystems; and
- recommend buffer zones and other mitigation and monitoring measures.

1.3 Expertise of the Specialist

This report was prepared by Rob Palmer, PhD (Zoology). Rob has over 25 years’ experience in aquatic systems and specialist knowledge of river regulation and river ecology. He has undertaken numerous environmental assessments throughout Africa, mostly concerning water resource developments and mining. He is a member of the SA Council for Natural Scientific Professions (Appendix A), and an accredited SASS5 biomonitoring practitioner (Appendix B). His CV is included in Appendix C. A Declaration of Independence is included in Appendix D.

2. STUDY AREA

2.1 General

The proposed development is about 25 km east of Hoedspruit, Mopani District, Limpopo Province (Figure 2-1). The area is adjacent to the Klaserie and Timbavati Private Game Reserves.

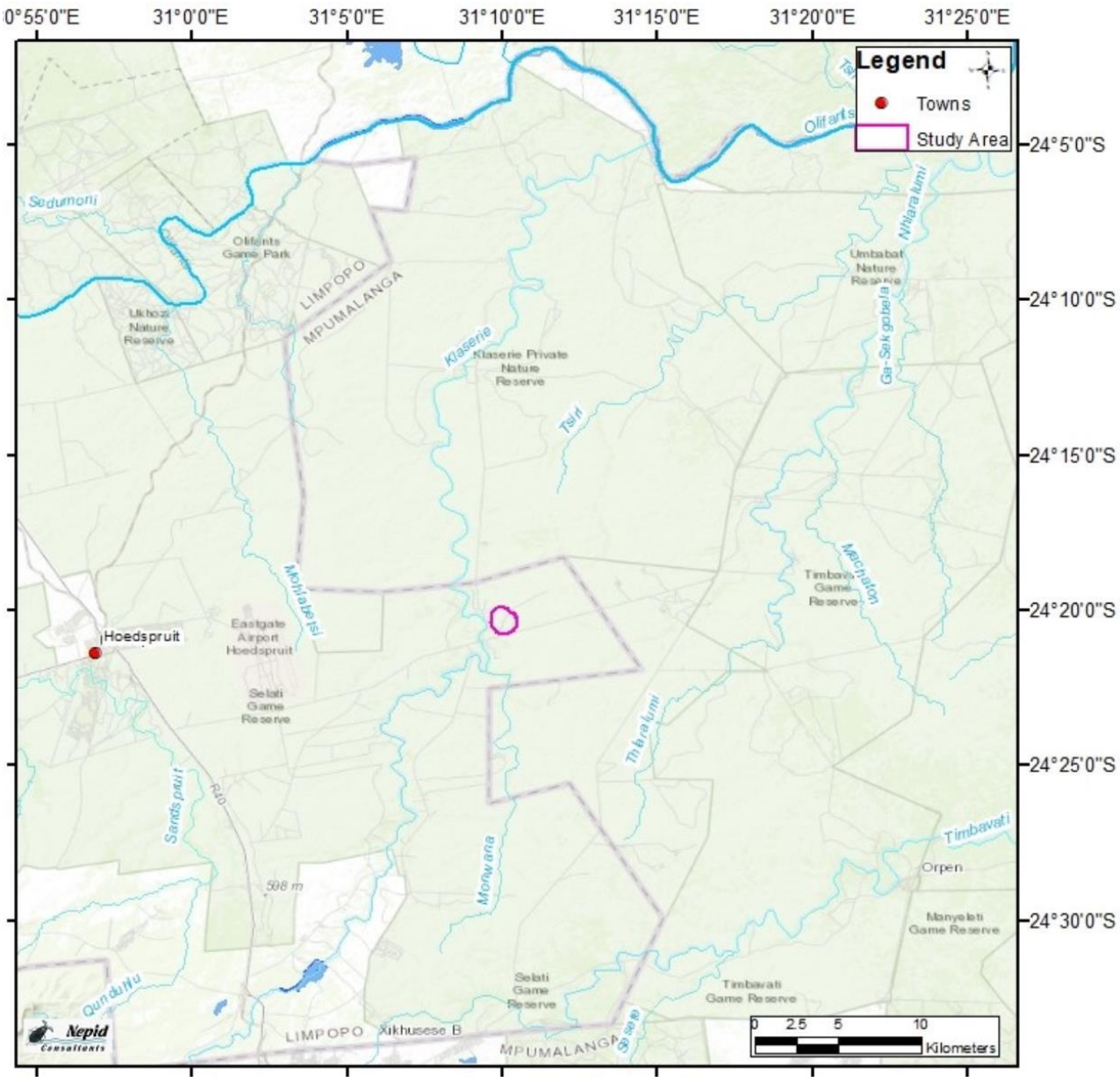


Figure 2-1. General Locality Map.

2.2 Detail

The proposed development footprint covers an area of 18.8 hectares immediately north and east of an existing earth dam (Figure 2-2). The Study Area for this report considered all aquatic ecosystems within 500 m of the proposed development area, as required in terms of Government Notice 509 (26th August 2016). The Study Area for this report covered an area of about 176 hectares (Figure 2-2).

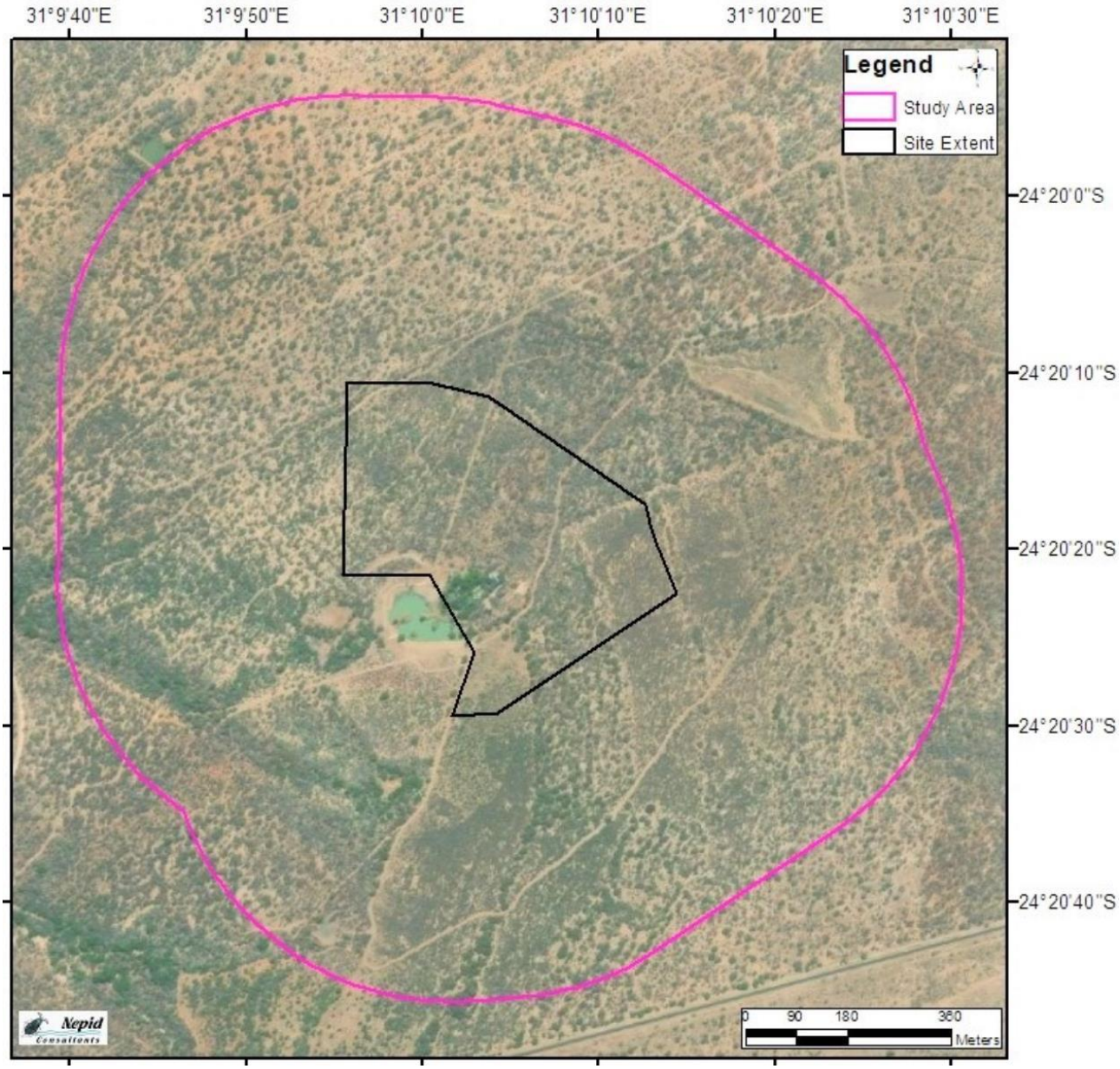


Figure 2-2. Detailed Locality Map.

[Source: Maxar World Imagery 2020-08-01].

3. METHODS

3.1 Approach

This report is based on a review of relevant data and a field survey undertaken in May 2021. The report addresses the requirements of:

- Procedures for the Assessment and Minimum Criteria for Reporting on identified Environmental Themes in terms of Sections 24(5)(a) and (h) and 44 of the National Environmental Management Act, 1998 (Act No. 107 of 1998) ("NEMA"), when applying for Environmental Authorisation" ("the Protocols") (Government Notice No. 320 as published in Government Gazette No. 43110 on 20 March 2020); and
- Department of Water Affairs and Sanitation Risk Assessment Matrix, dated September 2016, required for a General Authorisation to impede or divert the flow of water in a watercourse (National Water Act Section 21c), and/or alter the bed, banks, course or characteristics of a watercourse (National Water Act Section 21i) (DWA 2016).

3.2 Review

A desktop review of available ecological data pertaining to the general vicinity of the proposed development revealed the following important sources of information:

- Google Earth™ images (various dates);
- Maxar World Imagery, dated 2020-08-01;
- Terrestrial biodiversity assessment (Ecorex 2021);
- Limpopo Conservation Plan version 2 (Desmet *et al.* 2013); and
- The National Environmental Screening Tool (https://screening.environment.gov.za).

3.3 Field Survey

Duration:	0.5 day
Date:	21st July 2021
Season:	Autumn (dry)
Timing:	The timing of the field survey was some three months after the tropical storm "Eloise" had caused widespread flooding. The earth dam contained water but was not spilling at the time of the survey.
Data Quality:	The quality of data presented is appropriate for the purposes of this report.

3.4 Risk Assessment

Risks of the proposed development on aquatic ecosystems were assessed using the Department of Water Affairs and Sanitation Risk Assessment Matrix, dated September 2016. The method complies with General Authorisations for impeding or diverting the flow of water in a watercourse (National Water Act Section 21c), and/or altering the bed, banks, course or characteristics of a watercourse (National Water Act Section 21i) (DWA 2016).

3.5 Assumptions and Limitations

3.5.1 Report Focus

This report focusses on aquatic ecosystem classification, delineation, functional assessment and present ecological state, but does not address various aspects related to aquatic ecosystems, such as hydrology, water abstraction, hydraulics, amphibians, reptiles or waterbirds. However, the level of detail collected and presented is considered appropriate for the purposes of this report.

3.5.2 Spatial Resolution

The wetland boundaries are considered accurate to about 5 m, as they were based on available Google Earth imagery and a standard, hand-held GPS. Higher resolution delineation would need more detailed assessment of soils, differential GPS and boundaries pegged in the field, but this is not considered necessary for the purposes of this report.

3.5.3 Temporal Resolution

Baseline data for this report were based on one field survey so seasonal variation in baseline conditions were not quantified. However, a single survey is considered appropriate for the purposes of this report.

4. REGIONAL CONTEXT

4.1 Geology

The geology of the Study Area is characterised by unnamed potassic granite and granodiorite of the Swazian Era. Soils in the area are characterised by course sandy texture, low pH and have a high risk of erosion (Schulze and Horan 2006).

4.2 Topography

The topography of the Study Area is flat to very gently undulating.

4.3 Rainfall

Mean annual rainfall is low and estimated at 536 mm (Hijmans *et al.* 2005).

4.4 Climate

Climate is in the Study Area is classified as *Arid Hot Steppe* (BSh) in terms of The Köppen climate classification system.

4.5 Vegetation

Vegetation in the Study Area is classified as *Granite Lowveld* (SVL 3), which has a conservation status of *Least Concern* (Government Notice 1002, 9th December 2011).

4.6 Aquatic Ecoregion

The Study Area is located within the *Lowveld Level I* Aquatic Ecoregion (*sensu* Kleynhans *et al.* 2005). This ecoregion is described as "…*hot and dry, … characterised by plains with a low to moderate relief and vegetation consisting mostly of Lowveld Bushveld types. Open hills with high relief and low mountains with high relief are present towards the west on the boundary with the North Eastern Highlands*." (Kleynhans et al. 2005).

4.7 Freshwater Priority Areas

There are no National Freshwater Priority wetlands or rivers within the area assessed for this report (Nel 2011).

4.8 Conservation Plan

The Limpopo Conservation Plan version 2 classifies the proposed development area as a *Critical Biodiversity Area 1*. These are areas identified as irreplaceable and critical for biodiversity (Desmet *et al.* 2013). The main objective for these areas is to maintain them in a natural state with limited or no biodiversity loss, and to rehabilitate degraded areas to a natural or near natural state (Desmet *et al.* 2013).

4.9 Ecological Importance and Sensitivity

No information was available on the Present Ecological State of aquatic ecosystems within the proposed development footprint as the area falls outside areas that have been rated by the Department of Water Affairs and Sanitation (DWS 2014).

4.10 Drainage

Drainage within the Study Area comprises episodic drainage lines within the Klaserie River Catchment, within Quaternary Catchment B73B, in the lower Olifants Water Management Area (Figure 4-1).

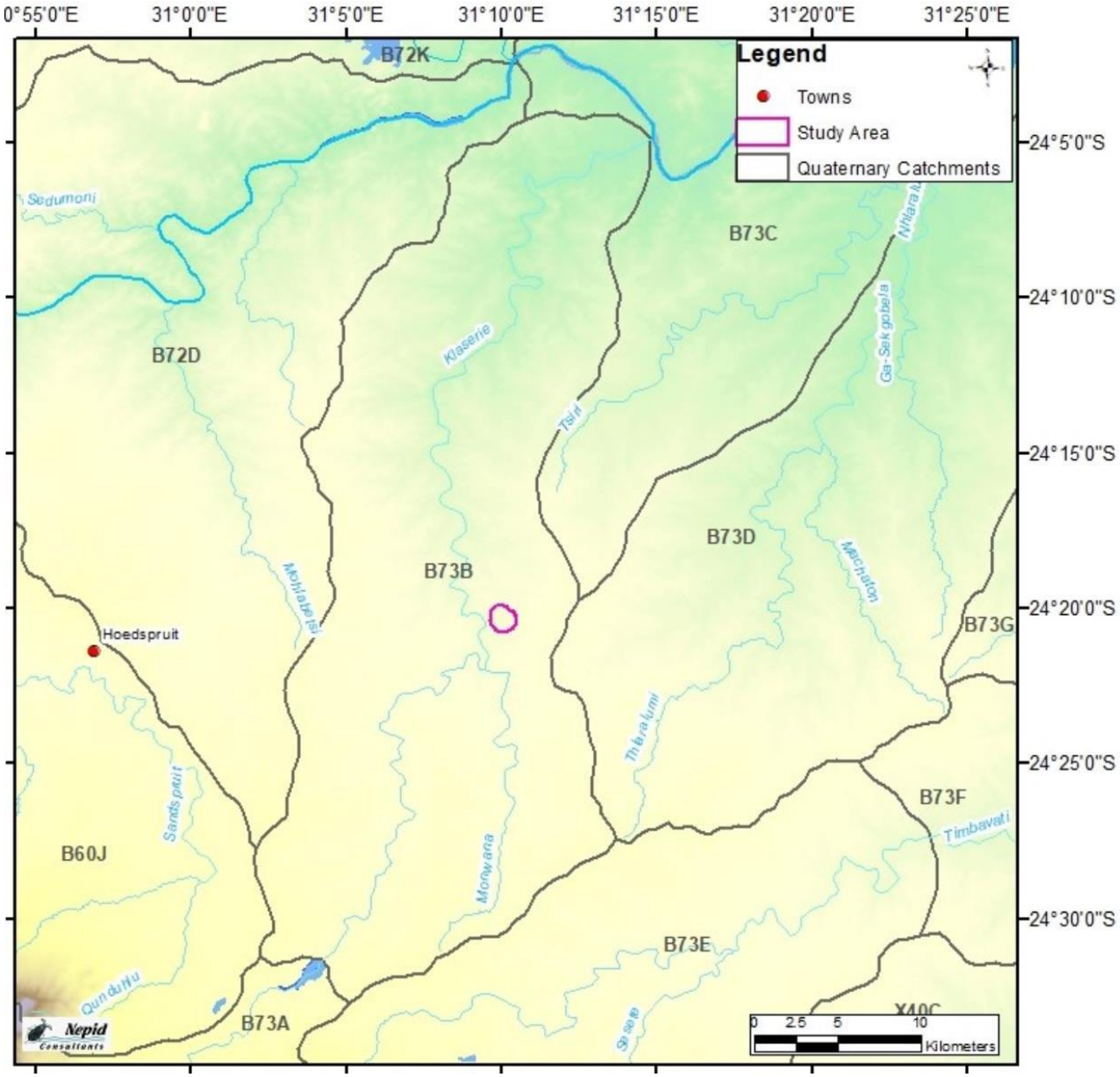


Figure 4-1. Quaternary Catchments.

4.11 Aquatic Sensitivity

The National Environmental Screening Tool indicated that the aquatic biodiversity sensitivity of the Study Areas is "*Very Low"* (Figure 4-3). The closest aquatic ecosystem with high sensitivity is the Klaserie River, which runs about 800 m west of the proposed development at its closest point (Figure 4-2). The field survey for this report confirmed that the aquatic biodiversity sensitivity of the Study Area is "*Very Low"*.

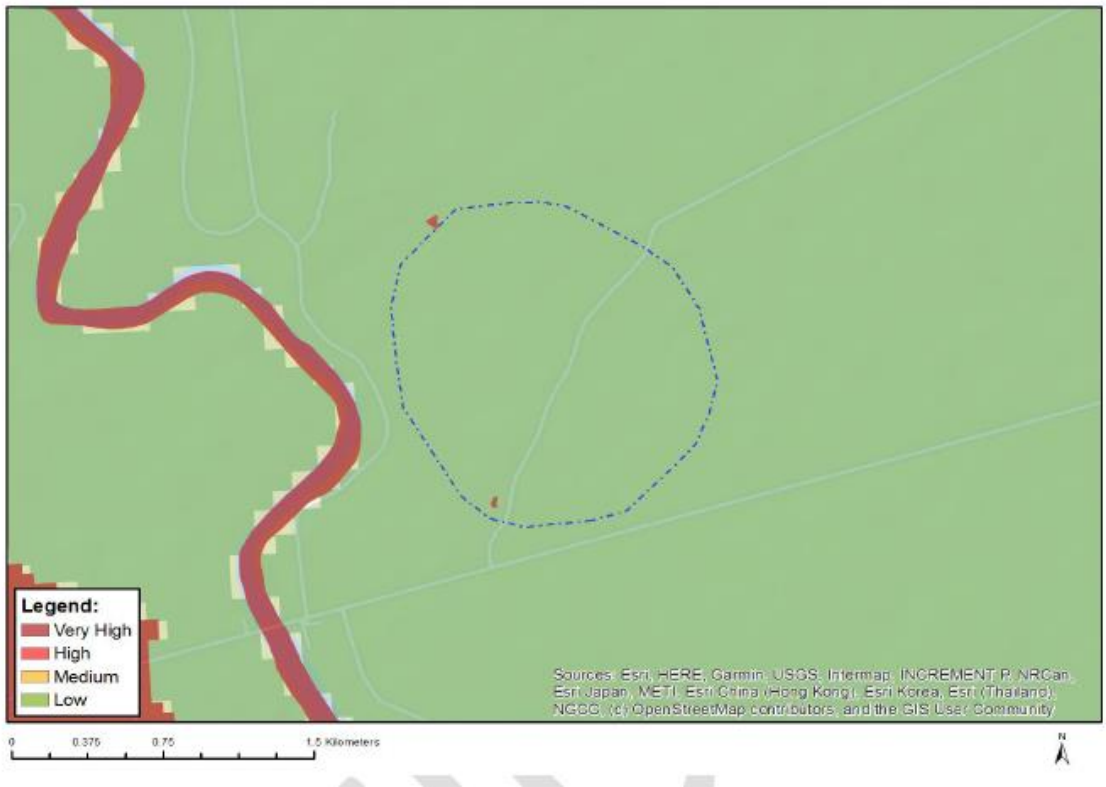


Figure 4-2. Map of Aquatic Biodiversity Theme Sensitivity.

4.12 Land Use

Land use in the Study Area during the field survey in July 2021 comprised private game reserve in what had formerly been a commercial farm. The central portion of the Study Area comprised an existing homestead and earth dam (Figure 2-2). The surrounding vegetation comprised secondary bushveld in various stages of succession.

5. BASELINE ASSESSMENT

5.1 Aquatic Ecosystems Classification

One artificial hydro-geomorphic aquatic ecosystem type was identified within the potential footprint of the proposed development as follows:

Type: **Earth Dam**.

Distribution: **Dam A.** The proposed development is centred around an existing earth dam that covers an area of about 0.7 hectares at full supply and referred to in this report as "Dam A" (Figure 5-1).

Ephemeral Dams. Three smaller dams were located within the Study Area (Figure 5-2). The biggest of these is upslope and outside of the potential area of influence of the proposed development (Figure 2-2).

Flow Type: All dams within the Study Area are located on ephemeral drainage lines. Dam A received inflow from two ephemeral drainage lines, but inflow was augmented by water pumped from the Klaserie River (Hannes Snyman, pers. com). Dam was therefore maintained as a permanent water body, whereas the remaining dams were ephemeral.

Soils: Alluvial sand and clay.

Flora: Plant species diversity was low, with a total of 23 species recorded (Ecorex 2021). Wetland plants on the edge of Dam A comprised mostly *Eriochloa meyeriana* and the emergent sedge *Schoenoplectus corymbosus.*

Figure 5-1. Dam A on Schoongezicht at S24.340 237, E31.166332 [2021-07-21].

Figure 5-2. Ephemeral Dams on Schoongezicht at S24.336624, E31.172 260 [Duncan McKenzie: 2021-05-05].

Drainage Lines

The Study Area contained a number of ephemeral drainage lines (Figure 5-3). These were mapped for the purposes of this study but not considered further because they do not support aquatic biota and therefore do not constitute aquatic ecosystems.

Figure 5-3. Ephemeral Drainage Lines at Schoongezicht [2021-07-21].

5.2 Aquatic Ecosystem Delineation

Delineation of aquatic ecosystems within the Study Area is shown in Figure 5-4. There are no natural aquatic ecosystems within the proposed development area.

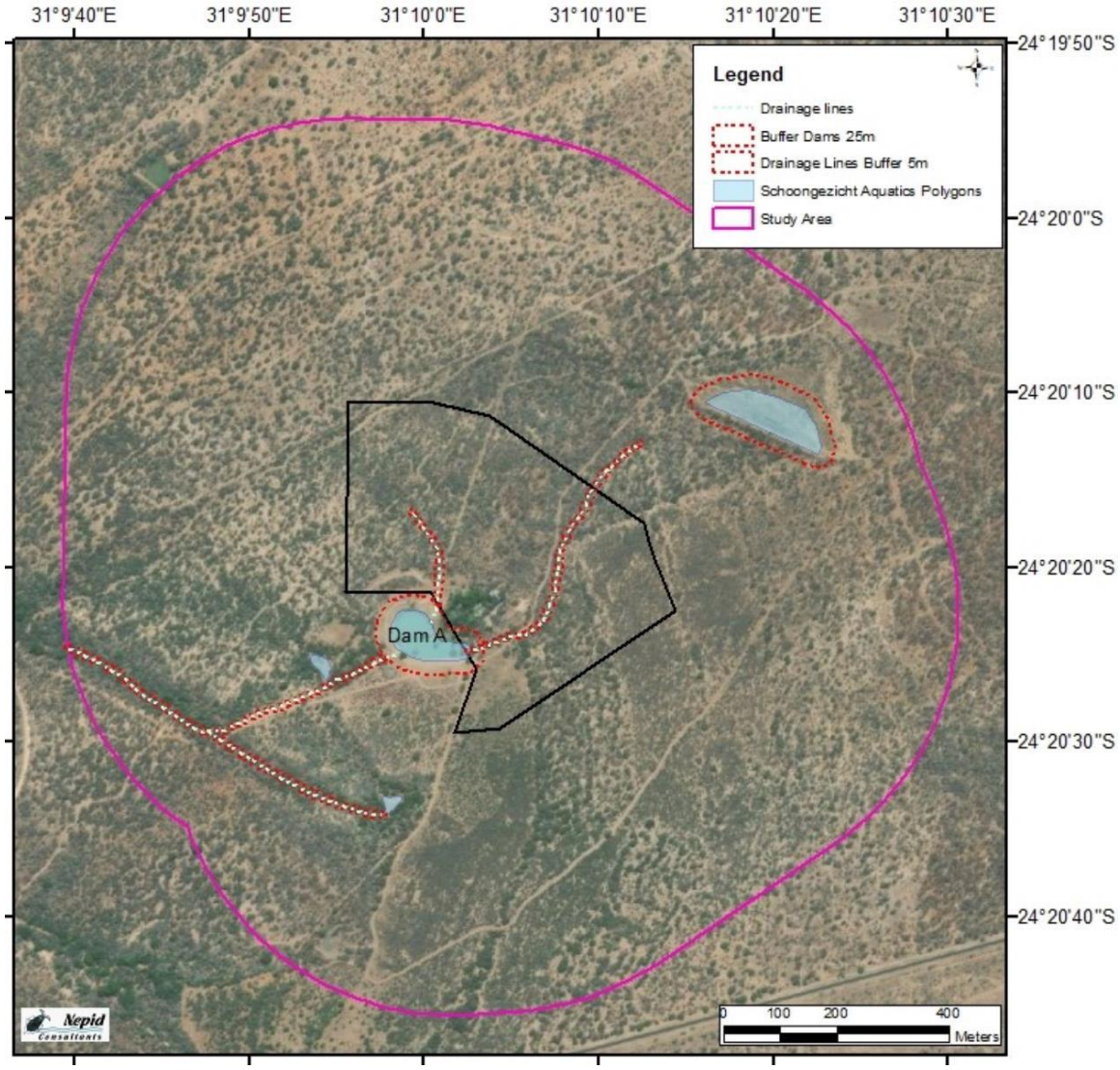


Figure 5-4. Aquatic Ecosystem Delineation.

5.3 Aquatic Biota

Dam A

The composition and abundance of aquatic biota in Dam A comprised taxa that are hardy, tolerant and widespread. At least one Nile Crocodile was present in Dam A. The global conservation status of Nile Crocodile is listed as *Least Concern*, whereas their regional conservation status is listed as *Vulnerable* (http://speciesstatus.sanbi.org). The diversity of benthic invertebrates was low, with two four recorded, namely *Anispos* sp., Corixidae, Orthclad Chironomidae, and the alien invasive snail *Tarebia granifera.* However, there a was a high abundance of planktonic taxa, most notably the crustaceans *Lovenula sp., Metadiaptomus sp.* and *Moina sp.* (Figure 5-4). Blue-green algae were notably absent. Two species of fish were recorded in the Dam A, namely *Oreochromis mossambicus* and *Enteromius viviparus* (Figure 5-5).

Figure 5-5. Photographs of Selected Aquatic Invertebrates Recorded in Dam A. [2021-05-05].

A) *Lovenula* sp. (Diaptomidae); B) *Moina* sp. (Moinidae); C) *Anisops* sp. (Notonectidae); D) *Metadiaptomus sp.* (Diaptomidae).

Figure 5-6. Photographs of Fish Recorded in Dam A. [2021-07-21].

A) *Enteromius viviparus* (Cyprindae); B) *Oreochromis mossambicus* (Cichlidae).

Ephemeral Dams

Ephemeral dams within the Study Area were dry during the field survey in July 2021. However, the dams contained puddles of shallow water in May 2021, when Duncan McKenzie surveyed terrestrial ecology within the Study Area. Duncan collected water samples from the ephemeral puddles and these contained a high abundance of planktonic taxa, most notably the *Chlamydomonas* sp., *Euglena* spp., *Eudorna* sp. and *Volvox globator* (Figure 5-7). Blue-green algae were notably absent. The diversity of benthic invertebrates was low, with two taxa recorded, namely *Hydra* sp. and the snail *Bulinus forskalii* (Figure 5-7). No species of conservation concern were recorded.

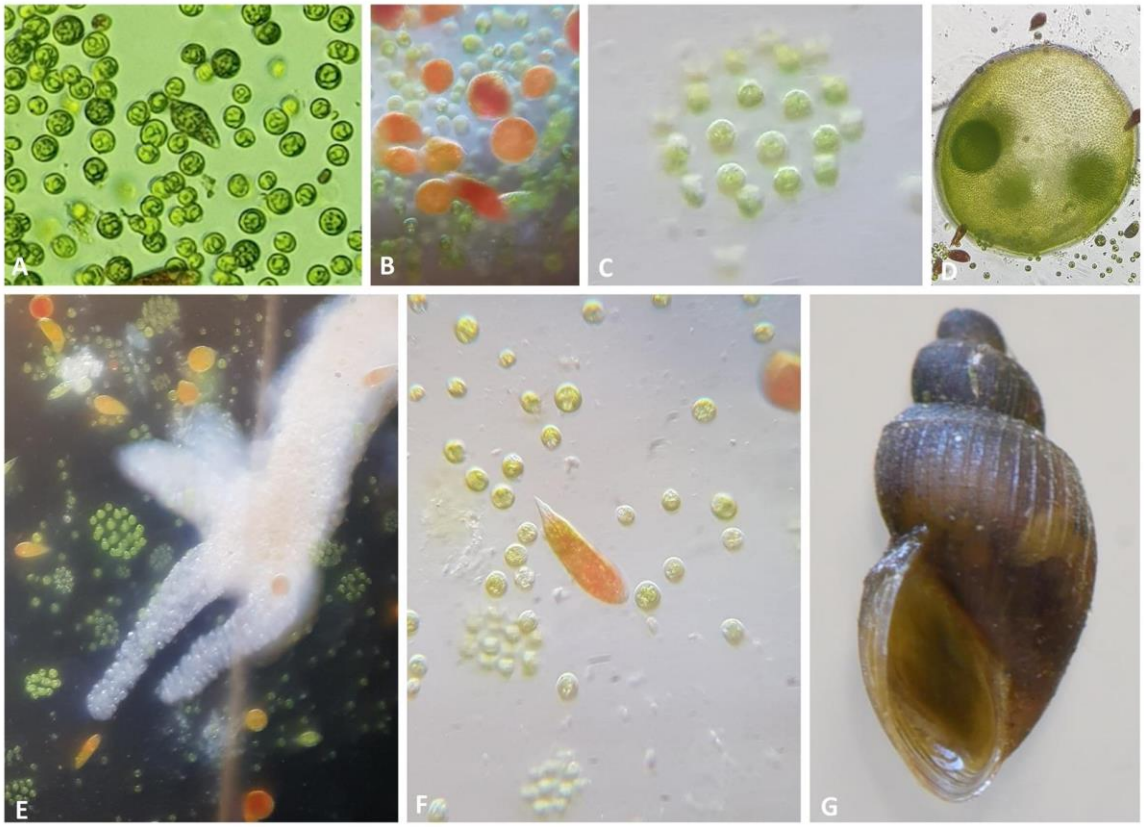


Figure 5-7. Photographs of Selected Aquatic Biota Recorded in Dam B at Schoongezicht. [2021-05-05].

A) *Chlamydomonas* sp. (Chlamydomonadaceae); B) *Euglena* sp. (Euglenaceae); C) *Eudorina* sp. (Volvocaceae); D) *Volvox globator* (Volvocaceae); E) *Hydra* sp. (Hydridae); F) *Euglea sanguinea* (Euglenaceae); and G) *Bulinus forskalii* (Bulinidae).

5.4 Present Ecological State

Present Ecological State of aquatic ecosystems was not assessed for this report because there were no natural aquatic ecosystems in the Study Area, and the available assessment methods do not apply to artificial ecosystems, such as earth dams.

5.5 Ecological Importance and Sensitivity

Ecological Importance and Sensitivity of aquatic ecosystems was not assessed for this report because there were no natural aquatic ecosystems in the Study Area, and the available assessment methods do not apply to artificial ecosystems, such as earth dams.

6. RISK ASSESSMENT

The following section summarises the key risks of the proposed housing development on aquatic ecosystems. Detailed scoring of the Risk Assessment is included in Appendix F.

CONSTRUCTION PHASE

6.1 Impact of Construction on Stability of Episodic Drainage Lines

Construction of the proposed family homes could disturb the stability of episodic drainage lines within the Study Area and increase the risks of erosion. The severity of this impact can be prevented by ensuring that no development takes place within 5 m of any drainage line. Disturbance of soils during construction could create conditions suitable for colonisation of alien invasive plants, but alien plants can be controlled, so the severity of this impact on biota was rated as "not impacted" (1/5). Construction activities are unlikely to impact measurably on the flow regime, water quality or aquatic habitats, so the severities of these aspects were rated as "not impacted" (1/5). The spatial extent of construction impacts on the stability of drainage lines is likely to be limited to no further than Dam A, so this aspect was rated as "area-specific" (1/5). The impacts of construction on the stability of the drainage lines are unlikely to alter the ecological state, so duration was rated as "not impacted" (1/5). The frequency of construction is once-off, so this aspect was rated as "annual or less" (1/5). The probability of this impact is unlikely, so this aspect was rated as 2/5. Increased erosion would be detected "without much effort", so detection was rated as 2/5. The overall risk of construction on the stability of the drainage lines is rated with high confidence as **Low.**

6.2 Impact of Solid Waste on Episodic Drainage Lines

Construction of the proposed family homes could generate increased solid wastes in the form of excess building materials, concrete, glass, plastics and other wastes. However, excess building material can be managed with standard house-keeping. Solid waste is therefore unlikely to impact measurably on the flow regime, water quality, habitats or biota in the drainage lines or earth dam, so the severities of these aspects were rated as "not impacted" (1/5). The spatial extent of solid waste is likely to be limited to the development footprint, so this aspect was rated as "area-specific" (1/5). The impacts of solid waste on episodic drainage lines are reversible, so duration was rated as "not impacted" (1/5). The frequency of activity is once-off, so this aspect was rated as "annual or less" (1/5). The probability of this impact is unlikely, so this aspect was rated as 2/5. The presence of solid waste will be easily observed, so detection was rated as 1/5. The overall risk of solid waste disposal during construction on episodic drainage lines is rated with high confidence as **Low.**

CONSTRUCTION AND OPERATION PHASE

6.3 Impact of Wastewaters on Water Quality

Construction and operation of the proposed family homes could generate increased waste waters that could impact negatively on the quality of groundwater and surface water in Dam A. The most likely sources of water contamination during construction are ablutions, equipment washing, spills and leaks. The most likely sources of water contamination during operation are seepage from septic tanks. The drainage lines are dry for most of the time so the chances that wastewater contaminants would reach Dam A are unlikely. A certain amount of seepage is expected from septic tanks from time to time, but the numbers of people that are expected to inhabit the proposed homes are limited, so excessive seepage from the septic tanks is not expected. Furthermore, the occupancy rate of the proposed homes is expected to be infrequent, and this further reduces the likelihood of seepage from septic tanks. The severities of wastewater contamination on the flow regime, water quality, habitats and biota were rated as "not impacted" (1/5). The spatial extent of potential wastewater contamination is likely to be limited to Dam A, so this aspect was rated as

"area-specific" (1/5). The impacts of potential wastewater contamination on Dam A are reversible, so duration was rated as "not impacted" (1/5). The frequency of activity is once-off, so this aspect was rated as "annual or less" (1/5). The probability of this impact is unlikely, so this aspect was rated as 2/5. The presence of wastewater contamination will be easily observed, so detection was rated as 1/5. The overall risk of wastewater contamination during construction and operation on Dam A is rated with high confidence as **Low.**

7. RECOMMENDATIONS

7.1 Authorisation

Authorisation of the proposed developments in relation to potential impacts on aquatic ecosystems is recommended on the following grounds:

- the proposed housing development will have minimal impact on aquatic ecosystems and no direct or indirect impacts on natural aquatic ecosystems;
- potential risks to aquatic ecosystems can be minimised by adhering to the recommended control measures as detailed in Appendix E.

7.2 Buffer Zones

The following buffer zones are recommended:

- 5 m from ephemeral drainage lines; and
- 25 m from the Full Supply Level of Dam A

(Figure 7-1).

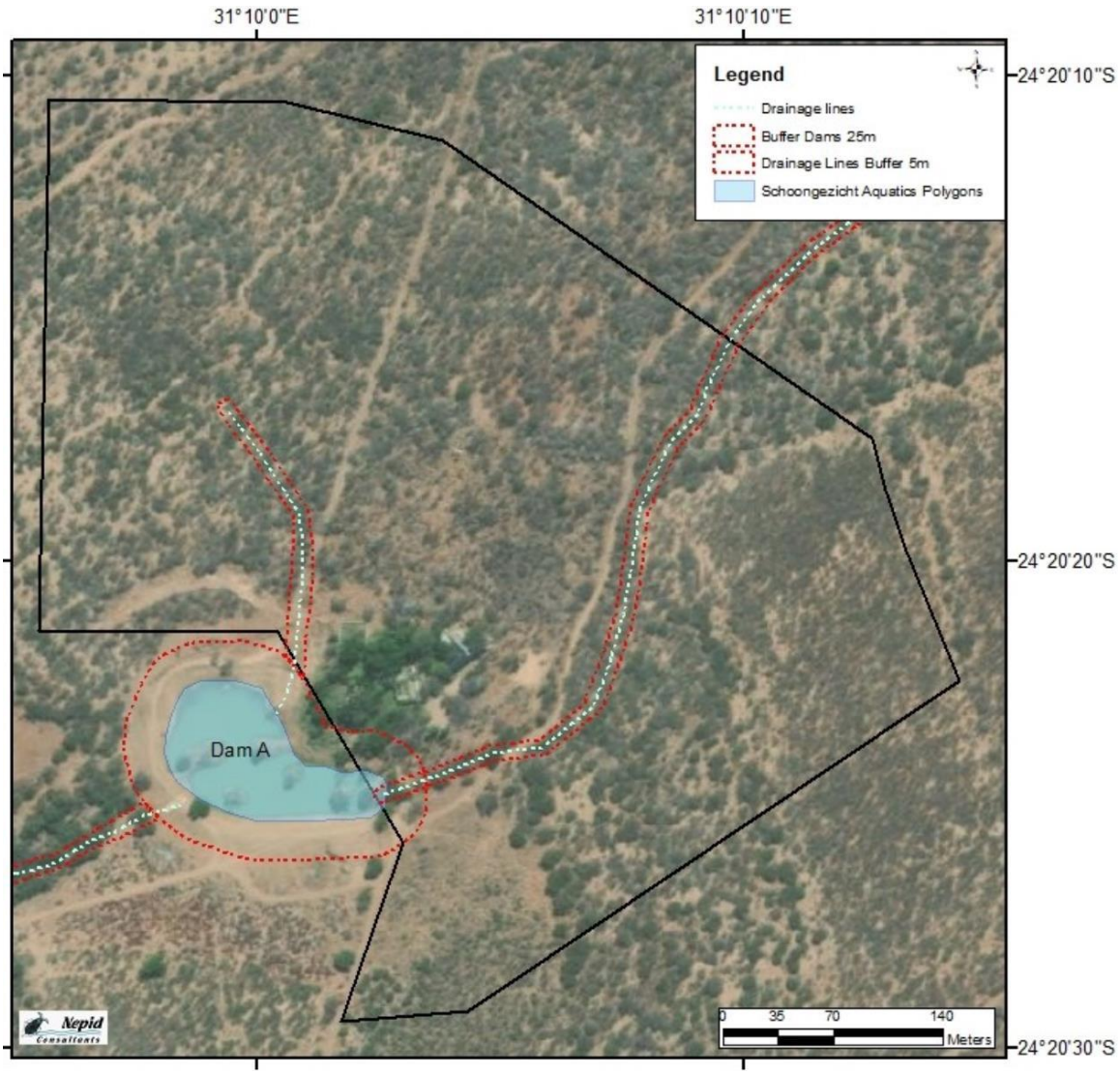


Figure 7-1. Proposed Buffer Zones.

7.3 Monitoring

Monitoring of aquatic ecosystems is not considered necessary because of the low risks of the proposed development on aquatic biodiversity.

8. REFERENCES

Department of Water Affairs and Sanitation (DWA) 2016. General authorisations in terms of Section 39 on the National Water Act, 1998 (Act No. 36 of 1998) for water uses as defined in Sections 21(c) and/or Section 21(i). https://www.dwa.gov.za/Documents/.

Department of Water and Sanitation (DWS) 2014. A Desktop Assessment of the Present Ecological State, Ecological Importance and Ecological Sensitivity per sub Quaternary reaches for Secondary Catchments in South Africa: Compiled by RQIS-RDM: https://www.dwa.gov.za/iwqs/rhp/eco/peseismodel.

Ecorex 2021. Terrestrial Ecology Study. Schoongezicht, Mopani District, Limpopo. Specialist Report prepared by Duncan McKenzie, Ecorex, for Henwod Environmental Solutions (Pty)Ltd. June 2021.

Kleynhans, C. J., Louw, M. D., and Moolman, J. 2007. Reference frequency of occurrence of fish species in South Africa. Report produced for the Department of Water Affairs and Forestry (Resource Quality Services) and the Water Research Commission.

Kleynhans, C. J., Thirion, C. and Moolman, J. 2005. A Level I River Ecoregion classification System for South Africa, Lesotho and Swaziland. Report No. N/0000/00/REQ0104. Resource Quality Services, Department of Water Affairs and Forestry, Pretoria, South Africa.

Mpumalanga Department of Economic Development, Environment and Tourism (MDEDET) 2012. Environmental Authorisation. Application 17/2/3/E-165. Portion 2 of the farm Roodekrantz 27KU, Portion 23 of the farm Argyle 46KU, and the remainder of the farms Buffelsbed 26KU an Op Goedehoop 25KU, Ingwelala Shareblock, Umbabat Nature Reserve, Mpumalanga Province.

Mpumalanga Tourism and Parks Agency (MTPA) 2011. MTPA, CSIR, SANBI. MBSP Freshwater Assessment 2011 [Vector] 2011. Available from the Biodiversity GIS website, downloaded on 20 April 2018.

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

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. K5/1801.

Ollis, D. J., Snaddon, C. D., Job, N. M., Mbona, N. 2013. Classification system for wetlands and other aquatic ecosystems in South Africa. User manual: Inland systems. SANBI Biodiversity Series 22. South African National Biodiversity Institute.

Schulze, R.E. and Horan, M.J.C. 2006. Soils: Hydrological Attributes. In: Schulze, R.E. (Ed). 2006. South African Atlas of Climatology and Agrohydrology. Water Research Commission, Pretoria, RSA, WRC Report 1489/1/06, Section 4.2.

9. APPENDICES

Appendix A: SACNASP Certificate

SACNASP

South African Council for Natural Scientific Professions

herewith certifies that

Robert William Palmer

Registration Number: 400108/95

is a registered scientist

in terms of section 20(3) of the Natural Scientific Professions Act, 2003
(Act 27 of 2003)
in the following fields(s) of practice (Schedule 1 of the Act)

Biological Science (Professional Natural Scientist)

Effective 25 October 1995 Expires 31 March 2022

Chairperson

Chief Executive Officer

To verify this certificate scan this code

Appendix B: SASS5 Certificate

NATIONAL AQUATIC ECOSYSTEM HEALTH MONITORING PROGRAMME

Water and Sanitation
Environment Affairs

Water Research Commission

CERTIFICATE OF ACCREDITATION

This is to certify that

Rob Palmer

has met the requirements of the
River Health Programme as a SASS5 Practitioner

COMPETENCY IN THE FOLLOWING AREAS HAVE BEEN DEMONSTRATED:

UNDERSTANDING OF THE SCOPE AND APPLICATION OF THE SASS5 METHOD.

DEMONSTRATION OF THE CORRECT SAMPLING PROTOCOLS

DEMONSTRATION OF THE CORRECT SAMPLE PREPARATION PROTOCOLS

IDENTIFICATION OF AQUATIC MACROINVERTEBRATES

COMPETENCY IS VALID FOR 3 YEARS FROM CERTIFICATE DATE

NATIONAL SASS5 AUDITOR

13 April 2019
DATE

Appendix C: Curriculum Vitae

Curriculm Vitae: One Page **Robert William Palmer**

Profession	:	Aquatic Ecologist
Date of Birth	:	15 Dec 1961
Name of Firm	:	Nepid Consultants CC
Position in Firm	:	Director
Years with Firm	:	16
Nationality	:	South African
Place of birth	:	Grahamstown, South Africa
Marital Status	:	Married

Qualifications:

• PhD [Zoology]	Rhodes University, Grahamstown, RSA	1992
• BSc (Hons) [Mammalogy]	Pretoria University, RSA	1985
• BSc [Zoology]	University of Cape Town, RSA	1984

Professional Registrations:

- SA Council for Natural Scientific Professions (Biological Science): No 400108/95
- SASS5 Accreditation (Dept. Water Affairs & Sanitation)

Professional Societies

- International Association for Impact Assessment (South Africa)
- Southern African Society of Aquatic Scientists

Languages:

	Speaking	Reading	Writing
English (home):	Excellent	Excellent	Excellent
Afrikaans:	Good	Good	Poor
Xhosa:	Fair	Poor	Poor
Portuguese:	Poor	Fair	Poor

Countries of Work Experience (short-term consultancies):

Southern Africa:	Angola, Lesotho, Malawi, Namibia, South Africa, Swaziland, Zambia.
East Africa:	Eritrea, Ethiopia, Mozambique, Tanzania, Uganda.
West Africa:	Burkina Faso, Guinea, Mali, Sierra Leone.
Central Africa:	Cameroon, DRC.
North Africa:	Morocco.
Asia:	Afghanistan.

Key Qualifications: Freshwater Biodiversity - Rivers & Wetlands

- Over 25 years of experience of river research and management, aquatic surveys, data analysis and report writing;
- design of environmental monitoring and mitigation programmes, impact assessment and water resource planning;
- Team leader for various mining and water resource development projects and environmental impact assessments involving coordination of multi-disciplinary teams; and
- Specialist knowledge of river ecology; instream flow requirements; ecological impacts of dams; wetland delineation; aquatic macroinvertebrates; control of pest blackflies; and freshwater fish.

Employment Record:

2005 – present	Nepid Consultants CC	Founder Director
1997 – 2004	AfriDev Consultants Pty Ltd	Associate from 1997; Director from 2000
1991 – 1997	Onderstepoort Veterinary Institute	Research Fellow
1986 – 1991	Rhodes University	PhD Student

Contact Details: email: rob@nepid.co.za; Tel: +27(0)82 574 4486; PO Box 4349, White River, 1240, RSA
website: www.nepid.co.za

Dated: 23rd June 2021

Page 1

Appendix D: Declaration of Independence

The Specialist Appointed in terms of the Regulations

I, **Robert William Palmer**, as the appointed specialist hereby declare/affirm the correctness of the information provided as part of the application, and that I:

- in terms of the general requirement to be independent (tick which is applicable):

✓	other than fair remuneration for work performed/to be performed in terms of this application, have no business, financial, personal or other interest in the activity or application and that there are no circumstances that may compromise my objectivity; or
	am not independent, but another EAP that is independent and meets the general requirements set out in Regulation 13 has been appointed to review my work (Note: a declaration by the review specialist must be submitted);

- have expertise in conducting specialist work as required, including knowledge of the Act, regulations and any guidelines that have relevance to the proposed activity;
- will ensure compliance with the EIA Regulations 2014;
- will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the application;
- will take into account, to the extent possible, the matters listed in regulation **18** of the regulations when preparing the application and any report, plan or document relating to the application;
- will disclose to the proponent or applicant, registered interested and affected parties and the competent authority all material information in my possession that reasonably has or may have the potential of influencing any decision to be taken with respect to the application by the competent authority or the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority (unless access to that information is protected by law, in which case I will indicate that such protected information exists and is only provided to the competent authority);
- declare that all the particulars furnished by me in this form are true and correct;
- am aware that it is an offence in terms of Regulation 48 to provide incorrect or misleading information and that a person convicted of such an offence is liable to the penalties as contemplated in section 49B(2) of the National Environmental Management Act, 1998 (Act 107 of 1998).

R.W.P.

Signature of the specialist

Nepid Consultants CC

Name of company

2020-03-22

Date

R.M.Mokoena

Signature of the Commissioner of Oaths for project/application:

2020.03.22

Date:

Warrant Officer

Designation:

Official stamp (below)

SUID-AFRIKAANSE POLISIEDIENS
CSC
2020 -03- 22
COMMUNITY SERVICE CENTRE
WITRIVER
SOUTH AFRICAN POLICE SERVICE

Appendix E: Risk Matrix

RISK MATRIX (Based on DWS 2015 publication: Section 21 c and I water use Risk Assessment Protocol)

NAME and REGISTRATION No of SACNASP Professional member: RW Palmer Reg no. 400108/95

Risk to be scored for construction and operational phases of the project. MUST BE COMPLETED BY SACNASP PROFESSIONAL MEMBER REGISTERED IN AN APPROPRIATE FIELD OF EXPERTISE.

					Severity															
No.	**Phases**	**Activity**	**Aspect**	**Impact**	**Flow Regime**	**Water Quality**	**Habitat**	**Biota**	**Severity**	**Spatial scale**	**Duration**	**Consequence**	**Frequency of activity**	**Frequency of impact**	**Legal Issues**	**Detection**	**Likelihood**	**Significance**	**Risk Rating**	**Confidence level**	Control Measures	**PES AND EIS OF WATERCOURSE**
1	Construction	Clearing of vegetation	Erosion of Drainage Line. Soil disturbance and compaction. Alien invasive vegetation.	Impact of Construction on Stability of Episodic Drainage Lines	1	1	1	1	**1.0**	1	1	**3.0**	1	2	5	2	**10.0**	**30**	**Low**	90	**1a) Buffer Zones.** The following buffer zones of no development are recommended: - at least 25 m from the edge of the Full Supply Level of Dam A; and - at least 5 m from all episodic drainage lines (See Figure 7-1). **1b) Erosion and Sediment Control.** Erosion and sediment control measures must be implemented during construction and operation to minimise transport of sediment into watercourses. Measures to control erosion and sediment transport may include sandbags, straw bales, grass fences and geotextile fences. Gabions or other engineering solutions may need be needed, where necessary. Sediment-laden water should be retained onsite for as long as possible to maximise settling of sediment onsite. No sediment-laden water should be discharged into receiving watercourses. **1c) Control Alien Invasive Vegetation.** Alien invasive vegetation within the proposed buffer zones must be controlled. Personnel tasked to control alien vegetation should receive appropriate training in the following: methods and control measures; equipment and techniques; types of herbicides and dosages applied; mixing techniques; storage of chemicals and equipment; health and safety issues; plant identification; procedures for equipment washing; equipment maintenance; record keeping, inter alia.	PES = n/a EIS = n/a

2	Construction	Discard of excess building materials (concrete, rubble; glass, tiles, plastics etc).	Solid waste disposal.	Impact of Solid Waste on Episodic Drainage Lines	1	1	1	1	**1.0**	1	1	**3.0**	1	2	5	1	**9.0**	**27**	**Low**	80	**2a) Housekeeping.** Standard practises for good housekeeping should be applied. All excess construction materials, rubble and any foreign materials must be removed from the site as soon as practically possible and disposed of appropriately. Bins must have closed lids to prevent their contents from blowing out. Bins must be emptied at regular intervals and all wastes taken to the nearest formal landfill site. Wastes must be covered with a tarpaulin or appropriate cover when transported.	PES = n/a EIS = n/a
3	Construction and Operation	Ablutions; Equipment Washing; Spills and Leaks Septic Tanks	Wastewater disposal	Impact of Wastewaters on Water Quality in Dam A	1	1	1	1	**1.0**	1	2	**4.0**	3	1	5	2	**11.0**	**44**	**Low**	60	**3a) Ablutions. T**emporary (mobile) on-site toilet facilities should be properly maintained and in working order during construction. No disposal or leakage of untreated sewage should occur on or near the site. Provision shall be made for at least one toilet per 10 personnel on site. Contractors shall not be permitted to use the natural environment as a toilet. **3b) Washing and Maintenance.** Washing of vehicles and equipment must be undertaken outside the proposed buffer zones. Washing and maintenance of vehicles and equipment should be conducted in the areas designated for this purpose.	PES = n/a EIS = n/a

3c) Spills and Leaks. Spill kits must be available onsite during construction to treat small quantities of soils contaminated by hydrocarbons or other contaminants. Large quantities of contaminated soil or other materials should be removed and treated as hazardous waste in an appropriate manner. Standard practices for good housekeeping should be applied. Site tools and equipment such as pumps, compressors and generators should be placed on bermed impermeable sheeting (e.g. polyethylene or other similar material) to prevent hydraulic fluid or fuel leaks from contaminating soil or ground water.

3d) Material Preparation. Concrete batching and preparation of other materials that could impact surface water quality must be undertaken beyond the proposed buffer zones. All reasonable steps must be undertaken to ensure that such materials do not contaminate surface wate quality.

3e) Septic Tanks. Septic tanks must have sufficient capacity to ensure no spillage more than once in 50 years. Septic tanks must be located further than 32 from the Full Supply Level of the Dam A. The septic tanks and associated drains but not be covered with concrete or paving. Sludge must be removed from septic tanks once every five years or less. The reticulation network must include an adequate number of inspection chambers and/or access points so that blockages can be removed easily.

ANNEXURE C: Aquatic Risk Matrix for Crossing

DETAILS OF SPECIALIST AND DECLARATION OF INTEREST

	(For official use only)
File Reference Number:	
NEAS Reference Number:	
Date Received:	

Application for integrated environmental authorisation and waste management licence in terms of the-

(1) National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended and the Environmental Impact Assessment Regulations, 2010; and

(2) National Environmental Management Act: Waste Act, 1998 (Act No. 59 of 2008) and Government Notice 718, 2009

PROJECT TITLE

Proposed construction of a family homestead (Lathleka) and the upgrade of an existing river crossing, on the Remaining Extent 2 of the Farm Schoongezight 66 KU

Specialist:	Dr. A.R. Deacon		
Contact person:			
Postal address:	PO Box 784, Malalane 1320		
Postal code:	1320	Cell:	082 325 5583
Telephone:		Fax:	
E-mail:	andrew@nethog.co.za		
Professional affiliation(s) (if any)	SACNASP Pr. Sci. Nat. 116951		

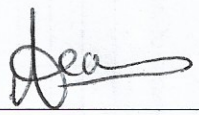
Project Consultant:	Steven Henwood (Henwood Environmental Solutions)		
Contact person:	Steven Henwood		
Postal address:	PO Box 12340, Steiltes		
Postal code:	1213	Cell:	078 672 3645
Telephone:		Fax:	
E-mail:	sheneood@mweb.co.za		

4.2 The specialist appointed in terms of the Regulations_

I, Andrew Richard Deacon declare that --

General declaration:

- I act as the independent specialist in this application;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, Regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- all the particulars furnished by me in this form are true and correct; and
- I realise that a false declaration is an offence in terms of regulation 71 and is punishable in terms of section 24F of the Act.



Signature of the specialist:

Andrew Deacon Environmental Consultant

Name of company (if applicable):

18/10/2021

Date:

RISK ASSESSMENT KEY (Based on DWS 2015 publication: Section 21 c and I water use Risk Assessment Protocol)

Negative Rating

TABLE 1- SEVERITY

How severe does the aspects impact on the resource quality (flow regime, water quality, geomorphology, biota, habitat) ?

Insignificant / non-harmful	1
Small / potentially harmful	2
Significant / slightly harmful	3
Great / harmful	4
Disastrous / extremely harmful and/or wetland(s) involved	5

Where "or wetland(s) are involved" it means that the activity is located within the delineated boundary of any wetland. The score of 5 is only compulsory for the significance rating.

TABLE 2 – SPATIAL SCALE

How big is the area that the aspect is impacting on?

Area specific (at impact site)	1
Whole site (entire surface right)	2
Regional / neighboring areas (downstream within quaternary catchment)	3
National (impacting beyond seconday catchment or provinces)	4
Global (impacting beyond SA boundary)	5

TABLE 3 – DURATION

How long does the aspect impact on the resource quality?

One day to one month, PES, EIS and/or REC not impacted	1
One month to one year, PES, EIS and/or REC impacted but no change in status	2
One year to 10 years, PES, EIS and/or REC impacted to a lower status but can be improved over this period through mitigation	3
Life of the activity, PES, EIS and/or REC permanently lowered	4
More than life of the organisation/facility, PES and EIS scores, a E or F	5

PES and EIS (sensitivity) must be considered.

TABLE 4 – FREQUENCY OF THE ACTIVITY

How often do you do the specific activity?

Annually or less	1
6 monthly	2
Monthly	3
Weekly	4
Daily	5

TABLE 5 – FREQUENCY OF THE INCIDENT/IMPACT

How often does the activity impact on the resource quality?

Almost never / almost impossible / >20%	1
Very seldom / highly unlikely / >40%	2
Infrequent / unlikely / seldom / >60%	3
Often / regularly / likely / possible / >80%	4
Daily / highly likely / definitely / >100%	5

TABLE 6 – LEGAL ISSUES

How is the activity governed by legislation?

No legislation	1
Fully covered by legislation (wetlands are legally governed)	5

Located within the regulated areas

TABLE 7 – DETECTION

How quickly/easily can the impacts/risks of the activity be observed on the resource quality, people and property?

Immediately	1
Without much effort	2
Need some effort	3
Remote and difficult to observe	4
Covered	5

TABLE 8: RATING CLASSES

RATING	CLASS	MANAGEMENT DESCRIPTION
1 – 55	(L) Low Risk	Acceptable as is or consider requirement for mitigation. Impact to watercourses and resource quality small and easily mitigated.
56 – 169	M) Moderate Risk	Risk and impact on watercourses are notably and require mitigation measures on a higher level, which costs more and require specialist input. Licence
170 – 300	(H) High Risk	Watercourse(s) impacts by the activity are such that they impose a long-term threat on a large scale and lowering of the Reserve. Licence required.

A low risk class must be obtained for all activities to be considered for a GA

TABLE 9: CALCULATIONS

Consequence = Severity + Spatial Scale + Duration
Likelihood = Frequency of Activity + Frequency of Incident + Legal Issues + Detection
Significance\Risk = Consequence X Likelihood

RISK ASSESSMENT MUST BE CONDUCTED BY A SACNASP REGISTERED PROFESSIONAL MEMBER AND THE ASSESSOR MUST:

1) CONSIDER BOTH CONSTRUCTION AND OPERATIONAL PHASES OF PROPOSED ACTIVITIES;

2) CONSIDER RISKS TO RESOURCE QUALITY POST MITIGATION CONSIDERING MITIGATION MEASURES LISTED IN TABLES PROVIDED;

3) CONSIDER THE SENSITIVITY (ECOLOGICAL IMPORTANCE AND SENSITIVITY – EIS) AND STATUS (PRESENT ECOLOGICAL STATUS - PES) OF THE WATERCOURSE AS RECEPTOR OF RISKS POSED;

4) CONSIDER POSITIVE IMPACTS/RISKS REDUCTION AS A VERY LOW RISK IN THIS ASSESSMENT;

5) INDICATE CONFIDENCE LEVEL OF SCORES PROVIDED IN THE LAST COLUMN AS A PERCENTAGE FROM 0 - 100%.

ON THE EXCELL SPREADSHEET POP-UP COMMENTS ARE AVAILABLE FOR ALL COLUMNS IN THE HEADINGS WHICH EXPLAINS THE PURPOSE OF EACH COLUMN!

RISK MATRIX (Based on DWS 2015 publication: Section 21 c and I water use Risk Assessment Protocol)

NAME and REGISTRATION No of SACNASP Professional member: Dr Andrew R Deacon. Reg no. 116951

Risk to be scored for construction and operational phases of the project. MUST BE COMPLETED BY SACNASP PROFESSIONAL MEMBER REGISTERED IN AN APPROPRIATE FIELD OF EXPERTISE.

					Severity									
No.	Phases	Activity	Aspect	Potential Impact	Flow Regime	Physico & Chemical (Water Quality)	Habitat (Geomorph+Vegetation)	Biota	Severity	Spatial scale	Duration	Consequence	Frequency of activity	Frequency of impact
1	Construction	Constructing rocky drift: vented ford with 50 cm culverts.	Site clearance; clearing of vegetation through the flood bench down to the bridge site.	Removal of natural vegetation and potential marginal habitat. Direct disturbance of the banks and bed of rivers; impacting indigenous vegetation.	1	1	2	1	1,25	1	1	3,25	1	1
			Creating access roads	Erosion and vegetation clearing	1	1	1	1	1	1	1	3	1	1
			Run-off from exposed ground,	Ecological disturbance (impact on soil surface) and pollution (proximity to stream)	1	1	1	1	1	1	1	3	1	1
			Disruption to the free passage of fish and aquatic animals.	Preventing the free passage of aquatic animals and fish.	2	1	1	2	1,5	1	2	4,5	1	2
			Construction material.	Removing rocks and material from the environment.	1	1	1	1	1	1	1	3	1	1
			A cement layer to secure the outer structure will cover the bridge.	Pollution due to hazardous substances associated with construction activities include cement.	2	2	2	1	1,75	1	2	4,75	1	2
									#DIV/0!			#DIV/0!		
2	Operational		Run-off from roads to the river	Erosion, sedimentation and	1	2	1	1	1,25	1	1	3,25	1	1
			Risk of erosion; bank or bed erosion.	Alterations to local flow patterns cause induced or accelerated bed and bank erosion, or sediment deposition or increased flood risk. Risks of bank erosion during high flow events and rainfall run-off causing silt/sediment pollution.	1	2	2	1	1,5	1	2	4,5	1	2
			Scouring downstream of the bridge.	Eroding the bridge structure.	1	1	1	1	1	1	1	3	1	1
			Trash and sediment accumulation at the upstream end.	Impacting on the aquatic habitat.	1	1	1	1	1	1	1	3	1	1
			Potential flood risks	Alterations to local flow patterns cause induced or accelerated bed and bank erosion, or sediment deposition or increased flood risk.	1	1	1	1	1	1	1	3	1	1
			Causeway restricting flows	Damming and flooding upstream; impact on normal hydraulic regime.	2	1	1	1	1,25	1	1	3,25	1	1
			Maintenance and repair of existing access roads.	Ecological disturbance (impact on soil surface) and pollution (proximity to stream)	1	1	1	1	1	1	1	3	1	1

Legal Issues	Detection		Likelihood	Significance	Risk Rating	Confidence level	Control Measures	Borderline LOW MODERATE Rating Classes
5	1		8	**26**	**Low**	**4**	No clearing needed; old crossing of rocky rift already present for years. Perhaps 1 m of reed cover will be removed for a wider bridge structure.	
5	1		8	**24**	**Low**	**4**	No clearing needed due to the the two track path already present for years. The river bank is flat with very little steeper bank structure. Construction should take place in the low flow period.	
5	1		8	**24**	**Low**	**4**	No significant disturbance - pipes laid down and then covered with rocks and boulders. No soil movement neccesary.	
5	1		9	**40,5**	**Low**	**4**	50 cm culverts will allow passage for all fish species in the system. During high flow fish will be able to swim over and around the structure.	
5	1		8	**24**	**Low**	**4**	Rocks already at the site and other rocks from disturbed areas (road verges and quarries) will be used for the construction.	
5	1		9	**42,75**	**Low**	**4**	Carefully control all on-site operations that involve the use of cement and concrete (this applies to areas other than the batching plant). Implement Best Practice procedures to address all other pollution-related aspects.	
			0	**#DIV/0!**				
5	1		8	**26**	**Low**	4	The river embankment is stable and very little disturbance under normal conditions are anticipated. Driving	
5	1		9	**40,5**	**Low**	4	The river embankment is stable and very little disturbance under normal conditions are anticipated. Driving during hager flows when the flood plains are inundated is not recommended.	
5	1		8	**24**	**Low**	4	Reeds will stabilise the embankment and regular maintenance to keep the structure relevant will ensure very little scouring and erosion.	
5	1		8	**24**	**Low**	4	Regular maintenance to keep the pipes clean from debris will be a prerequisite.	
5	1		8	**24**	**Low**	4	A cement layer to secure the outer structure will stabilise the bridge and the relative small structure will not have a significant impact on the overall environment.	
5	1		8	**26**	**Low**	3	Regular maintenance to keep the pipes clean from debris will be a prerequisite.	
5	1		8	**24**	**Low**	5	Although maintence of the access path will be expected, years of use did not deteriorate the site and will not be expected in the future.	

PES AND EIS OF WATERCOURSE

ANNEXURE D: Historical and Cultural Report

Phase 1 Archaeological and Heritage Impact Assessment on the farm Schoongezicht 66 KU in respect of proposed housing development, Limpopo Province.

Compiled by:

KUDZALA antiquity cc

For **Henwood Environmental Solutions**

Surveyor: Mr JP Celliers

11 May, 2021

I, Jean-Pierre Celliers as authorized representative of Kudzala Antiquity CC , hereby confirm my independence as a specialist and declare that neither I or the Kudzala Antiquity CC have any interest, be it business, financial, personal or other, in any proposed activity, application or appeal in respect of which I was appointed as Heritage Consultant, other than fair remuneration for work performed on this project.

SIGNATURE: 

Table of Contents

Executive summary

Site name and location: An area of approximately 18 ha on the farm Schoongezicht 66 KU in respect of the proposed clearing of natural vegetation in order to construct a few houses.
Purpose of the study: An archaeological and heritage study in order to identify cultural heritage resources in respect of the establishment of a camp for tourism purposes.

Topographical Maps: 1:50 000 2431 AC (1960, 1986, 2008); 1:250 000 2430 (1942).

EIA Consultant: Henwood Environmental Solutions

Client:

Heritage Consultant: Kudzala Antiquity CC.
Contact person: JP Celliers Tel: +27 72 583 1622
E-mail: kudzala@lantic.net

Report date: 11 May 2021

Description and findings:

An Archaeological and Heritage Impact Assessment was undertaken by Kudzala Antiquity CC in respect of the proposed establishment of a new camp and associated facilities on a few small sites within an area of approximately 18 hectares of the farm Schoongesicht 66 KU near Hoedspruit, Limpopo Province. The study was done with the aim of identifying sites which are of heritage significance on the identified project areas and assess their current preservation condition, significance and possible impact of the proposed action. This forms part of legislative requirements as appears in section 38 of the National Heritage Resources Act (Act No. 25 of 1999). This report can be submitted in support of the National Environmental Management Act (Act 25 of 1998).

The survey was conducted on foot and with the aid of a motor vehicle in an effort to locate archaeological remains and historic sites, structures and features. Archival information including scrutiny of previous heritage surveys of the area formed the baseline information against which the survey was conducted. Three locations, sites S1, S2 and S3, were documented, they consist of a family graveyard which has two marked graves and two existing houses, one of which (site S2) is possibly older than 60 years of age as it is indicated on a topographical map dated 1960. The graves are considered to be of high significance and it is recommended than the proposed activities not impact in any way on the graveyard, a buffer zone of at least 20 meters should be observed.

The older building (site S2) is not regarded as being of heritage significance but because of its age it is protected by the Act (25 0f 1999) and demolishing should be permitted. The second house is a modern building and is not within the ambit of the Act.

A single survey orientation location was documented, site SO 1, which includes a GPS location and photographs of the landscape at that particular location.

In terms of section 34 of the National Heritage Resources Act (NHRA, 25 of 1999), no significant buildings or structures were located. One house (site S1) is however older than 60 years and demolishing must be permitted.

In terms of section 35 of the NHRA, no significant archaeological sites or features were located.

In terms of section 36 of the NHRA, two graves were located.

It is not within the expertise of this report or the surveyor to comment on possible palaeontological remains which may be located in the study area.

Disclaimer: *Although all possible care is taken to identify all sites of cultural importance during the investigation of study areas, it is always possible that hidden or sub-surface sites could be overlooked during the study. Kudzala Antiquity CC will not be held liable for such oversights or for costs incurred as a result of such oversights.*

Introduction

1.1. Terms of reference

Kudzala Antiquity CC was commissioned to conduct an archaeological and heritage resources survey in respect of the proposed construction of a few new houses on small footprints within an area of approximately 18 hectares of the farm Schoongezicht 66 KU located near the town Hoedspruit, Limpopo Province. The survey was conducted in order to assess the potential impact that the proposed activity may have on archaeological and heritage resources. The survey was conducted for Henwood Environmental Solutions.

1.1.1 Project overview

The client is in the process of obtaining environmental authorization to clear indigenous vegetation in order to construct a few houses nearby the existing farmstead complex on the farm. Suitable areas within the identified footprint area are earmarked for this activity pending environmental authorization.

1.1.2. Constraints and limitations

The archaeological survey consisted of non-intrusive methods which exclusively rely on surface observations. Most of the project footprint area was relatively easy of access but certain areas were difficult to access due to dense vegetation growth which resulted in archaeological visibility being low.

1.2. Legislative Framework

The National Heritage Resources Act (NHRA) (Act No. 25, 1999) require that individuals or institutions have specialist heritage impact assessment studies undertaken whenever development activities are planned and such activities trigger activities listed in the legislation. This report is the result of an archaeological and heritage study in accordance with the requirements as set out in Section 38 (3) of the NHRA in an effort to ensure that heritage features or sites that qualify as part of the national estate are properly managed and not damaged or destroyed.

The study aims to address the following objectives:

- Analysis of heritage issues;
- Assess the cultural significance of identified places including archaeological sites and features, buildings and structures, graves and burial grounds within a specific historic context;
- Identifying the need for more research;
- Surveying and mapping of identified places including archaeological sites and features, buildings and structures, graves and burial grounds;
- A preliminary assessment of the feasibility of the proposed development or construction from a heritage perspective;
- Identifying the need for alternatives when necessary; and
- Recommending mitigation measures to address any negative impacts on archaeological and heritage resources.

Heritage resources considered to be part of the national estate include those that are of archaeological, cultural or historical significance or have other special value to the present community or future generations.

The national estate may include:

- places, buildings, structures and equipment of cultural significance;
- places to which oral traditions are attached or which are associated with living
- heritage;
- historical settlements and townscapes;
- landscapes and natural features of cultural significance;
- geological sites of scientific or cultural importance;
- archaeological and paleontological sites;
- graves and burial grounds including:
    - (i) ancestral graves;
    - (ii) royal graves and graves of traditional leaders;
    - *(iii)* graves of victims of conflict;
    - (iv) graves of individuals designated by the Minister by notice in the *Gazette;*
    - (v) historical graves and cemeteries; and other human remains which are not covered in terms of the Human Tissue Act, 1983 (Act No. 65 of 1983);
- sites of significance relating to slavery in South Africa;
- movable objects including:

(i) objects recovered from the soil or waters of South Africa, including archaeological and paleontological objects and material, meteorites and rare geological specimens;

(ii) objects to which oral traditions are attached or which are associated with living heritage

(iii) ethnographic art and objects;
(iv) military objects
(v) objects of decorative or fine art;
(vi) objects of scientific or technological interest; and
(vii) books, records, documents, photographic positives and negatives, graphic, film or video material or sound recordings, excluding those that are public records as defined in section 1 of the National Archives of South Africa Act, 1996 (Act No. 43 of 1996).

Cultural resources are unique and non-renewable physical phenomena (of natural occurrence or made by humans) that can be associated with human (cultural) activities (Van Vollenhoven 1995:3). These would be any man-made structure, tool, object of art or waste that was left behind on or beneath the soil surface by historic or pre-historic communities. These remains, when studied in their original context by archaeologists, are interpreted in an attempt to understand, identify and reconstruct the activities and lifestyles of past communities. When these items are removed from their original context, any meaningful information they possess is lost, therefore it is important to locate and identify such remains before construction or development activities commence.

1.3. Approach and statutory requirements

The SAHRA Minimum standards of 2007 guideline document, forms the background against which the survey was planned and the report compiled. An Archaeological Impact Assessment (AIA) consists of three phases. This document deals with the first phase. This (phase 1) investigation is aimed at getting an overview of cultural resources in the project area, assigning significance to these resources, assessing the possible impact that the proposed activity may have on these resources, making recommendations pertaining to the management of heritage resources and putting forward mitigation measures where applicable.

When the archaeologist or heritage specialist encounters a situation where the planned project will lead to the destruction or alteration of an archaeological/ heritage site or feature, a second phase investigation is normally recommended. During a phase two investigation mitigation measures are put in place and detailed investigation into the nature of the cultural material is undertaken. Often at this stage, archaeological excavation and detailed mapping of a site is carried out in order to document and preserve the cultural heritage.

Phase three consists of the compiling of a management plan for the safeguarding, conservation, interpretation and utilization of cultural resources (Van Vollenhoven, 2002).

Continuous communication between the developer and heritage specialist after the initial assessment has been carried out may result in the modification of a planned route or development to incorporate or protect existing archaeological and heritage sites.

2. Description of surveyed area

The study area is located south-east of the town of Hoedspruit and located south of the Klaserie Private Nature Reserve. It is within the boundaries of Limpopo Province.
The survey was carried out on a project footprint consisting of approximately 18 hectares of Granite Lowveld vegetation.

Landscape: Natural and wetland vegetation previously Granite Lowveld vegetation and soils.

Visibility: Good-Poor in certain areas due to dense vegetation cover.

Veld type: The vegetation is classed as Granite Lowveld comprising tall shrubland with few trees to moderately dense woodland on the deep sandy uplands with *Terminala sericea, Combretum zeyheri and C. Tricholaena Eragrostis rigidior*. Dense thicket to open savanna in the bottomlands. The dense herbacius layer contains the dominant *Digitaria eriantha, Panicum maximum* and *Astrida congesta* on fine-textured soils. The brackish bottomlands support *Sporobolus nitens, Urochloa mosambicensus* and *Chloris virgata* (Mucina and Rutherford, 2009).

Geology and soils: Swazian Goudplaats Gneiss, Makhutswi Gneiss and Nelspruit Suite occur from north to south. Further south, the younger Mpuluzi Granite form the major base geology of the area. Archaian gneiss and granite weather into sandy soils in the uplands and clayey soils with high sodium content in the lowlands.

3. Methodology

This study consists of a detailed archival study in order to understand the study area in a historical timeframe, an archaeological background study which include scrutiny of previous archaeological reports of the area, obtained through the SAHRIS database, and published as well as unpublished written sources on the archaeology of the area, social consultation with people who live nearby and a lastly a physical survey of the affected and immediate area.

The South African Heritage Resources Agency (SAHRA) and the relevant legislation (NHRA) require that the following components be included in an archaeological impact assessment:

- Archaeology;
- Shipwrecks;
- Battlefields;
- Graves;
- Structures older than 60 years;
- Living heritage;
- Historical settlements;
- Landscapes;
- Geological sites; and
- Paleontological sites and objects.

All the above-mentioned heritage components are addressed in this report, except shipwrecks, geological sites and paleontological sites and objects.

The ***purpose*** of the archaeological, archival and heritage study is to establish the whereabouts and nature of cultural heritage sites should they occur on project area. This includes settlements, structures and artefacts which have value for an individual or group of people in terms of historical, archaeological, architectural and human (cultural) development.

The ***aim*** of this study is to locate and identify such objects or places in order to assess and rate their significance and establish if further investigation is needed. Mitigation measures can then be suggested and put in place when necessary.

3.1. Archaeological and Archival background studies

The purpose of the desktop study is to compile as much information as possible on the heritage resources of the area. This helps to provide an historical context for located sites. Sources used for this study include published and unpublished documents, archival material and maps. Information obtained from the following institutions or individuals were consulted:

- Published and unpublished archaeological reports and articles;
- Published and unpublished historical reports and articles;
- Archival documents from the National Archives in Pretoria;
- Historical maps; and
- South African Heritage Resource Information System (SAHRIS) database.

3.1.1. Previous archaeological studies in the area

Some archaeological impact assessments (AIA's) and heritage impact assessments have been done in the vicinity of the proposed development area.

In 2002 Mr FP Coetzee conducted an Archaeological Investigation on Antwerpen Game Farm in the Hoedspruit District. He did find some Middle Stone Age and early Iron Age remains in an erosion donga on the farm which is approximately 6000 hectares in extent.

In 2003 Mr F Roodt compiled a report in respect of a lodge development on the farm Avoca 88 for R&R Cultural Resources Consultants. He found some pottery fragments which were eroded from a nearby anthill. He did not ascribe any significance to the fragments.

In 2005 Dr Udo Kűsel conducted a "*Cultural Heritage Resources Impact Assessment of a Portion of Kapama Hoedspruit (Guernsey 81 KU Portions 6, 34, 98, 109, 56, 204 and 210)".* He stated that "except for a few isolated Stone Age flakes no important cultural heritage resources could be found".

3.1.2. Historic maps

Historical maps were scrutinized and features that were regarded as important in terms of heritage value were identified and if they were located within the boundaries of the project area they were physically visited in an effort to determine:

(i) whether they still exist;
(ii) their current condition; and
(iii) Significance.

3.1.3. Physical survey

- The survey of the proposed project area was conducted on 30 April 2021
- The survey took one day to complete.
- The documented sites were numbered sequentially.
- Sites were recorded by using a handheld Garmin Oregon 450 GPS unit and the unit was given time to reach an accuracy of at least 5 metres.

- Sites were plotted on 1:50 000 topographical maps which are geo-referenced (WGS 84) and also on Google Earth.
- No sites of archaeological or heritage significance were located. Two graves were documented. A survey orientation location was mapped and photographed for survey purposes.

3.2. Social Consultation

Social consultation forms an important part of identifying sites which may be of heritage significance. The current farm Manager of Schoongezicht, Mr Hannes Snyman, was consulted about the presence of heritage sites within the project area. He pointed out the two family graves and stated that to his knowledge there are no additional heritage sites or graves present within the proposed project area.

3.3. Heritage site significance

The South African Heritage Resources Agency (SAHRA) formulated guidelines for the conservation of all cultural resources (sections 6 and 7 of the NHRA, 1999) and therefore also divided such sites into three main categories. These categories might be seen as guidelines that suggest the extent of protection a given site might receive. They include sites or features of local (Grade 3) provincial (Grade 2) national (Grade 1) significance, grades of *local significance* and *generally protected* sites with a variety of degrees of significance.

For practical purposes the surveyor uses his own classification for sites or features and divides them into three groups, those of low or no significance, those of medium significance and those of high significance **(*Also see table 5.2.Significance rating guidelines for sites*).**

Values used to assign significance and impact characteristics to a site include:

- **Types of significance**

The site's scientific, aesthetic and historic significance or a combination of these is established.

- **Degrees of significance**

The archaeological or historic site's rarity and representative value is considered. The condition of the site is also an important consideration.

- **Spheres of significance**

Sites are categorized as being significant in the international, national, provincial, regional or local context. Significance of a site for a specific community is also taken into consideration.

To arrive at the specific allocation of significance of a site or feature, the specialist considers the following:

- Historic context;
- Archaeological context or scientific value;
- Social value;
- Aesthetic value; and
- Research value.

More specific criteria used by the specialist in order to allocate value or significance to a site include:

- The unique nature of a site;
- The integrity of the archaeological deposit;
- The wider historic, archaeological and geographic context of the site;
- The location of the site in relation to other similar sites or features;
- The depth of the archaeological deposit (when it can be determined or is known);
- The preservation condition of the site;
- Quality of the archaeological or historic material of the site; and
- Quantity of sites and site features.

Archaeological and historic sites containing data, which may significantly enhance the knowledge that archaeologists currently have about our cultural heritage, should be considered highly valuable. In all instances these sites should be preserved and not damaged during construction activities. However, when development activities jeopardize the future of such a site, a second and third phase in the Cultural Resource Management (CRM) process is normally advised. This entails the excavation or rescue excavation of cultural material, along with a management plan to be drafted for the preservation of the site or sites.

Graves are considered very sensitive sites and should never under any circumstances be jeopardized by development activities. Graves and burial grounds are incorporated in the NHRA under section 36 and in all instances where graves are found by the surveyor, the recommendation would be to steer clear of these areas. If this is not possible or if construction activities have for some reason damaged graves, specialized consultants are normally contacted to aid in the process of exhumation and re-interment of the human remains.

4. History and Archaeology

4.1. Historic period

4.1.1. Early History

In Southern Africa the domestication of the environment began only a couple of thousands of years ago, when agriculture and herding were introduced. At some time during the last half of the first millennium BC, people living in the region where Botswana, Zambia and Angola are today, started moving southward, until they reached the Highveld and the Cape in the area of modern South Africa. As time passed and the sub-continent became fully settled, these agro-pastoralists, who spoke Bantu languages, started dominating all those areas which were ecologically suitable for their way of life. This included roughly the eastern half of modern South Africa, the eastern fringe of Botswana and the north of Namibia. Historians agree that the earliest Africans to inhabit in the Lowveld in Mpumalanga were of Nguni origin.

Up until the 1930s, malaria would have occurred sporadically in the study area during the rainy season. During the first half of the nineteenth century, Tsetse flies also thrived in this area. Pastoralists would have avoided the moist low-lying valleys and thickly wooded regions where these insects preferred to congregate. It is unlikely that populations would be dense in areas where malaria and the “sleeping sickness” transferred by Tsetse flies was a constant threat to humans and their stock (Bergh 1999: 3; Shillington 1995: 32).

In a few decades, the course of history in the old Transvaal province would change forever. The Difaqane (Sotho), or Mfekane (“the crushing” in Nguni) was a time of bloody upheavals in Natal and on the Highveld, which occurred around the early 1820s until the late 1830s. It came about in response to heightened competition for land and trade, and caused population groups like gun-carrying Griquas and Shaka’s Zulus to attack other tribes.

During the time of the Difaqane, a northwards migration of white settlers from the Cape was also taking place. Some travellers, missionaries and adventurers had gone on expeditions to the northern areas in South Africa – some as early as the 1720’s. One such an adventurer was Robert Schoon, who formed part of a group of Scottish travellers and traders who had travelled the northern provinces of South Africa in the late 1820s and early 1830s. Schoon had gone on two long expeditions in the late 1820’s and once again ventured eastward and northward of Pretoria in 1836 (Bergh, 1999: 13, 116-121).

By the late 1820s, a mass-movement of Dutch speaking people in the Cape Colony started advancing into the northern areas. This was due to feelings of mounting dissatisfaction caused by

economical and other circumstances in the Cape. This movement later became known as the Great Trek. This migration resulted in a massive increase in the numbers of people of European descent. As can be expected, the movement of whites into the Northern provinces would have a significant impact on the local farmer – herders who populated the land.

By 1860, the population of Europeans in the central Transvaal was already very dense and the administrative machinery of their leaders was firmly in place. Many of the policies that would later be entrenched as legislation during the period of apartheid had already been developed (Ross 2002: 39; Bergh, 1999: 170).

However, relations were at times also interdependent in nature. After the Great Trek, when European farmers had settled at various areas in the northern provinces, wealthier individuals were often willing to lodge needy white families on their property in exchange for odd jobs and commando service. These “bywoners” often arrived with a family and a few cows. He would till the soil and pay a minimal rent to the farmer from the crops he grew. The farmer did not consider him a labourer, but mostly kept workers for hard labour on the farm.

The discovery of gold in South Africa had a major impact in the region. In 1873 gold was discovered in Pilgrims Rest, 80 kilometres north of Nelspruit. This drew scores of prospectors into the region. The establishment of Barberton in 1884, after the discovery of the Sheba gold reef, also brought about greater activity in the area. The Nelspruit settlement first received official recognition in August 1884 (South African History Online 2013).

4.1.2. Colonial settlement

The Groot Trek of the Voortrekkers started with the Tregardt- van Rensburg trek in 1835. The two men met where Tregardt and his followers crossed the Orange River at Buffelsvlei (Aliwal North). Here van Rensburg joined the trek northwards. On August 23, 1837 the Tregardt trek left for Delagoabay from the Soutpansberg. They travelled eastwards alongside the Olifants River to the eastern foothills of the Drakensberg. From here they travelled through the Lowveld and the current Kruger National Park where they eventually crossed the Lebombo mountains in March 1838. They reached the Fortification at Lourenço Marques on 13 April 1838 (Bergh, 1998:124-125).

Permanent European (Voortrekker) settlement of the eastern areas of Mpumalanga can be traced back to a commission under the leadership of A.H. (Hendrik) Potgieter who negotiated with the Portuguese Governor at Delagoabaai in 1844 for land. It was agreed that these settlers could settle in an area that was four days journey from the east coast of Africa between the 10˚ and 26˚ south latitudes. Voortrekkers started migrating into the area in 1845. Andries-Ohrigstad was the first town established in this area in July 1845 after the Voortrekkers successfully negotiated for

land with the Pedi Chief Sekwati. Farms were given out as far west as the Olifants River. The western boundary was not officially defined but at a Volksraad meeting in 1849 it was decided that the Elands River would be the boundary between the districts of Potchefstroom and Lydenburg as this eastern portion of the Transvaal was then known (Bergh, 1998).

Due to internal strife and differences between the various Voortrekker groups that settled in the broader Transvaal region, the settlers in the Ohrigstad area now governed from the town of Lydenburg decided to secede from the Transvaal Republic in 1856. The Republic of Lydenburg laid claim to a large area that included not only the land originally obtained from the Pedi Chief Sekwati in 1849 but also other areas of land negotiated for from the Swazis. The Republic of Lydenburg was a vast area and stretched from the northern Strydpoort mountains to Wakkerstroom in the south and Bronkhortsspruit in the west to the Swazi border and the Lebombo mountains east.

As can be expected, the migration of Europeans into the north would have a significant impact on the indigenous people who populated the land. This was also the case in Mpumalanga. In 1839 Mswati succeeded Sobhuza (also known as Somhlomo) as king of the Swazi. Threatened by the ambitions of his half-brothers, including Malambule, who had support from the Zulu king Mpande, he turned to the Ohrigstad Boers for protection. He claimed that the land that the Boers had settled on was Swazi property. The Commandant General of the Ohrigstad settlement, Andries Hendrik Potgieter, responded that the land was ceded to him by the Pedi leader Sekwati, in return for protection of the Pedi from Swazi attacks (Giliomee, 2003).

However, in reaction to the increasingly authoritarian way in which Potgieter conducted affairs at Ohrigstad, the Volksraad of Ohrigstad saw Mswati's offer as a means to obtain more respectable title deeds for the property (Bonner, 1978). According to a sales contract set up between the Afrikaners and the Swazi people on 25 July 1846, the whites were the rightful owners of the land that had its southern border at the Crocodile River, which stretched out in a westerly direction up to Elandspruit; of which the eastern border was where the Crocodile and Komati rivers joined and then extended up to Delagoa bay in the north (Van Rooyen, 1951). The Europeans bought the land for a 100 heads of cattle (Huyser).

4.1.3. History of the Anglo Boer War (1899-1902) in the area

The discovery of diamonds and gold in the Northern provinces had very important consequences for South Africa. After the discovery of these resources, the British, who at the time had colonized the Cape and Natal, had intensions of expanding their territory into the northern Boer republics. This eventually led to the Anglo-Boer War, which took place between 1899 and 1902 in South Africa, and which was one of the most turbulent times in South Africa's history.

Even before the outbreak of war in October 1899 British politicians, including Sir Alfred Milner and Mr. Chamberlain, had declared that should Britain's differences with the Z.A.R. result in violence, it would mean the end of republican independence. This decision was not immediately publicised, and as a consequence republican leaders based their assessment of British intentions on the more moderate public utterances of British leaders. Consequently, in March 1900, they asked Lord Salisbury to agree to peace on the basis of the status quo ante bellum. Salisbury's reply was, however, a clear statement of British war aims (Du Preez, 1977).

During the British advance between February to September 1900, Lord Roberts replaced Genl. Buller as the supreme commander and applied a different tactic in confronting the Boer forces instead of a frontal attack approach he opted to encircle the enemy. This proved successful and resulted for instance in the surrender of Genl. Piet Cronje and 4000 burghers at Paardeberg on 27 February 1900.

This was the start of a number of victories for the British and shortly after they occupied Pretoria on 5 June 1900, a skirmish at Diamond Hill resulted in the Boer forces under command of Louis Botha, retreated alongside the Delagoa Bay railway to the east. Between the 21-27 August, Botha and 5000 burghers defended their line at Bergendal but were overwhelmed by superior numbers and artillery. This resulted in the Boer forces retreating even further east and three weeks later the British reached Komatipoort and thus the whole of the Eastern Transvaal south of the Delagoa Bay railway line was now occupied by British Forces.

General Louis Botha, with his Boer forces, marched through Nelspruit on 11 September 1900. A week later, on 18 September 1900, the British battalion of Lieutenant General F. Roberts arrived in Nelspruit. No major skirmishes in the war took place near Nelspruit, but a concentration camp for black people was established a small distance to the north of the town. Another event of import in the area was the arrival of the President of the Transvaal, Paul Kruger, in Nelspruit on 29 May 1900, where he received a message saying Lord Roberts had annexed the Transvaal. Kruger declared the annexation illegitimate on 3 September 1900, the same day that Nelspruit was proclaimed as the administrative capital of the Transvaal Republic. Kruger left Nelspruit in June of that year in order to board a ship to Swaziland (Bergh, 1999: 51; 54).

4.1.4. Railway history in the Eastern Lowveld

By June 1892, the new railway constructed from Lourenco Marques to Pretoria, reached Nelspruit. In November 1891 the Hall family opened a new hotel, mainly to accommodate railway construction workers. This hotel was moved to the centre of the town in June 1892 and was named the Fig Tree Hotel.

Railway expansion continued up until the Anglo-Boer War (1899-1902) and thereafter (Bergh, 1999). After the establishment of the Union of South Africa on 31 May 1910 the Transvaal had the most railway track in terms of distance. Some 2 730km of railway connected the economic centres of this province. Railways made a huge contribution towards economic development especially in the Witwatersrand area where it served as important platform for mining and industrial development (Bergh, 1999).

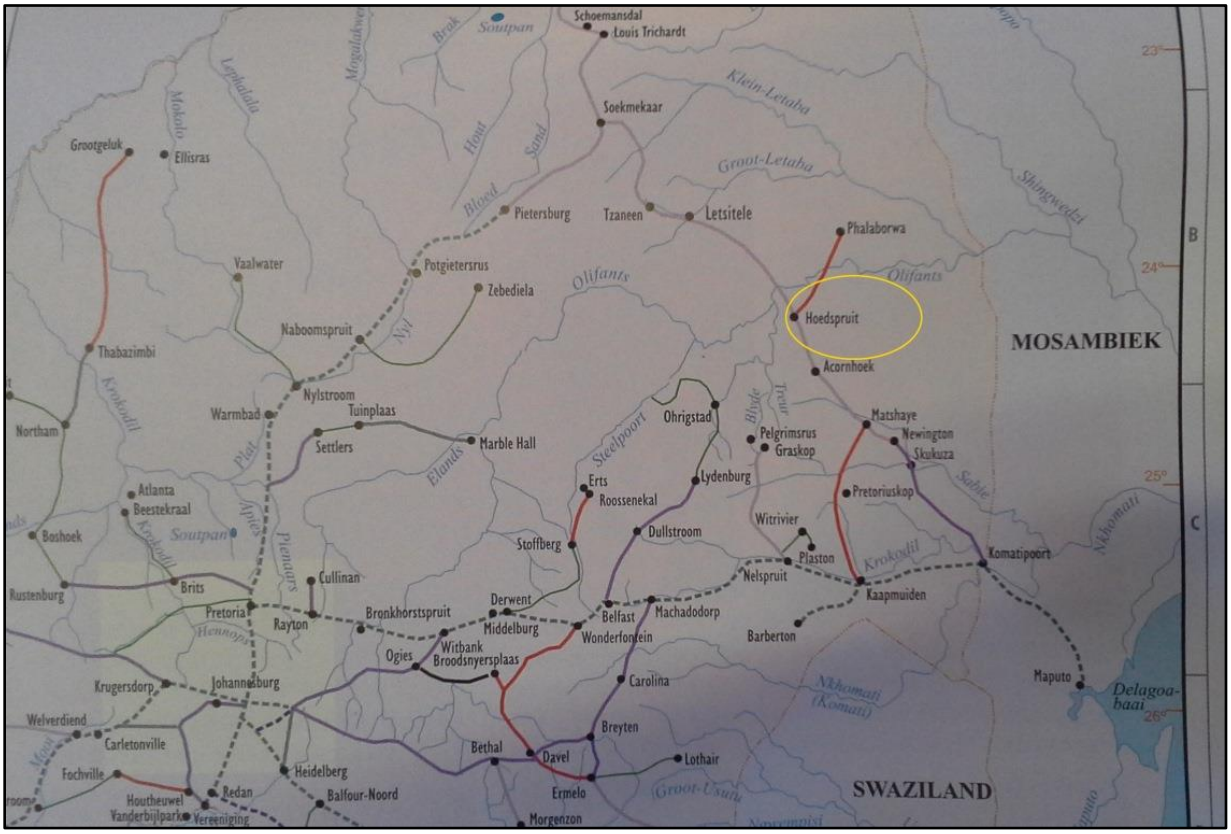


Figure 4.1. Railway development in the Transvaal, 1889-1980 (Bergh, 1999: 79)

The decade after establishment of the Union is characterised by a sharp increase in railway development especially between 1911 – 1916, after which a period of inactivity followed due to the First World War (Bergh, 1999). Most of the development took place in the Eastern Transvaal and five railway lines were constructed in order to promote the growing agricultural industry.

Ermelo was linked with Piet Retief and further to the south with Commondale and Vryheid in Natal (Fig. 4.1.). The Komatipoort – Newington line was extended and passed over Acornhoek, Hoedspruit, Letsitele, Tzaneen and Soekmekaar where it connects with the northern line from Pietersburg towards Louis Trichardt and Schoemansdal (Bergh, 1999).

4.1.5. Historic maps of the study area

Since the mid-1800s up until the present, South Africa has been divided and re-divided into various districts. Since 1845, the property under investigation formed part of the Lydenburg district. By 1902 the farm was under the jurisdiction of the Ohrigstad ward of the Lydenburg district. As of 1924, the property formed part of the Pilgrims Rest District and currently, it falls within the Mopani District of the Limpopo Province (Bergh, 1999: 17, 20-27; Mopani District Municipality, 2021).

From 1868 to 1924 the farm was known as Schoongezicht 490, ward Origstadsrivier. From 1924 to 1950 the farm was known as Schoongezicht 490 Pilgrims Rest District and since 1950, the farm has been known as Schoongezicht 66 KU.

The two towns that are situated closest to the study area are Hoedspruit and Phalaborwa. The first official landowner of the farm Hoedspruit was Dawid Johannes Joubert. He arrived in the Lowveld in 1844 and settled in the area between the Blyde River and what is now known as the Zandspruit River. In 1848 Joubert registered the farm at the land office in Ohrigstad. The town came into being during the mid-1800s (Hoedspruit N/d).

Phalaborwa is located about 45 kilometres to the north of Schoongezicht. This town was built on the site of centuries old mining operations. It was laid out on the farm Laaste and proclaimed in July 1857. It is believed that the name means “it is better here than in the south”, referring to the peaceful existence refugees enjoyed there after fleeing from the Swazi and Zulu tribes, who were terrorizing tribes further south during the Difaqane period (Raper, 2014: 364).

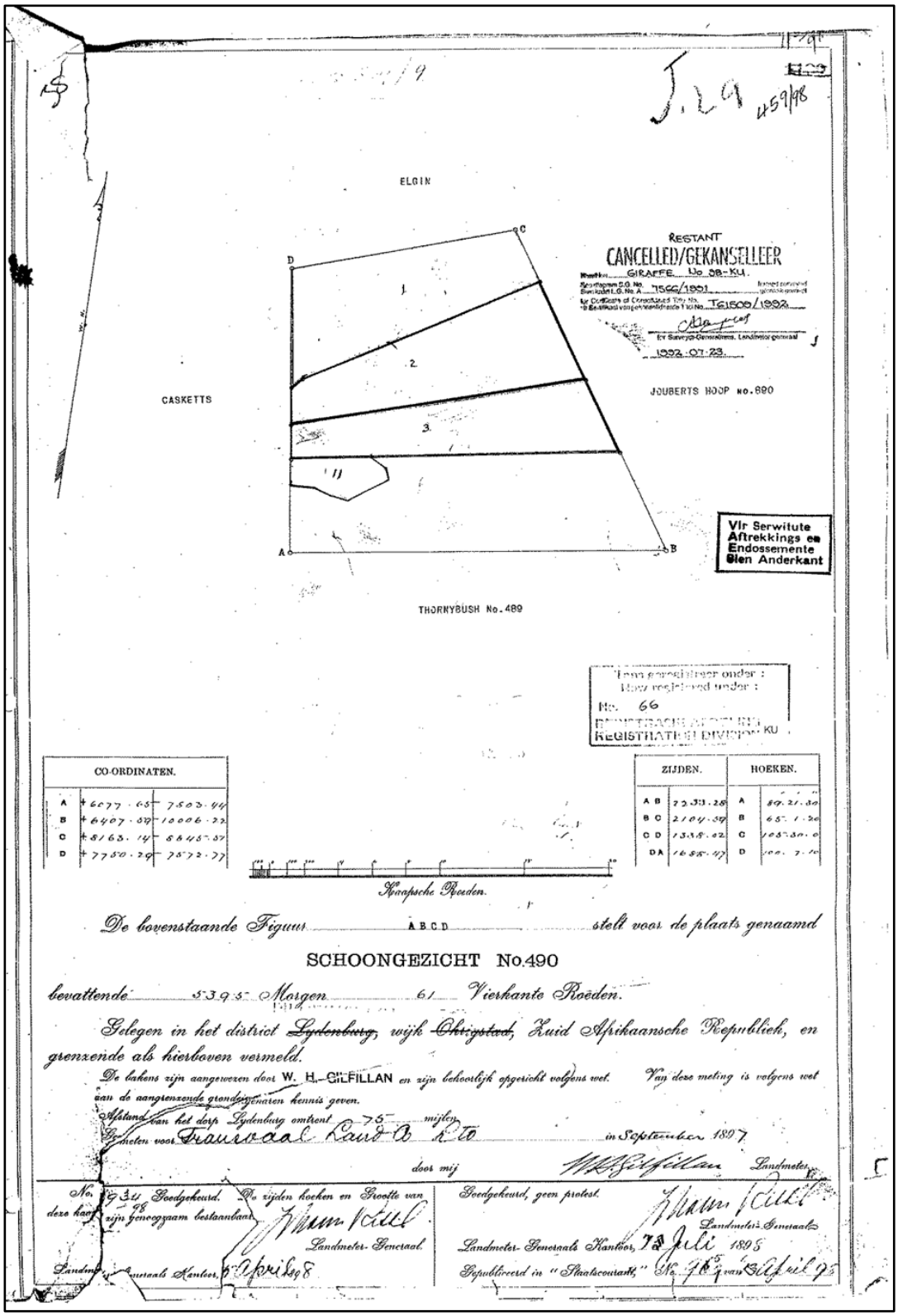


Figure 4.2. A Landmeter Generaal map of farm Schoongezicht 490, dated 1898. At the time Schoongezicht 66 KU was known as Schongezicht 490 Lydenburg District, Wyk Origstad. The various portions making up the farm can be seen (Chief Surveyor-General, 2021).

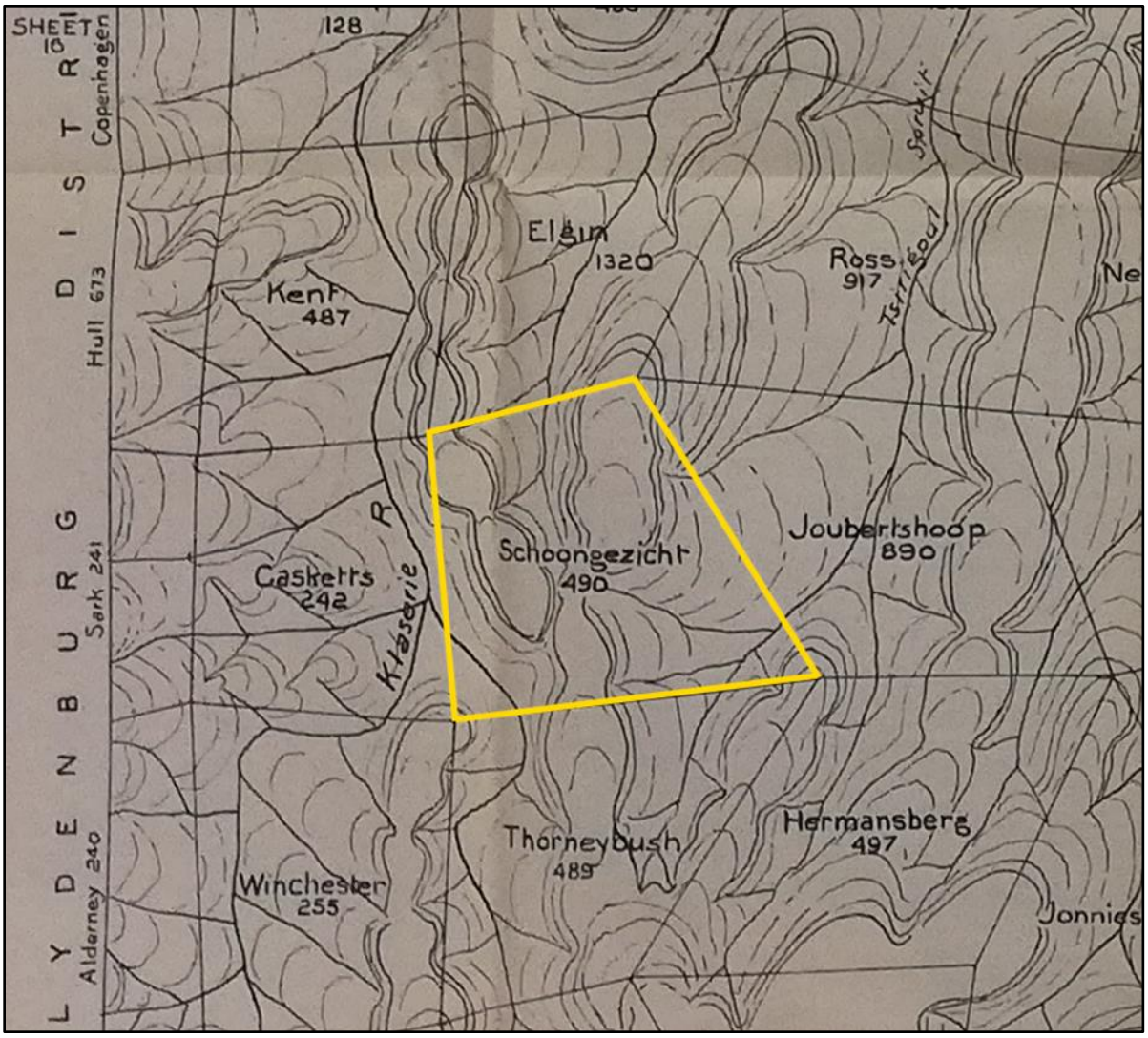


Figure 4.3. A Major Jackson map of the Olifants River area in the year 1904. The farm Schoongezicht is indicated with a yellow border. No buildings or other developments are indicated on the farm (Surveyor General, 1904).

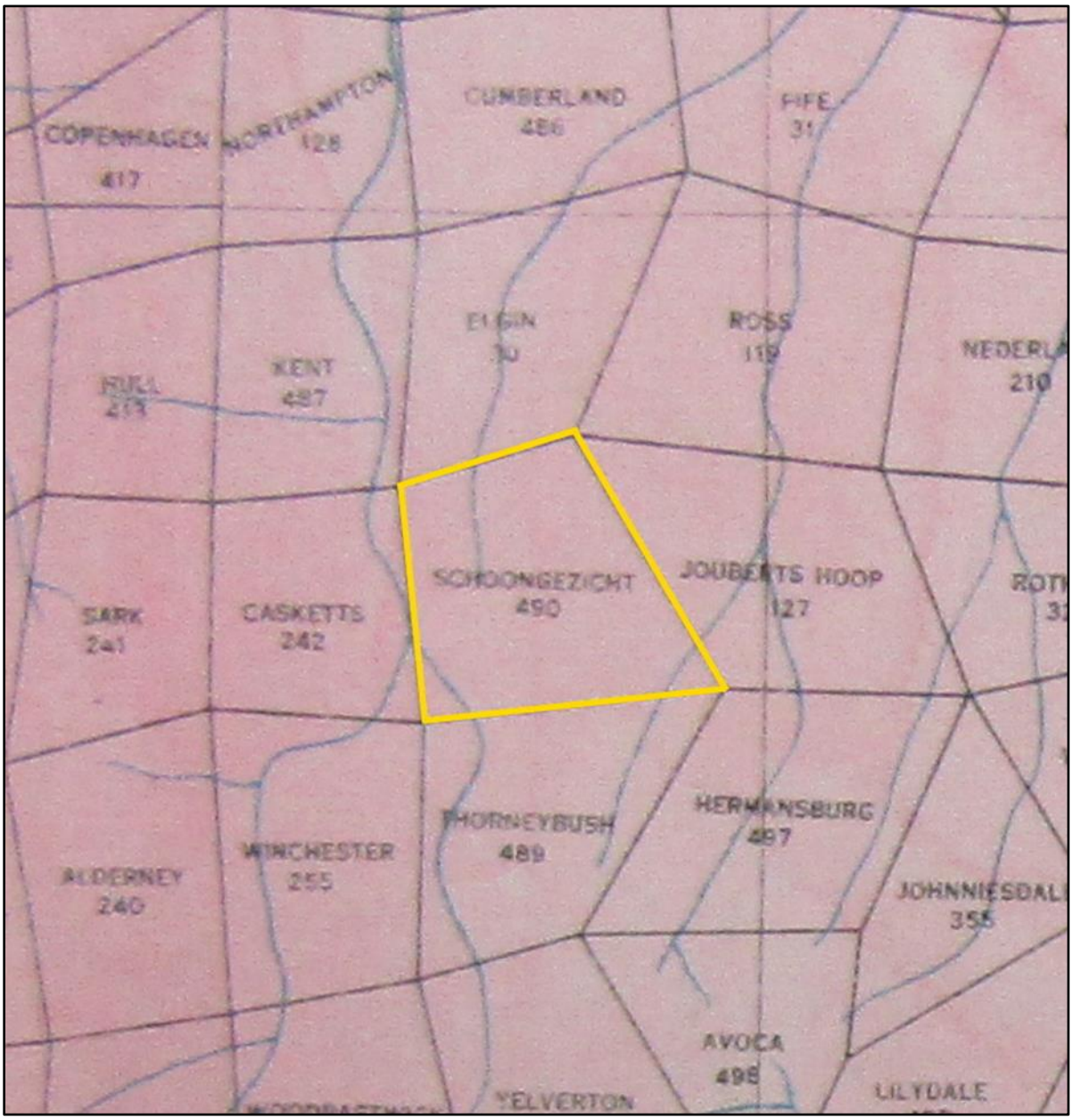


Figure 4.4. Map of the Kruger National Park and surrounds, dated approximately 1930. At the time, the farm under investigation was known as Schoongezicht 490 (NARSSA *Maps: 3/1254*).

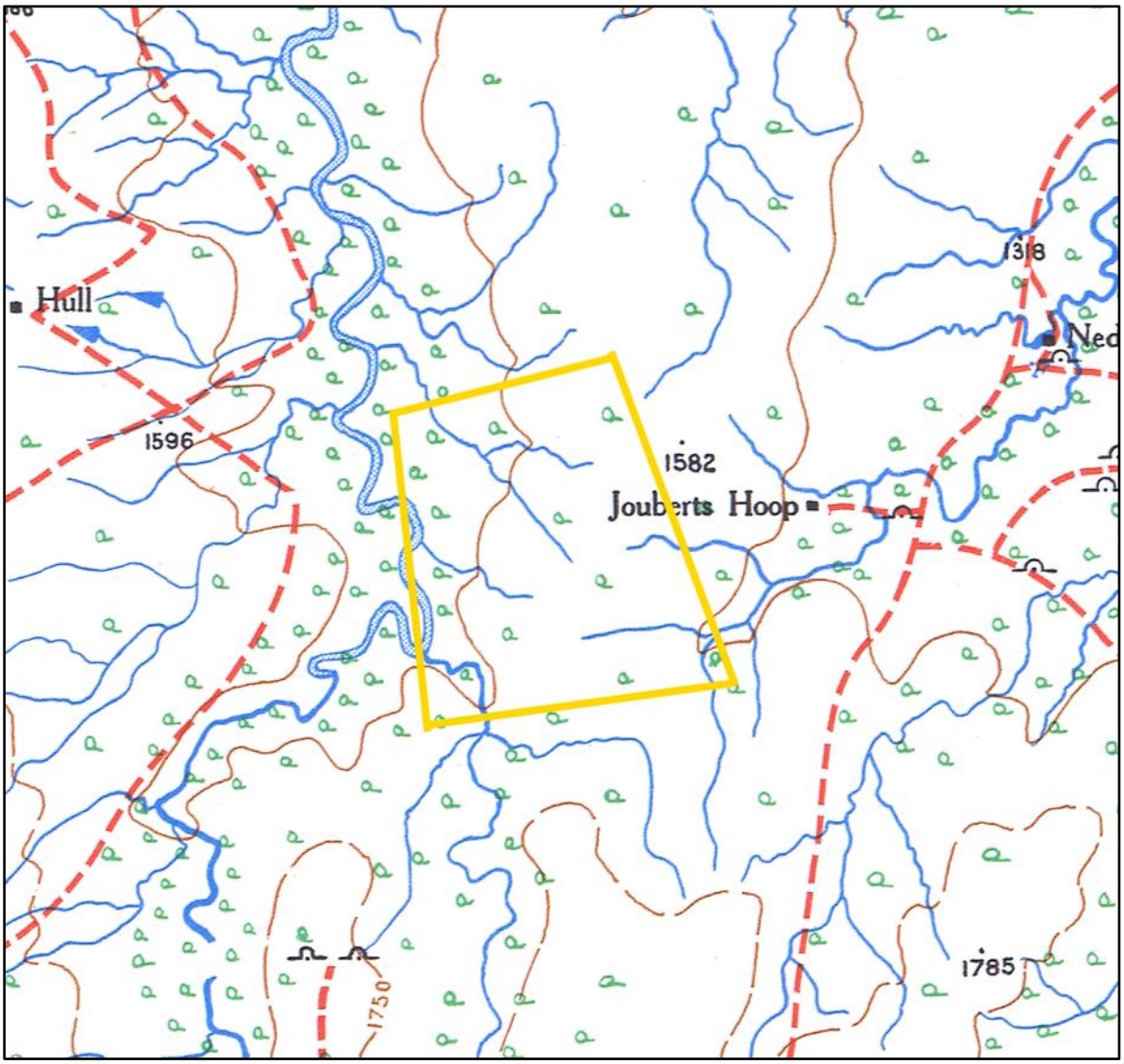


Figure 4.5. A Topographical map of the area under investigation, dated 1942. By this time the farm was known as Schoongezicht 66 KU. A yellow border shows the approximate location of the farm. The Klaserie River can be seen on the eastern border of the farm. No buildings or other developments can be seen and the whole farm consisted of natural bush (Topographical Map, 1942).

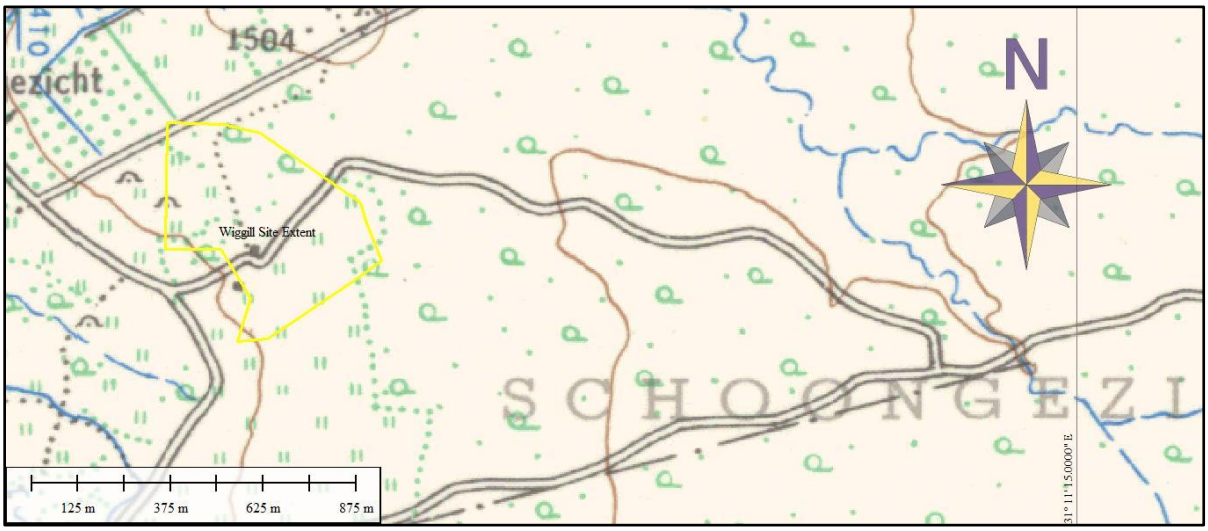


Figure 4.6. A Topographical map of the area under investigation. The study area is indicated with a yellow border. By this time the farm was known as Schoongezicht 66 KU. Two huts can be seen to the northeast and two buildings to the south east. A road to the north and another to the south is also visible. Most of the study area consists of cultivated land with several orchards nearby the study area and along the river (Topographical Map, 2431 AC, 1960).

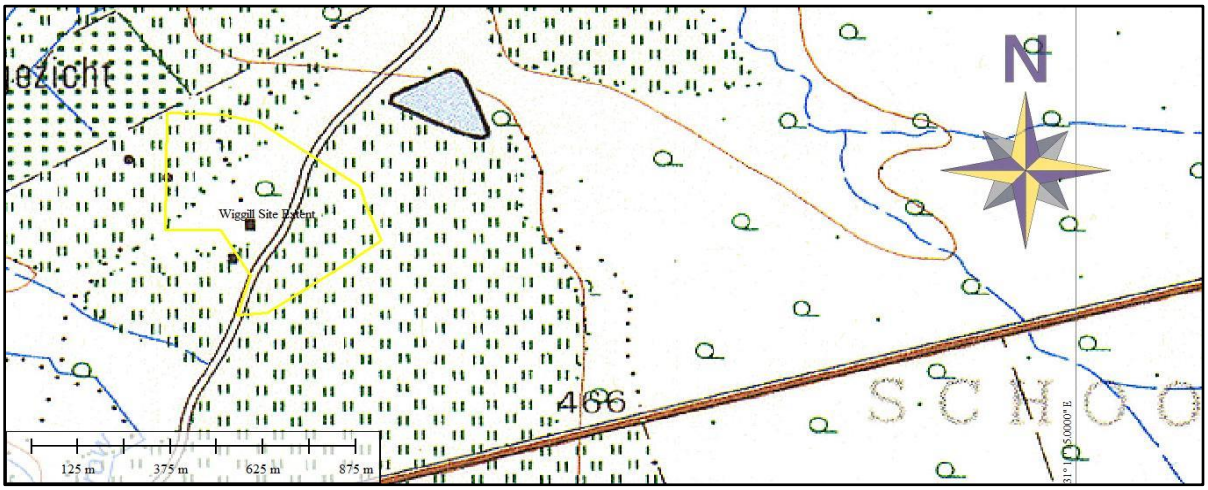


Figure 4.7. Topographical map of the area under investigation in the year 1986. The study area is indicated with a yellow border. The center of the study area consists of natural bush, whilst the south and north consists of cultivated land. Two buildings are visible one inside the study area and the other just south of it. A single road can be seen in the center of the study area (Topographical Map, 2431 AC, 1986).

Figure 4.8. Topographical map of the area under investigation in the year 2008. The study area is indicated with a yellow border. Two buildings surrounded by trees can be seen just north-west of the road which traverses the study area. Cultivated land can be seen in the south. (Topographical Map, 2431 AC, 2008).

4.1.6. Historical overview and development of the farm Schoongesicht 66 KU

Online sources and information found at the National Archives Repository of South Africa were used to compile an historical overview of the property and the surrounding area. Firstly, a record of historical landowners will be provided. Thereafter follows a discussion of how the study area and surrounds was historically used and developed.

Record of historical landowners

Schoongezicht 490, ward Ohrigstadrivier, was first inspected by P. D. de Villiers on 29 July 1868 and again by P. B. Swart, on 6 August 1995. According to P.B. Swart, the property measured 4000 morgen. The title deed to Schoongezicht 490 was first granted to Cornelus Johannes de Beer on 10 December 1869. The following details could be found regarding subsequent landowners:

Entry number	Date of transfer	Portion	Transported from	Transported to
2	10/12/1869	Farm	Cornelus Johannes de Beer	Henry Austin
3	10/12/1869	Farm	Estate Late Henry Austin	Robert Cottle Green
4	10/1/1870	Farm	Robert Cottle Green	Oscar Wilhelm Alric Forssman
5	23/4/1889	Farm	Oscar Wilhelm Alric Forssman	William James Thompson

6	1920	Farm	Transvaal Land Consolidated	Isaac Alias Judes
7	1920	Farm	Isaac Alias Judes	Transvaal Consolidated Land Exploration Co. Ltd.
8	1923	Farm	Transvaal Consolidated Land Exploration Co. Ltd.	Transvaal Estates and Development Co. Ltd
9	1929	Farm	Transvaal Estates and Development Co. Ltd	African European Investment Coy. Ltd.
10	1944	Portion 1	African European Investment Coy. Ltd.	Clifford Walter Schweiger
11	1944	Portion 2	African European Investment Coy. Ltd.	Alric Archibald Wiggill
12	1944	Portion 3	African European Investment Coy. Ltd.	Johannes Kooy
13	1944	Rem. Ext.	African European Investment Coy. Ltd.	Jan Jacob Stephanus Wassenaar

(NARSSA *TAB, RAK: 2900;* NARSSA *TAB, RAK: 2941*)

No further details regarding historical landowners could be found for the period 1944 – 1976.
On 17 June 1976, portion 2 of the farm Schoongezicht 66 KU was registered in the name of Funny Fancies Prop Pty. Ltd. and it is still the owner of this property (Windeed Search Engine, 2021).

History of land use

Little information could be found in the National Archives that specifically deals with the settlement and development of the farm Schoongezicht 66 KU, however, given its location, the history of this farm is invariably closely linked to the history of the Kruger National Park and the private nature reserves in the area.

The Kruger National Park was proclaimed in 1926 and brought with it a greater conservation awareness in South Africa. A section of land lying to the west of the Park, between the Sabie River in the south and the Olifants River in the north, was the area where the concept of private nature reserves was born. Charles Boyed Varty and Frank A. Unger, both fervent wildlife lovers, purchased the farm Sparta, in the present Sabi Sand Wildtuin, and proceeded to pioneer the “game farm” idea in this area (Klaserie Reserve, 2018).

In 1934, some landowners who desired the establishment of a scheme of co-operative game protection, applied to the Transvaal Land Owners Association for help. This organisation administrated unoccupied agricultural and game farms for individuals and groups, among other things. The “Game Ordinance” was consequently founded in 1935. By the mid-1940s this ordinance had however become obsolete, as modern methods of transport and hunting increased the risk of over hunting. In 1947, the Division of Nature Conservation was established to assist with the protection of wildlife resources in the country (Klaserie Reserve, 2018).

In 1950, the Klaserie River Irrigation District was proclaimed, and it included all the farms along the Klaserie River south of the Klaserie Private Nature Reserve (NASA *SAB, BAO: 10984 H124/1080/12*).

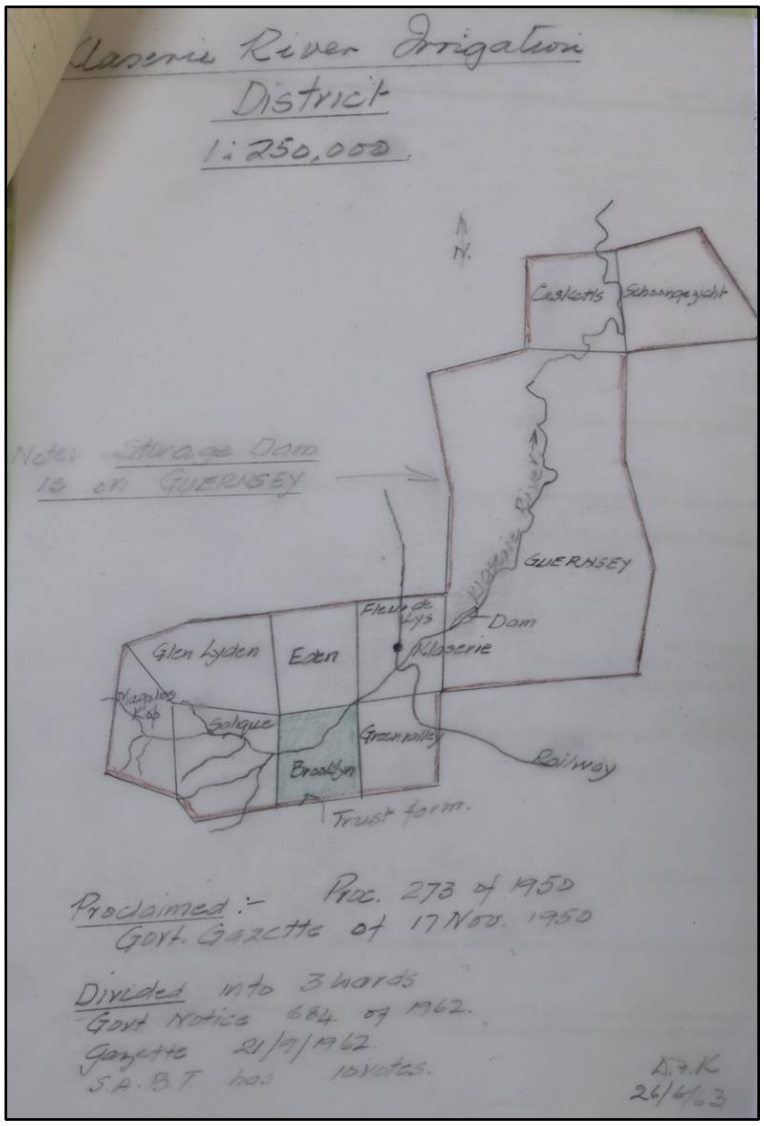


Figure 4.9. A Map of the Klaserie River Irrigation District in 1963. The farm Schoongezight 66 KU, is the northernmost farm forming part of this Irrigation District (NASA *SAB, BAO: 10984 H124/1080/12*).

In 1954 the Transvaal Game Ordinance (No 23 of 1949) was amended, and people were allowed to form private reserves under certain conditions. The first reserve that was established was the Umbabat Private Nature Reserve, named after the Umbabat River. This reserve's name was changed in 1956 to Timbavati – the Xitsonga name for the river. In 1961 the Kruger National Park started to fence their western boundary, and the Timbavati Private Nature Reserve was also fenced (Klaserie Reserve 2018).

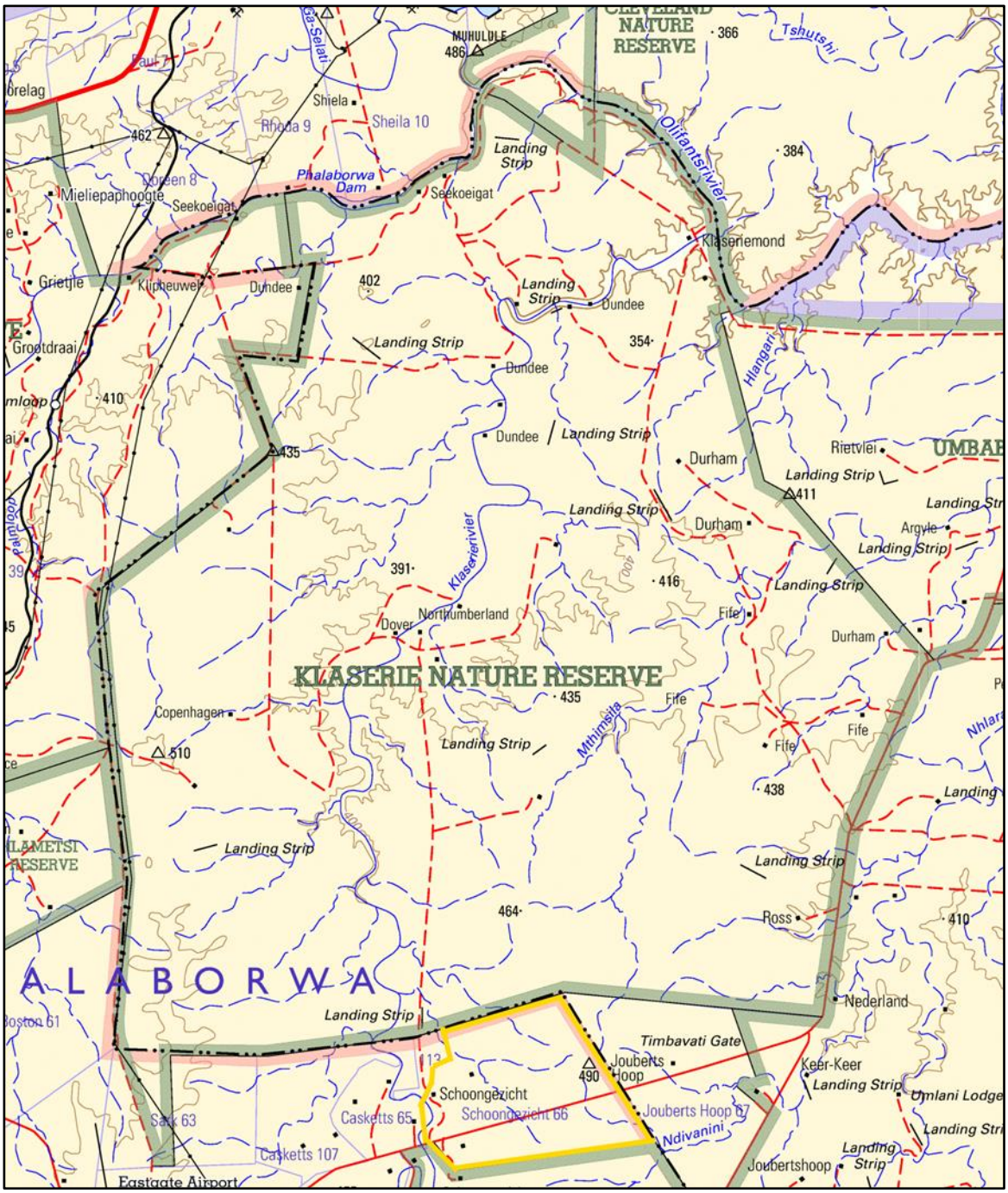


Figure 4.10. A Topographical map of the Klaserie Nature Reserve and surrounds in the year 1998. A yellow border shows the location of the farm Schoongezicht 66 KU (Topographical Map, 1998).

A report submitted to the Minister of Agriculture in1968, dealt with the agriculture situation in the Hoedspruit and Klaserie areas (NASA *SAB, LPE: 29 NA2/9/2*).

The Hoedspruit irrigation area was said to have developed after World War II with the erection of two canals and there were 80 farmers within this area. Originally, the predominant crop in the area was rice, but with low cost imported rice, this farming stopped in 1958. Instead, tomatoes, tobacco, sugar, pumpkins and to a lesser extent citrus, was then cultivated (NASA *SAB, LPE: 29 NA2/9/2*).

The area was said to be excellent for winter production and that water was cheap and abundant. Transportation from the area was said to be good, however, there were some problems with irrigation and the existing canals needed to be replaced with cement canals (NASA *SAB, LPE: 29 NA2/9/2*).

The Klaserie area was described as an area where agronomy plays an important role. The water supply was said to be stable due to the Klaserie dam further upstream.

According to the report, the water was primarily used in the cultivation of vegetables such as tomatoes, pumpkins and onions, however it was also used in the production of tobacco and maize. Beef farming was said to play a rather insignificant role, but that the area offered ideal conditions for this type of farming. However, the close proximity to the Kruger National Park means that foot and mouth disease as well as lions posed a risk to cattle farming (NASA *SAB, LPE: 29 NA2/9/2*).

The report found that the Klaserie area is more suitable than the Hoedspruit area and it suggested that cattle farming should be promoted within the area (NASA *SAB, LPE: 29 NA2/9/2*)

In 1981, Cheday Investments (Pty) Ltd made application for a permit to change the use of land in respect of portion 7 of the farm Schoongezicht 66 KU. The application was to erect a butchery as well as a house on the property (NASA S*AB, CDB: PB4/19/2/33/66/1*).

According to the application, at the time, there were no butcheries within a radius of 30km of the proposed location. Also, the premises fell within a hunting area frequented by foreign hunters who are normally only interested in trophy hunting, meaning that the game meat was often wasted (NASA S*AB, CDB: PB4/19/2/33/66/1*).

The application for change of use was granted on 20 July 1982 (NASA S*AB, CDB: PB4/19/2/33/66/1*).

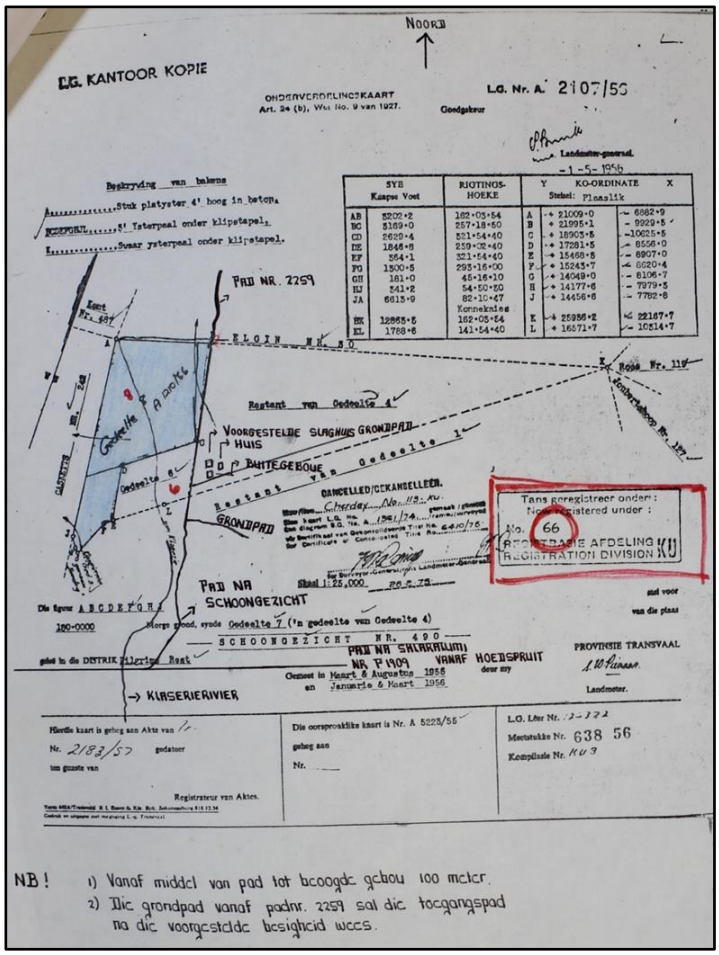


Figure 4.11. Surveyor General Subdivision map of the farm Schoongezicht 66 KU, dated 1956. The location of the proposed butchery, residence and outbuildings is indicated on the map (NASA *SAB, CDB: PB4/19/2/33/66/1*).

Sections of the road D2259, including those over portion 2 of the farm Schoongezicht 66 KU and as shown in fig. 4.11 above, was de- proclaimed on 12 November 2018 (Green Gazette, 2021).

On or about 1985, another permit for change of use was issued to Mr. S.J. Naude for portion 7 of the farm Schoongezicht 66 KU for use as a general dealer/café (NASA S*AB, CDB: PB4/19/2/33/66/1*). The portion subject to Mr. Naude's application later became the farm Cherday 113 KU.

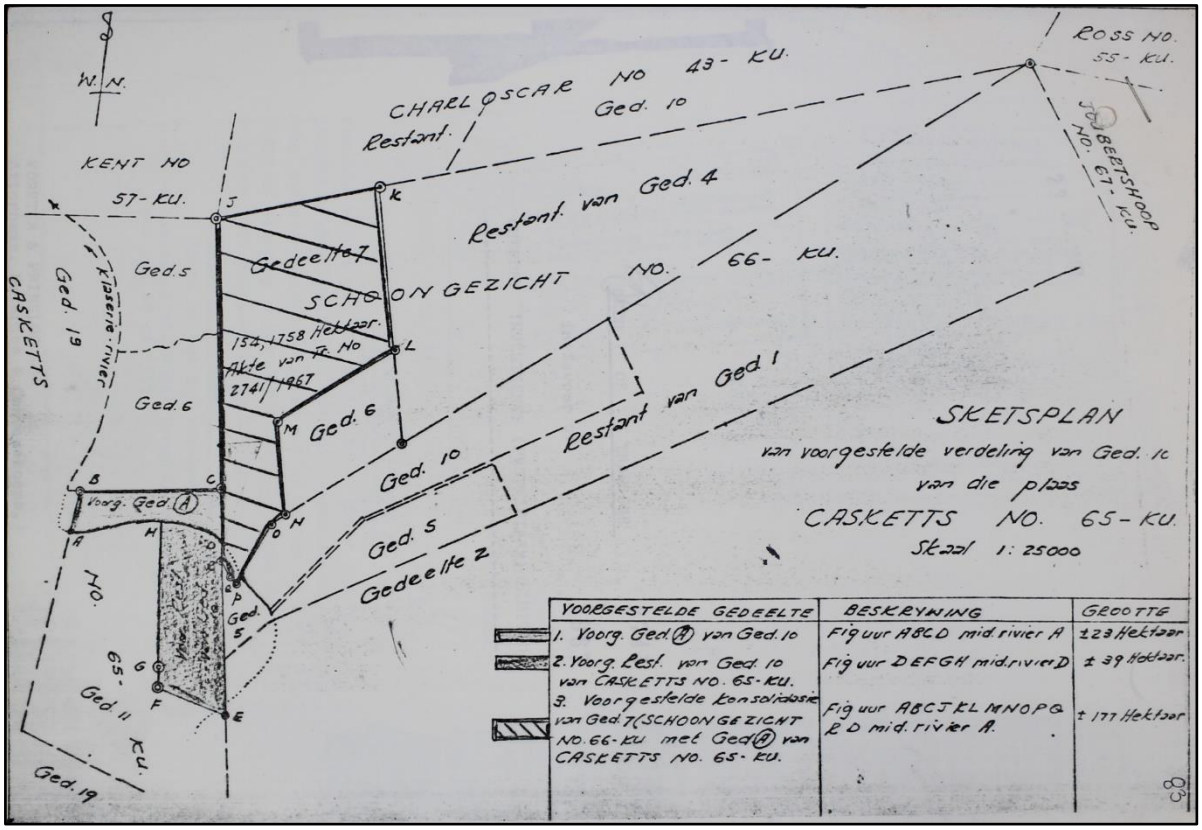


Figure 4.12. Circa 1984 Sketch plan of the proposed subdivision of portion 10 of the farm Casketts 65 KU. Portion 2 of the farm Schoongezicht 66 KU is visible to the south (NASA *SAB, CDB: PB4/19/2/33/66/1*).

4.2. Archaeology

4.2.1. Stone Age

In Mpumalanga Province the Drakensberg separates the interior plateau also known as the Highveld from the low-lying subtropical Lowveld, which stretches to the Indian Ocean. A number of rivers amalgamate into two main river systems, the Olifants River and the Komati River. This fertile landscape has provided resources for humans and their predecessors for more than 1.7 million years (Esterhuizen & Smith in Delius, 2007).

The initial attraction of abundant foods in the form of animals and plants eventually also led to the discovery of and utilisation of various minerals including ochre, iron and copper. People also obtained foreign resources by means of trade from the coast. From 900 AD this included objects brought across the ocean from foreign shores.

The Early Stone Age (ESA)

In South Africa the ESA dates from about 2 million to 250 000 years ago, in other words from the early to middle Pleistocene. The archaeological record shows that as the early ancestors progressed physically, mentally and socially, bone and stone tools were developed. One of the most influential advances was their control of fire and diversifying their diet by exploitation of the natural environment (Esterhuizen & Smith in Delius, 2007).

The earliest tools date to around 2.5 million years ago from the site of Gona in Ethiopia. Stone tools from this site shows that early hominids had to cognitive ability to select raw material and shape it for a specific application. Many bones found in association with stone tools like these have cut marks which lead scientists to believe that early hominids purposefully chipped cobblestones to produce flakes with a sharp edge capable of cutting and butchering animal carcasses. This supplementary diet of higher protein quantities ensured that brain development of hominids took place more rapidly.

Mary Leaky discovered stone tools like these in the Olduwai Gorge in Tanzania during the 1960s. The stone tools are named after this gorge and are known as relics from the Oldowan industry. These tools, only found in Africa, are mainly simple flakes, which were struck from cobbles. This method of manufacture remained for about 1.5 million years. Although there is continuing debate about who made these tools, two hominids may have been responsible. The first of these was an early form of *Homo* and the second was *Paranthropus robustus*, which became extinct about 1 million years ago (Esterhuizen & Smith in Delius, 2007).

Some time later, around 1.7 million years ago, more specialised tools known as Acheulean tools, appeared. These are named after tools from a site in France by the name of Saint Acheul, where

they were first discovered in the 1800s. It is argued that these tools had their origin in Africa and then spread towards Europe and Asia with the movement of hominids out of Africa. These tools had longer and sharper edges and shapes, which suggest that they could be used for a larger range of activities, including the butchering of animals, chopping of wood, digging roots and cracking bone. *Homo ergaster* was probably responsible for the manufacture of Acheulean tools in South Africa. This physical type was arguably physically similar to modern humans, had a larger brain and modern face, body height and proportion very similar to modern humans. *Homo ergaster* was able to flourish in a variety of habitats in part because they were dependent on tools. They adapted to drier, more open grassland settings. Because these early people were often associated with water sources such as rivers and lakes, sites where they left evidence of their occupation are very rare. Most tools of these people have been washed into caves, eroded out of riverbanks and washed downriver. An example in Mpumalanga is Maleoskop on the farm Rietkloof where Early Stone Age (ESA) tools have been found. This is one of only a handful such sites in Mpumalanga.

Middle Stone Age (MSA)

A greater variety of tools with diverse sizes and shapes appeared by 250 000 before present (BP). These replaced the large hand axes and cleavers of the ESA. This technological advancement introduces the Middle Stone Age (MSA). This period is characterised by tools that are smaller in size but different in manufacturing technique (Esterhuizen & Smith in Delius, 2007).

In contrast to the ESA technology of removing flakes from a core, MSA tools were flakes to start with. They were of a predetermined size and shape and were made by preparing a core of suitable material and striking off the flake so that it was flaked according to a shape which the toolmaker desired. Elongated, parallel-sided blades, as well as triangular flakes are common finds in these assemblages. Mounting of stone tools onto wood or bone to produce spears, knives and axes became popular during the MSA. These early humans not only settled close to water sources but also occupied caves and shelters. The MSA represents the transition of more archaic physical type (*Homo)* to anatomically modern humans, *Homo sapiens.*

The MSA has not been extensively studied in Mpumalanga but evidence of this period has been excavated at Bushman Rock Shelter, a well-known site on the farm Klipfonteinhoek in the Ohrigstad district. This cave was excavated twice in the 1960s by Louw and later by Eloff. The MSA layers show that the cave was repeatedly visited over a long period. Lower layers have been dated to over 40 000 BP while the top layers date to approximately 27 000 BP (Esterhuizen & Smith in Delius, 2007; Bergh, 1998).

Later Stone Age (LSA)

Early hunter gatherer societies were responsible for a number of technological innovations and social transformations during this period starting at around 20 000 years BP. Hunting of animals proved more successful with the innovation of the bow and link-shaft arrow. These arrows were made up of a bone tip which was poisoned and loosely linked to the main shaft of the arrow. Upon impact, the tip and shaft separated leaving the poisoned arrow-tip imbedded in the prey animal. Additional innovations include bored stones used as digging stick weights to uproot tubers and roots; small stone tools, mostly less than 25mm long, used for cutting of meat and scraping of hides; polished bone tools such as needles; twine made from plant fibres and leather; tortoiseshell bowls; ostrich eggshell beads; as well as other ornaments and artwork (Esterhuizen & Smith in Delius, 2007).

At Bushman Rock Shelter the MSA is also represented and starts at around 12 000 BP but only lasted for some 3 000 years. The LSA is of importance in geological terms as it marks the transition from the Pleistocene to the Holocene, which was accompanied by a gradual shift from cooler to warmer temperatures. This change had its greatest influence on the higher-lying areas of South Africa. Both Bushman Rock Shelter and a nearby site, Heuningneskrans, have revealed a greater use in plant foods and fruit during this period (Esterhuizen & Smith in Delius, 2007; Bergh, 1998).

Faunal evidence suggests that LSA hunter-gatherers trapped and hunted zebra, warthog and bovids of various sizes. They also diversified their protein diet by gathering tortoises and land snails *(Achatina*) in large quantities.

Ostrich eggshell beads were found in most of the levels at these two sites. It appears that there is a gap of approximately 4 000 years in the Mpumalanga LSA record between 9 000 BP and 5 000 BP. This may be a result of generally little Stone Age research being conducted in the province. It is, however, also a period known for rapid warming and major climate fluctuation, which may have led people to seek out protected environments in this area. The Mpumalanga Stone Age sequence is visible again during the mid-Holocene at the farm Honingklip near Badplaas in the Carolina district (Esterhuizen & Smith in Delius, 2007; Bergh, 1998).

At this location, two LSA sites were located on opposite sides of the Nhlazatshe River, about one kilometre west of its confluence with the Teespruit. These two sites are located on the foothills of the Drakensberg, where the climate is warmer than the Highveld but also cooler than the Lowveld (Esterhuizen & Smith in Delius, 2007; Bergh, 1998).

Nearby the sites, dated to between 4 870 BP and 200 BP are four panels, which contain rock art. Colouring material is present in all the excavated layers of the site, which makes it difficult to determine whether the rock art was painted during the mid- or later Holocene. Stone walls at both

sites date from the last 250 years of hunter gatherer occupation and they may have served as protection from predators and intruders (Esterhuizen & Smith in Delius, 2007; Bergh, 1998).

4.2.2. Early Iron Age

The period referred to as the Early Iron Age (AD 200-1500 approx.) started when presumably Karanga (north-east African) herder groups moved into the north eastern parts of South Africa. It is believed that these people may have been responsible for making of the famous Lydenburg Heads, ceramic masks dating to approximately 600AD.

Ludwig von Bezing was a boy of more or less 10 years of age when he first saw pieces of the now famous Lydenburg heads in 1957 while playing in the veld on his father's farm near Lydenburg. Five years later von Bezing developed an interest in archaeology and went back to where he first saw the shards. Between 1962 and 1966 he frequently visited the Sterkspruit valley to collect pieces of the seven clay heads. Von Bezing joined the archaeological club of the University of Cape Town when he studied medicine at this institution.

He took his finds to the university at the insistence of the club. He had not only found the heads, but potsherds, iron beads, copper beads, ostrich eggshell beads, pieces of bones and millstones. Archaeologists of the University of Cape Town and WITS Prof. Ray Innskeep and Dr Mike Evers excavated the site where von Bezing found the remains. This site and in particular its unique finds (heads, clay masks) instantly became internationally famous and was henceforth known as the Lydenburg Heads site.

Two of the clay masks are large enough to probably fit over the head of a child, the other five are approximately half that size. The masks have both human and animal features, a characteristic that may explain that they had symbolic use during initiation- and other religious ceremonies. Carbon dating proved that the heads date to approximately 600 AD and was made by Early Iron Age people. These people were Bantu herders and agriculturists and probably populated Southern Africa from areas north-east of the Limpopo river. Similar ceramics were later found in the Gustav Klingbiel Nature Reserve and researchers believe that they are related to the ceramic wares (pottery) of the Lydenburg Heads site in form, function and decorative motive. This sequence of pottery is formally known as the Klingbiel type pottery. No clay masks were found in a context similar to this pottery sequence.

Two larger heads and five smaller ones make up the Lydenburg find. The Lydenburg heads are made of the same clay used in making household pottery. It is also made with the same technique used in the manufacture of household pottery. The smaller heads display the 32odelling of a curved forehead and the back neck as it curves into the skull. Around the neck of each of the heads, two or three rings are engraved horizontally and are filled in with hatching marks to form a pattern. A ridge

of clay over the forehead and above the ears indicates the hairline. On the two larger heads a few rows of small clay balls indicate hair decorations. The mouth consists of lips – the smaller heads also have teeth. The seventh head has the snout of an animal and is the only head that represents an animal.

Some archaeological research was done during the 1970's at sites belonging to the Early Iron Age (EIA), location Plaston, a settlement close to White River (Evers, 1977). This site is located on a spur between the White River and a small tributary. It is situated on holding 119 at Plaston.

The site was discovered during house building operations when a collection of pottery sherds was excavated. The finds consisted of pottery shards both on the surface and excavated.

Some of the pottery vessels were decorated with a red ochre wash. Two major decoration motifs occurred on the pots:

- Punctuation, using a single stylus; and
- Broad line incision, the more common motif.

A number of EIA pottery collections from Mpumalanga and Limpopo may be compared to the Plaston sample. They include Silver Leaves, Eiland, Matola, Klingbiel and the Lydenburg Heads site. The Plaston sample is distinguished from samples of these sites in terms of rim morphology, the majority of rims from Plaston are rounded and very few bevelled. Rims from the other sites show more bevelled rims (Evers, 1977:176).

Early Iron Age pottery was also excavated by archaeologist, Prof. Tom Huffman during 1997 on location where the Riverside Government complex is currently situated (Huffman, 1998). This site is situated a few km north of Nelspruit next to the confluence of the Nelspruit and Crocodile River. It was discovered during the course of an environmental impact assessment for the new Mpumalanga Government complex offices. A bulldozer cutting exposed storage pits, cattle byres, a burial and midden on the crest of a gentle slope. Salvage excavations conducted during December 1997 and March 1998 recovered the burial and contents of several pits.

One of the pits contained, among other items, pottery dating to the eleventh century (AD 1070 ± 40 BP). This relates the pottery to the Mzonjani and Broederstroom phases. The early assemblage belongs to the Kwale branch of the Urewe tradition.

During the early 1970s Dr Mike Evers of the University of the Witwatersrand conducted fieldwork and excavations in the Eastern Transvaal. Two areas were studied: the first area was the Letaba area south of the Groot Letaba River, west of the Lebombo Mountains, east of the great escarpment and north of the Olifants River. The second area was the Eastern Transvaal escarpment area between Lydenburg and Machadodorp.

These two areas are referred to as the Lowveld and escarpment respectively. The earliest work on Iron Age archaeology was conducted by Trevor and Hall in 1912. This revealed prehistoric copper-, gold- and iron mines. Schwelinus (1937) reported smelting furnaces, a salt factory and terraces near Phalaborwa. In the same year D.S. van der Merwe located ruins, graves, furnaces, terraces and soapstone objects in the Letaba area.

Mason (1964, 1965, 1967, 1968) started the first scientific excavation in the Lowveld, followed by N.J. van der Merwe and Scully. M. Klapwijk (1973, 1974) also excavated an EIA site at Silverleaves and Evers and van den Berg (1974) excavated at Harmony and Eiland, both EIA sites.

Research by the National Cultural History Museum resulted in the excavation of an EIA site in Sekhukuneland, known as Mototolong (Van Schalkwyk, 2007). The site is characterized by four large cattle kraals containing ceramics, which may be attributed to the Mzonjani and Doornkop occupational phases.

4.2.3. Late Iron Age

The later phases of the Iron Age (AD 1600-1800's) are represented by various tribes including Ndebele, Swazi, BaKoni, and Pedi, marked by extensive stonewalled settlements found throughout the escarpment and particularly around Machadodorp, Lydenburg, Badfontein, Sekhukuneland, Roossenekal and Steelpoort. The BaKoni were the architects of a unique archaeological stone building complex who by the 19th century spoke seKoni which was similar to Sepedi. The core elements of this tradition are stone-walled enclosures, roads and terraces. These settlement complexes may be divided into three basic features: homesteads, terraces and cattle tracks. Researchers such as Mike Evers (1975) and David Collett (1982) identified three basic settlement layouts in this area. Basically these sites can be divided into simple and complex ruins. Simple ruins are normally small in relation to more complex sites and have smaller central cattle byres and fewer huts. Complex ruins consist of a central cattle byre, which has two opposing entrances and a number of semi-circular enclosures surrounding it. The perimeter wall of these sites is sometimes poorly visible. Huts are built between the central enclosure and the perimeter wall. These are all connected by track-ways referred to as cattle tracks. These tracks are made by building stone walls, which forms a walkway for cattle to the centrally located cattle byres.

5. Site descriptions, locations and impact significance assessment

Three locations, sites S1, S2 & S3, were documented. They consist of a formal family graveyard (site S1) with two marked graves and two houses (sites S2 & S3). The first house (S2) is within the ambit of the Act (NHRA, 25 of 1999, section 34) as it is older than 60 years, but it is of low heritage significance. The second house is a more modern building and not protected by the Act.

A single survey orientation location was documented, site SO1, which includes a GPS location and photographs of the landscape at that particular location.

The located sites and survey orientation sites are tabled in Appendix B and their photos in Appendix D. A map of their location is also provided in Appendix C.

Tables indicate the ***site significance rating scales and status*** in terms of possible impacts of the proposed actions on any located or identified heritage sites (**Table 5.5 & 5.6).**

Table 5.1. Summary of located sites and their heritage significance

Type of site	Identified sites	Significance
Graves and graveyards	One, site S1	High
Late Iron Age	None	N/A
Early Iron Age	None	N/A
Historical buildings or structures	One, site S2	Low
Historical features and ruins	None	N/A
Stone Age sites	None	N/A

Table 5.2. Significance rating guidelines for sites

Field Rating	Grade	Significance	Recommended Mitigation
National Significance (NS)	Grade 1	High Significance	Conservation, nomination as national site
Provincial Significance (PS)	Grade 2	High Significance	Conservation; Provincial site nomination
Local significance (LS 3A)	Grade 3A	High Significance	Conservation, No mitigation advised
Local Significance (LS 3B)	Grade 3B	High Significance	Mitigation but at least part of site should be retained
Generally Protected A (GPA)	GPA	High/ Medium Significance	Mitigation before destruction
Generally Protected B (GPB)	GPB	Medium Significance	Recording before destruction
Generally Protected C (GPC)	GPC	Low Significance	Destruction

5.1. Description of located sites

Sites:

5.1.1. Site S 1

Location: See Appendix B and D (fig. 1)

Description: Two graves with headstones in a formally enclosed family graveyard. Both graves have gravestones and are inscribed as follows: *"In Loving Memory of Alric Grant *13-02-1926; † 07-12-2001. The Lord is My Sheperd. Wiggil"* the second grave: *"Peter LB Granat. 30 Sept 1956-24 March 2009. Beloved Husband and Father. Never will I leave you. Never will I forsake you. Hebrews 13 Vers 5."*

Impact of the proposed development/ activity: The proposed new housing construction will probably not impact on this site location as it is located some distance from the planned construction locations.

Recommendation: The proposed activity should have direct or secondary impact on the graves. A buffer zone of at least 20 meters surrounding the graveyard should be observed.


Photo view north

5.1.2. Site S 2

Location: See Appendix B and D (fig. 2, 3)

Description: A historic farmstead. As evidenced by historic topographical maps the structure must have been built before 1960 and is still there today (see figs. 4.6 - 4.8 and map Appendix C). There has been many additions and alterations to the building and it is structurally compromised. Also see built environment data sheets for more information in Appendix E.

Impact of the proposed development/ activity: The proposed new construction will probably impact on this site location.

Recommendation: The house is not significant in terms of heritage value. Demolition must be permitted by the relevant heritage authority.


Photo taken north-west

5.1.3. Site S 3

Location: See Appendix B and D (fig. 4)

Description: A modern farmstead. As evidenced by historic topographical maps the structure must have been built between 1986 and 2008 and is still there today (see figs. 4.7 - 4.8 and map Appendix C). Also see built environment data sheets for more information in Appendix E.

Impact of the proposed development/ activity: The proposed new construction will probably not impact on this site location as it is located some distance from the planned construction locations.

Recommendation: The house is not significant in terms of heritage value. No recommendations.


Photo taken north-east

Survey orientations:

5.1.4. Site SO 1.

Location: See Appendix B and D (fig.5-7)

Description: Survey orientation location.

Impact of the proposed development/ activity: N/A

Recommendation: N/A


Photo view north-west

TABLE 5.3. General description of located sites and field rating.

Site No.	Description	Type of significance	Degree of significance	NHRA heritage resource & rating
S 1	Graves	Graves & burial grounds	Archaeological: N/A Historic: High	Section 35. GP A. High significance
S 2	Farmstead	Built environment	Archaeological: N/A Historic: Low	Section 34. GP C. Low significance
S 3	Farmstead	Built environment	Archaeological: N/A Historic: Low	Section 34. GP C. Low significance
SO1	Survey orientation location	N/A	Archaeological: N/A Historic: N/A	None

TABLE 5.4. Site condition assessment and management recommendations.

Site no.	Type of Heritage resource	Integrity of cultural material	Preservation condition of site	Relative location	Quality of archaeological/ historic material	Quantity of site features	Recommended conservation management
S 1	Graves	None	Good	Schoongezicht 66 KU	Archaeology: N/A Historically: Good	2	No impact. 20 m buffer zone.
S 2	Built environment	None	Fair	Schoongezicht 66 KU	Archaeology: N/A Historically: Fair-Poor	1	Permit before destruction.
S 3	Built environment	None	Good	Schoongezicht 66 KU	Archaeology: N/A Historically: N/A	1	None
SO 1	N/A	N/A	N/A	Schoongezicht 66 KU	Archaeology: N/A Historically: N/A	-	N/A

TABLE 5.5. Significance Rating Scales of Impact

Site No.	Nature of impact	Type of site	Extent	Duration	Intensity	Probability	Score total
S 1	Residential construction	Graves	Family graveyard	Short term	Low (1)	Improbable (1)	2
S 2	Residential construction	Farmstead	Site	Short term	Moderate (2)	Possible (2)	4
S 3	Residential construction	Farmstead	Site	Short term	Moderate (2)	Possible (2)	4
SO 1	Residential construction	N/A	N/A	Short term	Low (1)	Improbable (1)	2

***Notes:** Short term ≥ 5 years, Medium term 5-15 years, Long term 15-30 years, Permanent 30+ years

Intensity: Very High (4), High (3), Moderate (2), Low (1)

Probability: Improbable (1), Possible (2), Highly probable (3), Definite (4)

TABLE 5.6. Site current status and future impact scores

Site No.	Current Status	Low impact (4-6 points)	Medium impact (7-9 points)	High impact (10-12 points)	Very high impact (13-16 points)	Score Total
S 1	Neutral	4	-	-	-	4
S 2	Neutral	-	7	-	-	7
S 3	Neutral	-	7	-	-	7
SO 1	Neutral	-	-	-	-	-

5.2. Cumulative impacts on the heritage landscape

Cumulative impacts can occur when a range of impacts which result from several concurrent processes have impact on heritage resources. The importance of addressing cumulative impacts is that the total impact of several factors together is often greater than one single process or activity that may impact on heritage resources. Construction of the proposed residences may have indirect impact on the identified sites. This should be managed as per the recommendations in section 5.1. Also see section 6.1. Recommended management measures.

6. Summary of findings and recommendations

Three locations, sites S1, S2 and S3, were documented, they consist of a family graveyard which has two marked graves and two existing houses, one of which (site S2) is possibly older than 60 years of age as it is indicated on a topographical map dated 1960. The graves are considered to be of high significance and it is recommended than the proposed activities not impact in any way on the graveyard, a buffer zone of at least 20 meters should be observed.

The older building (site S2) is not regarded as being of heritage significance but because of its age it is protected by the Act (25 0f 1999) and demolishing should be permitted. The second house is a modern building and is not within the ambit of the Act.

A single survey orientation location was documented, site SO 1, which includes a GPS location and photographs of the landscape at that particular location.

In terms of section 34 of the National Heritage Resources Act (NHRA, 25 of 1999), no significant buildings or structures were located. One house (site S1) is however older than 60 years and demolishing must be permitted.

In terms of section 35 of the NHRA, no significant archaeological sites or features were located.

In terms of section 36 of the NHRA, two graves were located.

It is not within the expertise of this report or the surveyor to comment on possible palaeontological remains which may be located in the study area.

The bulk of archaeological remains are normally located beneath the soil surface. It is therefore possible that some significant cultural material or remains were not located during this survey and will only be revealed when the soil is disturbed. Should excavation or large scale earth moving activities reveal any human skeletal remains, broken pieces of ceramic pottery, large quantities of sub-surface charcoal or any material that can be associated with previous occupation, a qualified archaeologist should be notified immediately. This will also temporarily halt such activities until an archaeologist has assessed the situation. It should be noted that if such a situation occurs it may have further financial implications.

6.1. Recommended management measures

Monitoring programmes which should be followed when a “chance find” of a heritage object or human remains occur, include the following:

- The contractors and workers should be notified that archaeological sites might be exposed during the construction work.
- Should any heritage artefacts be exposed during excavation, work on the area where the artefacts were discovered, shall cease immediately and the Environmental Control Officer shall be notified as soon as possible;

- All discoveries shall be reported immediately to a museum, preferably one at which an archaeologist is available, so that an investigation and evaluation of the finds can be made. Acting upon advice from these specialists, the Environmental Control Officer will advise the necessary actions to be taken;
- Under no circumstances shall any artefacts be removed, destroyed or interfered with by anyone on the site; and
- Contractors and workers shall be advised of the penalties associated with the unlawful removal of cultural, historical, archaeological or palaeontological artefacts, as set out in the National Heritage Resources Act (Act No. 25 of 1999).

7. References

1. Amery, L.S. (ed),1909. ***The times history of the war in South Africa 1899-1902*****,** Vol VI. London,

2. Barnard, C. 1975**.** ***Die Transvaalse Laeveld. Komee van 'n Kontrei.***

3. Bergh, J.S. (ed.) 1998. ***Geskiedenisatlas van Suid-Afrika. Die vier noordelike provinsies***. (J.L. van Schaik, Pretoria).

4. Bornman, H. 1995. ***Pioneers of the Lowveld***.

5. Breutz, P.L. 1985. ***Pre-Colonial Africa: The South-Eastern Bantu Cultural Province.***

6. Cartwright, A. P. 1961. Valley of gold. 1872-1961. Cape Town.

7. Coetzee, F.P. 2002. *An Archaeological Investigation Antwerpen Game Farm, Hoedspruit District, Northern Province.* An unpublished report by the Archaeology Contracts Unit (UNISA) on file at SAHRA as: 2002-SAHRA-0087.

8. Delius, P. 2007. ***Mpumalanga History and Heritage.*** University of KwaZulu-Natal Press.

9. Du Preez, S. J. ***Peace attempts during the Anglo Boer War until March 1901.*** Magister Artium thesis in History. Pretoria: University of Pretoria.

10. Evers, T.M. in Voight, E.A. 1981. ***Guide to Archaeological Sites in the Northern and Eastern Transvaal.*** Transvaal Museum, Pretoria.

11. Giliomee, H. 2003. ***The Afrikaners, a biography of a people*****.** Tafelberg: Cape Town & Charlottesville.

12. Hall, H.L. 1938 (1990). ***I Have Reaped my Mealies. An Autobiography***. Whitnall Simonsen.

13. Huffman, T. N. 2007. ***Handbook to the Iron Age: The Archaeology of Pre-Colonial Farming Societies in Southern Africa***. Kwa-Zulu Natal Press.

14. Huyser, J. D. ***Die Naturelle-Politiek van die Suid-Afrikaanse Republiek.*** D. LITT. Verhandeling, Universiteit van Pretoria.

15. Jones, H. M. & Jones G. M. 1999. ***A Gazetteer of the Second Anglo-Boer War. 1899-1902.*** Buckinghamshire: The Military Press.

16. Mason, R. 1962. ***Prehistory of the Transvaal: a record of human activity.*** Witwatersrand University Press, Johannesburg.

17. Küsel, U. 2005. *Cultural Heritage Resources Impact Assessment of a Portion of Kapama Hoedspruit (Guernsey 81 KU Portions 6, 34, 98, 109, 56, 204 and 210).* An unpublished report by

African Heritage Consultants CC on file at SAHRA as: 2005-SAHRA-0264.

18. Massie, R.H. 1905. **The Native tribes of Transvaal. Prepared for the general staff war office.** Harrison and Sons, London.

19. Myburgh, A.C. 1956. ***Die Stamme van die Distrik Carolin*a.** Staatsdrukker. Pretoria.

20. Packard, P. 2001. ***"Malaria blocks development" revisited: the role of disease in the history of agricultural development in the Eastern and Northern Transvaal Lowveld. 1890-1960.*** *Journal of Southern African Studies* 27 (3), September 2001.

21. Raper, P. E. 2014. A dictionary of Southern African place names. Johannesburg: Jonathan Ball Publishers.

22. Roodt, F. 2003. *Lodge Development-Timbavati Nature Reserve Farm: Avoca 88 (Acornhoek).* An unpublished report by R & R Cultural Resource Consultants on file at SAHRA as: 2003-SAHRA-0032.

23. Ross, R. 1999. ***A concise history of South Africa*.** Cambridge University Press. Cambridge.

24. Van Vollenhoven, A.C. 2002. ***Die Metodiek van Kultuurhulpbronbestuur (KHB).*** S.A. Tydskrif vir Kultuurgeskiedenis 16(2).

25. Van Vollenhoven, A.C. 1995. ***Die bydrae van Argeologie tot Kultuurhulpbronbestuur.*** Referaat gelewer voor die Suid-Afrikaanse Vereniging vir Kultuurgeskiedenis, Transvaal Streektak, Sunnyside.

ELECTRONIC SOURCES:

1. Chief Surveyor-General. 2021. Scanned images: Schoongezicht 66 KU. Available: http://csg.dla.gov.za/esio/listdocument.jsp [Cited 25 April 2021].

2. Mopani District Municipality. 2021. Location. [Online]. Available: http://www.mopani.gov.za/about/location.php [Cited 25 April 2021].

3. Google Earth. 2021. 24°*21*'09.08" S 31°*06'06.31" E elev 479 m.* [Online]. [Cited 19 April 2021].

4. Google Earth. 2021. 24°*20*'23.02" S 31°*09'55.22" E elev 444 m.* [Online]. [Cited 19 April 2021].

5. Hoedspruit. N/d. *History of Hoedspruit.* [Online]. Available: http://www.hoedspruit.co.za/history.html. [Cited 30 October 2018]

6. Klaserie Reserve. 2018. Klaserie Private Nature Reserve. History. [Online]. Available: http://www.klaseriereserve.co.za/about.html. [Cited 30 October 2018]

7. Pistorius, C. C. 2008. *A Phase I Heritage Impact Assessment (HIA) study for the proposed Wonderfontein Colliery near Belfast in the Mpumalanga Province of South Africa. Prepared by: Dr Julius C. C. Pistorius, Archaeologist and Heritage Management Consultant.* . [Online]. Available: http://www.sahra.org.za/sahris/sites/default/files/heritagereports/Wonderfontein%20Colliery_0.pdf. [Cited 26 June 2018]

8. University of the Witwatersrand. 2017. *Rock Art Research Institute, University of the Witwatersrand. Rock Art of Southern Africa*. [Online]. Available: https://www.wits.ac.za/rockart/about-rock-art/rock-art-of-southern-africa/. [Cited 25 June 2018]

9. Windeed Search Engine. 2021. *Deeds Office Property. Schoongezicht, 66, 2 (Limpopo).* [Accessed: 16 April 2021]

10. Green Gazette. 2021. *General Notice. Northern Province Roads Agency (Pty) Limitd and Provincial Roads Act (7/1998). Notice for the Deproclamation of a section of Road D2259 over Portions 2, 10 and 13 of the Farms Schoongezircht 66 KU and Cherday 113 KU in the Mopani District* [Online]. Available: https://www.greengazette.co.za/notices/northern-province-roads-agency-pty-limitd-and-provincial-roads-act-7-1998-notice-for-the-deproclamation-of-a-section-of-road-d2259-over-portions-2-10-and-13-of-the-farms-schoongezircht_20190201-LIM-02969-00015

ARCHIVAL SOURCES (National Archive Pretoria)

1. National Archives and Records Service of South Africa. 1867-1892. *TAB, RAK: 2900. Lydenburg.*

2. National Archives and Records Service of South Africa. 1904-1950. *TAB, RAK: 2941. Pelgrimsrus.*

3. National Archives of South Africa. N/d. *Maps: 3/1254. Kruger National Park.*

4. National Archives and Records Service of South Africa. 1963-1972. S*AB, BAO: 10984 H124/1080/12. Besproeiing. Klaserie Rivierbesproeiingsdistrik. Suid-Afrikaanse Naturelle Trust. Plaas Brooklyn. Bosbokrand.*

5. National Archives and Records Service of South Africa. 1968-1969. SAB, *LPE: 29 NA2/9/2. Landboubeleid en Aktuele Landbouaangeleendhede. Ad hoc en spesiale ondersoeke Klaserie – Hoedspruit omgewing en finansiele probleme. Sondagsrivier.*

6. National Archives and Records Service of South Africa. 1982-1987. S*AB, CDB: PB4/19/2/33/66/1. Plaaslike bestuur. Gemeenskapsvorming. Besigheidsregte. Pelgrimsrust. Gedeelte 7. Schoongezicht 66.*

MAPS

1. Surveyor General. 1904. *Transvaal (Jackson's First Series). Sheet No. 58. Olifant's River*. Pretoria: Government Printing Works.

2. Anon. 1920s. *The standard map of the Transvaal. Compiled from registered diagrams and information supplied by the various land owner and from other authentic sources. Johannesburg: The Map Office.*

3. Topographical Map. 1942. *South Africa. 1:250 000 Sheet. 2430 Pilgrim's Rest. First Edition.* Pretoria: Government Printer.

4. Topographical Map. 1960. *South Africa. 1:50 000 Sheet. 2431AC Casketts. First Edition.* Pretoria: Government Printer.

5. Topographical Map. 1986. *South Africa. 1:50 000 Sheet. 2431AC Casketts. Second Edition.* Pretoria: Government Printer.

6. Topographical Map. 2008. *South Africa. 1:50 000 Sheet. 2431AC Casketts. Third Edition.* Pretoria: Government Printer.

Appendix A

Terminology

"Alter" means any action affecting the structure, appearance or physical properties of a place or object, whether by way of structural or other works, by painting, plastering or other decoration or any other means.

"Archaeological" means –

- Material remains resulting from human activity which are in a state of disuse and are in or on land and which are older than 100 years, including artifacts, human and hominid remains and artificial features or structures;
- Rock Art, being any form of painting, engraving or other graphic representation on a fixed rock surface or loose rock or stone, which was executed by human agency and which is older than 100 years, including any area within 10m of such representation;
- Wrecks, being any vessel or aircraft, or any part thereof, which was wrecked in South Africa, whether on land, in the internal waters, the territorial waters or in the maritime culture zone of the Republic, as defined respectively in sections 3, 4 and 6 of the Maritime Zones Act, 1994 (Act No. 15 of 1994), and any cargo, debris or artifacts found or associated therewith, which is older than 60 years or which SAHRA considers to be worthy of conservation; and
- Features, structures and artefacts associated with military history which are older than 75 years and the sites on which they are found;

"Conservation", in relation to heritage resources, includes protection, maintenance, preservation and sustainable use of places or objects so as to safeguard their cultural significance;

"Cultural significance" means aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technological value or significance;

"Development" means any physical intervention, excavation, or action, other than those caused by natural forces, which may in the opinion of a heritage authority in any way result in a change to the nature, appearance or physical nature of a place, or influence its stability and future well-being, including –

- construction, alteration, demolition, removal or change of use of a place or a structure at a place;
- carrying out any works on or over or under a place;

- subdivision or consolidation of land comprising, a place, including the structures or airspace of a place;
- constructing or putting up for display signs or hoardings;
- any change to the natural or existing condition or topography of land; and
- any removal or destruction of trees, or removal of vegetation or topsoil;

"Expropriate" means the process as determined by the terms of and according to procedures described in the Expropriation Act, 1975 (Act No. 63 of 1975);

"Foreign cultural property", in relation to a reciprocating state, means any object that is specifically designated by that state as being of importance for archaeology, history, literature, art or science;

"Grave" means a place of internment and includes the contents, headstone or other marker of such a place, and any other structure on or associated with such place;

"Heritage resource" means any place or object of cultural significance;

"Heritage register" means a list of heritage resources in a province;

"Heritage resources authority" means the South African Heritage Resources Agency, established in terms of section 11, or, insofar as this Act (25 of 1999) is applicable in or in respect of a province, a provincial heritage resources authority (PHRA);

"Heritage site" means a place declared to be a national heritage site by SAHRA or a place declared to be a provincial heritage site by a provincial heritage resources authority;

"Improvement" in relation to heritage resources, includes the repair, restoration and rehabilitation of a place protected in terms of this Act (25 of 1999);

"Land" includes land covered by water and the air space above the land;

"Living heritage" means the intangible aspects of inherited culture, and may include –

- cultural tradition;
- oral history;
- performance;
- ritual;
- popular memory;
- skills and techniques;
- indigenous knowledge systems; and
- the holistic approach to nature, society and social relationships;

"Management" in relation to heritage resources, includes the conservation, presentation and improvement of a place protected in terms of the Act;

"Object" means any moveable property of cultural significance which may be protected in terms of any provisions of the Act, including –

- any archaeological artifact;
- palaeontological and rare geological specimens;
- meteorites;
- other objects referred to in section 3 of the Act;

"Owner" includes the owner's authorized agent and any person with a real interest in the property and –

- in the case of a place owned by the State or State-aided institutions, the Minister or any other person or body of persons responsible for the care, management or control of that place;
- in the case of tribal trust land, the recognized traditional authority;

"Place" includes –

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

"Site" means any area of land, including land covered by water, and including any structures or objects thereon;

"**Structure"** means any building, works, device or other facility made by people and which is fixed to land, and includes any fixtures, fittings and equipment associated therewith.

Appendix B

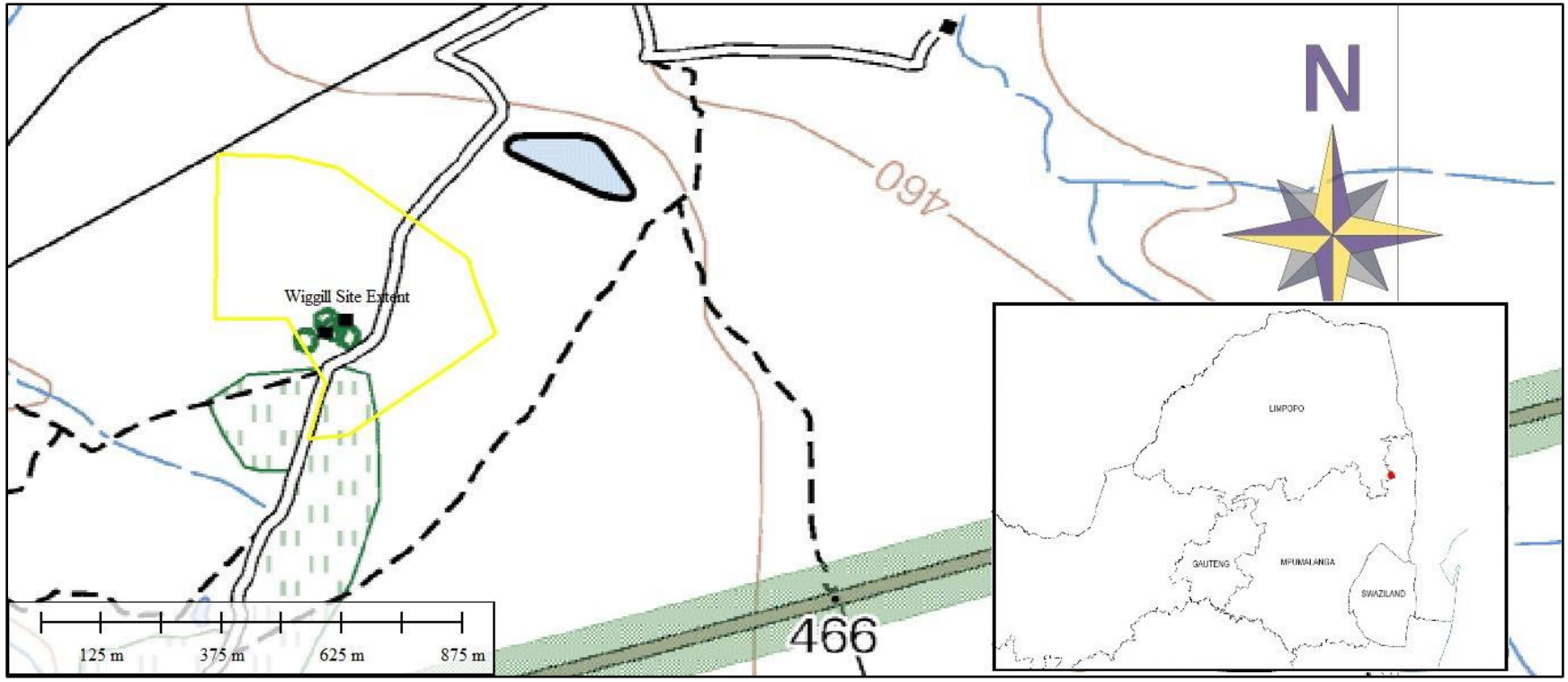
List of sites

Three sites were recorded and numbered S 1, S 2 and S 3. A single survey orientation site was recorded. The site was named SO 1.

Table A. Site and Survey Orientation Locations.

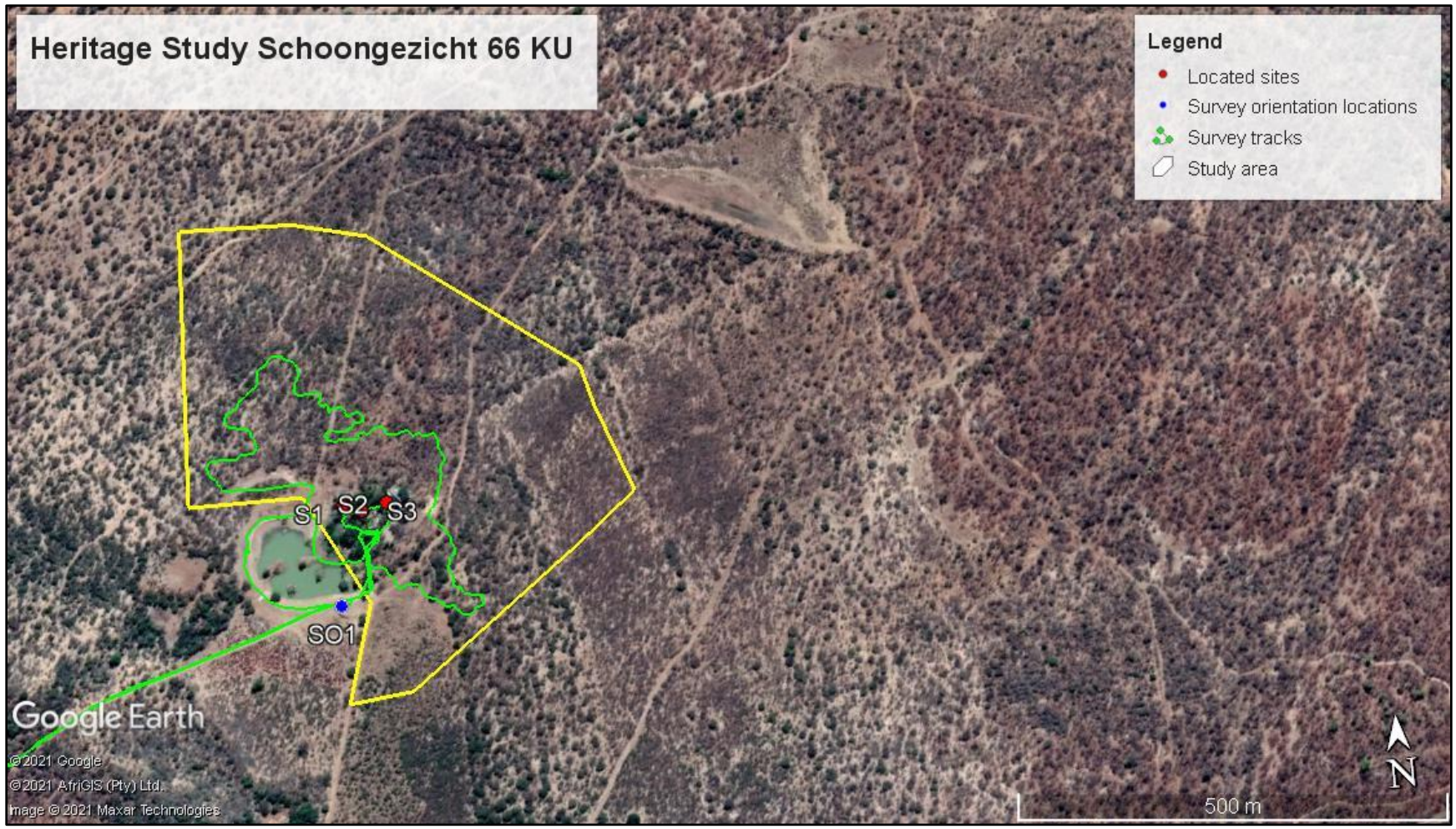
Site Name	Date of compilation	GPS Coordinates		Photo figure No.
S 1	30/04/2021	S24,339444	E031,167231	1
S 2	30/04/2021	S24,339521	E031,167449	2, 3
S 3	30/04/2021	S24,339456	E031,167745	4
SO 1	30/04/2021	S24,340510	E031,167140	5-7

Appendix C



Regional Map 1:50 000 Topographical Map 2431 AC (2008)

Topographical Map 1:50 000 2431 AC (2008)



Aerial view: Google Earth 2021.

Appendix D

Site Photos

Fig. 1. Site S 1. Photos taken towards the north.

Fig. 2. Site S 2. Photos taken towards the north-east and south-east.

Fig. 3. Site S2. Photos taken towards the north-west and south.

Fig. 4. Site S3. Photos taken towards the north-west and north.

Survey Orientation Photos

Fig.5 . Site SO1. Photo taken in an eastern direction.

Fig.6 . Site SO1. Photo taken in a southern direction.

Fig. 7. Site SO1. Photo taken in a western direction.

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Appendix E
Built Environment Data Sheets

Schoongezicht 66 KU built heritage site description form

Location: Schoongezicht 66 KU	DATE RECORDED: 30/04/2021
SITE NUMBER: S 1 – House	GPS CO-ORDINATES: S24,339444 E031,167231

TYPE OF SITE: A farmstead

GEOGRAPHICAL SETTING & LANDSCAPE: Manicured, maintained landscape.

ARCHITECT / BUILDER: Not known

AGE ESTIMATE: Before 1960. The house is indicated on a topographical map of 1960.

BUILDING/S OLDER THAN 60 YEARS (yes/no): Yes

BUILDING STYLE: Utilitarian

BUILDING TYPE: House/ residence

PRESENT USE: House/ residence

OCCUPIED (yes / no): Yes

CONDITION (good / fair / poor / derelict): Fair-Poor, Structural damage

DESCRIPTION: A rectangular concrete block and mortar structure, plastered and white-washed. Locally sourced stone-cladding in some places. Timber roof structure covered with corrugated iron sheeting. Large steel frame windows. Timber doors.

CONSTRUCTION: Walls of concrete block and mortar, timber roof structure covered with corrugated iron sheeting, steel frame windows, timber doors.

ALTERATIONS: Numerous visible. See additional photos.

ADDITIONAL FEATURES & RISKS: Visible structural damage on the north-eastern corner

EVALUATION (cross where relevant)

Outstanding importance		Significant		Contributing		Irrelevant	x	Intrusive		Vacant / undeveloped	

SIGNIFICANCE (indicate where relevant)

ARCHITECTURAL / AESTHETIC		HISTORICAL	
Important example of a building type	No	Associated with historic person or group	No
Important example of a style or period in history	No	Associated with historic event or activity	N/K
Fine details, workmanship or aesthetics	No	CULTURAL / POLITICAL / SOCIAL / EDUCATIONAL / RELIGIOUS / ECONOMIC	
Work of a major architect or builder	No	Associated with any of the above	No
ENVIRONMENTAL		Illustrative of an historical period	No
Landmark in village, town or city	No	SCIENTIFIC / TECHNICAL	
Contributes to character of street or square	No	Example of industrial, technical or engineering development	No
Contributes to character of a neighbourhood or area	No	Important to archaeology, palaeontology, geology or biology	No
Part of an important group of buildings & landscape features	No	New, rare or experimental building techniques	No

STATEMENT OF SIGNIFICANCE & RECOMMENDATIONS: Low significance. It is however older than 60 years and demolishment should be permitted.

RECORDED BY: JP Celliers	CONTACT NUMBERS: 0827793748

Schoongezicht 66 KU built heritage site description form

Location: Schoongezicht 66 KU	DATE RECORDED: 30/04/2021
SITE NUMBER: S 2 – House	GPS CO-ORDINATES: S24,339521 E031,167449

TYPE OF SITE: A farmstead

GEOGRAPHICAL SETTING & LANDSCAPE: Manicured, maintained landscape.

ARCHITECT / BUILDER: Not known

AGE ESTIMATE: Between 1986 and 2008 as evidenced on topographical maps.

BUILDING/S OLDER THAN 60 YEARS (yes/no): No

BUILDING STYLE: Farmstead/ Colonial style

BUILDING TYPE: House/ residence

PRESENT USE: House/ residence

OCCUPIED (yes / no): Yes

CONDITION (good / fair / poor / derelict): Good

DESCRIPTION: A rectangular u-shaped brick and mortar structure, plastered and painted. Locally sourced stone-cladding in some places. Timber roof structure covered with corrugated iron sheeting. Large steel frame windows. Timber doors. Aluminium framed glazed sliding doors.

CONSTRUCTION: Walls of brick and mortar, timber roof structure covered with corrugated iron sheeting, aluminium framed windows, timber doors.

ALTERATIONS: None.

ADDITIONAL FEATURES & RISKS: None.

EVALUATION (cross where relevant)

Outstanding importance		Significant		Contributing		Irrelevant	x	Intrusive		Vacant / undeveloped	

SIGNIFICANCE (indicate where relevant)

ARCHITECTURAL / AESTHETIC		HISTORICAL	
Important example of a building type	No	Associated with historic person or group	No
Important example of a style or period in history	No	Associated with historic event or activity	N/K
Fine details, workmanship or aesthetics	No	CULTURAL / POLITICAL / SOCIAL / EDUCATIONAL / RELIGIOUS / ECONOMIC	
Work of a major architect or builder	No	Associated with any of the above	No
ENVIRONMENTAL		Illustrative of an historical period	No
Landmark in village, town or city	No	SCIENTIFIC / TECHNICAL	
Contributes to character of street or square	No	Example of industrial, technical or engineering development	No
Contributes to character of a neighbourhood or area	No	Important to archaeology, palaeontology, geology or biology	No
Part of an important group of buildings & landscape features	No	New, rare or experimental building techniques	No

STATEMENT OF SIGNIFICANCE & RECOMMENDATIONS: Low significance.

RECORDED BY: JP Celliers	CONTACT NUMBERS: 0827793748

ANNEXURE E: Palaeontological Report

DETAILS OF SPECIALIST AND DECLARATION OF INTEREST

	(For official use only)
File Reference Number:	
NEAS Reference Number:	
Date Received:	

Application for integrated environmental authorisation and waste management licence in terms of the-

(1) National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended and the Environmental Impact Assessment Regulations, 2010; and

(2) National Environmental Management Act: Waste Act, 1998 (Act No. 59 of 2008) and Government Notice 718, 2009

PROJECT TITLE

Proposed construction of a family homestead (Lathleka) and the upgrade of an existing river crossing, on the Remaining Extent 2 of the Farm Schoongezight 66 KU

Specialist:	Palaeontologist		
Contact person:	Marion Bamford		
Postal address:	P O Box 652, WITS		
Postal code:	2050	Cell:	082 555 6937
Telephone:	011 717 6690	Fax:	X
E-mail:	Marionbamford12@gmail.com		
Professional affiliation(s) (if any)	PSSA, FRSSAf, mASSAf. SASQUA, INQUA, IOP		

Project Consultant:	Steven Henwood (Henwood Environmental Solutions)		
Contact person:	Steven Henwood		
Postal address:	PO Box 12340, Steiltes		
Postal code:	1213	Cell:	078 672 3645
Telephone:		Fax:	
E-mail:	sheneood@mweb.co.za		

4.2 The specialist appointed in terms of the Regulations_

I, **Marion Kathleen Bamford** , declare that --

General declaration:

- I act as the independent specialist in this application;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, Regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- all the particulars furnished by me in this form are true and correct; and
- I realise that a false declaration is an offence in terms of regulation 71 and is punishable in terms of section 24F of the Act.

Signature of the specialist:

Marion Bamford Consulting

Name of company (if applicable):

18 October 2021

Date:

Palaeosciences Centre, East Campus, 1 Jan Smuts Avenue, Braamfontein, Johannesburg
Private Bag 3, WITS 2050, Johannesburg, SOUTH AFRICA Tel: 011 717 6682

Marion.bamford@wits.ac.za
15 April 2021

Dr Ragna Redelstorff
Heritage Officer Archaeology, Palaeontology & Meteorites Unit
South African Heritage Resources Agency
111 Harrington Street
Cape Town 8001

Dear Dr Redelstorff

RE: Request for Exemption of any Palaeontological Impact Assessment for the proposed construction of Lathleka and Inkasi Homes for the Wiggill Family on Farm Schooengezicht 66KU, about 20km east of Hoedspruit, Limpopo Province.

In my capacity as a professional palaeontologist, I am requesting exemption for palaeontological impact assessment in terms of the National Heritage Resources Act (Act 25 of 1999) and the National Environmental Management Act (Act 107 of 1998) which requires that the proposed development must be preceded by the relevant impact assessment, in this case for palaeontology.

Two homes are planned, Lathleka and Inkasi, for the Wiggill family on a remaining extent of the Farm Schoongezicht 66 KU, approximately 20 km east of Hoedspruit (Figure 1). The whole farm is on ancient rocks of the Makhutswi Gneiss (Figure 2). Gneiss is a high grade metamorphic rock, meaning that it has been subjected to higher temperatures and pressures than schist. It is formed by the metamorphosis of granite, or sedimentary rock. Gneiss displays distinct foliation, representing alternating layers composed of different minerals. Therefore, there is no chance of any fossils occurring in these rocks. This is confirmed by the grey colouration in the SAHRIS palaeosensitivity map (Figure 3).

We request that no further palaeontological assessment be required, and, as far as the palaeontology is concerned, the project may proceed.

Figure 1: Google Earth map showing the location of the proposed homes for the Wigell Family on Farm Schoongezicht 66KU within the fine white line.

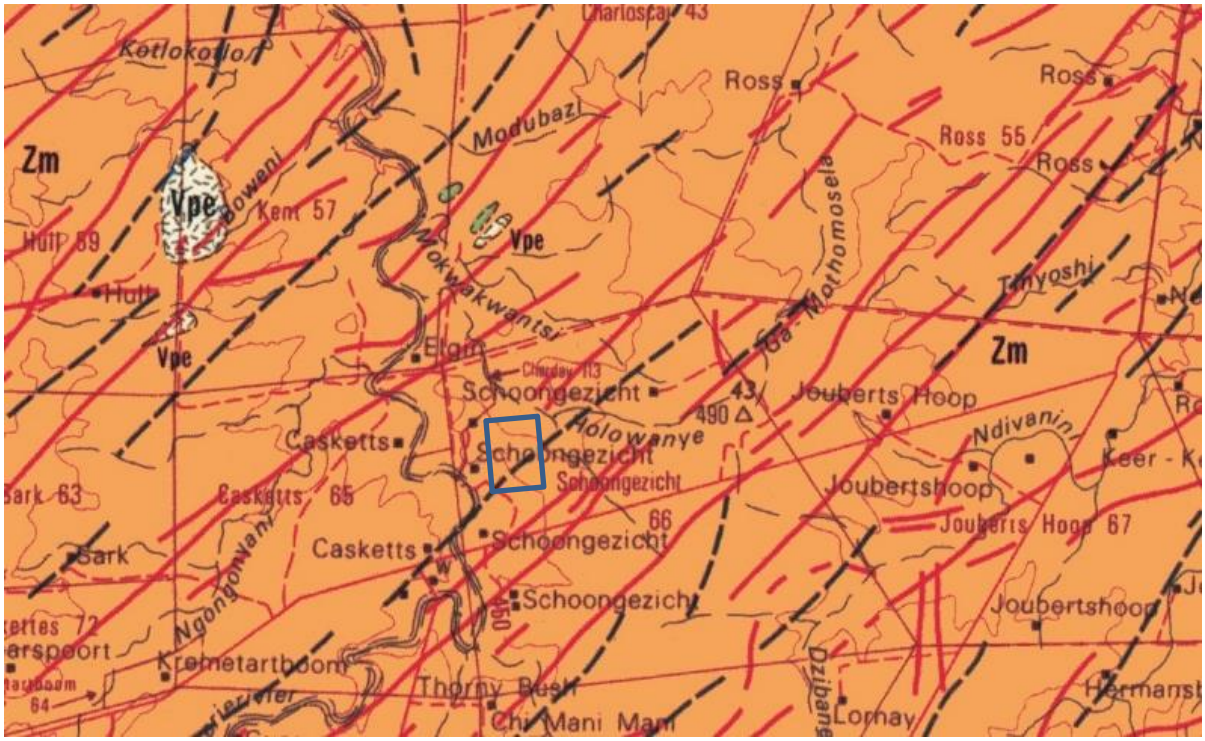

Figure 2: Geological map of the area around the Farm Schoongezicht 66. The location of the proposed project is indicated within the blue rectangle. Abbreviations of the rock types are: Zm = Makhutswi Gneiss biotite gneiss. Map enlarged from the Geological Survey 1: 250 000 map 2430 Pilgrims Rest.

Figure 3: SAHRIS palaeosensitivity map for the site for the proposed Wiggill Family homes shown within the yellow rectangle. Background colours indicate the following degrees of sensitivity: red = very highly sensitive; orange/yellow = high; green = moderate; blue = low; grey = insignificant/zero.

Yours faithfully

MKBamford

Prof Marion Bamford
Palaeobotanist; PhD (Wits 1990)

Declaration of Independence

This letter has been compiled by Professor Marion Bamford, of the University of the Witwatersrand, sub-contracted by Henwood Environmental Services., South Africa. The views expressed in this report are entirely those of the author and no other interest was displayed during the decision making process for the Project.

Specialist: Prof Marion Bamford

Signature: MKBamford