The Scoping Assessment for the proposed Buffelspoort Solar Photovoltaic (PV) Energy Facility

Mooinooi, North-West Province

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CLIENT

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1 Introduction

1.1 Background

The Biodiversity Company was appointed to undertake a terrestrial and freshwater (wetlands) ecology desktop scoping assessment for the proposed Buffelspoort Solar Photovoltaic (PV) Energy Facility on portions 75 and 134 of the Farm Buffelspoort 343JQ (Figure 1-1) (hereafter referred to as the "proposed Project Site"). The proposed Project Site is located approximately 6 km west of Mooinooi, within jurisdiction of the Rustenburg Local Municipality and the Bojanala Platinum District Municipality in the North-West Province (Figure 1-2).

The proposed project will have a generation capacity of up to 40 MWp. The purpose of the facility will be to supply power to a private offtaker through connecting to an 88kV Substation via a newly proposed ~ 2.5km long 88kV single circuit overhead power line that will be routed over privately-owned properties from the onsite facility substation to the point of interconnection, north of the N4. The construction of the Solar PV Energy Facility aims to enable the private offtaker to diversify their energy mix and to reduce their reliance on Eskom supplied power and is a conscious effort for the offtaker to contribute to their sustainability targets and reduce their carbon footprint. A grid connection corridor which varies in width from 200 m to 300 m and is up to 2.5 km in length has been identified for the assessment and suitable placement of the grid connection infrastructure within the corridor. This corridor will provide for the avoidance of sensitive environment areas. A Development Footprint of up to ~77ha have been identified within the proposed Project Site (~223ha) by the Buffelspoort Solar Project (Pty) Ltd for the development of the Buffelspoort Solar PV Energy Facility.

Infrastructure associated with the Buffelspoort Solar PV Energy Facility will include the following:

- Solar PV arrays comprising PV panels and mounting structures;
- Inverters and transformers;
- Cabling between the arrays;
- Onsite facility substation;
- 88kV single circuit overhead power line for the distribution of the generated power, which will be connected to an existing 88kV Substation just north of the proposed project site;
- Battery Energy Storage System (BESS)[1] – to be initiated at a later stage than the Solar PV Energy Facility;
- Temporary laydown area;
- Operations and Maintenance (O&M) building, which will include a site security office, warehouse, storage area and workshop;
- Main access road (existing – to be upgraded with hard surface) and internal (new) gravel roads; and
- Fencing around the site, including an access gate.

The approach was informed by the Environmental Impact Assessment Regulations. 2014 (GNR 326, 7 April 2017) of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA). The approach has taken cognisance of the recently published Government Notices 320 (20 March 2020) in terms of NEMA, dated 20 March and 30 October 2020: "*Procedures for the Assessment and Minimum*

[1] The BESS is included as part of the ESIA process albeit that the facility will only be installed after the Solar PV Energy Facility has come into operation. The total electricity requirements for the offtaker is currently under review and an energy master plan is being developed, which will only be finalised post implementation of the Solar PV Energy Facility to address all the electricity needs of the offtaker. The BESS has been included in this ESIA in order to ensure that should the energy master plan require this component to be included sooner than expected that it has already been authorized.

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, when applying for Environmental Authorisation" (Reporting Criteria). The National Web based Environmental Screening Tool has characterised the terrestrial sensitivity of the project area as "Very High".

This report, after taking into consideration the desktop findings and recommendations provided by the specialist herein, should inform and guide the Environmental Assessment Practitioner (EAP) and regulatory authorities, enabling informed decision making, as to the ecological viability of the proposed project. However, the scoping phase is only one part of the EIA phase. A detailed field assessment of the potential impacts should be conducted during the practical part of the EIA phase.

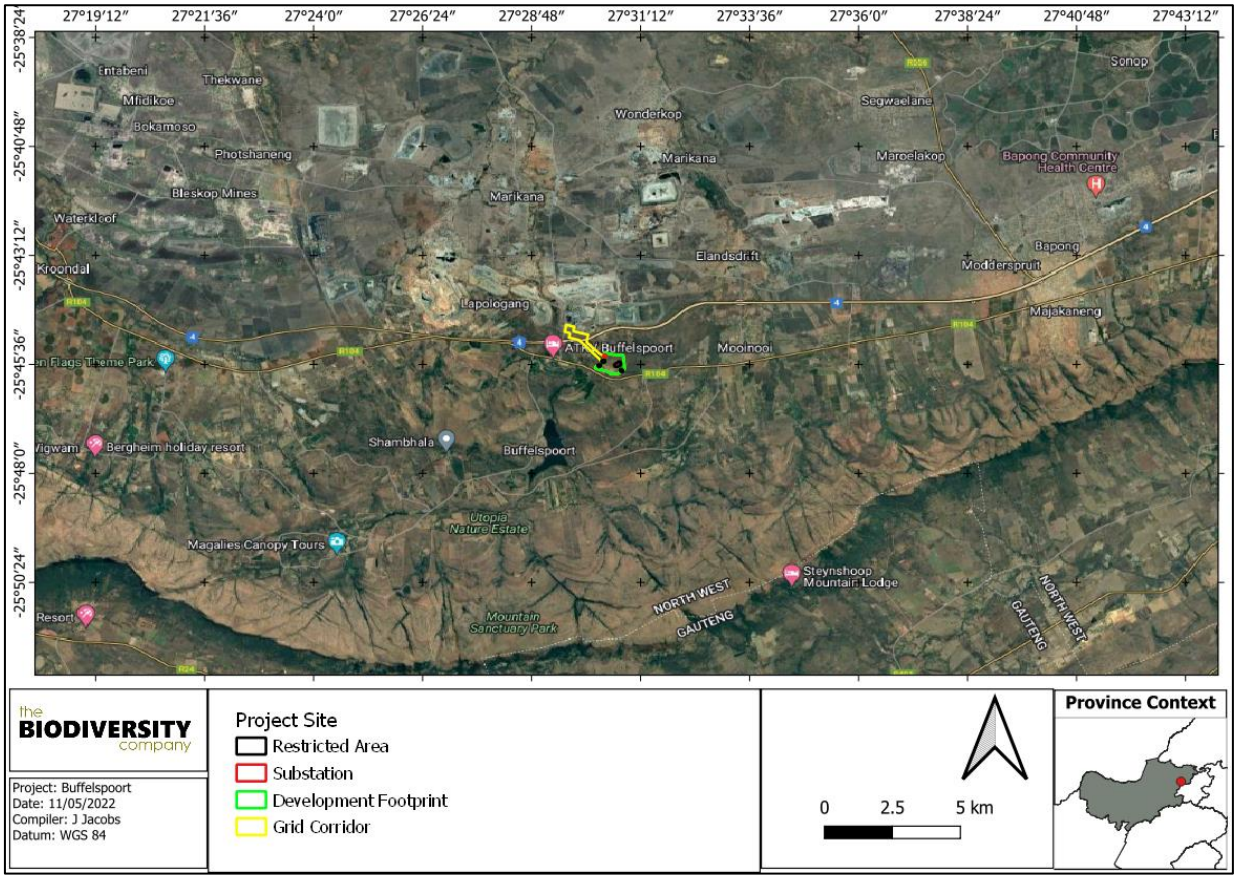


Figure 1-1 Proposed location of the project area in relation to the nearby towns

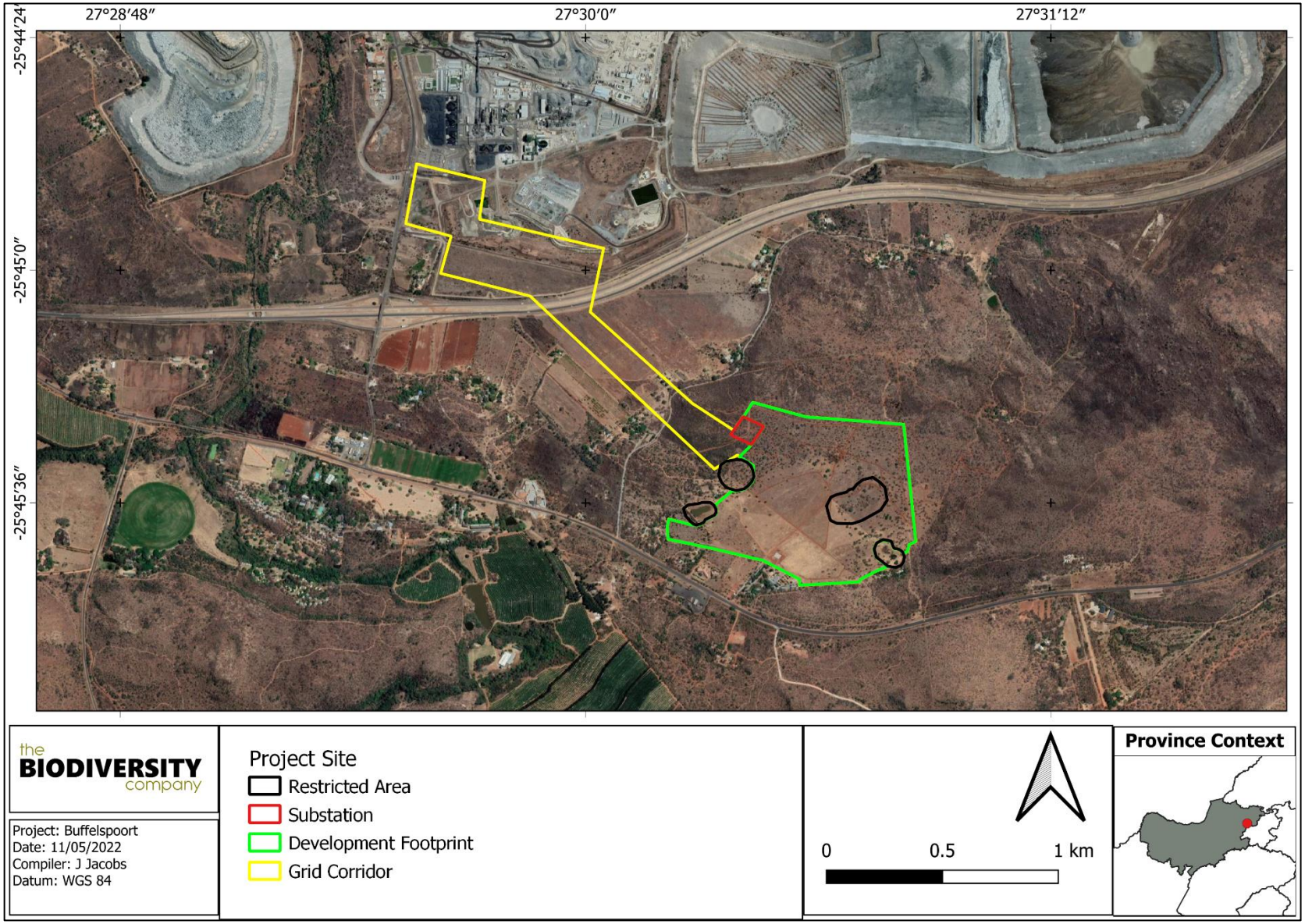
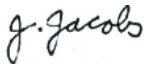


Figure 1-2 The proposed project site

1.2 Specialist Details

Report Name	**The Scoping Assessment for the proposed Buffelspoort Solar Photovoltaic (PV) Energy Facility**
Reference	**Buffelspoort Solar PV Energy Facility**
Submitted to	savannah environmental
Report Writer	**Jan Jacobs** 
	Jan Jacobs completed his BSc Honours degree in Biodiversity and Conservation Biology at the University of the Western Cape in 2016 and completed his Master of Applied Science degree in Nature Conservation at the Tshwane University of Technology in 2022. His Masters thesis is currently under examination and he is expected to officially graduate in October 2022.
Reviewer	**Andrew Husted** 
	Andrew Husted is Pr Sci Nat registered (400213/11) in the following fields of practice: Ecological Science, Environmental Science and Aquatic Science. Andrew is an Aquatic, Wetland and Biodiversity Specialist with more than 12 years' experience in the environmental consulting field. Andrew has completed numerous wetland training courses, and is an accredited wetland practitioner, recognised by the DWS, and also the Mondi Wetlands programme as a competent wetland consultant.
Declaration	The Biodiversity Company and its associates operate as independent consultants under the auspice of the South African Council for Natural Scientific Professions. We declare that we have no affiliation with or vested financial interests in the proponent, other than for work performed under the Environmental Impact Assessment Regulations, 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. We have no vested interest in the project, other than to provide a professional service within the constraints of the project (timing, time and budget) based on the principals of science.

2 Scope of Work

The principle aim of the assessment (which is the desktop part of the EIA) was to provide information to guide the risk of the proposed activity to the communities of flora (plants) and fauna (mammals, birds, reptiles and amphibians) of the associated ecosystems within the proposed Project Site. This was achieved through the following:

- Desktop assessment to identify the relevant ecologically important geographical features within the proposed Project Site;
- Desktop assessment to compile an expected species list and identify possible threatened flora and fauna species that occur within the proposed Project Site;
- Identify the manner that the proposed project impacts the species composition and ecosystems based on the desktop information, and evaluate the level of risk of these potential impacts; and
- The prescription of mitigation measures and recommendations for identified risks.

3 Key Legislative Requirements

The legislation, policies and guidelines listed below in Table 3-1 are applicable to the current project. The list below, although extensive, may not be complete and other legislation, policies and guidelines may apply in addition to those listed below.

Table 3-1 A list of key legislative requirements relevant to the proposed Project

Region	Legislation / Guideline
National	Constitution of the Republic of South Africa (Act No. 108 of 1996)
	The National Environmental Management Act (NEMA) (Act No. 107 of 1998)
	The National Environmental Management: Protected Areas Act (Act No. 57 of 2003)
	The National Environmental Management: Biodiversity Act (Act No. 10 of 2004), Threatened or Protected Species Regulations
	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, GNR 320 of Government Gazette 43310 (March 2020)
	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, GNR 1150 of Government Gazette 43855 (October 2020)
	The National Environmental Management: Waste Act, 2008 (Act 59 of 2008);
	National Water Act (NWA) (Act No. 36 of 1998)
	Alien and Invasive Species Regulations and, Alien and Invasive Species List 20142020, published under NEMBA
	Conservation of Agricultural Resources Act, 1983 (Act 43 of 1983) (CARA)
Provincial	North West Biodiversity Management Amendment Bill, 2017
	North-West Biodiversity Sector Plan of 2015 (READ, 2015).

4 Methods

4.1 Desktop Assessment

The desktop assessment was principally undertaken using a Geographic Information System (GIS) to access the latest available spatial datasets to develop digital cartographs and species lists. These datasets and their date of publishing are provided below.

4.1.1 Ecologically Important Landscape Features

Existing ecologically relevant data layers were incorporated into a GIS to establish how the proposed project might interact with any ecologically important entities. Emphasis was placed around the following spatial datasets:

- National Biodiversity Assessment 2018 (Skowno *et al*, 2019) (NBA) - The purpose of the NBA is to assess the state of South Africa's biodiversity based on best available science, with a view to understanding trends over time and informing policy and decision-making across a range of sectors. The NBA deals with all three components of biodiversity: genes, species, and ecosystems; and assesses biodiversity and ecosystems across terrestrial, freshwater, estuarine and marine environments. The two headline indicators assessed in the NBA are:
    - *Ecosystem Threat Status* – indicator of an ecosystem's wellbeing, based on the level of change in structure, function or composition. Ecosystem types are categorised as Critically Endangered (CR), Endangered (EN), Vulnerable (VU), Near Threatened (NT) or Least Concern (LC), based on the proportion of the original extent of each ecosystem type that remains in good ecological condition.
    - *Ecosystem Protection Level* – indicator of the extent to which ecosystems are adequately protected or under-protected. Ecosystem types are categorised as Well Protected (WP), Moderately Protected (MP), Poorly Protected (PP), or Not Protected (NP), based on the proportion of the biodiversity target for each ecosystem type that is included within one or more protected areas. NP, PP or MP ecosystem types are collectively referred to as under-protected ecosystems.
- Protected areas - South Africa Protected Areas Database (SAPAD) (DEA, 2021) – The SAPAD Database contains spatial data pertinent to the conservation of South African biodiversity. It includes spatial and attribute information for both formally protected areas and areas that have less formal protection. SAPAD is updated on a continuous basis and forms the basis for the Register of Protected Areas, which is a legislative requirement under the National Environmental Management: Protected Areas Act, Act 57 of 2003.
- National Protected Areas Expansion Strategy (NPAES) (SANBI, 2016) – The NPAES provides spatial information on areas that are suitable for terrestrial ecosystem protection. These focus areas are large, intact and unfragmented and therefore, of high importance for biodiversity, climate resilience and freshwater protection.
- Conservation/Biodiversity Sector Plan:

The North-West Department of Economic Development, Environment, Conservation and Tourism (NWDEDECT), as custodian of the environment in the North West, is the primary implementing agent of the Biodiversity Sector Plan. The spatial component of the Biodiversity Sector Plan is based on systematic biodiversity planning undertaken by NWDEDECT. The purpose of a Biodiversity Sector Plan is to inform land-use planning, environmental assessments, land and water use authorisations, as well as natural resource management, undertaken by a range of sectors whose policies and decisions impact biodiversity. This is done by providing a map of biodiversity priority areas, referred to as Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs), with accompanying land-use planning and decision-making guidelines (NWDEDECT, 2015). As part of this plan, sites were assigned to the following CBA categories based on their biodiversity characteristics, spatial configuration, and requirement for meeting targets for both biodiversity pattern and ecological processes:

- Critical Biodiversity Area 1 (CBA1);
- Critical Biodiversity Area 2 (CBA2);

- Ecological Support Area 1 (ESA1); and
- Ecological Support Area 2 (ESA2).

Critical Biodiversity Areas (CBAs) are terrestrial and aquatic areas of the landscape that need to be maintained in a natural or near-natural state to ensure the continued existence and functioning of species and ecosystems and the delivery of ecosystem services. Thus, if these areas are not maintained in a natural or near natural state then biodiversity targets cannot be met. Maintaining an area in a natural state can include a variety of biodiversity compatible land uses and resource uses (Desmet *et al.,* 2013).

Ecological Support Areas (ESA's) are not essential for meeting biodiversity targets but play an important role in supporting the ecological functioning of Critical Biodiversity Areas and/or in delivering ecosystem services (SANBI, 2017). Critical Biodiversity Areas and Ecological Support Areas may be terrestrial or aquatic.

- Important Bird and Biodiversity Areas (IBAs) (BirdLife South Africa, 2017) – IBAs constitute a global network of over 13 500 sites, of which 112 sites are found in South Africa. IBAs are sites of global significance for bird conservation, identified through multi-stakeholder processes using globally standardised, quantitative and scientifically agreed criteria; and

- South African Inventory of Inland Aquatic Ecosystems (SAIIAE) (Van Deventer *et al.,* 2018) – A SAIIAE was established during the NBA of 2018. It is a collection of data layers that represent the extent of river and inland wetland ecosystem types and pressures on these systems.

4.1.2 Desktop Flora Assessment

The Vegetation of South Africa, Lesotho and Swaziland (Mucina & Rutherford, 2006) and SANBI (2019) was used to identify the vegetation type that would have occurred under natural or pre-anthropogenically altered conditions. Furthermore, the Plants of Southern Africa (POSA) database was accessed to compile a list of expected flora species within the project area (Figure 4-1). The Red List of South African Plants (Raimondo *et al.,* 2009; SANBI, 2020) was utilized to provide the most current national conservation status of flora species.

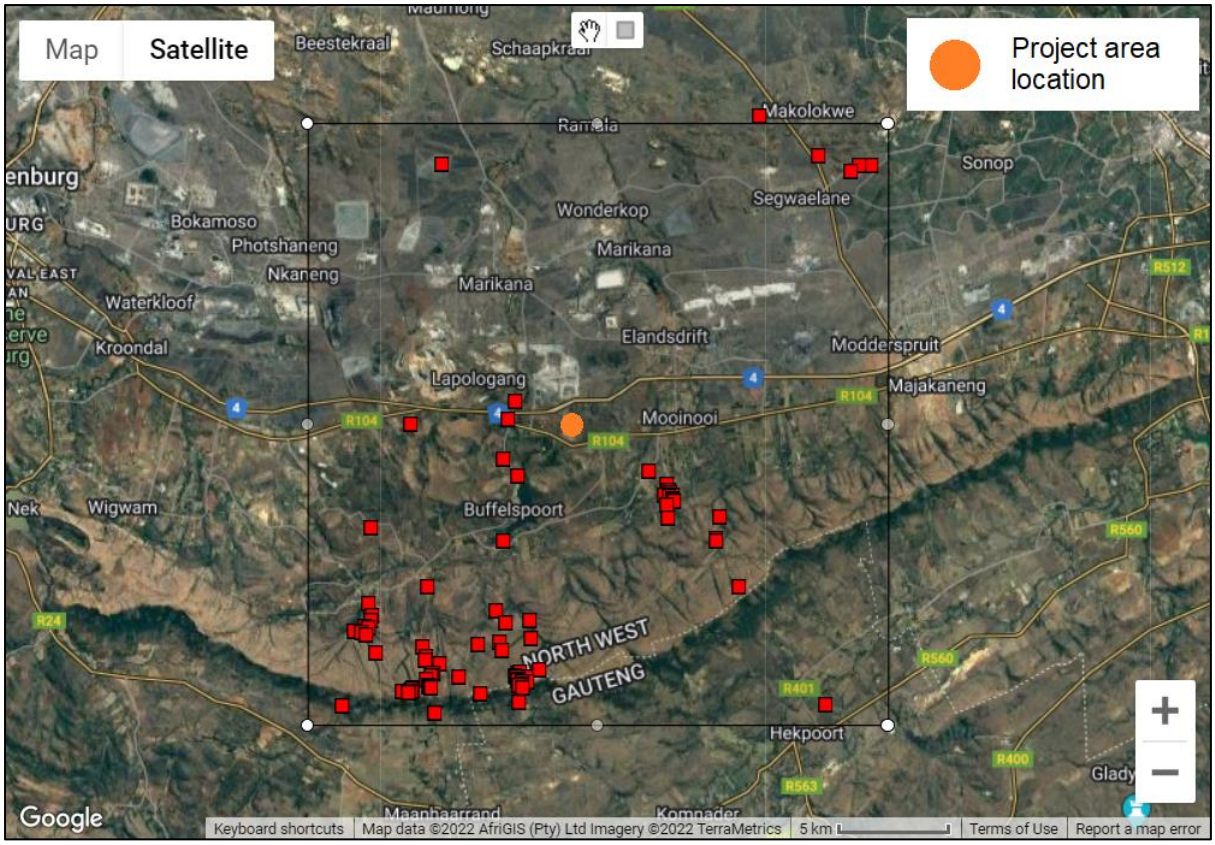


Figure 4-1 ***Map illustrating extent of area used to obtain the expected flora species list from the Plants of South Africa (POSA) database. Orange dot indicates approximate location of the proposed Project Site. The red squares are cluster markers of botanical records as per POSA data.***

4.1.3 Desktop Faunal Assessment

The faunal desktop assessment comprised of the following, compiling an expected:

- Amphibian list, generated from the IUCN spatial dataset (2017) and FrogMap database (Fitzpatrick Institute of African Ornithology, 2021a), using the 2527 quarter degree square;
- Reptile list, generated from the IUCN spatial dataset (2017) and ReptileMap database (Fitzpatrick Institute of African Ornithology, 2021b), using the 2527 quarter degree square;
- Avifauna list, generated from the SABAP2 dataset by looking at pentads 2540_2725; 2540_2730; 2540_2735; 2545_2725; 2545_2730; 2545_2735; 2550_2725; 2550_2730 and 2550_2735); and
- Mammal list from the IUCN spatial dataset (2017).

4.2 Wetland Assessment

4.2.1 Wetland Identification and Mapping

The National Wetland Classification Systems (NWCS) developed by the SANBI will be considered for this assessment. This system comprises a hierarchical classification process of defining a wetland based on the principles of the hydrogeomorphic (HGM) approach at higher levels. In addition, the method will also include the assessment of structural features at the lower levels of classification (Ollis *et al*., 2013).

The wetland areas will be delineated in accordance with the DWAF (2005) guidelines. A cross section is presented in Figure 4-2. The outer edges of the wetland areas will be identified by considering the following four specific indicators, the:

- Terrain Unit Indicator helps to identify those parts of the landscape where wetlands are more likely to occur;
- Soil Form Indicator identifies the soil forms, as defined by the Soil Classification Working Group (1991), which are associated with prolonged and frequent saturation.
    - The soil forms (types of soil) found in the landscape were identified using the South African soil classification system namely; Soil Classification: A Taxonomic System for South Africa (Soil Classification Working Group, 1991);
- Soil Wetness Indicator identifies the morphological "signatures" developed in the soil profile due to prolonged and frequent saturation; and
- Vegetation Indicator identifies hydrophilic vegetation associated with frequently saturated soils.

Vegetation will be used as the primary wetland indicator. However, in practise the soil wetness indicator tends to be the most important, and the other three indicators will be used in a confirmatory role.

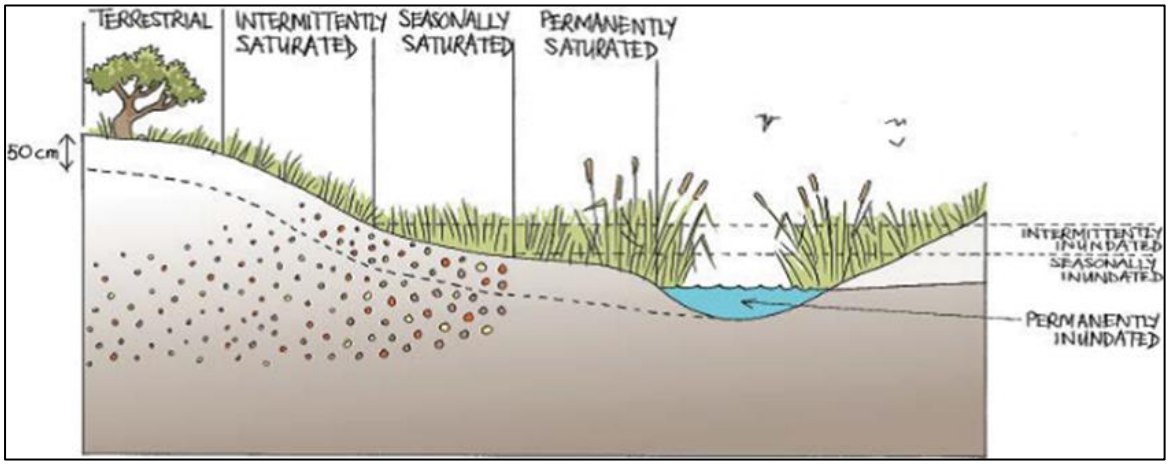


Figure 4-2 Cross section through a wetland, indicating how the soil wetness and vegetation indicators change (Ollis et al., 2013).

4.2.2 Functional Assessment

Wetland Functionality refers to the ability of wetlands to provide healthy conditions for the wide variety of organisms found in wetlands and humans. EcoServices serve as the main factor contributing to wetland functionality.

The assessment of the ecosystem services supplied by the identified wetlands will be conducted per the guidelines as described in WET-EcoServices (Kotze *et al*. 2008). An assessment will be undertaken that examines and rates the following services according to their degree of importance and the degree to which the services are provided (Table 4-1).

Table 4-1 Classes for determining the likely extent to which a benefit is being supplied

Score	Rating of likely extent to which a benefit is being supplied
< 0.5	Low
0.6 - 1.2	Moderately Low
1.3 - 2.0	Intermediate

Score	Rating of likely extent to which a benefit is being supplied
2.1 - 3.0	Moderately High
> 3.0	High

4.2.3 Present Ecological Status

The overall approach is to quantify the impacts of human activity or clearly visible impacts on wetland health, and then to convert the impact scores to a Present Ecological Status (PES) score. This takes the form of assessing the spatial extent of impact of individual activities/occurrences and then separately assessing the intensity of impact of each activity in the affected area. The extent and intensity are then combined to determine an overall magnitude of impact. The Present Ecological Status categories are provided in Table 4-2.

Table 4-2 The Present Ecological Status categories (Macfarlane et al., 2009)

Impact Category	Description	Impact Score Range	PES
None	**Unmodified, natural**	**0 to 0.9**	**A**
Small	Largely Natural with few modifications. A slight change in ecosystem processes is discernible and a small loss of natural habitats and biota may have taken place.	1.0 to 1.9	B
Moderate	Moderately Modified. A moderate change in ecosystem processes and loss of natural habitats has taken place, but the natural habitat remains predominantly intact.	2.0 to 3.9	C
Large	Largely Modified. A large change in ecosystem processes and loss of natural habitat and biota has occurred.	4.0 to 5.9	D
Serious	Seriously Modified. The change in ecosystem processes and loss of natural habitat and biota is great, but some remaining natural habitat features are still recognizable.	6.0 to 7.9	E
Critical	Critical Modification. The modifications have reached a critical level and the ecosystem processes have been modified completely with an almost complete loss of natural habitat and biota.	8.0 to 10	F

4.2.4 Importance and Sensitivity

The importance and sensitivity of water resources is determined to establish resources that provide higher than average ecosystem services, biodiversity support functions or are particularly sensitive to impacts. The mean of the determinants is used to assign the Importance and Sensitivity (IS) category, as listed in Table 4-3 (Rountree and Kotze, 2013).

Table 4-3 Description of Ecological Importance and Sensitivity categories

EIS Category	Range of Mean	Recommended Ecological Management Class
Very High	3.1 to 4.0	**A**
High	2.1 to 3.0	**B**
Moderate	1.1 to 2.0	**C**
Low Marginal	< 1.0	**D**

4.2.5 Determining Buffer Requirements

Land capability and agricultural potential will be determined by a combination of soil, terrain and climate features. Land capability is defined by the most intensive long-term sustainable use of land under rain-fed conditions. At the same time an indication is given about the permanent limitations associated with the different land use classes.

4.3 Agricultural Potential

Land capability is divided into eight (8) classes and these may be divided into three (3) capability groups. Table 4-4 shows how the land classes and groups are arranged in order of decreasing capability and ranges of use. The risk of use and sensitivity increases from class I to class VIII (Smith, 2006).

Table 4-4 Land capability class and intensity of use (Smith, 2006)

Land Capability Class	Increased Intensity of Use									Land Capability Groups
I	W	F	LG	MG	IG	LC	MC	IC	VIC	Arable Land
II	W	F	LG	MG	IG	LC	MC	IC		
III	W	F	LG	MG	IG	LC	MC			
IV	W	F	LG	MG	IG	LC				
V	W	F	LG	MG						Grazing Land
VI	W	F	LG	MG						
VII	W	F	LG							
VIII	W									Wildlife
W - Wildlife		MG - Moderate Grazing			MC - Moderate Cultivation					
F- Forestry		IG - Intensive Grazing			IC - Intensive Cultivation					
LG - Light Grazing		LC - Light Cultivation			VIC - Very Intensive Cultivation					

Land capability has been classified into 15 different categories by DAFF (2017) which indicates the national land capability category and associated sensitivity related to soil resources. Given the fact that ground truthing and Digital Soil Mapping (DSM) exercises have indicated anomalies in the form of high sensitivity soil resources (which was not indicated by the DAFF (2017) raster file), the ground-truthed baseline delineations and sensitivities were used for this assessment rather than that of DAFF (2017).

The land potential classes are determined by combining the land capability results and the climate capability of a region as shown in Table 4-5. The final land potential results are then described in

Table 4-6. These land potential classes are regarded as the final delineations subject to sensitivity, given the comprehensive addition of climatic conditions as those relevant to the DAFF (2017) land capabilities. The main contributors to the climatic conditions as per Smith (2006) is that of Mean Annual Precipitation (MAP), Mean Annual Potential Evaporation (MAPE), mean September temperatures, mean June temperatures and mean annual temperatures. These parameters will be derived from Mucina and Rutherford (2006) for each vegetation type located within the proposed Project Site. This will give the specialist the opportunity to consider micro-climate, aspect, topography etc.

Table 4-5 The combination table for land potential classification

Land capability class	Climate capability class							
	C1	C2	C3	C4	C5	C6	C7	C8
I	L1	L1	L2	L2	L3	L3	L4	L4
II	L1	L2	L2	L3	L3	L4	L4	L5

Land capability class	Climate capability class							
	C1	C2	C3	C4	C5	C6	C7	C8
III	L2	L2	L3	L3	L4	L4	L5	L6
IV	L2	L3	L3	L4	L4	L5	L5	L6
V	Vlei	Vlei	Vlei	Vlei	Vlei	Vlei	Vlei	Vlei
VI	L4	L4	L5	L5	L5	L6	L6	L7
VII	L5	L5	L6	L6	L7	L7	L7	L8
VIII	L6	L6	L7	L7	L8	L8	L8	L8

Table 4-6 The Land Potential Classes.

Land potential	Description of land potential class
L1	Very high potential: No limitations. Appropriate contour protection must be implemented and inspected.
L2	High potential: Very infrequent and/or minor limitations due to soil, slope, temperatures or rainfall. Appropriate contour protection must be implemented and inspected.
L3	Good potential: Infrequent and/or moderate limitations due to soil, slope, temperatures or rainfall. Appropriate contour protection must be implemented and inspected.
L4	Moderate potential: Moderately regular and/or severe to moderate limitations due to soil, slope, temperatures or rainfall. Appropriate permission is required before ploughing virgin land.
L5	Restricted potential: Regular and/or severe to moderate limitations due to soil, slope, temperatures or rainfall.
L6	Very restricted potential: Regular and/or severe limitations due to soil, slope, temperatures or rainfall. Non-arable
L7	Low potential: Severe limitations due to soil, slope, temperatures or rainfall. Non-arable
L8	Very low potential: Very severe limitations due to soil, slope, temperatures or rainfall. Non-arable

4.3.1 Climate Capability

According to Smith (2006), climatic capability is determined by taking into consideration various steps pertaining to the temperature, rainfall and Class A-pan of a region. The first step in this methodology is to determine the Mean Annual Precipitation (MAP) to Class A-pan ratio.

Table 4-7 Climatic capability (step 1) (Smith, 2006)

Climatic Capability Class	Limitation Rating	Description	MAP: Class A-pan Class
C1	None to Slight	Local climate is favourable for good yields for a wide range of adapted crops throughout the year.	0.75-1.00
C2	Slight	Local climate is favourable for a wide range of adapted crops and a year-round growing season. Moisture stress and lower temperature increase risk and decrease yields relative to C1.	0.50-0.75
C3	Slight to Moderate	Slightly restricted growing season due to the occurrence of low temperatures and frost. Good yield potential for a moderate range of adapted crops.	0.47-0.50
C4	Moderate	Moderately restricted growing season due to the occurrence of low temperatures and severe frost. Good yield potential for a moderate range of adapted crops but planting date options more limited than C3.	0.44-0.47
C5	Moderate to Severe	Moderately restricted growing season due to low temperatures, frost and/or moisture stress. Suitable crops at risk of some yield loss.	0.41-0.44
C6	Severe	Moderately restricted growing season due to low temperatures, frost and/or moisture stress. Limited suitable crops that frequently experience yield loss.	0.38-0.41
C7	Severe to Very Severe	Severely restricted choice of crops due to heat and moisture stress.	0.34-0.38

C8	Very Severe	Very severely restricted choice of crops due to heat and moisture stress. Suitable crops at high risk of yield loss.	0.30-0.34

In the event that the MAP: Class A-pan ratio is calculated to fall within the C7 or C8 class, no further steps are required, and the climatic capability can therefore be determined to be C7 or C8. In cases where the above-mentioned ratio falls within C1-C6, steps 2 to 3 will be required to further refine the climatic capability.

Step 2

Mean September temperatures;

- <10℃ = C6;
- 10 - 11℃ = C5;
- 11 - 12℃ = C4;
- 12 - 13℃ = C3; and
- >13℃ = C1.

Step 3

Mean June temperatures;

- <9℃ = C5;
- 9 - 10℃ = C4;
- 10 - 11℃ = C3; and
- 11 - 12℃ = C2.

4.3.2 Current Land Use

A generalised land-use will be derived for the larger project area considering agricultural productivity. Categories for possible current land uses to be determined include:

- Mining;
- Bare areas;
- Agriculture crops;
- Natural veld;
- Grazing lands;
- Forest;
- Plantation;
- Urban;
- Built-up;
- Waterbodies; and
- Wetlands.

4.4 Assumptions and Limitations

The following assumptions and limitations are applicable for this assessment:

- The assessment area was based on the area provided by the client and any alterations to the footprint and/or missing GIS information pertaining to the assessment area would have affected the area surveyed;
- The information provided herein is desktop based; and

- The species likelihood of occurrence is based on desktop information and might be changed after the assessment.

5 Results & Discussion

5.1 Desktop Assessment

5.1.1 Ecologically Important Landscape Features

The GIS analysis pertaining to the relevance of the proposed project to ecologically important landscape features is summarised in Table 5-1.

Table 5-1 Summary of relevance of the proposed project to ecologically important landscape features.

Desktop Information Considered	Relevant/Irrelevant	Section
Ecosystem Threat Status	Relevant – Overlaps with an Endangered ecosystem and a Least Concern ecosystem.	5.1.1.1
Ecosystem Protection Level	Relevant – Overlaps with a Poorly Protected Ecosystem.	5.1.1.2
Protected Areas	Relevant – The proposed Project Site overlaps with the Magaliesberg Biosphere Reserve (the Development Footprint falls within the buffer area and the Grid Corridor extends into the transition area).	5.1.1.4
National Protected Areas Expansion Strategy	Relevant – The project area overlaps with a NPAES Priority Focus Area.	5.1.1.5
Critical Biodiversity Area	Relevant – The project area overlaps with a CBA2, an ESA1 and an ESA2.	5.1.1.3
Important Bird and Biodiversity Areas	Relevant – Overlaps with the Magaliesberg IBA.	5.1.1.6
REDZ	Irrelevant – Does not overlap with any Renewable Energy Development Zones.	-
Powerline Corridor	Irrelevant – Lies 2.6 km North from the Northern Corridor of the Strategic Transmission Corridors.	-
South African Inventory of Inland Aquatic Ecosystems	Relevant – The Grid Corridor's 500 m regulated zone overlaps with a Critically Endangered (CR) river.	5.1.1.7
National Freshwater Priority Area	Relevant – The Grid Corridor's 500 m regulated zone overlaps with five unclassified NFEPA wetlands.	5.1.1.8
Strategic Water Source Areas	Irrelevant – The proposed Project Site is 130 km from the closest SWSA.	-

5.1.1.1 Ecosystem Threat Status

The Ecosystem Threat Status is an indicator of an ecosystem's wellbeing, based on the level of change in structure, function or composition. Ecosystem types are categorised as Critically Endangered (CR), Endangered (EN), Vulnerable (VU), Near Threatened (NT) or Least Concern (LC), based on the proportion of the original extent of each ecosystem type that remains in good ecological condition. According to the spatial dataset the proposed project overlaps mainly with an EN ecosystem, and marginally with a LC ecosystem (Figure 5-1).

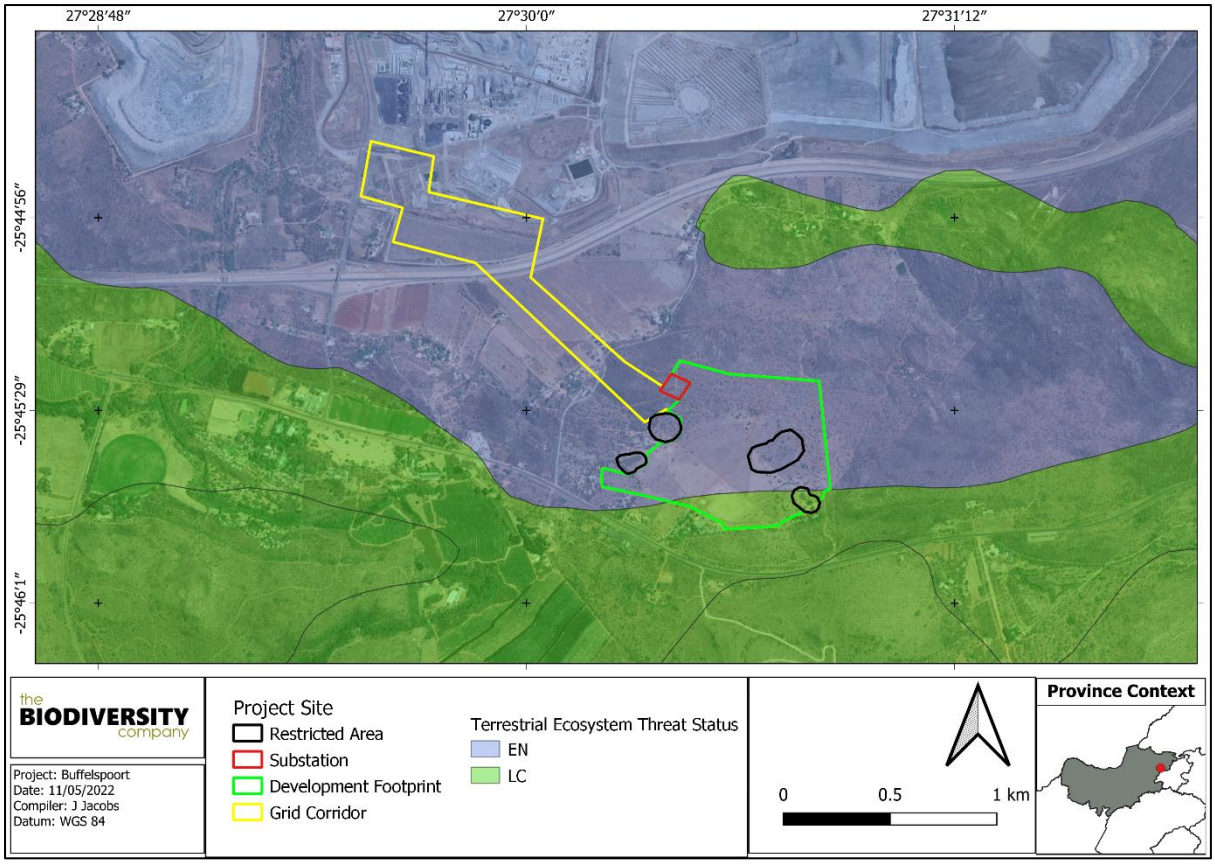


Figure 5-1 Map illustrating the ecosystem threat status associated with the project area

5.1.1.2 Ecosystem Protection Level

This is an indicator of the extent to which ecosystems are adequately protected or under-protected. Ecosystem types are categorised as Well Protected (WP), Moderately Protected (MP), Poorly Protected (PP), or Not Protected (NP), based on the proportion of the biodiversity target for each ecosystem type that is included within one or more protected areas. NP, PP or MP ecosystem types are collectively referred to as under-protected ecosystems. The proposed Project overlaps with a PP ecosystem (Figure 5-2).

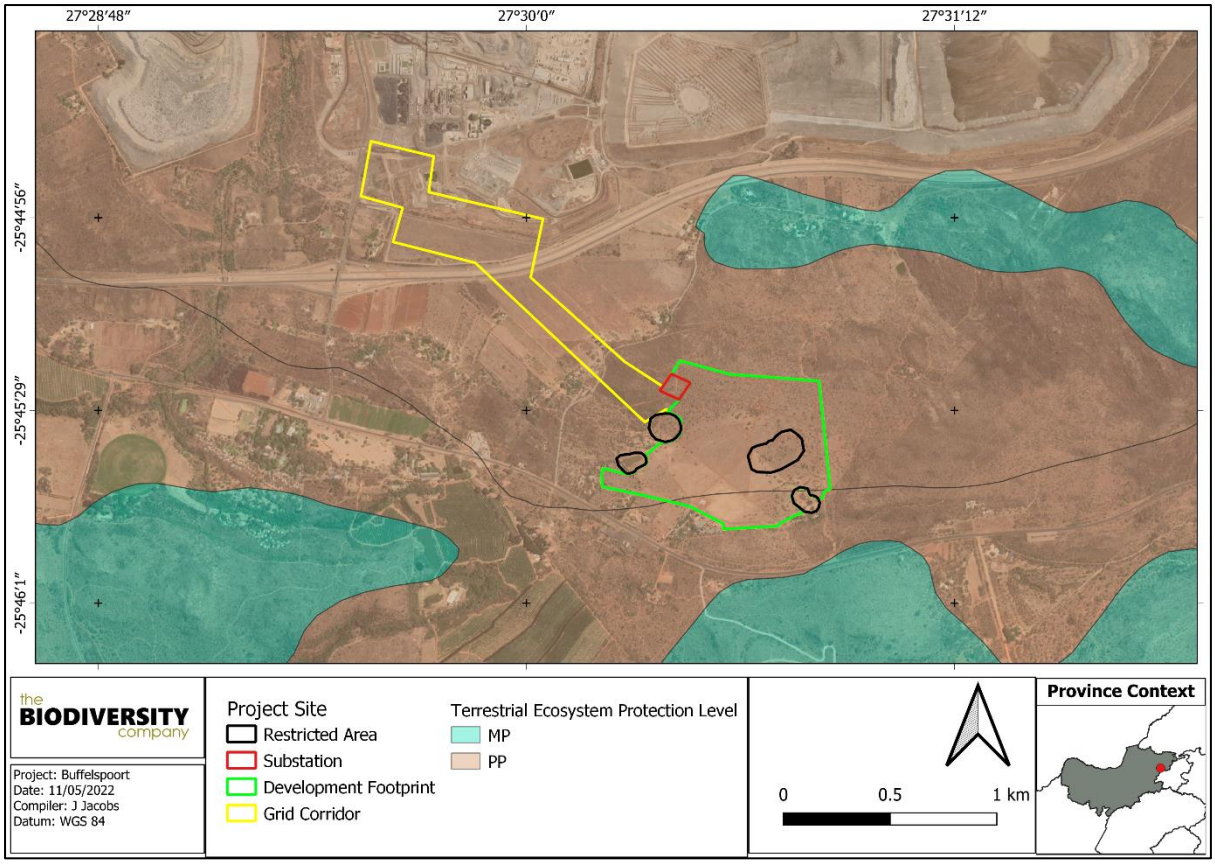


Figure 5-2 Map illustrating the ecosystem protection level associated with the project area

5.1.1.3 Critical Biodiversity Areas and Ecological Support Areas

The conservation of CBAs is crucial, in that if these areas are not maintained in a natural or near-natural state, biodiversity conservation targets cannot be met. Maintaining an area in a natural state can include a variety of biodiversity compatible land uses and resource uses (SANBI-BGIS, 2017).

The purpose of the North-West Biodiversity Sector Plan (NWBSP) (2015) is to inform land-use planning and development on a provincial scale and to aid in natural resource management. One of the outputs is a map of Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs). These are classified into different categories, namely CBA1 areas, CBA2 areas, ESA1 areas and ESA2 areas based on biodiversity characteristics, spatial configuration, and requirements for meeting targets for both biodiversity patterns and ecological processes.

Figure 5-3 shows the project area superimposed on the Terrestrial CBA maps. The proposed Project overlaps with a CBA2, an ESA1 and an ESA2.

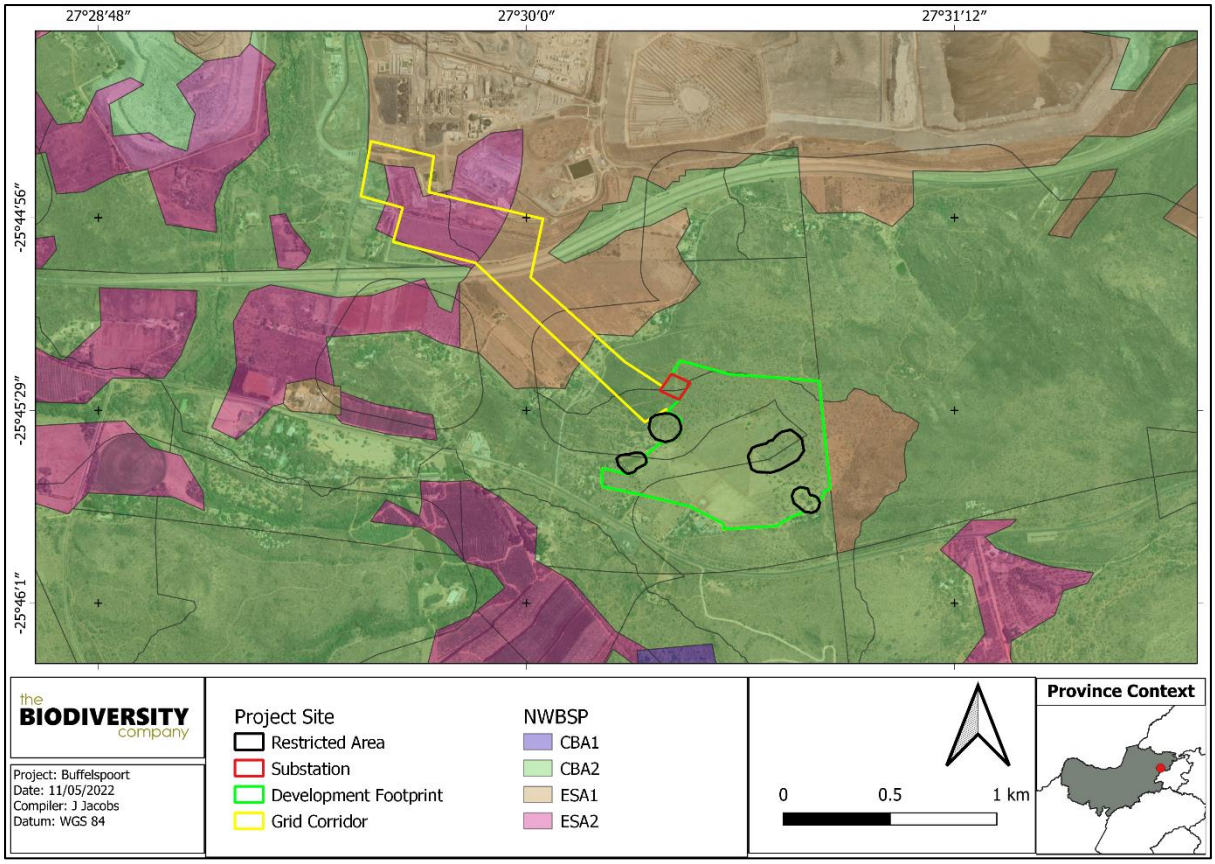


Figure 5-3 Map illustrating the locations of CBAs in the project area

5.1.1.4 Protected areas

According to the protected area spatial datasets from SAPAD (2021) and SACAD (2021), the proposed Project site overlaps with the Magaliesberg Biosphere Reserve (Figure 5-4), with the Development Footprint encroaching into areas designated as a Buffer Zone and the Grid Corridor extending into a Transition Area.

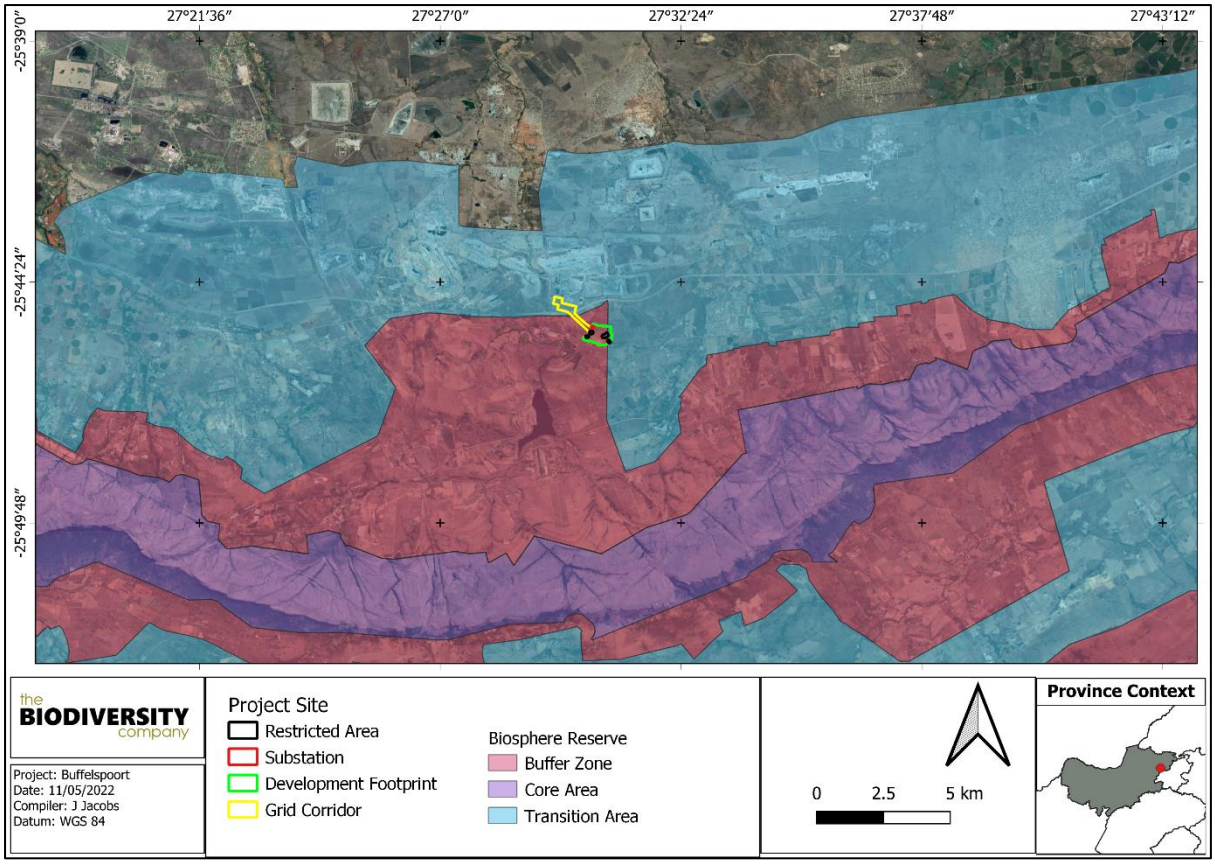


Figure 5-4 The project area in relation to the protected areas

5.1.1.5 National Protected Area Expansion Strategy

National Protected Area Expansion Strategy 2016 (NPAES) areas were identified through a systematic biodiversity planning process. They present the best opportunities for meeting the ecosystem-specific protected area targets set in the NPAES and were designed with a strong emphasis on climate change resilience and requirements for protecting freshwater ecosystems. These areas should not be seen as future boundaries of protected areas, as in many cases only a portion of a particular focus area would be required to meet the protected area targets set in the NPAES. They are also not a replacement for fine scale planning which may identify a range of different priority sites based on local requirements, constraints and opportunities (NPAES, 2016).

The Development Footprint and Grid Connection Corridor overlap with a NPAES Priority Focus Area (Figure 5-5).

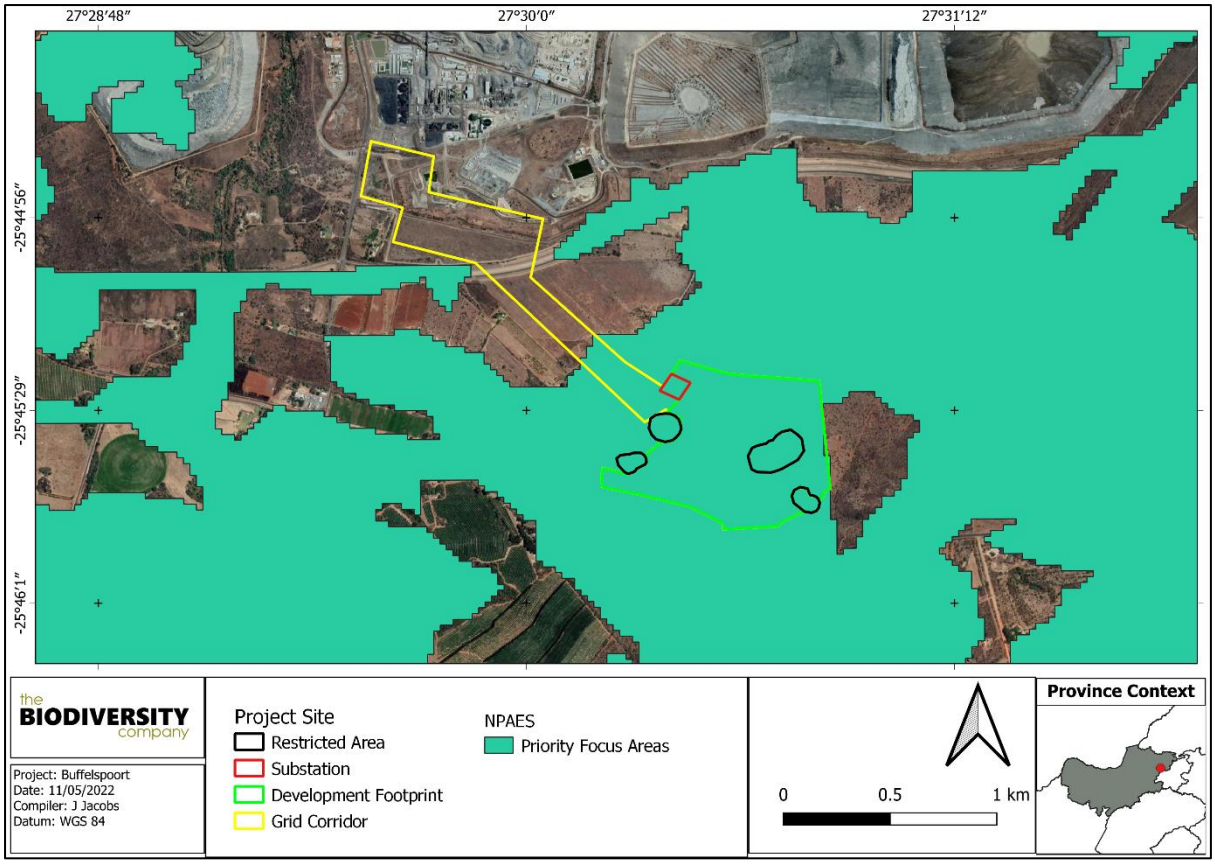


Figure 5-5 The project area in relation to the National Protected Area Expansion Strategy

5.1.1.6 Important Bird and Biodiversity Area

Important Bird & Biodiversity Areas (IBAs) are sites of international significance for the conservation of the world's birds and other conservation significant species as identified by BirdLife International. These sites are also all Key Biodiversity Areas; sites that contribute significantly to the global persistence of biodiversity (Birdlife South Africa, 2017).

According to Birdlife South Africa (2017), the selection of IBAs is achieved through the application of quantitative ornithological criteria, grounded in up-to-date knowledge of the sizes and trends of bird populations. The criteria ensure that the sites selected as IBAs have true significance for the international conservation of bird populations and provide a common currency that all IBAs adhere to, thus creating consistency among, and enabling comparability between, sites at national, continental and global levels. Figure 5-6 shows that the Development Footprint and Grid Connection Corridor overlap with the Magaliesberg IBA.

The Magaliesberg IBA was previously known as the Magaliesberg and Witwatersberg IBA, and consists mainly of the Magaliesberg range which extends from the North-West of Rustenburg in the West to the N1 in the East near Pretoria (Birdlife South Africa, 2015). Several large rivers have their headwaters in these mountains, such as the Crocodile, Sterkstroom, Magalies and Skeerpoort rivers (Birdlife South Africa, 2015). Three (3) major impoundments have been built along the Magaliesberg, namely the Hartbeespoort Dam in the East, Buffelspoort Dam in the centre and Olifantsnek Dam about 7 km south of Rustenburg (Birdlife South Africa, 2015).

IBA trigger species in the Magaliesberg IBA include two globally threatened species, namely Cape Vulture (*Gyps coprotheres*) and Secretarybird (*Sagittarius serpentarius*), of which the former is considered to be the most important (Birdlife South Africa, 2015). Regionally threatened species include the Lanner Falcon (*Falco biarmicus*), Half-collared Kingfisher (*Alcedo semitorquata*), African Grass Owl

(*Tyto capensis*), African Finfoot (*Podica senegalensis*) and Verreaux's Eagle (*Aquila verreauxii*) (Birdlife South Africa, 2015). Biome-restricted species include the White-bellied Sunbird (*Cinnyris talatala*), Kurrichane Thrush (*Turdus libonyanus*), White-throated Robin-chat (*Cossypha humeralis*), Kalahari Scrub Robin (*Erythropygia paena*) and Barred Wren-Warbler (*Calamonastes fasciolatus*) (Birdlife South Africa, 2015).

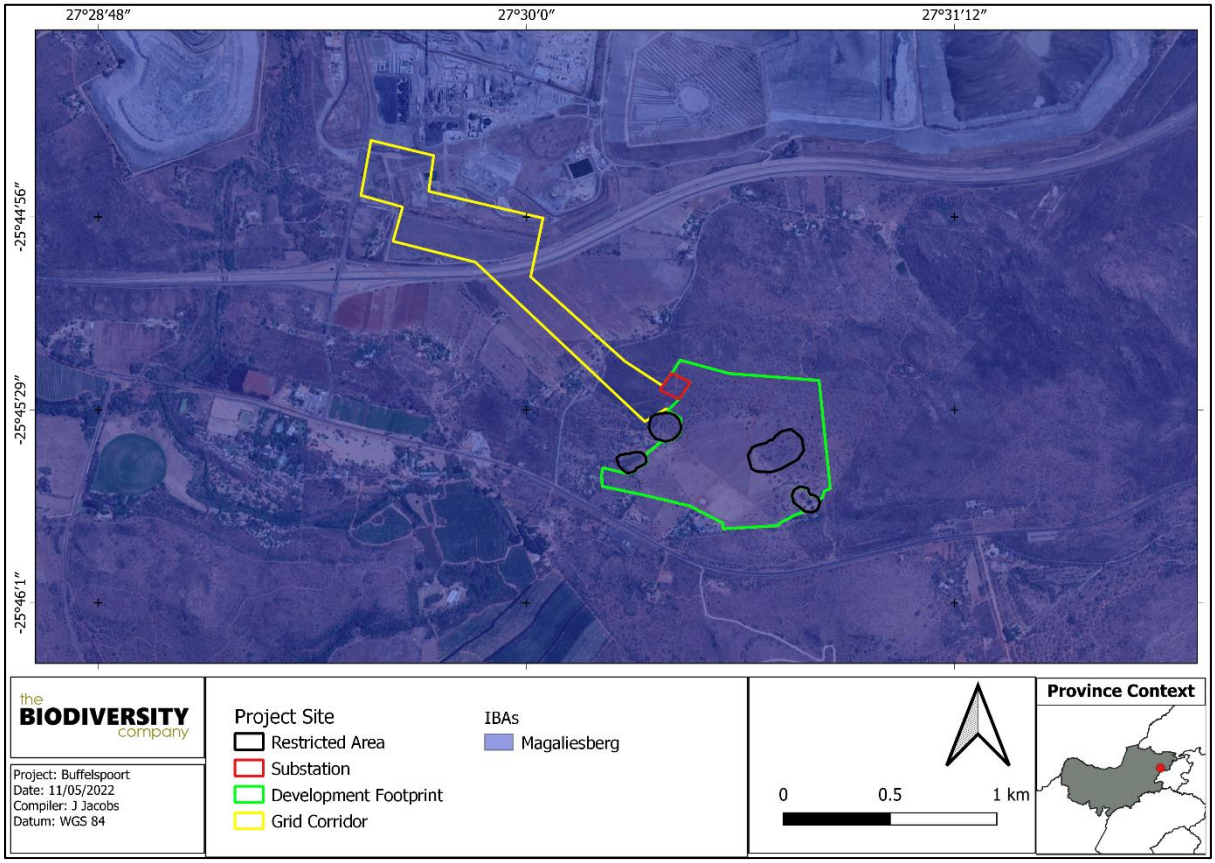


Figure 5-6 The project area in relation to the Magaliesberg IBA

5.1.1.7 Hydrological Setting

The South African Inventory of Inland Aquatic Ecosystems (SAIIAE) was released with the NBA 2018. Ecosystem threat status (ETS) of river and wetland ecosystem types are based on the extent to which each river ecosystem type had been altered from its natural condition. Ecosystem types are categorised as Critically Endangered (CR), Endangered (EN), Vulnerable (VU) or Least Threatened (LT), with CR, EN and VU ecosystem types collectively referred to as 'threatened' (Van Deventer *et al.,* 2019; Skowno *et al.,* 2019). The 500 m regulated area around the Grid Corridor overlaps with a CR river (Figure 5-7).

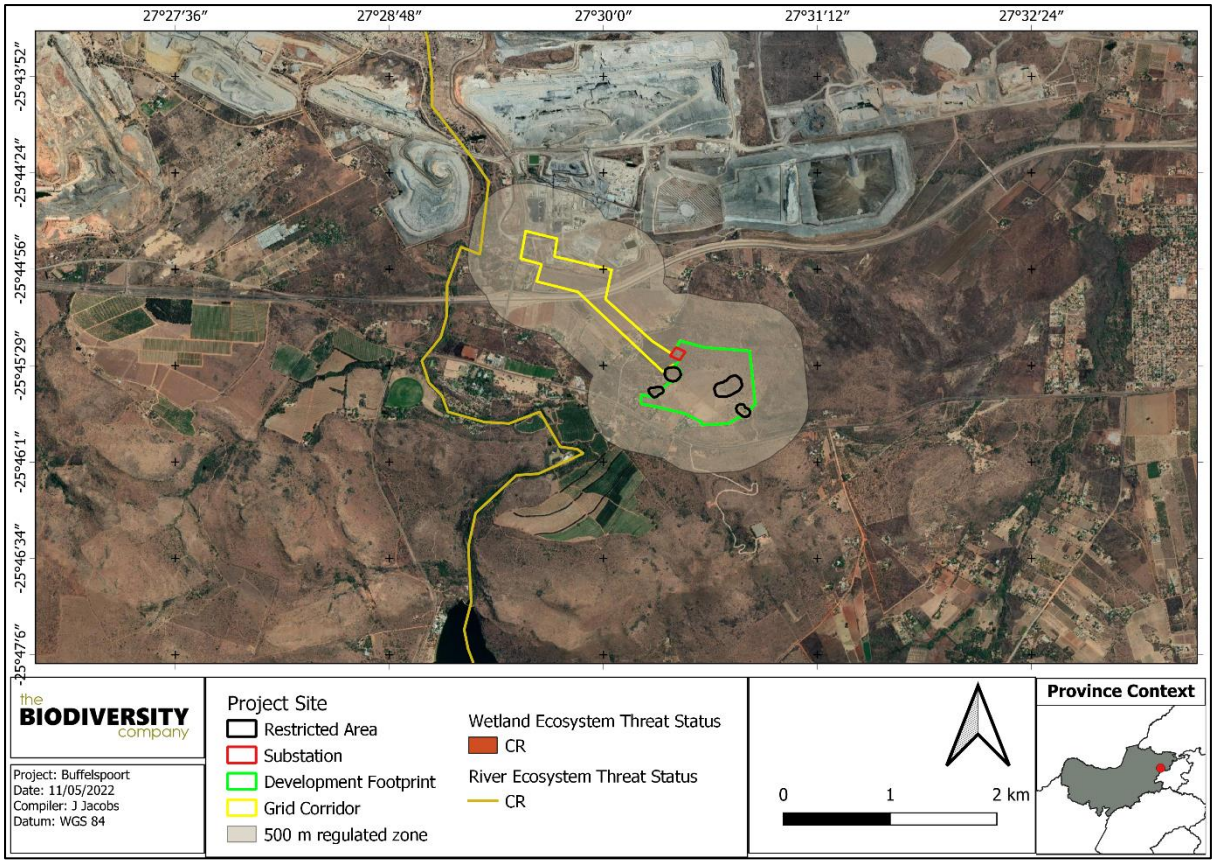


Figure 5-7 Map illustrating ecosystem threat status of rivers and wetland ecosystems in the project area

5.1.1.8 National Freshwater Ecosystem Priority Area Status

In an attempt to better conserve aquatic ecosystems, South Africa has categorised its river systems according to set ecological criteria (i.e., ecosystem representation, water yield, connectivity, unique features, and threatened taxa) to identify Freshwater Ecosystem Priority Areas (FEPAs) (Driver *et al.,* 2011). The FEPAs are intended to be conservation support tools and envisioned to guide the effective implementation of measures to achieve the National Environment Management Biodiversity Act's (NEM:BA) biodiversity goals (Nel *et al.,* 2011).

Figure 5-8 shows that the 500 m regulated area of the Grid Corridor overlaps with five unclassified NFEPA wetlands.

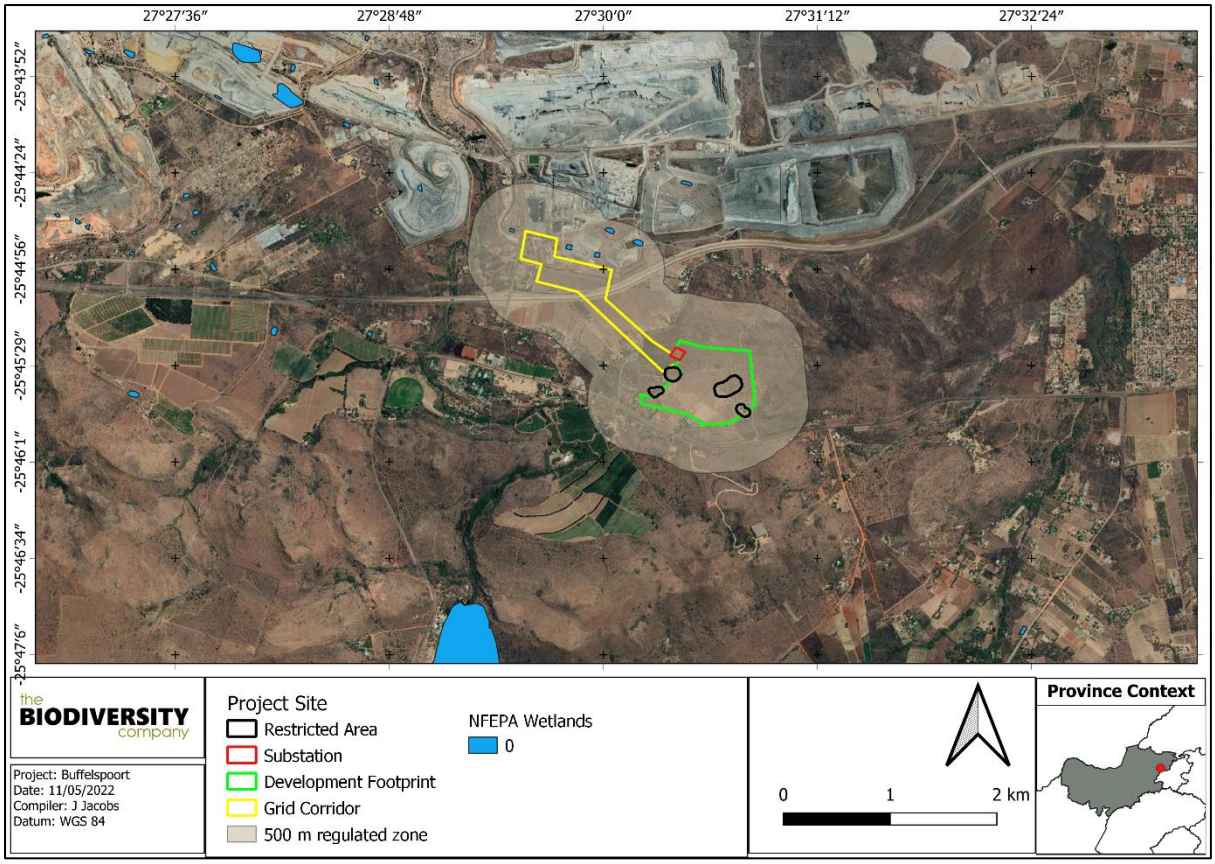


Figure 5-8 The project area in relation to the National Freshwater Ecosystem Priority Areas

5.1.2 Flora Assessment

This section is divided into a description of the vegetation type expected to occur under natural conditions and the expected flora species.

5.1.2.1 Vegetation Type

The proposed Project Site is situated in the Savanna biome. The savanna vegetation of South Africa represents the southernmost extension of the most widespread biome in Africa (Mucina & Rutherford, 2006). Major macroclimatic traits that characterise the Savanna biome include a seasonal precipitation and a sub-tropical thermal regime with no or usually low incidence of frost (Mucina & Rutherford, 2006).

The savanna biome is the largest biome in South Africa, extending throughout the east and north-eastern areas of the country. The Savanna biome is characterised by a dominant grass layer, over-topped by a discontinuous, but distinct woody plant layer (Mucina & Rutherford, 2006). At a structural level, Africa's Savanna biome can be broadly categorised as either fine-leaved (microphyllous) savannas or broad-leaved savannas. Fine-leaved savannas typically occur on nutrient rich soils and are dominated by microphyllous woody plants of the Mimosaceae family (Common genera include *Vachellia* and *Albizia*) and a generally dense herbaceous layer (Scholes & Walker, 1993).

On a fine-scale vegetation type, the Development Footprint and Grid Connection Corridor overlap with the Marikana Thornveld and Moot Plains Bushveld vegetation types (Figure 5-9).

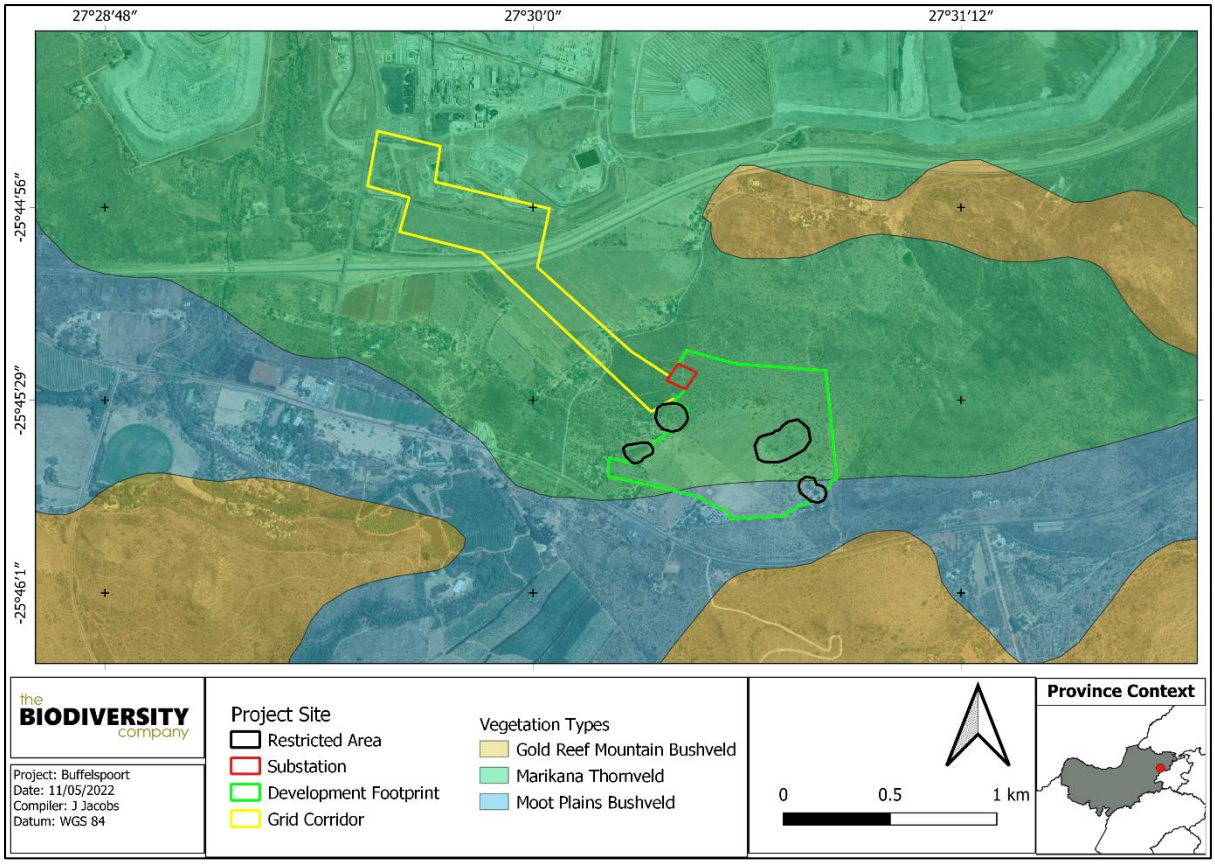


Figure 5-9 Map illustrating the vegetation type associated with the project area

5.1.2.1.1 Marikana Thornveld

Marikana Thornveld extends on the broad plains from Rustenburg in the West, through Marikana and Brits, and towards Pretoria in the East (Mucina & Rutherford, 2006). It is characterised by open *Vachellia karroo* woodland, which occurs in valleys and on undulating plains and hills (Mucina & Rutherford, 2006). Fire-protected habitats, such as drainage lines, rocky outcrops and termitaria are typically dominated by denser, shrub-dominated vegetation (Mucina & Rutherford, 2006).

Important Plant Taxa in the Marikana Thornveld

Based on Mucina and Rutherford's (2006) vegetation classification, important plant taxa are those species that have a high abundance, a frequent occurrence (not being particularly abundant) or are prominent in the landscape within a particular vegetation type. They note the following species are important taxa in the Marikana Thornveld vegetation type:

Tall Tree: *Senegalia burkei*.

Small Trees: *Senegalia caffra*, *Vachellia gerrardii*, *Vachellia karroo*, *Combretum molle*, *Searsia lancea*, *Ziziphus mucronata*, *Vachellia nilotica, Vachellia tortilis* subsp. *heteracantha*, *Celtis africana*, *Dombeya rotundifolia*, *Pappea capensis*, *Peltophorum africanum*, *Terminalia sericea*.

Tall Shrubs: *Euclea crispa* subsp. *crispa*, *Olea europaea* subsp. *africana*, *Searsia pyroides* var. *pyroides*, *Diospyros lycioides* subsp. *guerkei*, *Ehretia rigida* subsp. *rigida*, *Euclea undulata*, *Grewia flava*, *Pavetta gardeniifolia*.

Low Shrubs: *Asparagus cooperi*, *Rhynchosia nitens*, *Indigofera zeyheri*, *Justicia flava*.

Woody Climbers: *Clematis brachiata*, *Helinus integrifolius*.

Herbaceous Climbers: *Pentarrhinum insipidum*, *Cyphostemma cirrhosum*.

Graminoids: *Elionurus muticus*, *Eragrostis lehmanniana*, *Setaria sphacelata*, *Themeda triandra*, *Aristida scabrivalvis* subsp. *scabrivalvis*, *Fingerhuthia africana*, *Heteropogon contortus*, *Hyperthelia dissoluta*, *Melinis nerviglumis*, *Pogonarthria squarrosa*.

Herbs: *Hermannia depressa*, *Ipomoea obscura*, *Barleria macrostegia*, *Dianthus mooiensis* subsp. *mooiensis*, *Ipomoea oblongata*, *Vernonia oligocephala*.

Geophytic Herbs: *Ledebouria revoluta*, *Ornithogalum tenuifolium*, *Sansevieria aethiopica*.

Conservation Status

According to Mucina and Rutherford (2006), this vegetation type is classified as Endangered, with its national conservation target being 19%. Over 48% has already been transformed by urban expansion and cultivation, and alien invasive plants occur in high densities, especially along drainage lines (Mucina & Rutherford, 2006). Erosion is very low to moderate (Mucina & Rutherford, 2006). Less than 1% is conserved in the Magaliesberg Biosphere Reserve, De Onderstepoort Nature Reserve and other reserves. Erosion is very low to moderate (Mucina & Rutherford, 2006).

5.1.2.1.2 Moot Plains Bushveld

The main belt of the Moot Plains Bushveld extends from the Selons River Valley south of the Magaliesberg, through Maanhaarrand and the valley bottom of the Magalies River, east of the Hartebeestpoort Dam between the Magaliesberg and Daspoort mountain ranges and to Pretoria (Mucina & Rutherford, 2006). It is characterised by low-lying savanna dominated by *Vachellia* species. occurring on the bottomlands and plains, or woodlands on the lower hillsides vary in height and density (Mucina & Rutherford, 2006). Grasses dominate the herbaceous layer (Mucina & Rutherford, 2006).

Important Plant Taxa in the Moot Plains Bushveld

Mucina and Rutherford (2006) noted the following species as important taxa in the Moot Plains Bushveld:

Small trees: *Vachellia nilotica*, *Vachellia tortillis* subsp. *heteracantha*, *Searsia lancea*.

Tall shrubs: *Buddleja saligna*, *Euclea undulata*, *Olea europaea* subsp. *africana*, *Grewia occidentalis*, *Gymnosporia polyacantha*, *Mystroxylon aethiopicum* subsp. *burkeanum*.

Low shrubs: *Aptosimum elongatum*, *Felicia fascicularis*, *Lantana rugosa*, *Teucrium trifidum*.

Succulent shrub: *Kalanchoe paniculata*.

Woody climber: *Jasminum breviflorum*.

Herbaceous climber: *Lotononis bainesii*.

Graminoids: *Heteropogon contortus*, *Setaria sphacelata*, *Themeda triandra*, *Aristida congesta*, *Chloris virgata*, *Cynodon dactylon*, *Sporobolus nitens*, *Tragus racemosus*.

Herbs: *Achyropsis avicularis*, *Corchorus asplenifolius*, *Evolvulus alsinoides*, *Helichrysum nudifolium*, *Helichrysum undulatum*, *Hermannia depressa*, *Osteospermum muricatum*, *Phyllanthus maderaspatensis*.

Conservation Status

According to Mucina and Rutherford (2006), this vegetation type is classified as Vulnerable, with its national conservation target being 19%. About 28% has been transformed by cultivation as well as urban and built-up areas (Mucina & Rutherford, 2006). Erosion is mainly very low to low, but also moderate in some areas (Mucina & Rutherford, 2006). About 13% is statutorily conserved, mainly in

the Magaliesberg Nature Area (Mucina & Rutherford, 2006). Outside protected areas there are very scattered occurrences to sometimes dense patches of this vegetation type in places of various alien plants such as *Cereus jamacaru*, *Eucalyptus* species, *Jacaranda mimosifolia*, *Lantana camara*, *Melia azedarach* and *Schinus* species (Mucina & Rutherford, 2006).

5.1.2.2 Expected Flora Species

The Plants of Southern Africa (POSA) database indicates that 508 species of indigenous plants are expected to occur within the proposed Project Site (The full list of species will be provided in the final report). Three (3) flora species of conservation concern (SCC), based on their conservation status, could be expected to occur within the Project Site and are provided in Table 5-2 below.

Table 5-2 Threatened flora species that may occur within the Project Site

Family	Taxon	Author	IUCN	Ecology
Crassulaceae	*Adromischus umbraticola* subsp. *Umbraticola*	C.A.Sm.	NT	Indigenous; Endemic
Aizoaceae	*Delosperma leendertziae*	N.E.Br.	NT	Indigenous; Endemic
Apocynaceae	*Stenostelma umbelluliferum*	(Schltr.) Bester & Nicholas	NT	Indigenous; Endemic

5.1.3 Faunal Assessment

5.1.3.1 Amphibians

Based on the International Union for Conservation of Nature (IUCN) Red List Spatial Data and FrogMap, 22 amphibian species are expected to occur within the proposed Project Site (The full list will be provided in the final assessment). No amphibian SCCs are expected to occur within the proposed Project Site.

5.1.3.2 Reptiles

Based on the IUCN Red List Spatial Data and the ReptileMAP database, 66 reptile species are expected to occur within the proposed Project Site (The full list will be provided in the final assessment). One species is regarded as threatened (Table 5-3).

Table 5-3 Threatened reptile species that are expected to occur within the Project Site

Species	Common Name	Conservation Status		Likelihood of Occurrence
		Regional (SANBI, 2016)	IUCN (2021)	
Kinixys lobatsiana	Lobatse Hinged Tortoise	VU	VU	Moderate

Kinixys lobatsiana (Lobatse Hinged Tortoise) occurs in South Africa and Botswana, where it prefers rocky hillsides in habitats of mixed *Vachellia* and *Combretum* woodland, tropical bushveld as well as thornveld where vegetation ranges from dense, short shrubland to open tree savanna (IUCN, 2017). Main threats are habitat destruction and degradation due to urbanization, mining, agriculture and alien invasive plants (IUCN, 2017). The presence of savanna habitat within the proposed Project Site contributed to a moderate likelihood of occurrence for this species.

5.1.3.3 Mammals

The IUCN Red List Spatial Data lists 86 mammal species that could be expected to occur within the proposed Project Site (The full list will be provided in the final assessment). This list excludes large mammal species that are normally restricted to protected areas. Thirteen of these expected species are regarded as threatened (Table 5-4). Of these 13 SCCs, eight (8) have a low likelihood of occurrence based on the lack of suitable habitat in the Project Site.

Table 5-4 Threatened mammal species that are expected to occur within the Project Site

Species	Common Name	Conservation Status		Likelihood of occurrence
		Regional (SANBI, 2016)	IUCN (2021)	
Aonyx capensis	Cape Clawless Otter	NT	NT	Low
Atelerix frontalis	South African Hedgehog	NT	LC	Moderate
Cloeotis percivali	Short-eared Trident Bat	EN	LC	Low
Crocidura mariquensis	Swamp Musk Shrew	NT	LC	Low
Eidolon helvum	African Straw-colored Fruit Bat	LC	NT	Low
Felis nigripes	Black-footed Cat	VU	VU	Moderate
Hydrictis maculicollis	Spotted-necked Otter	VU	NT	Low
Mystromys albicaudatus	White-tailed Rat	VU	EN	Low
Ourebia ourebi	Oribi	EN	LC	Low
Panthera pardus	Leopard	VU	VU	High
Parahyaena brunnea	Brown Hyaena	NT	NT	Moderate
Pelea capreolus	Grey Rhebok	NT	LC	Low
Redunca fulvorufula	Mountain Reedbuck	EN	LC	Low

Aonyx capensis (Cape Clawless Otter) is the most widely distributed otter species in Africa (IUCN, 2017). This species is predominantly aquatic, and it is seldom found far from water (IUCN, 2017). It is mostly threatened by riverine habitat destruction due to bush clearing, deforestation, overgrazing, siltation, draining of wetlands or water extraction or denudation of riparian vegetation (IUCN, 2017). This species has a low likelihood of occurrence based on the lack of rivers in the proposed Project Site.

Atelerix frontalis (South African Hedgehog) has a tolerance to a degree for habitat modification and occurs in a wide variety of semi-arid and sub-temperate habitats (IUCN, 2017). Based on the Red List of Mammals of South Africa, Lesotho and Swaziland (2016), South African Hedgehog populations are decreasing due to the threats of electrocution, veld fires, road collisions, predation from domestic pets and illegal harvesting. This species' ability to adapt to some human disturbances, combined with the presence of semi-natural to natural habitat within the proposed Project Site contributed to a moderate likelihood of occurrence for this species.

Cloeotis percivali (Short-eared Trident Bat) occurs in savanna areas where there is sufficient cover in the form of caves and mine tunnels for day roosting (IUCN, 2017). It feeds exclusively on moths and appears to be very sensitive to disturbance (IUCN, 2017). The lack of suitable roosting habitats contributed to the low likelihood of occurrence in the proposed Project Site for this species.

Crocidura maquassiensis (Maquassie Musk Shrew) is listed as VU on a regional basis and is known to be found in rocky, mountain habitats (IUCN, 2017). It may tolerate a wider range of habitats and individuals have been collected in Kwa-Zulu Natal from a garden, and in mixed bracken and grassland alongside a river at 1,500 m (IUCN, 2017). This species has a low likelihood of occurrence based on the lack of rocky, mountain habitats in the proposed Project Site.

Eidolon helvum (African Straw-coloured Fruit Bat) has a wide distribution across Sub-Saharan Africa as well as marginally on the South-West border of Saudi Arabia and Yemen (IUCN, 2017). It occupies a variety of habitats, including various types of forests, moist and dry savanna and mosaics as well as modified or urbanised habitats with woodland (IUCN, 2017). Major threats include habitat loss, persecution and hunting (IUCN, 2017). The lack of woodlands in the proposed Project Site contributed to a low likelihood of occurrence for this species.

Felis nigripes (Black-footed cat) is endemic to the arid regions of southern Africa (IUCN, 2017). This species is naturally rare, has cryptic colouring, is small in size and is nocturnal. These factors have contributed to a lack of information on this species (IUCN, 2017). The highest densities of this species have been recorded in the more arid Karoo region of South Africa (IUCN, 2017). The habitat in the proposed Project Site can be considered to be somewhat suitable for the species and the likelihood of occurrence is therefore rated as moderate.

Hydrictis maculicollis (Spotted-necked Otter) is found throughout much of Africa, where it only occurs in freshwater habitats, including lakes, dams and larger rivers with deeper water (Apps, 2012; IUCN, 2017). It needs dense vegetation or holes for shelter, and cannot live in polluted water (Apps, 2012). Threats in southern Africa include water pollution, vegetation clearing near water, and habitat destruction for development (Apps, 2012). This species has a low likelihood of occurrence due to the lack of large, deep freshwater habitats in the proposed Project Site.

Mystromys albicaudatus (White-tailed Rat) is endemic to South Africa and Lesotho, where it is found in savanna, grassland, Karoo and Fynbos on black loam soils (Apps, 2012; IUCN, 2017). It is uncommon and threatened by habitat degradation due to forestry and the farming of livestock and crops (Apps, 2012). This species' scarcity and sensitivity to disturbances contributed to a low likelihood of occurrence in the proposed Project Site.

Ourebia ourebi (Oribi) has a patchy distribution in Africa, ranging from Senegal to Ethiopia and Eritrea and south through eastern Africa to Angola and the Eastern Cape of South Africa (IUCN, 2017). Its habitat requirements include open habitats with short grasses and patches of heavy cover (Apps, 2012). It does not occur in woodland except those that are near grassland (Apps, 2012). Its main threat is habitat loss due to bush encroachment, poorly managed agriculture over large areas, forestry and arable crops (Apps, 2012). The lack of heavy woody vegetation cover patches and the Oribi's patchy distribution and susceptibility to local extinction contributed to a low likelihood of occurrence in the proposed Project Site for this species.

Panthera pardus (Leopard) has a wide habitat tolerance and are quite adaptable to human encroachment and crop-farming areas (Apps, 2012). It is mostly nocturnal, although it can be seen during the day, especially in protected areas (Apps, 2012). The Leopard's ability to adapt to anthropogenic activities and the presence of a conservation area overlapping with the proposed Project Site contributed to a high likelihood of occurrence for this species.

Parahyaena brunnea (Brown Hyaena) is endemic to southern Africa (IUCN, 2017). This species occurs in dry areas, generally with annual rainfall less than 100 mm, particularly along the coast, semi-desert, open scrub and open woodland savanna (IUCN, 2017). Given its known ability to persist outside of formally protected areas the likelihood of occurrence of this species is rated as moderate.

Pelea capreolus (Grey Rhebok) is endemic to South Africa, eSwatini and Lesotho (IUCN, 2017). In the eastern parts of this species' distribution, it is found on rocky hills, grassy mountain slopes, and plateau grasslands (IUCN, 2017). In the south and southwest, it is associated with the rocky hills of mountain fynbos and the little Karoo (IUCN, 2017). It is mainly threatened by the bushmeat trade and illegal sport hunting with dogs (IUCN, 2017). The lack of rocky outcrops and hills within the Project Site contributed to a low likelihood of occurrence of this species.

Redunca fulvorufula (Mountain Reedbuck) is endemic to southern Africa and prefers dry, stony slopes (with an angle of 20 to 30 degrees) with grass cover and scattered bushes and trees. It is also dependent on water (Apps, 2012; IUCN, 2017). The lack of suitable habitats on the proposed Project Site contributed to the low likelihood of occurrence for this species.

5.1.3.4 Avifauna

The SABAP2 Data lists 366 avifauna species that could be expected to occur within the proposed Project Site (The full list will be provided in the final assessment). Twenty (20) of these expected species

are regarded as threatened (Table 5-5). Two (2) of the species have a low likelihood of occurrence due to lack of suitable habitat and food sources in the proposed Project Site.

Table 5-5 Threatened avifauna species that are expected to occur within the project area.

Species	Common Name	Conservation Status		Likelihood of occurrence
		Regional (SANBI, 2016)	IUCN (2021)	
Alcedo semitorquata	Half-collared Kingfisher	NT	LC	Moderate
Calidris ferruginea	Curlew Sandpiper	LC	NT	Low
Ciconia ciconia	White Stork	NT	LC	Moderate
Ciconia nigra	Black Stork	VU	LC	Moderate
Coracias garrulus	European Roller	NT	LC	Moderate
Eupodotis senegalensis	White-bellied Bustard	VU	LC	Moderate
Falco biarmicus	Lanner Falcon	VU	LC	High
Falco vespertinus	Red-footed Falcon	NT	VU	Moderate
Gorsachius leuconotus	White-backed Night Heron	VU	LC	High
Gyps africanus	White-backed Vulture	CR	CR	Moderate
Gyps coprotheres	Cape Vulture	EN	EN	High
Mycteria ibis	Yellow-billed Stork	EN	LC	High
Oxyura maccoa	Maccoa Duck	NT	EN	Moderate
Phoeniconaias minor	Lesser Flamingo	NT	NT	Low
Podica senegalensis	African Finfoot	VU	LC	Moderate
Polemaetus bellicosus	Martial Eagle	EN	EN	High
Pterocles gutturalis	Yellow-throated Sandgrouse	NT	LC	High
Sagittarius serpentarius	Secretarybird	VU	EN	High
Torgos tracheliotos	Lappet-faced Vulture	EN	EN	High
Tyto capensis	African Grass Owl	VU	LC	High

Alcedo semitorquata (Half-collared Kingfisher) is rated as Vulnerable on a regional scale (SANBI, 2016). It occurs in several countries within sub-Saharan Africa, and has a wide range in South Africa, Angola, Zambia, Zimbabwe, Mozambique, Malawi and Tanzania, with patchy distributions in the Democratic Republic of the Congo (DRC), Burundi, Ethiopia, Sudan and South Sudan (IUCN, 2017). It lives in forests, inland freshwater wetlands as well as marine habitats such as estuaries and saline lagoons (IUCN, 2017). The presence of a water body within the project area and rivers around the project area contributed to a moderate likelihood of occurrence for this species.

Calidris ferruginea (Curlew Sandpiper) is a resident of Africa which migrates to the Russian Federation during the breeding season (IUCN, 2017). During the winter, the Curlew Sandpiper prefers a wide variety of coastal habitats such as brackish lagoons, tidal mudflats and sandflats, estuaries, saltmarshes and rocky shores. Inland habitats include the muddy edges of marshes, large rivers and lakes (both saline and freshwater), irrigated land, flooded areas, dams and saltpans (IUCN, 2017). The lack of suitable habitats in the project area contributed to a low likelihood of occurrence for this species.

Ciconia ciconia (White Stork) is a Palearctic migrant which breeds in several countries in Europe and Asia (IUCN, 2017). It mostly inhabits open areas (IUCN, 2017). During the winter, this species prefers grasslands, steppe, savanna as well as cultivated fields, often gathering near water bodies (IUCN, 2017). The presence of suitable habitats in the project area contributed to a moderate likelihood of occurrence for this species.

Ciconia nigra (Black Stork) is a Palaearctic migrant with a wide distribution across Africa, Europe and Asia (IUCN, 2017). It is found in old, undisturbed, open forests from sea-level up to mountainous regions and forages mostly in freshwater habitats such as shallow streams, pools, marshes, swampy patches, damp meadows, flood-plains and pools in dry riverbeds but also occasionally grasslands with stands of reeds or long grass (IUCN, 2017). Habitat degradation is the main threat of this species (IUCN, 2017). The presence of suitable foraging habitats in and around the project area contributed to a moderate likelihood of occurrence for this species.

Coracias garrulous (European Roller) is a winter migrant from most of South-central Europe and Asia occurring throughout sub-Saharan Africa (IUCN, 2017). The European Roller has a preference for bushy plains and dry savannah areas (IUCN, 2017). The presence of open areas in the project area, which the European Roller prefers to forage in, contributed to a moderate likelihood of occurrence for this species.

Eupodotis senegalensis (White-bellied Bustard) is rated as Vulnerable on a regional scale and occurs in sub-Saharan Africa (IUCN, 2017). It occurs in dry savannas, subtropical and tropical dry shrublands, grasslands, inland seasonal riverine wetlands (rivers, creeks and streams), deserts and arable land (IUCN, 2017). The presence of a river near the project area as well as the presence of suitable habitat within the project area contributed to a moderate likelihood of occurrence for this species.

Falco biarmicus (Lanner Falcon) is native to South Africa and inhabits a wide variety of habitats, from lowland deserts to forested mountains (IUCN, 2017). Their diet is mainly composed of small birds such as pigeons and francolins (IUCN, 2017). The likelihood of occurrence of this species in the project area is rated as high due to the suitable habitat and the expected presence of many bird species on which Lanner Falcons may predate.

Falco vespertinus (Red-footed Falcon) is a migrant that breeds in eastern Europe as well as west, central and north-central Asia and winters in southern Africa (IUCN, 2017). When they are not breeding, Red-footed Falcons overwinter in the Kalahari region, where it can be found in savannas, grasslands and shrublands (IUCN, 2017). Threats include habitat loss and degradation as well as loss of prey due to poisoning (IUCN, 2017). The presence of suitable overwintering habitats in the project area contributed to a moderate likelihood of occurrence for this species.

Gorsachius leuconotus (White-backed Night Heron) is a native of sub-Saharan Africa where it occurs in densely vegetated forests and frequents tree-fringed streams, mangroves, islands in large rivers and lakes, wooded margins of marshes and occasionally reedbeds (IUCN, 2017). In southern Africa, it is threatened by habitat loss and degradation (IUCN, 2017). The presence of a river lined with trees near the project area contributed to a high likelihood of occurrence for this species.

Gyps africanus (White-backed Vulture) is the most widespread and common vulture species in Africa, with a very wide distribution spanning numerous countries in sub-Saharan Africa (IUCN, 2017). It primarily occupies lowland open wooded savanna, especially areas dominated by *Vachellia* species, where it needs tall trees for nesting but also nests on electricity pylons in South Africa (IUCN, 2017). It largely faces the same types of threats of other African vulture species, such as habitat destruction, loss of food, hunting, persecution and poisoning (IUCN, 2017). The presence of savannas in and around the project area contributed to a moderate likelihood of occurrence for this species.

Gyps coprotheres (Cape Vulture) is found in southern Africa, where it prefers protected areas and woody vegetation for foraging and steep cliffs for roosting (IUCN, 2017). Various threats are leading to a decline in this species' population numbers, including poisoning (deliberate and accidental), collision with cables, wind farm developments, habitat loss and unsustainable harvesting for traditional uses (IUCN, 2017). The presence of a conservation area overlapping with the project area as well as the presence of woody vegetation in and around the project area has contributed to a high likelihood of occurrence for this species.

Mycteria ibis (Yellow-billed Stork) is migratory and has a large distributional range which includes much of sub-Saharan Africa (IUCN, 2017). It is typically associated with freshwater ecosystems, especially wetlands and the margins of lakes and dams (IUCN, 2017). The presence of water bodies in and near the project area contributed to a high likelihood of occurrence for this species.

Oxyura maccoa (Maccoa Duck) has a large range in Africa, divided into a northern population in Eritrea, Ethiopia, Kenya and Tanzania, and a southern population in Angola, Botswana, Namibia, South Africa and Zimbabwe (IUCN, 2017). It breeds in both natural and man-made inland freshwater wetlands, preferring those that are shallow and nutrient-rich and with extensive emergent vegetation such as reeds and cattails (IUCN, 2017). The two main threats are pollution and habitat loss (IUCN, 2017). The presence of suitable breeding habitats in and around the project area contributed to a moderate likelihood of occurrence for this species.

Phoeniconaias minor (Lesser Flamingo) occurs mainly in sub-Saharan Africa but is also found in the southernmost part of Yemen and several locations in India (IUCN, 2017). It breeds on large, undisturbed alkaline and saline lakes, salt pans or coastal lagoons, usually far out from the shore (IUCN, 2017). The lack of suitable habitat within the project area contributed to a low likelihood of occurrence for this species.

Podica senegalensis (African Finfoot) occurs in sub-Saharan Africa (IUCN, 2017). It prefers a variety of freshwater habitats, especially those that are well-vegetated along the edge of the water (IUCN, 2017). It is mainly threatened by habitat loss due to the expansion of woody vegetation, human encroachment and the excessive burning of grasslands (IUCN, 2017). The presence of water bodies in and within the project area contributed to a moderate likelihood of occurrence for this species.

Polemaetus bellicosus (Martial Eagle) is listed as EN on a regional scale and on a global scale (IUCN, 2017). This species has an extensive range across much of sub-Saharan Africa, but populations are declining due to deliberate and incidental poisoning, habitat loss, reduction in available prey, pollution and collisions with power lines (IUCN, 2017). It inhabits open woodland, wooded savanna, bushy grassland, thorn-bush and, in southern Africa, more open country and even sub-desert (IUCN, 2017). The presence of suitable foraging and breeding habitat in the project area contributed to a high likelihood of occurrence for this species.

Pterocles gutturalis (Yellow-throated Sandgrouse) occurs from northern South Africa to Ethiopia, and prefers open grassland to scrub savannas (Sinclair *et al*., 2002; IUCN, 2017). It can also be found in desert, wetlands and habitats modified by humans (IUCN, 2017). The presence of suitable open habitats in the project area contributed to a moderate likelihood of occurrence for this species.

Sagittarius serpentarius (Secretarybird) occurs in sub-Saharan Africa and inhabits grasslands, open plains, and lightly wooded savanna (IUCN, 2017). It is also found in agricultural areas and sub-desert (IUCN, 2017). It mainly eats insects (86% of diet) but will also prey on rodents and other mammals, lizards, snakes, eggs, young birds and amphibians (IUCN, 2017). The likelihood of occurrence for this species is rated as high due to the open areas present in the project area as well as the expected presence of several prey species.

Torgos tracheliotos (Lappet-faced Vulture) has a wide distribution across sub-Saharan Africa as well as Saudi Arabia, Yemen and Oman (IUCN, 2017). It inhabits dry savanna, arid plains, deserts and open mountain slopes up to 3,500 m.a.s.l. and ranges widely while foraging (IUCN, 2017). The likelihood of occurrence for this species is rated as high due to the savanna areas present in the project area.

Tyto capensis (African Grass Owl) is considered to be Vulnerable on a regional scale (SANBI, 2016). Its distribution ranges from Cameroon in the North, extending eastwards to Kenya and westwards to the north-western coast of Angola and extending southwards into the eastern parts of South Africa (IUCN, 2017). It inhabits dry savanna, subtropical to tropical dry shrublands, grasslands, and inland wetlands (IUCN, 2017). The presence of suitable savannas and grasslands in the project area has contributed to a high likelihood of occurrence for this species.

5.1.4 Land Capability

As part of the desktop assessment, soil information was obtained using published South African Land Type Data. Land type data for the site was obtained from the Institute for Soil Climate and Water (ISCW) of the Agricultural Research Council (ARC) (Land Type Survey Staff, 1972 - 2006). The land type data is presented at a scale of 1:250 000 and comprises of the division of land into land types.

5.1.4.1 Climate

The SVcb 6 vegetation type is characterised by summer rainfall with a Mean Annual Precipitation (MAP) that ranges between 600 mm and 700 mm (see Figure 5-10). Compared to the Dwaalboom Thornveld, this unit has a relatively more temperate climate. Of the savanna vegetation units that are located outside Kalahari bioregions, this unit has the highest mean annual potential evaporation. In the winter season frost is fairly frequent (Mucina & Rutherford, 2006).

The SVcb 8 vegetation type is characterised by a summer rainfall with a Mean Annual Precipitation (MAP) that ranges between 55 mm in the west and 700 mm in the east (see Figure 5-11). The winter season is dry and frost is frequent (Mucina & Rutherford, 2006).

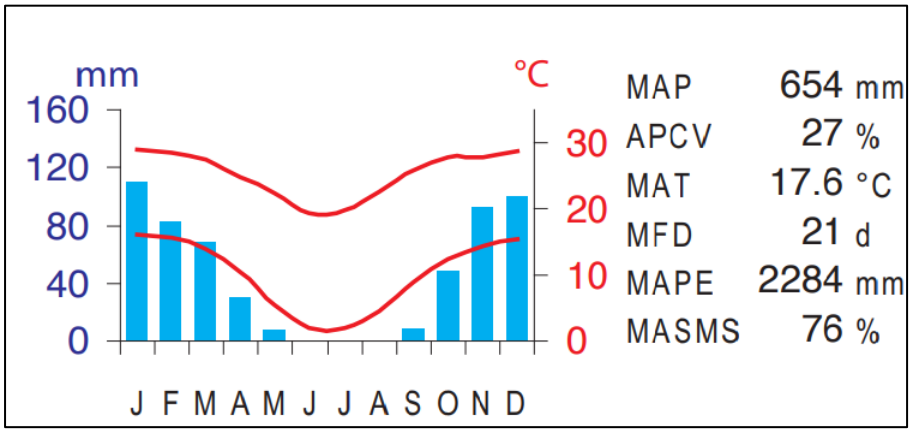


Figure 5-10 Climate for the Marikana Thornveld (Mucina & Rutherford, 2006)

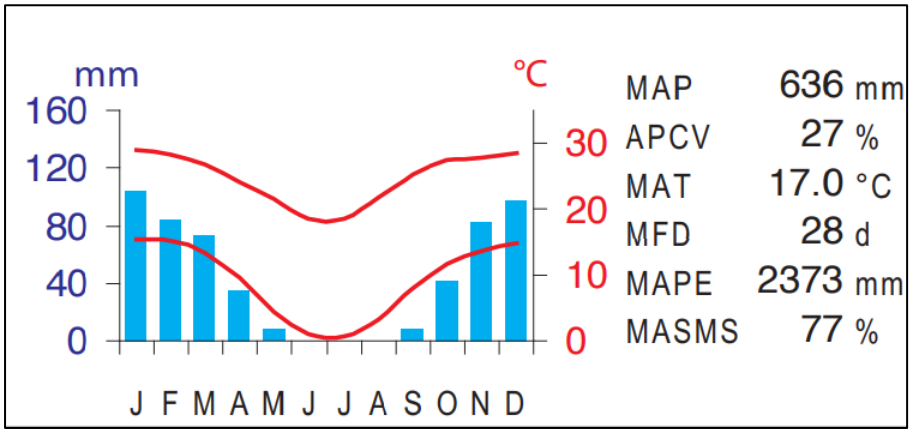


Figure 5-11 Climate for the Moot Plains Bushveld (Mucina & Rutherford, 2006)

5.1.4.2 Geology and Soil

According to the land type database (Land Type Survey Staff, 1972 - 2006) the development falls within the Bc 8 and Ea 3 land types.

The Bc 8 and Ea 3 land types mostly consist of Rensburg, Dundee, Arcadia, Hutton, and/Oakleaf soil forms according to the South African soil classification working group (1990) with the possibility of other

soils occurring throughout. The Bc 8 land type terrain units and expected soils are illustrated in Figure 5-12 and Table 5-6 respectively. The Ea 3 land type terrain terrain units and expected soils are illustrated in Figure 5-13 and Table 5-7 respectively.

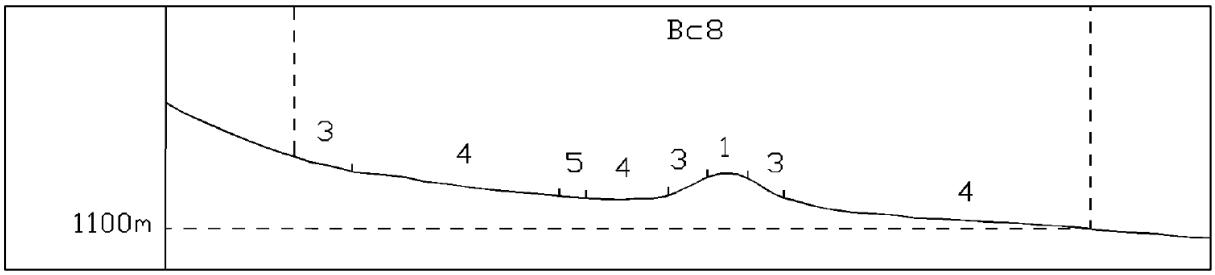


Figure 5-12 Illustration of land type Bc 8 terrain units (Land Type Survey Staff, 1972 – 2006)

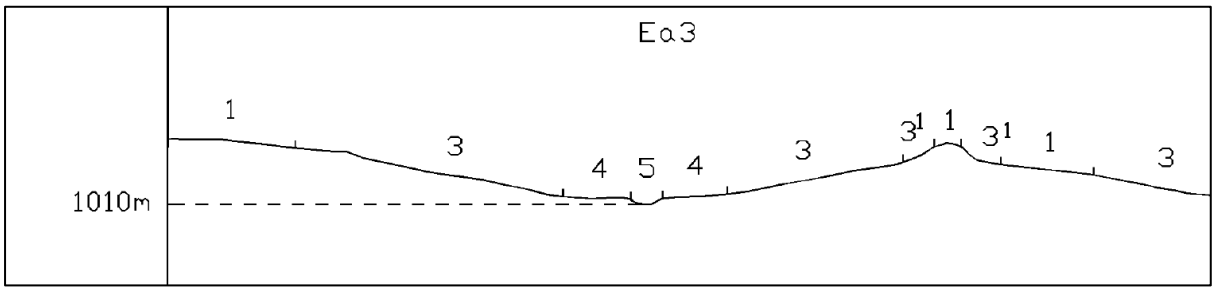


Figure 5-13 Illustration of land type Ea 3 terrain units (Land Type Survey Staff, 1972 – 2006)

Table 5-6 Soils expected at the respective terrain units within the Bc 8 land type (Land Type Survey Staff, 1972 - 2006)

Terrain units							
1 (2%)		**3 (8%)**		**4 (85%)**		**5 (5%)**	
Bare Rocks	50%	Mispah	50%	Hutton	40%	Rensburg, Dundee	60%
Mispah	50%	Bare Rocks	44%	Avalon	18%	Mispah	10%
		Hutton	6%	Clovelly	7%	Katspruit	10%
				Shortlands	6%	Arcadia	10%
				Bare Rocks	6%	Shortlands	6%
				Katspruit	5%	Bare Rocks	4%
				Arcadia	1%		

Table 5-7 Soils expected at the respective terrain units within the Ea 3 land type (Land Type Survey Staff, 1972 - 2006)

Terrain Units											
1 (30%)		**1 (1) (0.5)**		**3 (44.5%)**		**3(1) (1%)**		**4 (15%)**		**5 (9%)**	
Arcadia	70%	Bare Rocks	80%	Arcadia	76%	Bare Rocks	70%	Arcadia	89%	Oakleaf	67%
Bare Rocks	14%	Mispah	9%	Bare Rocks	10%	Mispah	30%	Hutton	3%	Arcadia	22%
Mispah	9%			Mispah	6%			Shortlands	3%	Shortlands	6%
Hutton	4%			Hutton	4%			Swartland	3%	Hutton	5%
Shortlands	3%			Shortlands	3%						
				Glenrosa	4%						

	Swartland	1%

In the Marikana Thornveld, most of the area is underlain by mafic intrusive rocks of the Rustenburg Layered Suite of the Bushveld Igneous Complex. Rocks include gabbro, norite, pyroxenite and anorthosite. The shales and quartzites of the Pretoria Group (Transvaal Supergroup) also contribute to the geology. Soils comprise mainly of vertic melanic clays with some dystrophic or mesotrophic plinthic catenas and some freely drained, deep soils. Land types are mainly Ea, Ba and Ae (Mucina & Rutherford, 2006).

In the Moot Plains Bushveld, the area is underlain with clastic sediments, minor carbonates and volcanics of the Pretoria Group (including the Silverton Formation) as well as some Malmani dolomites in the west. All are of the Transvaal Supergroup (Vaalian). There is also some contribution from mafic Bushveld intrusives. Soils are often stony with colluvial clay-loam but varied, including red-yellow apedal freely drained, dystrophic and eutrophic plinthic catenas, vertic and melanic clays, and some less typical Glenrosa and Mispah forms. Land types are Ae, Ba, Ea, Bc, Ac and less typically Fb (Mucina & Rutherford, 2006).

5.1.4.3 Terrain

The slope percentage of the Project Site has been calculated and is illustrated in Figure 5-14. Most of the regulated area is characterised by a slope percentage between 0 and 10% with some irregularities in areas with slopes reaching 45%. This illustration indicates a non-uniform topography with occurrence of some steep sloping areas being present. The Digital Elevation Model (DEM) of the project area (Figure 5-15) indicates an elevation of 1 205 to 1 283 Metres Above Sea Level (MASL).

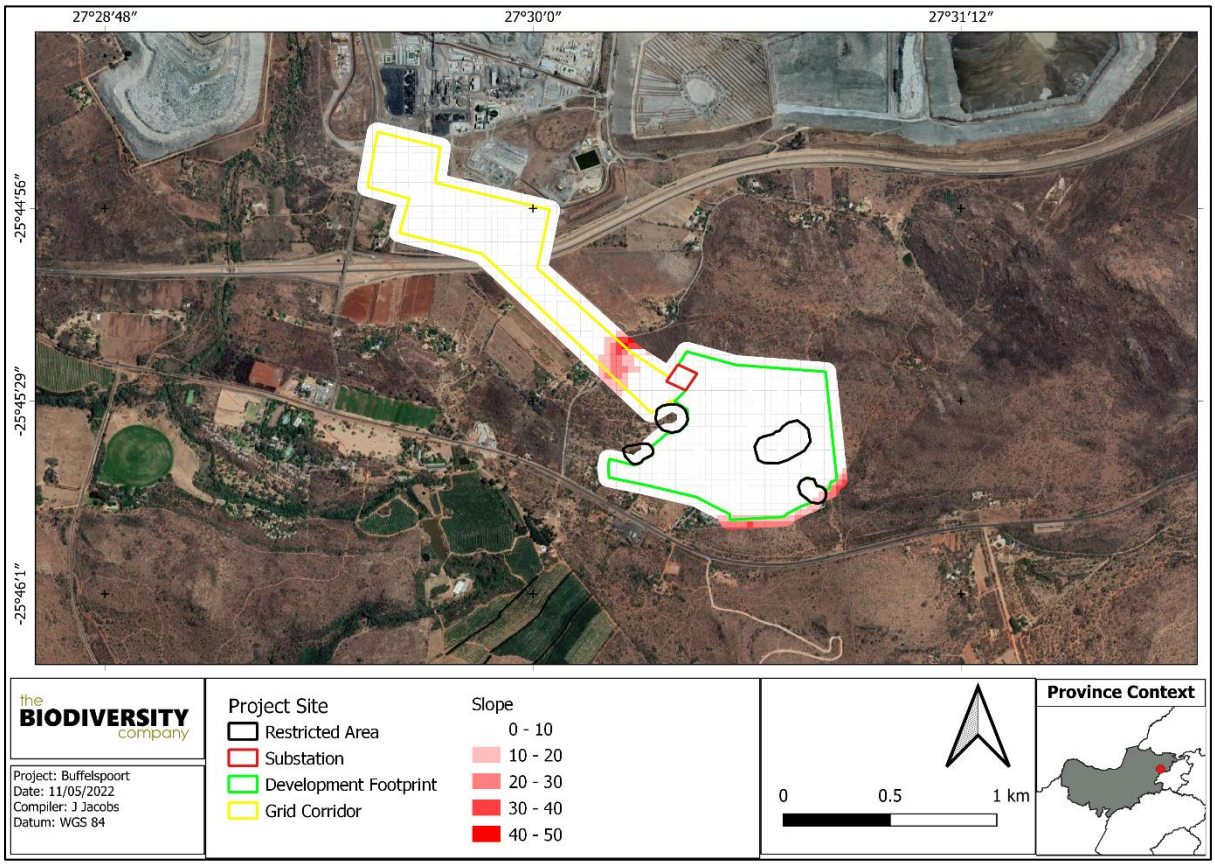


Figure 5-14 Slope percentage map for the Project Site

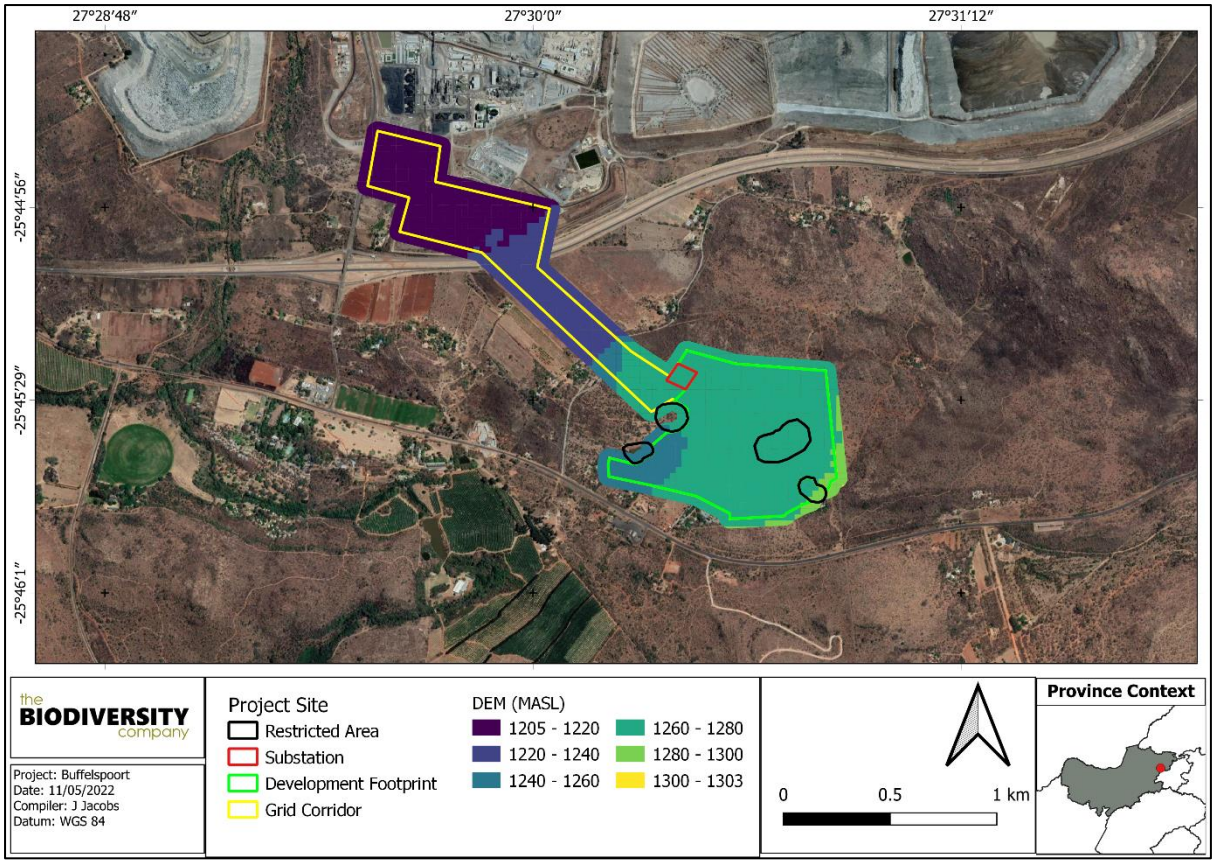


Figure 5-15 Digital Elevation Model of the assessment area (metres above sea level)

6 Impact Screening

6.1 Terrestrial Impact Screening

Anthropogenic activities drive habitat destruction, causing displacement of fauna and flora and possibly direct mortality. Land clearing destroys local wildlife habitat and can lead to the loss of local breeding grounds, nesting sites and wildlife movement corridors such as rivers, streams and drainage lines, or other locally important features. The removal of natural vegetation may reduce the habitat available for fauna species and may reduce animal populations and species compositions within the Project Site.

The terrestrial habitat expected in the proposed Project Site consists of Marikana Thornveld (Endangered) and Moot Plains Bushveld (Vulnerable), which based on the desktop scoping assessment is expected to host three (3) flora SCCs, namely *Adromischus umbraticola* subsp. *umbraticola*, *Delosperma leendertziae* and *Stenostelma umbelluliferum*. Portions of the project area are classified as CBA2, ESA1 and ESA2. The 500 m regulated zone around the Grid Corridor also overlaps with a CR river and unclassified NFEPA wetlands. A total of 10 fauna SCCs were given a high likelihood of occurrence, while a further 13 were given a moderate likelihood of occurrence. Based on the desktop assessment information, which was obtained during the desktop part of the EIA phase, it can be said that the majority of the project area will have a high sensitivity rating. However, the actual state of the Project Site must be confirmed by a field assessment. For impacts on avifauna within the proposed Project Site, please see the Avifauna Assessment Report (TBC, 2022b).

Table 6-1 Scoping evaluation table summarising the impacts identified to terrestrial biodiversity (fauna and flora)

Impact Biodiversity loss/disturbance Issue	Nature of Impact	Extent of Impact	No-Go Areas
Destruction, fragmentation and degradation of habitats and ecosystems	Direct impacts: » Disturbance / degradation / loss to vegetation and habitats » Ecological corridors are disrupted » Habitat fragmentation Indirect impacts: » Erosion risk increases » Fire risk increases » Increase in invasive alien species	Regional	None identified at this stage
Spread and/or establishment of alien and/or invasive species	Direct impacts: » Loss of vegetation and habitat due to increase in alien species Indirect impacts: » Creation of infrastructure suitable for breeding activities of alien and/or invasive species » Spreading of potentially dangerous diseases due to invasive and pest species	Regional	None identified at this stage
Direct mortality of fauna	Direct impacts: » Loss of SCC species » Loss of fauna diversity Indirect impacts: » Loss of diversity and species composition in the area. » Possible impact on the food chain	Regional/International	None identified at this stage
Reduced dispersal/migration of fauna	Direct impacts: » Loss of genetic diversity » Isolation of species and groups leading to inbreeding Indirect impacts: » Reduced seed dispersal » Loss of ecosystem services	Regional/National	None identified at this stage
Environmental pollution due to water runoff, spills from vehicles and erosion	Direct impacts: » Pollution in waterbodies and the surrounding environment » Faunal mortality (direct and indirectly) Indirect impacts: » Ground water pollution » Loss of ecosystem services	Regional	None identified at this stage
Disruption/alteration of ecological life cycles (breeding, migration, feeding) due to noise, dust, heat radiation and light pollution.	Direct impacts: » Disruption/alteration of ecological life cycles due to noise » Reduced pollination and growth of vegetation due to dust » Faunal mortality due to light pollution (nocturnal species becoming more visible to predators) » Heat radiation could lead to the displacement of species. Sources for this heat radiation will include the PV panels themselves as well as increased ambient	Regional	None identified at this stage

Impact Biodiversity loss/disturbance			
Issue	**Nature of Impact**	**Extent of Impact**	**No-Go Areas**
	temperatures in bare ground or concrete-covered areas following the removal of vegetation. Indirect impacts: » Loss of ecosystem services		
Staff and others interacting directly with fauna (potentially dangerous) or poaching of animals	Direct impacts: » Loss of SCCs or TOPS species Indirect impacts: » Loss of ecosystem service » Loss of genetic diversity	Regional	None identified at this stage
Description of expected significance of impact The **Construction of the Solar PV Energy Facility** could result in the loss or degradation of the habitat and vegetation, most of which is still in a natural condition and is expected to support a number of fauna species. The construction of the Solar PV Energy Facility could also lead to the displacement/mortalities of the fauna and more specifically SCC fauna species. The operation of the Solar PV Energy Facility could result in the disruption of ecological life cycles. This could be as a result of a number of things, but mainly due to dust, noise, light pollution and heat radiation. The disturbance of the soil/vegetation layer will allow for the establishment of flora alien invasive species. In turn, the new infrastructure will provide refuge for invasive/feral fauna species. Soil disturbances associated with human developments create suitable germination sites for invasive alien plants. Pest fauna species such as rodents will use gaps in building structures (such as roofs) as refugia and will forage in any place where food or garbage is stored**.** Erosion is another possible impact that could result from the disturbance of the top soil and vegetation cover. A number of machines, vehicles and equipment will be required, aided by chemicals and concrete mixes for the construction of the proposed Project. Leaks, spillages or breakages from any of these could result in contamination of the receiving water resources adjacent to the proposed Project Site. Contaminated water resources are likely to have an effect on the associated biota. The significance of these impacts will be determined after a field assessment has been conducted. See the Terrestrial Biodiversity Assessment Report (TBC, 2022a).			
Gaps in knowledge & recommendations for further study » Identification and descriptions of habitats during field assessment (to verify desktop findings). » Identification of the Site Ecological Importance of each habitat after field assessment. » Location and identification of plant SCCs as well as in the location of nests/dens in the case of fauna species. » Determine a suitable buffer width for the identified habitat features (after these features have been identified during a field assessment). **Recommendations with regards to general field surveys** » Field surveys to prioritise the Development Footprint and Grid Connection Corridor, but also consider the 500 m project area of influence (PAOI). » Whenever possible, conduct fieldwork during the wet season period. » Avifauna assessment field work to be conducted over two seasons to ensure migratory species are considered. On 30 May 2022, an avifauna field survey was conducted in the proposed Project Site by TBC (TBC, 2022b)			

6.2 Wetland Impact Screening

A key consideration for the scoping level impact assessment is the presence of the water resources delineated in proximity to the Project Site. The available data also suggests the presence of drainage features and wetlands within proximity to the Grid Corridor. A Zone of Regulation (ZoR) of 500 m is applicable for any wetland system that is present beyond the proposed Project Site boundary.

Table 6-2 Scoping evaluation table summarising the impacts identified to wetlands

Impact Wetland disturbance / loss			
Issue	**Nature of Impact**	**Extent of Impact**	**No-Go Areas**
Disturbance / degradation / loss to wetland soils or vegetation due	Direct impacts:	Regional	None identified at this stage

to the construction of the facility and associated infrastructure, such as crossings	» Disturbance / degradation / loss to wetland soils or vegetation Indirect impacts: » Loss of ecosystem services		
Increased erosion and sedimentation & contamination of resources	Direct impacts: » Erosion and structural changes to the systems Indirect impacts: » Sedimentation & contamination of downstream reaches	Regional	None identified at this stage
Description of expected significance of impact The northern portion of the 500 m regulated zone of the proposed Project Site overlaps with natural water sources (a Critically Endangered river and five unclassified NFEPA wetlands), and thus the proposed development may result in the loss or degradation of these systems. These disturbances could also result in the infestation and establishment of alien vegetation would affect the functioning of the systems. Earthworks will expose and mobilise earth materials which could result in sedimentation of the receiving systems. A number of machines, vehicles and equipment will be required, aided by chemicals and concrete mixes for the project. Leaks, spillages or breakages from any of these could result in contamination of the receiving water resources within the 500 m regulated zone. Contaminated water resources are likely to influence the associated biota. It is anticipated to increase stormwater runoff due to the hardened surfaces and the crossings will result in an increase in run-off volume and velocities, resulted in altered flow regimes. The changes could result in physical changes to the receiving systems caused by erosion, run-off and also sedimentation, and the functional changes could result in changes to the vegetative structure of the systems. The reporting of surface run-off to the systems could also result in the contamination of the systems, transporting (in addition to sediment) diesel, hydrocarbons and soil from the operational areas. The significance of these impacts will be determined after a field assessment has been conducted. See the Terrestrial Biodiversity Assessment Report (TBC, 2022a).			
Gaps in knowledge & recommendations for further study » Identification, delineation and characterisation of water resources. » Undertake a functional assessment of systems, where applicable. » Determine a suitable buffer width for the resources. **Recommendations with regards to general field surveys** » Field surveys to prioritise the development footprint and grid connection corridor, but also consider the 500 m regulation area. » Beneficial to undertake fieldwork during the wet season period.			

6.3 Soil Impact Screening

Considering the occurrence of various soil forms that are commonly associated with high land capabilities, it is likely that areas with high land capability sensitivity do occur within the project area. Further to this, due to the climatic capability, the ultimate land potential is more likely to be low.

Table 6-3 Scoping evaluation table summarising the impacts identified to soils

Impact **Loss of land capability**			
Issue	**Nature of Impact**	**Extent of Impact**	**No-Go Areas**
Compaction/soil stripping/transformation of land use which leads to loss of land capability	Direct impacts: » Loss of soil / land capability Indirect impacts: » Loss of land capability	Regional	None identified at this stage
Description of expected significance of impact The construction of the Solar PV Facility could result in the encroachment into areas characterised by high land potential properties, which can ultimately result in the loss of land capability. According to the DEA Screening Tool, the proposed Project Site overlaps with areas with "High" and "Medium" relative agricultural sensitivities. These disturbances could also result in the infestation and establishment of alien vegetation, which in turn can have a detrimental impact on soil resources. Earthworks will expose and mobilise earth materials which could result in compaction and/or erosion. A number of machines, vehicles and equipment will be required, aided by chemicals and concrete mixes for the project. Leaks, spillages or breakages from any of these could result in contamination of soil resources, which could affect the salinity or pH of the soil, which can render the fertility of the soil unable to provide nutrition to plants. The significance of			

these impacts will be determined after a field assessment has been conducted. See the Terrestrial Biodiversity Assessment Report (TBC, 2022b).

Gaps in knowledge & recommendations for further study

- Identification and delineation of soil forms.
- Determination of soil sensitivity.

Recommendations with regards to general field surveys

- Field surveys to prioritise the Development Footprint and Grid Connection Corridor.

7 Conclusion

7.1 Terrestrial Ecology

Based on the desktop assessment it can be said that the project area is sensitive with a moderate to high likelihood of fauna SCCs occurring. This assumption is based on the Development Footprint and Grid Connection corridor overlapping with a CBA2, ESA1, ESA2, the Magaliesberg Biosphere Reserve, NPAES Priority Focus Area, the Magaliesberg IBA, CR river and five (5) unclassified NFEPA wetlands.

The expected post-mitigation risk significance for the project in is expected to be medium. The expectant anthropogenic activities are likely to drive habitat destruction, causing displacement of fauna and flora and possibly event direct mortality. Land clearing destroys local wildlife habitat and can lead to the loss of local breeding grounds, nesting sites for avifauna and wildlife movement corridors such as rivers, streams and drainage lines, or other locally important features. The removal of natural vegetation may reduce the habitat available for fauna species, and may reduce animal populations and species compositions within the area.

7.2 Wetland

A key consideration for the impact assessment is the presence of the identified water resources in relation to the proposed Project Site. The available data also suggests the presence of features in proximity to the proposed Project Site, with wetlands system expected for the 500 m regulated area.

Construction could result in the encroachment into water resources and result in the loss or degradation of these systems, most of which are functional and provide ecological services. These disturbances could also result in the infestation and establishment of alien vegetation which would affect the functioning of the systems. Leaks and/or spillages could result in contamination of the receiving water resources within the northern portion of the proposed Project Site's 500 m regulated zone. Contaminated water resources are likely to have an effect on the associated biota. An increase in stormwater runoff could result in physical changes to the receiving systems caused by erosion, run-off and also sedimentation, and the functional changes could result in changes to the vegetative structure of the systems.

7.3 Soil

Various soil forms are expected throughout the project area, of which some are commonly associated with high land capabilities. Even though the soil depth, texture and permeability of these soils ensure high land capability, the climatic capability of the area often reduces the land potential considerably. The harsh climatic conditions are associated with low annual rainfall and high evapotranspiration potential demands of the area. The area is not favourable for most cropping practices, which corresponds to the current mining activities in the area.

The proposed development can result in the loss of land capability. The disturbances could further also result in the infestation and establishment of alien vegetation, which in turn can have a detrimental impact on soil resources. The development of the area could also result in compaction and/or erosion. Further to this, these activities could also cause leaks and/or spillages resulting in contamination of soil

resources, which could affect the salinity or pH of the soil and can render the fertility of the soil unable to provide nutrition to plants.

8 References

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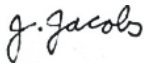
9 Appendix Items

9.1 Appendix A – Specialist Declaration of Independence

I, Jan Jacobs, declare that:

- I act as the independent specialist in this application;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the 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.



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May 2022