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# **TERRESTRIAL ECOLOGICAL ASSESSMENT FOR THE PROPOSED EXPANSION OF TIFFANY'S SPAR IN SALT ROCK, ILEMBE DISTRICT MUNICIPALITY, KWAZULU-NATAL PROVINCE**

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**DETAILS OF SPECIALIST CONSULTANT**

<b>Date:</b>	December 2022
<b>Document Title:</b>	Terrestrial Ecological Assessment for the Proposed Expansion of Tiffany's Spar in Salt Rock, Ilembe District Municipality, Kwazulu-Natal Province
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**TERRESTRIAL ECOLOGICAL ASSESSMENT FOR THE PROPOSED EXPANSION OF TIFFANY'S  
SPAR IN SALT ROCK, ILEMBE DISTRICT MUNICIPALITY, KWAZULU-NATAL PROVINCE  
DRAFT REPORT**

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## SPECIALISTS DECLARATION

I, Mark Summers as the appointed independent specialist, in terms of the 2014 EIA Regulations, hereby declare that I:

- act as the independent specialist in this application;
- 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;
- regard the information contained in this report as it relates to my specialist input/study to be true and correct, and do not have and will not have any financial interest in the undertaking of the activity, other than remuneration for work performed in terms of the NEMA, the Environmental Impact Assessment Regulations, 2014 and any specific environmental management Act;
- declare that there are no circumstances that may compromise my objectivity in performing such work;
- 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;
- will comply with the Act, Regulations and all other applicable legislation;
- have no, and will not engage in, conflicting interests in the undertaking of the activity;
- have no vested interest in the proposed activity proceeding;
- 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;
- have ensured that information containing all relevant facts in respect of the specialist input/study was distributed or made available to interested and affected parties and the public and that participation by interested and affected parties was facilitated in such a manner that all interested and affected parties were provided with a reasonable opportunity to participate and to provide comments on the specialist input/study;
- have ensured that the comments of all interested and affected parties on the specialist input/study were considered, recorded and submitted to the competent authority in respect of the application;
- all the particulars furnished by me in this specialist input/study are true and correct; and
- realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.

Signature of specialist:



Name of specialist:

Mark Summers

Date:

December 2022

## SPECIALISTS DECLARATION

I, Dacre James Alletson as the appointed independent specialist, in terms of the 2014 EIA Regulations, hereby declare that I:

- act as the independent specialist in this application;
- 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;
- regard the information contained in this report as it relates to my specialist input/study to be true and correct, and do not have and will not have any financial interest in the undertaking of the activity, other than remuneration for work performed in terms of the NEMA, the Environmental Impact Assessment Regulations, 2014 and any specific environmental management Act;
- declare that there are no circumstances that may compromise my objectivity in performing such work;
- 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;
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- have no, and will not engage in, conflicting interests in the undertaking of the activity;
- have no vested interest in the proposed activity proceeding;
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- have ensured that the comments of all interested and affected parties on the specialist input/study were considered, recorded and submitted to the competent authority in respect of the application;
- all the particulars furnished by me in this specialist input/study are true and correct; and
- realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.

Signature of specialist:



Name of specialist: D.J. Alletson

Date: December 2022



## TERMS OF REFERENCE

The study was to adhere to the following:

- Adherence to the content requirements of Terrestrial Plant and Animal Species Protocols, as per Government Notice No. 1150 of 30 October 2020.
- Adherence to all appropriate best practice guidelines, relevant legislation and authority requirements.
- Provide a thorough overview of all applicable legislation, guidelines.
- Cumulative impact identification and assessment
- Identification of sensitive areas to be avoided.
- Assessment of the significance of the proposed development during the Pre-construction, Construction, Operation, Decommissioning Phases and Cumulative impacts. Potential impacts should be rated in terms of the direct, indirect and cumulative.
  - Direct impacts: are impacts that are caused directly by the activity and generally occur at the same time and at the place of the activity. These impacts are usually associated with the construction, operation or maintenance of an activity and are generally obvious and quantifiable.
  - Indirect impacts: of an activity are indirect or induced changes that may occur as a result of the activity. These types of impacts include all the potential impacts that do not manifest immediately when the activity is undertaken, or which occur at a different place as a result of the activity.
  - Cumulative impacts: are impacts that result from the incremental impact of the proposed activity on a common resource when added to the impacts of other past, present or reasonably foreseeable future activities. Cumulative impacts can occur from the collective impacts of individual minor actions over a period of time and can include both direct and indirect impacts.
- Comparative assessment of alternatives (if alternatives provided).
- Implications of specialist findings for the proposed development (e.g. permits, licenses etc.).
- Specify if any further assessment will be required.
- Include an Impact Statement, concluding whether project can be authorised or not.
- Recommend mitigation measures in order to minimise the impact of the proposed development.

Specific issues to be addressed are as follows:

- Review existing ecological information available;
- Determine the general ecological state of the proposed site, determine the occurrence of any red data and/or vulnerable species, or any sensitive species requiring special attention;
- Provide a detailed description of the baseline environment; and
- Provide mitigation measures to prevent and/or mitigate any environmental impacts that may occur due to the proposed project.

## ASSUMPTIONS AND LIMITATIONS

The following assumptions, limitations, uncertainties are listed regarding the ecological assessment of the site:

- The study was undertaken in summer and good rains have meant that vegetation could still be identified by leaves and remnant flowers;
- No bulbs were identified, and it is likely due to historical sugar cane growing;
- Rare and threatened plant species are, by their nature, usually very difficult to locate and can be easily missed.
- It must be assumed and accepted that many plant species, in particular geophytes and annuals, will be absent from the visible species assemblage;
- The assessment area was limited to untransformed areas within the given site boundary;
- This study has only focused on the identification of faunal species that may occur on site, or were noted on site during fieldwork. Night time surveying was not undertaken due to budgetary constraints.

## ACRONYMS

ADU	Animal Demographic Unit
AIS	Alien and Invasive species
BA	Basic Assessment
CBA	Critical Biodiversity Area
DAFF	Department of Agriculture, Forestry and Fisheries
DEA	Department of Environmental Affairs
DFFE	Department of Environment, Forestry and Fisheries
DWS	Department of Water and Sanitation
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
ECO	Environmental Control Officer
EDTEA	Economic Development, Tourism and Environmental Affairs
EIA	Environmental Impact Assessment
EMF	Environmental Management Framework
EMPr	Environmental Management Programme
ESA	Ecological Support Area
GIS	Geographical Information System
NEM:BA	National Environmental Management: Biodiversity Act
NEMA	National Environmental Management Act
PA	Protected Area
POC	Potential of Occurrence
SABAP2	South African Bird Atlas Project 2
SANBI	South African National Biodiversity Institute
SCC	Species of conservation concern
ToPS	Threatened or Protected Species
ToR	Terms of Reference
TSCP	Terrestrial Systematic Conservation Plan

## GLOSSARY

Definitions	
<b>Alternative</b>	Alternatives can refer to any of the following but are not limited to: alternative sites for development, alternative projects for a particular site, alternative site layouts, alternative designs, alternative processes and alternative materials.
<b>Biodiversity</b>	The diversity of genes, species and ecosystems, and the ecological and evolutionary processes that maintain that diversity.
<b>Biodiversity offset</b>	Conservation measures designed to remedy the residual negative impacts of development on biodiversity and ecological infrastructure, once the first three levels of the mitigation hierarchy have been explicitly considered (i.e. to avoid, minimize and rehabilitate / restore impacts). Offsets are the last resort form of mitigation, only to be implemented if nothing else can mitigate the impact.
<b>Biodiversity priority areas</b>	Features in the landscape that are important for conserving a representative sample of ecosystems and species, for maintaining ecological processes, or for the provision of ecosystem services. These are identified using a systematic spatial biodiversity planning process and include the following categories: Protected Areas, Critically Endangered and Endangered ecosystems, Critical Biodiversity Areas, Ecological Support Areas, and Focus Areas for land-based Protected Area expansion.
<b>Category 1a Listed Invasive Species</b>	Species listed by notice in terms of section 70(1)(a) of the act, as a species that must be combatted or eradicated. These species are contained in Notice 3 of the AIS list, which is referred to as the National List of Invasive Species. Landowners are obliged to take immediate steps to control Category 1a species.
<b>Category 1b Listed Invasive Species</b>	Species listed by notice in terms of section 70(1)(a) of the act, as species that must be controlled or 'contained'. These species are contained in Notice 3 of the AIS list, which is referred to as the National List of Invasive Species. However, where an Invasive Species Management Programme has been developed for a

<b>Definitions</b>	
	Category 1b species, then landowners are obliged to “control” the species in accordance with the requirements of that programme.
<b>Category 2 Listed Invasive Species</b>	Species which require a permit to carry out a restricted activity e.g. cultivation within an area specified in the Notice or an area specified in the permit, as the case may be. Category 2 includes plant species that have economic, recreational, aesthetic or other valued properties, notwithstanding their invasiveness. It is important to note that a Category 2 species that falls outside the demarcated area specified in the permit, becomes a Category 1b invasive species. Permit-holders must take all the necessary steps to prevent the escape and spread of the species.
<b>Category 3 Listed Invasive Species</b>	A species listed by notice in terms of section 70(1)(a) of the act, as species which are subject to exemptions in terms of section 71(3) and prohibitions in terms of section 71A of the act, as specified in the notice. Category 3 species are less-transforming invasive species which are regulated by activity. The principal focus with these species is to ensure that they are not introduced, sold or transported. However, Category 3 plant species are automatically Category 1b species within riparian and wetland areas.
<b>CBA Maps</b>	A map of Critical Biodiversity Areas and Ecological Support Areas based on a systematic biodiversity plan.
<b>Connectivity</b>	The spatial continuity of a habitat or land cover type across a landscape.
<b>Corridor</b>	A relatively narrow strip of a particular type that differs from the areas adjacent on both sides.
<b>Critical Biodiversity Areas</b>	Areas required to meet biodiversity targets of representivity and persistence for ecosystems, species and ecological processes, determined by a systematic conservation plan. They may be terrestrial or aquatic, and are mostly in a good ecological state. These areas need to be maintained in a natural or near-natural state, and a loss or degradation must be avoided. If these areas were to be modified, biodiversity targets could not be met.
<b>Cumulative impact</b>	Past, current and reasonably foreseeable future impacts of an activity, considered together with the impact of the proposed activity, that in itself may not be significant, but may become significant when added to the existing and reasonably foreseeable impacts eventuating from similar or diverse activities.
<b>Ecological condition</b>	An assessment of the extent to which the composition, structure and function of an area or biodiversity feature has been modified from a reference condition of natural.
<b>Ecological infrastructure</b>	Naturally functioning ecosystems that generate or deliver valuable ecosystem services, e.g. mountain catchment areas, wetlands, and soils.
<b>Ecological process</b>	The functions and processes that operate to maintain and generate biodiversity.
<b>Ecological Support Areas</b>	An area that must be maintained in at least fair ecological condition in order to support the ecological functioning of a CBA or protected area, or to generate or deliver ecosystem services, or to meet remaining biodiversity targets for ecosystem types or species when it is not possible or necessary to meet them in natural or near natural areas. It is one of five broad categories on a CBA map, and a subset of biodiversity priority areas.
<b>Ecosystem resilience</b>	The ability of an ecosystem to maintain its functions (biological, chemical, and physical) in the face of disturbance or to recover from external pressures.
<b>Ecosystem threshold</b>	The tipping point where ongoing disturbance or change results in an irreversible change in its composition, structure and functioning. Surpassing ecosystem thresholds diminishes the quality and quantity of ecosystem services provided, rapidly reduces the ability of the ecosystem to sustain life, and results in less resilient ecosystems.
<b>Ecosystem services</b>	The benefits that people obtain from ecosystems, including provisioning services (such as food and water), regulating services (such as flood control), cultural services (such as recreational benefits), and supporting services (such as nutrient cycling, carbon storage) that maintain the conditions for life on Earth.
<b>Edge</b>	The portion of an ecosystem or cover type near its perimeter, and within which environmental conditions may differ from interior locations in the ecosystem.

<b>Definitions</b>	
<b>Endemic</b>	Restricted or exclusive to a particular geographic area and occurring nowhere else. Endemism refers to the occurrence of endemic species.
<b>Exempted Alien Species</b>	An alien species that is not regulated in terms of this statutory framework - as defined in Notice 2 of the AIS List.
<b>Forbs</b>	Herbaceous plants with soft leaves and non-woody stems.
<b>Fragmentation</b>	The breaking up of a habitat or cover type into smaller, disconnected parcels, often associated with, but not equivalent to, habitat loss.
<b>Geophyte</b>	Perennial plants having underground organs, such as bulbs, corms or tubers.
<b>Hotspot</b>	An area characterised by high levels of biodiversity and endemism, and that faces significant threats to that biodiversity.
<b>Habitat</b>	The area of an environment occupied by a species or group of species, due to the particular set of environmental conditions that prevail there.
<b>Habitat loss</b>	Conversion of natural habitat in an ecosystem to a land use or land cover class that results in irreversible change to the composition, structure and functional characteristics of the ecosystem concerned.
<b>Indigenous Vegetation</b>	Refers to vegetation consisting of indigenous plant species occurring naturally in an area, regardless of the level of alien infestation and where the topsoil has not been lawfully disturbed during the preceding ten years;
<b>Mitigate</b>	The implementation of practical measures to reduce adverse impacts or enhance beneficial impacts of an action.
<b>"No-Go" option</b>	The "no-go" development alternative option assumes the site remains in its current state, i.e. there is no construction of a WEF and associated infrastructure in the proposed project area.
<b>Patch</b>	A surface area that differs from its surroundings in nature or appearance.
<b>Prohibited Alien Species</b>	An alien species listed by notice by the Minister, in respect of which a permit may not be issued as contemplated in section 67(1) of the act. These species are contained in Notice 4 of the Alien Invasive Species List, which is referred to as the List of Prohibited Alien Species.
<b>Red List</b>	A publication that provides information on the conservation and threat status of species, based on scientific conservation assessments.
<b>Rehabilitation</b>	Less than full restoration of an ecosystem to its pre-disturbance condition.
<b>Restoration</b>	To return a site to an approximation of its condition before alteration.
<b>Riparian</b>	The land adjacent to a river or stream that is, at least periodically, influenced by flooding.
<b>Runoff</b>	Non-channelized surface water flow.
<b>Succulent</b>	Plants that have some parts that are more than normally thickened and fleshy, usually to retain water in arid climates or soil conditions.
<b>Species of special conservation concern</b>	Species that have particular ecological, economic or cultural significance, including but not limited to threatened species.
<b>Systematic biodiversity conservation planning</b>	Scientific methodology for determining areas of biodiversity importance involving: mapping biodiversity features (such as ecosystems, species, spatial components of ecological processes); mapping a range of information related to these biodiversity features and their condition (such as patterns of land and resource use, existing protected areas); setting quantitative targets for biodiversity features, analysing the information using GIS; and developing maps that show spatial biodiversity priorities. Systematic biodiversity planning is often called 'systematic conservation planning' in the scientific literature.
<b>Threatened ecosystems</b>	An ecosystem that has been classified as Critically Endangered, Endangered or Vulnerable, based on analysis of ecosystem threat status. A threatened ecosystem has lost, or is losing, vital aspects of its structure, composition or function. The Biodiversity Act makes provision for the Minister or Environmental Affairs, or a provincial MEC of Environmental Affairs, to publish a list of threatened ecosystems.
<b>Threatened species</b>	A species that has been classified as Critically Endangered, Endangered or Vulnerable, based on a conservation assessment using a standard set of criteria

<b>Definitions</b>	
	developed by the IUCN for determining the likelihood of a species becoming extinct. A threatened species faces a high risk of extinction in the near future.

**COMPLIANCE WITH TERRESTRIAL ECOLOGICAL PROTOCOLS AS PER GN. 320 OF 20 MARCH 2020**

<b>Reporting requirements of Terrestrial Biodiversity Specialist Assessments – GN. 320 of 20 March 2020 for Very High or High Site Sensitivity</b>	<b>Section of specialist report addressing requirement</b>
This report must include as a minimum the following information:	
contact details of the specialist, their SACNASP registration number, their field of expertise and a curriculum vitae;	<b>Appendix 7</b>
A signed statement of independence by the specialist;	<b>See Specialist Declaration on page vii and viii</b>
A statement on the duration, date and season of the site inspection and the relevance of the season to the outcome of the assessment;	<b>See Section 2: Site Visit and Sampling Methodology</b>
A description of the methodology used to undertake the site sensitivity verification, impact assessment and site inspection, including equipment and modelling used where relevant;	<b>Section 2, Section 3 and Section 4</b>
A description of the assumptions made and any uncertainties or gaps in knowledge or data as well as a statement of the timing and intensity of site inspection observations	<b>See Assumptions and Limitations</b>
A location of the areas not suitable for development, which are to be avoided during construction and operation (where relevant)	<b>Section 6.8</b>
Additional environmental impacts expected from the proposed development	<b>Section 7</b>
Any direct, indirect and cumulative impacts of the proposed development	<b>Section 7</b>
The degree to which impacts and risks can be mitigated	<b>Section 7</b>
The degree to which the impacts and risks can be reversed	<b>Section 7</b>
The degree to which the impacts and risks can cause loss of irreplaceable resources	<b>Section 7</b>
Proposed impact management actions and impact management outcomes proposed by the specialist for inclusion in the Environmental Management Programme (EMPr);	<b>Section 7</b>
A motivation must be provided if there were development footprints identified as per paragraph 2.3.6 above that were identified as having a “low” terrestrial biodiversity sensitivity and that were not considered appropriate	<b>Section 1</b>
A substantiated statement, based on the findings of the specialist assessment, regarding the acceptability, or not, of the proposed development, if it should receive approval or not; and	<b>Section 8 and 9</b>
Any conditions to which this statement is subjected.	<b>Section 8 and 9</b>

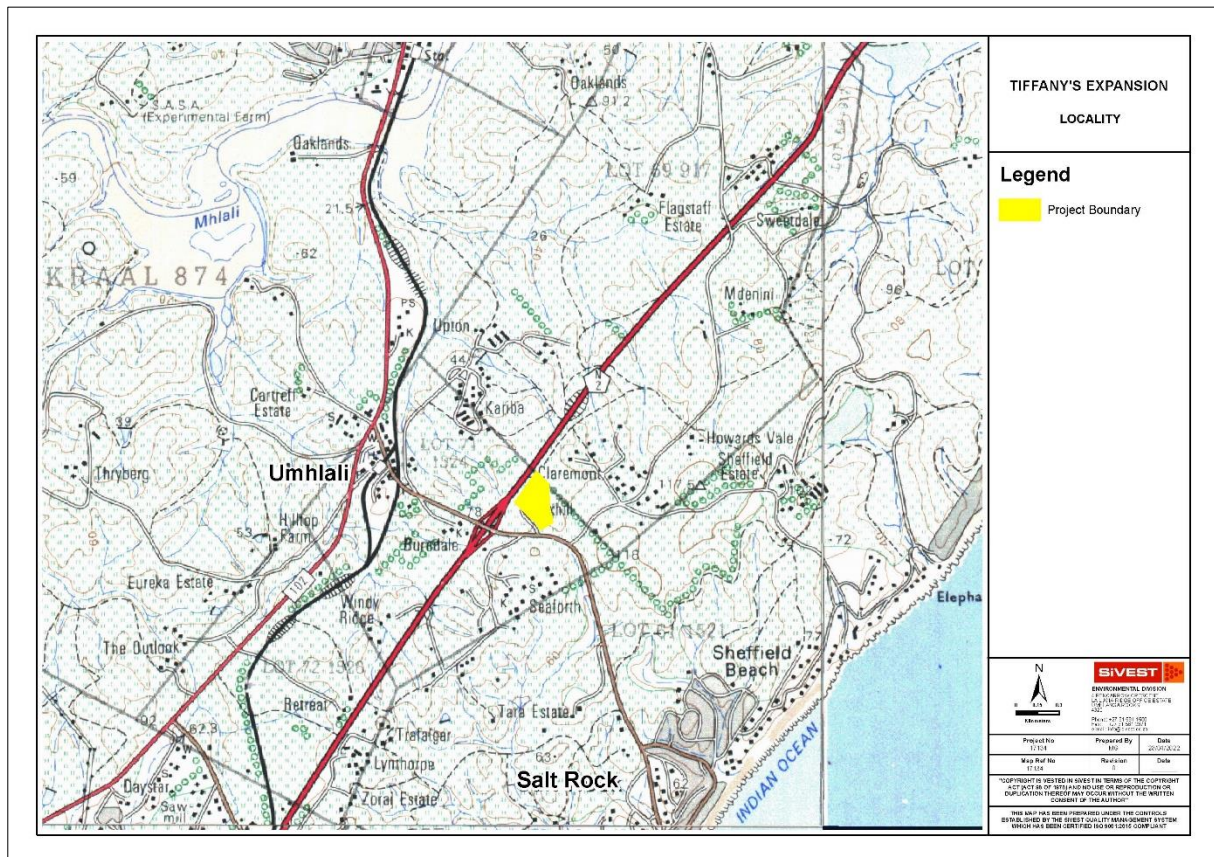
**COMPLIANCE WITH SPECIES SPECIFIC PROTOCOLS AS PER GN. 1150 OF 30 OCTOBER 2020**

<b>Requirements of Animal and Plant Species Protocol – GN. 1150 30 October 2020 for Very High or High Site Sensitivity</b>	<b>Section of specialist report addressing requirement</b>
This report must include as a minimum the following information:	
Contact details and relevant experience as well as the SACNASP registration number of the specialist preparing the assessment including a curriculum vitae;	<b>Appendix 7</b>

<b>Requirements of Animal and Plant Species Protocol – GN. 1150 30 October 2020 for Very High or High Site Sensitivity</b>	<b>Section of specialist report addressing requirement</b>
A signed statement of independence by the specialist;	<b>See Specialist Declaration on page vii and viii</b>
A statement on the duration, date and season of the site inspection and the relevance of the season to the outcome of the assessment;	<b>See Section 2: Site Visit and Sampling Methodology</b>
A description of the methodology used to undertake the site sensitivity verification, impact assessment and site inspection, including equipment and modelling used where relevant;	<b>Section 2, Section 3 and Section 4</b>
A description of the mean density of observations/number of sample sites per unit area and the site inspection observations;	<b>Section 6</b>
A description of the assumptions made and any uncertainties or gaps in knowledge or data;	<b>See Assumptions and Limitations</b>
Details of all SCC found or suspected to occur on site, ensuring sensitive species are appropriately reported;	<b>Section 5 and Section 6</b>
The online database name, hyperlink and record accession numbers for disseminated evidence of SCC found within the study area;	<b>Section 5</b>
The location of areas not suitable for development and to be avoided during construction where relevant;	<b>Section 6.8</b>
A discussion on the cumulative impacts;	<b>Section 7</b>
Impact management actions and impact management outcomes proposed by the specialist for inclusion in the Environmental Management Programme (EMPr);	<b>Section 7</b>
A reasoned opinion, based on the findings of the specialist assessment, regarding the acceptability or not of the development and if the development should receive approval or not, related to the specific theme being considered, and any conditions to which the opinion is subjected if relevant; and	<b>Section 8 and 9</b>
A motivation must be provided if there were any development footprints identified as per paragraph above that were identified as having “low” or “medium” terrestrial animal species sensitivity and were not considered appropriate.	<b>Section 1</b>

## 1. INTRODUCTION AND PROJECT BACKGROUND

SiVEST SA (Pty) Ltd, has been appointed by JDJ Properties to undertake a terrestrial biodiversity assessment for the proposed expansion of Tiffany's Spar. The proposed development entails the extension of the shopping complex in a north easterly direction towards an old farm house and property adjacent to the shopping centre. The project area is approximately 5.53 ha in extent and is located on a portion 158 of ERF1524. The site borders the N2 National Highway to the west.



**Figure 1: Regional context.**

Please note, although a site inspection showed site sensitivity to be medium to low, a full Terrestrial Impact Assessment was undertaken as species of conservation concern could potentially occur on site and because the Client had requested it to be undertaken; as per section 4.6 of the Plant / Animal Species Protocols of Government Notice No. 1150 of 30 October 2020, “Where SCC are found on site or have been confirmed to be likely present, a Terrestrial Plant / Animal Species Specialist Assessment must be submitted in accordance with the requirements specified for “very high” and “high” sensitivity in this protocol.”

The Terrestrial Ecological Report has assessed various aspects of the terrestrial ecology and provided recommendations. A similar report has been prepared for the aquatic ecosystems. In terms of the ecological assessment, fieldwork was focused on areas where disturbance was planned.

## 2. SITE VISIT AND SAMPLING METHODOLOGY

The site visit was undertaken on the 9<sup>th</sup> December 2021 by Mark Summers. Weather conditions were partly cloudy but warm with no rain and minimal wind. The study was undertaken in summer which falls into the optimal sampling season for vegetation and fauna.

## 2.1. Vegetation Sampling

A random vegetation sampling technique and “hotspot<sup>1</sup>” assessment technique was utilised, which focused the sampling effort on areas with natural vegetation or where the vegetation was dominated by indigenous species (i.e. not comprising a large proportion of alien invasive plant species). Individual plant species observed during the assessment were recorded to give an indication of species diversity and the overall species assemblage.

The sampling procedure proposed for this study is satisfactory for providing a general overview and rapid assessment of the plant diversity and assemblages that occur on site. This methodology allows sufficient information to be gathered to make the necessary inferences as to the ecological state of the receiving environment and to assess the possible impacts that may happen as a result of the proposed activities.

## 2.2. Faunal Sampling

The following methodology was used when sampling.

- Taxa specific lists were compiled with the use of databases such as the Animal Demographic Unit (ADU) Virtual Museum. These lists were compared with species seen on site visits.
- All site data was collated for the general area with a focus on the various alternatives presented, which gave an overall site assessment;
- Verification of fauna on site was done per taxa with a focus on movement, foraging, nesting and sites.
- Point count bird surveys, with a clear view of the surrounding vegetation, and walk through surveys were conducted in all of the habitat types around proposed development. Birds were identified visually or by their vocalisation.
- Active searches for reptiles and amphibians were conducted within habitats likely to harbour or be important for species. This included sifting through leaf litter, rolling over logs and stones and searching for burrows.

The sampling procedure proposed for this study is satisfactory for providing a general overview and rapid assessment of the faunal diversity and assemblages that occur on site. This methodology allows sufficient information to be gathered to make the necessary inferences as to the ecological state of the receiving environment and to assess the possible impacts that may be imparted as a result of the proposed activities as well as the provision for rehabilitation recommendations and landscape management plans.

## 3. REGULATIONS GOVERNING THIS REPORT & LEGISLATION

The following legislation was consulted:

- National Environmental Management Act, Act No. 107 of 1998 (NEMA);
- National Forests Act (Act No. 84 of 1998);
- Terrestrial Plant and Animal Species Protocols, Government Notice No. 1150 of 30 October 2020;
- Environment Conservation Act No. 73 of 1989, Amendment Notice No. R1183 of 1997;
- National Environmental Management: Biodiversity Act (Act No. 10 of 2004);
- Conservation of Agricultural Resources (Act No. 43 of 1983) as amended in 2001;

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<sup>1</sup> Hotspot in this context refers to areas in the landscape, such as rocky outcrops and wetlands that supply refugia to plant species that would otherwise not exist in said landscape due to disturbance.



### Permit / Licence requirements:

In terms of the National Forests Act, 1998 (Act No. 84 of 1998) and Government Notice 1339 of 6 August 1976 (promulgated under the Forest Act, 1984 (Act No. 122 of 1984) for protected tree species), the removal, relocation or pruning of any protected plants; or, 3 or more indigenous trees whose crowns are largely contiguous will require a Department of Agriculture, Fisheries and Forestry (DAFF) licence.

Protected indigenous plants in general are controlled under the relevant provincial Ordinances or Acts dealing with nature conservation. In KZN the relevant statute is the 1974 Provincial Nature Conservation Ordinance. In terms of this Ordinance, a permit must be obtained from Ezemvelo KZN Wildlife to remove or destroy any plants listed in the Ordinance.

For a full list of legislation requirements, please contact the Specialist.

## 4. DESKTOP ASSESSMENT

One of the major advantages that technology has provided is the access to information. As a result of this and the ongoing pursuance of environmental knowledge, databases which can be interrogated to provide general information regarding the site have been developed.

This information in turn potentially predicts what may occur on the site and the site's value from a regional / provincial perspective in terms of conservation and biodiversity.

The caveat here is that the majority of these databases are created at a **landscape level**. In addition, the factors which are often utilised to determine many of the outputs are related to abiotic characteristics, such as rainfall, temperature, soil types, underlying geology, elevation and aspect.

The result, therefore, is the development of a database that provides a high level assessment of the area, which still requires **substantial ground-truthing** to illustrate the various components that comprise the landscape. The field survey may highlight areas of conservation significance and biodiversity richness as well as provide information regarding the *status quo*; and any consequences or concerns may be generated as a result of development.

A number of databases have been interrogated in the process of undertaking the Desktop Analysis. A summary of the methodology utilised for the generation of each of the databases has been tabulated below, with the description of the table available in **Appendix 8**.

**Table 1: Databases Consulted in the Terrestrial Ecological Assessment**

Database
Ezemvelo KZN Wildlife C-Plan & Sea Database
• Irreplaceability Analysis
• Critical Biodiversity Areas
• Ecological Support Areas
• Landscape Corridors
• Local Corridors
South African National Biodiversity Institute: Plants of South Africa
South African National Biodiversity Institute: Threatened Ecosystems
Bio Resource Units (BRU)
Environmental Potential Atlas
Mucina and Rutherford National Vegetation Types
KwaZulu – Natal Vegetation Types (KZN VT)
National Freshwater Ecosystem Priority Areas (NFEPAs)
South African Bird Atlas Project 2
Animal Demographic Unit
• ReptileMAP
• FrogMAP
• MammalMAP
• LepiMAP

## 5. RESULTS OF THE DESKTOP ASSESSMENT

### 5.1. Department of Forestry, Fisheries and Environment Screening Tool

The following sensitivities were identified by the DFFE Online Screening Tool, and have been interrogated in the assessment below:

**Table 2: Environmental sensitivity themes**

Tiffany's Spar				
Theme	Very High Sensitivity	High Sensitivity	Medium Sensitivity	Low Sensitivity
Animal Species Theme		X		
Plant Species Theme			X	
Terrestrial Biodiversity Theme	X			

**Table 3: DFFE sensitivities potentially occurring on site.**

Animal	Plant	Terrestrial Biodiversity
Amphibia- <i>Hyperolius pickersgilli</i>	<i>Aspalathus gerrardii</i>	Vulnerable Ecosystem
Aves- <i>Geokichla guttata</i>	<i>Tephrosia inandensis</i>	
Aves- <i>Circus ranivorus</i>	<i>Thesium polygaloides</i>	
Invertebrate- <i>Arytropteris basalis</i>	<i>Fimbristylis aphylla</i>	
Invertebrate- <i>Pomatonota dregii</i>	<i>Oxygonum dregeanum subsp. streyi</i>	
Invertebrate- <i>Phymeurus illepidus</i>	<i>Pavonia dregei</i>	
Mammalia- <i>Chrysospalax villosus</i>	Sensitive species 649	
Mammalia- <i>Dendrohyrax arboreus</i>	Sensitive species 1221	
Sensitive species 7	<i>Disperis woodii</i>	
	<i>Senecio dregeanus</i>	
	Sensitive species 191	

### 5.2. Desktop vegetation description

#### 5.2.1. C-Plan Biodiversity Features / Species within Project Area

The desktop analysis indicated that the highest classification of site is 0 (i.e. Where a planning unit has an irreplaceability value of 0, all biodiversity features recorded here are conserved to the target amount, and there is unlikely to be a biodiversity concern with the development of the site (see **Figure 2** and **Appendix 8**), and the Minset analysis mirrors the C-Plan. No CBA Optimal or Irriplaceable areas intersect the site.

In terms of the SEA and C-Plan data generated, through the physical characteristics that are present on site, a number of groups have been identified as potentially present on the site, and these groups are wholly significant in terms of conservation significance or parts thereof. In terms of C-Plan, no key groups were identified in site, however the TSCP Minest database (**Table 4**) identifies species which may be significant to the site.

**Table 4: Features listed in the KwaZulu-Natal Conservation Plan database (TSCP Minset).**

Taxon	Common Name	Scientific Name	Comment
Mollusc	Unknown	<i>Euonyma lymneaeformis</i>	No information available
Mollusc		<i>Edouardia conulus</i>	No information available
Mollusc	Jigsaw-piece hunter snail	<i>Gulella separata</i>	No information available
Millipede	Sickle-shaped black millipede	<i>Doratogonus falcatus</i>	No information available
Millipede	Visible keeled millipede	<i>Gnomeskelus spectabilis</i>	No information available

Taxon	Common Name	Scientific Name	Comment
Millipede	Cristulate black millipede	<i>Doratogonus cristulatus</i>	Eggs laid in thick vegetation, in soil or rotting logs or in cattle dung. Adults in leaf litter, under rocks or logs, or top 50cm of soil, in cool, wet weather often seen on soil / vegetation. Habitat potentially present
Millipede	Natal Black Millipede	<i>Doratogonus natalensis</i>	Population densities are likely to be low based on unquantified sampling in Ngoye and the Karkloof, which produced small numbers of specimens. The known forest sites of the species are widely separated, making a genetic exchange between the sites highly unlikely. With the exception of Ngoye, each forest is restricted to an area of less than 10 km <sup>2</sup> and the forested area of Karkloof is itself fragmented
Millipede	Wandering Black Millipede	<i>Doratogonus peregrinus</i>	No information available
Plant		<i>Vernonia africana</i>	Extinct. Last collected in 1895. Its coastal habitat is almost entirely transformed by agriculture and urban development. Exhaustive searches of the few remaining degraded grassland fragments in the area failed to relocate any individuals.
Plant		<i>Barleria natalensis</i>	Extinct. Known from type, last collected in 1890. The type locality and surrounds have been completely transformed to commercial sugarcane cultivation. It has not been found again at the type locality or elsewhere and is presumed to be extinct.

#### 5.2.2. SANBI Plants of Southern Africa (POSA)

The POSA database was queried for a species list for the project site and surrounding areas. The output shows all plants that have been collected and recorded at specific locations throughout Southern Africa, with an estimated 111 plant species in the general area of Salt Rock and Ballito. The entire list, inclusive of the site-specific list can be found in **Appendix 1**.

The most common families on the POSA list are as follows:

- Asteraceae – 11 species with 4 species being indigenous
- Cyperaceae – 8 species, all indigenous
- Fabaceae – 12 species with 8 indigenous
- Poaceae – 9 species with 8 indigenous

#### 5.2.3. Bio Resource Units (BRU)

The Bioresource unit for the site is as follows:

##### Ya14 – North Coast

Bioresource Group 1: "Moist Coast Forest, Thorn and Palm Veld".

**Vegetation pattern:** The vegetation consists of bushed grassland and bushland thicket.

**Indicator Species:** *Syzygium cordatum* (Water Berry), *Strelitzia nicolae* (Natal Wild Banana).

The rainfall average is 973 mm per annum. The mean temperature is 20.5°C and the climate rating is C1, local climate is favourable for good yields for a wide range of adapted crops throughout the year. The erosion rating for the site is 4.0, which translates to a high erosion risk.

There are nine perennial rivers, including the Mloti, Mgeni, Mhlali, Mvoti, Nonoti, Ohlanga, Tongati and Tugela River. There is also one non-perennial river.

#### 5.2.4. Environmental Potential Atlas

The ENPAT data provides the following information about the geology for the site:

The geology of the site consists of the following:

- Red dune cordon sand of the Berea Formation (**Figure 3**)

The ENPAT data provides the following information about the soils for the site:

- Red-yellow apedal, freely drained soils; red, dystrophic and / or mesotrophic (**Figure 4**).  
5.2.5. *Mucina and Rutherford's Vegetation and VegMap 2018*

One vegetation type is predicted to occur on site by Mucina and Rutherford (2006) and VegMap 2018 (CB3). In this case Mucina and Rutherford (2006) and VegMap 2018 is the same. Please refer to **Figure 5**.

### **CB 3 KwaZulu-Natal Coastal Belt**

**Distribution** KwaZulu-Natal Province: Long and in places broad coastal strip along the KwaZulu-Natal coast, from near Mtunzini in the north, via Durban to Margate and just short of Port Edward in the south. Altitude ranges from about 20 – 450 m.

**Vegetation & Landscape Features** Highly dissected undulating coastal plains which presumably used to be covered to a great extent with various types of subtropical coastal forest (the remnants of one of which are described in chapter 12 as Northern Coastal Forest). Some primary grassland dominated by *Themeda triandra* still occurs in hilly, high-rainfall areas where pressure from natural fire and grazing regimes prevailed. At present the KwaZulu-Natal Coastal Belt is affected by an intricate mosaic of very extensive sugarcane fields, timber plantations and coastal holiday resorts, with interspersed secondary *Aristida* grasslands, thickets and patches of coastal thornveld.

**Important Taxa** Graminoides: *Aristida junciformis* subsp. *galpinii* (d), *Digitaria eriantha* (d), *Panicum maximum* (d), *Themeda triandra* (d), *Alloteropsis semialata* subsp. *eckloniana*, *Cymbopogon caesius*, *C. nardus*, *Eragrostis curvula*, *Eulalia villosa*, *Hyparrhenia filipendula*, *Melinis repens*. Herbs: *Berkheya speciosa* subsp. *speciosa* (d), *Cyanotis speciosa* (d), *Senecio glaberrimus* (d), *Alepidea longifolia*, *Centella glabrata*, *Cephalaria oblongifolia* *Chamaecrista mimosoides*, *Conostomium natalense*, *Crotalaria lanceolata*, *Dissotis canescens*, *Eriosema squarrosus*, *Gerbera ambigua*, *Hebenstretia comosa*, *Helichrysum cymosum* subsp. *cymosum*, *H. pallidum*, *Hibiscus pedunculatus*, *Hybanthus capensis*, *Indigofera hiliaris*, *Pentanisia prunelloides* subsp. *latifolia*, *Senecio albanensis*, *S. bupleuroides* *S. coronatus*, *S. rhyncholaenus*, *Sisyranthus imberbis*, *Stachys aethiopica*, *S. nigricans*, *Vernonia galpinii*, *V. oligocephala*. Geophytic Herb: *Bulbine asphodeloides*, *Dlsa polygonoides*, *Hypoxis filiformis*, *Ledebouria floribunda floribunda*, *Pachycarpus asperifolius*, *Schizocarpus nervosus*, *Tritonia disticha*. Low Shrubs: *Clutia pukchella*, *Gnidia kraussiana*, *Phyllanthus glaucophyllus*, *Tephrosia polystachya*. Woody Climbers: *Abrus laevigatus*, *Asparagus racemosus*, *Smilax anceps*. Small Trees & Tall Shrubs: *Bridelia micrantha* (d), *Phoenix reclinata* (d), *Syzygium cordatum* (d), *Acacia natalitia*, *Albizia adianthifolia*, *Antidesma venosum*.

**Biogeographically Important Taxa** (Coastal belt element, Southern distribution limit) Graminoides: *Cyperus natalensis*, *Eragrostis lappula*. Herbs: *Helichrysum longifolium*, *Selago tarachodes*, *Senecio dregeanus*, *Sphenostylis angustifolia*. Geophytic Herbs: *Kniphofia gracilis*, *K. littoralis*, *K. rooperi*, *Pachystigma venosum*, *Zeuxine Africana*. Low Shrubs: *Helichrysum kraussii* (d), *Agathisanthemum bojeri*, *Desmodium dregeanum*. Megaherb: *Strelitzia Nicolai* (d). Geoxylic Suffrutices: *Ancylobotrys petersiana*, *Eugenia albanensis*, *Salacia kraussii*. Small Trees & Tall Shrubs: *Anastrabe integerrima* (d), *Acacia nilotica* subsp. *kraussiana*.

**Endemic Taxon** Herb: *Vernonia Africana* (extinct). Geophytic Herb: *Kniphofia pauciflora*. Low Shrub: *Barleria natalensis* (extinct).

**Conservation** Endangered. Target 25%. Only very small part statutorily conserved in Ngoye, Mbumbazi and Vernon Crookes Nature Reserves. About 50% transformed for cultivation, by urban sprawl and for road-building. Aliens include *Chromolaena odorata*, *Lantana camara*, *Melia azedarach* and *Solanum mauritianum*. Erosion is low and moderate.

#### 5.2.6. SANBI Threatened Ecosystems

No SANBI Threatened Ecosystems, or Protected Areas Expansion Strategy areas are found on site.

#### *5.2.7. Protected Areas.*

There are no protected areas within 5km of the site.

#### *5.2.8. National Freshwater Ecosystem Priority Areas (NFEPA) - SAIIE*

No wetlands or rivers are intersected by the site boundary.

#### *5.2.9. Kwadukuza Biodiversity and Open Space Management Plan (BOSMaP)*

The Kwadukuza BOSMaP was queried to identify the planning sector in which Tiffany's expansion falls within. The output of BOSMaP shows that the site falls within an area noted as "soft transformation," which means that the site has experienced transformation of its original habitat to being one of agriculture. This conflicts with the conventional modification (land transformation) layer as per **Figure 6**, and **Section 5.4**, which shows that the land was used for sugar cane farming and the associated farm house.

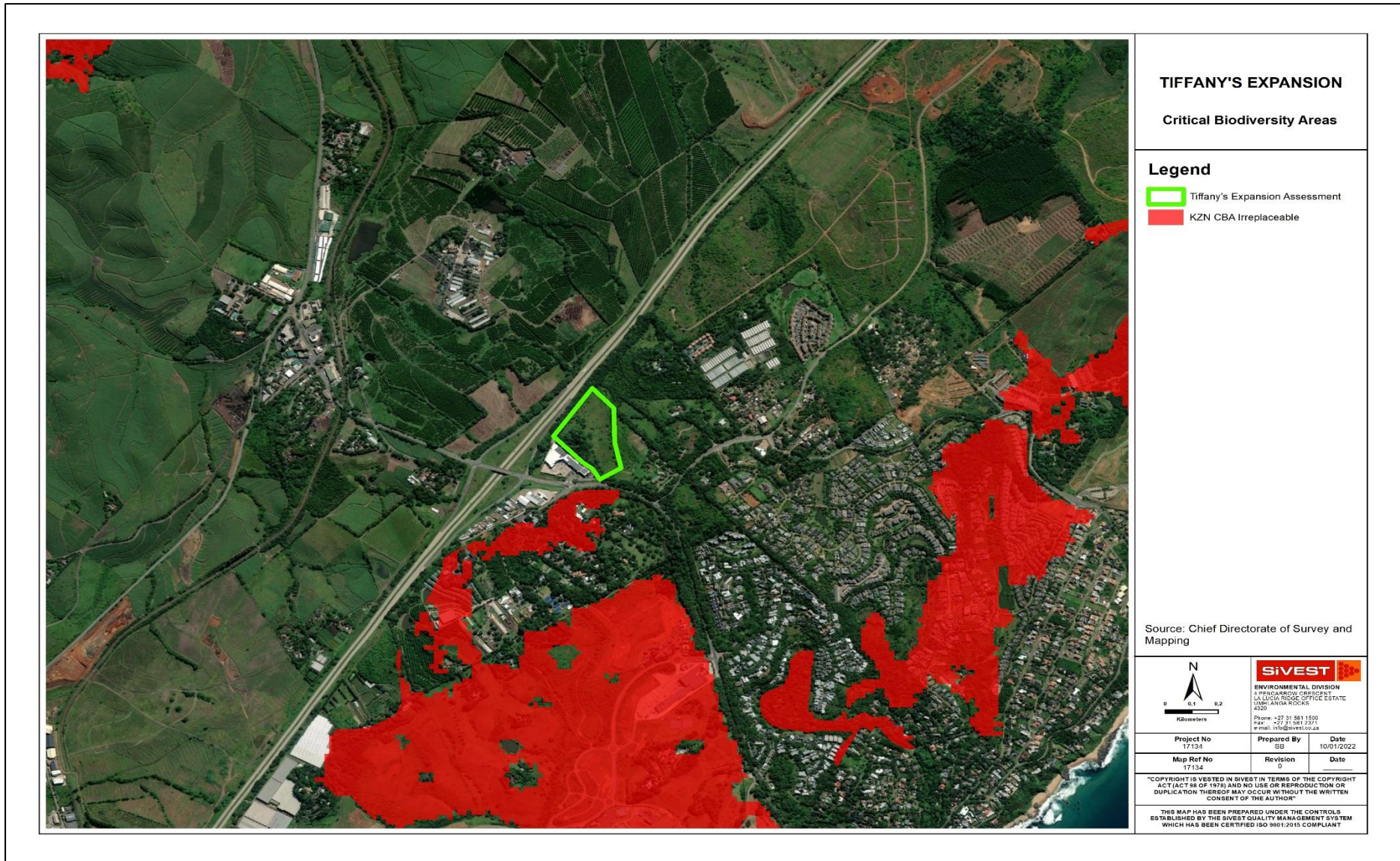
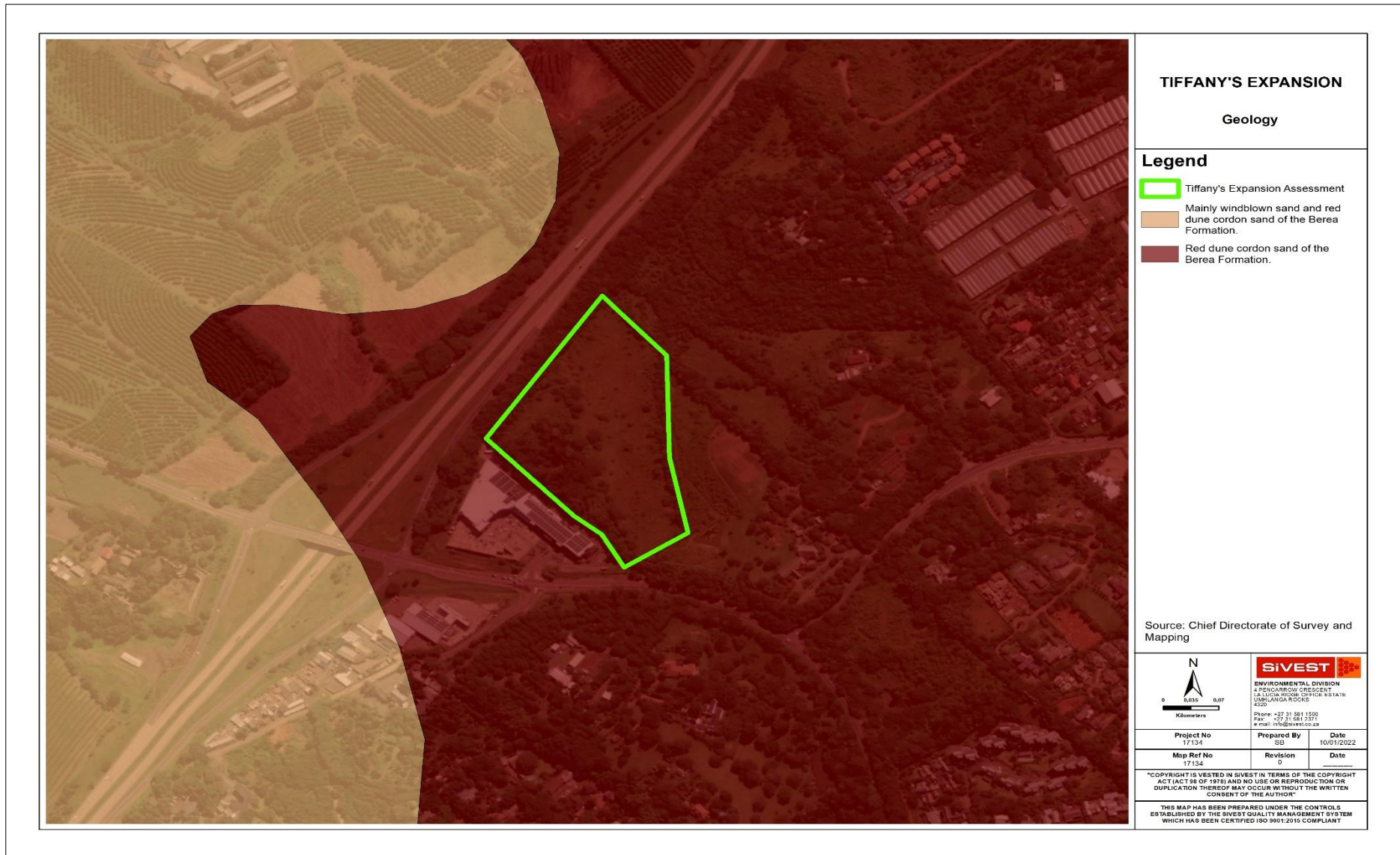
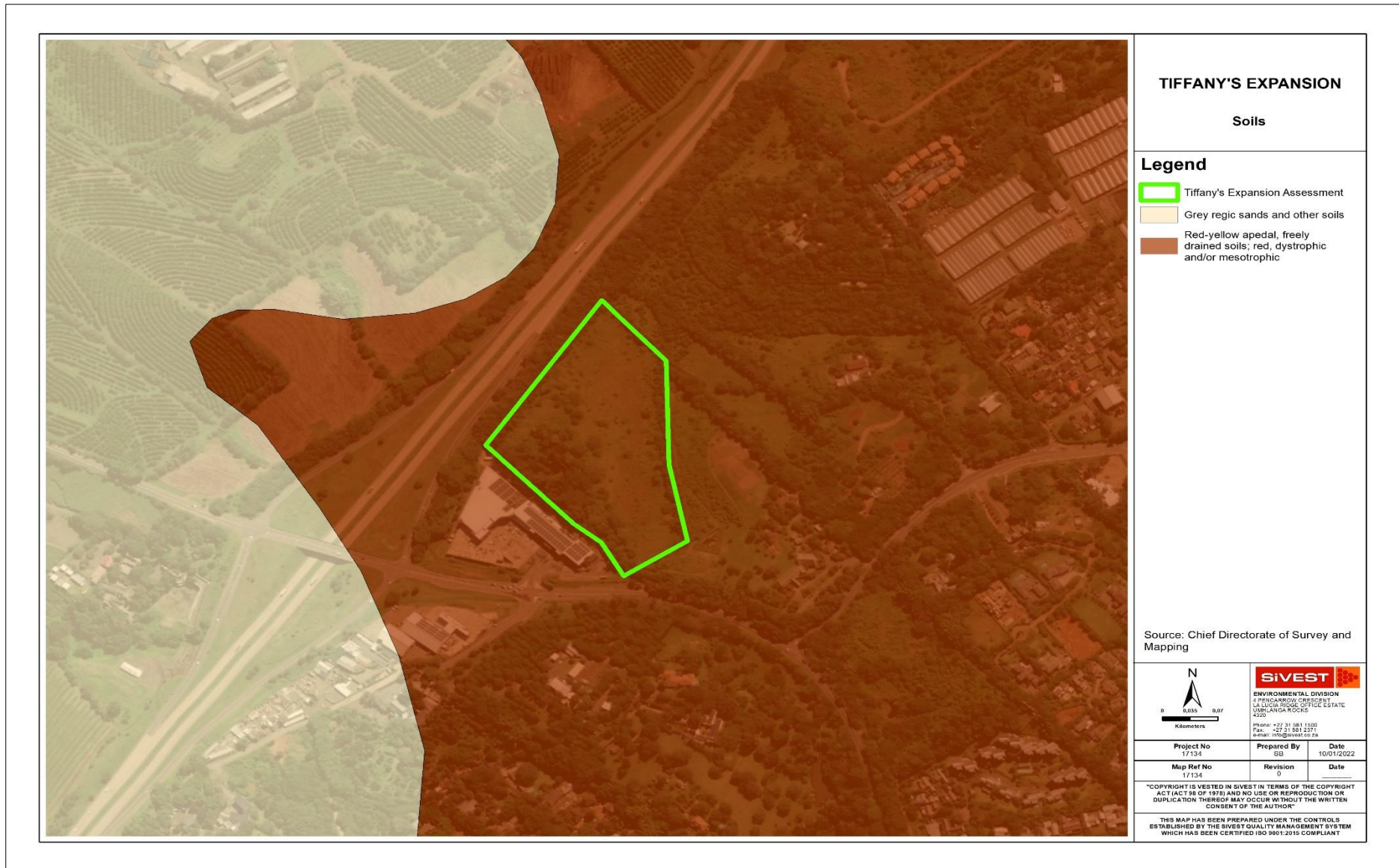


Figure 2: CBA mapping of the general site area.



**Figure 3: Geology Map**

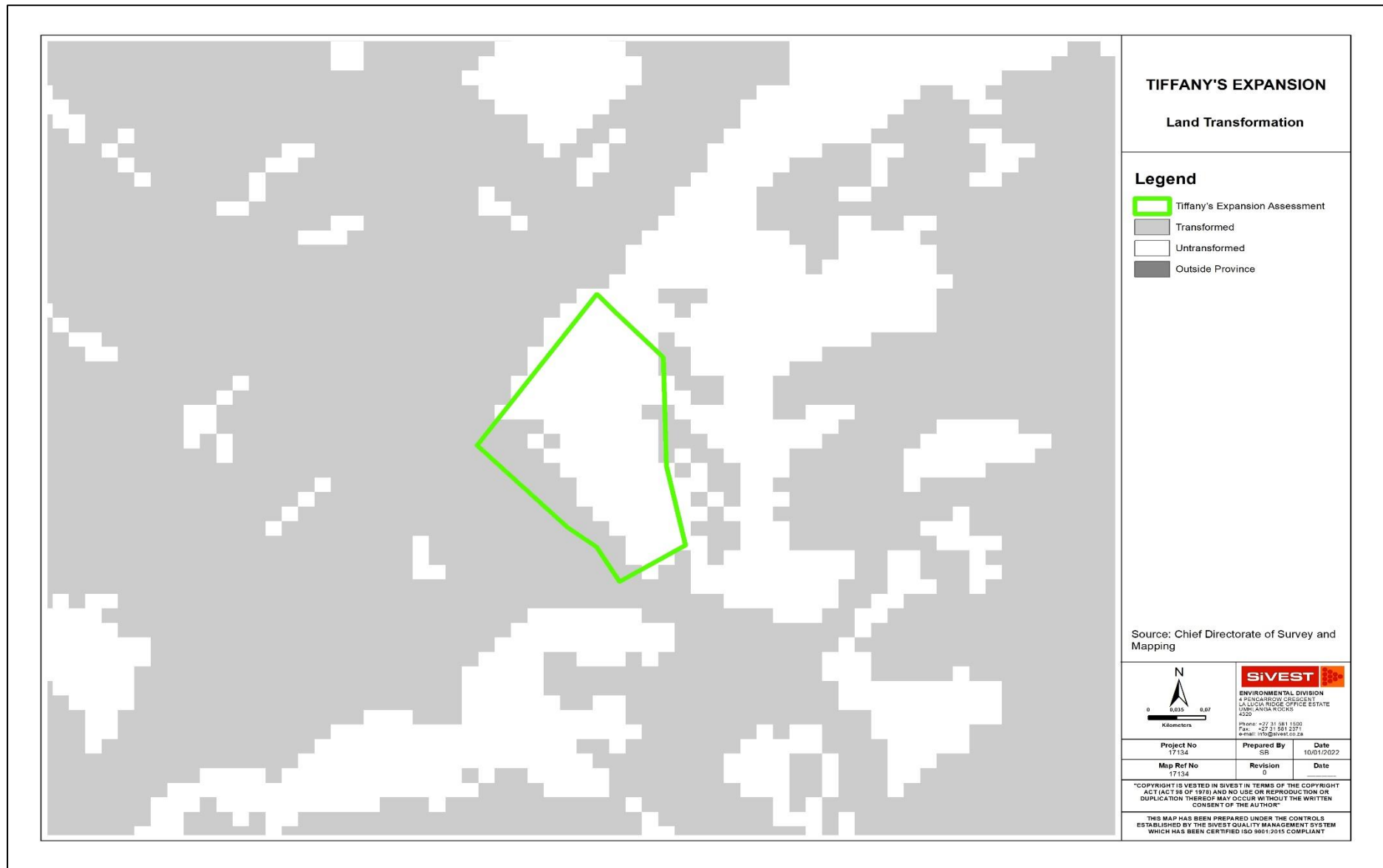


**Figure 4: Soils Map**





**Figure 5: VegMap 2018 vegetation types.**



**Figure 6: Land transformation.**

### 5.3. Desktop faunal description

The Virtual Museum databases allow for the rapid assessment of species which are predicted to occur in an area. These databases are compiled using verified citizen science observations, as well as correlating species and their habitat requirements and assigning the result to a habitat type. This results in species predicted for an area. These databases are continually updated and verified by the Animal Demographic Unit at the Fitzpatrick Institute of African Ornithology, University of Cape Town. This may often result in a wide paucity in data as no previous observations have been made in an area, resulting in no predicted data for that species in that area. This means that verification of faunal data is essential in filling in gaps that may occur at desktop level. Desktop data for the area around.

#### 5.3.1. Critically Biodiverse Areas

Critical Biodiversity Areas (CBAs) can be divided into two subcategories, namely *Irreplaceable* and *Optimal*. Each of these can in turn be subdivided into additional subcategories. The CBA categories are based on the optimised outputs derived using systematic conservation planning software, with the Planning Units (PU) identified representing the localities for which the conservation targets for one or more of the biodiversity features contained within can be achieved.

See Section 5.2.1 for a description of the CBA within the study site.

#### 5.3.2. South African Bird Atlas Project 2

The South African Bird Atlas Project 2 (SABAP 2) Database was queried to determine which bird species have been recorded within the greater study area. Please note that the data represents a minimum presence ratio, which indicates species that have been recorded in the area. This does not mean that other species do not occur in the pentad. Further to this, a good guideline to use for an accurate estimate of minimum presence ratio, is if more than 7-10 cards have been submitted for a pentad. Pentad 2925\_3110 has had 449 cards submitted (above the accurate estimate of minimum presence ratio), which will give a high degree of confidence of species predicted to occur on site.

The complete list includes 295 species as listed in **Appendix 2**. Conservation status is given for Red Data Species on a Regional Basis as per the 2015 Eskom Red Data Book of Birds of South Africa (Taylor, 2015), where 16 potential Red Data species occur in the study area (**Table 5**). No Red Data species were identified during the assessment.

**Table 5: Red Data avifaunal species predicted to occur on site (LC = Least Concerned, NT = Near Threatened, VU = Vulnerable, EN = Endangered, FP = Full Protocol, FPn = Full Protocol number).**

Scientific Name	Common Name	Red List Status (Regional, Global)	Average of fp	Average of fpn	Max of fp_last
<i>Balearica regulorum</i>	Grey Crowned Crane	EN, EN	1.1136	5	07/10/2021
<i>Geokichla guttata</i>	Spotted Ground Thrush	EN, EN	1.3363	6	13/06/2020
<i>Circus ranivorus</i>	African Marsh Harrier	EN, LC	0.4454	2	30/10/2014
<i>Buteo trizonatus</i>	Forest Buzzard	LC, NT	0.2227	1	21/12/2013
<i>Calidris ferruginea</i>	Curlew Sandpiper	LC, NT	0.2227	1	23/12/2013
<i>Rostratula benghalensis</i>	Greater Painted-snipe	NT, LC	0.2227	1	11/11/2017
<i>Coracias garrulus</i>	European Roller	NT, LC	0.6682	3	23/12/2013
<i>Morus capensis</i>	Cape Gannet	VU, EN	0.4454	2	18/07/2020
<i>Falco biarmicus</i>	Lanner Falcon	VU, LC	1.3363	6	30/12/2019
<i>Podica senegalensis</i>	African Finfoot	VU, LC	0.2227	1	25/12/2015
<i>Nettapus auritus</i>	African Pygmy Goose	VU, LC	2.0045	9	16/01/2022
<i>Microparra capensis</i>	Lesser Jacana	VU, LC	0.2227	1	25/12/2015
<i>Pelecanus onocrotalus</i>	Great White Pelican	VU, LC	0.4454	2	20/02/2020
<i>Sterna caspia</i>	Caspian Tern	VU, LC	0.4454	2	30/03/2014

<i>Stephanoaetus coronatus</i>	Crowned Eagle	VU, NT	4.4543	20	07/12/2021
<i>Geronticus calvus</i>	Southern Bald Ibis	VU, VU	1.1136	5	07/10/2021
<i>Anas hybrid</i>	Hybrid Mallard	Exotic	0.6682	3	02/10/2017

### 5.3.3. Important Bird Areas

There are no important bird areas within 10km of site.

### 5.3.4. ReptileMAP

The Animal Demographic Unit's (ADU) ReptileMAP lists 28 reptile species that occur within the greater study area. These are listed in **Appendix 3**, with two species seen during the assessment, and three species of conservation concern potentially occur within the study area (**Table 6**).

**Table 6: Red List Reptile species predicted to occur within the study area.**

Scientific name	Common name	Red list category	Number of records	Last recorded
<i>Chamaesaura macrolepis</i>	Large-scaled Grass Lizard	Near Threatened (SARCA 2014)	1	16/03/1986
<i>Macrelaps microlepidotus</i>	Natal Black Snake	Near Threatened (SARCA 2014)	1	15/06/1900
<i>Dendroaspis angusticeps</i>	Green Mamba	Vulnerable (SARCA 2014)	1	15/06/1900

### 5.3.5. FrogMAP

The ADU's FrogMAP lists 20 species of amphibians that occur within the greater study area. The full list of amphibians predicted to be within the study area can be found in **Appendix 4**. No species were seen during the assessment, and no species of conservation concern were predicted to occur.

### 5.3.6. MammalMAP

The ADU's MammalMAP predicts that 10 species of mammal occur within the study area (full list in **Appendix 5**). No species were seen on site, with two species of conservation concern predicted to occur on site (**Table 7**).

**Table 7: Red List Mammal species predicted to occur within the study area.**

Scientific name	Common name	Red list category	Number of records	Last recorded
<i>Cephalophus natalensis</i>	Red Duiker	Near Threatened (2016)	1	22/09/2019
<i>Philantomba monticola</i>	Blue Duiker	Vulnerable (2016)	1	29/05/2012

### 5.3.7. LepiMAP

According to the ADU's LepiMAP, 78 species of butterflies and moths have been recorded within the greater study area (full list in **Appendix 6**). Two species were seen during the assessment, with no species of conservation concern predicted to occur.

### 5.3.8. Faunal Probability of Occurrence

#### Fauna POC Assessment Summary

The potential occurrence of fauna of conservation significance for the study area were highlighted at a desktop level by investigating the following:

- 1) Biodiversity features for the study area highlighted in the Provincial Terrestrial Systematic Conservation Plan or CPLAN (EKZNW, 2010);
- 2) Species records found in the South African Bird Atlas Project 2 (SABAP2) database;

- 3) Species intersected with the DFFE Screening Tool;
- 4) Available species records (ADU, 2020); and
- 5) Professional experience regarding rare/threatened amphibian species, reptiles and small mammals and their habitat requirements in KZN.

The findings of the desktop faunal potential of occurrence (POC) assessment have been summarised in terms of potential mammals, avifauna (birds), amphibians, reptiles and invertebrates of conservation concern (i.e. Red-Dated Listed Species: CR: Critically Endangered, EN: Endangered, VU: Vulnerable, NT: Near Threatened). Note that species of Least Concern (LC), endemic species and species with restricted ranges have been excluded from the assessment, with the focus being on Red-Data Listed (threatened) species (**Table 8**).

**Table 8: Faunal probability of occurrence.**

Group	Scientific Name	Common Name	Threat Status (regional, global)	Habitat Requirements / Preferences (IUCN, 2017)	Requirements Met	POC
Avifauna	<i>Balearica regulorum</i>	Grey Crowned Crane	EN, EN	Wetlands such as marshes, pans and dams with tall emergent vegetation, riverbanks, open riverine woodland, shallowly flooded plains and temporary pools with adjacent grasslands, open savannas, croplands, pastures, fallow fields and irrigated areas	Yes - secondary grassland present	Potentially likely to forage on site
	<i>Geokichla guttata</i>	Spotted Ground-thrush	EN, EN	Forests and shrubland with tall and total canopy cover resulting in partially open understory	No - thick understory infested with IAP	Unlikely
	<i>Circus ranivorus</i>	African Marsh Harrier	EN, LC	The species breeds in wetlands, foraging primarily over reeds and lake margins	No - floodplain / waterbodies not present	Unlikely
	<i>Buteo trizonatus</i>	Forest Buzzard	LC, NT	This species inhabits native temperate forests from sea level up to 1,000 m. It can also be found in plantations, though usually near to areas of native forest	Yes - Secondary forest edge present	Potentially likely to forage on site
	<i>Calidris ferruginea</i>	Curlew Sandpiper	LC, NT	It shows a preference for open grassland with marshy, boggy depressions and pools.	No - habitat not present	Unlikely
	<i>Rostratula benghalensis</i>	Greater Painted-snipe	NT, LC	Species shows a preference for recently flooded areas in shallow lowland freshwater temporary or permanent wetlands	No - habitat not present on site	Unlikely
	<i>Coracias garrulus</i>	European Roller	NT, LC	Open woodlands, perching on open dead branches, on telephone poles and powerlines	Yes - habitat present	Potentially likely
	<i>Morus capensis</i>	Cape Gannet	VU, EN	Marine, intertidal, marine coastal	No - inland of ocean	Unlikely
	<i>Falco biarmicus</i>	Lanner Falcon	VU, LC	Forest, Savanna, Shrubland, Grassland, Rocky areas (eg. inland cliffs, mountain peaks), Desert, Artificial/Terrestrial	Yes - Secondary forest and grassland surrounded by artificial environment.	Likely - flying or hunting over the area
	<i>Podica senegalensis</i>	African Finfoot	VU, LC	Occurs in forest and wooded savanna along permanent streams, along secluded thickly wooded rivers, on the edges of pools, lakes and dams with well-vegetated banks	No - habitat not present	Unlikely
	<i>Nettapus auritus</i>	African Pygmy Goose	VU, LC	Species inhabits permanent or temporary marshes, inland deltas, shallow lakes, flood-plains, slow-flowing rivers and occasionally coastal lagoons. Preference for deep clear waters abundant emergent and aquatic vegetation, especially water-lilies (Nymphaea spp.).	No - habitat not present	Unlikely
	<i>Microparra capensis</i>	Lesser Jacana	VU, LC	Species shows a preference for shallow water around the edges of permanent and seasonally flooded wetlands, with areas of sparse sedge (Rhynchospora, Elyocharis, Cyperus and Juncus spp.), aquatic grasses (Leersia and Hemarthria spp.) and stands of floating vegetation such as water-lilies (Nymphaea and Nymphaoides spp.)	No - habitat not present	Unlikely
	<i>Pelecanus onocrotalus</i>	Great White Pelican	VU, LC	Inland waters, marine intertidal.	No - habitat not present	Unlikely
	<i>Sterna caspia</i>	Caspian Tern	VU, LC	Wetlands (inland), Marine Neritic, Marine Intertidal, Marine Coastal/Supratidal, Artificial/Aquatic & Marine	No - habitat not present	Unlikely
	<i>Stephanoaetus coronatus</i>	Crowned Eagle	VU, NT	It inhabits forest, woodland, savanna and shrubland, as well as some modified habitats, such as plantations and secondary growth, and can persist in small forest fragments including urban greenspace forests	Yes - habitat present in the general area and site	Likely - last recorded sighting in December 2021 in pentad
<i>Geronticus calvus</i>	Southern Bald Ibis	VU, VU	High rainfall (>700 mm p.a.), sour and alpine grasslands, characterised by an absence of trees and a short, dense grass sward. It also occurs in lightly wooded and relatively arid country. It has high nesting success on safe, undisturbed cliffs.	Yes - secondary grassland present	Potentially likely, last recorded in October 2021 in pentad	
Mammals	<i>Cephalophus natalensis</i>	Red Duiker	Near Threatened (2016)	Inhabits evergreen forest, tropical/subtropical forest patches, coastal scrub, and riverine thickets.	No - habitat not present	May potentially be a transient species
	<i>Philantomba monticola</i>	Blue Duiker	Vulnerable	Forest, riverine forest and plantation	No - habitat not present	May potentially be a transient species
Reptiles	<i>Chamaesaura macrolepis</i>	Large-scaled Grass Lizard	Near Threatened (SARCA 2014)	Occurs in the savanna, Indian Ocean Coastal Belt and Grassland Biomes in dry, open, sandy grasslands near the coast and on the Lebombo Mountains	Yes, sandy soils present	Potentially likely, however no recent recordings
	<i>Macrelaps microlepidotus</i>	Natal Black Snake	Near Threatened (SARCA 2014)	A semi-fossorial species with an affinity for forests, where it tends to frequent moist leaf litter and humic soil. In coastal bush, it is associated with damp localities near water.	No - no moist soils on site	Potentially occurring in drainage line from Umgeni Valley
	<i>Dendroaspis angusticeps</i>	Green Mamba	Vulnerable (SARCA 2014)	Inhabits coastal bush and forest, moist savanna and evergreen hill forest, and in agricultural areas including coconut and cashew plantations	Yes - habitat present	Potentially likely, specimen identified in Ballito on iNaturalist
Invertebrates	<i>Euonyma lymnaeaeformis</i>	Unknown	No information	No information	No information	No information
	<i>Edouardia conulus</i>	Unknown	No information	No information	No information	No information
	<i>Gulella separata</i>	Jigsaw-piece hunter snail	KZN Endemic	No information	No information	No information
	<i>Doratogonus falcatus</i>	Sickle-shaped black millipede	Least Concern	No information	No information	No information
	<i>Gnomeskulus spectabilis</i>	Visible keeled millipede	No information	No information	No information	No information
	<i>Doratogonus cristulatus</i>	Cristulate black millipede	KZN Endemic	Eggs laid in thick vegetation, in soil or rotting logs or in cattle dung. Adults in leaf litter, under rocks or logs, or top 50cm of soil, in cool, wet weather often seen on soil / vegetation.	Yes - habitat present	Unlikely based on limited identification of species in area
	<i>Doratogonus natalensis</i>	Natal Black Millipede	Vulnerable / KZN Endemic	Population densities are likely to be low based on unquantified sampling in Ngoye and the Karkloof, which produced small numbers of specimens. The known forest sites of the species are widely separated, making a genetic exchange between the sites highly unlikely. With the exception of Ngoye, each forest is restricted to an area of less than 10 km <sup>2</sup> and the forested area of Karkloof is itself fragmented	No - range limits exceeded	Unlikely based on limited range
	<i>Doratogonus peregrinus</i>	Wandering Black Millipede	Not evaluated	No information	No information	No information

#### 5.4. Historical Imagery of the site.

Historical imagery was sourced for the Tiffany's Expansion from the National Geospatial Information Portal (2022), with photos available from 1970, 1977, 1997 and 2005. The imagery shows that the general area has been used for agricultural activities, particularly sugar cane farming from as early as 1970. The farmhouse was also visible in the earlier photo's however demolition of the farmhouse appears to have occurred between 2011 and 2012. Therefore, historical disturbance has been in existence for many years. Further to note is the existence of ornamental plants at the old farmhouse, of which some of these species have persisted.



**Figure 7: Aerial imagery from 1970 with the site circled in red.**



**Figure 8: Aerial imagery from 1977 with the site circled in red.**



**Figure 9: Aerial imagery from 1997 with the site circled in red.**





Figure 10: Aerial imagery from 2005 with the site circled in red.

## 6. RESULTS OF FIELD ASSESSMENT

### 6.1. General Vegetation Description

A total of **34** plants were noted during the field survey, of which **12** were alien. No plants of conservation concern were identified.

The project area was historically transformed due to agriculture and the demolished farmhouse, however there is natural recovery taking place. This is evident from the abundance of pioneer plant species such as Coastal Buffalo Grass (*Stenotaphrum secundatum*), Bietou (*Osteospermum moneliferum*), and Sicklebush (*Dichrostachy cinerea*).

#### 6.1.1. Habitat description

Two distinct vegetation types were present on site, namely secondary coastal grassland (**Plate 1**) and secondary coastal forest surrounding the demolished farmhouse (**Plate 2**). Both of these vegetation types were in the primary to secondary phase of succession (i.e. a previously disturbed area is being re-colonised by species following disturbance, or in the case of this site, sugar cane farming). The sites are dominated by pioneer species, with a mix of intermediate and climax species present in low abundances. There is also a proliferation of alien and invasive species particularly in the understory of the secondary coastal forest (**Plate 3**).



**Plate 1: Secondary coastal grassland dominated by pioneer species.**



**Plate 2: Secondary coastal forest with the understory dominated by pioneer species.**



**Plate 3: Alien and invasive *Lantana camara* dominating the understory.**

### 6.1.2. Secondary Coastal Forest

The coastal forest around the farmhouse shows the presence of the occasional canopy forming trees such as *Syzigium cordatum* (Plate 4), *Albizia adianthifolia* (Plate 5) and *Ficus burkei* (Plate 6). Ornamental and farmhouse plants such as *Casuarina equisetifolia* (Plate 7) and *Duranta erecta* (Plate 8) are present. Although there is a component of alien and invasive species, particularly in the understory and the fringe areas, diversity was noted to be medium due to the presence of indigenous species, and the apparent recovery of these areas.



Plate 4: *Syzigium cordatum*



Plate 5: *Albizia adianthifolia*



Plate 6: *Ficus burkei*



Plate 7: *Casuarina equisetifolia*



Plate 8: *Duranta erecta*

### 6.1.3. Secondary Grassland

The secondary grassland (recovered cane fields) is dominated by introduced perennial pioneer and creeping *S. secundatum* (Plate 9) at a high biomass, and *Dichrostachys cinerea* (Plate 10), which proliferate in disturbed areas. Other species indicative of the current ecological state of the secondary

grassland is the presence of *Tagetes minuta* (Plate 11) and *Sorghum bicolor* (Plate 12), which is noted as a crop weed, particularly in sugar cane fields or recently disturbed areas. Although there is an indigenous component visible in the grassland, the diversity is noted as being low due to dominance by alien and invasive species.



**Plate 9: *Stenotaphrum secundatum*.**



**Plate 10: *Dichrostachys cinerea*.**



**Plate 11: *Tagetes minuta*.**



**Plate 12: *Sorghum bicolor*.**

#### 6.2. *Species of conservation concern*

No species of conservation concern were noted on site; however plant permits for the cutting, trimming, destroying or relocation of plants in a forest must be permitted by DFFE under the National Forest Act, Act No. 84 of 1998), should the project be approved.

#### 6.3. *Mucina and Rutherford (2006) and VegMap 2018*

According to Mucina and Rutherford 2006 and VegMap 2018, the site is classified as KwaZulu-Natal Coastal Belt CB3 (Endangered). While historically this vegetation type is likely to have existed (prior to historical imagery dating back to 1970), the area has been historically transformed through agricultural activities. Recovery of the secondary coastal forest is limited to the area around the old farm house and the area to the north of site (outside of the boundary), and some species represented of CB3 are present, however these species are in low number and therefore the site is not representative of this vegetation type.

#### 6.4. *Species identified by the DFFE Screening Tool.*

No species highlighted in the DFFE Screening tool were identified on site. It must be noted that bulbs may not have been identified due to high biomass of *S. secundatum*.

## 6.5. Ecological Corridors.

Habitat loss and fragmentation is one of the main reasons for species and habitat decline worldwide. The intention of ecological corridors is to reduce the edge effect where edge effects decrease suitable habitat for a wide range of fauna and flora in an area.

In the case of the Tiffany's expansion site, the site is at the southern edge of recovering cane fields. The "open area" has the N2 boundary running in a north-east direction along the whole length of it, with suburbs to the south and east of the site. The open area itself runs in a north-easterly direction to an area which has been demarcated for future development (name is unknown however the services have been put in place at the development). Whether fences are preventing movement of fauna is also unknown. The length of the open area is approximately 1.8km long after which the northern boundary is bound by sugar cane fields (**Figure 11**).

Although the secondary grassland may be important ecological features, forest habitat offers a unique habitat providing food and a secure movement corridor for sensitive species such as Sensitive Species 7. The largest section of "forest" is directly north east of the proposed footprint, which may be connected to the site by a narrow corridor running along the N2 highway from the old farm house area. The development is likely to result in a direct loss of the secondary forest around the old farm house and the secondary grassland in the centre of the site. This loss of habitat is on the edge of a corridor therefore reducing the size of the open area / corridor.

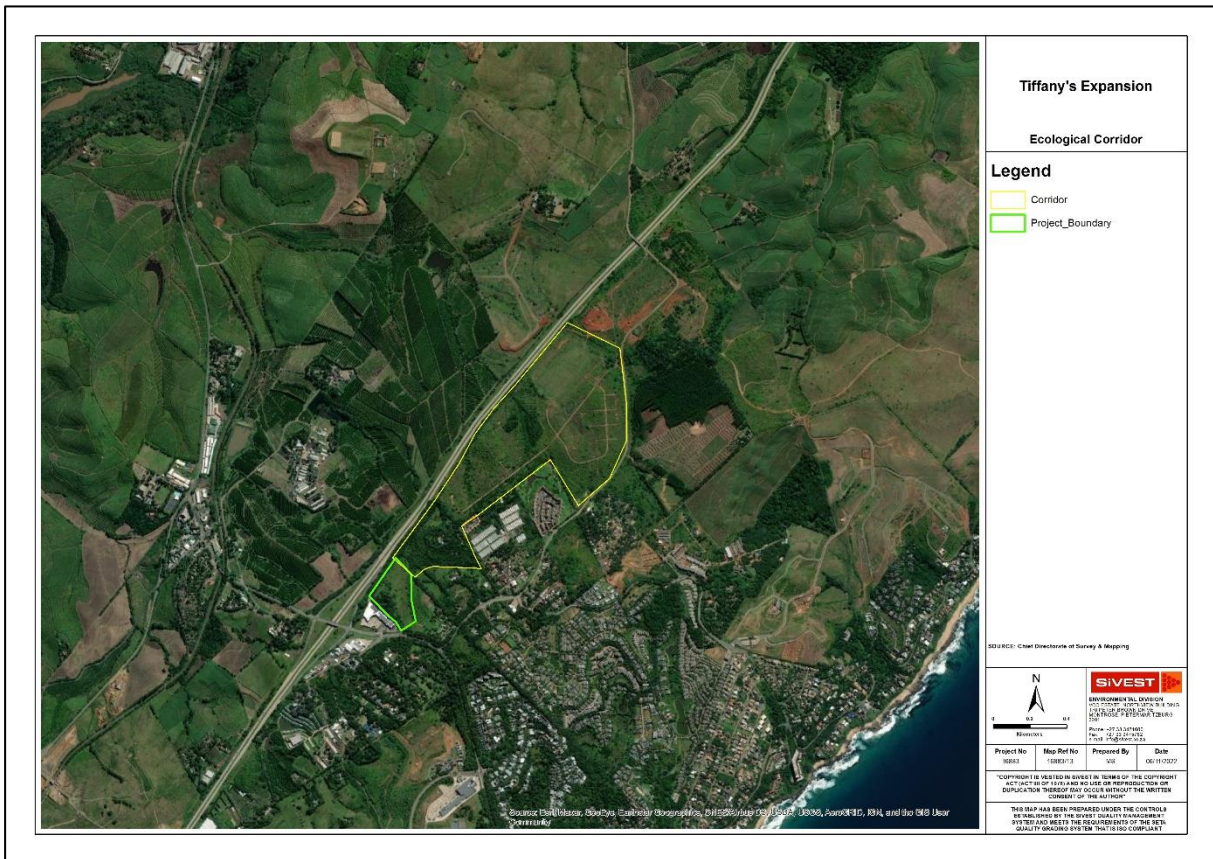


Figure 11: Environmental corridor to the NE of site.

## 6.6. Vegetation Assessment

Within the context of this vegetation assessment, conservation importance is broadly defined as the importance of the encountered vegetation communities as a whole, and the role these areas will fulfill in the preservation and maintenance of biodiversity in the local area. Biodiversity maintenance and importance are a function of the specific biodiversity attributes and noteworthiness of the vegetation communities in question and the biotic integrity and future viability of these features.

The biodiversity noteworthiness of the system is a function of the following:

- species richness/diversity;
- rarity of the system;
- conservation status of the system (endangered, least concern etc.);
- habitat (real or potential) for Red Data Species; and
- presence of unique and/or special features,

The integrity and future viability of the system is a function of the following:

- Extent of buffer around the system;
- Connectivity of system to other natural areas in the landscape;
- Level of alteration to indigenous vegetation communities within the system;
- Level of invasive and pioneer species encroachment system; and
- Presence of hazardous and/or obstructive boundaries to fauna.

The scores for each function of biodiversity maintenance were determined according to the scoring system shown in **Table 9** below. The scores were totaled and averaged to determine the biodiversity maintenance services score. Thereafter, the overall scores were rated according to the rating scale in **Table 10** below.

#### 6.6.1. Biodiversity Assessment

In terms of assessing the impacts of a proposed development on the receiving environment, it is vital that the current state of the environment is assessed, and the level at which it contributes currently, is considered and recorded.

It is bearing this in mind that we have developed an assessment matrix which will assist in determining the current biodiversity and conservation value of the various vegetation types that were encountered during the field survey (SiVEST, 2013). In addition, we need to consider the biodiversity noteworthiness of the receiving environment (i.e. does the environment hold any rare species, protected species and unique landscape features) as well as the functional integrity and future sustainability of the vegetation types in the immediate vicinity of the development.

**Table 9. Biodiversity maintenance services score sheet (Template and Description)**

Biodiversity Noteworthiness	Scores				
	0	1	2	3	4
Diversity	Low	Med-Low	Medium	Med-High	High
Rarity	Low	Med-Low	Medium	Med-High	High
Conservation Status	Least Concern	Near-Threatened	Vulnerable	Endangered	Critically Endangered
Red Data	No	-	-	-	Yes
Uniqueness / Special features	None	Med-Low	Medium	Med-High	High
Integrity & Future Viability	0	1	2	3	4
Buffer	Low	Med-Low	Medium	Med-High	High
Connectivity	Low	Med-Low	Medium	Med-High	High
Alteration	>50%	25-50%	5-25%	1-5%	<1%
Invasive/pioneers	>50%	25-50%	5-25%	1-5%	<1%
Size	<1 ha	1 – 2 ha	3 - 10 ha	10 – 15 ha	>15 ha

**Table 10. Rating Scale for Biodiversity Maintenance services based on Assessment scores**

Score:	0-1,4	1,5 - 3,8	3,9 - 6,5	6,6 - 8,5	8,6 - 10,0
Rating of the likely extent to which a service is being performed	Low	Moderately Low	Intermediate	Moderately High	High

A total of 34 plant species were recorded during the field survey, of which 12 were alien. No species of conservation concern were identified on site.

Please note, the Biodiversity Noteworthiness and Future Integrity assessments have been combined for both habitat types as there are no site or design alternatives offered.

Biodiversity noteworthiness

In terms of the vegetation classifications that were identified from the aerial photography and ground truthed on site, the following assessment was made in terms of the noteworthiness of the vegetation that would be immediately impacted upon by the proposed Development.

Functional Integrity and Sustainability

The Functional Integrity and Sustainability speaks to the impact of the proposed activity on the receiving environment. It also speaks to the likelihood that it will be of significance, and whether there are significant mitigation and or amelioration measures that are required to be put in place to ensure that the impacts are manageable, and will not prove deleterious to the vegetation type as a whole.

**Table 11. Biodiversity noteworthiness and integrity and future viability of the Tiffany’s Site.**

Biodiversity Noteworthiness	Diversity	Rarity	Conservation Status	Red Data Species	Uniqueness / Special features	Average
Category Selected	1	2	3	0	1	--
Weighted Score	1.2	2.40	6.00	0.00	1.20	2.16
Service Performance	Low	Moderately low	Intermediate	Low	Low	Moderately low
Integrity & Future Viability	Buffer	Connectivity	Alteration	Invasive/pioneers	Size	Average
Category Selected	1	3	1	0	2	--
Weighted Score	1	6	1	0	3	2.20
Service Performance	Low	Intermediate	Low	Low	Moderately low	Moderately low

- The average score of the proposed development is **2.16**, which indicates that this area is functioning at a moderately low level.
- The average score of the proposed development is **2.2**, which indicates that integrity and future viability is at a moderately low level.

Conservation Status of the system increases the importance of the system, driving the biodiversity noteworthiness of the site. In terms of integrity and future viability, connectiveness to the corridors northeast of site are the most important factor to consider in the future viability of the system.

*6.7. Faunal Description*

*6.7.1. Avifauna*

A total of 31 bird species were seen during the sampling period, however SABAP predicts 295 species to occur on site. A full list of species avifauna can be found in **Appendix 2**. Species seen were in flight and foraging within the site. This assumes that these birds were using the sample site as a viable home range and movement corridor, which is understandable as the species seen are in line with species that inhabit coastal residential areas. No species of conservation concern were identified during the assessment however some species of conservation concern are likely to occur on site, excluding aquatic and marine species noted on the list. The trees that border the sites will act as a movement corridor for coastal forest species.



Species such as Lanner Falcon, Crowned Eagle, Grey Crowned Crane and Southern Bald Ibis may feed and fly over the area, however Lanner Falcon and Crowned Eagle are the only species that may nest or roost on site. Please note, no active nests were noted on site, therefore no negative effects on avifaunal species of concern are predicted to occur.

It is expected that the proposed development will result in negligible loss of habitat for species of conservation concern as the area has been transformed with limited natural habitat remaining.

Some species noted on site were Yellow-bellied Greenbul (**Plate 13**), Dark-capped Bulbul, Black-bellied Starling (**Plate 14**), Neddicky, Golden-tailed Woodpecker, Rattling Cisticola, Yellow-rumped Tinkerbird and Red-capped Robin-Chat.



**Plate 13: Yellow bellied Greenbul**



**Plate 14: Black bellied Starling**

#### 6.7.2. Herpetofauna

No amphibians or reptiles were noted on site. Habitat requirements for herpetofauna species of conservation concern is not available as no wetlands or drainage lines were noted. Some frog species, snake species and lizard / gecko species are likely to occur on site, particularly in the forested areas bordering the edge of site. Please note, no habitat for Pickersgill's Reed Frog (*Hyperolius pickersgilli*) is present on site, therefore this species is not expected to occur on site itself, however the species is predicted to occur in the general area.

#### 6.7.3. Mammals

No mammal species of conservation concern were noted on site. Blue Duiker and Red Duiker could occur on site, however no tracks or signs of habitation was noted, therefore if these species are to occur, they are likely to be transient species. Both of these species occur in nearby residential estates. Habitat for these species to occur is however present along the edge of the site (particularly the forested area). High levels of noise and human disturbance caused by the existing Tiffany's shopping centre and the N2 highway are likely to drive these species away from here, if they are to occur on site.

It is expected that the proposed development will result in negligible loss of habitat for species of conservation concern as these species are unlikely to use this site, however presence may be limited to that of an ecological corridor.

#### 6.7.4. Butterflies

No butterfly or moth species of conservation concern were noted on site. Two species were seen on site, that being the Golden Piper (*Eurytela dryope angulate*), Blue Pansy (*Junonia oenone oenone*).

#### 6.7.5. Other Species

No invertebrates predicted to occur on site by the DFFE screening tool, TSCP Minset or species of conservation concern were identified on site.

## 6.8. Sensitivities identified from Field Assessments

Taking the desktop and field assessments into consideration, the following is noted:

- The majority of the study site is recovering from historical sugar cane farming, as is evident from the vegetation species composing in the centre of the site, however the border of the site is dominated by secondary coastal forest species, alien and invasive species and species planated from the original farm house.
- No CBA areas or SANBI Threatened Ecosystems were predicted to occur on site, with confirmation from the field assessment.
- Although the site sensitivity is considered medium to low the recovering coastal forest associated with the edge of site increases the sensitivity of this protion of site to a medium (**Figure 12**), however is still developable. Vegetation species of conservation concern were not noted and however avoidance of recovering coastal forest should be avoided if possible. If these species of conservation concern are to be removed, permits from DAFF and EKZNW are required.
- With the above in mind, the ecological sensitivity, combined with the Wetland Ecologists sensitivities were overlayed and are presented in **Figure 12** below.



**Figure 12: Ecological and Wetland Sensitivity**

## 7. IMPACT ASSESSMENT

The nature of the activity is that it has the potential to cause negative environmental effects. However, if mitigation measures for the activity are correctly implemented and the rehabilitation is successful, minimal disturbance of environment will be seen at a site level only (**See Appendix 9 for Methodology**).

The potential impacts of the proposed development mainly related to direct loss of terrestrial floral and faunal species as a result of construction and operation of the proposed development. However, the loss of floral and faunal species of conservation concern is limited as very few, if any species are predicted to occur on site. Additionally, the vegetation type (SV3 Indian Ocean Coastal Belt – Endangered); is in a primary to secondary ecological state so it doesn't represent the vegetation type, although some species indicative of the vegetation type are present. Consequently, loss of terrestrial fauna and flora will be on a site scale and can be largely mitigated against, provided mitigation measures are implemented.

### 7.1. *Planning and design phase impacts*

Loss of remaining open space areas, that being secondary coastal grassland and coastal forest will occur if the development is approved. Loss will be centred on individual species of plants rather than ecosystem types, however it is noted that no species of conservation concern were identified in the field assessment. Should the whole site be cleared, approximately 3ha of medium sensitivity vegetation and approximately 2ha of low sensitivity vegetation may be lost. This has been regarded as the worst-case scenario as there is high levels of alien and invasive species currently present on site. The developer has revised their layout to avoid the northeastern border of site, which incorporates small section of medium sensity and low sensitivity secondary habitat.

### 7.2. *Construction phase impacts*

#### 7.2.1. *Transformation of habitat for flora*

Since the north eastern portion of site is not planned to be cleared, a total loss of habitat for flora will not occur. Transformation of habitat will occur in the form of parking places, extension of the Tiffany's Shopping Centre and alien and invasive species growing in disturbed areas to the northeast portion of site.

#### 7.2.2. *Erosion related impacts*

Vegetation binds and protects the soil surface, and when removed, increases erosion potential. This may lead to water and wind removing vital topsoil, potentially clogging roadsides, drainage lines wetlands and watercourses through sedimentation. It is anticipated that this may occur at the edge of the parking bays leading into the vegetation on the north east portion of the revised layout.

#### 7.2.3. *Habitat transformation and fragmentation for fauna*

Continued transformation of vegetation in the area could result in a marginal reduction in flora and fauna for the area. Disturbance of the soil surface adjacent to the completely cleared areas may lead to the establishment of alien invasive plant species. Continued transformation of the land results in habitat fragmentation, where edge effects decrease suitable habitat for a wide range of fauna in the area. This leads to an overall indirect decline in faunal diversity through alien and invasive species and a direct loss through complete hard transformation of habitat.

### 7.3. *Operation phase impacts*

#### *7.3.1. Erosion related impacts for operation phase*

Erosion potential is increased in areas where vegetation has been removed. Hard transformation will increase water velocity in steeper areas and may result in a loss of topsoil and the erosion of drainage lines. This will aid in alien and invasive plant establishment and vegetation rehabilitation will be compromised as the loss of topsoil will delay rehabilitation efforts.

#### *7.3.2. Biodiversity loss due to operation phase*

Biodiversity loss during operation is expected to be minimal, if soil layers are maintained and vegetation re-establishment is achieved.

#### *7.4. Decommission phase impacts*

Decommissioning phase impacts are anticipated to be the same as the construction and operation phase impacts, therefore mitigation measures for the construction and operation phase must be followed should decommissioning of the proposed development occur.

#### *7.5. No-go alternative.*

Please note that a No-Go option would be the status quo. The No-Go alternative would be a feasible alternative if alien and invasive plant species could be controlled to avoid proliferation of these species into surrounding areas. This would entail the establishment of an alien and invasive control programme at a site level and extending into the neighbouring corridors.

7.6. Impacts identified for all phases and proposed accommodation

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION										RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION									
		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S	E		P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S		
<b>Planning and Design Phase</b>																						
Open space	Minimisation of loss of remainin open space to reduce species and habitat loss	1	3	2	1	4	2	22	-	Low	<ul style="list-style-type: none"> <li>Green engineering solutions should include native tree species already growing on site in parking bays and eating areas.</li> <li>Rehabilitation of the north east portion of site which will not be cleared during construction and operation should be in line with a rehabilitation and alien and invasive management plan.</li> <li>As far as possible, this area should be rehabilitated to a climax state.</li> </ul>	1	2	2	1	1	2	14	+	low		
<b>Construction Phase</b>																						
Transformation of habitat for flora	Transformation of habitat will occur in the form of parking places, extension of the Tiffany's Shopping Centre and alien and invasive species growing in disturbed areas to the	2	2	2	2	4	3	36	-	Medium	<ul style="list-style-type: none"> <li>Footprint of the layout needs to be a strictly adhered to.</li> <li>Where possible, indigenous vegetation needs to be retained.</li> <li>Clearance for construction should be done in a phased approach, and</li> </ul>	1	2	1	2	2	2	16	-	Low		

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION										RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION											
		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S	E		P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S				
	northeast portion of site.												rehabilitation should be done as soon as work has ceased adjacent to the expansion. <ul style="list-style-type: none"> <li>• Where possible, construction should occur in the dry season to prevent soil loss through stormwater.</li> <li>• Where possible, manual clearance of the vegetation should be done so as to prevent the unnecessary movement of machinery in no-go areas.</li> <li>• No-go areas must be demarcated and retained for the whole construction period and must include the northeast portion of site as per the layout.</li> <li>• The contractor should implement an alien invasive control programme, particularly in areas where soil disturbance occurs.</li> <li>• Soil stockpiles need to be grassed with an indigenous mix or</li> </ul>											

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION										RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION																								
		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S	E		P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S																	
													covered with shadecloth to prevent soil loss through wind and water erosion.																								
Erosion related impacts	Vegetation binds and protects the soil surface, and when removed, increases erosion potential. This may lead to water and wind removing vital topsoil, potentially clogging roadsides, drainage lines wetlands and watercourses through	1	2	2	2	2	2	2	18	-	Low	<ul style="list-style-type: none"> <li>• All stormwater outflows must be protected with renomattresses and gabion baskets to reduce the effect of erosion. Rainwater harvesting of stormwater is encouraged, and where possible, reused for toilet flushing and irrigation.</li> <li>• Where possible, indigenous</li> </ul>	1	2	1	2	2	2	16	-	Low																



ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION										RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION													
		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S	E		P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S						
	sedimentation. It is anticipated that this may occur at the edge of the parking bays leading into the vegetation on the north east portion of the revised layout.												<ul style="list-style-type: none"> <li>vegetation needs to be retained.</li> <li>Vegetation should be cleared only when construction occurs in that section of the construction.</li> <li>Soil stockpiles need to be grassed with an indigenous mix or covered with shadecloth to prevent soil loss through wind and water erosion.</li> <li>Progressive rehabilitation must be implemented, where areas must be rehabilitated once construction is complete.</li> <li>Construction activities should be limited to the winter months to prevent loss of soil to water runoff.</li> <li>Spraying of the soil surface should occur when working in dusty conditions.</li> </ul>													

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION										RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION									
		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S	E		P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S		
Habitat transformation and fragmentation for fauna	Continued transformation of vegetation in the area could result in a marginal reduction in flora and fauna for the area. Disturbance of the soil surface adjacent to the completely cleared areas may lead to the establishment of alien invasive plant species. Continued transformation of the land results in habitat fragmentation.	2	2	2	2	4	3	36	-	Medium	<ul style="list-style-type: none"> <li>Construction footprint needs to be a strictly adhered to.</li> <li>Areas outside of the construction zone must be demarcated as "no-go" areas as per the layout.</li> <li>Where possible, indigenous vegetation needs to be retained.</li> <li>Manual clearance of alien and invasive vegetation should be done so as to prevent the unnecessary movement of machinery in no-go areas.</li> <li>An alien and invasive control programme should be implemented, particularly in areas where soil disturbance has occurred.</li> <li>Soil stockpiles need to be returned to the excavations, with the subsoil being placed first, followed by the topsoil.</li> <li>Monthly ECO auditing should occur during</li> </ul>	1	2	1	2	2	2	16	-	Low		

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION															
		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S							
												rehabilitation of the site. Once rehabilitation is complete, one three month, and one six month follow up audit should be conducted to assess the state of rehabilitation.															
<b>Operational Phase</b>																											
Erosion related impacts for operation phase	Erosion potential is increased in areas where vegetation has been removed. Hard transformation may increase water velocity in steeper areas and may result in a loss of topsoil and the erosion of drainage lines. This will aid in alien and invasive plant establishment and vegetation rehabilitation will be compromised as the loss of topsoil will delay rehabilitation efforts.	1	2	2	2	2	2	18	-	Low	<ul style="list-style-type: none"> <li>All stormwater outflows must be protected with renomattresses and gabion baskets to reduce the effect of erosion on the access road.</li> <li>Where possible, indigenous vegetation needs to be returned as soon as construction ceases.</li> <li>Soil stockpiles need to be grassed with an indigenous mix and rehabilitated to prevent soil loss through wind and water erosion before operation phase begins.</li> <li>Rehabilitation should take place as</li> </ul>	1	2	1	2	2	2	16	-	Low							

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION										RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION															
		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S	E		P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S								
													<ul style="list-style-type: none"> <li>soon as construction is complete.</li> <li>• Operation phase should only begin once the ECO has deemed rehabilitation successful and mitigation measures have been implemented.</li> <li>• A six monthly check of the area should take place for the emergence erosion gulley's, and if gulley's emerge, will need to be rehabilitated immediately.</li> </ul>															
Biodiversity loss due to operation phase	Biodiversity loss during operation is expected to be minimal, if soil layers are maintained and vegetation re-establishment is achieved.	1	2	2	2	4	2	-	22	Low	<ul style="list-style-type: none"> <li>• A post construction monitoring programme to ensure that rehabilitation efforts are successful and that edge effects are reduced.</li> <li>• Monthly monitoring of these sensitive areas should take place during the first year after construction to ensure that rehabilitation is successful.</li> </ul>	1	2	1	2	2	2	16	-	Low								

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION										RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION													
		E	P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S	E		P	R	L	D	I/M	TOTAL	STATUS (+ OR -)	S						
													• Six monthly checks of the area should take place for the emergence of invader species.													
<b>Decommissioning Phase</b>																										
It is anticipated that decommissioning phase impacts will mirror the construction and operation phase impacts. As such, construction and operation phase impacts must be implemented should decommissioning of the facility occur																										

### 7.7. Impact Statement

The proposed development will result in a minor loss to biodiversity at a site level due to the high levels of transformation which historically occurred on site, however this loss can be largely mitigated against, provided the mitigation measures are implemented. The largest threat to the site is the establishment of alien and invasive vegetation which is prevalent in the secondary forested areas. Careful monitoring for alien and invasive species is required throughout the construction and operation phase.

Loss of indigenous species at a site level will occur resulting in a medium negative impact, however overall loss of biodiversity (particularly species of conservation concern) at a local level is expected to be at a minimum as no floral or faunal species of conservation concern were noted on site, therefore not affecting the greater area. The largest impact is expected to be the establishment of alien and invasive vegetation adjacent to developable areas, however the establishment of alien and invasive species can be mitigated against to result in a low overall impact. No fatal flaws have been identified and the Ecologist supports the proposed development provided the mitigation measures are implemented.

## 8. CONCLUSIONS

It is important to mention that additional species may have been overlooked during the field survey because of the plant life history characteristics exhibited by certain plant species during this time of the season. Some species, especially the plants which have underground bulbs, may not have emerged due to variations in their life strategies. However, it is the Specialist's opinion that the vegetation that was recorded from the site assessment provides enough information in order for inferences and extrapolations as to the quality, and the likely impacts associated with a development of this nature, to be made.

A total of 34 plant species were recorded during the field survey, of which 11 were alien. No plant species of conservation concern were noted, however permits for the trimming, removal, relocation and or destruction of indigenous tree species in terms of the National Forest Act will be required prior to any construction commencing.

According to Mucina and Rutherford 2006 and VegMap 2018, the site is classified as Endangered KwaZulu-Natal Coastal Belt. Upon undertaking the groundtruthing exercise it was found that the site was previously transformed, however natural recovery is occurring. The site does have some species which indicate the presence of this vegetation type. However these species are in low abundance and the high level of alien and invasive species indicates that further recovery is required. As such, species diversity was estimated to be medium particularly around the site boundary.

If development does take place, indigenous plants will need to be removed or relocated, permits for their removal will need to be obtained from DAFF. The ECO should conduct a site sweep prior to construction occurring in order to identify areas where indigenous plants may require permitting for their removal. The removal should occur during their dormant growth period months and with due care informed by a Translocation Plan, preferably compiled by a qualified botanist or similarly qualified individual (should this be required).

From a faunal perspective, the study area has a low to medium conservation value. This is based on the potential for this site to harbour a few species of conservation importance. Habitat for foraging is present throughout throughout the proposed site, however connectivity to the greater area is limited due to fencing on all sides except for the N2 and so movement of mammal species in particular is currently unlikely. Therefore, the proposed project is unlikely to affect the status of species of conservation concern (mammals in particular). It is therefore not anticipated that the proposed construction will have a long term negative effect on the fauna of the area. The fauna of the site is directly dependent on the vegetation of the site, and the careful management of the vegetation (and soil) outside of the developable area will benefit the fauna of the area.

Although species identified in the DFFE Screening Tool and MINSET may be present on site (including species as per the POC table), isolation of this site from the surrounding area and historical disturbance

reduce the likelihood of this site functioning as an ecological corridor. Even though there may be site specific impacts, these can largely be mitigated against. The Developer is to take the delineated sensitive areas into account with their design.

The ecologist has no objection to the development provided all mitigation measures can be agreed and achieved are implemented.

## **9. RECOMMENDATIONS**

Should any development take place the following is recommended but not limited to:

- ✓ Permits for the removal and relocation of indigenous plants must be in place before any construction can commence;
- ✓ The appointed ECO should do a site walk through prior to construction commencing to search for breeding and nesting fauna such as chameleon species, and plant species requiring permitting (if required). Should these be identified, a search and rescue operation by a suitably qualified person, must be undertaken before construction commences;
- ✓ Rehabilitation must occur once construction is complete in the relevant area;
- ✓ The area delineated as medium sensitivity should be avoided as far as practically possible, however if avoidance is not possible, permitting for the removal / relocation / destruction of these species must be obtained prior to construction occurring;
- ✓ An Alien Invasive Control Programme must be implemented;
- ✓ Construction must occur in a phased approach and
- ✓ No biodiversity offset plan is recommended.

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## **Appendix 1 Plants Species Lists**

## POSA Species List

Family	Scientific Name	Ecology
Acanthaceae	<i>Justicia debilis</i> (Forssk.) Vahl	Indigenous
Acanthaceae	<i>Asystasia gangetica</i> (L.) T.Anderson subsp. <i>micrantha</i> (Nees) Ensermu	Indigenous
Acanthaceae	<i>Justicia betonica</i> L.	Indigenous
Adoxaceae	<i>Sambucus nigra</i> L.	Not indigenous; Naturalised; Invasive
Adoxaceae	<i>Sambucus canadensis</i> L.	Not indigenous; Naturalised; Invasive
Aizoaceae	<i>Delosperma</i> sp.	
Amaranthaceae	<i>Pupalia lappacea</i> (L.) A.Juss. var. <i>lappacea</i>	Indigenous
Amaranthaceae	<i>Celosia trigyna</i> L.	Indigenous
Amaryllidaceae	<i>Crinum macowanii</i> Baker	Indigenous
Anacardiaceae	<i>Searsia chirindensis</i> (Baker f.) Moffett	Indigenous
Anacardiaceae	<i>Schinus terebinthifolius</i> Raddi	Not indigenous; Cultivated; Naturalised; Invasive
Apocynaceae	<i>Nerium oleander</i> L.	Not indigenous; Naturalised; Invasive
Araliaceae	<i>Heptapleurum arboricola</i> Hayata	Not indigenous; Cultivated; Naturalised; Invasive
Asphodelaceae	<i>Kniphofia littoralis</i> Codd	Indigenous; Endemic
Asteraceae	<i>Ageratum houstonianum</i> Mill.	Not indigenous; Naturalised; Invasive
Asteraceae	<i>Bidens biternata</i> (Lour.) Merr. & Sherff	Not indigenous; Naturalised
Asteraceae	<i>Adenostemma cafferum</i> DC.	Indigenous
Asteraceae	<i>Senecio pleistocephalus</i> S.Moore	Indigenous
Asteraceae	<i>Tragopogon hybridus</i> L.	Not indigenous; Naturalised
Asteraceae	<i>Ambrosia artemisiifolia</i> L.	Not indigenous; Naturalised; Invasive
Asteraceae	<i>Sphagneticola trilobata</i> (L.) Pruski	Not indigenous; Naturalised; Invasive
Asteraceae	<i>Chromolaena odorata</i> (L.) R.M.King & H.Rob.	Not indigenous; Naturalised; Invasive
Asteraceae	<i>Brachylaena transvaalensis</i> E.Phillips & Schweick.	Indigenous
Asteraceae	<i>Senecio glutinosus</i> Thunb.	Indigenous
Basellaceae	<i>Anredera cordifolia</i> (Ten.) Steenis	Not indigenous; Naturalised; Invasive
Brassicaceae	<i>Lepidium africanum</i> (Burm.f.) DC. subsp. <i>africanum</i>	Indigenous
Buxaceae	<i>Buxus natalensis</i> (Oliv.) Hutch.	Indigenous; Endemic
Cannabaceae	<i>Celtis mildbraedii</i> Engl.	Indigenous
Cannabaceae	<i>Celtis gomphophylla</i> Baker	Indigenous

Family	Scientific Name	Ecology
Cannaceae	<i>Canna indica</i> L.	Not indigenous; Naturalised; Invasive
Caryophyllaceae	<i>Drymaria cordata</i> (L.) Willd. ex Roem. & Schult. subsp. <i>diandra</i> (Blume) J.A.Duke	Not indigenous; Naturalised; Invasive
Casuarinaceae	<i>Casuarina equisetifolia</i> L.	Not indigenous; Naturalised; Invasive
Celastraceae	<i>Maytenus procumbens</i> (L.f.) Loes.	Indigenous
Celastraceae	<i>Salacia gerrardii</i> Harv. ex Sprague	Indigenous; Endemic
Celastraceae	<i>Maytenus peduncularis</i> (Sond.) Loes.	Indigenous
Celastraceae	<i>Maytenus acuminata</i> (L.f.) Loes. var. <i>acuminata</i>	Indigenous
Ceratophyllaceae	<i>Ceratophyllum</i> sp.	
Ceratophyllaceae	<i>Ceratophyllum demersum</i> L. var. <i>demersum</i>	Indigenous
Commelinaceae	<i>Aneilema aequinoctiale</i> (P.Beauv.) Loudon	Indigenous
Convolvulaceae	<i>Ipomoea hederifolia</i> L.	Not indigenous; Cultivated; Naturalised; Invasive
Convolvulaceae	<i>Hewittia malabarica</i> (L.) Suresh	Indigenous
Convolvulaceae	<i>Ipomoea indica</i> (Burm.) Merr.	Not indigenous; Naturalised; Invasive
Crassulaceae	<i>Crassula expansa</i> Aiton subsp. <i>expansa</i>	Indigenous
Cucurbitaceae	<i>Coccinia variifolia</i> A.Meeuse	Indigenous; Endemic
Cucurbitaceae	<i>Cucumis maderaspatanus</i> L.	Indigenous
Cyperaceae	<i>Pycreus polystachyos</i> (Rottb.) P.Beauv.	Indigenous
Cyperaceae	<i>Isolepis cernua</i> (Vahl) Roem. & Schult. var. <i>cernua</i>	Indigenous
Cyperaceae	<i>Isolepis prolifera</i> (Rottb.) R.Br.	Indigenous
Cyperaceae	<i>Pycreus mundii</i> Nees	Indigenous
Cyperaceae	<i>Scleria achtenii</i> De Wild.	Indigenous
Cyperaceae	<i>Cyperus macrocarpus</i> (Kunth) Boeckeler	Indigenous
Cyperaceae	<i>Cyperus cyperoides</i> (L.) Kuntze subsp. <i>pseudoflavus</i> (Kuk.) Lye	Indigenous
Cyperaceae	<i>Bulbostylis humilis</i> (Kunth) C.B.Clarke	Indigenous
Ebenaceae	<i>Euclea natalensis</i> A.DC. subsp. <i>rotundifolia</i> F.White	Indigenous
Ebenaceae	<i>Euclea natalensis</i> A.DC. subsp. <i>natalensis</i>	Indigenous
Euphorbiaceae	<i>Erythrococca berberidea</i> Prain	Indigenous
Euphorbiaceae	<i>Ricinus communis</i> L.	Not indigenous; Naturalised; Invasive
Fabaceae	<i>Senegalia burkei</i> (Benth.) Kyal. & Boatwr.	Indigenous
Fabaceae	<i>Senegalia caffra</i> (Thunb.) P.J.H.Hurter & Mabb.	Indigenous

Family	Scientific Name	Ecology
Fabaceae	<i>Indigofera hiliaris</i> Eckl. & Zeyh. var. <i>hiliaris</i>	Indigenous
Fabaceae	<i>Senna occidentalis</i> (L.) Link	Not indigenous; Naturalised; Invasive
Fabaceae	<i>Baphia racemosa</i> (Hochst.) Baker	Indigenous; Endemic
Fabaceae	<i>Bauhinia galpinii</i> N.E.Br.	Indigenous
Fabaceae	<i>Biancaea decapetala</i> (Roth) O.Deg.	Not indigenous; Naturalised; Invasive
Fabaceae	<i>Mimosa pudica</i> L. var. <i>hispida</i> Brenan	Not indigenous; Naturalised
Fabaceae	<i>Indigofera inhambanensis</i> Klotzsch	Indigenous
Fabaceae	<i>Chamaecrista mimosoides</i> (L.) Greene	Indigenous
Fabaceae	<i>Tephrosia polystachya</i> E.Mey. var. <i>hirta</i> Harv.	Indigenous
Fabaceae	<i>Indigofera sanguinea</i> N.E.Br.	Indigenous
Hyacinthaceae	<i>Ledebouria petiolata</i> J.C.Manning & Goldblatt	Indigenous
Hypoxidaceae	<i>Hypoxis villosa</i> L.f. var. <i>obliqua</i> (Jacq.) Baker	Indigenous
Hypoxidaceae	<i>Hypoxis angustifolia</i> Lam. var. <i>buchananii</i> Baker	Indigenous
Lamiaceae	<i>Volkameria glabra</i> (E.Mey.) Mabb. & Y.W.Yuan	Indigenous
Loganiaceae	<i>Strychnos madagascariensis</i> Poir.	Indigenous
Lycopodiaceae	<i>Palhinhaea cernua</i> (L.) Vasc. & Franco	Indigenous
Malvaceae	<i>Hibiscus surattensis</i> L.	Indigenous
Malvaceae	<i>Abutilon galpinii</i> A.Meeuse	Indigenous
Malvaceae	<i>Triumfetta rhomboidea</i> Jacq. var. <i>rhomboidea</i>	Indigenous
Melastomataceae	<i>Antherotoma phaeotricha</i> (Hochst.) Jacq.-Fel.	Indigenous
Meliaceae	<i>Melia azedarach</i> L.	Not indigenous; Naturalised; Invasive
Moraceae	<i>Ficus natalensis</i> Hochst. subsp. <i>natalensis</i>	Indigenous
Nyctaginaceae	<i>Commicarpus chinensis</i> (L.) Heimerl subsp. <i>natalensis</i> Meikle	Indigenous
Peraceae	<i>Clutia monticola</i> S.Moore var. <i>monticola</i>	Indigenous
Petiveriaceae	<i>Rivina humilis</i> L.	Not indigenous; Naturalised; Invasive
Poaceae	<i>Panicum laticomum</i> Nees	Indigenous
Poaceae	<i>Stiburus alopecuroides</i> (Hack.) Stapf	Indigenous
Poaceae	<i>Sporobolus subtilis</i> Kunth	Indigenous
Poaceae	<i>Eragrostis capensis</i> (Thunb.) Trin.	Indigenous
Poaceae	<i>Dactyloctenium australe</i> Steud.	Indigenous

Family	Scientific Name	Ecology
Poaceae	<i>Eragrostis curvula</i> (Schrad.) Nees	Indigenous
Poaceae	<i>Ehrharta erecta</i> Lam. var. <i>natalensis</i> Stapf	Indigenous
Poaceae	<i>Cenchrus purpureus</i> (Schumach.) Morrone	Not indigenous; Naturalised; Invasive
Poaceae	<i>Dactyloctenium giganteum</i> Fisher & Schweick.	Indigenous
Polygonaceae	<i>Persicaria capitata</i> (Buch.-Ham. ex D.Don) H.Gross	Not indigenous; Naturalised; Invasive
Polygonaceae	<i>Triplaris americana</i> L.	Not indigenous; Naturalised; Invasive
Polypodiaceae	<i>Microsorium scolopendria</i> (Burm.f.) Copel.	Indigenous
Portulacaceae	<i>Portulaca oleracea</i> L.	Not indigenous; Naturalised
Rubiaceae	<i>Tricalysia capensis</i> (Meisn. ex Hochst.) Sim var. <i>capensis</i>	Indigenous
Rubiaceae	<i>Vangueria macrocalyx</i> Sond.	Indigenous
Rutaceae	<i>Vepris trichocarpa</i> (Engl.) Mziray	Indigenous
Rutaceae	<i>Zanthoxylum davyi</i> (I. Verd.) P.G. Waterman	Indigenous
Salviniaceae	<i>Azolla cristata</i> Kaulf.	Not indigenous; Naturalised; Invasive
Sapindaceae	<i>Pancovia golungensis</i> (Hiern) Exell & Mendonça	Indigenous
Sapotaceae	<i>Mimusops caffra</i> E.Mey. ex A.DC.	Indigenous
Sapotaceae	<i>Mimusops obovata</i> Nees ex Sond.	Indigenous
Solanaceae	<i>Solanum mauritianum</i> Scop.	Not indigenous; Naturalised; Invasive
Solanaceae	<i>Solanum anguivi</i> Lam.	Indigenous
Thelypteridaceae	<i>Christella dentata</i> (Forssk.) Brownsey & Jermy	Indigenous
Theophrastaceae	<i>Samolus valerandi</i> L.	Indigenous
Verbenaceae	<i>Lantana camara</i> L.	Not indigenous; Cultivated; Naturalised; Invasive
Verbenaceae	<i>Duranta erecta</i> L.	Not indigenous; Naturalised; Invasive

### Tiffany's Site Plant Species List

Scientific Name	Common Name	Growth Form	Origin	Ecological status
<i>Ficus burkei</i> (Miq.) Miq	Common wild fig	Tree	Indigenous	
<i>Grewia occidentalis</i> L. var. <i>occidentalis</i>	Cross berry	Tree	Indigenous	
<i>Strelitzia nicolai</i> Regel & Koern.	Natal wild banana	Tree	Indigenous	
<i>Mirabilis jalapa</i> L.	Beauty-of-the-nigh	Herb	Alien	1b
<i>Syzygium cordatum</i> Hochst. ex C.Krauss subsp. <i>cordatum</i>	Umdoni	Tree	Indigenous	DAFF Permit

Scientific Name	Common Name	Growth Form	Origin	Ecological status
<i>Ageratum conyzoides</i> L.	Billy goat-weed	Herb	Alien	1b
<i>Albizia adianthifolia</i> (Schumach.) W.Wight var. <i>adianthifolia</i>	flat-crown albizia	Tree	Indigenous	
<i>Asystasia gangetica</i> (L.) T.Anderson subsp. <i>micrantha</i> (Nees) Ensermu	Creeping Foxglove	Herb	Indigenous	
<i>Bidens pilosa</i> L.	Black-jack	Herb	Alien	
<i>Casuarina equisetifolia</i> L.	Horsetail Tree	Tree	Alien	2
<i>Chromolaena odorata</i> (L.) R.M.King & H.Rob.	Trifid weed	Herb	Alien	1b
<i>Dichrostachys cinerea</i> (L.) Wight & Arn.	Sickle bush	Tree	Indigenous	
<i>Eriosema psoraleoides</i> (Lam.) G.Don	Canary Pea	Herb	Indigenous	
<i>Erythrina lysistemon</i> Hutch.	Coral tree	Tree	Indigenous	
<i>Gomphocarpus fruticosus</i> (L.) Aiton f. subsp. <i>fruticosus</i>	Milkweed	Herb	Indigenous	
<i>Harpephyllum caffrum</i> Bernh. ex Krauss	Wild Plum	Tree	Indigenous	
<i>Helichrysum aureum</i> (Houtt.) Merr. var. <i>aureum</i>	Everlasting	Herb	Indigenous	
<i>Imperata cylindrica</i> (L.) P.Beauv.	Cotton wool grass	Grass	Indigenous	
<i>Lantana camara</i> L.	Tick berry	Shrub	Alien	1b
<i>Malvastrum coromandelianum</i> (L.) Garcke	Prickly Malvastrum	Herb	Alien	1b
<i>Melia azedarach</i> L.	Syringa	Tree	Alien	1b
<i>Melinis repens</i> (Willd.) Zizka subsp. <i>repens</i>	Redtop	Grass	Indigenous	
<i>Ophrestia oblongifolia</i> (E.Mey.) H.M.L.Forbes var. <i>oblongifolia</i>			Indigenous	
<i>Osteospermum moniliferum</i> L. subsp. <i>moniliferum</i>	Bietou		Indigenous	
<i>Psidium guajava</i> L.	Guava tree	Tree	Alien	2
<i>Schotia brachypetala</i> Sond.	Weeping Boer-bean	Tree	Indigenous	
<i>Solanum nigrum</i> L.	Black Nightshade	shrub	Alien	
<i>Sorghum bicolor</i> (L.) Moench subsp. <i>arundinaceum</i> (Desv.) de Wet & Harlan	Sorghum	Grass	Indigenous	
<i>Sphenostylis angustifolia</i> Sond.	Wild Sweetpea	Herb	Indigenous	
<i>Stenotaphrum secundatum</i> (Walter) Kuntze	Coastal Buffalo Grass	Grass	Alien	
<i>Strelitzia nicolai</i> Regel & K�rn.	Natal Wild Banana	Megaherb	Indigenous	
<i>Tagetes minuta</i> L.	Khakibos	Herb	Alien	
<i>Trichilia emetica</i> subsp. <i>emetica</i>	Natal mahogany	Tree	Indigenous	
<i>Vachellia natalitia</i> (E.Mey.) & Kyal. & Boatwr.	Natal Thorn	Tree	Indigenous	







## **Appendix 2 SABAP2 Bird Species List**

Common Group	Scientific Name	Common Name	Red List Status (Regional, Global)	Average of fp	Average of fpn	Max of fp_last
Crane	<i>Balearica regulorum</i>	Grey Crowned Crane	EN, EN	1.1136	5	07/10/2021
Thrush	<i>Geokichla guttata</i>	Spotted Ground Thrush	EN, EN	1.3363	6	13/06/2020
Harrier	<i>Circus ranivorus</i>	African Marsh Harrier	EN, LC	0.4454	2	30/10/2014
Buzzard	<i>Buteo trizonatus</i>	Forest Buzzard	LC, NT	0.2227	1	21/12/2013
Sandpiper	<i>Calidris ferruginea</i>	Curlew Sandpiper	LC, NT	0.2227	1	23/12/2013
Painted-snipe	<i>Rostratula benghalensis</i>	Greater Painted-snipe	NT, LC	0.2227	1	11/11/2017
Roller	<i>Coracias garrulus</i>	European Roller	NT, LC	0.6682	3	23/12/2013
Gannet	<i>Morus capensis</i>	Cape Gannet	VU, EN	0.4454	2	18/07/2020
Falcon	<i>Falco biarmicus</i>	Lanner Falcon	VU, LC	1.3363	6	30/12/2019
Finfoot	<i>Podica senegalensis</i>	African Finfoot	VU, LC	0.2227	1	25/12/2015
Goose	<i>Nettapus auritus</i>	African Pygmy Goose	VU, LC	2.0045	9	16/01/2022
Jacana	<i>Microparra capensis</i>	Lesser Jacana	VU, LC	0.2227	1	25/12/2015
Pelican	<i>Pelecanus onocrotalus</i>	Great White Pelican	VU, LC	0.4454	2	20/02/2020
Tern	<i>Sterna caspia</i>	Caspian Tern	VU, LC	0.4454	2	30/03/2014
Eagle	<i>Stephanoaetus coronatus</i>	Crowned Eagle	VU, NT	4.4543	20	07/12/2021
Ibis	<i>Geronticus calvus</i>	Southern Bald Ibis	VU, VU	1.1136	5	07/10/2021
	<i>Anas hybrid</i>	Hybrid Mallard	Exotic	0.6682	3	02/10/2017
	<i>Scopus umbretta</i>	Hamerkop	LC	28.0624	126	07/03/2022
	<i>Anas platyrhynchos</i>	Mallard	Exotic	0.2227	1	18/06/2009
	<i>Cisticola fulvicapilla</i>	Neddicky	LC	53.4521	240	02/04/2022
	<i>Philomachus pugnax</i>	Ruff	LC	0.6682	3	30/12/2015
Apalis	<i>Apalis thoracica</i>	Bar-throated Apalis	LC	17.3719	78	15/04/2022
Apalis	<i>Apalis flavida</i>	Yellow-breasted Apalis	LC	13.1403	59	24/02/2022
Avocet	<i>Recurvirostra avosetta</i>	Pied Avocet	LC	0.2227	1	12/07/2014
Barbet	<i>Lybius torquatus</i>	Black-collared Barbet	LC	87.3051	392	20/04/2022
Barbet	<i>Trachyphonus vaillantii</i>	Crested Barbet	LC	88.196	396	10/04/2022
Barbet	<i>Stactolaema leucotis</i>	White-eared Barbet	LC	74.1648	333	25/04/2022
Batis	<i>Batis capensis</i>	Cape Batis	LC	0.2227	1	06/09/2012
Batis	<i>Batis molitor</i>	Chinspot Batis	LC	4.2316	19	05/08/2021

Common Group	Scientific Name	Common Name	Red List Status (Regional, Global)	Average of fp	Average of fpn	Max of fp_last
Bee-eater	<i>Merops persicus</i>	Blue-cheeked Bee-eater	LC	0	0	-
Bee-eater	<i>Merops pusillus</i>	Little Bee-eater	LC	16.7038	75	14/12/2021
Bee-eater	<i>Merops bullockoides</i>	White-fronted Bee-eater	LC	27.8396	125	15/04/2022
Bishop	<i>Euplectes orix</i>	Southern Red Bishop	LC	80.8463	363	10/04/2022
Bittern	<i>Ixobrychus sturmii</i>	Dwarf Bittern	LC	0.4454	2	26/12/2017
Bittern	<i>Ixobrychus minutus</i>	Little Bittern	LC	3.3408	15	19/02/2022
Boubou	<i>Laniarius ferrugineus</i>	Southern Boubou	LC	67.0379	301	25/04/2022
Brownbul	<i>Phyllastrephus terrestris</i>	Terrestrial Brownbul	LC	7.1269	32	20/04/2022
Bulbul	<i>Pycnonotus tricolor</i>	Dark-capped Bulbul	LC	94.2094	423	25/04/2022
Bushshrike	<i>Chlorophoneus viridis</i>	Gorgeous Bushshrike	LC	0.6682	3	21/11/2018
Bushshrike	<i>Malaconotus blanchoti</i>	Grey-headed Bushshrike	LC	1.3363	6	09/01/2021
Bushshrike	<i>Chlorophoneus olivaceus</i>	Olive Bushshrike	LC	2.8953	13	13/06/2020
Bushshrike	<i>Chlorophoneus sulfureopectus</i>	Orange-breasted Bushshrike	LC	23.1626	104	15/04/2022
Bustard	<i>Lissotis melanogaster</i>	Black-bellied Bustard	LC	2.6726	12	12/06/2021
Buttonquail	<i>Turnix sylvaticus</i>	Common Buttonquail	LC	0.2227	1	06/06/2015
Buzzard	<i>Buteo buteo</i>	Common Buzzard	LC	2.2272	10	01/12/2017
Buzzard	<i>Buteo rufofuscus</i>	Jackal Buzzard	LC	0.2227	1	22/12/2019
Camaroptera	<i>Camaroptera brachyura</i>	Green-backed Camaroptera	LC	66.5924	299	25/04/2022
Canary	<i>Crithagra sulphurata</i>	Brimstone Canary	LC	25.167	113	28/03/2022
Canary	<i>Crithagra scotops</i>	Forest Canary	LC	0.2227	1	08/04/2017
Canary	<i>Crithagra mozambica</i>	Yellow-fronted Canary	LC	69.265	311	20/04/2022
Chat	<i>Cercomela familiaris</i>	Familiar Chat	LC	56.7929	255	15/04/2022
Chat	<i>Thamnolaea cinnamomeiventris</i>	Mocking Cliff Chat	LC	26.2806	118	25/04/2022
Cisticola	<i>Cisticola natalensis</i>	Croaking Cisticola	LC	2.0045	9	02/10/2017
Cisticola	<i>Cisticola aberrans</i>	Lazy Cisticola	LC	0.6682	3	16/01/2022
Cisticola	<i>Cisticola tinniens</i>	Levaillant's Cisticola	LC	1.3363	6	07/10/2021
Cisticola	<i>Cisticola chiniana</i>	Rattling Cisticola	LC	44.5434	200	07/10/2021
Cisticola	<i>Cisticola erythrops</i>	Red-faced Cisticola	LC	11.1359	50	07/10/2021
Cisticola	<i>Cisticola galactotes</i>	Rufous-winged Cisticola	LC	4.4543	20	07/10/2021
Cisticola	<i>Cisticola ayresii</i>	Wing-snapping Cisticola	LC	0.2227	1	01/08/2021

Common Group	Scientific Name	Common Name	Red List Status (Regional, Global)	Average of fp	Average of fpn	Max of fp_last
Cisticola	<i>Cisticola juncidis</i>	Zitting Cisticola	LC	4.6771	21	07/10/2021
Coot	<i>Fulica cristata</i>	Red-knobbed Coot	LC	12.9176	58	12/06/2021
Cormorant	<i>Microcarbo africanus</i>	Reed Cormorant	LC	55.0111	247	10/04/2022
Cormorant	<i>Phalacrocorax lucidus</i>	White-breasted Cormorant	LC	20.9354	94	07/03/2022
Coucal	<i>Centropus burchellii</i>	Burchell's Coucal	LC	73.4967	330	15/04/2022
Crake	<i>Amaurornis flavirostra</i>	Black Crake	LC	55.6793	250	25/04/2022
Crombec	<i>Sylvietta rufescens</i>	Long-billed Crombec	LC	0.4454	2	26/12/2013
Crow	<i>Corvus albus</i>	Pied Crow	LC	13.363	60	25/04/2022
Cuckoo	<i>Cuculus gularis</i>	African Cuckoo	LC	0.2227	1	28/03/2022
Cuckoo	<i>Chrysococcyx cupreus</i>	African Emerald Cuckoo	LC	0.4454	2	20/07/2014
Cuckoo	<i>Cuculus clamosus</i>	Black Cuckoo	LC	1.3363	6	09/12/2016
Cuckoo	<i>Chrysococcyx caprius</i>	Diederik Cuckoo	LC	23.8307	107	02/12/2021
Cuckoo	<i>Clamator jacobinus</i>	Jacobin Cuckoo	LC	0.6682	3	25/12/2015
Cuckoo	<i>Chrysococcyx klaas</i>	Klaas's Cuckoo	LC	27.3942	123	15/04/2022
Cuckoo	<i>Cuculus solitarius</i>	Red-chested Cuckoo	LC	0.2227	1	27/09/2014
Cuckooshrike	<i>Campephaga flava</i>	Black Cuckooshrike	LC	4.0089	18	23/08/2021
Cuckooshrike	<i>Coracina caesia</i>	Grey Cuckooshrike	LC	0.2227	1	02/10/2017
Darter	<i>Anhinga rufa</i>	African Darter	LC	8.2405	37	11/01/2022
Dove	<i>Streptopelia capicola</i>	Cape Turtle Dove	LC	0.6682	3	30/12/2019
Dove	<i>Turtur chalcospilos</i>	Emerald-spotted Wood Dove	LC	5.3452	24	24/02/2022
Dove	<i>Streptopelia senegalensis</i>	Laughing Dove	LC	60.3563	271	20/04/2022
Dove	<i>Columba larvata</i>	Lemon Dove	LC	0.2227	1	22/07/2011
Dove	<i>Oena capensis</i>	Namaqua Dove	LC	1.3363	6	12/02/2022
Dove	<i>Streptopelia semitorquata</i>	Red-eyed Dove	LC	94.2094	423	25/04/2022
Dove	<i>Columba livia</i>	Rock Dove	LC	2.6726	12	07/10/2021
Dove	<i>Turtur tympanistria</i>	Tambourine Dove	LC	59.6882	268	20/04/2022
Drongo	<i>Dicrurus ludwigii</i>	Common Square-tailed Drongo	LC	2.4499	11	16/06/2021
Drongo	<i>Dicrurus adsimilis</i>	Fork-tailed Drongo	LC	44.5434	200	25/04/2022
Duck	<i>Anas sparsa</i>	African Black Duck	LC	0.4454	2	03/02/2022
Duck	<i>Dendrocygna bicolor</i>	Fulvous Whistling Duck	LC	0.4454	2	24/12/2016

Common Group	Scientific Name	Common Name	Red List Status (Regional, Global)	Average of fp	Average of fpn	Max of fp_last
Duck	<i>Thalassornis leuconotus</i>	White-backed Duck	LC	3.118	14	11/01/2022
Duck	<i>Dendrocygna viduata</i>	White-faced Whistling Duck	LC	59.02	265	25/04/2022
Duck	<i>Anas undulata</i>	Yellow-billed Duck	LC	47.216	212	25/04/2022
Eagle	<i>Haliaeetus vocifer</i>	African Fish Eagle	LC	27.8396	125	02/04/2022
Eagle	<i>Circaetus pectoralis</i>	Black-chested Snake Eagle	LC	2.0045	9	11/01/2018
Eagle	<i>Circaetus cinereus</i>	Brown Snake Eagle	LC	0.2227	1	17/01/2014
Eagle	<i>Lophaetus occipitalis</i>	Long-crested Eagle	LC	9.5768	43	25/04/2022
Eagle	<i>Hieraaetus wahlbergi</i>	Wahlberg's Eagle	LC	0.4454	2	21/12/2014
Eagle-Owl	<i>Bubo africanus</i>	Spotted Eagle-Owl	LC	20.0445	90	11/09/2021
Egret	<i>Egretta alba</i>	Great Egret	LC	6.0134	27	27/09/2021
Egret	<i>Ardea intermedia</i>	Intermediate Egret	LC	1.559	7	25/04/2022
Egret	<i>Egretta garzetta</i>	Little Egret	LC	4.0089	18	08/08/2020
Egret	<i>Bubulcus ibis</i>	Western Cattle Egret	LC	3.3408	15	01/08/2021
Falcon	<i>Falco peregrinus</i>	Peregrine Falcon	LC	0.8909	4	18/07/2020
Firefinch	<i>Lagonosticta rubricata</i>	African Firefinch	LC	13.5857	61	12/03/2022
Firefinch	<i>Lagonosticta senegala</i>	Red-billed Firefinch	LC	25.6125	115	25/04/2022
Fiscal	<i>Lanius collaris</i>	Southern Fiscal	LC	82.6281	371	25/04/2022
Flufftail	<i>Sarothrura elegans</i>	Buff-spotted Flufftail	LC	0.8909	4	02/10/2021
Flufftail	<i>Sarothrura rufa</i>	Red-chested Flufftail	LC	0.6682	3	22/12/2019
Flycatcher	<i>Muscicapa adusta</i>	African Dusky Flycatcher	LC	27.6169	124	20/04/2022
Flycatcher	<i>Terpsiphone viridis</i>	African Paradise Flycatcher	LC	26.7261	120	15/04/2022
Flycatcher	<i>Muscicapa caerulescens</i>	Ashy Flycatcher	LC	2.6726	12	27/04/2021
Flycatcher	<i>Trochocercus cyanomelas</i>	Blue-mantled Crested Flycatcher	LC	0.8909	4	21/04/2018
Flycatcher	<i>Sigelus silens</i>	Fiscal Flycatcher	LC	7.3497	33	01/08/2021
Flycatcher	<i>Melaenornis pammelaina</i>	Southern Black Flycatcher	LC	44.9889	202	15/04/2022
Flycatcher	<i>Muscicapa striata</i>	Spotted Flycatcher	LC	1.1136	5	17/02/2018
Francolin	<i>Scleroptila shelleyi</i>	Shelley's Francolin	LC	2.4499	11	07/10/2021
Goose	<i>Alopochen aegyptiaca</i>	Egyptian Goose	LC	85.9688	386	25/04/2022
Goose	<i>Plectropterus gambensis</i>	Spur-winged Goose	LC	76.1693	342	25/04/2022
Goshawk	<i>Accipiter tachiro</i>	African Goshawk	LC	4.0089	18	12/03/2022

Common Group	Scientific Name	Common Name	Red List Status (Regional, Global)	Average of fp	Average of fpn	Max of fp_last
Grassbird	<i>Sphenoeacus afer</i>	Cape Grassbird	LC	7.7951	35	07/10/2021
Grassbird	<i>Schoenicola brevirostris</i>	Fan-tailed Grassbird	LC	0	0	-
Grebe	<i>Tachybaptus ruficollis</i>	Little Grebe	LC	40.5345	182	25/04/2022
Greenbul	<i>Andropadus importunus</i>	Sombre Greenbul	LC	63.4744	285	25/04/2022
Greenbul	<i>Chlorocichla flaviventris</i>	Yellow-bellied Greenbul	LC	51.4477	231	25/04/2022
Greenshank	<i>Tringa nebularia</i>	Common Greenshank	LC	1.1136	5	30/12/2019
Guineafowl	<i>Numida meleagris</i>	Helmeted Guineafowl	LC	67.706	304	25/04/2022
Gull	<i>Larus dominicanus</i>	Kelp Gull	LC	0.2227	1	14/03/2013
Harrier-Hawk	<i>Polyboroides typus</i>	African Harrier-Hawk	LC	2.2272	10	18/07/2020
Heron	<i>Nycticorax nycticorax</i>	Black-crowned Night Heron	LC	0.2227	1	26/12/2013
Heron	<i>Ardea melanocephala</i>	Black-headed Heron	LC	43.2071	194	24/02/2022
Heron	<i>Ardea goliath</i>	Goliath Heron	LC	7.3497	33	25/04/2022
Heron	<i>Ardea cinerea</i>	Grey Heron	LC	59.2428	266	25/04/2022
Heron	<i>Ardea purpurea</i>	Purple Heron	LC	30.0668	135	25/04/2022
Heron	<i>Ardeola ralloides</i>	Squacco Heron	LC	1.1136	5	08/08/2020
Heron	<i>Butorides striata</i>	Striated Heron	LC	0.8909	4	18/08/2020
Honey-buzzard	<i>Pernis apivorus</i>	European Honey-buzzard	LC	2.4499	11	07/03/2022
Honeybird	<i>Prodotiscus regulus</i>	Brown-backed Honeybird	LC	0.6682	3	25/06/2021
Honeyguide	<i>Indicator indicator</i>	Greater Honeyguide	LC	8.0178	36	05/07/2019
Honeyguide	<i>Indicator minor</i>	Lesser Honeyguide	LC	6.6815	30	16/01/2022
Honeyguide	<i>Indicator variegatus</i>	Scaly-throated Honeyguide	LC	1.1136	5	16/06/2021
Hoopoe	<i>Upupa africana</i>	African Hoopoe	LC	3.5635	16	26/10/2019
Hornbill	<i>Bycanistes bucinator</i>	Trumpeter Hornbill	LC	0.2227	1	16/06/2010
Ibis	<i>Threskiornis aethiopicus</i>	African Sacred Ibis	LC	6.6815	30	07/10/2021
Ibis	<i>Bostrychia hagedash</i>	Hadada Ibis	LC	92.6503	416	25/04/2022
Indigobird	<i>Vidua funerea</i>	Dusky Indigobird	LC	16.0356	72	26/12/2019
Indigobird	<i>Vidua chalybeata</i>	Village Indigobird	LC	1.559	7	05/01/2019
Jacana	<i>Actophilornis africanus</i>	African Jacana	LC	55.0111	247	25/04/2022
Kingfisher	<i>Ispidina picta</i>	African Pygmy Kingfisher	LC	2.4499	11	24/02/2022

Common Group	Scientific Name	Common Name	Red List Status (Regional, Global)	Average of fp	Average of fpn	Max of fp_last
Kingfisher	<i>Halcyon albiventris</i>	Brown-hooded Kingfisher	LC	64.8107	291	20/04/2022
Kingfisher	<i>Megaceryle maxima</i>	Giant Kingfisher	LC	7.3497	33	28/03/2022
Kingfisher	<i>Alcedo cristata</i>	Malachite Kingfisher	LC	17.3719	78	15/04/2022
Kingfisher	<i>Ceryle rudis</i>	Pied Kingfisher	LC	25.167	113	10/04/2022
Kite	<i>Elanus caeruleus</i>	Black-winged Kite	LC	1.559	7	06/11/2020
Kite	<i>Milvus aegyptius</i>	Yellow-billed Kite	LC	40.7572	183	12/02/2022
Lapwing	<i>Vanellus senegallus</i>	African Wattled Lapwing	LC	2.2272	10	07/10/2021
Lapwing	<i>Vanellus armatus</i>	Blacksmith Lapwing	LC	10.9131	49	07/10/2021
Lapwing	<i>Vanellus coronatus</i>	Crowned Lapwing	LC	0.2227	1	21/08/2012
Lark	<i>Mirafra africana</i>	Rufous-naped Lark	LC	4.2316	19	16/01/2022
Longclaw	<i>Macronyx croceus</i>	Yellow-throated Longclaw	LC	6.9042	31	05/01/2022
Malkoha	<i>Ceuthmochares australis</i>	Green Malkoha	LC	9.5768	43	20/04/2022
Mannikin	<i>Lonchura cucullata</i>	Bronze Mannikin	LC	82.8508	372	20/04/2022
Mannikin	<i>Lonchura nigriceps</i>	Red-backed Mannikin	LC	2.2272	10	13/06/2020
Martin	<i>Riparia cincta</i>	Banded Martin	LC	0.2227	1	20/02/2020
Martin	<i>Riparia paludicola</i>	Brown-throated Martin	LC	16.2584	73	13/12/2020
Martin	<i>Hirundo fuligula</i>	Rock Martin	LC	0	0	-
Martin	<i>Riparia riparia</i>	Sand Martin	LC	0.4454	2	30/12/2015
Masked-weaver	<i>Ploceus intermedius</i>	Lesser Masked-weaver	LC	0.2227	1	05/09/2013
Moorhen	<i>Gallinula chloropus</i>	Common Moorhen	LC	75.7238	340	20/04/2022
Moorhen	<i>Paragallinula angulata</i>	Lesser Moorhen	LC	1.3363	6	25/04/2022
Mousebird	<i>Urocolius indicus</i>	Red-faced Mousebird	LC	4.2316	19	25/04/2022
Mousebird	<i>Colius striatus</i>	Speckled Mousebird	LC	81.2918	365	20/04/2022
Myna	<i>Acridotheres tristis</i>	Common Myna	LC	41.6481	187	15/04/2022
Nightjar	<i>Caprimulgus pectoralis</i>	Fiery-necked Nightjar	LC	3.5635	16	07/10/2021
Oriole	<i>Oriolus larvatus</i>	Black-headed Oriole	LC	7.1269	32	12/03/2022
Osprey	<i>Pandion haliaetus</i>	Western Osprey	LC	1.7817	8	05/07/2019
Owl	<i>Strix woodfordii</i>	African Wood Owl	LC	0.4454	2	07/05/2016
Owl	<i>Tyto alba</i>	Western Barn Owl	LC	0.4454	2	21/04/2018

Common Group	Scientific Name	Common Name	Red List Status (Regional, Global)	Average of fp	Average of fpn	Max of fp_last
Parakeet	<i>Psittacula krameri</i>	Rose-ringed Parakeet	LC	0.2227	1	08/11/2013
Pigeon	<i>Treron calvus</i>	African Green Pigeon	LC	16.2584	73	25/04/2022
Pigeon	<i>Columba guinea</i>	Speckled Pigeon	LC	3.3408	15	25/04/2022
Pipit	<i>Anthus cinnamomeus</i>	African Pipit	LC	6.9042	31	16/01/2022
Pipit	<i>Anthus leucophrys</i>	Plain-backed Pipit	LC	0.2227	1	06/11/2020
Plover	<i>Charadrius hiaticula</i>	Common Ringed Plover	LC	0.4454	2	01/08/2021
Plover	<i>Charadrius pecuarius</i>	Kittlitz's Plover	LC	1.559	7	06/11/2020
Plover	<i>Charadrius tricollaris</i>	Three-banded Plover	LC	32.0713	144	07/03/2022
Plover	<i>Charadrius marginatus</i>	White-fronted Plover	LC	0.2227	1	23/12/2013
Pratincole	<i>Glareola pratincola</i>	Collared Pratincole	LC	0.4454	2	07/10/2021
Prinia	<i>Prinia subflava</i>	Tawny-flanked Prinia	LC	56.5702	254	20/04/2022
Puffback	<i>Dryoscopus cubla</i>	Black-backed Puffback	LC	16.9265	76	12/03/2022
Quelea	<i>Quelea quelea</i>	Red-billed Quelea	LC	26.0579	117	07/02/2022
Quelea	<i>Quelea erythrops</i>	Red-headed Quelea	LC	2.6726	12	06/11/2020
Rail	<i>Rallus caerulescens</i>	African Rail	LC	0.4454	2	20/05/2018
Raven	<i>Corvus albicollis</i>	White-necked Raven	LC	0.2227	1	15/05/2020
Robin-Chat	<i>Cossypha caffra</i>	Cape Robin-Chat	LC	4.4543	20	07/10/2021
Robin-Chat	<i>Cossypha dichroa</i>	Chorister Robin-Chat Robin-Chat	LC	0.2227	1	20/03/2016
Robin-Chat	<i>Cossypha natalensis</i>	Red-capped Robin-Chat	LC	80.8463	363	25/04/2022
Sandpiper	<i>Actitis hypoleucos</i>	Common Sandpiper	LC	0.6682	3	25/12/2015
Sandpiper	<i>Tringa stagnatilis</i>	Marsh Sandpiper	LC	0.2227	1	30/12/2015
Sandpiper	<i>Tringa glareola</i>	Wood Sandpiper	LC	18.7082	84	07/03/2022
Saw-wing	<i>Psalidoprocne pristoptera</i>	Black (Southern Africa) Saw-wing	LC	45.657	205	20/04/2022
Scrub Robin	<i>Cercotrichas signata</i>	Brown Scrub Scrub Robin	LC	4.8998	22	28/10/2017
Scrub Robin	<i>Cercotrichas leucophrys</i>	White-browed Scrub Robin	LC	64.3653	289	20/04/2022
Seedeater	<i>Crithagra gularis</i>	Streaky-headed Seedeater	LC	1.559	7	21/02/2015
Shrike	<i>Lanius collurio</i>	Red-backed Shrike	LC	0.4454	2	26/12/2018
Snipe	<i>Gallinago nigripennis</i>	African Snipe	LC	0.2227	1	30/12/2015
Sparrow	<i>Passer melanurus</i>	Cape Sparrow	LC	0.2227	1	20/12/2015
Sparrow	<i>Passer domesticus</i>	House Sparrow	LC	60.5791	272	25/04/2022



Common Group	Scientific Name	Common Name	Red List Status (Regional, Global)	Average of fp	Average of fpn	Max of fp_last
Sparrow	<i>Passer diffusus</i>	Southern Grey-headed Sparrow	LC	70.6013	317	15/04/2022
Sparrow	<i>Gymnoris supercilialis</i>	Yellow-throated Bush Sparrow	LC	5.1225	23	18/08/2018
Sparrowhawk	<i>Accipiter melanoleucus</i>	Black Sparrowhawk	LC	9.5768	43	05/08/2021
Sparrowhawk	<i>Accipiter minullus</i>	Little Sparrowhawk	LC	1.3363	6	18/07/2020
Spoonbill	<i>Platalea alba</i>	African Spoonbill	LC	7.7951	35	03/08/2019
Spurfowl	<i>Pternistis natalensis</i>	Natal Spurfowl	LC	73.4967	330	25/04/2022
Starling	<i>Notopholia corrusca</i>	Black-bellied Starling	LC	75.9465	341	25/04/2022
Starling	<i>Lamprotornis nitens</i>	Cape Starling	LC	32.7394	147	25/04/2022
Starling	<i>Sturnus vulgaris</i>	Common Starling	LC	6.6815	30	17/11/2017
Starling	<i>Onychognathus morio</i>	Red-winged Starling	LC	61.6927	277	25/04/2022
Starling	<i>Cinnyricinclus leucogaster</i>	Violet-backed Starling	LC	32.7394	147	15/04/2022
Starling	<i>Creatophora cinerea</i>	Wattled Starling	LC	0.6682	3	26/12/2015
Stilt	<i>Himantopus himantopus</i>	Black-winged Stilt	LC	0.6682	3	30/12/2015
Stint	<i>Calidris minuta</i>	Little Stint	LC	0.6682	3	28/05/2016
Stonechat	<i>Saxicola torquatus</i>	African Stonechat	LC	18.4855	83	16/01/2022
Stork	<i>Ciconia ciconia</i>	White Stork	LC	0	0	-
Stork	<i>Ciconia episcopus</i>	Woolly-necked Stork	LC	69.7105	313	20/04/2022
Sunbird	<i>Chalcomitra amethystina</i>	Amethyst Sunbird	LC	54.5657	245	20/04/2022
Sunbird	<i>Hedydipna collaris</i>	Collared Sunbird	LC	15.1448	68	03/02/2022
Sunbird	<i>Cyanomitra veroxii</i>	Grey Sunbird	LC	12.4722	56	20/04/2022
Sunbird	<i>Cyanomitra olivacea</i>	Olive Sunbird	LC	40.0891	180	25/04/2022
Sunbird	<i>Cinnyris bifasciatus</i>	Purple-banded Sunbird	LC	3.5635	16	27/09/2021
Sunbird	<i>Chalcomitra senegalensis</i>	Scarlet-chested Sunbird	LC	0.8909	4	22/06/2018
Sunbird	<i>Cinnyris talatala</i>	White-bellied Sunbird	LC	72.8285	327	25/04/2022
Swallow	<i>Hirundo rustica</i>	Barn Swallow	LC	46.7706	210	10/04/2022
Swallow	<i>Cecropis cucullata</i>	Greater Striped Swallow	LC	1.1136	5	16/01/2022
Swallow	<i>Cecropis abyssinica</i>	Lesser Striped Swallow	LC	65.2561	293	12/03/2022
Swallow	<i>Cecropis semirufa</i>	Red-breasted Swallow	LC	0.2227	1	19/10/2013
Swallow	<i>Hirundo albigularis</i>	White-throated Swallow	LC	25.8352	116	19/02/2022
Swallow	<i>Hirundo smithii</i>	Wire-tailed Swallow	LC	9.7996	44	09/11/2021

Common Group	Scientific Name	Common Name	Red List Status (Regional, Global)	Average of fp	Average of fpn	Max of fp_last
Swamphen	<i>Porphyrion madagascariensis</i>	African Swamphen	LC	0.2227	1	18/06/2009
Swift	<i>Apus barbatus</i>	African Black Swift	LC	4.0089	18	06/11/2020
Swift	<i>Cypsiurus parvus</i>	African Palm Swift	LC	44.098	198	10/04/2022
Swift	<i>Tachymarptis melba</i>	Alpine Swift	LC	2.8953	13	25/06/2018
Swift	<i>Apus horus</i>	Horus Swift	LC	2.8953	13	14/11/2021
Swift	<i>Apus affinis</i>	Little Swift	LC	29.6214	133	19/02/2022
Swift	<i>Apus caffer</i>	White-rumped Swift	LC	40.98	184	15/04/2022
Tchagra	<i>Tchagra senegalus</i>	Black-crowned Tchagra	LC	9.5768	43	09/11/2021
Tchagra	<i>Tchagra tchagra</i>	Southern Tchagra	LC	19.5991	88	02/04/2022
Teal	<i>Anas erythrorhyncha</i>	Red-billed Teal	LC	0.2227	1	25/12/2015
Tern	<i>Thalasseus bergii</i>	Greater Crested Tern	LC	1.1136	5	22/04/2016
Tern	<i>Sterna albifrons</i>	Little Tern	LC	0.2227	1	30/03/2014
Thrush	<i>Turdus libonyanus</i>	Kurrichane Thrush	LC	22.2717	100	14/11/2021
Thrush	<i>Turdus olivaceus</i>	Olive Thrush	LC	0.6682	3	05/07/2019
Tinkerbird	<i>Pogoniulus pusillus</i>	Red-fronted Tinkerbird	LC	48.3296	217	25/04/2022
Tinkerbird	<i>Pogoniulus bilineatus</i>	Yellow-rumped Tinkerbird	LC	81.2918	365	20/04/2022
Tit	<i>Parus niger</i>	Southern Black Tit	LC	38.9755	175	20/04/2022
Trogon	<i>Apaloderma narina</i>	Narina Trogon	LC	0.2227	1	09/08/2015
Turaco	<i>Tauraco corythaix</i>	Knysna Turaco	LC	0.4454	2	20/03/2016
Turaco	<i>Tauraco porphyreolophus</i>	Purple-crested Turaco	LC	78.3964	352	25/04/2022
Twinspot	<i>Mandingoa nitidula</i>	Green Twinspot	LC	1.3363	6	27/04/2021
Vulture	<i>Gypohierax angolensis</i>	Palm-nut Vulture	LC	2.6726	12	25/07/2021
Wagtail	<i>Motacilla aguimp</i>	African Pied Wagtail	LC	64.588	290	20/04/2022
Wagtail	<i>Motacilla capensis</i>	Cape Wagtail	LC	81.5145	366	25/04/2022
Wagtail	<i>Motacilla clara</i>	Mountain Wagtail	LC	0.4454	2	07/10/2021
Wagtail	<i>Motacilla flava</i>	Western Yellow Wagtail	LC	0.2227	1	08/01/2009
Warbler	<i>Acrocephalus baeticatus</i>	African Reed Warbler	LC	2.0045	9	07/10/2021
Warbler	<i>Iduna natalensis</i>	African Yellow Warbler	LC	4.6771	21	16/01/2022
Warbler	<i>Sylvia borin</i>	Garden Warbler	LC	1.3363	6	05/01/2018
Warbler	<i>Acrocephalus arundinaceus</i>	Great Reed Warbler	LC	0.8909	4	05/01/2019

Common Group	Scientific Name	Common Name	Red List Status (Regional, Global)	Average of fp	Average of fpn	Max of fp_last
Warbler	<i>Acrocephalus gracilirostris</i>	Lesser Swamp Warbler	LC	17.8174	80	05/01/2022
Warbler	<i>Bradypterus baboecala</i>	Little Rush Warbler	LC	24.2762	109	07/02/2022
Warbler	<i>Acrocephalus palustris</i>	Marsh Warbler	LC	0.2227	1	21/03/2010
Warbler	<i>Acrocephalus schoenobaenus</i>	Sedge Warbler	LC	0.2227	1	20/02/2020
Warbler	<i>Phylloscopus trochilus</i>	Willow Warbler	LC	3.3408	15	16/01/2022
Wattle-eye	<i>Platysteira peltata</i>	Black-throated Wattle-eye	LC	21.6036	97	25/04/2022
Waxbill	<i>Uraeginthus angolensis</i>	Blue Waxbill	LC	2.0045	9	23/05/2015
Waxbill	<i>Estrilda astrild</i>	Common Waxbill	LC	11.5813	52	07/10/2021
Waxbill	<i>Estrilda perreini</i>	Grey Waxbill	LC	1.559	7	07/03/2022
Waxbill	<i>Amandava subflava</i>	Orange-breasted Waxbill	LC	1.7817	8	20/05/2018
Weaver	<i>Ploceus capensis</i>	Cape Weaver	LC	2.2272	10	06/11/2020
Weaver	<i>Ploceus bicolor</i>	Dark-backed Weaver	LC	1.559	7	16/06/2021
Weaver	<i>Ploceus xanthops</i>	Golden Weaver	LC	0.8909	4	20/02/2021
Weaver	<i>Ploceus xanthopterus</i>	Southern Brown-throated Weaver	LC	0.6682	3	25/12/2015
Weaver	<i>Ploceus velatus</i>	Southern Masked Weaver	LC	1.1136	5	07/10/2021
Weaver	<i>Ploceus ocularis</i>	Spectacled Weaver	LC	79.0646	355	20/04/2022
Weaver	<i>Amblyospiza albifrons</i>	Thick-billed Weaver	LC	63.029	283	02/04/2022
Weaver	<i>Ploceus cucullatus</i>	Village Weaver	LC	91.9822	413	25/04/2022
Weaver	<i>Ploceus subaureus</i>	Yellow Weaver	LC	73.4967	330	25/04/2022
White-eye	<i>Zosterops virens</i>	Cape White-eye	LC	73.9421	332	20/04/2022
Whydah	<i>Vidua macroura</i>	Pin-tailed Whydah	LC	39.6437	178	24/02/2022
Widowbird	<i>Euplectes axillaris</i>	Fan-tailed Widowbird	LC	13.363	60	12/02/2022
Widowbird	<i>Euplectes progne</i>	Long-tailed Widowbird	LC	0.4454	2	06/11/2020
Widowbird	<i>Euplectes ardens</i>	Red-collared Widowbird	LC	5.5679	25	06/11/2020
Wood Hoopoe	<i>Phoeniculus purpureus</i>	Green Wood Hoopoe	LC	4.6771	21	24/10/2020
Woodpecker	<i>Dendropicos fuscescens</i>	Cardinal Woodpecker	LC	22.2717	100	15/04/2022
Woodpecker	<i>Campethera abingoni</i>	Golden-tailed Woodpecker	LC	57.9065	260	15/04/2022
Wryneck	<i>Jynx ruficollis</i>	Red-throated Wryneck	LC	1.559	7	01/08/2021



## **Appendix 3 ReptileMAP Species List**

Family	Scientific name	Common name	Red list category	Average of Number of records	Max of Last recorded
Cordylidae	<i>Chamaesaura macrolepis</i>	Large-scaled Grass Lizard	Near Threatened (SARCA 2014)	1	16/03/1986
Lamprophiidae	<i>Macrelaps microlepidotus</i>	Natal Black Snake	Near Threatened (SARCA 2014)	1	15/06/1900
Elapidae	<i>Dendroaspis angusticeps</i>	Green Mamba	Vulnerable (SARCA 2014)	1	15/06/1900
Agamidae	<i>Acanthocercus atricollis</i>	Southern Tree Agama	Least Concern (SARCA 2014)	2	15/06/1900
Chamaeleonidae	<i>Chamaeleo dilepis</i>	Common Flap-neck Chameleon	Least Concern (SARCA 2014)	1	04/01/2019
Colubridae	<i>Crotaphopeltis hotamboeia</i>	Red-lipped Snake	Least Concern (SARCA 2014)	4	20/06/1985
Colubridae	<i>Dasypeltis inornata</i>	Southern Brown Egg-eater	Least Concern (SARCA 2014)	2	24/06/1981
Colubridae	<i>Dispholidus typus typus</i>	Boomslang	Least Concern (SARCA 2014)	2	15/06/1900
Colubridae	<i>Philothamnus hoplogaster</i>	South Eastern Green Snake	Least Concern (SARCA 2014)	1	15/06/1900
Colubridae	<i>Philothamnus semivariegatus</i>	Spotted Bush Snake	Least Concern (SARCA 2014)	1	07/10/2017
Elapidae	<i>Naja annulifera</i>	Snouted Cobra	Least Concern (SARCA 2014)	1	15/06/1900
Elapidae	<i>Naja mossambica</i>	Mozambique Spitting Cobra	Least Concern (SARCA 2014)	1	15/06/1900
Gekkonidae	<i>Hemidactylus mabouia</i>	Common Tropical House Gecko	Least Concern (SARCA 2014)	1	26/01/2021
Gekkonidae	<i>Lygodactylus capensis</i>	Common Dwarf Gecko	Least Concern (SARCA 2014)	3	26/01/2021
Gerrhosauridae	<i>Gerrhosaurus flavigularis</i>	Yellow-throated Plated Lizard	Least Concern (SARCA 2014)	2	15/06/1900
Lamprophiidae	<i>Boaedon capensis</i>	Brown House Snake	Least Concern (SARCA 2014)	3	15/06/1900
Lamprophiidae	<i>Duberria lutrix lutrix</i>	South African Slug-eater	Least Concern (SARCA 2014)	1	15/06/1900
Lamprophiidae	<i>Lycodonomorphus rufulus</i>	Brown Water Snake	Least Concern (SARCA 2014)	2	15/06/1900
Lamprophiidae	<i>Lycophidion capense capense</i>	Cape Wolf Snake	Least Concern (SARCA 2014)	3	15/06/1900
Lamprophiidae	<i>Pseudaspis cana</i>	Mole Snake	Least Concern (SARCA 2014)	4	25/11/1911
Pythonidae	<i>Python natalensis</i>	Southern African Python	Least Concern (SARCA 2014)	1	15/06/1900
Scincidae	<i>Acontias plumbeus</i>	Giant Legless Skink	Least Concern (SARCA 2014)	1	27/04/2020
Scincidae	<i>Panaspis wahlbergii</i>	Wahlberg's Snake-eyed Skink	Least Concern (SARCA 2014)	10	13/05/1981
Scincidae	<i>Trachylepis varia sensu lato</i>	Common Variable Skink Complex	Least Concern (SARCA 2014)	1	15/06/1900
Typhlopidae	<i>Afrotyphlops bibronii</i>	Bibron's Blind Snake	Least Concern (SARCA 2014)	1	14/09/1997
Viperidae	<i>Causus rhombeatus</i>	Rhombic Night Adder	Least Concern (SARCA 2014)	4	24/10/1992
Elapidae	<i>Naja subfulva</i>	Brown Forest Cobra		3	17/06/1980
Leptotyphlopidae	<i>Leptotyphlops scutifrons scutifrons</i>	Peters' Thread Snake		3	15/06/1900



## **Appendix 4 FrogMAP Species List**

Family	Scientific name	Common name	Red listcategory	Average of Number of records	Max of Last recorded records
Arthroleptidae	<i>Arthroleptis wahlbergi</i>	Bush Squeaker	Least Concern	2	06/10/2002
Arthroleptidae	<i>Leptopelis natalensis</i>	Forest Tree Frog	Least Concern	3	03/10/2002
Brevicipitidae	<i>Breviceps mossambicus</i>	Mozambique Rain Frog	Least Concern	2	17/11/1999
Bufo	<i>Schismaderma carens</i>	Red Toad	Least Concern	1	28/01/2021
Bufo	<i>Sclerophrys gutturalis</i>	Guttural Toad	Least Concern (IUCN, 2016)	6	06/10/2002
Bufo	<i>Sclerophrys pusilla</i>	Flatbacked Toad	Least Concern (IUCN, 2016)	2	21/12/2019
Hyperoliidae	<i>Afrixalus delicatus</i>	Delicate Leaf-folding Frog	Least Concern (2013)	3	
Hyperoliidae	<i>Afrixalus spinifrons</i>	Natal Leaf-folding Frog	Least Concern (2016)	1	
Hyperoliidae	<i>Hylambates maculatus</i>	Redlegged Kassina	Least Concern ver 3.1 (2013)	1	06/10/2002
Hyperoliidae	<i>Hyperolius sp.</i>			1	21/12/2019
Hyperoliidae	<i>Hyperolius argus</i>	Argus Reed Frog	Least Concern	1	06/10/2002
Hyperoliidae	<i>Hyperolius marmoratus</i>	Painted Reed Frog	Least Concern (IUCN ver 3.1, 2013)	9	21/12/2019
Hyperoliidae	<i>Hyperolius marmoratus taeniatus</i>	Painted Reed Frog (subsp. taeniatus)	Least Concern (IUCN ver 3.1, 2013)	8	21/12/2019
Hyperoliidae	<i>Hyperolius microps</i>	Sharp-headed Long Reed Frog	Least Concern	1	06/10/2002
Hyperoliidae	<i>Hyperolius tuberilinguis</i>	Tinker Reed Frog	Least Concern	4	17/11/1999
Hyperoliidae	<i>Kassina senegalensis</i>	Bubbling Kassina	Least Concern	2	17/11/1999
Phrynobatrachidae	<i>Phrynobatrachus natalensis</i>	Snoring Puddle Frog	Least Concern (IUCN, 2013)	7	17/11/1999
Ptychadenidae	<i>Ptychadena mascareniensis</i>	Mascarene Grass Frog	Least Concern	1	06/10/2002
Ptychadenidae	<i>Ptychadena oxyrhynchus</i>	Sharposed Grass Frog	Least Concern	3	17/11/1999
Pyxicephalidae	<i>Amietia delalandii</i>	Delalande's River Frog	Least Concern (2017)	1	03/10/2002



## **Appendix 5 MammalMAP Species List**



Family	Scientific name	Common name	Red list category	Average of Number of records	Max of Last recorded
Bovidae	<i>Cephalophus natalensis</i>	Red Duiker	Near Threatened (2016)	1	22/09/2019
Bovidae	<i>Philantomba monticola</i>	Blue Duiker	Vulnerable (2016)	1	29/05/2012
Equidae	<i>Equus quagga</i>	Plains Zebra	Least Concern (2016)	2	23/11/1998
Gliridae	<i>Graphiurus (Graphiurus) murinus</i>	Forest African Dormouse	Least Concern	3	17/03/2011
Herpestidae	<i>Atilax paludinosus</i>	Marsh Mongoose	Least Concern (2016)	1	04/08/2012
Hystriidae	<i>Hystrix africaeaustralis</i>	Cape Porcupine	Least Concern	1	05/08/2012
Muridae	<i>Mastomys natalensis</i>	Natal Mastomys	Least Concern (2016)	2	17/08/2009
Muridae	<i>Otomys angoniensis</i>	Angoni Vlei Rat	Least Concern (2016)	1	
Muridae	<i>Rattus norvegicus</i>	Brown Rat	Least Concern	93	26/09/2009
Muridae	<i>Rattus rattus</i>	Roof Rat	Least Concern	1	11/08/2011



**Appendix 6 LepiMAP Species List**

Family	Scientific name	Common name	Red listcategory	Average of Number of records	Max of Last recorded
CRAMBIDAE	<i>Zebronia phenice</i>			1	04/01/2019
EREBIDAE	<i>Amata sp.</i>			1	08/01/2013
EREBIDAE	<i>Mocis mayeri</i>			1	04/04/2014
HESPERIIDAE	<i>Acleros mackeenii mackeenii</i>	Macken's dart	Least Concern (SABCA 2013)	6	05/11/2021
HESPERIIDAE	<i>Afrogegenes sp.</i>			1	24/10/2020
HESPERIIDAE	<i>Borbo lugens</i>	Lesser-horned swift	Least Concern (SABCA 2013)	3	05/05/1923
HESPERIIDAE	<i>Caprona pillaana</i>	Ragged skipper	Least Concern (SABCA 2013)	1	24/12/1925
HESPERIIDAE	<i>Coeliades forestan forestan</i>	Striped policeman	Least Concern (SABCA 2013)	1	15/05/1990
HESPERIIDAE	<i>Coeliades pistratus</i>	Two-pip policeman	Least Concern (SABCA 2013)	1	15/06/1913
HESPERIIDAE	<i>Larsenia gemella</i>	Twin swift	Least Concern (SABCA 2013)	1	04/01/2019
HESPERIIDAE	<i>Moltena fiara</i>	Strelitzia night-fighter	Least Concern (SABCA 2013)	3	15/04/1923
HESPERIIDAE	<i>Sarangesa ruona</i>	Ruona elfin	Least Concern (SABCA 2013)	1	09/07/1969
HESPERIIDAE	<i>Spialia dromus</i>	Forest sandman	Least Concern (SABCA 2013)	3	10/04/1980
HESPERIIDAE	<i>Tagiades flesus</i>	Clouded flat	Least Concern (SABCA 2013)	5	04/01/2019
LYCAENIDAE	<i>Anthene amarah amarah</i>	Black-striped ciliate blue	Least Concern (SABCA 2013)	1	30/03/2009
LYCAENIDAE	<i>Anthene larydas</i>	Spotted ciliate blue	Least Concern (SABCA 2013)	1	04/01/2019
LYCAENIDAE	<i>Azanus mirza</i>	Pale babul blue	Least Concern (SABCA 2013)	1	04/01/2019
LYCAENIDAE	<i>Azanus moriqua</i>	Black-bordered babul blue	Least Concern (SABCA 2013)	1	04/01/2019
LYCAENIDAE	<i>Deudorix antalus</i>	Brown playboy	Least Concern (SABCA 2013)	4	22/04/2001
LYCAENIDAE	<i>Euchrysops barkeri</i>	Pale smoky blue	Least Concern (SABCA 2013)	4	24/12/1925
LYCAENIDAE	<i>Euchrysops malathana</i>	Grey smoky blue	Least Concern (SABCA 2013)	1	04/01/2019
LYCAENIDAE	<i>Hypolycaena philippus philippus</i>	Purple-brown hairstreak	Least Concern (SABCA 2013)	3	05/11/2021
LYCAENIDAE	<i>Iolaus silas</i>	Southern sapphire	Least Concern (SABCA 2013)	1	12/05/2009
LYCAENIDAE	<i>Lachnocnema laches</i>	Southern pied woolly legs	Least Concern (SABCA 2013)	2	30/03/2009
LYCAENIDAE	<i>Lampides boeticus</i>	Pea blue	Least Concern (SABCA 2013)	2	04/04/2014
LYCAENIDAE	<i>Leptomyrina hirundo</i>	Tailed black-eye	Least Concern (SABCA 2013)	1	11/07/1969
LYCAENIDAE	<i>Leptotes sp.</i>			4	24/10/2020
LYCAENIDAE	<i>Deudorix diocles</i>	Orange-barred playboy	Least Concern (SABCA 2013)	2	22/04/2001

Family	Scientific name	Common name	Red listcategory	Average of Number of records	Max of Last recorded
LYCAENIDAE	<i>Zizeeria knysna knysna</i>	African grass blue	Least Concern (SABCA 2013)	3	04/11/2021
NOCTUIDAE	<i>Eustrotia decissima</i>			1	04/04/2014
NYMPHALIDAE	<i>Acraea natalica</i>	Black-based acraea	Least Concern (SABCA 2013)	1	04/01/2019
NYMPHALIDAE	<i>Acraea neobule neobule</i>	Wandering donkey acraea	Least Concern (SABCA 2013)	4	10/04/1980
NYMPHALIDAE	<i>Acraea petraea</i>	Blood-red acraea	Least Concern (SABCA 2013)	1	15/07/1913
NYMPHALIDAE	<i>Amauris albimaculata albimaculata</i>	Layman	Least Concern (SABCA 2013)	2	24/10/2020
NYMPHALIDAE	<i>Bicyclus safitza safitza</i>	Black-haired bush brown	Least Concern (SABCA 2013)	4	05/11/2021
NYMPHALIDAE	<i>Brakefieldia perspicua perspicua</i>	Marsh patroller	Least Concern (SABCA 2013)	2	08/07/2013
NYMPHALIDAE	<i>Byblia anvatarata acheloia</i>	African joker	Least Concern (SABCA 2013)	1	15/06/1913
NYMPHALIDAE	<i>Cassionympha cassius</i>	Rainforest dull brown	Least Concern (SABCA 2013)	1	17/01/1927
NYMPHALIDAE	<i>Charaxes candiope</i>	Green-veined charaxes	Least Concern (SABCA 2013)	3	17/03/2018
NYMPHALIDAE	<i>Charaxes cithaeron cithaeron</i>	Blue-spotted charaxes	Least Concern (SABCA 2013)	2	16/05/1990
NYMPHALIDAE	<i>Charaxes ethalion ethalion</i>	Satyr charaxes	Least Concern (SABCA 2013)	2	16/05/1990
NYMPHALIDAE	<i>Charaxes varanes varanes</i>	Pearl charaxes	Least Concern (SABCA 2013)	5	04/01/2019
NYMPHALIDAE	<i>Charaxes wakefieldi</i>	Forest queen	Least Concern (SABCA 2013)	1	15/06/1900
NYMPHALIDAE	<i>Charaxes zoolina</i>	Club-tailed charaxes	Least Concern (SABCA 2013)	2	16/05/1990
NYMPHALIDAE	<i>Eurytela dryope angulata</i>	Golden piper	Least Concern (SABCA 2013)	2	04/01/2019
NYMPHALIDAE	<i>Eurytela hiarbas angustata</i>	Pied piper	Least Concern (SABCA 2013)	2	15/01/1940
NYMPHALIDAE	<i>Hypolimnas anthedon wahlbergi</i>	Variable diadem	Least Concern (SABCA 2013)	1	15/07/1913
NYMPHALIDAE	<i>Hypolimnas misippus</i>	Common diadem	Least Concern (SABCA 2013)	1	04/04/2014
NYMPHALIDAE	<i>Junonia hierta cebrene</i>	Yellow pansy	Least Concern (SABCA 2013)	2	28/01/2021
NYMPHALIDAE	<i>Junonia natalica natalica</i>	Brown commodore	Least Concern (SABCA 2013)	4	08/07/2013
NYMPHALIDAE	<i>Junonia oenone oenone</i>	Dark blue pansy	Least Concern (SABCA 2013)	8	04/01/2019
NYMPHALIDAE	<i>Junonia terea elgiva</i>	Soldier pansy	Least Concern (SABCA 2013)	1	04/01/2019
NYMPHALIDAE	<i>Neptis laeta</i>	Common barred sailer	Least Concern (SABCA 2013)	1	04/01/2019
NYMPHALIDAE	<i>Phalanta eurytis eurytis</i>	Forest leopard	Least Concern (SABCA 2013)	1	15/05/1992
NYMPHALIDAE	<i>Precis archesia archesia</i>	Garden inspector	Least Concern (SABCA 2013)	1	31/03/2013

Family	Scientific name	Common name	Red listcategory	Average of Number of records	Max of Last recorded
NYMPHALIDAE	<i>Precis octavia sesamus</i>	Southern gaudy commodore	Least Concern (SABCA 2013)	1	15/06/1902
NYMPHALIDAE	<i>Protogoniomorpha parhassus</i>	Common Mother-of-pearl	Least Concern (SABCA 2013)	5	04/01/2019
NYMPHALIDAE	<i>Sevenia boisduvali boisduvali</i>	Boisduval's tree nymph	Least Concern (SABCA 2013)	4	15/05/2015
NYMPHALIDAE	<i>Sevenia natalensis</i>	Bronze tree nymph	Least Concern (SABCA 2013)	1	09/07/1969
NYMPHALIDAE	<i>Telchinia cabira</i>	Yellow-banded telchinia	Least Concern (SABCA 2013)	2	04/01/2019
NYMPHALIDAE	<i>Telchinia encedon encedon</i>	White-barred telchinia	Least Concern (SABCA 2013)	5	24/10/2020
NYMPHALIDAE	<i>Telchinia serena</i>	Dancing telchinia	Least Concern (SABCA 2013)	3	10/04/1980
NYMPHALIDAE	<i>Vanessa cardui</i>	Painted lady	Least Concern (SABCA 2013)	4	25/12/2015
PAPILIONIDAE	<i>Papilio dardanus cenea</i>	Mocker swallowtail	Least Concern (SABCA 2013)	1	15/07/1913
PAPILIONIDAE	<i>Papilio demodocus demodocus</i>	Citrus swallowtail	Least Concern (SABCA 2013)	4	20/02/2021
PIERIDAE	<i>Belenois creona severina</i>	African caper white	Least Concern (SABCA 2013)	3	06/11/2021
PIERIDAE	<i>Belenois gidica abyssinica</i>	African veined white	Least Concern (SABCA 2013)	1	15/05/2015
PIERIDAE	<i>Belenois thysa thysa</i>	False dotted border	Least Concern (SABCA 2013)	3	24/10/2020
PIERIDAE	<i>Catopsilia florella</i>	African migrant	Least Concern (SABCA 2013)	1	08/01/2013
PIERIDAE	<i>Colotis auxo auxo</i>	Sulphur orange tip	Least Concern (SABCA 2013)	1	17/03/2018
PIERIDAE	<i>Dixeia pigea</i>	Small ant-heap white	Least Concern (SABCA 2013)	4	17/03/2018
PIERIDAE	<i>Dixeia spilleri</i>	Sulphur ant-heap white	Least Concern (SABCA 2013)	1	17/03/2018
PIERIDAE	<i>Eronia cleodora</i>	Vine-leaf vagrant	Least Concern (SABCA 2013)	1	15/11/1965
PIERIDAE	<i>Eurema brigitta brigitta</i>	Broad-bordered grass yellow	Least Concern (SABCA 2013)	1	15/05/2015
PIERIDAE	<i>Eurema hecabe solifera</i>	Lowveld yellow	Least Concern (SABCA 2013)	1	17/08/2019
PIERIDAE	<i>Leptosia alcesta inalcesta</i>	African wood white	Least Concern (SABCA 2013)	1	24/10/2020
PTEROPHORIDAE	FAMILY PTEROPHORIDAE	Unidentified PTEROPHORIDAE		1	07/10/2017
SATURNIIDAE	<i>Pselaphelia flavivitta</i>			1	07/10/2017



## **Appendix 7 CV's of specialists**



**Appendix 8**  
**Desktop Assessment Methodology and Information**

## **EZEMVELO KZN WILDLIFE C-PLAN & SEA DATABASE**

The C-Plan is a systematic conservation-planning package that runs with the GIS software ArcGIS, and which analyses biodiversity features and landscape units. C-Plan is used to identify a national reserve system that will satisfy specified conservation targets for biodiversity features (*Ezemvelo KZN Wildlife*, 2010). Biodiversity features can be land classes or species, and targets that are set within area units either for land classes, or as numbers of occurrences of species for species locality data sets (*Ezemvelo KZN Wildlife*, 2010). These units or measurements are used as **surrogates** for un-sampled data. The C-Plan is an effective conservation tool when determining priority areas at a **regional level** and is being used in South Africa to identify areas of high conservation value. The SEA (Goodman, 2004) modelled the distribution of a selection of 255 red data and endemic species that have the potential to occur in the area.

### Irreplaceability Analysis

The following is referenced from Goodman (2004): “The first product of the conservation planning analysis in C-Plan is an irreplaceability map of the planning area, in this case the province of KwaZulu-Natal. This map is divided into grid cells called ‘Planning Units’.

Each planning unit has associated with it an ‘Irreplaceability Value’, which is a reflection of the planning units’ importance with respect to the conservation of biodiversity. Irreplaceability reflects the planning unit’s ability to meet set ‘targets’ for selected biodiversity ‘features’. The irreplaceability value is scaled between 0 and 1.

**Irreplaceability value – 0.** Where a planning unit has an irreplaceability value of 0, all biodiversity features recorded here are conserved to the target amount, and there is unlikely to be a biodiversity concern with the development of the site. This of course will be subject to ground truthing to determine the biodiversity features at a finer scale.

**Irreplaceability value – 1.** These planning units are referred to as totally irreplaceable and the conservation of the features within them is critical to meet conservation targets. (EIA very definitely required and depending on the nature of the proposal authorisation is unlikely to be granted).

**Irreplaceability value > 0 but < 1.** Some of these planning units are still required to meet biodiversity conservation targets. If the value is high (e.g. 0.9) then most units are required (few options available for alternative choices). If the value is low, then many options are available for meeting the biodiversity targets. (EIA required and depending on the nature of the proposed development, permission could be granted).”

The irreplaceability units have been optimised further to create various subcategories called *Critical Biodiversity Areas* and *Ecological Support Areas* (*Ezemvelo KZN Wildlife*, 2014).

### Critical Biodiversity Areas

The Critical Biodiversity Areas (CBAs) can be divided into two subcategories, namely *Irreplaceable* and *Optimal*. Each of these can in turn be subdivided into additional subcategories (**Table 12**).

The CBA categories are based on the optimised outputs derived using systematic conservation planning software, with the Planning Units (PU) identified representing the localities for which the conservation targets for one or more of the biodiversity features contained within can be achieved.

The distribution of the biodiversity features is not always applicable to the entire extent of the PU, but is more often than not confined to a specific niche habitat e.g. a forest or wetland reflected as a portion of the PU in question. In such cases, development could be considered within the PU if special mitigation measures are put in place to safeguard this feature(s) and if the nature of the development is commensurate with the conservation objectives. Obviously this is dependent on a site by site, case by case, basis.

Using C-Plan, these areas are identified through the MINSET analysis process and reflect the negotiable sites with an Irreplaceability score of less than 0.8. Within the C-Plan MINSET analysis this does not mean they are of a lower biodiversity value however, only that there are more alternate options



available within which the features located within can be met. The determination of the spatial locality of these PU's is driven primarily by the Decision Support Layers.

**Table 12. Summary of CBA Categories (from *Ezemvelo* KZN Wildlife, Biodiversity Spatial Planning Terms).**

Category	C-Plan	MARXAN (statistical modelling package)	Expert Input/ Desktop	Biodiversity Sector and Regional Plans
CBA: Irreplaceable (SCA)	Irreplaceability = 1	No equivalent		CBA: Irreplaceable
CBA: High Irreplaceable (SCA)	Irreplaceability Score >= 0.8 and <1.0	Selection frequency value = 80% –100%		CBA: Irreplaceable
CBA: Irreplaceable Expert Input			Expert input	CBA: Irreplaceable
CBA: Irreplaceable Linkage			Desktop and expert input	CBA: Irreplaceable
CBA: Optimal (SCA)	Irreplaceability Score > 0 and < 0.8	“Best” solution from MARXAN runs less the identified CBA High Irreplaceability areas		CBA: Optimal
CBA: Optimal, High Degradation	Irreplaceability Score > 0 and < 0.8	“Best” solution from MARXAN runs less the identified CBA High Irreplaceability areas	Field Assessment	CBA: Optimal
CBA: Optimal Low Degradation	Irreplaceability Score > 0 and < 0.8	“Best” solution from MARXAN runs less the identified CBA High Irreplaceability areas	Field Assessment	CBA: Optimal
CBA: Optimal Expert Input			Expert input	CBA: Optimal

#### Ecological Support Areas

Ecological Support Areas (ESAs) are required to support and sustain the ecological functioning of Critical Biodiversity Areas (CBAs). For terrestrial and aquatic environments, these areas are functional but are not necessarily pristine natural areas. They are however, required to ensure the persistence and maintenance of biodiversity patterns and ecological processes within the CBAs, and contribute significantly to the maintenance of Ecological Infrastructure<sup>2</sup> (EI).

#### Landscape Corridors

A series of bio-geographic corridors were developed in KZN to facilitate evolutionary, ecological and climate change processes to create a linked landscape for the conservation of species in a fragmented landscape.

#### Local Corridors

Corridors were developed at a district scale to create fine scale links within the landscape that facilitate ecological processes and ensure persistence of critical biodiversity features.

### **BIO RESOURCE UNITS (BRU)**

A Bioresource Unit is a demarcated area in which the environmental conditions such as soil, vegetation, climate and, to a lesser degree, terrain form, are sufficiently similar to permit uniform recommendations of land use and farm practices to be made, to assess the magnitude of crop yields that can be achieved, to provide a framework in which an adaptive research programme can be carried out, and to enable land users to make correct decisions (Camp, 1998).

The environmental factors defined in a BRU should give an indication of habitat suitability for both plant and animal species. On the other hand, knowing the habitat requirements of any particular species, it should be possible to map locations suitable for such species. There are 590 BRUs in KwaZulu-Natal.

<sup>2</sup> A term referring to areas in the landscape which provide significant Ecosystem Services which contribute positively to the economy and human welfare. Examples include 'Flood mitigation' and 'Good Water Quality' (provided both by wetlands and well maintained water catchments). Ecological infrastructure is the stock of functioning ecosystems that provides a flow of essential system services to human communities – services such as the provision of fresh water, climate regulation and soil formation. Ecological infrastructure includes features such as healthy mountain catchments, rivers, wetlands, and nodes and corridors of natural grassland habitat which together form a network of interconnected structural elements within the landscape. If this ecological infrastructure is degraded or lost, the flow of ecosystem services will diminish and ecosystems will become vulnerable to shocks and disturbances, such as the impacts of climate change, unsustainable land use change and natural disasters like floods and droughts. It is important to note that when ecological infrastructure is degraded or fails, the direct monetary cost to society and government is often very high. Ecological infrastructure is, therefore, the nature-based equivalent of hard infrastructure, and is just as important for providing the vital services that underpin social development and economic activity.

## Environmental Potential Atlas

The following is referenced from the Department of Environmental Affairs and Tourism (2007): The Environmental Potential Atlas (ENPAT) developed from a single map of Gauteng to a complete spatial data set of the entire South Africa.

ENPAT was updated in July 2001 and is used by the National Department of Environmental Affairs and Tourism and various provincial environmental management departments as a decision-making tool in the process of environmental impact assessments. ENPAT includes the decision-making parameters such as: high-risk development category indications and potential impacts are linked to the 1:250 000 spatial databases on national and provincial level.

The main purpose of ENPAT is to proactively indicate potential conflicts between development proposals and critical or sensitive environments. ENPAT can also be used for development planning since it indicates the environment's potential for development.

ENPAT consists of two distinct, parallel sets of information: natural or environmental characteristics, and social-economic factors. The environmental character maps depict geology, land types, soils, vegetation, and hydrology. The socio-economic factors consist of land cover, cadastral aspects and infrastructure, land use and culture.

These two sets of information are combined and assessed in terms of their potential or latent environmental sensitivity. Sensitivity is assigned based on the ability of a resource to absorb change or impact. A value of **0** indicates a **low sensitivity** - thus a high ability to accept change and a value of **1** indicates a **high sensitivity**, or a low ability to accept change. Areas of low sensitivity are thus available or suitable for development.

## Mucina and Rutherford National Vegetation Types

Mucina and Rutherford (2006) present an up-to-date and comprehensive overview of the vegetation of South Africa and the two small neighbouring countries of Lesotho and eSwatini. This account is based on vegetation survey using appropriate tools of contemporary vegetation mapping and vegetation description. They aimed at drawing a new vegetation map that depicts the complexity and **macro-scale** ecology and reflects the level of knowledge of the vegetation of the region. This is an extensive account of the vegetation of a complex and biologically intriguing part of the world, offering not only insights into structure and dynamics of the vegetation cover, but containing a wealth of base-line data for further vegetation- ecological, biogeographical, and conservation-oriented studies. The map and the descriptive account of the vegetation of South Africa, Lesotho and Swaziland offers a powerful decision-making tool for conservationists, land and resource planners, and politicians as well as the interested public at large.

## KwaZulu – Natal Vegetation Types (KZN VT)

The KZN VT was created to provide an accurate representation of the **historical extent** of the vegetation types present in KZN with the most current available information. A key issue of concern is our current lack of knowledge regarding the historical extents of both our wetland and forest biomes. Almost all vegetation mapping conducted currently only displays the current extent of the feature in question. As such, no true understanding as to rates of loss and or minimum required habitat areas required to ensure persistence can be accurately determined. This issue further influences our understanding of the grassland/savannah/bushland matrix within which these features reside. The KZN VT map has undergone several changes since the publication of the Mucina and Rutherford (2006) national vegetation types.

Ezemvelo KZN Wildlife has, in association with various government departments, NGOs, Working Groups and Forums, municipalities and parastatals, refined the KZN VT to develop an accurate representation of the extent of the vegetation types present. As a result of the finer scale mapping and classification, KZN VT map has in some cases identified new vegetation types and or subtypes within the vegetation types identified at national level. These changes have been peer reviewed and adopted by the National Vegetation Committee, and have been incorporated into the revised South African Vegetation map.





## Appendix 9 Impact Methodology

### ENVIRONMENTAL IMPACT ASSESSMENT (EIA) METHODOLOGY

The Environmental Impact Assessment (EIA) Methodology assists in evaluating the overall effect of a proposed activity on the environment. Determining of the significance of an environmental impact on an environmental parameter is determined through a systematic analysis.

#### **Determination of Significance of Impacts**

Significance is determined through a synthesis of impact characteristics which include context and intensity of an impact. Context refers to the geographical scale (i.e. site, local, national or global), whereas intensity is defined by the severity of the impact e.g. the magnitude of deviation from background conditions, the size of the area affected, the duration of the impact and the overall probability of occurrence. Significance is calculated as shown in **Table 1**.

Significance is an indication of the importance of the impact in terms of both physical extent and time scale, and therefore indicates the level of mitigation required. The total number of points scored for each impact indicates the level of significance of the impact.

#### **Impact Rating System**

The impact assessment must take account of the nature, scale and duration of effects on the environment and whether such effects are positive (beneficial) or negative (detrimental). Each issue / impact is also assessed according to the various project stages, as follows:

- Planning;
- Construction;
- Operation; and
- Decommissioning.

Where necessary, the proposal for mitigation or optimisation of an impact should be detailed. A brief discussion of the impact and the rationale behind the assessment of its significance has also been included.

***The significance of Cumulative Impacts should also be rated (As per the Excel Spreadsheet Template).***

#### *Rating System Used to Classify Impacts*

The rating system is applied to the potential impact on the receiving environment and includes an objective evaluation of the possible mitigation of the impact. Impacts have been consolidated into one (1) rating. In assessing the significance of each issue the following criteria (including an allocated point system) is used:

**Table 13:** Rating of impacts criteria

<b>ENVIRONMENTAL PARAMETER</b>		
A brief description of the environmental aspect likely to be affected by the proposed activity (e.g. Surface Water).		
<b>ISSUE / IMPACT / ENVIRONMENTAL EFFECT / NATURE</b>		
Include a brief description of the impact of environmental parameter being assessed in the context of the project. This criterion includes a brief written statement of the environmental aspect being impacted upon by a particular action or activity (e.g. oil spill in surface water).		
<b>EXTENT (E)</b>		
This is defined as the area over which the impact will be expressed. Typically, the severity and significance of an impact have different scales and as such bracketing ranges are often required. This is often useful during the detailed assessment of a project in terms of further defining the determined.		
1	Site	The impact will only affect the site
2	Local/district	Will affect the local area or district
3	Province/region	Will affect the entire province or region
4	International and National	Will affect the entire country
<b>PROBABILITY (P)</b>		
This describes the chance of occurrence of an impact		
1	Unlikely	The chance of the impact occurring is extremely low (Less than a 25% chance of occurrence).
2	Possible	The impact may occur (Between a 25% to 50% chance of occurrence).
3	Probable	The impact will likely occur (Between a 50% to 75% chance of occurrence).
4	Definite	Impact will certainly occur (Greater than a 75% chance of occurrence).
<b>REVERSIBILITY (R)</b>		
This describes the degree to which an impact on an environmental parameter can be successfully reversed upon completion of the proposed activity.		
1	Completely reversible	The impact is reversible with implementation of minor mitigation measures
2	Partly reversible	The impact is partly reversible but more intense mitigation measures are required.
3	Barely reversible	The impact is unlikely to be reversed even with intense mitigation measures.
4	Irreversible	The impact is irreversible and no mitigation measures exist.
<b>IRREPLACEABLE LOSS OF RESOURCES (L)</b>		
This describes the degree to which resources will be irreplaceably lost as a result of a proposed activity.		
1	No loss of resource.	The impact will not result in the loss of any resources.
2	Marginal loss of resource	The impact will result in marginal loss of resources.
3	Significant loss of resources	The impact will result in significant loss of resources.
4	Complete loss of resources	The impact is result in a complete loss of all resources.
<b>DURATION (D)</b>		
This describes the duration of the impacts on the environmental parameter. Duration indicates the lifetime of the impact as a result of the proposed activity.		

1	Short term	The impact and its effects will either disappear with mitigation or will be mitigated through natural process in a span shorter than the construction phase (0 – 1 years), or the impact and its effects will last for the period of a relatively short construction period and a limited recovery time after construction, thereafter it will be entirely negated (0 – 2 years).
2	Medium term	The impact and its effects will continue or last for some time after the construction phase but will be mitigated by direct human action or by natural processes thereafter (2 – 10 years).
3	Long term	The impact and its effects will continue or last for the entire operational life of the development, but will be mitigated by direct human action or by natural processes thereafter (10 – 50 years).
4	Permanent	The only class of impact that will be non-transitory. Mitigation either by man or natural process will not occur in such a way or such a time span that the impact can be considered transient (Indefinite).

**INTENSITY / MAGNITUDE (I / M)**

Describes the severity of an impact (i.e. whether the impact has the ability to alter the functionality or quality of a system permanently or temporarily).

1	Low	Impact affects the quality, use and integrity of the system/component in a way that is barely perceptible.
2	Medium	Impact alters the quality, use and integrity of the system/component but system/ component still continues to function in a moderately modified way and maintains general integrity (some impact on integrity).
3	High	Impact affects the continued viability of the system/component and the quality, use, integrity and functionality of the system or component is severely impaired and may temporarily cease. High costs of rehabilitation and remediation.
4	Very high	Impact affects the continued viability of the system/component and the quality, use, integrity and functionality of the system or component permanently ceases and is irreversibly impaired (system collapse). Rehabilitation and remediation often impossible. If possible rehabilitation and remediation often unfeasible due to extremely high costs of rehabilitation and remediation.

**SIGNIFICANCE (S)**

Significance is determined through a synthesis of impact characteristics. Significance is an indication of the importance of the impact in terms of both physical extent and time scale, and therefore indicates the level of mitigation required. This describes the significance of the impact on the environmental parameter. The calculation of the significance of an impact uses the following formula:

**Significance = (Extent + probability + reversibility + irreplaceability + duration) x magnitude/intensity.**

The summation of the different criteria will produce a non-weighted value. By multiplying this value with the magnitude/intensity, the resultant value acquires a weighted characteristic which can be measured and assigned a significance rating.

Points	Impact Significance Rating	Description
5 to 23	Negative Low impact	The anticipated impact will have negligible negative effects and will require little to no mitigation.
5 to 23	Positive Low impact	The anticipated impact will have minor positive effects.
24 to 42	Negative Medium impact	The anticipated impact will have moderate negative effects and will require moderate mitigation measures.
24 to 42	Positive Medium impact	The anticipated impact will have moderate positive effects.
43 to 61	Negative High impact	The anticipated impact will have significant effects and will require significant mitigation measures to achieve an acceptable level of impact.
43 to 61	Positive High impact	The anticipated impact will have significant positive effects.
62 to 80	Negative Very high impact	The anticipated impact will have highly significant effects and are unlikely to be able to be mitigated adequately. These impacts could be considered "fatal flaws".
62 to 80	Positive Very high impact	The anticipated impact will have highly significant positive effects.